2.10.7 Buckling Analysis

2.10.7.1 Analysis of Cask Body for the 1-ft and 30-ft Drops. The buckling analysis of the cask body is performed in the steps described in Section 2.1.2.6.1, Cask Body Buckling. The cask body is evaluated as a Linear-Type Support as described in Section 6 of NUREG/CR-6322.

Step 1. Calculate cask body properties:

I = 14,793 in.^{4} = moment of inertia,

r = $\sqrt{I/A}$ = 10.21 in. = radius of gyration,

A = 141.85 in.^{2},

ℓ = 173.25 in. = length of cask,

k = 1.0 = effective length factor of cask,

b = 15.562 in. = width of cask wall (width of cask wall to start of radius at corners per AISC, B5.1),

t = 1.5 in. = thickness of cask wall,

$k\ell/r$ = 16.97 = slenderness ratio of cask acting as a column,

d = 27.324 in. = overall depth of cask cross section,

L = 173.25 in. = laterally unsupported length of cask,

M_1, M_2 = 0 = moments at ends of cask,

S_y = 47.0 ksi = cask yield stress at 200°F.

Step 2. Check whether cask is a compact or non-compact section and calculate the width ratio as shown in NF-3322.1(d)(1)), NF-3322.2(d)(2), and NUREG/CR-6322, Section 6.23. If the cask is shown to be a compact or non-compact section and the width-to-thickness ratio meets the criteria, then the individual compression elements (cask wall) are fully effective and will not buckle. Therefore, they do not need to be addressed separately.

(a) Compact section.

(1) width-to-thickness ratio,

$b/t \le 190/\sqrt{S_y}$, where

b/t = 15.562/1.5,

= 10.37, and

$190/\sqrt{S_y}$ = 27.7, therefore,

10.37 < 27.7.

(2) depth-to-thickness ratio,

$d/t \le (640/\sqrt{S_y})[1 - 3.74(f_a/S_y)]$ when $f_a/S_y \le 0.16$, or

$d/t \le 257/\sqrt{S_y}$ when $f_a/S_y > 0.16$.

Maximum $f_a/S_y > 0.16$, therefore,

d/t = 27.324/1.5

= 18.2, and

$257/\sqrt{S_y} = 37.5$,

18.2 < 37.5.

(3) laterally unsupported length

$L \leq [1950 + 1200(M_1/M_2)](b/S_y)$, where

$173.25 \leq [1950 + 1200(M_1/M_2)](15.562/47.0)$,

173.25 ≤ 645 in.; and

depth ≤ 6(b), where

27.324 ≤ 6(15.562),

27.324 < 93.37.

(b) non-compact section width ratio.

b/t ≤ $238/\sqrt{S_y}$, where

10.37 ≤ $238/\sqrt{47.0}$,

10.37 < 34.7.

The cask meets all the requirements for a compact section.

Step 3. Determine the axial compression allowables.

For normal conditions, calculate the allowable axial compression using the following from NUREG/CR-6322, 6.21(2):

$F_a = S_y [0.47 - (k\ell/r)/444]$ if $k\ell/r \leq 120$, or

$F_a = S_y [0.40 - (k\ell/r)/600]$ if $k\ell/r > 120$.

Since $(k\ell/r) = 16.97$, the allowable is based on the first equation.

$F_a = 47.0(0.47 - 16.97/444)$,

= 20.3 ksi.

For accident conditions, calculate the allowable axial compression as follows:

$0 \leq \lambda < 1$: $F_a = S_y [1 - (\lambda^2/4)]/[1.12(1.11 + 0.75\lambda + 0.83\lambda^2 - 0.81\lambda^3)]$, or

$1 \leq \lambda \leq \sqrt{2}$: $F_a = S_y [1 - (\lambda^2/4)]/(1.12 \times 1.88)$, or

$\lambda > \sqrt{2}$: $F_a = S_y/(1.12 \times 1.88 \times \lambda^2)$,

where

$\lambda = [\sqrt{(S_y/E)}] [(k\ell/r)/\pi]$,

$\lambda = [\sqrt{(47{,}000/27.6\times10^6)}]\,[16.97/\pi]$,

$= 0.223 < 1$; therefore,

$F_a = 47.0\,[1-(.223^2/4)]/[1.12(1.11+0.75(.223)+0.83(.223^2)-0.81(.223^3)]$

$= 31.65$ ksi.

Step 4. Determine the maximum axial stress in the cask body for normal and accident conditions and compare against the allowables defined in Step 3.

Normal conditions

The maximum 1-ft drop axial g-level is 14.9g for the end drop (Table 2.10.4-6) and the maximum impact force is 8.17×10^5 lb (Table 2.10.4-11). It is conservatively assumed that the stress is constant through the length of the cask. Thermal stresses are ignored because they are tensile. The contents and depleted uranium do not load the cask wall; therefore, the load on the wall is

$P = [817{,}000\text{ lb}\,(55{,}000\text{ lb} - 24{,}535\text{ lb} - 6{,}648\text{ lb})]/55{,}000\text{ lb}$,

$P = 353{,}790$ lb.

Therefore,

$f_a = P/A$,

$= 353{,}790/141.85$,

$= 2.50$ ksi,

D.M.$= (20.3/2.50) - 1$,

$= 7.12$.

Accident conditions

The maximum 30-ft drop axial g-level is 61g for the end drop (Table 2.10.4-6) and the maximum impact force is 3.36×10^6 lb (Table 2.10.4-2). It is conservatively assumed that the stress is constant through the length of the cask. Thermal stresses are ignored because they are tensile. The contents and depleted uranium do not load the cask wall; therefore, the load on the wall is

$P = [3{,}360{,}000\text{ lb}\,(55{,}000\text{ lb} - 24{,}535\text{ lb} - 6{,}648\text{ lb})]/55{,}000\text{ lb}$,

$P = 1{,}455{,}000$ lb.

Therefore,

$f_a = P/A$,

$= 1{,}455{,}000/141.85$,

$= 10.3$ ksi,

D.M.$= (31.65/10.3) - 1$,

$= 2.07$.

Step 5. Determine the bending allowables per NUREG/CR-6322. F_b is 0.66 S_y for normal conditions since the cask body was determined in Step 2a to be a compact section.

F_b = 0.66(47.0 ksi),

= 31.0 ksi.

For accident conditions, the allowable is f(S_y), where f is the shape factor. The shape factor is calculated using the following method:

f = Shape Factor = $Ay_1/(I/c)$,

= 1.22,

where

A = 141.85 $in.^2$ = Area of cask body cross section,

y_1 = 9.31 in. = Distance to centroid of half cross-sectional area of cask body,

c = 13.662 in. = Distance from neutral axis to extreme fiber of cross section, and

I = 14,793 $in.^4$ = Moment of Inertia of cask body cross section.

Therefore,

F_b = 1.22 (47.0 ksi),

= 57.34 ksi.

Step 6. Evaluate the cask body for combined axial compression and bending. The cask body shall satisfy the following equations, which are taken from NUREG/CR-6322, Sections 6.22 and 6.32.

Normal conditions

$f_a/F_a + C_m (f_b)/\{F_b [1 - (2.15f_a/F_e)]\} \leq 1$, and

$f_a/(0.6S_y) + f_b/F_b \leq 1$.

Accident conditions

$f_a/F_a + C_m (f_b)/\{F_b [1 - (1.46f_a/F_e)]\} \leq 1$, and

$f_a/(0.6S_y) + f_b/F_b \leq 1$,

where

F_a = allowable axial stress from the expressions given above in step 3,

F_e = Euler buckling stress,

= $\pi^2 E/(k\ell/r)^2$,

F_b = bending allowable stress from step 5 above,

f_a = axial stress from step 4 above,

f_b = Maximum bending stress. Either the maximum longitudinal bending stress due to longitudinal bending or the stress intensity at the location of maximum compression due to longitudinal bending and transverse bending, whichever is greater, shall be used, and

C_m = 0.85.

Table 2.10.7-1 summarizes the buckling analyses for the above equations for both normal and accident conditions and resulting design margins. The maximum bending stress is taken from Table 2.10.6-42 for stress point 3 (Fig. 2.10.2-1) for the 30-ft side drop with 47.7g. The stress for the 15.6g 1-ft side drop is scaled. The axial and bending stresses are then ratioed for all other drop orientations.

All design margins are positive.

2.10.7.2 Analysis of Cask Body for the 290 psi External Water Pressure Load per 10CFR71.61. The buckling analysis of the cask body for the 290 psi external water pressure is performed in the steps described in Section 2.1.2.6.2. The cask body walls are evaluated for axial compression and bending as described in Section 6 of NUREG/CR-6322.

Step 1. Calculate cask wall properties:

$I = (1/12)(1)(t^3) = .281$ in.^{4} = moment of inertia for 1 in. length of wall,

$r = \sqrt{I/A} = .433$ in. = radius of gyration,

$A = 1.5(1) = 1.5$ in.^{2},

$\ell = 24.324$ in. = inside length of cask wall,

$k = .65$ = effective length factor of cask wall (fixed-fixed),

$t = 1.5$ in. = thickness of cask wall,

$k\ell/r = 36.51$ = slenderness ratio of cask wall acting as a column,

$M_1 = M_2$ = moments at ends of cask, and

$S_y = 47.0$ ksi = cask yield stress at 200°F.

Step 3. Determine the axial compression allowables.

Using accident condition allowables, calculate the allowable axial compression as follows:

$0 \le \lambda < 1$: $F_a = S_y [1 - (\lambda^2/4)]/[1.12(1.11 + 0.75\lambda + 0.83\lambda^2 - 0.81\lambda^3)]$, or

$1 \le \lambda \le \sqrt{2}$: $F_a = S_y [1 - (\lambda^2/4)]/(1.12 \times 1.88)$, or

$\lambda > \sqrt{2}$: $F_a = S_y/(1.12 \times 1.88 \times \lambda^2)$,

where

$\lambda = [\sqrt{(S_y/E)}]\,[(k\ell/r)/\pi]$,

Table 2.10.7-1 Buckling for Combined Axial Compression and Bending - Cask Body

Drop Angle (deg)	Drop Height	G-Level Lateral	G-Level Axial	f_a (ksi)	f_b (ksi)	f_a/F_a	Factor of Safety (f')	f_b/F_b	$C_m f_b / ((1-(f')f_a/F_e)F_b)$	$f_a/0.6S_y + f_b/F_b$	Design Margin	$f_a/F_a + C_m f_b / ((1-(f')f_a/F_e)F_b)$	Design Margin
0	1-ft	15.6	0	0.0	14.6	0.00	2.15	0.47	0.40	0.47	1.12	0.40	1.50
	30-ft	47.7	0	0.0	44.5	0.00	1.46	0.78	0.66	0.78	0.29	0.66	0.52
15	1-ft	7.4	2	1.9	6.9	0.09	2.15	0.22	0.19	0.29	2.47	0.28	2.56
	30-ft	21.5	5.8	4.9	20.6	0.15	1.46	0.36	0.31	0.53	0.88	0.46	1.17
30	1-ft	4.7	2.7	1.8	4.4	0.09	2.15	0.14	0.12	0.21	3.84	0.21	3.74
	30-ft	21.4	12.3	5.5	20.5	0.17	1.46	0.36	0.31	0.55	0.81	0.48	1.08
45	1-ft	3.7	3.7	0.8	3.5	0.04	2.15	0.11	0.10	0.14	6.04	0.14	6.31
	30-ft	23.1	23.1	6.3	22.1	0.20	1.46	0.39	0.33	0.61	0.64	0.53	0.89
60	1-ft	6.5	11.2	2.8	6.1	0.14	2.15	0.20	0.17	0.30	2.37	0.31	2.25
	30-ft	21.8	37.8	7.0	20.9	0.22	1.46	0.36	0.31	0.61	0.63	0.54	0.87
75	1-ft	2.6	9.9	1.7	2.4	0.08	2.15	0.08	0.07	0.14	6.34	0.15	5.76
	30-ft	14.9	55.4	9.4	14.3	0.30	1.46	0.25	0.22	0.58	0.72	0.51	0.96
90	1-ft	0	14.9	2.5	0.0	0.12	2.15	0.00	0.00	0.09	10.28	0.12	7.12
	30-ft	0	61	10.3	0.0	0.33	1.46	0.00	0.00	0.37	1.74	0.33	2.07

$$\lambda = [\sqrt{(47{,}000/27.6\text{x}10^6)}\,][36.51/\pi],$$

$$= .48 < 1,$$

therefore,

$$F_a = 47.0\,[1 - (.48^2/4)]/[1.12(1.11 + 0.75(.48) + 0.83(.48^2) - 0.81(.48^3)],$$

$$= 25.16 \text{ ksi.}$$

Step 4. Determine the maximum membrane stress in the cask wall for the 290 psi external water pressure and compare against the allowables defined in Step 3.

From Section 2.4.6 the membrane stress in the wall is –2.64 ksi, therefore,

$$\text{D.M.} = (25.16/2.64) - 1,$$

$$= 8.5.$$

Step 5. Determine the bending allowables per NUREG/CR-6322.

For accident conditions, the allowable is $f(S_y)$, where f is the shape factor. The shape factor is 1.5 for a rectangular section.

Therefore,

$$F_b = 1.5\ (47.\ \text{ksi}),$$

$$= 70.5 \text{ ksi.}$$

Step 6. Evaluate the cask wall for combined axial compression and bending. The cask wall is evaluated using the following equations, which are taken from NUREG/CR-6322, Section 6.32.

$$f_a/F_a + C_m\,(f_b)/\{F_b\,[1 - (1.46f_a/F_e)]\} \le 1,$$

$$= 0.19 \le 1.$$

$$\text{D.M.} = (1.0/0.19) - 1,$$

$$= 4.14.$$

$$f_a/(0.6S_y) + f_b/F_b \le 1,$$

$$= 0.33 < 1.$$

$$\text{D.M.} = (1.0/.33) - 1,$$

$$= 2.06.$$

where

F_a = allowable axial stress from the expressions given above in step 3,

F_e = Euler buckling,

$= \pi^2 E/(k\ell/r)^2$,

= 204,355 psi,

F_b = bending allowable stress from step 5 above,

= 70.5 ksi,

f_a = axial stress from step 4 above,

= 2.64 ksi,

f_b = maximum bending stress,

= 15.62 ksi (Section 2.4.5, Table 2.4-5),

C_m = $0.6 - 0.4(M_1/M_2)$, but not less than 0.4,

= $0.6 - 0.4(1)$,

= 0.2, therefore use 0.4.

As shown, the minimum design margin is 2.06.

2.10.7.3 Analysis of Cavity Liner and FSS. The buckling analysis of the cavity liner and FSS is performed in the steps described in Section 2.1.2.6.3, Cask Liner and FSS Buckling Criteria. The stability criteria defined in this section follow those for a Linear-Type Support as described in Section 6 of NUREG/CR-6322. Following is the analysis of the cavity liner and FSS:

Step 1. Calculate the following properties of the cavity liner and FSS:

I = 1,597 $in.^4$ = moment of inertia of liner box structure (FSS ignored),

I_L = 0.0044 $in.^4$ = moment of inertia of liner leg,

I_{FSS} = 0.006692 $in.^4$ = moment of inertia of FSS leg,

r = $\sqrt{I/A}$ = 7.57 in. = radius of gyration of liner box structure,

r_L = $\sqrt{I_L/A_L}$ = 0.108 in.,

r_{FSS} = $\sqrt{I_{FSS}/A_{FSS}}$ = 0.225 in.,

A = 27.88 $in.^2$ = area of liner (FSS ignored),

A_L = .375 $in.^2$ = area of 1 in. length of liner leg,

A_{FSS} = .132 $in.^2$ = area of 1 in. length of FSS leg,

ℓ = 167.25 in. = length of cask,

ℓ_L = 8.775 in. = length of liner leg,

ℓ_{FSS} = 8.775 in. = length of FSS leg,

k = 1.0 = effective length factor of liner and FSS box structure,

k_L = 0.65 = effective length factor of liner leg,

k_{FSS} = 0.65 = effective length factor of FSS leg,

b = 8.775 in. = width of liner panel,

t = 0.375 in. = thickness of cavity liner wall,

$k\ell/r$ = 22.1 = slenderness ratio of cavity liner and FSS box structure acting as a column,

$k\ell_L/r_L$ = 52.8 = slenderness ratio of cavity liner leg as a column,

$k\ell_{FSS}/r_{FSS}$ = 25.4 = slenderness ratio of FSS leg as a column,

d = 8.775 in. = depth of cavity liner/FSS legs,

L = 167.25 in. = laterally unsupported length of cask,

M_1, M_2 = 0 = moments at ends of cavity liner and FSS, and

S_y = 46.2 ksi = cavity liner yield stress at 222°F,

= 43.6 ksi = FSS yield stress at 294°F.

Step 2. Check whether cavity liner and FSS structure is a compact or non-compact section and calculate the width ratio as shown in NF-3322.1(d)(1), NF-3322.2(d)(2), and NUREG/CR-6322, Section 6.23, respectively. If the cavity liner and FSS structure is shown to be a compact or non-compact section and the width-to-thickness ratio meets the criteria, then the individual compression elements (cavity liner and FSS structure wall elements) are fully effective and will not buckle. Therefore, they do not need to be addressed separately, except that the lower cavity liner and FSS legs are evaluated for combined axial compression and bending during a side drop.

(a) Compact section.

(1) width-to-thickness ratio,

$b/t \le 190/\sqrt{S_y}$, where

b/t = 8.775/0.375,

= 23.4, and

$190/\sqrt{S_y}$ = 28, therefore,

23.4 < 28.

(2) depth-to-thickness ratio,

$d/t \le (640/\sqrt{S_y})[1 - 3.74(f_a/S_y)]$ when $f_a/S_y \le 0.16$, or

$d/t \le 257/\sqrt{S_y}$ when $f_a/S_y > 0.16$.

Maximum $f_a/S_y > 0.16$, therefore,

d/t = 8.775/0.375,

= 23.4 (Liner),

d/t = 8.775/0.61,

= 14.38 (FSS), and

$257/\sqrt{S_y}$ = 37.8 (Liner),

= 38.9 (FSS), therefore,

23.4 < 37.8 (Liner),

$14.38 < 38.9$ (FSS).

(3) laterally unsupported length

$L \leq [1950 + 1200(M_1/M_2)](b/S_y)$, where

$167.25 \leq [1950 + 1200(M_1/M_2)](8.775/S_y)$,

$167.25 \leq 370$ in., and

$d \leq 6(b)$,

$8.775 \leq 6(8.775)$; therefore,

$8.775 \leq 52.7$.

(b) non-compact section width ratio.

$b/t \leq 238/\sqrt{S_y}$,

$23.4 < 35.0$.

The cavity liner and FSS meet all the requirements for a compact section.

Step 3. Determine the axial compression allowables.

For normal conditions, calculate the allowable axial compression using the following from NUREG/CR-6322, 6.21(2):

$F_a = S_y [0.47 - (k\ell/r)/444]$ if $k\ell/r \leq 120$, or

$F_a = S_y [0.40 - (k\ell/r)/600]$ if $k\ell/r > 120$.

Since $(k\ell/r) = 22.1$, the allowable is based on the first equation.

$F_a = S_y(0.47 - 22.1/444)$,

$= 19.4$ ksi (Liner), and

$= 18.33$ ksi (FSS).

For accident conditions, calculate the allowable axial compression as follows:

$0 \leq \lambda < 1$: $F_a = S_y [1 - (\lambda^2/4)]/[1.12(1.11 + 0.75\lambda + 0.83\lambda^2 - 0.81\lambda^3)]$, or

$1 \leq \lambda \leq \sqrt{2}$: $F_a = S_y [1 - (\lambda^2/4)]/(1.12 \times 1.88)$, or

$\lambda > \sqrt{2}$: $F_a = S_y/(1.12 \times 1.88 \times \lambda^2)$,

where

$\lambda = [\sqrt{(S_y / E)}] [(k\ell/r)/\pi]$,

$\lambda = [\sqrt{(46{,}200 / 27.6 \times 10^6)}] [22.1/\pi]$,

$= .293 \leq 1$; therefore,

$F_a = 46.2[1 - (.293^2/4)]/[1.12(1.11 + 0.75(.293) + 0.83(.293^2) - 0.81(.293^3)]$,

$= 29.2$ ksi.

Step 4. Determine the maximum axial stress in the cavity liner for normal and accident conditions and compare against the allowables defined in Step 3.

Normal conditions

The maximum 1-ft drop axial g-level is 14.9g for the end drop (Table 2.10.4-6) and the maximum impact force is 8.17×10^5 lb (Table 2.10.4-11). It is conservatively assumed that the stress is constant through the length of the cavity liner. Thermal stresses are added because they are compressive. The stress due to the impact load is due to the loading of FSS, cavity liner, closure (or bottom head) and impact limiter. The cask wall shares in resisting the loading of the closure and impact limiter.

Load resisted by liner and cask wall = P_{L+CW},

= 2647 lb (bottom head/flange) + 3925 lb (impact limiter),

= 6565 lb.

Load resisted by liner only = P_L = 1300 lb (liner) + 751 lb (FSS),

= 2051 lb,

f_a = $P_{L+CW}/A_{L+CW} + P_L/A_L$ + thermal stress,

= 3.1 ksi,

where

P_{L+CW} = (6565 lb/55,000 lb)(817,000 lb),

= 97,520 lb,

P_L = (2051 lb/55,000 lb)(817,000 lb),

= 30,467 lb,

A_L = 27.88 in.^{2},

A_{L+CW} = 27.88 in.^{2} + 141.85 in.^{2},

= 169.73 in.^{2}, and

thermal stress = 1.4 ksi (Section 2.6.1.3).

D.M. = (19.4/3.1) – 1,

= 5.3.

Accident conditions

The maximum 30-ft drop axial g-level is 61g for the end drop (Table 2.10.4-6) and the maximum impact force is 3.36×10^6 lb (Table 2.10.4-2). It is conservatively assumed that the stress is constant through the length of the cavity liner. Thermal stresses are added because they are compressive. The stress due to the impact load is due to the loading of FSS, cavity liner, closure (or bottom head) and impact limiter. The cask wall shares in resisting the loading of the closure and impact limiter.

Load resisted by liner and cask wall = P_{L+CW},

= 2647 lb (bottom head/flange) + 3925 lb(impact limiter),

= 6565 lb.

Load resisted by liner only = P_L= 1300 lb (liner) + 751 lb (FSS),

= 2051 lb,

f_a = $P_{L+CW}/A_{L+CW} + P_L/A_L$ + thermal stress,

= 8.26 ksi,

where

P_{L+CW} = (6565 lb/55,000 lb)(3,360,000 lb),

= 401,062 lb,

P_L = (2051 lb/55,000 lb)(3,360,000 lb),

= 125,297 lb,

A_L = 27.88 $in.^2$,

A_{L+CW} = 27.88 $in.^2$ + 141.85 $in.^2$,

= 169.73 $in.^2$, and

thermal stress = 1.4 ksi (Section 2.6.1).

D.M. = (29.2/8.26) – 1,

= 2.54.

Step 5. Determine the bending allowables per NUREG/CR-6322. F_b is 0.66 S_y for normal conditions since the cask body was determined in Step 2a to be a compact section.

F_b = 0.66(46.2 ksi),

= 30.5 ksi.

For accident conditions, the allowable is f(S_y), where f is the shape factor. The shape factor is calculated using the following method:

f = Shape Factor = $Ay_1/(I/c)$,

= 1.15,

where

A_L = 27.88 $in.^2$ = area of cavity liner cross section,

y_1 = 6.95 in. = distance to centroid of half cross sectional area of cavity liner,

c = 9.456 in. = distance from neutral axis to extreme fiber of cross section, and

I = 1,597 $in.^4$ = Moment of Inertia of cavity liner cross section.

Therefore,

F_b = 1.15 (46.2 ksi) ,

= 53.1 ksi.

Step 6. Evaluate the cavity liner and FSS for combined axial compression and bending. The cavity liner and FSS shall satisfy the following equations, which are taken from NUREG/CR-6322, Sections 6.22 and 6.32.

Normal conditions

$f_a/F_a + C_m (f_b)/\{F_b [1 - (2.15f_a/F_e)]\} \leq 1$, or

$f_a/(0.6S_y) + f_b/F_b \leq 1$.

Accident conditions

$f_a/F_a + C_m (f_b)/\{F_b [1 - (1.46f_a/F_e)]\} \leq 1$, or

$f_a/(0.6S_y) + f_b/F_b \leq 1$,

where

F_a = allowable axial stress from the expressions given above in step 3,

F_e = Euler buckling stress,

= $\pi^2 E/(k\ell/r)^2$,

F_b = bending allowable stress from step 5 above,

f_a = axial stress from step 4 above,

f_b = Maximum bending stress. Either the maximum longitudinal bending stress due to longitudinal bending or the stress intensity at the location of maximum compression due to longitudinal bending and transverse bending, whichever is greater, shall be used, and

C_m = 0.85.

Tables 2.10.7-2 and 2.10.7-3 summarize the buckling analyses for the above equations for both normal and accident conditions and resulting design margins for the flat and corner orientations, respectively. The references for the maximum bending stresses are identified in Tables 2.10.7-2 and 2.10.7-3 for the maximum side drop (0° angle) g-level of 15.6 for normal conditions and 47.7 for accident conditions. The axial and bending stresses are then ratioed for all other drop orientations. All the design margins are positive.

Step 7. Evaluate the lower legs of the cavity liner and FSS due to a 1-ft and 30-ft side drop for combined axial compression and bending. The legs are loaded perpendicular to the cask axis from the inertial loading of the DU and contents and laterally from the same loading when the cask impacts in an angular orientation around its axis other than flat. The axial tension due to longitudinal bending of the cask is conservatively ignored. The stresses shall satisfy the following equations, which are taken from NUREG/CR-6322, Sections 6.22 and 6.32.

Normal conditions

$f_a/F_a + C_m (f_b)/\{F_b [1 - (2.15f_a/F_e)]\} \leq 1$, or

$f_a/(0.6S_y) + f_b/F_b \leq 1$.

Table 2.10.7-2 Buckling for Combined Axial Compression and Bending - Liner and FSS - Flat Orientation

Drop Angle (deg)	Drop Height	G-Level Lateral	G-Level Axial	f_a (ksi)	f_b[(a)] (ksi)	f_a/F_a	Factor of Safety (f')	f_b/F_b	$C_m f_b/((1-(f')f_a/F_e)F_b)$	$f_a/0.6S_y+f_b/F_b$	Design Margin	$f_a/F_a+C_m f_b/((1-(f')f_a/F_e)F_b)$	Design Margin
0	1-ft	15.6	0	1.4	9.9	0.1	2.15	0.33	0.28	0.38	1.66	0.35	1.85
	30-ft	47.7	0	1.4	30.4	0	1.46	0.57	0.49	0.62	0.61	0.54	0.86
15	1-ft	7.4	2	1.6	4.7	0.1	2.15	0.15	0.13	0.21	3.70	0.22	3.62
	30-ft	21.5	5.8	2.1	13.7	0.1	1.46	0.26	0.22	0.33	2.02	0.29	2.44
30	1-ft	4.7	2.7	1.7	3.0	0.1	2.15	0.10	0.08	0.16	5.30	0.17	4.81
	30-ft	21.4	12	2.8	13.7	0.1	1.46	0.26	0.22	0.36	1.81	0.32	2.17
45	1-ft	3.7	3.7	1.8	2.4	0.1	2.15	0.08	0.07	0.14	6.05	0.16	5.25
	30-ft	23.1	23	4.0	14.7	0.1	1.46	0.28	0.24	0.42	1.38	0.38	1.66
60	1-ft	6.5	11	2.7	4.1	0.1	2.15	0.14	0.12	0.23	3.33	0.25	2.93
	30-ft	21.8	38	5.7	13.9	0.2	1.46	0.26	0.23	0.46	1.16	0.42	1.38
75	1-ft	2.6	9.9	2.5	1.7	0.1	2.15	0.05	0.05	0.14	5.94	0.18	4.65
	30-ft	14.9	55	7.6	9.5	0.3	1.46	0.18	0.16	0.45	1.23	0.42	1.41
90	1-ft	0	15	3.1	0.0	0.2	2.15	0.00	0.00	0.11	8.10	0.16	5.26
	30-ft	0	61	8.3	0.0	0.3	1.46	0.00	0.00	0.29	2.41	0.28	2.54

(a) Stress intensity at stress point 4 (inside) at section E from Table 2.10.9-28 for 1-ft drop and Table 2.10.9-42 for 30-ft drop.

Table 2.10.7-3 Buckling for Combined Axial Compression and Bending - Liner and FSS - Corner Orientation

Drop Angle (deg)	Drop Height	G-Level Lateral	G-Level Axial	f_a (ksi)	f_b[a] (ksi)	f_a/F_a	Factor of Safety (f')	f_b/F_b	$C_m f_b/((1-(f')f_a/F_e)F_b)$	$f_a/0.6S_y+f_b/F_b$	Design Margin	$f_a/F_a+C_m f_b/((1-(f')f_a/F_e)F_b)$	Design Margin
0	1-ft	15.6	0	1.4	13.8	0.07	2.15	0.45	0.39	0.50	0.99	0.46	1.18
	30-ft	47.7	0	1.4	42.3	0.05	1.46	0.80	0.68	0.85	0.18	0.73	0.37
15	1-ft	7.4	2	1.6	6.6	0.08	2.15	0.21	0.18	0.27	2.66	0.27	2.74
	30-ft	21.5	5.8	2.1	16.3	0.07	1.46	0.31	0.26	0.38	1.62	0.33	2.00
30	1-ft	4.7	2.7	1.7	4.2	0.09	2.15	0.14	0.12	0.20	4.05	0.20	3.88
	30-ft	21.4	12.3	2.8	16.3	0.1	1.46	0.31	0.26	0.41	1.46	0.36	1.80
45	1-ft	3.7	3.7	1.8	3.3	0.09	2.15	0.11	0.09	0.17	4.78	0.19	4.39
	30-ft	23.1	23.1	4.0	17.6	0.14	1.46	0.33	0.28	0.47	1.11	0.42	1.38
60	1-ft	6.5	11.2	2.7	5.8	0.14	2.15	0.19	0.16	0.29	2.51	0.30	2.33
	30-ft	21.8	37.8	5.7	16.6	0.19	1.46	0.31	0.27	0.52	0.94	0.46	1.16
75	1-ft	2.6	9.9	2.5	2.3	0.13	2.15	0.08	0.06	0.17	5.00	0.20	4.12
	30-ft	14.9	55.4	7.6	11.3	0.26	1.46	0.21	0.18	0.49	1.05	0.45	1.25
90	1-ft	0	14.9	3.1	0.0	0.16	2.15	0.00	0.00	0.11	7.94	0.16	5.26
	30-ft	0	61	8.3	0.0	0.28	1.46	0.00	0.00	0.30	2.36	0.28	2.54

(a) Stress intensity at stress point 3 (inside) at section E from Table 2.10.9-34 for 1-ft drop and Table 2.10.9-50 for 30-ft drop.

Accident conditions

$f_a/F_a + C_m (f_b)/\{F_b [1 - (1.46f_a/F_e)]\} \leq 1$, or

$f_a/(0.6S_y) + f_b/F_b \leq 1$,

where

F_a = allowable axial stress from the expressions given above in step 3 using the section properties of the liner and FSS legs,

= $S_y(0.47 - (k\ell/r)/444$ (normal),

= 16.22 ksi (cavity liner, normal),

= 18.0 ksi (FSS normal),

λ = $[\sqrt{(S_y/E)}\ [(k\ell/r)/\pi]$,

= 0.70 (cavity liner),

= 0.336 (FSS),

F_a = $S_y [1 - \lambda^2/4)]/[1.12(1.11 + 0.75\lambda + 0.83\lambda^2 - 0.81\lambda^3)]$ (accident, $0 \leq \lambda < 1$),

= 21.2 ksi (cavity liner, accident),

= 29.1 ksi (FSS, accident),

F_e = Euler buckling using the section properties of the liner and FSS leg,

= $\pi^2 E/(k\ell/r)^2$,

= 97.61 ksi (cavity liner),

= 422.26 ksi (FSS),

F_b = allowable bending stress for normal conditions, as follows:

= $.66S_y$ = 30.5 ksi (cavity liner, normal),

= $.66S_y$ = 28.8 ksi (FSS, normal),

F_b = $f\ S_y$ for accident conditions where,

f = $Ay_1/(1/c)$ = 1.5 (cavity liner)

f = 1.29 (FSS)

F_b = 69.3 ksi (cavity liner, accident),

= 59.6 ksi (FSS, accident),

f_a = Membrane stress in cavity liner and FSS in direction of impact,

f_b = Maximum bending stress; the maximum lateral bending stress due to lateral bending, and

C_m = $0.6 - 0.4(M_1/M_2)$, but not less than 0.4. M_1/M_2 is positive. Ratio of M_1 of M_2 varies from small value to 1.0; conservatively use C_m = 0.6.

Table 2.10.7-4 summarizes the buckling analyses for the above equations for both normal and accident conditions and resulting design margins for the flat and corner orientations. The references for the maximum stresses are identified in the table for the maximum side drop g-level of 15.6 for normal conditions and 47.7 for accident conditions. The analysis shows that the cavity liner and FSS legs will not buckle for the maximum loading during side drops.

2.10.7.4 Neutron Shield Outer Shell Assembly. The neutron shield outer shell is anchored to the cask body through the impact limiter support structure. Since the cask body is much stiffer than the outer shell, overall buckling is precluded by the buckling resistance of the cask body. However, the neutron shield shell has been shown in Section 2.10.11.4 to not buckle due to the maximum normal condition external pressure that occurs when the cask is put into a fuel storage pool. The requirements of ASME Code, Section III, Subsection NB, NB-3133.3 and 3133.5 are used.

2.10.7.5 Impact Limiter Support Structure Ribs. The impact limiter support structure ribs are subjected to beam column loading when the cask is subjected to the normal condition 1-ft and accident condition 30-ft drops. The buckling analysis is contained in Section 2.10.3.6. The beam column criteria defined in Section 2.1.2.6.1 for the cask body are used.

Table 2.10.7-4 Buckling for Combined Axial Compression and Bending - Liner and FSS Legs During Side Drop

Component	Drop Height	Load Case (a)	Stress point (b)	f_a (c)	f_b (c)	f_a/F_a	Factor of Safety (f')	f_b/F_b	$C_m(f_b)/((1-(f')f_a/F_e)F_b)$	$f_a/0.6S_y+f_b/F_b$	Design Margin	$f_a/F_a+C_m(f_b)/((1-(f')f_a/F_e)F_b)$	Design Margin
Liner	1-ft	nfe	9	0.85	10.3	0.05	2.15	0.34	0.21	0.37	1.71	0.26	2.89
	1-ft	nce	7	0.72	12.8	0.04	2.15	0.42	0.26	0.44	1.25	0.30	2.36
	30-ft	afe	9	2.6	31.5	0.12	1.46	0.45	0.28	0.55	0.82	0.41	1.46
	30-ft	ace	7	2.21	41.1	0.10	1.46	0.59	0.37	0.67	0.49	0.47	1.12
FSS	1-ft	nce	31	1.22	9.37	0.06	2.15	0.31	0.19	0.35	1.83	0.25	3.04
	30-ft	ace	31	3.66	28.4	0.13	1.46	0.48	0.29	0.62	0.62	0.42	1.41

(a) n = Normal conditions, f = Flat drop orientation, c = corner drop orientation,
e = Stress at section E through cask (See Fig. 2.10.9-3)
(b) Stress locations, see Fig. 2.10.9-4
(c) Stresses from Tables 2.10.9-28 (nfe), 2.10.9-34 (nce), 2.10.9-42 (afe), and 2.10.9-50 (ace).

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2.10.9 Cavity Liner and Fuel Support Structure Assembly Analysis

2.10.9.1 Introduction. The FSS and the cavity liner extend the length of the fuel cavity and are an integral weldment as shown in Fig. 2.10.9-1. The cavity liner is welded to the cask flange and bottom plate. The FSS and cavity liner are made of type XM-19 Stainless Steel. The FSS is 166.63 in. long. The holes drilled in the wall of the FSS shown in Fig. 2.10.9-2 contain non-structural B4C pellets.

The loading on the cavity liner/FSS assembly conservatively assumes that the DU is nonstructural (see Section 2.3 for DU material properties), except that it is assumed to transfer compressive loads. In the analysis, the weight of the DU directly above the cavity liner is supported by the latter. The loads from the cavity liner/FSS assembly are transferred to the cask body through the DU.

The FSS supports the fuel assemblies and non-fuel assembly hardware (NFAH). This section analyzes the fuel and NFAH loading as a uniformly distributed load along the length of the FSS. Section 2.10.10 presents the analysis of the FSS that assumes the fuel and NFAH load the FSS at concentrated points along its length (at the fuel support grid and end-plate locations). The concentrated load analysis is very conservative, especially for a 30-ft drop, during which the load tends to distribute along the FSS length.

The analyses were performed at impact orientations ranging from flat to corner in order to bound the stresses. The flat orientation is where the cask's flat side is parallel to the ground. The corner orientation is where a longitudinal edge of the cask, or corner, is oriented in the down position. Full and partial fuel assembly loadings were considered to determine the highest stress in the FSS/cavity liner assembly.

We analyzed the FSS/cavity liner assembly for normal, accident, and thermal loading conditions. The analyses include the effects of cask bending due to the 1-ft and 30-ft drops, the DU loading, the contents loading (fuel and NFAH), the maximum normal operating pressure (MNOP), lateral displacements (ovaling) of the cask wall's cross section, and thermal stresses due to differential thermal gradients throughout the cask. The loading conditions analyzed are described in Section 2.10.9.5.

The analysis is performed at three locations along the length of the cask (Sections B, D and E, Fig. 2.10.9-3) to account for the differences in g-level, FSS geometry, and drop orientation. The stress reporting points on the FSS/cavity liner are presented in Fig. 2.10.9-4.

The analyses were performed using strength of material calculations and an ANSYS frame analysis to predict the stresses. The ANSYS models represent the various loading conditions and cask axial locations. The models include both the cavity liner and the FSS.

All design margins for both the FSS and cavity liner are positive.

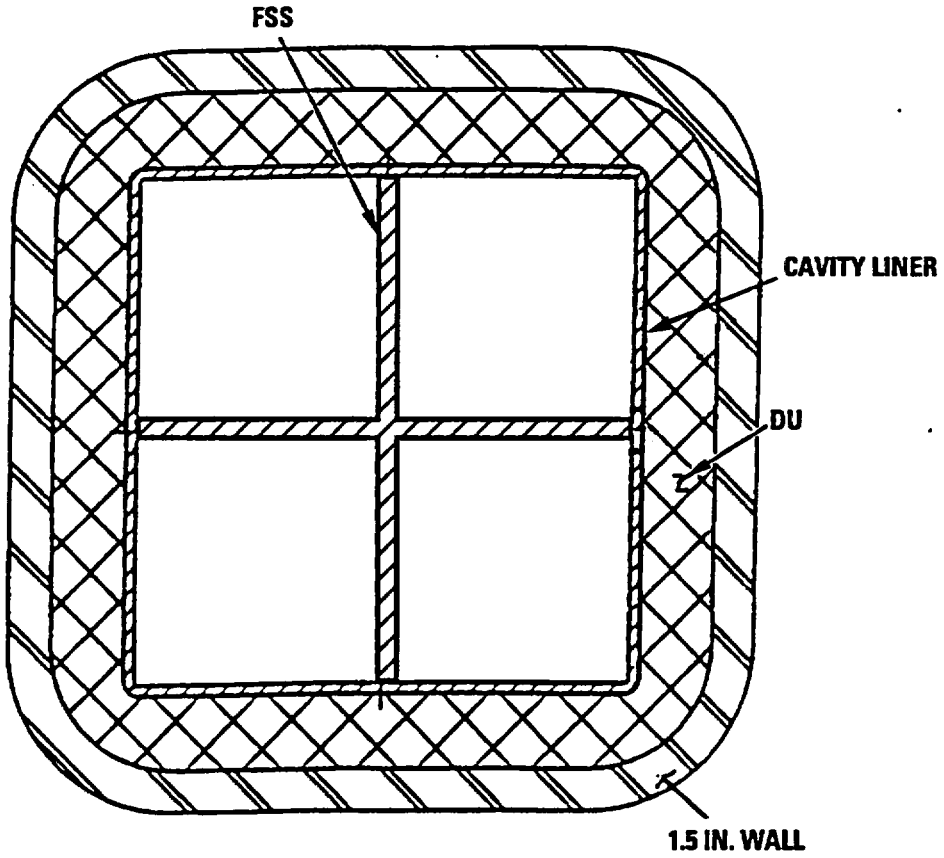

Fig. 2.10.9-1. GA-4 cask cross section showing cavity liner/FSS assembly

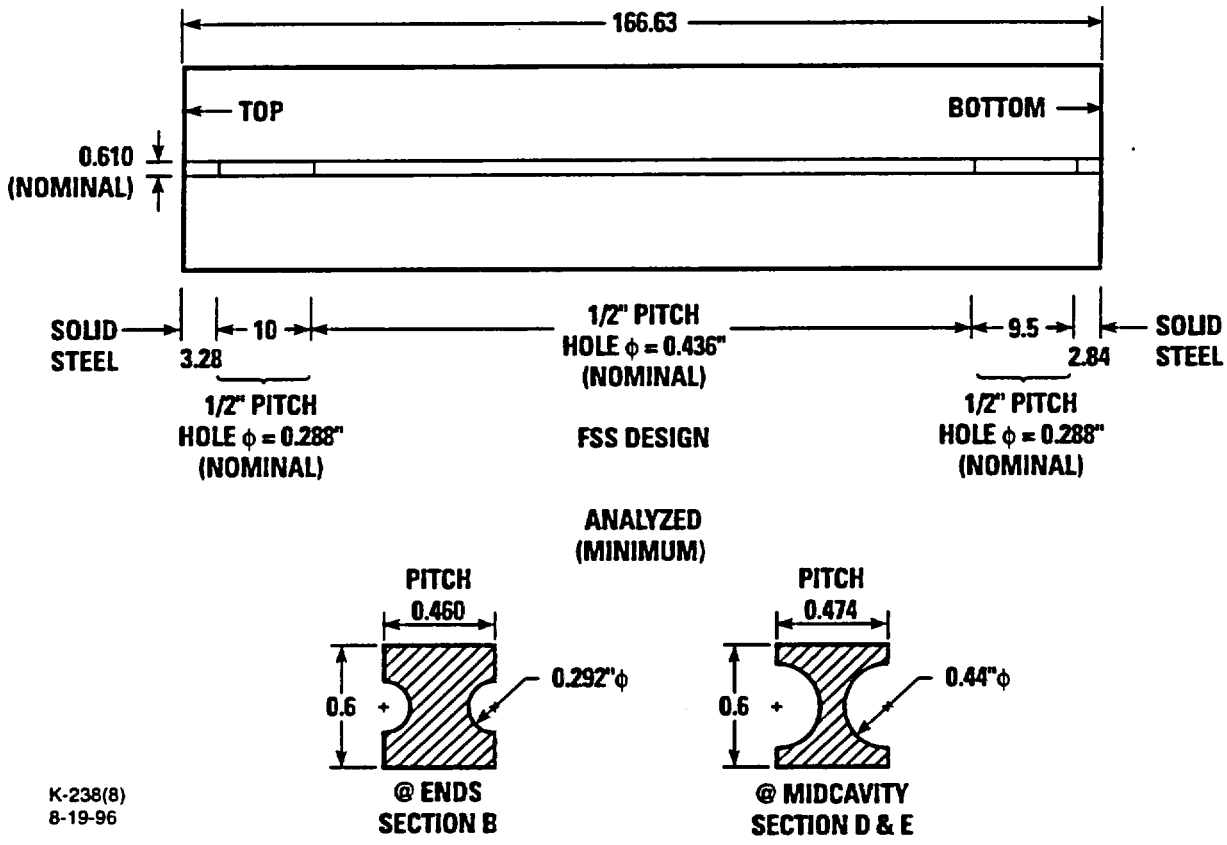

Fig. 2.10.9-2. GA-4 fuel support structure

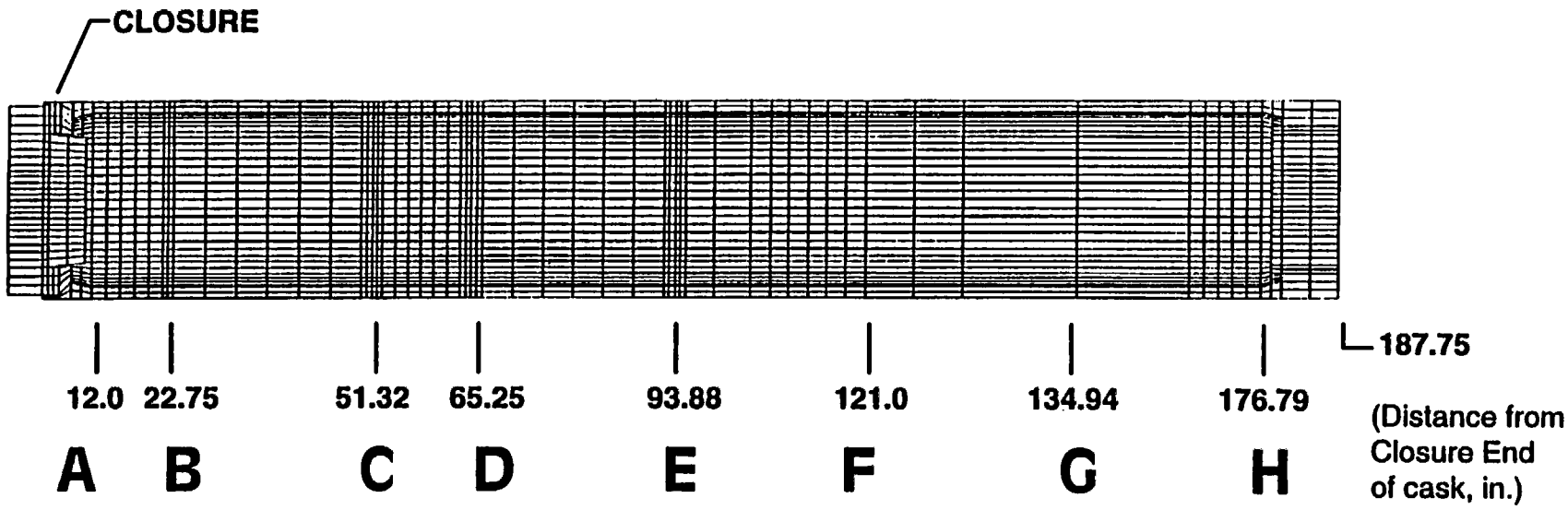

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Fig. 2.10.9-3. Sections for cavity liner stress point location and identification as shown on containment model

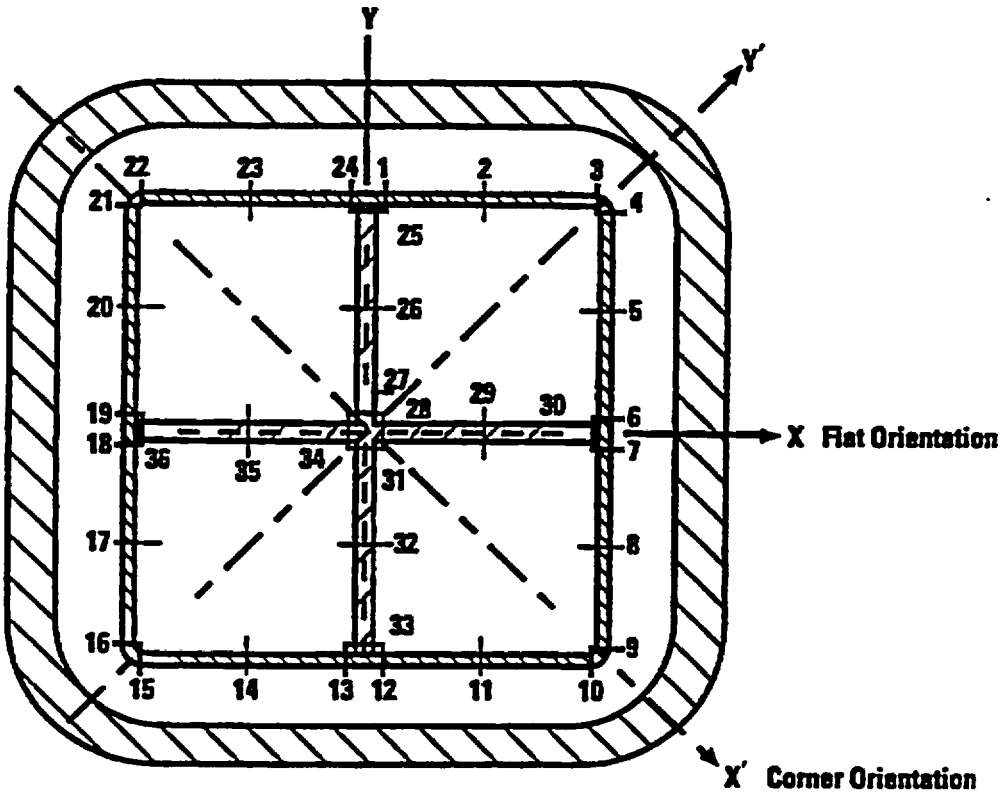

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Fig. 2.10.9-4. FSS/cavity liner stress reporting points

2.10.9.2 ANSYS Model. The ANSYS model used is a frame structure composed of beam elements. The ANSYS BEAM-3 2-D elastic beam element was used. The BEAM-3 element is a uniaxial element with tension, compression, and bending capabilities. The element has three degrees of freedom at each node, translation in the nodal x and y directions and rotation about the nodal z-axis.

The FSS/cavity liner cross-sectional dimensions are presented in Fig. 2.10.9-5. Two model orientations were used; flat orientation and corner orientation. The node and element identifications are the same for both models. The node identifications are presented in Figs. 2.10.9-6 and 2.10.9-7 for the flat and corner orientations, respectively. The stress reporting point element identification is presented in Fig. 2.10.9-8. The stress reporting points are the same for both the flat and corner orientations, with the only difference being a rotation in the coordinate system (as shown in Fig. 2.10.9-4). The stress reporting points and their corresponding nodes and elements are summarized in Table 2.10.9-1.

The model used 120 beam elements with 117 nodes. A unit thickness of 1 in. was used in the z (cask axial) direction.

The cavity liner section properties are

wall thickness = 0.375 in.,

section modulus, $I = bh^3/12 = (1)(.375)^3/12 = 0.0044$ in^4/axial in.

The FSS section properties are

wall thickness = 0.61 in. ± 0.01.

The minimum wall thickness was used for this analysis = 0.60 in.

Calculating the section moduli (see Fig. 2.10.9-2):

Section B:

$A_{pitch} = (.46)(.6) - (\pi/4)(.292)^2 = 0.209$ in^2/pitch,

$A_{in.} = (1/.46)(0.209) = 0.45$ in^2/axial in.,

$I_{pitch} = (.46)(.6)^3/12 - (\pi/64)(.292)^4 = 0.0079$ in^4/pitch, and

$I_{in.} = (1/.46)(.0079) = 0.017$ in^4/axial in.

Sections D and E:

$A_{pitch} = (.474)(.6) - (\pi/4)(.44)^2 = 0.132$ in^2/pitch,

$A_{in.} = (1/.474)(0.132) = 0.279$ in^2/axial in.,

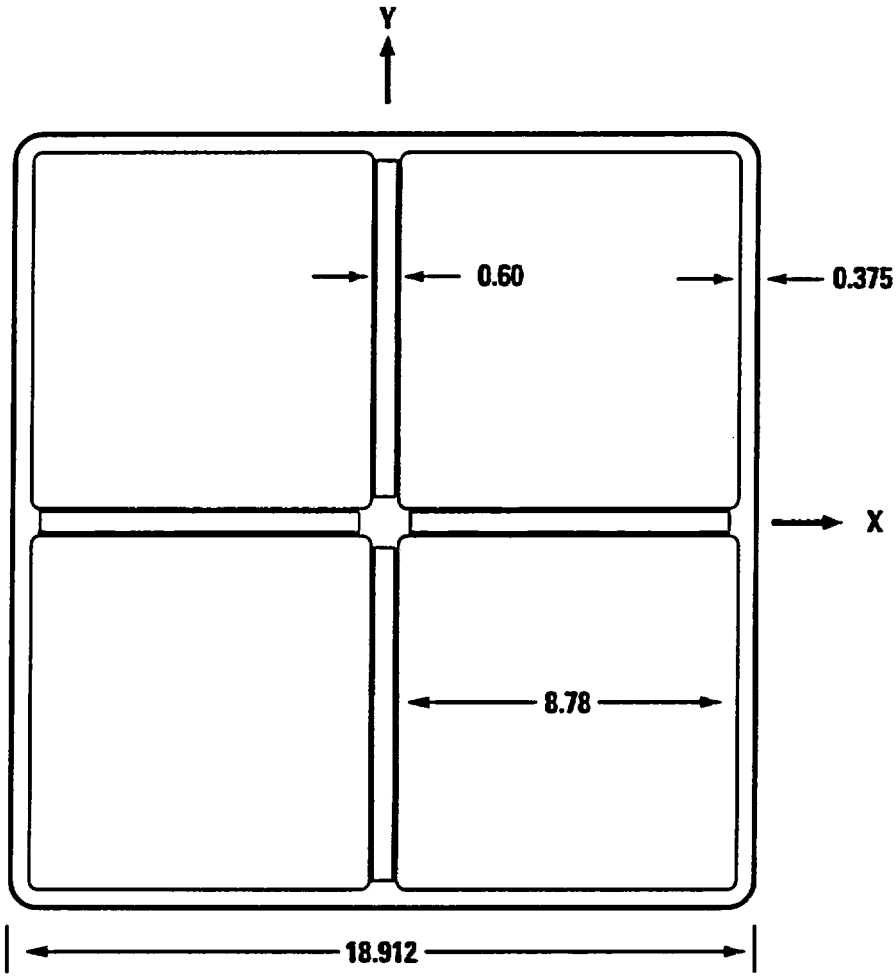

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Fig. 2.10.9-5. FSS/cavity liner dimensions

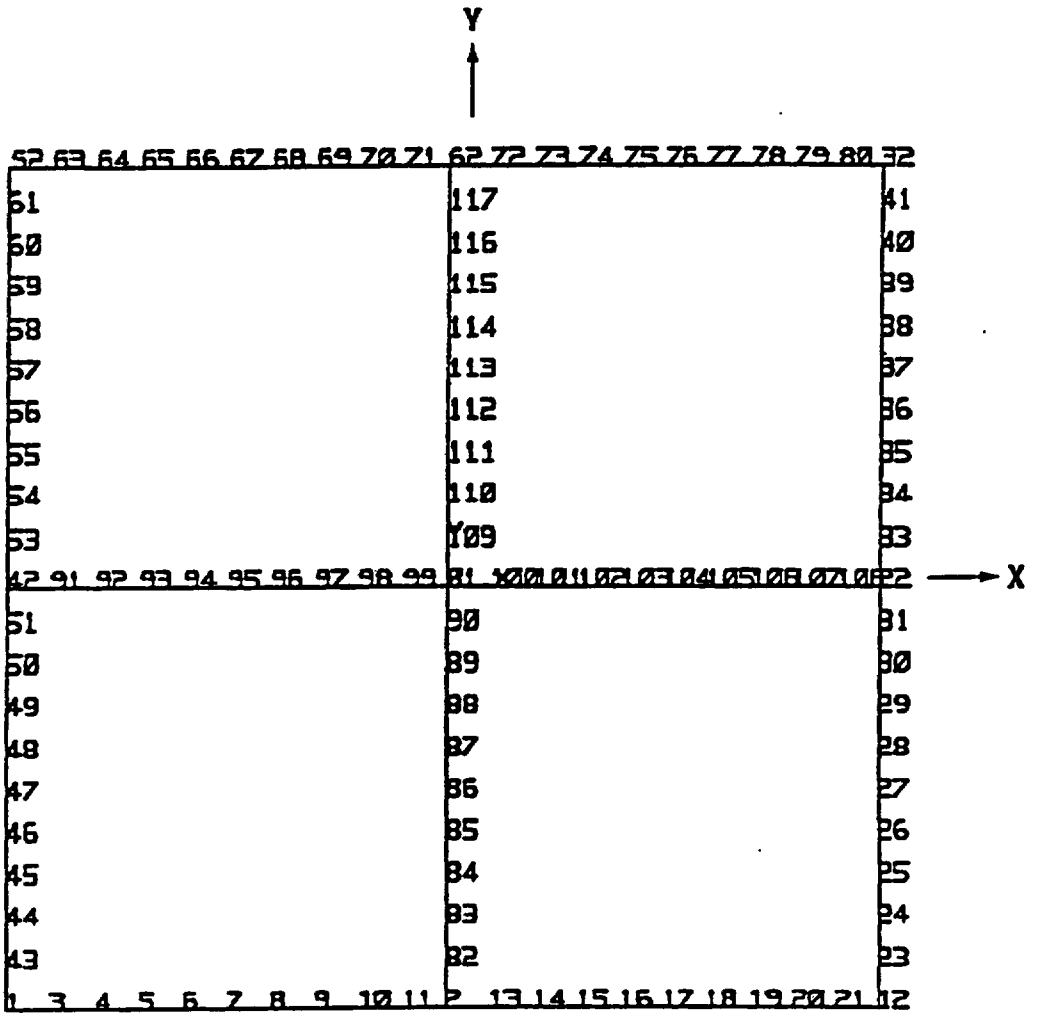

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Fig. 2.10.9-6. FSS/cavity liner frame analysis model node identification, flat orientation

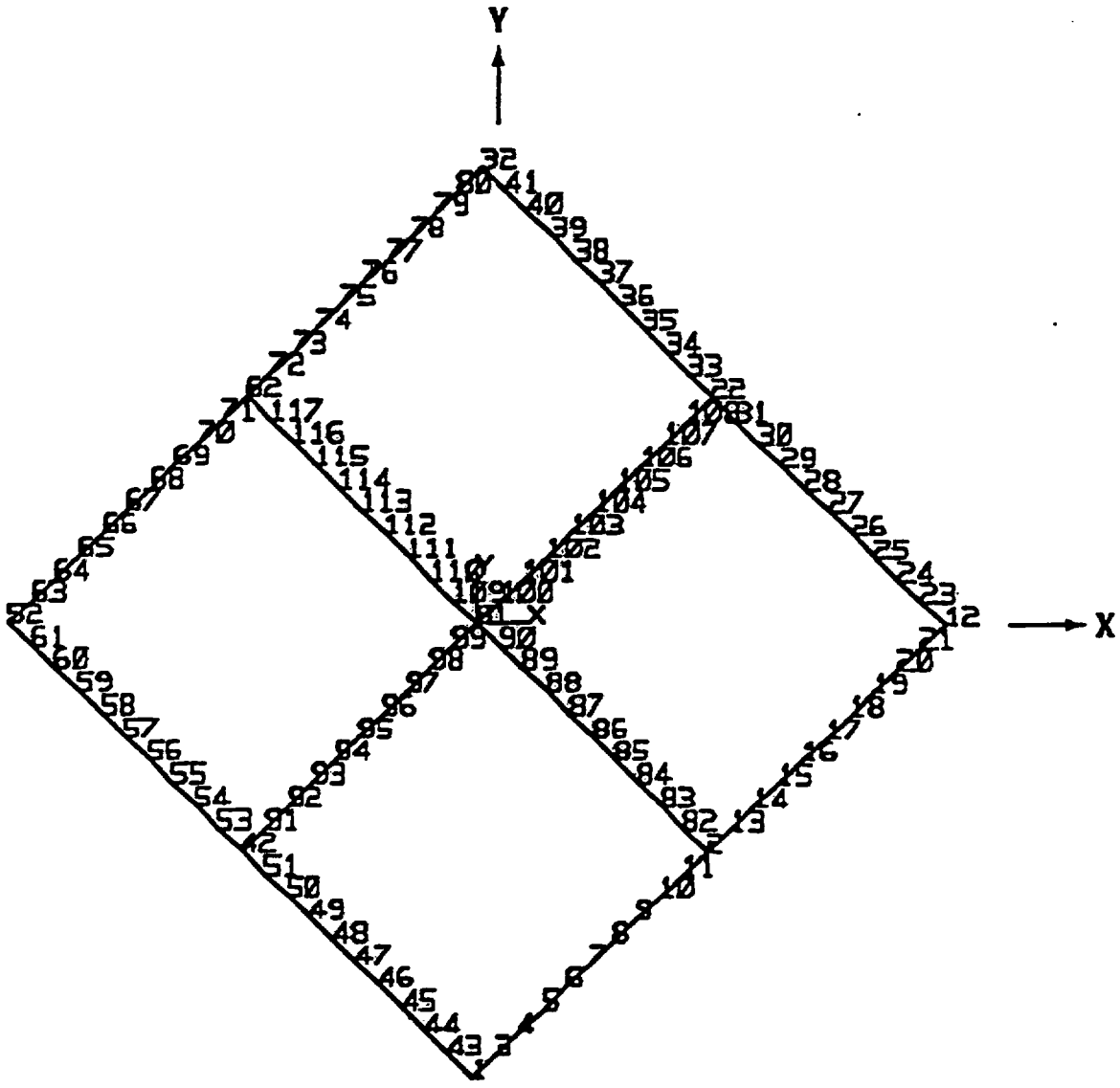

Fig. 2.10.9-7. FSS/cavity liner frame analysis model node identification, corner orientation

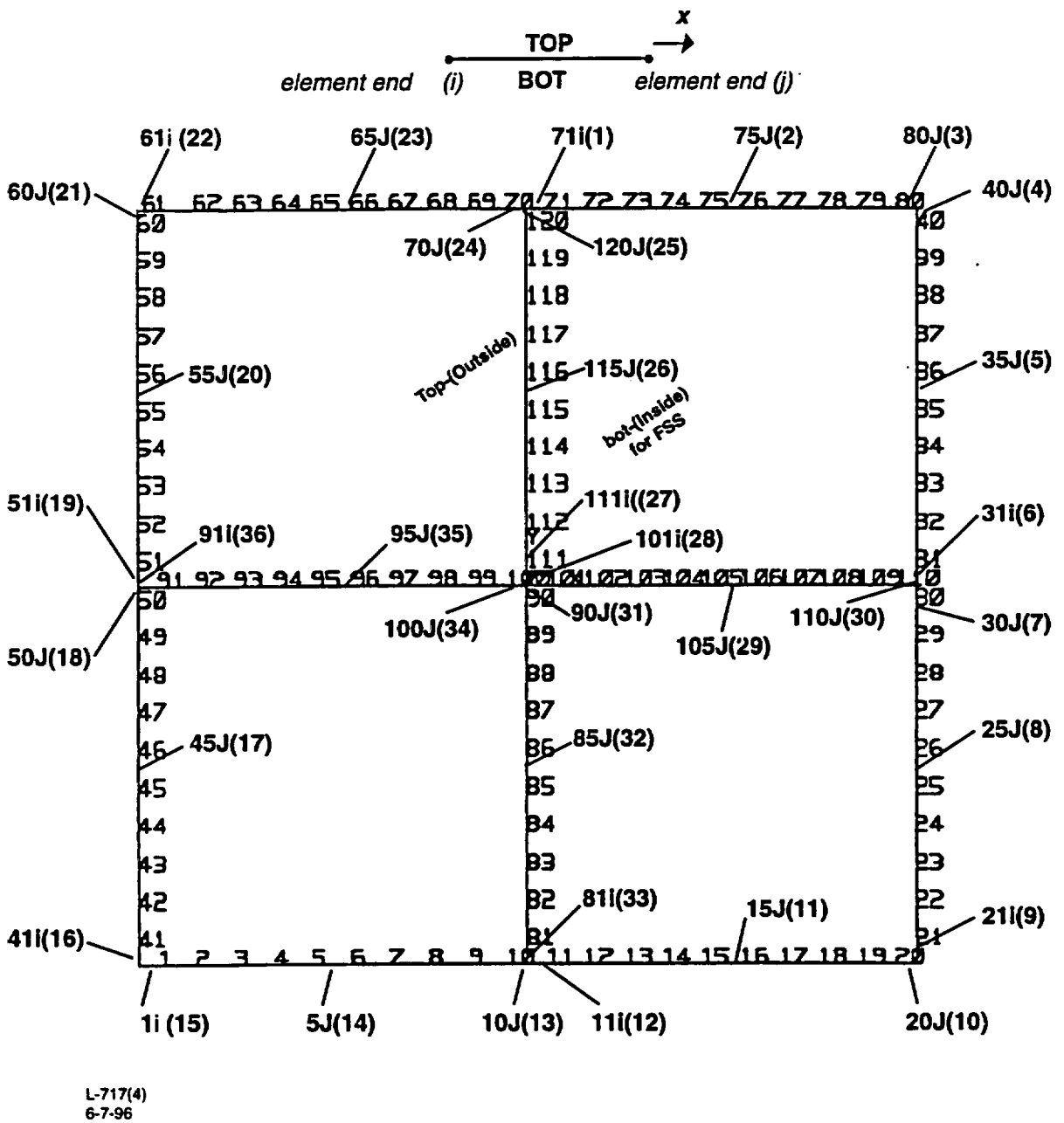

Fig. 2.10.9-8. FSS/cavity liner frame analysis model element identification/stress location, flat orientation (same for corner orientation)

TABLE 2.10.9-1
STRESS SUMMARY POINTS

Stress Point No.	Element No. and End (i or j)	Node No.
1	71i	62
2	75j	76
3	80j	32
4	40j	32
5	35j	37
6	31i	22
7	30j	22
8	25j	27
9	21i	12
10	20j	12
11	15j	17
12	11i	2
13	10j	2
14	5j	7
15	1i	1
16	41i	1
17	45j	47
18	50j	42
19	51i	42
20	55j	57
21	60j	52
22	61i	52
23	65j	67
24	70j	62
25	120j	62
26	115j	113
27	111i	81
28	101i	81
29	105j	104
30	110j	22
31	90j	81
32	85j	86
33	81i	2
34	100j	81
35	95j	95
36	91i	42

$I_{pitch} = (.474)(.6)^3/12 - (\pi/64)(.44)^4 = 0.0067$ in^4/pitch, and

$I_{in.} = (1/.474)(.0067) = 0.014$ in^4/axial in.

The temperature in the FSS/cavity liner cross section at various sections along the length is presented in Fig. 2.10.9-9. The corresponding Young's modulus and shear modulus values used in the frame model were:

	E_x/G_{xy}
Section B	
Cavity liner$_{175°F}$	27.7E6/10.65E6
FSS$_{215°F}$	27.51E6/10.58E6
Section D and E	
Cavity liner$_{225°F}$	27.45E6/10.56E6
FSS$_{295°F}$	27.03E6/10.4E6

2.10.9.3 Model Loading. The analyses include the out-of-plane cask bending due to the 1-ft and 30-ft drops, the DU and contents (fuel plus NFAH) loading, the maximum normal operating pressure (MNOP), lateral displacements (ovaling) of the cask wall cross section, and the thermal stress. Each loading type is discussed below:

2.10.9.3.1 Out-of-plane Cask Bending. The longitudinal (out-of-plane) bending of the cask during the 1-ft and 30-ft side drop and slapdown loading events was included in the total stress evaluation of the cavity liner/FSS. The 15° impact angle case produced the maximum moment in the cask for the slapdown (see Section 2.10.4). The maximum moment at the various sections along the length of the cask during a side and a slapdown drop are illustrated in Fig. 2.10.9-10. These moments were developed from the ANSYS cask analysis (Section 2.10.6) representing the maximum internal load distribution (4 fuel elements). These moments were also used conservatively for the three-fuel-element loading assumption. Sections B and E (Fig. 2.10.9-3) were used to represent the maximum stress condition for the side drop loading cases and Sections B and D were used for the 15° impact loading cases. The maximum moments used in the analyses are listed below.

Drop	Out-of-plane Moment, (10^6 in.-lb)	
Side Drop		
	Section B	Section E
1-ft	4.6	15
30-ft	14.2	46
15° Impact		
	Section B	Section D
1-ft (primary)	3.3	7.9
30-ft (secondary)	11.8	28

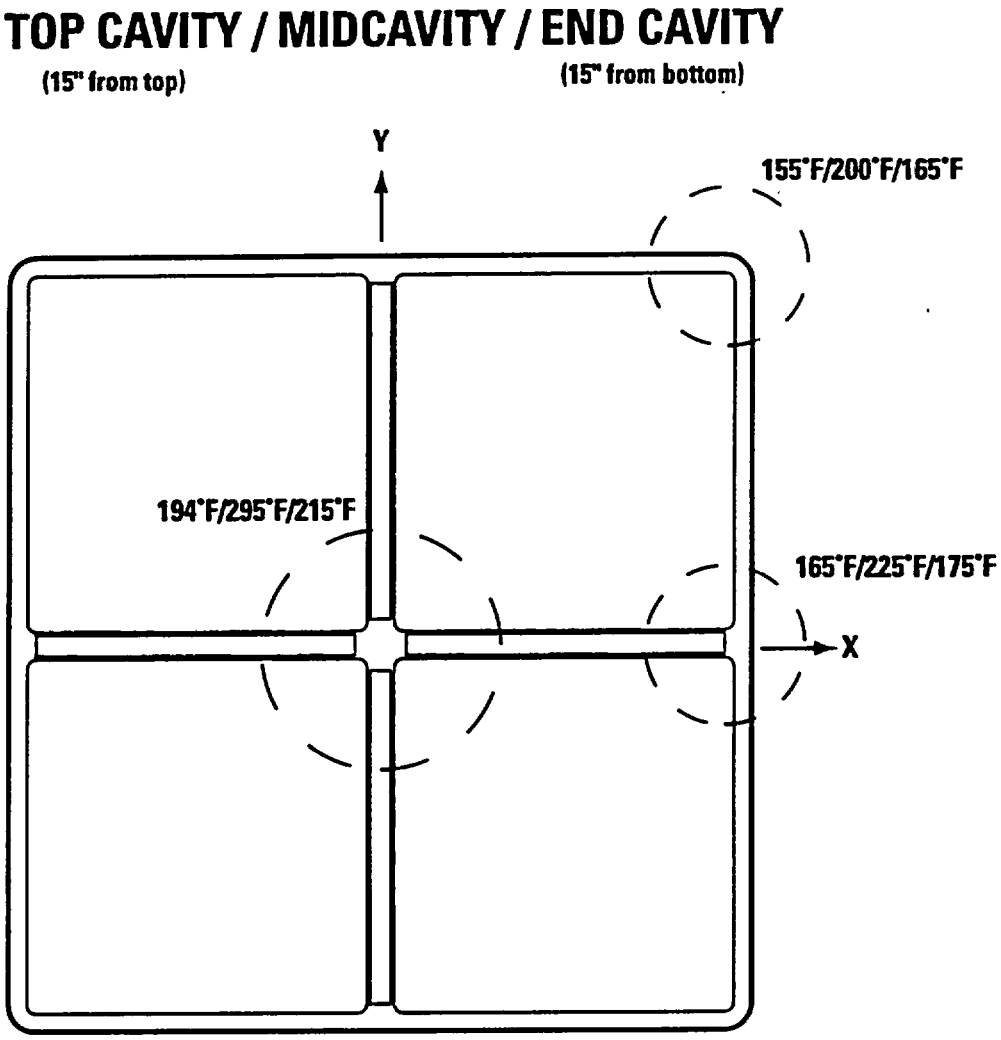

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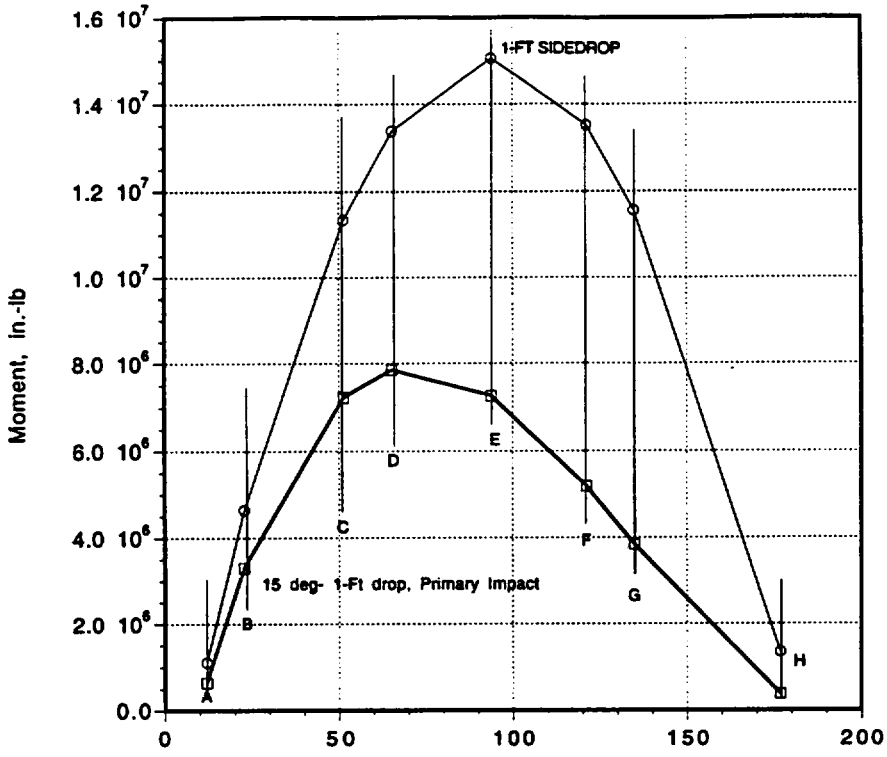
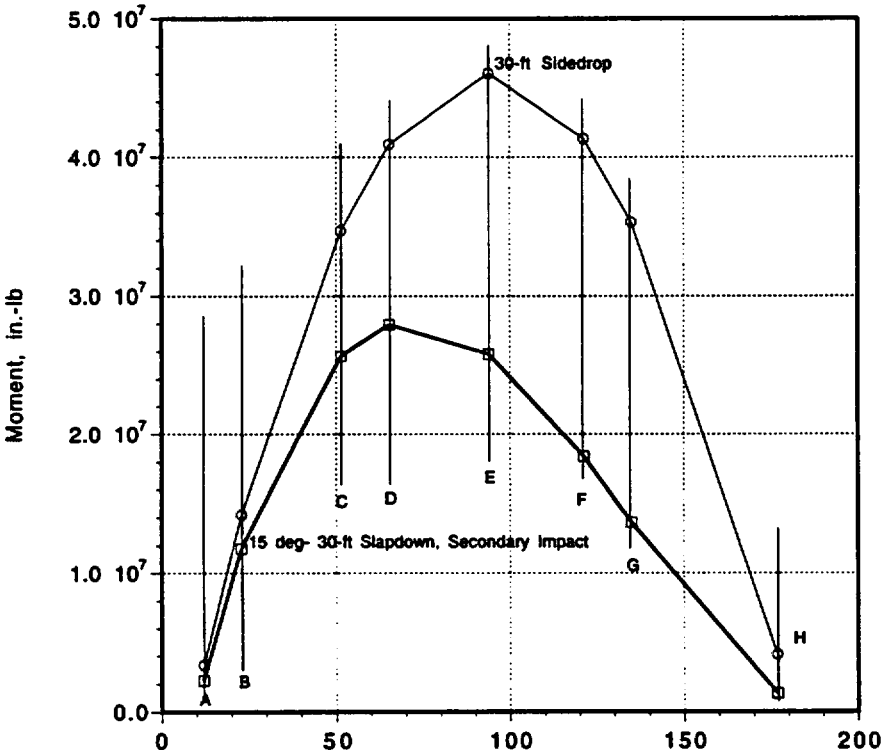
Fig. 2.10.9-9. FSS/cavity liner temperatures at various axial locations



a) 1-ft drop out-of-plane moment distribution along cask



b) 30-ft drop out-of-plane moment distribution along cask

Fig. 2.10.9-10. Out-of-plane moment distribution from the ANSYS cask models

The out-of-plane bending stresses (Z-direction) in the cavity liner/FSS were calculated assuming that plane sections remain plane (i.e., that strains vary directly with their distance from the neutral axis). This is in agreement with the ANSYS cask model results which include the FSS/cavity liner geometry for both the flat and corner orientations (see Section 2.10.6). The following method was used to compute the out-of-plane bending stresses:

σ_z = Mc/I,

where

M = maximum moment (defined above),

c = (see Figs. 2.10.9-11 and -12), and

I = $I_{cask\ wall} + I_{cavity\ liner}$ (the I_{FSS} was conservatively ignored),

= 14,793 + 1,593 = 16,386 in^4.

2.10.9.3.2 DU and Contents Loading. As discussed above, the analysis conservatively assumes that the DU is nonstructural. The maximum DU loading on the cavity liner during the 1-ft and 30-ft drops is the weight of the DU above the liner. The DU on the sides and bottom is supported on the lower part of the cask body wall. The cavity liner is supported in the middle of each side by the FSS. The FSS is also loaded by the contents (fuel assembly and NFAH). This section presents the analysis in which the contents are assumed to load the FSS uniformly. Section 2.10.10 discusses the analysis when the fuel is conservatively assumed to transfer the load at the fuel spacers and end fittings only.

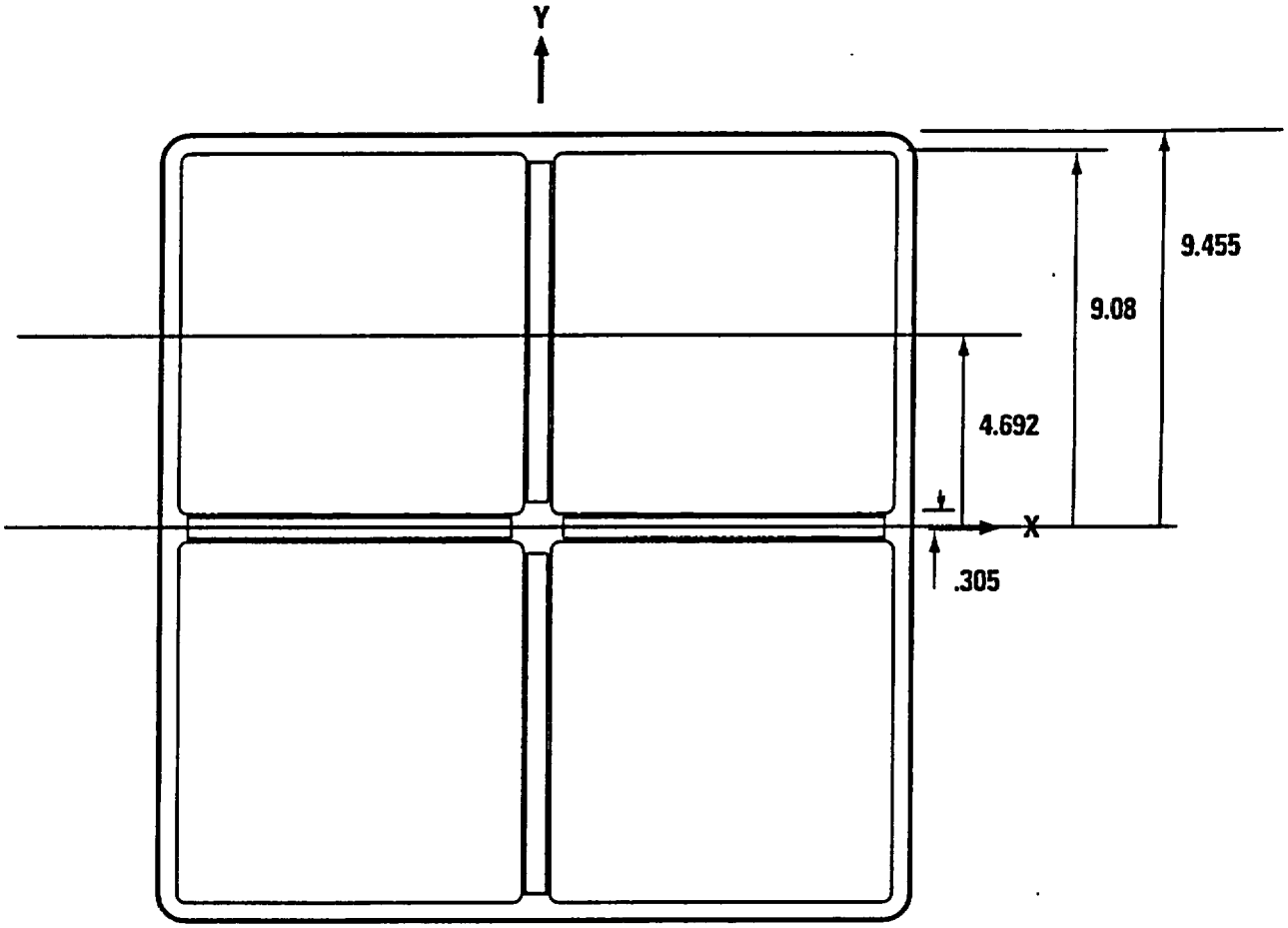
Following are the local g-levels during the 1-ft and 30-ft drop events obtained from the GACAP analysis (Section 2.10.4).

Drop	g-levels Side Drop/Slapdown	
	Side Drop (Table 2.10.4-6)	
	Section B	Section E
1-ft	15.6	15.6
30-ft	47.7	47.7
	15° Impact (Table 2.10.4-28 and 2.10.4-8)	
	Section B	Section D
1-ft (primary)	21.5	13.5
30-ft (secondary)	74	46

The FSS and content inertial loading on the FSS is developed as follows:

W = [(FSS weight/4 + (spent fuel + NFAH)]/166.63,

= 11 lb/in./g,



K-896(93)Mc
11-8-93

Fig. 2.10.9-11. Values of "c" for calculating out-of-plane bending stresses in the liner and FSS for the flat orientation

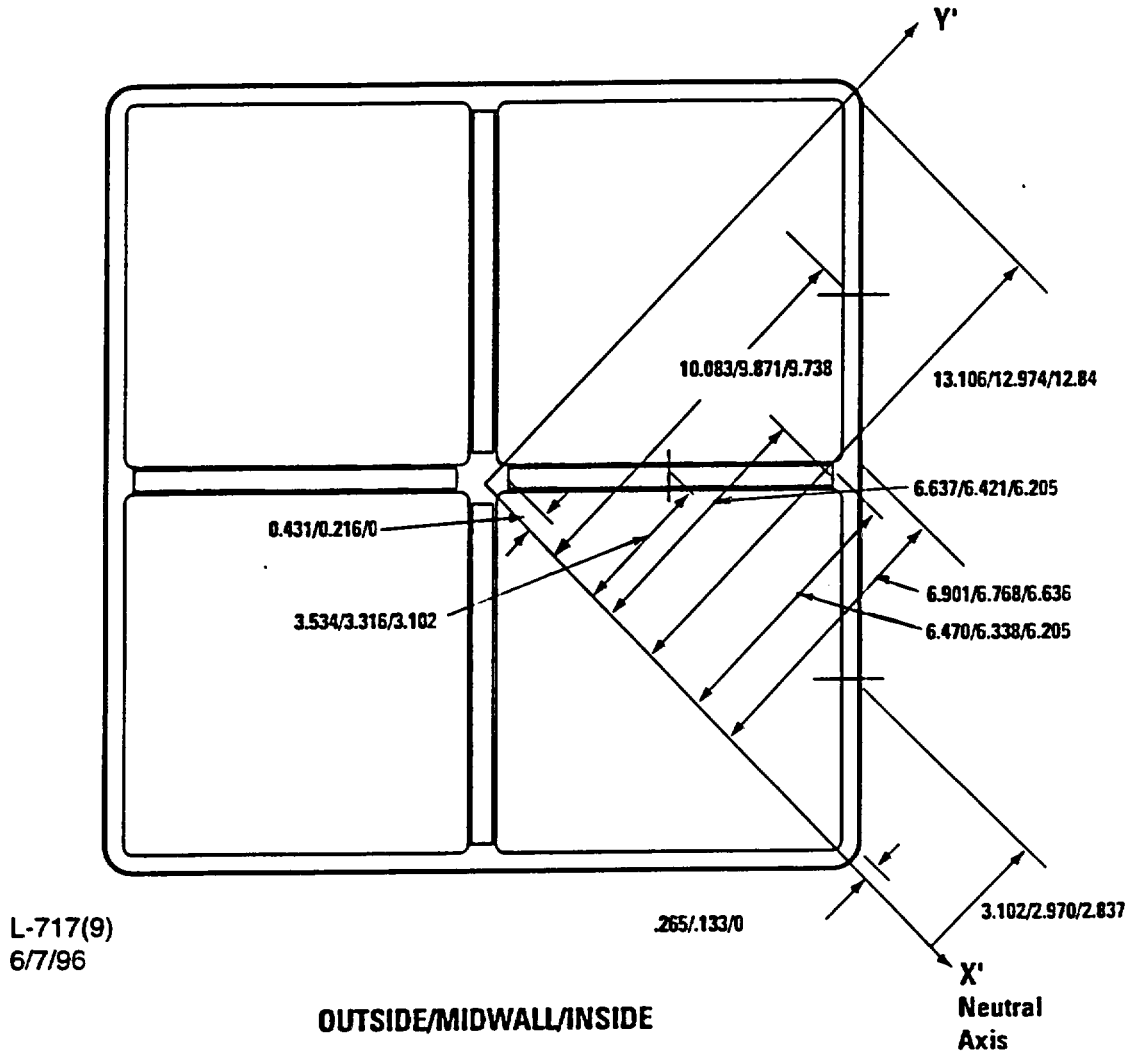


Fig. 2.10.9-12. Values of "c" for calculating out-of-plane bending stresses in the liner and FSS for the corner orientation

where

FSS weight = 751 lb, and

Spent fuel + NFAH weight = 1662 lb.

The following fuel assembly applied pressure on the FSS is developed using the above loading:

Loading	(g)	Wg (lb/axial in.)	w_f, Press. (psi) (Wg/8.78 in.)
Side Drop			
1-ft Drop			
Section B	15.6	171.7	19.6
Section E	15.6	171.7	19.6
30-ft Drop			
Section B	47.7	525	59.8
Section E	47.7	525	59.8
15° Impact			
1-ft Drop			
Section B	21.5	236.5	26.9
Section D	13.5	148.5	16.9
30-ft Drop			
Section B	74.	814	92.7
Section D	46	506	57.6

The postulated DU loading on the cavity liner upper wall is developed as follows:

Loading	(g)	$W_{DU}+W_{CL}$[a] (lb/in.)	Pressure[b] $(W_{DU}+W_{CL})/(8.78)(2)$
Side Drop			
1-ft Drop			
Section B	15.6	569.6	32.4
Section E	15.6	569.6	32.4
30-ft Drop			
Section B	47.7	1741.5	99.2
Section E	47.7	1741.5	99.2
15° Impact			
1-ft Drop			
Section B	21.5	785	44.7
Section D	13.5	493	28
30-ft Drop			
Section B	74.	2702	154
Section D	46	1679	95.6

[a] W_{DU} = t l μg
t = 2.65 in., DU thickness
l = 18.912 in.
μ = 0.688 lb/in.^{3}
W_{CL} = t l μg
t = 0.375 in., cavity liner thickness
l = 18.912 in.
μ = 0.286 lb/in.^{3}

[b] 8.78 in. is the flat unsupported portion of the cavity liner model, (18.912/2) – .375 – .3 = 8.78 in.

The weight of the two vertical walls of the cavity liner was neglected and the fuel load on the bottom was assumed to be supported by the deflected DU (containment wall distorted shape). The free-body diagram for the flat orientation is shown in Fig. 2.10.9-13, and the loading in the vertical walls represents the load distribution in the distorted shape.

The loading condition for the corner orientation is presented in Fig. 2.10.9-14. This loading condition is more complex than that in the flat orientation primarily because of the method used to input the ovality effect of the supporting cask wall (see Section 2.10.9.3.4, below). A fixed displacement (both x and y directions) was input on the cavity liner walls in contact with the supporting DU. This method provided the representative deformation in the cavity liner/FSS model, however, it imposed a false membrane stress in the cavity liner walls in contact with the supporting surface (as will be discussed later). The free-body diagram reflects this boundary condition assumption by showing the resultant loads in the remaining (free) legs.

2.10.9.3.3 MNOP. The maximum normal operating pressure (80 psi) was imposed on the internal walls of the cavity liner. A differential pressure was imposed on all walls that had loading on both sides.

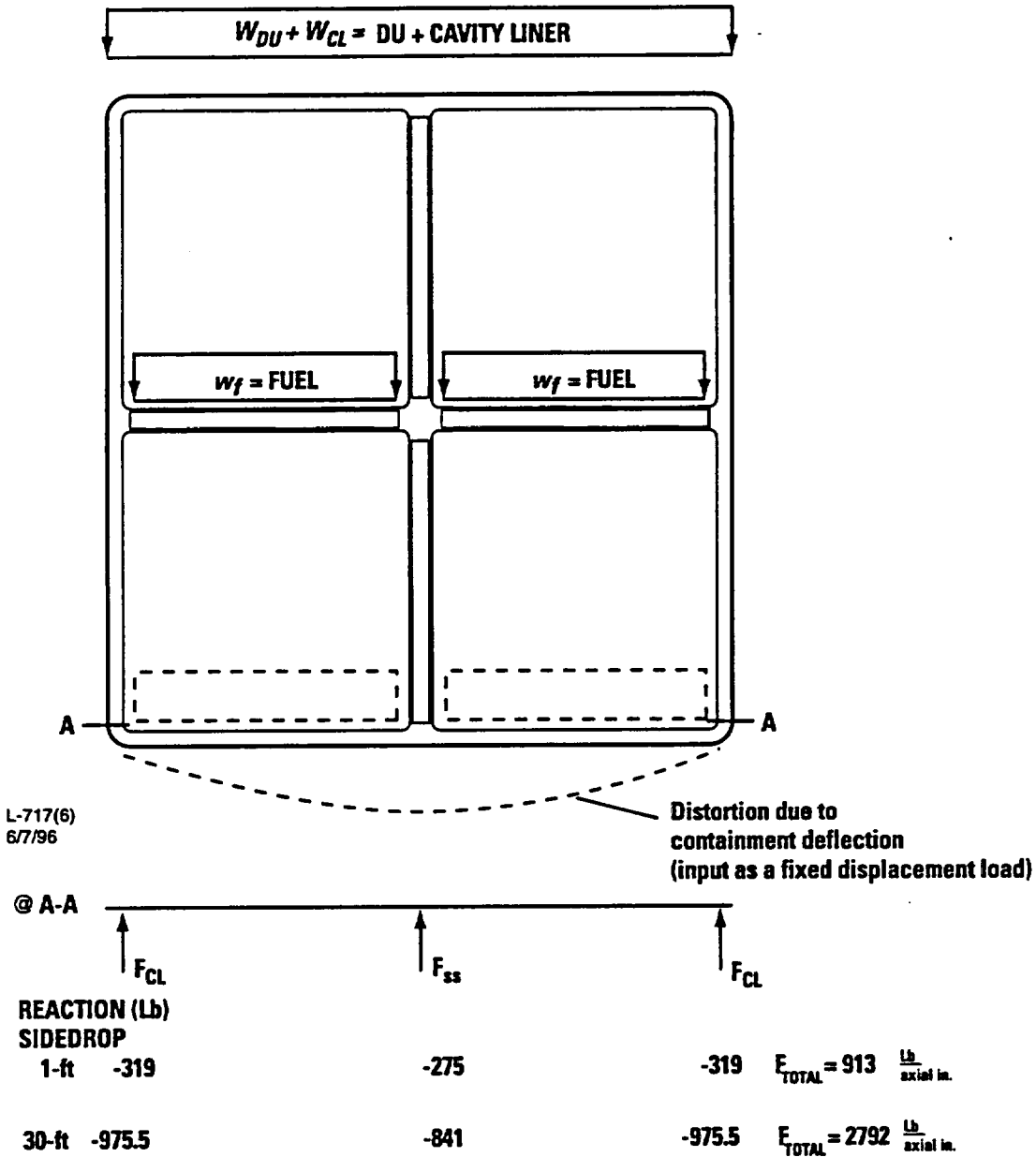


Fig. 2.10.9-13. Free-body diagram of cavity liner/FSS, flat orientation

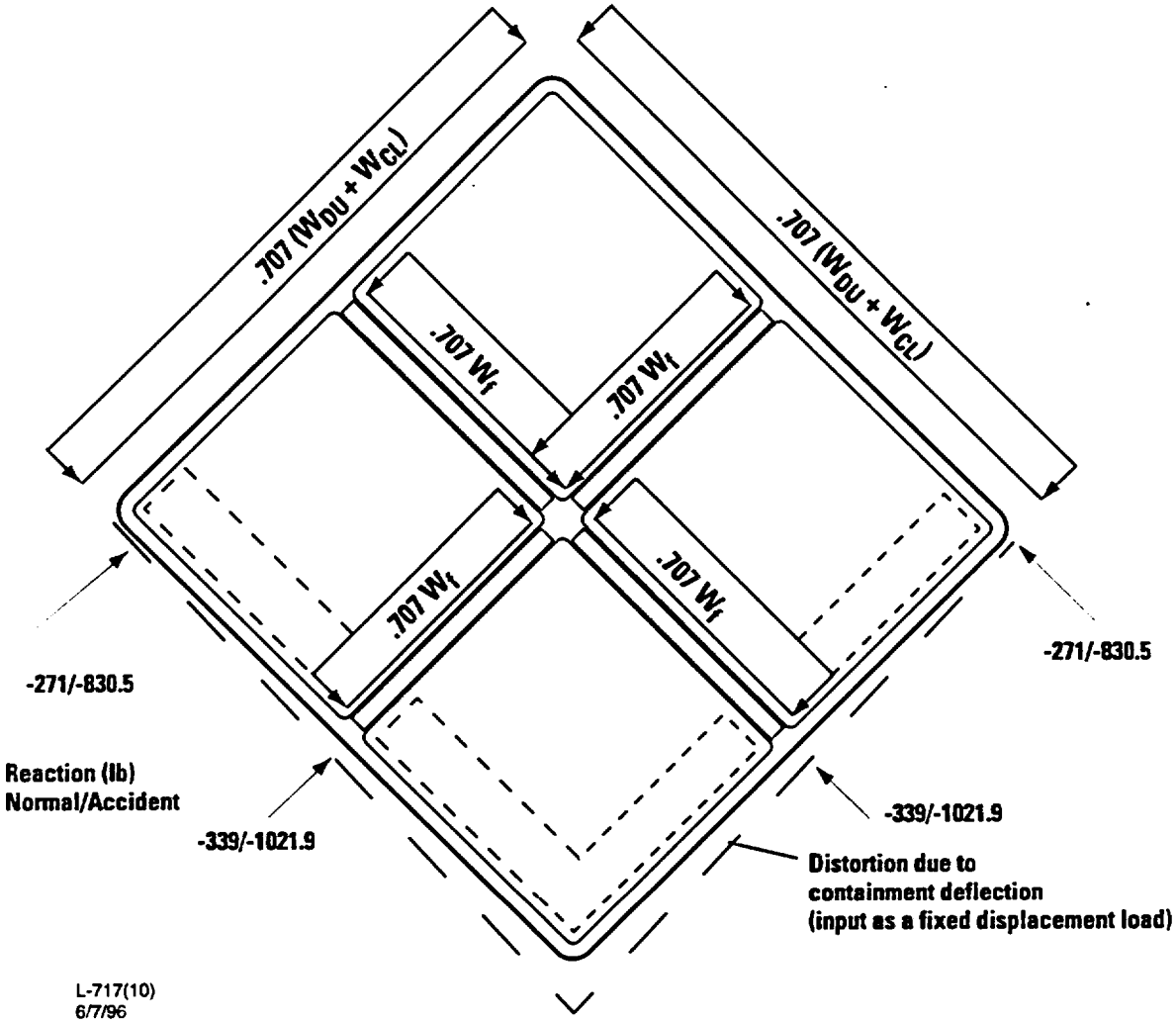


Fig. 2.10.9-14. Free-body diagram of cavity liner/FSS, corner orientation

2.10.9.3.4 Lateral Displacements (Ovaling) of the Cask Wall Cross-section. The cavity liner is supported by the DU and it is assumed that the DU has the same deflection profile as the containment wall. This is a very conservative loading condition on the frame model because it neglects the stiffness of the DU structure. The deflection (ovaling) of the cask wall under the internal loading and load plus MNOP is applied to the ANSYS cavity liner frame model by inputting the corresponding deflections as fixed displacements on the nodes of the model that are supported by the DU.

The deflection of the cask wall from the ANSYS analysis described in 2.10.2 for MNOP loading for the flat orientation are presented in Fig. 2.10.9-15. The deflection of the cask wall from the ANSYS analysis for the 30-ft drop in the flat orientation are presented in Fig 2.10.9-16 for Sections A through E. The deflection value relative to the cavity liner corner are input into the frame model. These values are calculated by subtracting the cavity liner corner deflection (at 8.78 in.) from the deflection at each node. The 1-ft drop deflection values are calculated by ratioing these deflection values by the CG g (1-ft g/30-ft g). The 1-ft and 30-ft drop plus MNOP deflections were obtained by superposing the MNOP and drop deflection values.

The deflection of the cask wall from the ANSYS analysis described in 2.10.2 for MNOP loading for the corner orientation are presented in Table 2.10.9-2 for Section E. The ANSYS cask model deflection results of the containment lower walls in the corner orientation under the 30-ft side drop and 30-ft side drop plus MNOP are presented in Tables 2.10.9-3 and 2.10.9-4, respectively, for Section E. The 30-ft values were ratioed by the respective g levels to obtain the 1-ft deflection values. The same procedure was used to obtain the deflection values for Section B, however the deflection results were much smaller than for Section E in this drop orientation.

The same technique was use to obtain the flat and corner containment wall deflection values for the 15° impact drop at Sections B and D. The 1-ft and 30-ft deflection results were smaller than those calculated for the side drop loading event, as shown in Fig. 2.10.9-17, and therefore the deflection values were not included.

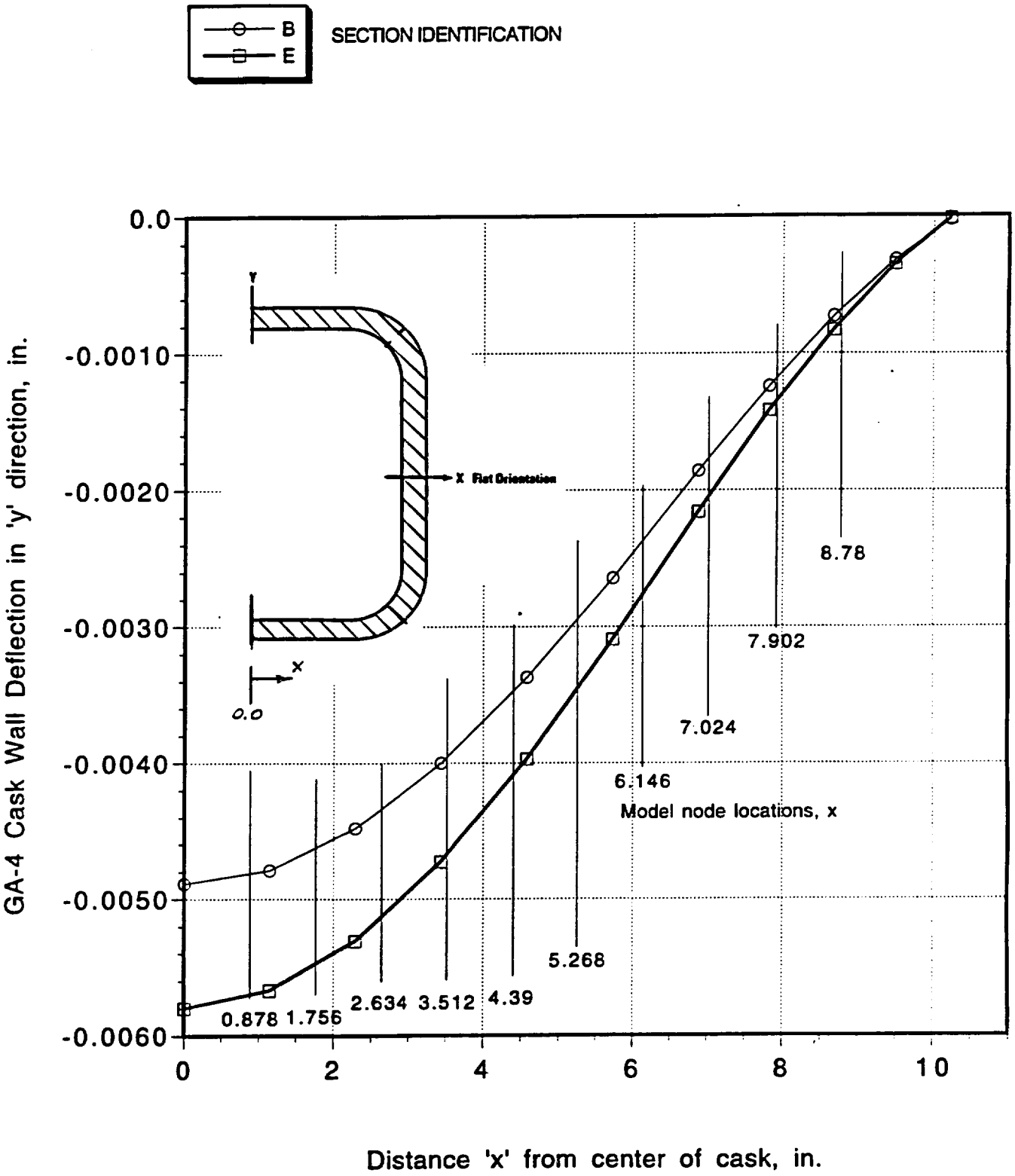


Fig. 2.10.9-15. Cask wall deflection, MNOP, flat orientation, Sections B and E

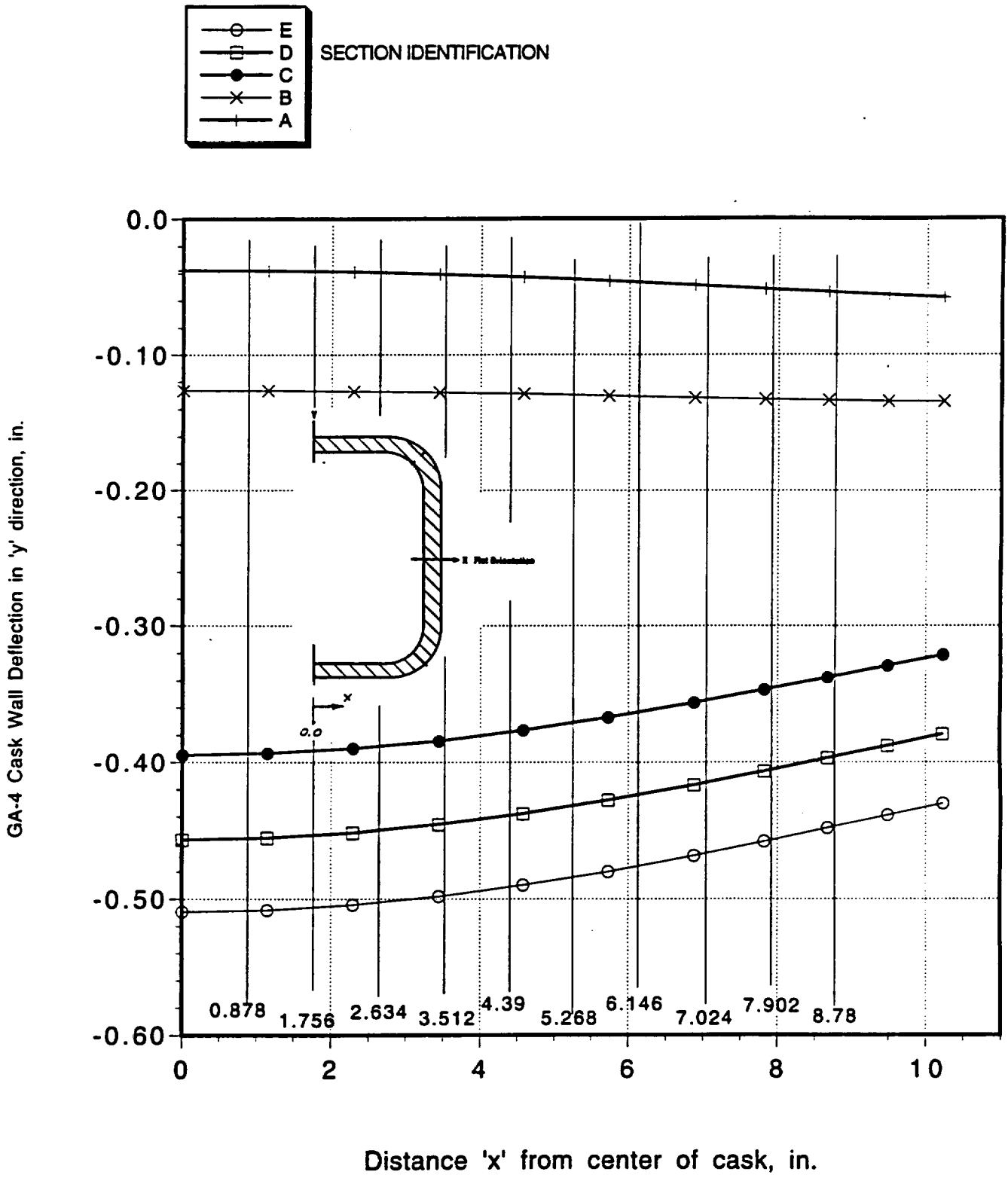


Fig. 2.10.9-16. Cask wall deflection - 30-ft sidedrop flat orientation

TABLE 2.10.9-2
CORNER ORIENTATION
MNOP CONTAINMENT WALL DEFLECTIONS, SECTION E

	ANSYS MNOP load			Deflection, (in.)	
		Deflection (in.)		Relative to	Relative to
FSS/Liner Node No.	Cask Model Node No.	x direction	y direction	Node.1 Δx deflection	Node 12 Δy deflection
1	29801	0.00019	0.00023	0.0000	0.0004
2	20989	0.0041	–0.0040	0.0039	–0.0039
3	29798	0.0004	0.0000	0.0003	0.0001
4	29795	0.0008	–0.0003	0.0006	–0.0002
5	29635	0.0012	–0.0007	0.0011	–0.0006
6	29559	0.0018	–0.0012	0.0016	–0.0010
7	29558	0.0025	–0.0018	0.0023	–0.0017
8	29557	0.0031	–0.0024	0.0029	–0.0023
9	29556	0.0036	–0.0030	0.0034	–0.0029
10	29555	0.0039	–0.0035	0.0037	–0.0034
11	29554	0.0041	–0.0039	0.0039	–0.0037
12	21237	–0.0002	–0.0001	–0.0004	0.0000
13	20990	0.0039	–0.0040	0.0037	–0.0039
14	20991	0.0036	–0.0039	0.0034	–0.0037
15	20992	0.0039	–0.0035	0.0037	–0.0034
16	20993	0.0026	–0.0030	0.0024	–0.0029
17	20994	0.0019	–0.0024	0.0017	–0.0023
18	20995	0.0012	–0.0018	0.0010	–0.0016
19	21071	0.0008	–0.0012	0.0006	–0.0011
20	21231	0.0004	–0.0007	0.0002	–0.0006
21	21234	0.0000	–0.0004	–0.0001	–0.0003
42	20989	–0.0041	–0.0040	–0.0039	–0.0039
43	29798	–0.0004	0.0000	–0.0003	0.0001
44	29795	–0.0008	–0.0003	–0.0006	–0.0002
45	29635	–0.0012	–0.0007	–0.0011	–0.0006
46	29559	–0.0018	–0.0012	–0.0016	–0.0010
47	29558	–0.0025	–0.0018	–0.0023	–0.0017
48	29557	–0.0031	–0.0024	–0.0029	–0.0023
49	29556	–0.0036	–0.0030	–0.0034	–0.0029
50	29555	–0.0039	–0.0035	–0.0037	–0.0034
51	29554	–0.0041	–0.0039	–0.0039	–0.0037
52	21237	0.0002	–0.0001	0.0004	0.0000
53	20990	–0.0039	–0.0040	–0.0037	–0.0039
54	20991	–0.0036	–0.0039	–0.0034	–0.0037
55	20992	–0.0039	–0.0035	–0.0037	–0.0034
56	20993	–0.0026	–0.0030	–0.0024	–0.0029
57	20994	–0.0019	–0.0024	–0.0017	–0.0023
58	20995	–0.0012	–0.0018	–0.0010	–0.0016
59	21071	–0.0008	–0.0012	–0.0006	–0.0011
60	21231	–0.0004	–0.0007	–0.0002	–0.0006
61	21234	0.0000	–0.0004	0.0001	–0.0003

TABLE 2.10.9-3
CORNER ORIENTATION
30-FT SIDE DROP DEFLECTIONS, SECTION E

	ANSYS Side Drop Model Results			Deflection, (in.)	
		Deflection (in.)		Relative to Node 1	Relative to Node 12
FSS/Liner Node No.	Cask Model Node No.	x direction	y direction	Δx deflection	Δy deflection
1	29801	–0.0005	–0.4405	0.0000	–0.041
2	20989	–0.0192	–0.4305	–0.0187	–0.031
3	29798	–0.0011	–0.4405	–0.0006	–0.041
4	29795	–0.0017	–0.4404	–0.0012	–0.0409
5	29635	–0.0025	–0.4403	–0.0020	–0.0408
6	29559	–0.0035	–0.4401	–0.0030	–0.0406
7	29558	–0.0051	–0.4396	–0.0046	–0.0401
8	29557	–0.0071	–0.4387	–0.0066	–0.0392
9	29556	–0.0095	–0.4373	–0.0090	–0.0378
10	29555	–0.0123	–0.4355	–0.0118	–0.036
11	29554	–0.0156	–0.4333	–0.0151	–0.0338
12	21237	–0.0519	–0.3995	–0.0514	0
13	20990	–0.0231	–0.4274	–0.0226	–0.0279
14	20991	–0.0272	–0.4238	–0.0267	–0.0243
15	20992	–0.0314	–0.42	–0.0309	–0.0205
16	20993	–0.0356	–0.416	–0.0351	–0.0165
17	20994	–0.0396	–0.412	–0.0391	–0.0125
18	20995	–0.0433	–0.408	–0.0428	–0.0085
19	21071	–0.0460	–0.405	–0.0455	–0.0055
20	21231	–0.0482	–0.4025	–0.0477	–0.003
21	21234	–0.0503	–0.4007	–0.0498	–0.0012
42	20989	0.0192	–0.4305	0.0187	–0.031
43	29798	0.0011	–0.4405	0.0006	–0.041
44	29795	0.0017	–0.4404	0.0012	–0.0409
45	29635	0.0025	–0.4403	0.0020	–0.0408
46	29559	0.0035	–0.4401	0.0030	–0.0406
47	29558	0.0051	–0.4396	0.0046	–0.0401
48	29557	0.0071	–0.4387	0.0066	–0.0392
49	29556	0.0095	–0.4373	0.0090	–0.0378
50	29555	0.0123	–0.4355	0.0118	–0.036
51	29554	0.0156	–0.4333	0.0151	–0.0338
52	21237	0.0519	–0.3995	0.0514	0
53	20990	0.0231	–0.4274	0.0226	–0.0279
54	20991	0.0272	–0.4238	0.0267	–0.0243
55	20992	0.0314	–0.42	0.0309	–0.0205
56	20993	0.0356	–0.416	0.0351	–0.0165
57	20994	0.0396	–0.412	0.0391	–0.0125
58	20995	0.0433	–0.408	0.0428	–0.0085
59	21071	0.0460	–0.405	0.0455	–0.0055
60	21231	0.0482	–0.4025	0.0477	–0.003
61	21234	0.0503	–0.4007	0.0498	0

TABLE 2.10.9-4
CORNER ORIENTATION
30-FT SIDE DROP + MNOP DEF., SECTION E

		Deflection, (in.)	
FSS/Liner Node No.	Cask Model Node No.	Relative to Node 1 Δx, deflection	Relative to Node 12 Δy, deflection
1	29801	0.0000	–0.0406
2	20989	–0.0148	–0.0349
3	29798	–0.0003	–0.0409
4	29795	–0.0006	–0.0411
5	29635	–0.0009	–0.0414
6	29559	–0.0014	–0.0416
7	29558	–0.0023	–0.0418
8	29557	–0.0037	–0.0415
9	29556	–0.0056	–0.0407
10	29555	–0.0081	–0.0394
11	29554	–0.0112	–0.0375
12	21237	–0.0518	0.0000
13	20990	–0.0188	–0.0318
14	20991	–0.0233	–0.0280
15	20992	–0.0271	–0.0239
16	20993	–0.0327	–0.0194
17	20994	–0.0374	–0.0148
18	20995	–0.0417	–0.0101
19	21071	–0.0449	–0.0066
20	21231	–0.0475	–0.0036
21	21234	–0.0499	–0.0015
42	20989	0.0148	–0.0349
43	29798	0.0003	–0.0409
44	29795	0.0006	–0.0411
45	29635	0.0009	–0.0414
46	29559	0.0014	–0.0416
47	29558	0.0023	–0.0418
48	29557	0.0037	–0.0415
49	29556	0.0056	–0.0407
50	29555	0.0081	–0.0394
51	29554	0.0112	–0.0375
52	21237	0.0518	0.0000
53	20990	0.0188	–0.0318
54	20991	0.0233	–0.0280
55	20992	0.0271	–0.0239
56	20993	0.0327	–0.0194
57	20994	0.0374	–0.0148
58	20995	0.0417	–0.0101
59	21071	0.0449	–0.0066
60	21231	0.0475	–0.0036
61	21234	0.0499	–0.0003

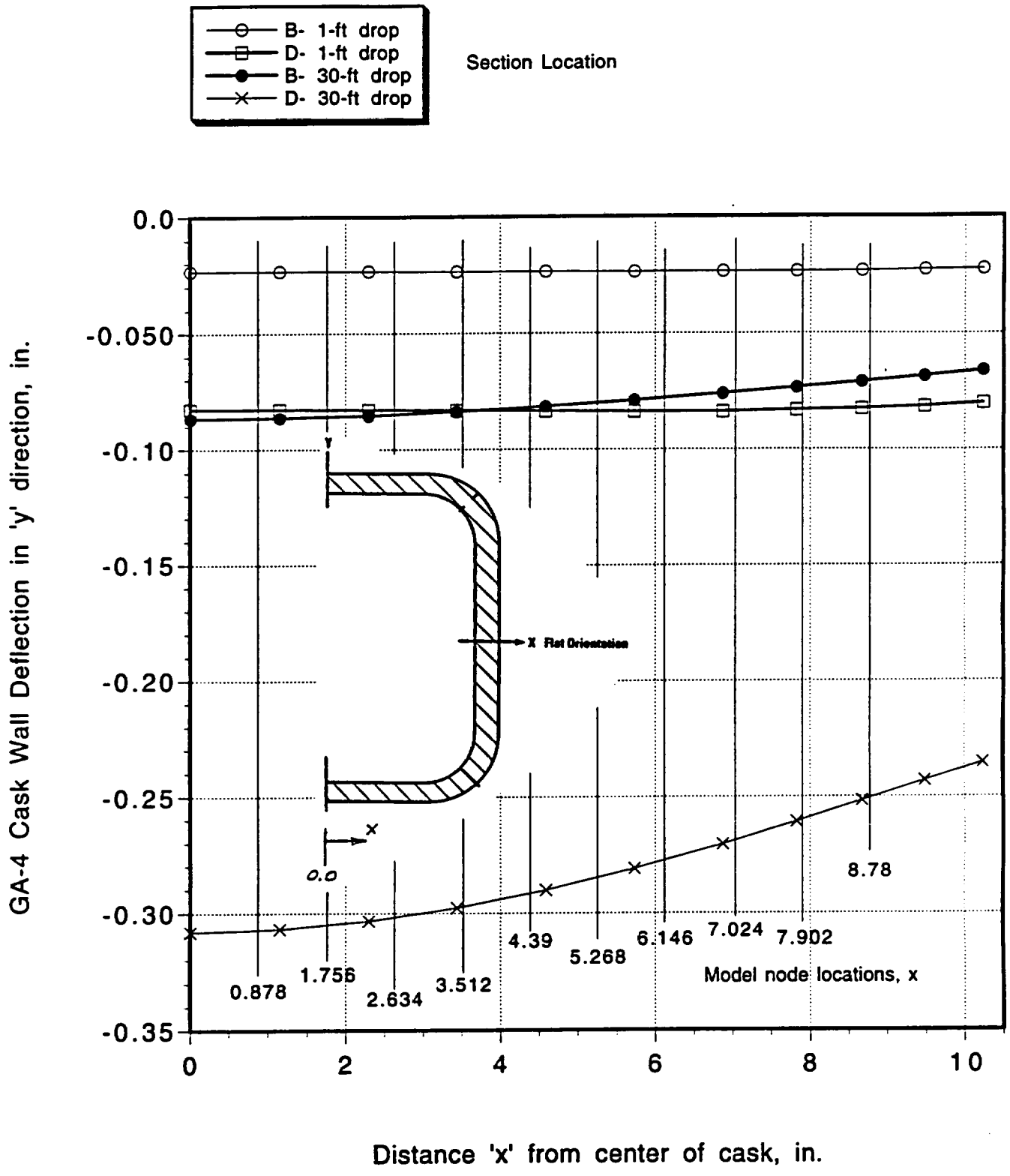


Fig. 2.10.9-17. Cask wall deflection values, 15° impact orientation, Sections B and D

2.10.9.3.5 Thermal Stress. The thermal loading is a result of the differential thermal growth between the cavity liner, FSS, and the cask body wall. Generally, the cask body is colder and stiffer than the cavity liner and the FSS. The top and bottom surfaces of the FSS are free to expand. The only restriction on the FSS is at its interface with the cavity liner. The cavity liner is connected to the cask body at the flange and bottom plate. During the hot environment condition, when the inner temperature is the highest, the cavity liner is hotter than the cask wall. Therefore, thermally-induced stresses are produced axially for the cask wall and the cavity liner. The thermal stress in the cavity liner under the hot environment is presented in Section 2.6.1.3.

The cavity liner/FSS analysis included a membrane stress of –1 ksi to represent the thermal stress condition of the cavity liner in the hot environment. This stress was treated as primary in the cavity liner because it was developed due to the constraint of cask containment wall.

The cold environment (–20°F) load case produces a tensile membrane stress in the cavity liner of 5.0 ksi (see Section 2.6.2). The cavity liner/FSS analysis included a membrane stress of 6.1 ksi (conservative) to represent the thermal stress condition of the cavity liner in the cold environment. This cold environment load case was analyzed only at the load cases that produced the lowest design margins in the hot design environment.

An ANSYS analysis was used to determine the thermal stresses in the FSS.

ANSYS Model. The ANSYS finite element program is used to determine the stresses in the cavity liner/FSS assembly. The model consists of a one-eighth cross section of the FSS and cavity liner. The hottest portion of the cross section was conservatively chosen. The model length is half of the cask cavity. Figure 2.10.9-18 shows the model.

Three-dimensional quadrilateral shell elements (STIF63) are used to model both the cavity liner and FSS. This element is defined by four nodal points. STIF63 elements have six degrees of freedom at each node, translations in the nodal x, y, and z directions and rotations about the nodal x, y, and z axes.

Temperature dependent material properties were input for the cavity liner and FSS. The modulus of elasticity and coefficient of thermal expansion were input in temperature tables for interpolation by ANSYS. A constant Poisson's ratio of 0.3 are used throughout the analysis. The stainless steel modulus of elasticity was conservatively used for the FSS elements. It was not reduced to account for the B_4C holes. The higher modulus of elasticity of the FSS produced conservative stresses in both the cavity liner and the FSS.

The temperature dependent material properties used for the ANSYS analysis are presented below.

Temperature (°F)	E (10^6 psi)	Coefficient of Thermal Expansion (10^{-6}/°F)
100	28.0	8.30
200	27.6	8.48
300	27.0	8.65
400	26.5	8.79

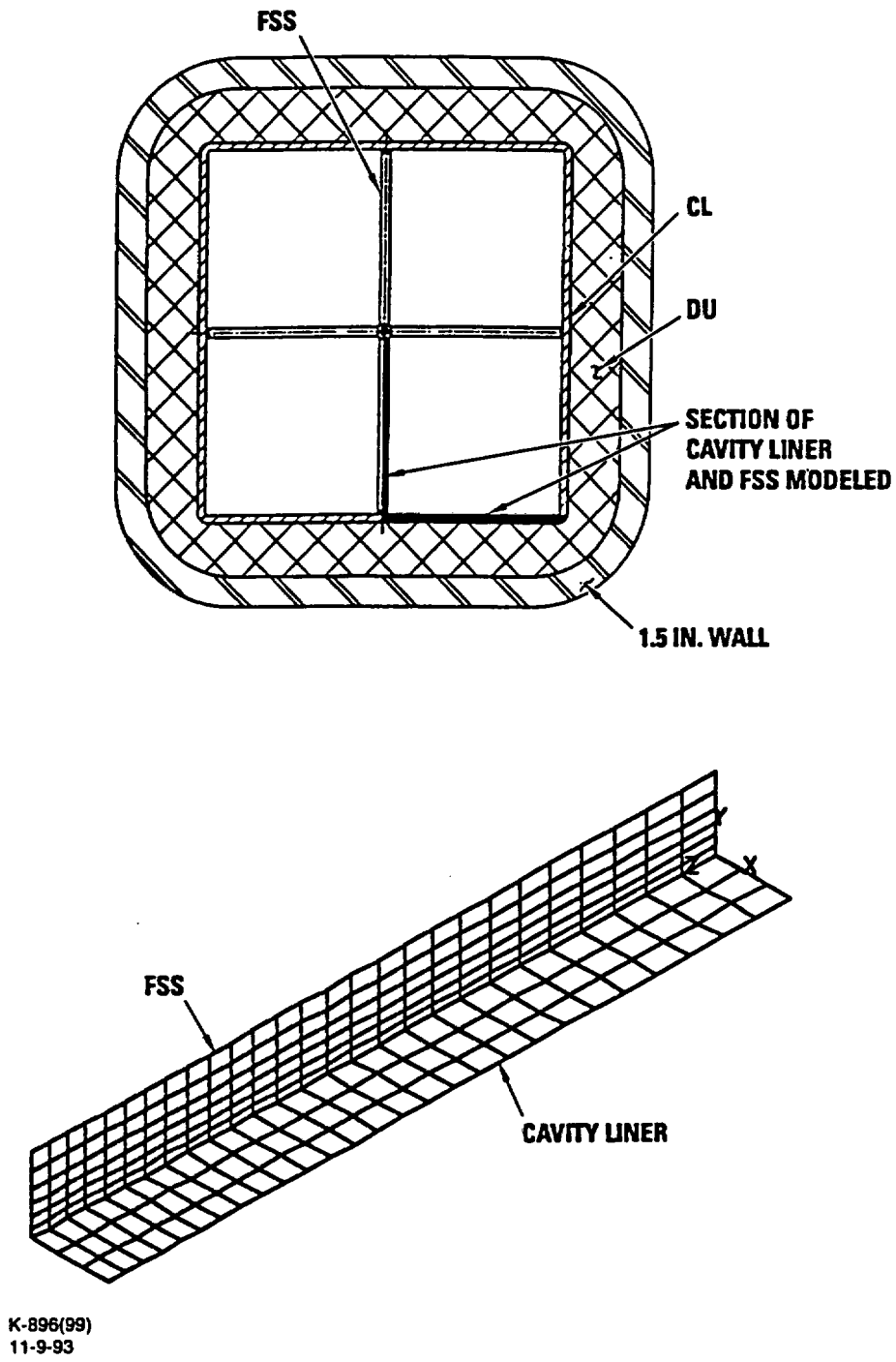


Fig. 2.10.9-18. ANSYS thermal stress model for the cavity liner and FSS

Figure 2.10.9-19 displays the boundary conditions for the ANSYS model. Symmetric boundary conditions were used at the boundaries shown to allow the model to expand correctly.

The ANSYS model is loaded by nodal temperatures. The temperatures are generated using separate TAC2D and ANSYS models. The input temperatures are described in Section 3.6.4.4. Figure 2.10.9-20 shows the temperature distribution of the FSS and cavity liner in the ANSYS model. These temperatures represent a conservative thermal case with respect to the actual hot environment. This temperature case used a maximum temperature of 328°F for the FSS (vs. the hot environment maximum of 294°F) and 267°F for the cavity liner (vs. the hot environment maximum of 222°F).

Fixed displacements are specified on the nodes at the end of the cavity liner, at the point that the cavity liner is connected to the bottom plate. The displacement limitation is used to model the restriction that the cask body places on the cavity liner thermal expansion. The restriction of cavity liner deflection generates forces that are reacted by the cask body. The forces cause deflection of the cask body. The specified displacements used in the ANSYS analysis include the deflection of the cask body due to the forces of the restrained cavity liner and FSS. The correct allowable displacement are obtained by an iterative process. Since the magnitude of the stresses in the cavity liner, cask body and FSS depend on the relative stiffness of each component, several iterations are done until the displacement allowed in the cavity liner, and the corresponding forces required to restrain the cavity liner at these displacements, match the force required to stretch the containment boundary the same amount.

The analysis shows that the thermally induced stresses are mainly axial. The cavity liner and FSS are subject to an axial compressive stress. Figure 2.10.9-21 shows the axial stress contour plot. Thermal stresses in the FSS are classified as secondary stresses because they are induced by self constraint. The allowable stresses are 3.0 S_m for normal conditions. All stresses generated from the ANSYS analysis are well below the material ultimate strength.

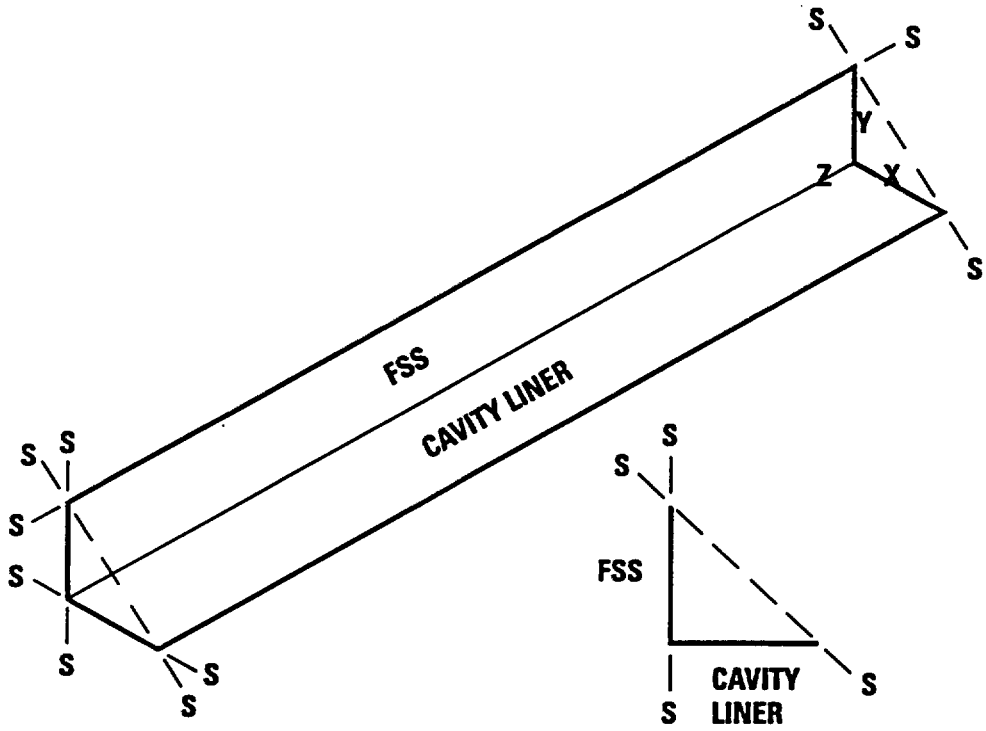


Fig. 2.10.9-19. Boundary condition for the thermal stress cavity liner and FSS model

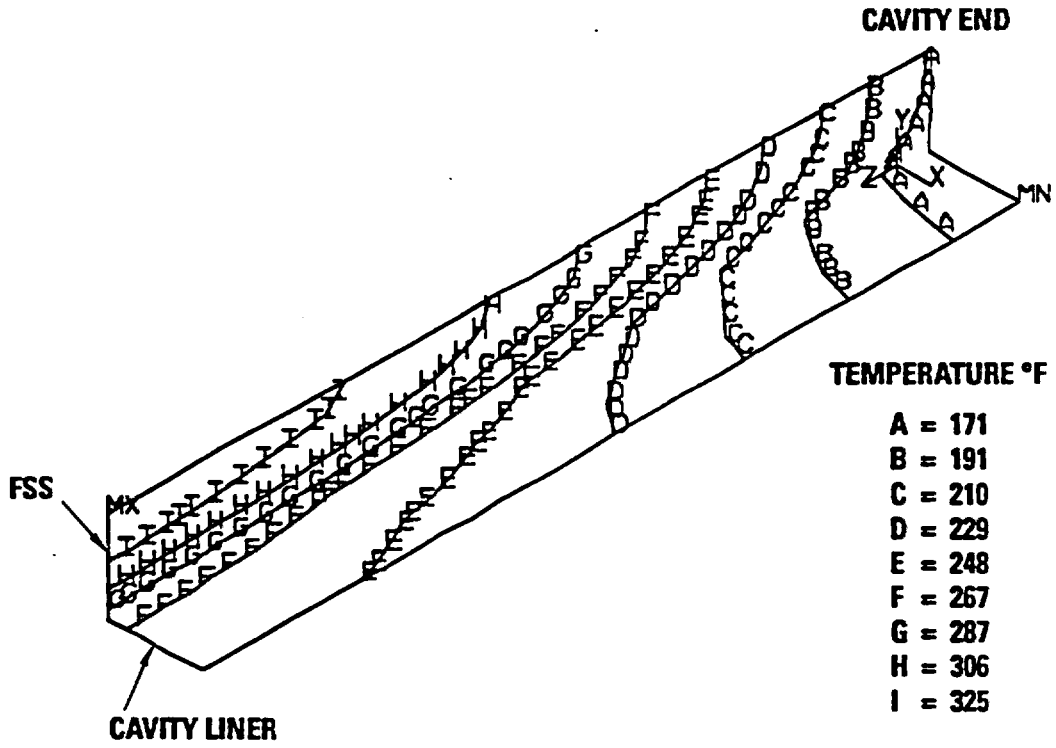


Fig. 2.10.9-20. Cavity liner and FSS ANSYS model temperature plot

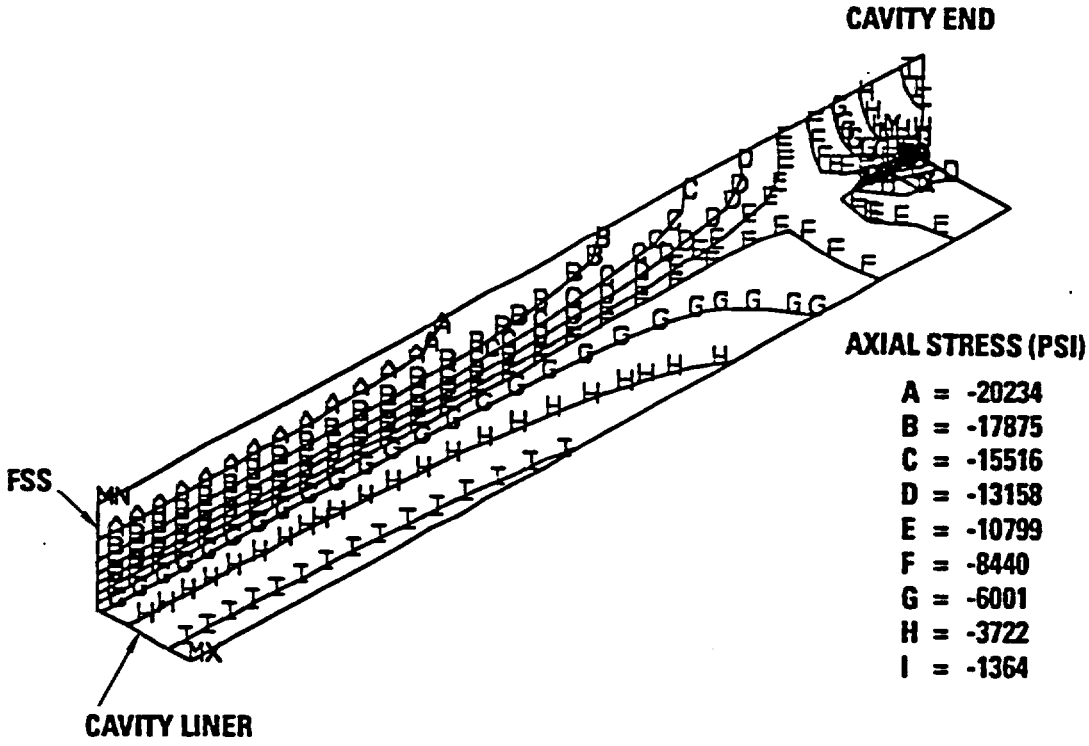


Fig. 2.10.9-21. Axial stress contour plot of cavity liner, FSS ANSYS results

2.10.9.4 Design Allowables. The material used for the cavity liner and FSS is type XM-19 Stainless Steel. The following allowables are based on the temperatures presented in Fig. 2.10.9-9 for the closure end, midcavity region and the bottom plate region.

Allowable Stress, ksi

	Normal Condition			Accident Condition		
	Temperature					
	closure end	mid region	bottom end	closure end	mid region	bottom end
	155°F	200°F	165°F	155°F	200°F	165°F
	corner regions of the cavity liner					
P_m	33.25	33.2	33.24	69.81	69.65	69.77
$P_m + P_b$	49.87	49.80	49.85	99.72	99.5	99.68
	Maximum liner temperature regions (at the FSS cavity liner connections)					
	165°F	225°F	175°F	165°F	225°F	175°F
P_m	33.24	32.75	33.23	69.77	68.74	69.74
$P_m + P_b$	49.85	49.13	49.84	99.68	98.2	99.63
	FSS					
	194°F	295°F	215°F	194°F	295°F	215°F
P_m	33.21	31.49	32.93	69.67	66.19	69.10
$P_m + P_b$	49.81	47.24	49.24	99.53	94.56	98.72

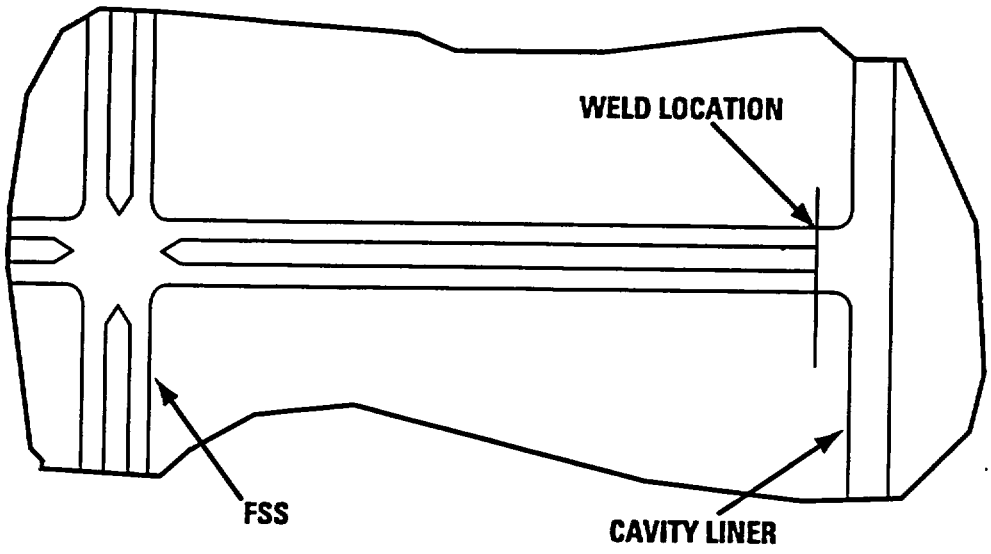
The allowables used in the analysis conservatively used the highest temperature condition for all regions analyzed and, consequently, the lowest allowables, as follows:

Cavity Liner

	Allowable Stress, ksi	
	Normal	Accident
P_m	32.75	68.74
$P_m + P_b$	49.13	98.2

FSS

	Allowable Stress, ksi	
	Normal	Accident
P_m	31.49	66.19
$P_m + P_b$	47.24	94.56



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The cavity liner/FSS weld location shown above is not practicable to inspect by volumetric means. Therefore, a weld efficiency factor of 0.65 was used in this region, which included stress location points 25, 30, 33, and 36 (Figs. 2.10.9-4 and/or 2.10.9-8). The following allowables (ksi) for the weld locations are

	Allowable Stress, ksi	
	Normal	Accident
P_m	20.47	43.02
$P_m + P_b$	30.71	61.46

The allowables used for the cold environment, based on a temperature range of –20°F –100°F (per ASME Code allowable table), are given below

Cavity Liner/FSS

	Allowable Stress, ksi	
	Normal	Accident
P_m	33.3	70.0
$P_m + P_b$	49.95	100.0

Weld Locations

	Allowable Stress, ksi	
	Normal	Accident
P_m	21.65	45.5
$P_m + P_b$	32.47	65.0

2.10.9.5 ANSYS Load Cases: This section defines the load cases that were analyzed for the loading conditions defined in Section 2.10.9.3. The individual load cases are presented in Tables 2.10.9-5 through 2.10.9-12.

TABLE 2.10.9-5
DESCRIPTION OF NORMAL CONDITIONS LOAD CASES FOR SIDE DROP, FLAT ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
1	B	—	32.4	19.6	.0026	4.6E6	HOT	4
	E	—	32.4	19.6	−.0199	15E6	HOT*	4
2	B	80	−47.6	19.6	−.0016	4.6E6	HOT	4
	E	80	−47.6	19.6	−.025	15E6	HOT*	4
3	B	—	32.4	19.6	.0026	4.6E6	HOT	3
	E	—	32.4	19.6	−.0199	15E6	HOT	3
4	B	80	−47.6	19.6	−.0016	4.6E6	HOT	3
	E	80	−47.6	19.6	−.025	15E6	HOT*	3

TABLE 2.10.9-6
DESCRIPTION OF NORMAL CONDITIONS LOAD CASES FOR SIDE DROP, CORNER ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
5	B	—	22.91	13.86	.0018	4.6E6	HOT	4
	E	—	22.91	13.86	−.0134	15E6	HOT*	4
6	B	80	−57.09	13.86	.0021	4.6E6	HOT	4
	E	80	−57.09	13.86	−.013	15E6	HOT*	4
7	B	—	22.91	13.86	.0018	4.6E6	HOT	3
	E	—	22.91	13.86	−.0134	15E6	HOT*	3
8	B	80	−57.09	13.86	−.0021	4.6E6	HOT	3
	E	80	−57.09	13.86	−.013	15E6	HOT*	3

TABLE 2.10.9-7
DESCRIPTION OF NORMAL CONDITIONS LOAD CASES
FOR 15° IMPACT, FLAT ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
9	B	—	44.7	26.9	.0	3.3E6	HOT	4
	D	—	28	16.9	−.0009	7.9E6	HOT	4
10	B	80	−35.3	26.9	−.0042	3.3E6	HOT	4
	D	80	−52	16.9	−.0051	7.9E6	HOT	4
11	B	—	44.7	26.9	.0	3.3E6	HOT	3
	D	—	28	16.9	−.0009	7.9E6	HOT	3
12	B	80	−35.3	26.9	−.0042	3.3E6	HOT	3
	D	80	−52	16.9	−.005	7.9E6	HOT	3

TABLE 2.10.9-8
DESCRIPTION OF NORMAL CONDITIONS LOAD CASES
FOR 15° IMPACT, CORNER ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
13	B	—	31.6	19	.002	3.3E6	HOT	4
	D	—	19.8	12	−.0061	7.9E6	HOT	4
14	B	80	−48.4	19	.0024	3.3E6	HOT	4
	D	80	−60.2	12	−.0057	7.9E6	HOT	4
15	B	—	31.6	19	.002	3.3E6	HOT	3
	D	—	19.8	12	−.0061	7.9E6	HOT	3
16	B	80	−48.4	19	.0024	3.3E6	HOT	3
	D	80	−60.2	12	−.0057	7.9E6	HOT	3

TABLE 2.10.9-9
DESCRIPTION OF ACCIDENT CONDITIONS LOAD CASES
FOR SIDE DROP, FLAT ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
17	B	—	99.2	59.8	.0079	14.2E6	HOT	4
	E	—	99.2	59.8	–.061	46E6	HOT*	4
18	B	80	19.2	59.8	.00375	14.2E6	HOT	4
	E	80	19.2	59.8	–.066	46E6	HOT*	4
19	B	—	99.2	59.8	.0079	14.2E6	HOT	3
	E	—	99.2	59.8	–.061	46E6	HOT	3
20	B	80	19.2	59.8	.00375	14.2E6	HOT	3
	E	80	19.2	59.8	–.066	46E6	HOT*	3

TABLE 2.10.9-10
DESCRIPTION OF ACCIDENT CONDITIONS LOAD CASES
FOR SIDE DROP, CORNER ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
21	B	—	70.13	42.28	.0054	14.2E6	HOT	4
	E	—	70.13	42.28	–.041	46E6	HOT*	4
22	B	80	9.87	42.28	.0057	14.2E6	HOT	4
	E	80	9.87	42.28	–.0406	46E6	HOT*	4
23	B	—	70.13	42.28	.005	14.2E6	HOT	3
	E	—	70.13	42.28	–.041	46E6	HOT*	3
24	B	80	9.87	42.28	.0057	14.2E6	HOT	3
	E	80	9.87	42.28	–.0406	46E6	HOT	3

TABLE 2.10.9-11
DESCRIPTION OF ACCIDENT CONDITIONS LOAD CASES
FOR 15° IMPACT, FLAT ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
25	B	—	154	92.7	–.0166	11.8E6	HOT	4
	D	—	95.6	57.5	–.0569	28E6	HOT	4
26	B	80	74	92.7	–.0208	11.8E6	HOT	4
	D	80	15.6	57.6	–.0619	28E6	HOT	4
27	B	—	154	92.7	–.0166	11.8E6	HOT	3
	D	—	95.6	57.6	–.0569	28E6	HOT	3
28	B	80	74	92.7	–.0208	11.8E6	HOT	3
	D	80	15.6	57.6	–.0619	28E6	HOT	3

TABLE 2.10.9-12
DESCRIPTION OF ACCIDENT CONDITIONS LOAD CASES
FOR 15° IMPACT, CORNER ORIENTATION

Load Case No	Section Loc.	MNOP (psi)	DU (psi)	Fuel (psi)	Max. Def. (in.)	Moment (in.-lb)	Thermal Environ. Condition	No. of Fuel Assy.
29	B	—	109	65.5	.0073	1.8E6	HOT	4
	D	—	67.6	40.7	–.0217	28E6	HOT	4
30	B	80	29	65.5	.0076	11.8E6	HOT	4
	D	80	12.4	40.7	–.0213	28E6	HOT	4
31	B	—	109	65.5	.0073	11.8E6	HOT	3
	D	—	67.6	40.7	–.0217	28E6	HOT	3
32	B	80	29	65.5	.0076	11.8E6	HOT	3
	D	80	12.4	40.7	–.0213	28E6	HOT	3

The analysis was performed for flat and corner orientations and for full (4 fuel elements) and partial (3 fuel elements) loading. The partial load configuration for the flat and corner orientations are presented in Fig 2.10.9-22. The hot environment, as defined by Section 2.6.1, was used in all load cases. The cold environment cases (–20° F) were selected based on the lowest design margin cases of the hot environment and are marked by asterisks in the tables. Figure 2.10.9-3 defines the section location along the length of the cask.

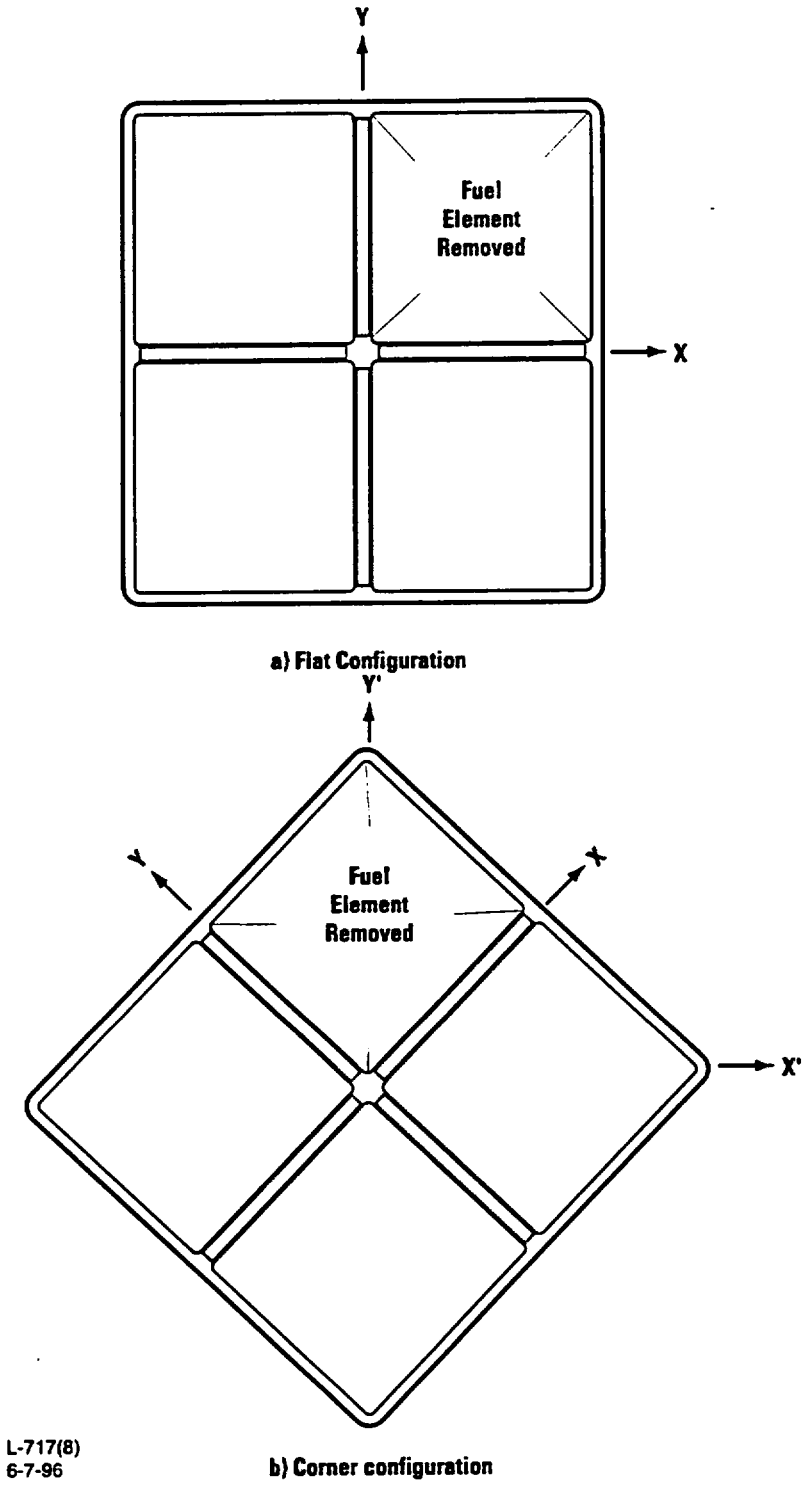


Fig. 2.10.9-22. ANSYS model loading configurations

The loading applied on the frame model is identified as follows:

MNOP (80 psi internal pressure was applied on the internal surface of the cavity liner–a delta pressure was applied on the leg/legs where the DU loading was applied, representing the net loading),

DU (pressure applied on the upper leg/legs of the cavity liner),

Fuel (pressure applied on the FSS),

Maximum Def. (maximum deflection imposed on the cavity liner representing cask wall ovalization where the DU was supporting the cavity liner), and

Moment, the out-of-plane moment applied to the results of the frame model.

The cavity liner/FSS is analyzed at two locations along the length of the cask in the side drop loading event, Section B at 22.75 in., and Section E at 93.88 in. from the closure end. The oblique drop loading event locations were Section B at 22.75 in. and Section D at 65.25 in. from the closure end.

2.10.9.6 Analysis Results. The ANSYS cavity liner/FSS frame model produces Sx, and Sxy inner/middle/outer stress values at each stress reporting point (Fig 2.10.9-4) for each load case. These stress values are then put in a table such as that shown in Table 2.10.9-13. This table summarizes and combines stresses for individual loads such as out-of-plane (S_z) bending, thermal stress in the cavity liner (the FSS thermal stress is a secondary type stress and not included in this summary), and the 1-ft and 30-ft drop loads from the frame analysis. The combined stress components of Table 2.10.9-13 are then transferred to a table, such as that shown in Table 2.10.9-14, where the principal stresses, stress intensity, and the design margin are calculated. Tables 2.10.9-13 and 2.10.9-14 present load case 4-E cold having the lowest design margin (1-ft side drop + MNOP, 3 fuel elements, flat orientation, T= –20°F at Section E) with a D.M. = +0.09.

Tables 2.10.9-15 through 2.10.9-26 summarize the stresses at points in the cavity liner and FSS that have the lowest design margins for each load case. From these tables we have chosen the most critical load cases: 1-E cold, 3-E, 4-E, 5-E, 5-E cold, 6-E, 6-E cold, 17-E cold, 18-E, 18-E cold, 19-E, 21-E, 22-E, and 22-E cold. The stress tables for these load cases are presented in Section 2.10.9.8.

The typical deflection profiles under normal and normal plus pressure conditions for the flat and corner orientation models are presented in Figs. 2.10.9-23 and 2.10.9-24. The deflections are exaggerated to illustrate the deflected shape relative to the undeflected shape. For the flat orientation (Fig. 2.10.9-23) 1-ft and 30-ft plus MNOP loading events, the minimum design margins occur in the bottom of the vertical legs of the cavity liner. D.M. = +0.27 for the 1-ft (load case 2-E), = +0.24 for the 30-ft drop hot environment (load case 18-E), = +0.09 for the 1-ft (load case 2-E cold), and = +0.16 for the 30-ft drop cold environment (load case 18-E cold). The three fuel element loading case produced a D.M. = +0.26 for the 1-ft + MNOP (load case 4-E). The corner orientation minimum design margins for the 1-ft drop occurred with

TABLE 2.10.9-13 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 4-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP+ MNOP, T=-20°F 3 FUEL ELEMENTS SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP+ Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal +MNOP + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-8.31	6.10	19.44	0.61	19.44	0.00	-2.21	0.61	0.00	0.00
	Middle	9.268	-8.48	6.10	0.81	0.61	0.81	0.00	-2.38	0.61	0.00	0.00
	Outside	9.455	-8.66	6.10	-17.83	0.61	-17.83	0.00	-2.56	0.61	0.00	0.00
2	Inside	9.080	-8.31	6.10	-3.56	0.05	-3.56	0.00	-2.21	0.05	0.00	0.00
	Middle	9.268	-8.48	6.10	0.81	0.05	0.81	0.00	-2.38	0.05	0.00	0.00
	Outside	9.455	-8.66	6.10	5.17	0.05	5.17	0.00	-2.56	0.05	0.00	0.00
3	Inside	9.080	-8.31	6.10	12.54	-0.51	12.54	0.00	-2.21	-0.51	0.00	0.00
	Middle	9.268	-8.48	6.10	0.81	-0.51	0.81	0.00	-2.38	-0.51	0.00	0.00
	Outside	9.455	-8.66	6.10	-10.92	-0.51	-10.92	0.00	-2.56	-0.51	0.00	0.00
4	Inside	9.080	-8.31	6.10	12.24	0.81	12.24	0.00	-2.21	0.81	0.00	0.00
	Middle	9.080	-8.31	6.10	0.51	0.81	0.51	0.00	-2.21	0.81	0.00	0.00
	Outside	9.080	-8.31	6.10	-11.22	0.81	-11.22	0.00	-2.21	0.81	0.00	0.00
5	Inside	4.692	-4.30	6.10	-11.48	-0.13	-11.48	0.00	1.80	-0.13	0.00	0.00
	Middle	4.692	-4.30	6.10	0.51	-0.13	0.51	0.00	1.80	-0.13	0.00	0.00
	Outside	4.692	-4.30	6.10	12.49	-0.13	12.49	0.00	1.80	-0.13	0.00	0.00
6	Inside	0.305	-0.28	6.10	30.50	-1.07	30.50	0.00	5.82	-1.07	0.00	0.00
	Middle	0.305	-0.28	6.10	0.51	-1.07	0.51	0.00	5.82	-1.07	0.00	0.00
	Outside	0.305	-0.28	6.10	-29.49	-1.07	-29.49	0.00	5.82	-1.07	0.00	0.00
7	Inside	0.305	0.28	6.10	14.51	0.82	14.51	0.00	6.38	0.82	0.00	0.00
	Middle	0.305	0.28	6.10	0.24	0.82	0.24	0.00	6.38	0.82	0.00	0.00
	Outside	0.305	0.28	6.10	-14.02	0.82	-14.02	0.00	6.38	0.82	0.00	0.00
8	Inside	4.692	4.30	6.10	-10.11	-0.12	-10.11	0.00	10.40	-0.12	0.00	0.00
	Middle	4.692	4.30	6.10	0.24	-0.12	0.24	0.00	10.40	-0.12	0.00	0.00
	Outside	4.692	4.30	6.10	10.60	-0.12	10.60	0.00	10.40	-0.12	0.00	0.00
9	Inside	9.080	8.31	6.10	30.97	-1.05	30.97	0.00	14.41	-1.05	0.00	0.00
	Middle	9.080	8.31	6.10	0.24	-1.05	0.24	0.00	14.41	-1.05	0.00	0.00
	Outside	9.080	8.31	6.10	-30.49	-1.05	-30.49	0.00	14.41	-1.05	0.00	0.00
10	Inside	9.080	8.31	6.10	31.78	3.16	31.78	0.00	14.41	3.16	0.00	0.00
	Middle	9.268	8.48	6.10	1.05	3.16	1.05	0.00	14.58	3.16	0.00	0.00
	Outside	9.455	8.66	6.10	-29.68	3.16	-29.68	0.00	14.76	3.16	0.00	0.00
11	Inside	9.080	8.31	6.10	-3.66	0.01	-3.66	0.00	14.41	0.01	0.00	0.00
	Middle	9.268	8.48	6.10	1.05	0.01	1.05	0.00	14.58	0.01	0.00	0.00
	Outside	9.455	8.66	6.10	5.77	0.01	5.77	0.00	14.76	0.01	0.00	0.00
12	Inside	9.080	8.31	6.10	-3.84	0.20	-3.84	0.00	14.41	0.20	0.00	0.00
	Middle	9.268	8.48	6.10	1.05	0.20	1.05	0.00	14.58	0.20	0.00	0.00
	Outside	9.455	8.66	6.10	5.94	0.20	5.94	0.00	14.76	0.20	0.00	0.00
13	Inside	9.080	8.31	6.10	-3.21	-0.15	-3.21	0.00	14.41	-0.15	0.00	0.00
	Middle	9.268	8.48	6.10	1.07	-0.15	1.07	0.00	14.58	-0.15	0.00	0.00
	Outside	9.455	8.66	6.10	5.35	-0.15	5.35	0.00	14.76	-0.15	0.00	0.00
14	Inside	9.080	8.31	6.10	-3.65	-0.44	-3.65	0.00	14.41	-0.44	0.00	0.00
	Middle	9.268	8.48	6.10	1.07	-0.44	1.07	0.00	14.58	-0.44	0.00	0.00
	Outside	9.455	8.66	6.10	5.79	-0.44	5.79	0.00	14.76	-0.44	0.00	0.00
15	Inside	9.080	8.31	6.10	32.60	-3.23	32.60	0.00	14.41	-3.23	0.00	0.00
	Middle	9.268	8.48	6.10	1.07	-3.23	1.07	0.00	14.58	-3.23	0.00	0.00
	Outside	9.455	8.66	6.10	-30.46	-3.23	-30.46	0.00	14.76	-3.23	0.00	0.00
16	Inside	9.080	8.31	6.10	31.55	1.07	31.55	0.00	14.41	1.07	0.00	0.00
	Middle	9.080	8.31	6.10	0.02	1.07	0.02	0.00	14.41	1.07	0.00	0.00
	Outside	9.080	8.31	6.10	-31.52	1.07	-31.52	0.00	14.41	1.07	0.00	0.00
17	Inside	4.692	4.30	6.10	-10.73	0.13	-10.73	0.00	10.40	0.13	0.00	0.00
	Middle	4.692	4.30	6.10	0.02	0.13	0.02	0.00	10.40	0.13	0.00	0.00
	Outside	4.692	4.30	6.10	10.76	0.13	10.76	0.00	10.40	0.13	0.00	0.00
18	Inside	0.305	0.28	6.10	12.69	-0.80	12.69	0.00	6.38	-0.80	0.00	0.00
	Middle	0.305	0.28	6.10	0.02	-0.80	0.02	0.00	6.38	-0.80	0.00	0.00
	Outside	0.305	0.28	6.10	-12.66	-0.80	-12.66	0.00	6.38	-0.80	0.00	0.00

TABLE 2.10.9-13 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 4-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP+ MNOP, T=-20°F 3 FUEL ELEMENTS SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP+ Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal +MNOP + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.28	6.10	31.86	1.08	31.86	0.00	5.82	1.08	0.00	0.00
	Middle	0.305	-0.28	6.10	0.51	1.08	0.51	0.00	5.82	1.08	0.00	0.00
	Outside	0.305	-0.28	6.10	-30.84	1.08	-30.84	0.00	5.82	1.08	0.00	0.00
20	Inside	4.692	-4.30	6.10	-10.98	0.14	-10.98	0.00	1.80	0.14	0.00	0.00
	Middle	4.692	-4.30	6.10	0.51	0.14	0.51	0.00	1.80	0.14	0.00	0.00
	Outside	4.692	-4.30	6.10	11.99	0.14	11.99	0.00	1.80	0.14	0.00	0.00
21	Inside	9.080	-8.31	6.10	11.89	-0.79	11.89	0.00	-2.21	-0.79	0.00	0.00
	Middle	9.080	-8.31	6.10	0.51	-0.79	0.51	0.00	-2.21	-0.79	0.00	0.00
	Outside	9.080	-8.31	6.10	-10.88	-0.79	-10.88	0.00	-2.21	-0.79	0.00	0.00
22	Inside	9.080	-8.31	6.10	12.18	0.51	12.18	0.00	-2.21	0.51	0.00	0.00
	Middle	9.268	-8.48	6.10	0.79	0.51	0.79	0.00	-2.38	0.51	0.00	0.00
	Outside	9.455	-8.66	6.10	-10.59	0.51	-10.59	0.00	-2.56	0.51	0.00	0.00
23	Inside	9.080	-8.31	6.10	-3.81	-0.05	-3.81	0.00	-2.21	-0.05	0.00	0.00
	Middle	9.268	-8.48	6.10	0.79	-0.05	0.79	0.00	-2.38	-0.05	0.00	0.00
	Outside	9.455	-8.66	6.10	5.40	-0.05	5.40	0.00	-2.56	-0.05	0.00	0.00
24	Inside	9.080	-8.31	6.10	19.29	-0.61	19.29	0.00	-2.21	-0.61	0.00	0.00
	Middle	9.268	-8.48	6.10	0.79	-0.61	0.79	0.00	-2.38	-0.61	0.00	0.00
	Outside	9.455	-8.66	6.10	-17.70	-0.61	-17.70	0.00	-2.56	-0.61	0.00	0.00
25	Inside	9.080	-8.31	0.00	1.70	-0.01	1.70	0.00	-8.31	-0.01	0.00	0.00
	Middle	9.080	-8.31	0.00	1.63	-0.01	1.63	0.00	-8.31	-0.01	0.00	0.00
	Outside	9.080	-8.31	0.00	1.56	-0.01	1.56	0.00	-8.31	-0.01	0.00	0.00
26	Inside	4.692	-4.30	0.00	1.28	-0.01	1.28	0.00	-4.30	-0.01	0.00	0.00
	Middle	4.692	-4.30	0.00	1.63	-0.01	1.63	0.00	-4.30	-0.01	0.00	0.00
	Outside	4.692	-4.30	0.00	1.99	-0.01	1.99	0.00	-4.30	-0.01	0.00	0.00
27	Inside	0.305	-0.28	0.00	0.85	-0.01	0.85	0.00	-0.28	-0.01	0.00	0.00
	Middle	0.305	-0.28	0.00	1.63	-0.01	1.63	0.00	-0.28	-0.01	0.00	0.00
	Outside	0.305	-0.28	0.00	2.41	-0.01	2.41	0.00	-0.28	-0.01	0.00	0.00
28	Inside	0.305	0.28	0.00	13.26	0.26	13.26	0.00	0.28	0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	0.26	2.53	0.00	0.00	0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	-8.19	0.26	-8.19	0.00	-0.28	0.26	0.00	0.00
29	Inside	0.305	0.28	0.00	3.94	0.26	3.94	0.00	0.28	0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	0.26	2.53	0.00	0.00	0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	1.13	0.26	1.13	0.00	-0.28	0.26	0.00	0.00
30	Inside	0.305	0.28	0.00	-5.38	0.26	-5.38	0.00	0.28	0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	0.26	2.53	0.00	0.00	0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	10.45	0.26	10.45	0.00	-0.28	0.26	0.00	0.00
31	Inside	0.305	0.28	0.00	2.92	-0.02	2.92	0.00	0.28	-0.02	0.00	0.00
	Middle	0.305	0.28	0.00	2.03	-0.02	2.03	0.00	0.28	-0.02	0.00	0.00
	Outside	0.305	0.28	0.00	1.14	-0.02	1.14	0.00	0.28	-0.02	0.00	0.00
32	Inside	4.692	4.30	0.00	2.32	-0.02	2.32	0.00	4.30	-0.02	0.00	0.00
	Middle	4.692	4.30	0.00	2.03	-0.02	2.03	0.00	4.30	-0.02	0.00	0.00
	Outside	4.692	4.30	0.00	1.74	-0.02	1.74	0.00	4.30	-0.02	0.00	0.00
33	Inside	9.080	8.31	0.00	1.72	-0.02	1.72	0.00	8.31	-0.02	0.00	0.00
	Middle	9.080	8.31	0.00	2.03	-0.02	2.03	0.00	8.31	-0.02	0.00	0.00
	Outside	9.080	8.31	0.00	2.34	-0.02	2.34	0.00	8.31	-0.02	0.00	0.00
34	Inside	0.305	0.28	0.00	11.57	-0.03	11.57	0.00	0.28	-0.03	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	-0.03	2.53	0.00	0.00	-0.03	0.00	0.00
	Outside	0.305	-0.28	0.00	-6.52	-0.03	-6.52	0.00	-0.28	-0.03	0.00	0.00
35	Inside	0.305	0.28	0.00	6.40	-0.26	6.40	0.00	0.28	-0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	-0.26	2.53	0.00	0.00	-0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	-1.35	-0.26	-1.35	0.00	-0.28	-0.26	0.00	0.00
36	Inside	0.305	0.28	0.00	-6.86	-0.49	-6.86	0.00	0.28	-0.49	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	-0.49	2.53	0.00	0.00	-0.49	0.00	0.00
	Outside	0.305	-0.28	0.00	11.92	-0.49	11.92	0.00	-0.28	-0.49	0.00	0.00

TABLE 2.10.9-14 CAVITY LINER AND FSS STRESS (ksi) AND DESIGN MARGINS, LOAD CASE 4-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP+ MNOP, T=-20°F, 3 FUEL ELEMENTS

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	19.44	0.00	-2.21	0.61	0.00	0.00	19.46	-0.02	-2.21	21.67	Pm+Pb	49.95	1.30
	Middle		0.81	0.00	-2.38	0.61	0.00	0.00	1.14	-0.33	-2.38	3.52	Pm	33.30	8.46
	Outside		-17.83	0.00	-2.56	0.61	0.00	0.00	0.02	-2.56	-17.85	17.87	Pm+Pb	49.95	1.79
2	Inside	75j	-3.56	0.00	-2.21	0.05	0.00	0.00	0.00	-2.21	-3.56	3.56	Pm+Pb	49.95	13.03
	Middle		0.81	0.00	-2.38	0.05	0.00	0.00	0.81	0.00	-2.38	3.20	Pm	33.30	9.42
	Outside		5.17	0.00	-2.56	0.05	0.00	0.00	5.17	0.00	-2.56	7.73	Pm+Pb	49.95	5.47
3	Inside	80j	12.54	0.00	-2.21	-0.51	0.00	0.00	12.56	-0.02	-2.21	14.77	Pm+Pb	49.95	2.38
	Middle		0.81	0.00	-2.38	-0.51	0.00	0.00	1.06	-0.25	-2.38	3.44	Pm	33.30	8.68
	Outside		-10.92	0.00	-2.56	-0.51	0.00	0.00	0.02	-2.56	-10.94	10.97	Pm+Pb	49.95	3.55
4	Inside	40j	12.24	0.00	-2.21	0.81	0.00	0.00	12.29	-0.05	-2.21	14.51	Pm+Pb	49.95	2.44
	Middle		0.51	0.00	-2.21	0.81	0.00	0.00	1.10	-0.59	-2.21	3.32	Pm	33.30	9.04
	Outside		-11.22	0.00	-2.21	0.81	0.00	0.00	0.06	-2.21	-11.28	11.34	Pm+Pb	49.95	3.41
5	Inside	35j	-11.48	0.00	1.80	-0.13	0.00	0.00	1.80	0.00	-11.48	13.29	Pm+Pb	49.95	2.76
	Middle		0.51	0.00	1.80	-0.13	0.00	0.00	1.80	0.54	-0.03	1.84	Pm	33.30	17.14
	Outside		12.49	0.00	1.80	-0.13	0.00	0.00	12.49	1.80	0.00	12.49	Pm+Pb	49.95	3.00
6	Inside	31i	30.50	0.00	5.82	-1.07	0.00	0.00	30.54	5.82	-0.04	30.57	Pm+Pb	49.95	0.63
	Middle		0.51	0.00	5.82	-1.07	0.00	0.00	5.82	1.35	-0.84	6.67	Pm	33.30	4.00
	Outside		-29.49	0.00	5.82	-1.07	0.00	0.00	5.82	0.04	-29.53	35.35	Pm+Pb	49.95	0.41
7	Inside	30j	14.51	0.00	6.38	0.82	0.00	0.00	14.56	6.38	-0.05	14.60	Pm+Pb	49.95	2.42
	Middle		0.24	0.00	6.38	0.82	0.00	0.00	6.38	0.95	-0.71	7.09	Pm	33.30	3.70
	Outside		-14.02	0.00	6.38	0.82	0.00	0.00	6.38	0.05	-14.07	20.45	Pm+Pb	49.95	1.44
8	Inside	25j	-10.11	0.00	10.40	-0.12	0.00	0.00	10.40	0.00	-10.11	20.51	Pm+Pb	49.95	1.44
	Middle		0.24	0.00	10.40	-0.12	0.00	0.00	10.40	0.29	-0.05	10.44	Pm	33.30	2.19
	Outside		10.60	0.00	10.40	-0.12	0.00	0.00	10.60	10.40	0.00	10.60	Pm+Pb	49.95	3.71
9	Inside	21j	30.97	0.00	14.41	-1.05	0.00	0.00	31.01	14.41	-0.04	31.04	Pm+Pb	49.95	0.61
	Middle		0.24	0.00	14.41	-1.05	0.00	0.00	14.41	1.18	-0.94	15.35	Pm	33.30	1.17
	Outside		-30.49	0.00	14.41	-1.05	0.00	0.00	14.41	0.04	-30.53	44.94	Pm+Pb	49.95	0.11

ca/marg-xnfep-cold

TABLE 2.10.9-14 (cont.) CAVITY LINER AND FSS STRESS (ksi) AND DESIGN MARGINS, LOAD CASE 4-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP+ MNOP, T=-20°F, 3 FUEL ELEMENTS

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	31.78	0.00	14.41	3.16	0.00	0.00	32.09	14.41	-0.31	32.40	Pm+Pb	49.95	0.54
	Middle		1.05	0.00	14.58	3.16	0.00	0.00	14.58	3.73	-2.68	17.26	Pm	33.30	0.93
	Outside		-29.68	0.00	14.76	3.16	0.00	0.00	14.76	0.33	-30.01	44.77	Pm+Pb	49.95	0.12
11	Inside	15j	-3.66	0.00	14.41	0.01	0.00	0.00	14.41	0.00	-3.66	18.07	Pm+Pb	49.95	1.76
	Middle		1.05	0.00	14.58	0.01	0.00	0.00	14.58	1.05	0.00	14.58	Pm	33.30	1.28
	Outside		5.77	0.00	14.76	0.01	0.00	0.00	14.76	5.77	0.00	14.76	Pm+Pb	49.95	2.39
12	Inside	11i	-3.84	0.00	14.41	0.20	0.00	0.00	14.41	0.01	-3.85	18.26	Pm+Pb	49.95	1.74
	Middle		1.05	0.00	14.58	0.20	0.00	0.00	14.58	1.09	-0.04	14.62	Pm	33.30	1.28
	Outside		5.94	0.00	14.76	0.20	0.00	0.00	14.76	5.95	-0.01	14.76	Pm+Pb	49.95	2.38
13	Inside	10j	-3.21	0.00	14.41	-0.15	0.00	0.00	14.41	0.01	-3.22	17.63	Pm+Pb	49.95	1.83
	Middle		1.07	0.00	14.58	-0.15	0.00	0.00	14.58	1.09	-0.02	14.60	Pm	33.30	1.28
	Outside		5.35	0.00	14.76	-0.15	0.00	0.00	14.76	5.35	0.00	14.76	Pm+Pb	49.95	2.38
14	Inside	5j	-3.65	0.00	14.41	-0.44	0.00	0.00	14.41	0.05	-3.70	18.11	Pm+Pb	49.95	1.76
	Middle		1.07	0.00	14.58	-0.44	0.00	0.00	14.58	1.23	-0.16	14.74	Pm	33.30	1.26
	Outside		5.79	0.00	14.76	-0.44	0.00	0.00	14.76	5.82	-0.03	14.79	Pm+Pb	49.95	2.38
15	Inside	1i	32.60	0.00	14.41	-3.23	0.00	0.00	32.92	14.41	-0.32	33.23	Pm+Pb	49.95	0.50
	Middle		1.07	0.00	14.58	-3.23	0.00	0.00	14.58	3.81	-2.74	17.32	Pm	33.30	0.92
	Outside		-30.46	0.00	14.76	-3.23	0.00	0.00	14.76	0.34	-30.80	45.55	Pm+Pb	49.95	0.10
16	Inside	41i	31.55	0.00	14.41	1.07	0.00	0.00	31.59	14.41	-0.04	31.62	Pm+Pb	49.95	0.58
	Middle		0.02	0.00	14.41	1.07	0.00	0.00	14.41	1.08	-1.06	15.47	Pm	33.30	1.15
	Outside		-31.52	0.00	14.41	1.07	0.00	0.00	14.41	0.04	-31.56	45.97	Pm+Pb	49.95	0.09
17	Inside	45j	-10.73	0.00	10.40	0.13	0.00	0.00	10.40	0.00	-10.73	21.13	Pm+Pb	49.95	1.36
	Middle		0.02	0.00	10.40	0.13	0.00	0.00	10.40	0.14	-0.12	10.52	Pm	33.30	2.17
	Outside		10.76	0.00	10.40	0.13	0.00	0.00	10.76	10.40	0.00	10.76	Pm+Pb	49.95	3.64
18	Inside	50j	12.69	0.00	6.38	-0.80	0.00	0.00	12.74	6.38	-0.05	12.79	Pm+Pb	49.95	2.91
	Middle		0.02	0.00	6.38	-0.80	0.00	0.00	6.38	0.81	-0.79	7.17	Pm	33.30	3.64
	Outside		-12.66	0.00	6.38	-0.80	0.00	0.00	6.38	0.05	-12.71	19.09	Pm+Pb	49.95	1.62

ca/marg-xnfep-cold

TABLE 2.10.9-14 (cont.) CAVITY LINER AND FSS STRESS (ksi) AND DESIGN MARGINS, LOAD CASE 4-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP+ MNOP, T=-20°F, 3 FUEL ELEMENTS

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	31.86	0.00	5.82	1.08	0.00	0.00	31.90	5.82	-0.04	31.93	Pm+Pb	49.95	0.56
	Middle		0.51	0.00	5.82	1.08	0.00	0.00	5.82	1.36	-0.85	6.68	Pm	33.30	3.99
	Outside		-30.84	0.00	5.82	1.08	0.00	0.00	5.82	0.04	-30.88	36.70	Pm+Pb	49.95	0.36
20	Inside	55j	-10.98	0.00	1.80	0.14	0.00	0.00	1.80	0.00	-10.98	12.79	Pm+Pb	49.95	2.91
	Middle		0.51	0.00	1.80	0.14	0.00	0.00	1.80	0.55	-0.04	1.84	Pm	33.30	17.09
	Outside		11.99	0.00	1.80	0.14	0.00	0.00	11.99	1.80	0.00	11.99	Pm+Pb	49.95	3.16
21	Inside	60j	11.89	0.00	-2.21	-0.79	0.00	0.00	11.94	-0.05	-2.21	14.15	Pm+Pb	49.95	2.53
	Middle		0.51	0.00	-2.21	-0.79	0.00	0.00	1.09	-0.58	-2.21	3.30	Pm	33.30	9.10
	Outside		-10.88	0.00	-2.21	-0.79	0.00	0.00	0.06	-2.21	-10.94	10.99	Pm+Pb	49.95	3.54
22	Inside	61i	12.18	0.00	-2.21	0.51	0.00	0.00	12.20	-0.02	-2.21	14.41	Pm+Pb	49.95	2.47
	Middle		0.79	0.00	-2.38	0.51	0.00	0.00	1.04	-0.25	-2.38	3.42	Pm	33.30	8.73
	Outside		-10.59	0.00	-2.56	0.51	0.00	0.00	0.02	-2.56	-10.61	10.64	Pm+Pb	49.95	3.69
23	Inside	65j	-3.81	0.00	-2.21	-0.05	0.00	0.00	0.00	-2.21	-3.81	3.81	Pm+Pb	49.95	12.11
	Middle		0.79	0.00	-2.38	-0.05	0.00	0.00	0.79	0.00	-2.38	3.18	Pm	33.30	9.48
	Outside		5.40	0.00	-2.56	-0.05	0.00	0.00	5.40	0.00	-2.56	7.96	Pm+Pb	49.95	5.28
24	Inside	70j	19.29	0.00	-2.21	-0.61	0.00	0.00	19.31	-0.02	-2.21	21.52	Pm+Pb	49.95	1.32
	Middle		0.79	0.00	-2.38	-0.61	0.00	0.00	1.12	-0.33	-2.38	3.51	Pm	33.30	8.50
	Outside		-17.70	0.00	-2.56	-0.61	0.00	0.00	0.02	-2.56	-17.72	17.74	Pm+Pb	49.95	1.82
25	Inside	120j	1.70	0.00	-8.31	-0.01	0.00	0.00	1.70	0.00	-8.31	10.01	Pm+Pb	32.47	2.24
	Middle		1.63	0.00	-8.31	-0.01	0.00	0.00	1.63	0.00	-8.31	9.94	Pm	21.65	1.18
	Outside		1.56	0.00	-8.31	-0.01	0.00	0.00	1.56	0.00	-8.31	9.87	Pm+Pb	32.47	2.29
26	Inside	115j	1.28	0.00	-4.30	-0.01	0.00	0.00	1.28	0.00	-4.30	5.58	Pm+Pb	49.95	7.96
	Middle		1.63	0.00	-4.30	-0.01	0.00	0.00	1.63	0.00	-4.30	5.93	Pm	33.30	4.62
	Outside		1.99	0.00	-4.30	-0.01	0.00	0.00	1.99	0.00	-4.30	6.29	Pm+Pb	49.95	6.95
27	Inside	111i	0.85	0.00	-0.28	-0.01	0.00	0.00	0.85	0.00	-0.28	1.13	Pm+Pb	49.95	43.23
	Middle		1.63	0.00	-0.28	-0.01	0.00	0.00	1.63	0.00	-0.28	1.91	Pm	33.30	16.44
	Outside		2.41	0.00	-0.28	-0.01	0.00	0.00	2.41	0.00	-0.28	2.69	Pm+Pb	49.95	17.57

ca/marg-xnfep-cold

TABLE 2.10.9-14 (cont.) CAVITY LINER AND FSS STRESS (ksi) AND DESIGN MARGINS, LOAD CASE 4-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP+ MNOP, T=-20°F, 3 FUEL ELEMENTS

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	13.26	0.00	0.28	0.26	0.00	0.00	13.27	0.28	-0.01	13.27	Pm+Pb	49.95	2.76
	Middle		2.53	0.00	0.00	0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	33.30	11.89
	Outside		-8.19	0.00	-0.28	0.26	0.00	0.00	0.01	-0.28	-8.20	8.21	Pm+Pb	49.95	5.09
29	Inside	105j	3.94	0.00	0.28	0.26	0.00	0.00	3.96	0.28	-0.02	3.97	Pm+Pb	49.95	11.57
	Middle		2.53	0.00	0.00	0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	33.30	11.89
	Outside		1.13	0.00	-0.28	0.26	0.00	0.00	1.19	-0.06	-0.28	1.47	Pm+Pb	49.95	33.07
30	Inside	110j	-5.38	0.00	0.28	0.26	0.00	0.00	0.28	0.01	-5.39	5.67	Pm+Pb	32.47	4.72
	Middle		2.53	0.00	0.00	0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	21.65	7.38
	Outside		10.45	0.00	-0.28	0.26	0.00	0.00	10.46	-0.01	-0.28	10.74	Pm+Pb	32.47	2.02
31	Inside	90j	2.92	0.00	0.28	-0.02	0.00	0.00	2.92	0.28	0.00	2.92	Pm+Pb	49.95	16.10
	Middle		2.03	0.00	0.28	-0.02	0.00	0.00	2.03	0.28	0.00	2.03	Pm	33.30	15.40
	Outside		1.14	0.00	0.28	-0.02	0.00	0.00	1.14	0.28	0.00	1.14	Pm+Pb	49.95	42.79
32	Inside	85j	2.32	0.00	4.30	-0.02	0.00	0.00	4.30	2.32	0.00	4.30	Pm+Pb	49.95	10.63
	Middle		2.03	0.00	4.30	-0.02	0.00	0.00	4.30	2.03	0.00	4.30	Pm	33.30	6.75
	Outside		1.74	0.00	4.30	-0.02	0.00	0.00	4.30	1.74	0.00	4.30	Pm+Pb	49.95	10.63
33	Inside	81j	1.72	0.00	8.31	-0.02	0.00	0.00	8.31	1.72	0.00	8.31	Pm+Pb	32.47	2.91
	Middle		2.03	0.00	8.31	-0.02	0.00	0.00	8.31	2.03	0.00	8.31	Pm	21.65	1.60
	Outside		2.34	0.00	8.31	-0.02	0.00	0.00	8.31	2.34	0.00	8.31	Pm+Pb	32.47	2.91
34	Inside	100j	11.57	0.00	0.28	-0.03	0.00	0.00	11.57	0.28	0.00	11.57	Pm+Pb	49.95	3.32
	Middle		2.53	0.00	0.00	-0.03	0.00	0.00	2.53	0.00	0.00	2.53	Pm	33.30	12.16
	Outside		-6.52	0.00	-0.28	-0.03	0.00	0.00	0.00	-0.28	-6.52	6.52	Pm+Pb	49.95	6.66
35	Inside	95j	6.40	0.00	0.28	-0.26	0.00	0.00	6.41	0.28	-0.01	6.42	Pm+Pb	49.95	6.78
	Middle		2.53	0.00	0.00	-0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	33.30	11.89
	Outside		-1.35	0.00	-0.28	-0.26	0.00	0.00	0.05	-0.28	-1.40	1.45	Pm+Pb	49.95	33.53
36	Inside	91i	-6.86	0.00	0.28	-0.49	0.00	0.00	0.28	0.03	-6.89	7.17	Pm+Pb	32.47	3.53
	Middle		2.53	0.00	0.00	-0.49	0.00	0.00	2.62	0.00	-0.09	2.71	Pm	21.65	6.98
	Outside		11.92	0.00	-0.28	-0.49	0.00	0.00	11.94	-0.02	-0.28	12.22	Pm+Pb	32.47	1.66

ca/marg-xnfep-cold

TABLE 2.10.9-15 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
SIDE DROP - FLAT ORIENTATION, FOUR FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
1	1 ft drop	cavity liner	B	1 / 24	middle	P_m	4.01	32.75	7.16
				1/24	outside	$P_m + P_b$	15.39	49.13	2.19
		FSS		33	middle	P_m	3.74	20.47	4.47
				33	inside/outside	$P_m + P_b$	3.74	30.71	7.21
2	1 ft drop+MNOP	cavity liner	B	3 / 22	middle	P_m	4.79	32.75	5.84
				6/19	inside	$P_m + P_b$	26.86	49.13	0.83
		FSS		25	middle	P_m	3.41	20.47	5.00
				30/36	outside	$P_m + P_b$	3.21	30.71	8.56
1	1 ft drop	cavity liner	E	3 / 22	middle	P_m	9.84	32.75	2.33
				1/24	outside	$P_m + P_b$	19.07	49.13	1.58
		FSS		33	middle	P_m	8.86	20.47	1.31
				33	inside/outside	$P_m + P_b$	8.86	30.71	2.47
2	1 ft drop+MNOP	cavity liner	E	1/24	middle	P_m	10.61	32.75	2.09
				9/16	outside	$P_m + P_b$	38.7	49.13	0.27
		FSS		25	middle	P_m	9.95	20.47	1.06
				30/36	outside	$P_m + P_b$	12.01	30.71	1.56
17	30 ft drop	cavity liner	B	3/22	middle	P_m	9.96	68.74	5.90
				1/24	outside	$P_m + P_b$	45.11	98.20	1.18
		FSS		33	middle	P_m	11.51	43.02	2.74
				33	inside/outside	$P_m + P_b$	11.51	61.46	4.34
18	30 ft drop+MNOP	cavity liner	B	1/24	middle	P_m	9.97	68.74	5.89
				6	inside/outside	$P_m + P_b$	30.38	98.28	2.23
		FSS		33	middle	P_m	9.86	43.02	3.36
				33	inside/outside	$P_m + P_b$	9.86	61.46	5.23
17	30 ft drop	cavity liner	E	10/15	middle	P_m	29.71	68.74	1.31
				9/16	outside	$P_m + P_b$	58.57	98.20	0.68
		FSS		33	middle	P_m	28.50	43.02	0.51
				33	inside/outside	$P_m + P_b$	28.50	61.46	1.16
18	30 ft drop+MNOP	cavity liner	E	10/15	middle	P_m	30.95	68.74	1.22
				9/16	outside	$P_m + P_b$	78.90	98.20	0.24
		FSS		33	middle	P_m	28.50	43.02	0.66
				30/36	outside	$P_m + P_b$	29.58	61.46	1.08

TABLE 2.10.9- 16 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
SIDE DROP - CORNER ORIENTATION, FOUR FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
5	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
6	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
5	1 ft drop	cavity liner	E	3/4	middle	P_m	13.11	32.75	1.50
				3/4	outside	$P_m + P_b$	26.03	49.13	0.89
		FSS		33	middle	P_m	7.1	20.47	1.88
				36	outside	$P_m + P_b$	15.32	30.71	1.00
6	1 ft drop+MNOP	cavity liner	E	15/16	middle	P_m	17.51	32.75	0.87
				1/6	inside	$P_m + P_b$	34.73	49.13	0.41
		FSS		25/30	middle	P_m	7.86	20.47	1.60
				30	outside	$P_m + P_b$	16.54	30.71	0.86
21	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
22	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
21	30 ft drop	cavity liner	E	14/17	middle	P_m	51.03	68.74	0.35
				3/4	outside	$P_m + P_b$	77.75	98.02	0.26
		FSS		33/36	middle	P_m	21.7	43.02	0.98
				36	outside	$P_m + P_b$	46.32	61.46	0.33
22	30 ft drop+MNOP	cavity liner	E	14/17	middle	P_m	51.03	68.74	0.35
				12/19	inside	$P_m + P_b$	61.14	98.20	0.61
		FSS		25/30	middle	P_m	19.39	43.02	1.22
				30	outside	$P_m + P_b$	43.07	61.46	0.43

TABLE 2.10.9- 17 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
SIDE DROP - FLAT ORIENTATION, THREE FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
3	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
4	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
3	1 ft drop	cavity liner	E	3 / 22	middle	P_m	9.83	32.75	2.33
				22	outside	$P_m + P_b$	19.09	49.13	1.57
		FSS		33	middle	P_m	8.95	20.47	1.29
				33	inside	$P_m + P_b$	9.25	30.71	2.32
4	1 ft drop+MNOP	cavity liner	E	1	middle	P_m	10.62	32.75	2.28
				16	outside	$P_m + P_b$	38.87	49.13	0.26
		FSS		33	middle	P_m	8.31	20.47	1.46
				36	outside	$P_m + P_b$	12.22	30.71	1.51
19	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
20	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
19	30 ft drop	cavity liner	E	15	middle	P_m	29.73	68.74	1.31
				16	outside	$P_m + P_b$	59.1	98.02	0.66
		FSS		33	middle	P_m	27.44	43.02	0.57
				33	inside	$P_m + P_b$	28.37	61.46	1.17
20	30 ft drop+MNOP	cavity liner	E	15	middle	P_m	30.99	68.74	1.22
				16	outside	$P_m + P_b$	79.43	98.20	0.24
		FSS		33	middle	P_m	25.49	43.02	0.69
				36	outside	$P_m + P_b$	30.22	61.46	1.03

TABLE 2.10.9- 18 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
SIDE DROP - CORNER ORIENTATION, THREE FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
7	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
8	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
7	1 ft drop	cavity liner	E	14/16	middle	P_m	15.31	32.75	1.14
				3/4	outside	$P_m + P_b$	25.65	49.13	0.92
		FSS		33/36	middle	P_m	6.86	20.47	1.99
				36	outside	$P_m + P_b$	15.11	30.71	1.03
8	1 ft drop+MNOP	cavity liner	E	15/16	middle	P_m	17.51	32.75	0.87
				1/6	inside	$P_m + P_b$	33.96	49.13	0.45
		FSS		25/30	middle	P_m	7.82	20.47	1.62
				30	outside	$P_m + P_b$	15.79	30.71	0.94
23	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
24	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
23	30 ft drop	cavity liner	E	14/17	middle	P_m	51.03	68.74	0.35
				3/4	outside	$P_m + P_b$	76.58	98.02	0.28
		FSS		33/36	middle	P_m	21.01	43.02	1.05
				36	outside	$P_m + P_b$	45.69	61.46	0.35
24	30 ft drop+MNOP	cavity liner	E	14/17	middle	P_m	51.03	68.74	0.35
				12/19	inside	$P_m + P_b$	61.23	98.20	0.60
		FSS		25	middle	P_m	19.0	43.02	1.26
				30	outside	$P_m + P_b$	40.76	61.46	0.51

TABLE 2.10.9-19 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
OBLIQUE LOADING CONDITION, 15° IMPACT - FLAT ORIENTATION, FOUR FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
9	1 ft drop	cavity liner	B	1/24	middle	P_m	3.41	32.75	8.60
				1/24	outside	$P_m + P_b$	17.91	49.13	1.74
		FSS		33	middle	P_m	3.38	20.47	5.06
				33	inside/outside	$P_m + P_b$	3.38	30.71	8.09
10	1 ft drop+MNOP	cavity liner	B	4/21	middle	P_m	3.94	32.75	7.31
				6/19	inside	$P_m + P_b$	28.57	49.13	0.72
		FSS		25	middle	P_m	2.44	20.47	7.39
				30	outside	$P_m + P_b$	4.35	30.71	6.06
9	1 ft drop	cavity liner	D	1/24	middle	P_m	5.80	32.75	4.64
				1/24	outside	$P_m + P_b$	14.59	49.13	2.37
		FSS		33	middle	P_m	5.88	20.47	2.48
				33	inside/outside	$P_m + P_b$	5.88	30.71	4.22
10	1 ft drop+MNOP	cavity liner	D	3/22	middle	P_m	6.67	32.75	3.91
				6/19	inside	$P_m + P_b$	27.33	49.13	0.80
		FSS		33	middle	P_m	4.38	20.47	3.68
				30/36	outside	$P_m + P_b$	5.54	30.71	4.55
25	30 ft drop	cavity liner	B	1/24	middle	P_m	9.48	68.74	6.25
				1/24	inside	$P_m + P_b$	54.13	98.20	0.81
		FSS		33	middle	P_m	11.38	43.02	2.78
				30/36	inside/outside	$P_m + P_b$	12.22	61.46	4.03
26	30 ft drop+MNOP	cavity liner	B	10/15	middle	P_m	10.94	68.74	5.29
				6/19	outside	$P_m + P_b$	41.61	98.20	1.36
		FSS		33	middle	P_m	10.18	43.02	3.23
				30/36	outside	$P_m + P_b$	14.48	61.46	3.24
25	30 ft drop	cavity liner	D	3/22	middle	P_m	17.89	68.74	2.84
				3/22	outside	$P_m + P_b$	44.57	98.20	1.20
		FSS		33	middle	P_m	18.53	43.02	1.32
				30/36	outside	$P_m + P_b$	23.71	61.46	1.59
26	30 ft drop+MNOP	cavity liner	D	10/15	middle	P_m	18.00	68.74	2.82
				9/16	outside	$P_m + P_b$	63.08	98.20	0.56
		FSS		33	middle	P_m	15.87	43.02	1.71
				30/36	outside	$P_m + P_b$	27.18	61.64	1.26

TABLE 2.10.9-20 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
OBLIQUE LOADING CONDITION, 15° IMPACT - FLAT ORIENTATION, THREE FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
11	1 ft drop	cavity liner	B	24	middle	P_m	3.42	32.75	8.58
				24	outside	$P_m + P_b$	18.06	49.13	1.72
		FSS		33	middle	P_m	3.07	20.47	5.67
				33	inside	$P_m + P_b$	3.36	30.71	8.14
12	1 ft drop+MNOP	cavity liner	B	4	middle	P_m	3.95	32.75	7.29
				19	inside	$P_m + P_b$	28.84	49.13	0.70
		FSS		33	middle	P_m	1.83	20.47	10.19
				36	outside	$P_m + P_b$	4.59	30.71	5.69
11	1 ft drop	cavity liner	D			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
12	1 ft drop+MNOP	cavity liner	D			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
27	30 ft drop	cavity liner	B	1	middle	P_m	9.50	68.74	6.23
				24	outside	$P_m + P_b$	54.63	98.20	0.80
		FSS		33	middle	P_m	10.9	43.02	3.16
				33	outside	$P_m + P_b$	13.12	61.46	3.67
28	30 ft drop+MNOP	cavity liner	B	15	middle	P_m	11.08	68.74	5.21
				19	outside	$P_m + P_b$	42.54	98.20	1.31
		FSS		33	middle	P_m	8.69	43.02	3.95
				36	outside	$P_m + P_b$	15.39	61.46	2.99
27	30 ft drop	cavity liner	D			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
28	30 ft drop+MNOP	cavity liner	D			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			

TABLE 2.10.9-21 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
OBLIQUE LOADING CONDITION, 15° IMPACT - CORNER ORIENTATION, FOUR FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
13	1 ft drop	cavity liner	B	3/4	middle	P_m	3.84	32.75	7.54
				3/4	outside	$P_m + P_b$	11.33	49.13	3.34
		FSS		33/36	middle	P_m	2.38	20.47	7.60
				33	outside	$P_m + P_b$	5.7	30.71	4.39
14	1 ft drop+MNOP	cavity liner	B	12/19	middle	P_m	5.0	32.75	5.55
				1	inside	$P_m + P_b$	18.79	49.13	1.61
		FSS		25/30	middle	P_m	2.32	20.47	7.84
				33/36	inside/outside	$P_m + P_b$	6.09	30.71	4.05
13	1 ft drop	cavity liner	D	3/4	middle	P_m	7.44	32.75	3.40
				3/4	outside	$P_m + P_b$	16.75	49.13	1.94
		FSS		36	middle	P_m	4.03	20.47	4.02
				30	outside	$P_m + P_b$	9.90	30.71	3.43
14	1 ft drop+MNOP	cavity liner	D	13	middle	P_m	11.13	32.75	1.94
				1/6	inside	$P_m + P_b$	29.61	49.13	0.66
		FSS		30	middle	P_m	5.14	20.47	2.98
				25	inside	$P_m + P_b$	10.39	30.71	1.95
29	30 ft drop	cavity liner	B	3/4	middle	P_m	11.12	68.74	5.18
				1	inside	$P_m + P_b$	38.57	98.20	1.55
		FSS		33/36	middle	P_m	8.39	43.02	4.13
				33	outside	$P_m + P_b$	20.0	61.46	2.07
30	30 ft drop+MNOP	cavity liner	B	12/19	middle	P_m	11.63	68.74	4.91
				12/19	outside	$P_m + P_b$	27.17	98.20	2.61
		FSS		33/36	middle	P_m	6.87	43.02	5.26
				33	outside	$P_m + P_b$	20.36	61.46	2.02
29	30 ft drop	cavity liner	D	14/17	middle	P_m	28.57	68.74	1.41
				3/4	outside	$P_m + P_b$	56.1	98.20	0.75
		FSS		33/36	middle	P_m	14.29	43.02	2.01
				30	outside	$P_m + P_b$	24.61	61.46	1.50
30	30 ft drop+MNOP	cavity liner	D	13/18	middle	P_m	30.01	68.74	1.24
				12/19	inside	$P_m + P_b$	37.85	98.20	1.59
		FSS		25/30	middle	P_m	12.16	43.02	2.54
				30	outside	$P_m + P_b$	28.29	61.46	1.17

TABLE 2.10.9-22 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - HOT ENVIRONMENT
OBLIQUE LOADING CONDITION, 15° IMPACT - CORNER ORIENTATION, THREE FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
15	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
16	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
15	1 ft drop	cavity liner	D	3/4	middle	P_m	7.43	32.75	3.41
				3/4	outside	$P_m + P_b$	16.4	49.13	2.00
		FSS		33	middle	P_m	3.86	20.47	4.30
				36	outside	$P_m + P_b$	6.22	30.71	3.94
16	1 ft drop+MNOP	cavity liner	D	13	middle	P_m	11.13	32.75	1.94
				1/6	inside	$P_m + P_b$	28.94	49.13	0.70
		FSS		30	middle	P_m	5.12	20.47	3.00
				30	outside	$P_m + P_b$	9.96	30.71	2.08
31	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
32	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
31	30 ft drop	cavity liner	D	14/17	middle	P_m	28.57	68.74	1.41
				3/4	outside	$P_m + P_b$	57.98	98.20	0.79
		FSS		33/36	middle	P_m	13.56	43.02	2.17
				30	outside	$P_m + P_b$	22.38	61.46	1.75
32	30 ft drop+MNOP	cavity liner	D	13/18	middle	P_m	30.01	68.74	1.29
				12/19	inside	$P_m + P_b$	37.97	98.20	1.59
		FSS		30	middle	P_m	11.79	43.02	2.65
				30	outside	$P_m + P_b$	26.07	61.46	1.36

TABLE 2.10.9-23 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - COLD ENVIRONMENT
SIDE DROP - FLAT ORIENTATION, FOUR FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
1	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
2	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
1	1 ft drop	cavity liner	E	10/15	middle	P_m	16.12	33.30	1.07
				9/16	outside	$P_m + P_b$	25.56	49.95	0.95
		FSS		33	middle	P_m	8.86	21.65	1.44
				33	inside/outside	$P_m + P_b$	8.86	32.47	2.67
2	1 ft drop+MNOP	cavity liner	E	10/15	middle	P_m	17.31	33.30	0.92
				9/16	outside	$P_m + P_b$	45.80	49.95	0.09
		FSS		25	middle	P_m	9.95	21.65	1.18
				30/36	outside	$P_m + P_b$	12.01	32.47	1.70
17	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
18	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
17	30 ft drop	cavity liner	E	10/15	middle	P_m	36.81	70.0	0.90
				9/16	outside	$P_m + P_b$	65.67	100.0	0.52
		FSS		33	middle	P_m	28.50	45.5	0.60
				33	inside/outside	$P_m + P_b$	28.50	65.0	1.28
18	30 ft drop+MNOP	cavity liner	E	10/15	middle	P_m	38.05	70.0	0.84
				9/16	outside	$P_m + P_b$	86.0	100.0	0.16
		FSS		33	middle	P_m	28.50	45.5	0.76
				33/36	outside	$P_m + P_b$	29.58	65.0	1.20

TABLE 2.10.9-24 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - COLD ENVIRONMENT
SIDE DROP - CORNER ORIENTATION, FOUR FUEL ELEMENTS

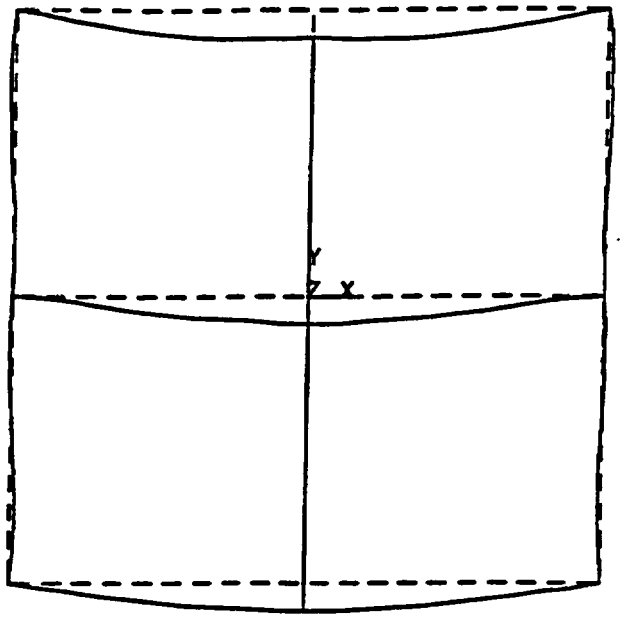
LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
5	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
6	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
5	1 ft drop	cavity liner	E	15/16	middle	P_m	22.41	33.30	0.49
				12/19	inside	$P_m + P_b$	26.35	49.95	0.90
		FSS		33	middle	P_m	7.1	21.65	2.05
				36	outside	$P_m + P_b$	15.32	32.47	1.12
6	1 ft drop+MNOP	cavity liner	E	15/16	middle	P_m	24.61	33.30	0.35
				12/19	inside	$P_m + P_b$	30.59	49.95	0.63
		FSS		25/30	middle	P_m	7.86	21.65	1.75
				30	outside	$P_m + P_b$	16.54	32.47	0.96
21	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
22	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
21	30 ft drop	cavity liner	E	14/17	middle	P_m	58.13	70.00	0.20
				3/4	outside	$P_m + P_b$	70.65	100.0	0.42
		FSS		36	middle	P_m	21.75	45.50	1.09
				36	outside	$P_m + P_b$	46.32	65.0	0.40
22	30 ft drop+MNOP	cavity liner	E	14/17	middle	P_m	58.13	70.0	0.20
				12/19	inside	$P_m + P_b$	68.2	100.0	0.47
		FSS		25/30	middle	P_m	19.39	45.5	1.35
				30	outside	$P_m + P_b$	43.07	65.0	0.51

TABLE 2.10.9-25 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - COLD ENVIRONMENT
SIDE DROP - FLAT ORIENTATION, THREE FUEL ELEMENTS

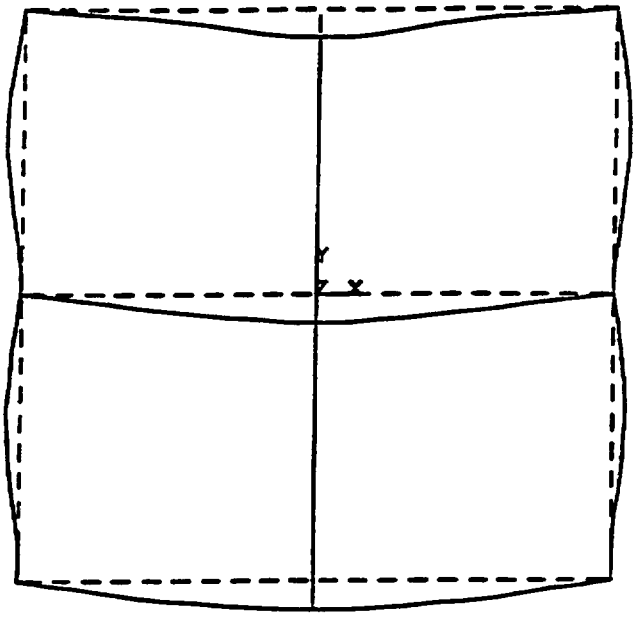
LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
3	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
4	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
3	1 ft drop	cavity liner	E			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
4	1 ft drop+MNOP	cavity liner	E	15	middle	P_m	17.32	33.30	0.92
				16	outside	$P_m + P_b$	45.97	49.95	0.09
		FSS		25	middle	P_m	9.94	21.65	1.18
				36	outside	$P_m + P_b$	12.22	32.47	1.66
19	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
20	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
19	30 ft drop	cavity liner	E			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
20	30 ft drop+MNOP	cavity liner	E	15	middle	P_m	38.09	70.0	0.84
				16	outside	$P_m + P_b$	86.53	100.0	0.16
		FSS		25/33	middle	P_m	25.49	45.50	0.78
				36	outside	$P_m + P_b$	30.22	65.0	1.15

TABLE 2.10.9- 26 SUMMARY OF DESIGN MARGINS FOR CAVITY LINER/FSS - COLD ENVIRONMENT
SIDE DROP - CORNER ORIENTATION, THREE FUEL ELEMENTS

LOAD CASE		STRESS POINT LOCATION				SUMMARY			
No.	Description	Component	Axial Section	Transverse Position	Position in Wall	Stress Type	Stress Inten. (ksi)	Allowable (ksi)	Design Margin
7	1 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
8	1 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
7	1 ft drop	cavity liner	E	14/17	middle	P_m	21.77	33.30	0.53
				12/19	inside	$P_m + P_b$	26.39	49.95	0.89
		FSS		33/36	middle	P_m	6.86	32.47	1.15
				36	outside	$P_m + P_b$	15.11	32.47	1.15
8	1 ft drop+MNOP	cavity liner	E	15/16	middle	P_m	24.61	33.30	0.35
				12	inside	$P_m + P_b$	30.63	49.95	0.63
		FSS		25/30	middle	P_m	7.82	21.65	1.77
				30	outside	$P_m + P_b$	15.79	32.47	1.06
23	30 ft drop	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
24	30 ft drop+MNOP	cavity liner	B			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			
23	30 ft drop	cavity liner	E	14	middle	P_m	58.13	70.0	0.20
				4	outside	$P_m + P_b$	69.48	100.0	0.44
		FSS		33/36	middle	P_m	21.01	45.50	1.17
				36	outside	$P_m + P_b$	45.69	65.0	0.42
24	30 ft drop+MNOP	cavity liner	E			P_m			
						$P_m + P_b$			
		FSS				P_m			
						$P_m + P_b$			



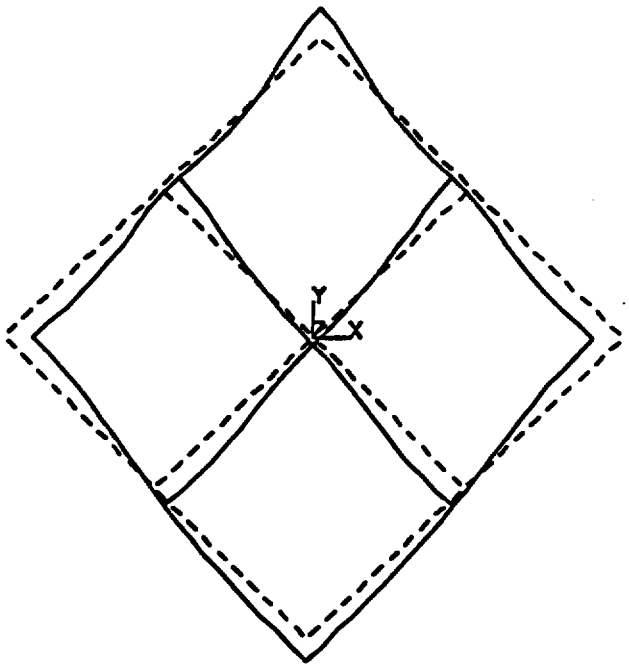
a) 1-FT Side drop Loading Condition



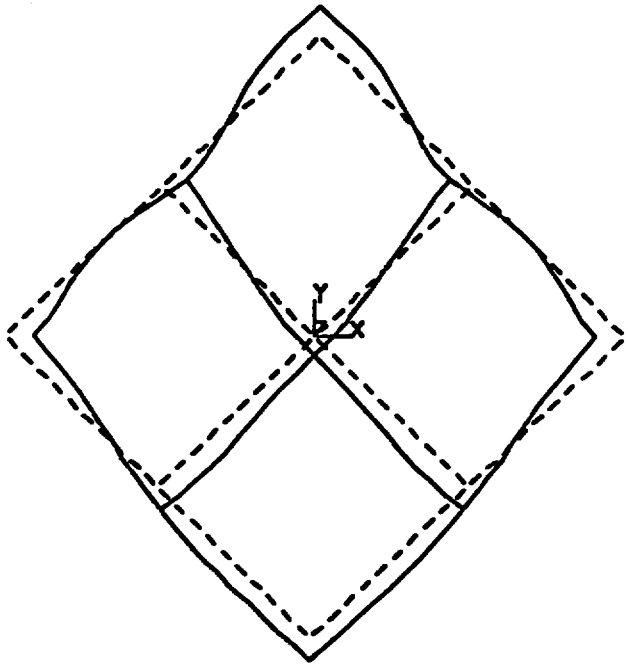
b) 1-FT Side drop + MNOP Loading Condition

L-764(2)
8-18-96

Fig. 2.10.9-23. Typical deflection profiles of the flat orientation cavity liner/FSS ANSYS model



a) 1-FT Side drop Loading Condition



b) 1-FT Side drop + MNOP Loading Condition

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Fig. 2.10.9-24. Typical deflection profiles of the corner orientation cavity Liner/FSS ANSYS model

MNOP at D.M. = +0.41 (load case 6-E) for the hot environment and D.M. = +0.35 (load case 6-E) for the cold environment. The 30-ft corner drop minimum margins were D.M. = +0.26 (load case 21-E) for the hot environment and +0.20 (load case 22-E) for the cold environment.

Note that the method used to impose the cask wall ovality in the corner orientation model was very conservative in that the cavity liner was not allowed to slide over the supporting DU. This induced a compressive membrane stress in the liner walls. Therefore, the design margins at stress points located below the neutral axis in the corner orientation are very conservative. Also notice that some of the load cases were not run, these load cases are marked-out in the summary tables. The criteria used to omit a particular load case was based on the results of the other load cases and if, by comparison, that loading would produce a higher design margin.

The loading on the cavity liner when the cask is in a fuel pool assumes that the cask is under 45 feet of water in the vertical position producing a maximum pressure of approximately 20 psi at the bottom end of the cavity. The stress state as a result of this loading are obtained by ratioing the MNOP values by 0.25 (20/80). The cask is vacuum dried after removal from the pool at .2 psia or –14.5 psig. This requires a factor of –0.18 (–14.5/80) on the MNOP values.

The results presented in this section represent the flat and corner orientation stress state of the cavity liner/FSS at various sections along the length of the cask. The analysis for two angle orientations (flat; 0°, and corner; 45°) envelop the maximum stress in the cavity liner/FSS for any angle orientation (around the cask axis). This is justified below.

The types of loading on the cavity liner/FSS are

1. Internal pressure (MNOP)

   The internal pressure (MNOP) stress effect on the cavity liner is not a function of angular orientation.

2. Out-of-plane bending (S_z)

   The moment of inertia about the CG of a square cross section is the same regardless of angular orientation around the cask axis, therefore, only the 'c' value ($\sigma = Mc/I$) changes the stress state at a section of constant moment. This analysis bounds the 'c' with the flat and corner orientations. The axial sections selected along the length of the cask for analysis included the section with the maximum moment.

3. Inertial loading on the internal components

   The effect of the fuel element and postulated DU loading on the cavity liner/FSS is a maximum in the flat orientation. The applied loading to the model is resolved into its components as the angle varies from the flat orientation (F, full value) to the corner orientation (where .707 F is applied on adjacent legs).

4. Ovaling of the containment wall

   The cavity liner/FSS, under 1-ft and 30-ft impact loading, is supported by the DU below it. It is assumed in this analysis that the DU has the same deflection profile as the cask containment wall. The deflection profiles of the flat and corner orientations are used at the axial section analyzed for the respective orientation. The deflection profile would be ratioed with respect to the angle change by the resolved normal load on the wall for all other angle orientations. Therefore the deflections would be smaller than those for either the flat or corner orientation.

5. Axial thermal stress

   The axial thermal stress in the cavity liner is not a function of orientation.

2.10.9.7 Cavity Liner Fatigue Evaluation. The maximum primary stress condition for cyclic normal loading conditions (MNOP plus thermal/vacuum dry) is:

MAXIMUM STRESS INTENSITY (ksi)								
Stress Location[a]	Stress Type	S_x	S_y	S_z	S_{xy}	S_{xz}	S_{yz}	SI
10	MNOP[b]	23.04	0	0	.94	0	0	
	Thermal	0	0	–1.4	0	0	0	
	Total	23.04	0	–1.4	.94	0	0	24.48
	Vacuum	–4.18	0	0	–.17	0	0	4.19
12	MNOP[b]	22.63	0	0	–.93	0	0	
	Thermal	0	0	–1.4	0	0	0	
	Total	22.63	0	–1.4	–.93	0	0	24.07

[a]See Fig 2.10.9-4.
[b]MNOP stresses from Table 2.10.9-56.

The total stress amplitude at stress location 10 is calculated below.

At this point the principal stresses are:

MNOP loading, $\sigma_1 = 23.08$ ksi,
$\sigma_2 = .04$ ksi, and
$\sigma_3 = -1.4$ ksi.

Vacuum loading, $\sigma_1 = .01$ ksi,
$\sigma_2 = 0$ ksi, and
$\sigma_3 = -4.19$ ksi.

The corresponding stress differences at this point is

$S'_{12} = (\sigma_{1l} - \sigma_{1j}) - (\sigma_{2l} - \sigma_{2j})$,

$S'_{23} = (\sigma_{2l} - \sigma_{2j}) - (\sigma_{3l} - \sigma_{3j})$,

$S_{31} = (\sigma_{3l} - \sigma_{3j}) - (\sigma_{1l} - \sigma_{1j})$,

$S'_{12} = (23.08 - .01) - (.04 - 0) = 23.03$ ksi,

$S'_{23} = (.04 - 0) - (-1.4 + 4.19) = -2.75$ ksi, and

$S'_{31} = (-1.4 + 4.19) - (23.08 - .01) = -20.28$ ksi

The maximum alternating stress is

$S_a = 1/2 \max | S'_{12}, S'_{23}, S'_{31} |$,

$= 1/2(23.03) = 11.51$ ksi;

using $S_{alt} = (E_{base}/E)(F)(S_a) = 47.47$ ksi (midcavity),

where

$E_{base} = 28.3 \times 10^6$,

$E_{275°F} = 27.45 \times 10^6$ (midcavity), and

$F = 4$, This factor is conservative because there are no welds and/or peak stresses at the maximum stress locations.

Using the fatigue curve from the ASME Code, Fig. I-9.2.1,

$N = 30{,}000$ cycles.

During the life of the cask, the maximum number of normal operating cycles will be 50 years x 25 shipments a year = 1250.

D.M. = (N/1250) −1 = + high.

2.10.9.8 Summary. Tables 2.10.9-27 through 2.10.9-54 present the stress tables for the following load cases: 1-E cold, 3-E, 4-E, 5-E, 5-E cold, 6-E, 6-E cold, 17-E cold, 18-E, 18-E cold, 19-E, 21-E, 22-E, and 22-E cold are included in this section. These load cases represent the lowest design margin load cases.

The cavity liner is subjected to an MNOP of 80 psi. The stress on the cavity liner due to this internal pressure was developed using the ANSYS frame model. The ANSYS stress results from the MNOP load case are presented in Tables 2.10.9-55 and 2.10.9-56.

TABLE 2.10.9-27 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 1-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP, T=-20°F, SECTION E, MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9 -8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-8.31	6.10	-4.63	-0.34	-4.63	0.00	-2.21	-0.34	0.00	0.00
	Middle	9.268	-8.48	6.10	-0.13	-0.34	-0.13	0.00	-2.38	-0.34	0.00	0.00
	Outside	9.455	-8.66	6.10	4.38	-0.34	4.38	0.00	-2.56	-0.34	0.00	0.00
2	Inside	9.080	-8.31	6.10	6.16	0.04	6.16	0.00	-2.21	0.04	0.00	0.00
	Middle	9.268	-8.48	6.10	-0.13	0.04	-0.13	0.00	-2.38	0.04	0.00	0.00
	Outside	9.455	-8.66	6.10	-6.41	0.04	-6.41	0.00	-2.56	0.04	0.00	0.00
3	Inside	9.080	-8.31	6.10	-9.65	0.42	-9.65	0.00	-2.21	0.42	0.00	0.00
	Middle	9.268	-8.48	6.10	-0.13	0.42	-0.13	0.00	-2.38	0.42	0.00	0.00
	Outside	9.455	-8.66	6.10	9.40	0.42	9.40	0.00	-2.56	0.42	0.00	0.00
4	Inside	9.080	-8.31	6.10	-9.94	-0.13	-9.94	0.00	-2.21	-0.13	0.00	0.00
	Middle	9.080	-8.31	6.10	-0.42	-0.13	-0.42	0.00	-2.21	-0.13	0.00	0.00
	Outside	9.080	-8.31	6.10	9.11	-0.13	9.11	0.00	-2.21	-0.13	0.00	0.00
5	Inside	4.692	-4.30	6.10	-1.17	-0.13	-1.17	0.00	1.80	-0.13	0.00	0.00
	Middle	4.692	-4.30	6.10	-0.42	-0.13	-0.42	0.00	1.80	-0.13	0.00	0.00
	Outside	4.692	-4.30	6.10	0.34	-0.13	0.34	0.00	1.80	-0.13	0.00	0.00
6	Inside	0.305	-0.28	6.10	7.60	-0.13	7.60	0.00	5.82	-0.13	0.00	0.00
	Middle	0.305	-0.28	6.10	-0.42	-0.13	-0.42	0.00	5.82	-0.13	0.00	0.00
	Outside	0.305	-0.28	6.10	-8.43	-0.13	-8.43	0.00	5.82	-0.13	0.00	0.00
7	Inside	0.305	0.28	6.10	-9.24	-0.13	-9.24	0.00	6.38	-0.13	0.00	0.00
	Middle	0.305	0.28	6.10	-0.85	-0.13	-0.85	0.00	6.38	-0.13	0.00	0.00
	Outside	0.305	0.28	6.10	7.54	-0.13	7.54	0.00	6.38	-0.13	0.00	0.00
8	Inside	4.692	4.30	6.10	0.10	-0.13	0.10	0.00	10.40	-0.13	0.00	0.00
	Middle	4.692	4.30	6.10	-0.85	-0.13	-0.85	0.00	10.40	-0.13	0.00	0.00
	Outside	4.692	4.30	6.10	-1.80	-0.13	-1.80	0.00	10.40	-0.13	0.00	0.00
9	Inside	9.080	8.31	6.10	9.44	-0.13	9.44	0.00	14.41	-0.13	0.00	0.00
	Middle	9.080	8.31	6.10	-0.85	-0.13	-0.85	0.00	14.41	-0.13	0.00	0.00
	Outside	9.080	8.31	6.10	-11.15	-0.13	-11.15	0.00	14.41	-0.13	0.00	0.00
10	Inside	9.080	8.31	6.10	10.43	1.60	10.43	0.00	14.41	1.60	0.00	0.00
	Middle	9.268	8.48	6.10	0.13	1.60	0.13	0.00	14.58	1.60	0.00	0.00
	Outside	9.455	8.66	6.10	-10.16	1.60	-10.16	0.00	14.76	1.60	0.00	0.00
11	Inside	9.080	8.31	6.10	-3.92	-0.01	-3.92	0.00	14.41	-0.01	0.00	0.00
	Middle	9.268	8.48	6.10	0.13	-0.01	0.13	0.00	14.58	-0.01	0.00	0.00
	Outside	9.455	8.66	6.10	4.18	-0.01	4.18	0.00	14.76	-0.01	0.00	0.00
12	Inside	9.080	8.31	6.10	-1.83	-0.07	-1.83	0.00	14.41	-0.07	0.00	0.00
	Middle	9.268	8.48	6.10	0.13	-0.07	0.13	0.00	14.58	-0.07	0.00	0.00
	Outside	9.455	8.66	6.10	2.09	-0.07	2.09	0.00	14.76	-0.07	0.00	0.00
13	Inside	9.080	8.31	6.10	-1.83	0.07	-1.83	0.00	14.41	0.07	0.00	0.00
	Middle	9.268	8.48	6.10	0.13	0.07	0.13	0.00	14.58	0.07	0.00	0.00
	Outside	9.455	8.66	6.10	2.09	0.07	2.09	0.00	14.76	0.07	0.00	0.00
14	Inside	9.080	8.31	6.10	-3.92	-0.46	-3.92	0.00	14.41	-0.46	0.00	0.00
	Middle	9.268	8.48	6.10	0.13	-0.46	0.13	0.00	14.58	-0.46	0.00	0.00
	Outside	9.455	8.66	6.10	4.18	-0.46	4.18	0.00	14.76	-0.46	0.00	0.00
15	Inside	9.080	8.31	6.10	10.43	-1.60	10.43	0.00	14.41	-1.60	0.00	0.00
	Middle	9.268	8.48	6.10	0.13	-1.60	0.13	0.00	14.58	-1.60	0.00	0.00
	Outside	9.455	8.66	6.10	-10.16	-1.60	-10.16	0.00	14.76	-1.60	0.00	0.00
16	Inside	9.080	8.31	6.10	9.44	0.13	9.44	0.00	14.41	0.13	0.00	0.00
	Middle	9.080	8.31	6.10	-0.85	0.13	-0.85	0.00	14.41	0.13	0.00	0.00
	Outside	9.080	8.31	6.10	-11.15	0.13	-11.15	0.00	14.41	0.13	0.00	0.00
17	Inside	4.692	4.30	6.10	0.10	0.13	0.10	0.00	10.40	0.13	0.00	0.00
	Middle	4.692	4.30	6.10	-0.85	0.13	-0.85	0.00	10.40	0.13	0.00	0.00
	Outside	4.692	4.30	6.10	-1.80	0.13	-1.80	0.00	10.40	0.13	0.00	0.00
18	Inside	0.305	0.28	6.10	-9.24	0.13	-9.24	0.00	6.38	0.13	0.00	0.00
	Middle	0.305	0.28	6.10	-0.85	0.13	-0.85	0.00	6.38	0.13	0.00	0.00
	Outside	0.305	0.28	6.10	7.54	0.13	7.54	0.00	6.38	0.13	0.00	0.00

TABLE 2.10.9-27 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 1-E COLD, FLAT ORIENTATION - 1-FT SIDE DROP, T=-20°F, SECTION E, MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9 -8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.28	6.10	7.60	0.13	7.60	0.00	5.82	0.13	0.00	0.00
	Middle	0.305	-0.28	6.10	-0.42	0.13	-0.42	0.00	5.82	0.13	0.00	0.00
	Outside	0.305	-0.28	6.10	-8.43	0.13	-8.43	0.00	5.82	0.13	0.00	0.00
20	Inside	4.692	-4.30	6.10	-1.17	0.13	-1.17	0.00	1.80	0.13	0.00	0.00
	Middle	4.692	-4.30	6.10	-0.42	0.13	-0.42	0.00	1.80	0.13	0.00	0.00
	Outside	4.692	-4.30	6.10	0.34	0.13	0.34	0.00	1.80	0.13	0.00	0.00
21	Inside	9.080	-8.31	6.10	-9.94	0.13	-9.94	0.00	-2.21	0.13	0.00	0.00
	Middle	9.080	-8.31	6.10	-0.42	0.13	-0.42	0.00	-2.21	0.13	0.00	0.00
	Outside	9.080	-8.31	6.10	9.11	0.13	9.11	0.00	-2.21	0.13	0.00	0.00
22	Inside	9.080	-8.31	6.10	-9.65	-0.42	-9.65	0.00	-2.21	-0.42	0.00	0.00
	Middle	9.268	-8.48	6.10	-0.13	-0.42	-0.13	0.00	-2.38	-0.42	0.00	0.00
	Outside	9.455	-8.66	6.10	9.40	-0.42	9.40	0.00	-2.56	-0.42	0.00	0.00
23	Inside	9.080	-8.31	6.10	6.16	-0.04	6.16	0.00	-2.21	-0.04	0.00	0.00
	Middle	9.268	-8.48	6.10	-0.13	-0.04	-0.13	0.00	-2.38	-0.04	0.00	0.00
	Outside	9.455	-8.66	6.10	-6.41	-0.04	-6.41	0.00	-2.56	-0.04	0.00	0.00
24	Inside	9.080	-8.31	6.10	-4.63	0.34	-4.63	0.00	-2.21	0.34	0.00	0.00
	Middle	9.268	-8.48	6.10	-0.13	0.34	-0.13	0.00	-2.38	0.34	0.00	0.00
	Outside	9.455	-8.66	6.10	4.38	0.34	4.38	0.00	-2.56	0.34	0.00	0.00
25	Inside	9.080	-8.31	0.00	-0.92	0.00	-0.92	0.00	-8.31	0.00	0.00	0.00
	Middle	9.080	-8.31	0.00	-0.92	0.00	-0.92	0.00	-8.31	0.00	0.00	0.00
	Outside	9.080	-8.31	0.00	-0.92	0.00	-0.92	0.00	-8.31	0.00	0.00	0.00
26	Inside	4.692	-4.30	0.00	-0.92	0.00	-0.92	0.00	-4.30	0.00	0.00	0.00
	Middle	4.692	-4.30	0.00	-0.92	0.00	-0.92	0.00	-4.30	0.00	0.00	0.00
	Outside	4.692	-4.30	0.00	-0.92	0.00	-0.92	0.00	-4.30	0.00	0.00	0.00
27	Inside	0.305	-0.28	0.00	-0.92	0.00	-0.92	0.00	-0.28	0.00	0.00	0.00
	Middle	0.305	-0.28	0.00	-0.92	0.00	-0.92	0.00	-0.28	0.00	0.00	0.00
	Outside	0.305	-0.28	0.00	-0.92	0.00	-0.92	0.00	-0.28	0.00	0.00	0.00
28	Inside	0.305	0.28	0.00	6.29	-0.02	6.29	0.00	0.28	-0.02	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	-0.02	-0.01	0.00	0.00	-0.02	0.00	0.00
	Outside	0.305	-0.28	0.00	-6.31	-0.02	-6.31	0.00	-0.28	-0.02	0.00	0.00
29	Inside	0.305	0.28	0.00	3.06	0.21	3.06	0.00	0.28	0.21	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	0.21	-0.01	0.00	0.00	0.21	0.00	0.00
	Outside	0.305	-0.28	0.00	-3.08	0.21	-3.08	0.00	-0.28	0.21	0.00	0.00
30	Inside	0.305	0.28	0.00	-8.26	0.44	-8.26	0.00	0.28	0.44	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	0.44	-0.01	0.00	0.00	0.44	0.00	0.00
	Outside	0.305	-0.28	0.00	8.24	0.44	8.24	0.00	-0.28	0.44	0.00	0.00
31	Inside	0.305	0.28	0.00	-0.99	0.00	-0.99	0.00	0.28	0.00	0.00	0.00
	Middle	0.305	0.28	0.00	-0.99	0.00	-0.99	0.00	0.28	0.00	0.00	0.00
	Outside	0.305	0.28	0.00	-0.99	0.00	-0.99	0.00	0.28	0.00	0.00	0.00
32	Inside	4.692	4.07	0.00	-0.99	0.00	-0.99	0.00	4.07	0.00	0.00	0.00
	Middle	4.692	4.07	0.00	-0.99	0.00	-0.99	0.00	4.07	0.00	0.00	0.00
	Outside	4.692	4.07	0.00	-0.99	0.00	-0.99	0.00	4.07	0.00	0.00	0.00
33	Inside	9.080	7.87	0.00	-0.99	0.00	-0.99	0.00	7.87	0.00	0.00	0.00
	Middle	9.080	7.87	0.00	-0.99	0.00	-0.99	0.00	7.87	0.00	0.00	0.00
	Outside	9.080	7.87	0.00	-0.99	0.00	-0.99	0.00	7.87	0.00	0.00	0.00
34	Inside	0.305	0.26	0.00	6.29	0.02	6.29	0.00	0.26	0.02	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	0.02	-0.01	0.00	0.00	0.02	0.00	0.00
	Outside	0.305	-0.28	0.00	-6.31	0.02	-6.31	0.00	-0.28	0.02	0.00	0.00
35	Inside	0.305	0.28	0.00	3.06	-0.21	3.06	0.00	0.28	-0.21	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	-0.21	-0.01	0.00	0.00	-0.21	0.00	0.00
	Outside	0.305	-0.28	0.00	-3.08	-0.21	-3.08	0.00	-0.28	-0.21	0.00	0.00
36	Inside	0.305	0.28	0.00	-8.26	-0.44	-8.26	0.00	0.28	-0.44	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	-0.44	-0.01	0.00	0.00	-0.44	0.00	0.00
	Outside	0.305	-0.28	0.00	8.24	-0.44	8.24	0.00	-0.28	-0.44	0.00	0.00

TABLE 2.10.9-28 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 1-E COLD, FLAT ORIENTATION - 1-ft SIDE DROP, T=–20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	-4.63	0.00	-2.21	-0.34	0.00	0.00	0.02	-2.21	-4.65	4.68	Pm+Pb	49.95	9.67
	Middle		-0.13	0.00	-2.38	-0.34	0.00	0.00	0.28	-0.41	-2.38	2.67	Pm	33.30	11.49
	Outside		4.38	0.00	-2.56	-0.34	0.00	0.00	4.41	-0.03	-2.56	6.96	Pm+Pb	49.95	6.18
2	Inside	75j	6.16	0.00	-2.21	0.04	0.00	0.00	6.16	0.00	-2.21	8.37	Pm+Pb	49.95	4.97
	Middle		-0.13	0.00	-2.38	0.04	0.00	0.00	0.01	-0.14	-2.38	2.40	Pm	33.30	12.90
	Outside		-6.41	0.00	-2.56	0.04	0.00	0.00	0.00	-2.56	-6.41	6.41	Pm+Pb	49.95	6.79
3	Inside	80j	-9.65	0.00	-2.21	0.42	0.00	0.00	0.02	-2.21	-9.67	9.69	Pm+Pb	49.95	4.16
	Middle		-0.13	0.00	-2.38	0.42	0.00	0.00	0.36	-0.49	-2.38	2.74	Pm	33.30	11.14
	Outside		9.40	0.00	-2.56	0.42	0.00	0.00	9.42	-0.02	-2.56	11.97	Pm+Pb	49.95	3.17
4	Inside	40j	-9.94	0.00	-2.21	-0.13	0.00	0.00	0.00	-2.21	-9.94	9.94	Pm+Pb	49.95	4.02
	Middle		-0.42	0.00	-2.21	-0.13	0.00	0.00	0.04	-0.46	-2.21	2.25	Pm	33.30	13.81
	Outside		9.11	0.00	-2.21	-0.13	0.00	0.00	9.11	0.00	-2.21	11.32	Pm+Pb	49.95	3.41
5	Inside	35j	-1.17	0.00	1.80	-0.13	0.00	0.00	1.80	0.01	-1.18	2.99	Pm+Pb	49.95	15.71
	Middle		-0.42	0.00	1.80	-0.13	0.00	0.00	1.80	0.04	-0.46	2.26	Pm	33.30	13.72
	Outside		0.34	0.00	1.80	-0.13	0.00	0.00	1.80	0.38	-0.04	1.85	Pm+Pb	49.95	26.02
6	Inside	31i	7.60	0.00	5.82	-0.13	0.00	0.00	7.60	5.82	0.00	7.60	Pm+Pb	49.95	5.57
	Middle		-0.42	0.00	5.82	-0.13	0.00	0.00	5.82	0.04	-0.46	6.28	Pm	33.30	4.30
	Outside		-8.43	0.00	5.82	-0.13	0.00	0.00	5.82	0.00	-8.43	14.25	Pm+Pb	49.95	2.50
7	Inside	30j	-9.24	0.00	6.38	-0.13	0.00	0.00	6.38	0.00	-9.24	15.62	Pm+Pb	49.95	2.20
	Middle		-0.85	0.00	6.38	-0.13	0.00	0.00	6.38	0.02	-0.87	7.25	Pm	33.30	3.59
	Outside		7.54	0.00	6.38	-0.13	0.00	0.00	7.54	6.38	0.00	7.54	Pm+Pb	49.95	5.62
8	Inside	25j	0.10	0.00	10.40	-0.13	0.00	0.00	10.40	0.19	-0.09	10.48	Pm+Pb	49.95	3.76
	Middle		-0.85	0.00	10.40	-0.13	0.00	0.00	10.40	0.02	-0.87	11.26	Pm	33.30	1.96
	Outside		-1.80	0.00	10.40	-0.13	0.00	0.00	10.40	0.01	-1.81	12.20	Pm+Pb	49.95	3.09
9	Inside	21j	9.44	0.00	14.41	-0.13	0.00	0.00	14.41	9.44	0.00	14.41	Pm+Pb	49.95	2.47
	Middle		-0.85	0.00	14.41	-0.13	0.00	0.00	14.41	0.02	-0.87	15.28	Pm	33.30	1.18
	Outside		-11.15	0.00	14.41	-0.13	0.00	0.00	14.41	0.00	-11.15	25.56	Pm+Pb	49.95	0.95

ca/marg-nfe-cold

TABLE 2.10.9-28 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 1-E COLD, FLAT ORIENTATION - 1-ft SIDE DROP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	10.43	0.00	14.41	1.60	0.00	0.00	14.41	10.67	-0.24	14.65	Pm+Pb	49.95	2.41
	Middle		0.13	0.00	14.58	1.60	0.00	0.00	14.58	1.67	-1.54	16.12	Pm	33.30	1.07
	Outside		-10.16	0.00	14.76	1.60	0.00	0.00	14.76	0.25	-10.41	25.16	Pm+Pb	49.95	0.99
11	Inside	15j	-3.92	0.00	14.41	-0.01	0.00	0.00	14.41	0.00	-3.92	18.33	Pm+Pb	49.95	1.72
	Middle		0.13	0.00	14.58	-0.01	0.00	0.00	14.58	0.13	0.00	14.58	Pm	33.30	1.28
	Outside		4.18	0.00	14.76	-0.01	0.00	0.00	14.76	4.18	0.00	14.76	Pm+Pb	49.95	2.39
12	Inside	11i	-1.83	0.00	14.41	-0.07	0.00	0.00	14.41	0.00	-1.83	16.24	Pm+Pb	49.95	2.07
	Middle		0.13	0.00	14.58	-0.07	0.00	0.00	14.58	0.16	-0.03	14.61	Pm	33.30	1.28
	Outside		2.09	0.00	14.76	-0.07	0.00	0.00	14.76	2.09	0.00	14.76	Pm+Pb	49.95	2.38
13	Inside	10j	-1.83	0.00	14.41	0.07	0.00	0.00	14.41	0.00	-1.83	16.24	Pm+Pb	49.95	2.07
	Middle		0.13	0.00	14.58	0.07	0.00	0.00	14.58	0.16	-0.03	14.61	Pm	33.30	1.28
	Outside		2.09	0.00	14.76	0.07	0.00	0.00	14.76	2.09	0.00	14.76	Pm+Pb	49.95	2.38
14	Inside	5j	-3.92	0.00	14.41	-0.46	0.00	0.00	14.41	0.05	-3.97	18.39	Pm+Pb	49.95	1.72
	Middle		0.13	0.00	14.58	-0.46	0.00	0.00	14.58	0.53	-0.40	14.98	Pm	33.30	1.22
	Outside		4.18	0.00	14.76	-0.46	0.00	0.00	14.76	4.23	-0.05	14.81	Pm+Pb	49.95	2.37
15	Inside	1i	10.43	0.00	14.41	-1.60	0.00	0.00	14.41	10.67	-0.24	14.65	Pm+Pb	49.95	2.41
	Middle		0.13	0.00	14.58	-1.60	0.00	0.00	14.58	1.67	-1.54	16.12	Pm	33.30	1.07
	Outside		-10.16	0.00	14.76	-1.60	0.00	0.00	14.76	0.25	-10.41	25.16	Pm+Pb	49.95	0.99
16	Inside	41i	9.44	0.00	14.41	0.13	0.00	0.00	14.41	9.44	0.00	14.41	Pm+Pb	49.95	2.47
	Middle		-0.85	0.00	14.41	0.13	0.00	0.00	14.41	0.02	-0.87	15.28	Pm	33.30	1.18
	Outside		-11.15	0.00	14.41	0.13	0.00	0.00	14.41	0.00	-11.15	25.56	Pm+Pb	49.95	0.95
17	Inside	45j	0.10	0.00	10.40	0.13	0.00	0.00	10.40	0.19	-0.09	10.48	Pm+Pb	49.95	3.76
	Middle		-0.85	0.00	10.40	0.13	0.00	0.00	10.40	0.02	-0.87	11.26	Pm	33.30	1.96
	Outside		-1.80	0.00	10.40	0.13	0.00	0.00	10.40	0.01	-1.81	12.20	Pm+Pb	49.95	3.09
18	Inside	50j	-9.24	0.00	6.38	0.13	0.00	0.00	6.38	0.00	-9.24	15.62	Pm+Pb	49.95	2.20
	Middle		-0.85	0.00	6.38	0.13	0.00	0.00	6.38	0.02	-0.87	7.25	Pm	33.30	3.59
	Outside		7.54	0.00	6.38	0.13	0.00	0.00	7.54	6.38	0.00	7.54	Pm+Pb	49.95	5.62

TABLE 2.10.9-28 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 1-E COLD, FLAT ORIENTATION - 1-ft SIDE DROP, T=–20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	7.60	0.00	5.82	0.13	0.00	0.00	7.60	5.82	0.00	7.60	Pm+Pb	49.95	5.57
	Middle		-0.42	0.00	5.82	0.13	0.00	0.00	5.82	0.04	-0.46	6.28	Pm	33.30	4.30
	Outside		-8.43	0.00	5.82	0.13	0.00	0.00	5.82	0.00	-8.43	14.25	Pm+Pb	49.95	2.50
20	Inside	55j	-1.17	0.00	1.80	0.13	0.00	0.00	1.80	0.01	-1.18	2.99	Pm+Pb	49.95	15.71
	Middle		-0.42	0.00	1.80	0.13	0.00	0.00	1.80	0.04	-0.46	2.26	Pm	33.30	13.72
	Outside		0.34	0.00	1.80	0.13	0.00	0.00	1.80	0.38	-0.04	1.85	Pm+Pb	49.95	26.02
21	Inside	60j	-9.94	0.00	-2.21	0.13	0.00	0.00	0.00	-2.21	-9.94	9.94	Pm+Pb	49.95	4.02
	Middle		-0.42	0.00	-2.21	0.13	0.00	0.00	0.04	-0.46	-2.21	2.25	Pm	33.30	13.81
	Outside		9.11	0.00	-2.21	0.13	0.00	0.00	9.11	0.00	-2.21	11.32	Pm+Pb	49.95	3.41
22	Inside	61i	-9.65	0.00	-2.21	-0.42	0.00	0.00	0.02	-2.21	-9.67	9.69	Pm+Pb	49.95	4.16
	Middle		-0.13	0.00	-2.38	-0.42	0.00	0.00	0.36	-0.49	-2.38	2.74	Pm	33.30	11.14
	Outside		9.40	0.00	-2.56	-0.42	0.00	0.00	9.42	-0.02	-2.56	11.97	Pm+Pb	49.95	3.17
23	Inside	65j	6.16	0.00	-2.21	-0.04	0.00	0.00	6.16	0.00	-2.21	8.37	Pm+Pb	49.95	4.97
	Middle		-0.13	0.00	-2.38	-0.04	0.00	0.00	0.01	-0.14	-2.38	2.40	Pm	33.30	12.90
	Outside		-6.41	0.00	-2.56	-0.04	0.00	0.00	0.00	-2.56	-6.41	6.41	Pm+Pb	49.95	6.79
24	Inside	70j	-4.63	0.00	-2.21	0.34	0.00	0.00	0.02	-2.21	-4.65	4.68	Pm+Pb	49.95	9.67
	Middle		-0.13	0.00	-2.38	0.34	0.00	0.00	0.28	-0.41	-2.38	2.67	Pm	33.30	11.49
	Outside		4.38	0.00	-2.56	0.34	0.00	0.00	4.41	-0.03	-2.56	6.96	Pm+Pb	49.95	6.18
25	Inside	120j	-0.92	0.00	-8.31	0.00	0.00	0.00	0.00	-0.92	-8.31	8.31	Pm+Pb	32.47	2.91
	Middle		-0.92	0.00	-8.31	0.00	0.00	0.00	0.00	-0.92	-8.31	8.31	Pm	21.65	1.60
	Outside		-0.92	0.00	-8.31	0.00	0.00	0.00	0.00	-0.92	-8.31	8.31	Pm+Pb	32.47	2.91
26	Inside	115j	-0.92	0.00	-4.30	0.00	0.00	0.00	0.00	-0.92	-4.30	4.30	Pm+Pb	49.95	10.63
	Middle		-0.92	0.00	-4.30	0.00	0.00	0.00	0.00	-0.92	-4.30	4.30	Pm	33.30	6.75
	Outside		-0.92	0.00	-4.30	0.00	0.00	0.00	0.00	-0.92	-4.30	4.30	Pm+Pb	49.95	10.63
27	Inside	111i	-0.92	0.00	-0.28	0.00	0.00	0.00	0.00	-0.28	-0.92	0.92	Pm+Pb	49.95	53.29
	Middle		-0.92	0.00	-0.28	0.00	0.00	0.00	0.00	-0.28	-0.92	0.92	Pm	33.30	35.20
	Outside		-0.92	0.00	-0.28	0.00	0.00	0.00	0.00	-0.28	-0.92	0.92	Pm+Pb	49.95	53.29

ca/marg-nfe-cold

TABLE 2.10.9-28 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 1-E COLD, FLAT ORIENTATION - 1-ft SIDE DROP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	6.29	0.00	0.28	-0.02	0.00	0.00	6.29	0.28	0.00	6.29	Pm+Pb	49.95	6.94
	Middle		-0.01	0.00	0.00	-0.02	0.00	0.00	0.02	0.00	-0.03	0.04	Pm	33.30	806.64
	Outside		-6.31	0.00	-0.28	-0.02	0.00	0.00	0.00	-0.28	-6.31	6.31	Pm+Pb	49.95	6.92
29	Inside	105j	3.06	0.00	0.28	0.21	0.00	0.00	3.07	0.28	-0.01	3.09	Pm+Pb	49.95	15.17
	Middle		-0.01	0.00	0.00	0.21	0.00	0.00	0.21	0.00	-0.22	0.42	Pm	33.30	78.26
	Outside		-3.08	0.00	-0.28	0.21	0.00	0.00	0.01	-0.28	-3.09	3.11	Pm+Pb	49.95	15.07
30	Inside	110j	-8.26	0.00	0.28	0.44	0.00	0.00	0.28	0.02	-8.28	8.56	Pm+Pb	32.47	2.79
	Middle		-0.01	0.00	0.00	0.44	0.00	0.00	0.44	0.00	-0.45	0.88	Pm	21.65	23.60
	Outside		8.24	0.00	-0.28	0.44	0.00	0.00	8.26	-0.02	-0.28	8.54	Pm+Pb	32.47	2.80
31	Inside	90j	-0.99	0.00	0.28	0.00	0.00	0.00	0.28	0.00	-0.99	1.27	Pm+Pb	49.95	38.36
	Middle		-0.99	0.00	0.28	0.00	0.00	0.00	0.28	0.00	-0.99	1.27	Pm	33.30	25.24
	Outside		-0.99	0.00	0.28	0.00	0.00	0.00	0.28	0.00	-0.99	1.27	Pm+Pb	49.95	38.36
32	Inside	85j	-0.99	0.00	4.07	0.00	0.00	0.00	4.07	0.00	-0.99	5.06	Pm+Pb	49.95	8.88
	Middle		-0.99	0.00	4.07	0.00	0.00	0.00	4.07	0.00	-0.99	5.06	Pm	33.30	5.59
	Outside		-0.99	0.00	4.07	0.00	0.00	0.00	4.07	0.00	-0.99	5.06	Pm+Pb	49.95	8.88
33	Inside	81j	-0.99	0.00	7.87	0.00	0.00	0.00	7.87	0.00	-0.99	8.86	Pm+Pb	32.47	2.67
	Middle		-0.99	0.00	7.87	0.00	0.00	0.00	7.87	0.00	-0.99	8.86	Pm	21.65	1.44
	Outside		-0.99	0.00	7.87	0.00	0.00	0.00	7.87	0.00	-0.99	8.86	Pm+Pb	32.47	2.67
34	Inside	100j	6.29	0.00	0.26	0.02	0.00	0.00	6.29	0.26	0.00	6.29	Pm+Pb	49.95	6.94
	Middle		-0.01	0.00	0.00	0.02	0.00	0.00	0.02	0.00	-0.03	0.04	Pm	33.30	806.64
	Outside		-6.31	0.00	-0.28	0.02	0.00	0.00	0.00	-0.28	-6.31	6.31	Pm+Pb	49.95	6.92
35	Inside	95j	3.06	0.00	0.28	-0.21	0.00	0.00	3.07	0.28	-0.01	3.09	Pm+Pb	49.95	15.17
	Middle		-0.01	0.00	0.00	-0.21	0.00	0.00	0.21	0.00	-0.22	0.42	Pm	33.30	78.26
	Outside		-3.08	0.00	-0.28	-0.21	0.00	0.00	0.01	-0.28	-3.09	3.11	Pm+Pb	49.95	15.07
36	Inside	91i	-8.26	0.00	0.28	-0.44	0.00	0.00	0.28	0.02	-8.28	8.56	Pm+Pb	32.47	2.79
	Middle		-0.01	0.00	0.00	-0.44	0.00	0.00	0.44	0.00	-0.45	0.88	Pm	21.65	23.60
	Outside		8.24	0.00	-0.28	-0.44	0.00	0.00	8.26	-0.02	-0.28	8.54	Pm+Pb	32.47	2.80

ca/marg-nfe-cold

TABLE 2.10.9-29 LINER AND FSS STRESSES (ksi); LOAD CASE 3-E, FLAT ORIENTATION - 1-FT SIDE DROP
3 FUEL ELEMENTS SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9 -8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-8.31	-1.00	-4.65	-0.35	-4.65	0.00	-9.31	-0.35	0.00	0.00
	Middle	9.268	-8.48	-1.00	-0.11	-0.35	-0.11	0.00	-9.48	-0.35	0.00	0.00
	Outside	9.455	-8.66	-1.00	4.42	-0.35	4.42	0.00	-9.66	-0.35	0.00	0.00
2	Inside	9.080	-8.31	-1.00	6.32	0.03	6.32	0.00	-9.31	0.03	0.00	0.00
	Middle	9.268	-8.48	-1.00	-0.11	0.03	-0.11	0.00	-9.48	0.03	0.00	0.00
	Outside	9.455	-8.66	-1.00	-6.55	0.03	-6.55	0.00	-9.66	0.03	0.00	0.00
3	Inside	9.080	-8.31	-1.00	-9.31	0.41	-9.31	0.00	-9.31	0.41	0.00	0.00
	Middle	9.268	-8.48	-1.00	-0.11	0.41	-0.11	0.00	-9.48	0.41	0.00	0.00
	Outside	9.455	-8.66	-1.00	9.09	0.41	9.09	0.00	-9.66	0.41	0.00	0.00
4	Inside	9.080	-8.31	-1.00	-9.61	-0.11	-9.61	0.00	-9.31	-0.11	0.00	0.00
	Middle	9.080	-8.31	-1.00	-0.41	-0.11	-0.41	0.00	-9.31	-0.11	0.00	0.00
	Outside	9.080	-8.31	-1.00	8.79	-0.11	8.79	0.00	-9.31	-0.11	0.00	0.00
5	Inside	4.692	-4.30	-1.00	-1.60	-0.11	-1.60	0.00	-5.30	-0.11	0.00	0.00
	Middle	4.692	-4.30	-1.00	-0.41	-0.11	-0.41	0.00	-5.30	-0.11	0.00	0.00
	Outside	4.692	-4.30	-1.00	0.77	-0.11	0.77	0.00	-5.30	-0.11	0.00	0.00
6	Inside	0.305	-0.28	-1.00	6.42	-0.11	6.42	0.00	-1.28	-0.11	0.00	0.00
	Middle	0.305	-0.28	-1.00	-0.41	-0.11	-0.41	0.00	-1.28	-0.11	0.00	0.00
	Outside	0.305	-0.28	-1.00	-7.25	-0.11	-7.25	0.00	-1.28	-0.11	0.00	0.00
7	Inside	0.305	0.28	-1.00	-7.69	-0.12	-7.69	0.00	-0.72	-0.12	0.00	0.00
	Middle	0.305	0.28	-1.00	-0.64	-0.12	-0.64	0.00	-0.72	-0.12	0.00	0.00
	Outside	0.305	0.28	-1.00	6.42	-0.12	6.42	0.00	-0.72	-0.12	0.00	0.00
8	Inside	4.692	4.30	-1.00	0.66	-0.12	0.66	0.00	3.30	-0.12	0.00	0.00
	Middle	4.692	4.30	-1.00	-0.64	-0.12	-0.64	0.00	3.30	-0.12	0.00	0.00
	Outside	4.692	4.30	-1.00	-1.93	-0.12	-1.93	0.00	3.30	-0.12	0.00	0.00
9	Inside	9.080	8.31	-1.00	9.01	-0.12	9.01	0.00	7.31	-0.12	0.00	0.00
	Middle	9.080	8.31	-1.00	-0.64	-0.12	-0.64	0.00	7.31	-0.12	0.00	0.00
	Outside	9.080	8.31	-1.00	-10.29	-0.12	-10.29	0.00	7.31	-0.12	0.00	0.00
10	Inside	9.080	8.31	-1.00	9.77	1.54	9.77	0.00	7.31	1.54	0.00	0.00
	Middle	9.268	8.48	-1.00	0.12	1.54	0.12	0.00	7.48	1.54	0.00	0.00
	Outside	9.455	8.66	-1.00	-9.53	1.54	-9.53	0.00	7.66	1.54	0.00	0.00
11	Inside	9.080	8.31	-1.00	-3.93	-0.01	-3.93	0.00	7.31	-0.01	0.00	0.00
	Middle	9.268	8.48	-1.00	0.12	-0.01	0.12	0.00	7.48	-0.01	0.00	0.00
	Outside	9.455	8.66	-1.00	4.17	-0.01	4.17	0.00	7.66	-0.01	0.00	0.00
12	Inside	9.080	8.31	-1.00	-2.14	-0.04	-2.14	0.00	7.31	-0.04	0.00	0.00
	Middle	9.268	8.48	-1.00	0.12	-0.04	0.12	0.00	7.48	-0.04	0.00	0.00
	Outside	9.455	8.66	-1.00	2.38	-0.04	2.38	0.00	7.66	-0.04	0.00	0.00
13	Inside	9.080	8.31	-1.00	-1.52	0.09	-1.52	0.00	7.31	0.09	0.00	0.00
	Middle	9.268	8.48	-1.00	0.14	0.09	0.14	0.00	7.48	0.09	0.00	0.00
	Outside	9.455	8.66	-1.00	1.79	0.09	1.79	0.00	7.66	0.09	0.00	0.00
14	Inside	9.080	8.31	-1.00	-3.91	-0.46	-3.91	0.00	7.31	-0.46	0.00	0.00
	Middle	9.268	8.48	-1.00	0.14	-0.46	0.14	0.00	7.48	-0.46	0.00	0.00
	Outside	9.455	8.66	-1.00	4.19	-0.46	4.19	0.00	7.66	-0.46	0.00	0.00
15	Inside	9.080	8.31	-1.00	10.59	-1.61	10.59	0.00	7.31	-1.61	0.00	0.00
	Middle	9.268	8.48	-1.00	0.14	-1.61	0.14	0.00	7.48	-1.61	0.00	0.00
	Outside	9.455	8.66	-1.00	-10.32	-1.61	-10.32	0.00	7.66	-1.61	0.00	0.00
16	Inside	9.080	8.31	-1.00	9.59	0.14	9.59	0.00	7.31	0.14	0.00	0.00
	Middle	9.080	8.31	-1.00	-0.87	0.14	-0.87	0.00	7.31	0.14	0.00	0.00
	Outside	9.080	8.31	-1.00	-11.32	0.14	-11.32	0.00	7.31	0.14	0.00	0.00
17	Inside	4.692	4.30	-1.00	0.04	0.14	0.04	0.00	3.30	0.14	0.00	0.00
	Middle	4.692	4.30	-1.00	-0.87	0.14	-0.87	0.00	3.30	0.14	0.00	0.00
	Outside	4.692	4.30	-1.00	-1.77	0.14	-1.77	0.00	3.30	0.14	0.00	0.00
18	Inside	0.305	0.28	-1.00	-9.51	0.14	-9.51	0.00	-0.72	0.14	0.00	0.00
	Middle	0.305	0.28	-1.00	-0.87	0.14	-0.87	0.00	-0.72	0.14	0.00	0.00
	Outside	0.305	0.28	-1.00	7.78	0.14	7.78	0.00	-0.72	0.14	0.00	0.00

TABLE 2.10.9-29 (cont.) LINER AND FSS STRESSES (ksi); LOAD CASE 3-E, FLAT ORIENTATION - 1-FT SIDE DROP 3 FUEL ELEMENTS SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9 -8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.28	-1.00	7.77	0.13	7.77	0.00	-1.28	0.13	0.00	0.00
	Middle	0.305	-0.28	-1.00	-0.41	0.13	-0.41	0.00	-1.28	0.13	0.00	0.00
	Outside	0.305	-0.28	-1.00	-8.60	0.13	-8.60	0.00	-1.28	0.13	0.00	0.00
20	Inside	4.692	-4.30	-1.00	-1.09	0.13	-1.09	0.00	-5.30	0.13	0.00	0.00
	Middle	4.692	-4.30	-1.00	-0.41	0.13	-0.41	0.00	-5.30	0.13	0.00	0.00
	Outside	4.692	-4.30	-1.00	0.26	0.13	0.26	0.00	-5.30	0.13	0.00	0.00
21	Inside	9.080	-8.31	-1.00	-9.96	0.13	-9.96	0.00	-9.31	0.13	0.00	0.00
	Middle	9.080	-8.31	-1.00	-0.41	0.13	-0.41	0.00	-9.31	0.13	0.00	0.00
	Outside	9.080	-8.31	-1.00	9.13	0.13	9.13	0.00	-9.31	0.13	0.00	0.00
22	Inside	9.080	-8.31	-1.00	-9.67	-0.41	-9.67	0.00	-9.31	-0.41	0.00	0.00
	Middle	9.268	-8.48	-1.00	-0.13	-0.41	-0.13	0.00	-9.48	-0.41	0.00	0.00
	Outside	9.455	-8.66	-1.00	9.42	-0.41	9.42	0.00	-9.66	-0.41	0.00	0.00
23	Inside	9.080	-8.31	-1.00	6.07	-0.03	6.07	0.00	-9.31	-0.03	0.00	0.00
	Middle	9.268	-8.48	-1.00	-0.13	-0.03	-0.13	0.00	-9.48	-0.03	0.00	0.00
	Outside	9.455	-8.66	-1.00	-6.32	-0.03	-6.32	0.00	-9.66	-0.03	0.00	0.00
24	Inside	9.080	-8.31	-1.00	-4.80	0.34	-4.80	0.00	-9.31	0.34	0.00	0.00
	Middle	9.268	-8.48	-1.00	-0.13	0.34	-0.13	0.00	-9.48	0.34	0.00	0.00
	Outside	9.455	-8.66	-1.00	4.55	0.34	4.55	0.00	-9.66	0.34	0.00	0.00
25	Inside	9.080	-8.31	0.00	-0.86	-0.01	-0.86	0.00	-8.31	-0.01	0.00	0.00
	Middle	9.080	-8.31	0.00	-0.93	-0.01	-0.93	0.00	-8.31	-0.01	0.00	0.00
	Outside	9.080	-8.31	0.00	-1.00	-0.01	-1.00	0.00	-8.31	-0.01	0.00	0.00
26	Inside	4.692	-4.30	0.00	-1.28	-0.01	-1.28	0.00	-4.30	-0.01	0.00	0.00
	Middle	4.692	-4.30	0.00	-0.93	-0.01	-0.93	0.00	-4.30	-0.01	0.00	0.00
	Outside	4.692	-4.30	0.00	-0.57	-0.01	-0.57	0.00	-4.30	-0.01	0.00	0.00
27	Inside	0.305	-0.28	0.00	-1.71	-0.01	-1.71	0.00	-0.28	-0.01	0.00	0.00
	Middle	0.305	-0.28	0.00	-0.93	-0.01	-0.93	0.00	-0.28	-0.01	0.00	0.00
	Outside	0.305	-0.28	0.00	-0.15	-0.01	-0.15	0.00	-0.28	-0.01	0.00	0.00
28	Inside	0.305	0.28	0.00	8.86	0.22	8.86	0.00	0.28	0.22	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	0.22	-0.01	0.00	0.00	0.22	0.00	0.00
	Outside	0.305	-0.28	0.00	-8.87	0.22	-8.87	0.00	-0.28	0.22	0.00	0.00
29	Inside	0.305	0.28	0.00	0.93	0.22	0.93	0.00	0.28	0.22	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	0.22	-0.01	0.00	0.00	0.22	0.00	0.00
	Outside	0.305	-0.28	0.00	-0.95	0.22	-0.95	0.00	-0.28	0.22	0.00	0.00
30	Inside	0.305	0.28	0.00	-6.99	0.22	-6.99	0.00	0.28	0.22	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	0.22	-0.01	0.00	0.00	0.22	0.00	0.00
	Outside	0.305	-0.28	0.00	6.98	0.22	6.98	0.00	-0.28	0.22	0.00	0.00
31	Inside	0.305	0.28	0.00	0.26	-0.02	0.26	0.00	0.28	-0.02	0.00	0.00
	Middle	0.305	0.28	0.00	-0.64	-0.02	-0.64	0.00	0.28	-0.02	0.00	0.00
	Outside	0.305	0.28	0.00	-1.53	-0.02	-1.53	0.00	0.28	-0.02	0.00	0.00
32	Inside	4.692	4.30	0.00	-0.34	-0.02	-0.34	0.00	4.30	-0.02	0.00	0.00
	Middle	4.692	4.30	0.00	-0.64	-0.02	-0.64	0.00	4.30	-0.02	0.00	0.00
	Outside	4.692	4.30	0.00	-0.93	-0.02	-0.93	0.00	4.30	-0.02	0.00	0.00
33	Inside	9.080	8.31	0.00	-0.94	-0.02	-0.94	0.00	8.31	-0.02	0.00	0.00
	Middle	9.080	8.31	0.00	-0.64	-0.02	-0.64	0.00	8.31	-0.02	0.00	0.00
	Outside	9.080	8.31	0.00	-0.33	-0.02	-0.33	0.00	8.31	-0.02	0.00	0.00
34	Inside	0.305	0.28	0.00	7.18	0.01	7.18	0.00	0.28	0.01	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	0.01	-0.01	0.00	0.00	0.01	0.00	0.00
	Outside	0.305	-0.28	0.00	-7.20	0.01	-7.20	0.00	-0.28	0.01	0.00	0.00
35	Inside	0.305	0.28	0.00	3.40	-0.22	3.40	0.00	0.28	-0.22	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	-0.22	-0.01	0.00	0.00	-0.22	0.00	0.00
	Outside	0.305	-0.28	0.00	-3.42	-0.22	-3.42	0.00	-0.28	-0.22	0.00	0.00
36	Inside	0.305	0.28	0.00	-8.48	-0.45	-8.48	0.00	0.28	-0.45	0.00	0.00
	Middle	0.000	0.00	0.00	-0.01	-0.45	-0.01	0.00	0.00	-0.45	0.00	0.00
	Outside	0.305	-0.28	0.00	8.45	-0.45	8.45	0.00	-0.28	-0.45	0.00	0.00

TABLE 2.10.9-30 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 3-E, FLAT ORIENTATION - 1-FT SIDE DROP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	-4.65	0.00	-9.31	-0.35	0.00	0.00	0.03	-4.68	-9.31	9.34	Pm+Pb	49.13	4.26
	Middle		-0.11	0.00	-9.48	-0.35	0.00	0.00	0.30	-0.41	-9.48	9.78	Pm	32.75	2.35
	Outside		4.42	0.00	-9.66	-0.35	0.00	0.00	4.45	-0.03	-9.66	14.10	Pm+Pb	49.13	2.48
2	Inside	75j	6.32	0.00	-9.31	0.03	0.00	0.00	6.32	0.00	-9.31	15.63	Pm+Pb	49.13	2.14
	Middle		-0.11	0.00	-9.48	0.03	0.00	0.00	0.01	-0.12	-9.48	9.49	Pm	32.75	2.45
	Outside		-6.55	0.00	-9.66	0.03	0.00	0.00	0.00	-6.55	-9.66	9.66	Pm+Pb	49.13	4.09
3	Inside	80j	-9.31	0.00	-9.31	0.41	0.00	0.00	0.02	-9.31	-9.33	9.35	Pm+Pb	49.13	4.26
	Middle		-0.11	0.00	-9.48	0.41	0.00	0.00	0.36	-0.47	-9.48	9.84	Pm	32.75	2.33
	Outside		9.09	0.00	-9.66	0.41	0.00	0.00	9.11	-0.02	-9.66	18.76	Pm+Pb	49.13	1.62
4	Inside	40j	-9.61	0.00	-9.31	-0.11	0.00	0.00	0.00	-9.31	-9.61	9.61	Pm+Pb	49.13	4.11
	Middle		-0.41	0.00	-9.31	-0.11	0.00	0.00	0.03	-0.44	-9.31	9.34	Pm	32.75	2.51
	Outside		8.79	0.00	-9.31	-0.11	0.00	0.00	8.79	0.00	-9.31	18.10	Pm+Pb	49.13	1.71
5	Inside	35j	-1.60	0.00	-5.30	-0.11	0.00	0.00	0.01	-1.61	-5.30	5.30	Pm+Pb	49.13	8.27
	Middle		-0.41	0.00	-5.30	-0.11	0.00	0.00	0.03	-0.44	-5.30	5.32	Pm	32.75	5.15
	Outside		0.77	0.00	-5.30	-0.11	0.00	0.00	0.79	-0.02	-5.30	6.08	Pm+Pb	49.13	7.08
6	Inside	31i	6.42	0.00	-1.28	-0.11	0.00	0.00	6.42	0.00	-1.28	7.70	Pm+Pb	49.13	5.38
	Middle		-0.41	0.00	-1.28	-0.11	0.00	0.00	0.03	-0.44	-1.28	1.31	Pm	32.75	24.06
	Outside		-7.25	0.00	-1.28	-0.11	0.00	0.00	0.00	-1.28	-7.25	7.25	Pm+Pb	49.13	5.77
7	Inside	30j	-7.69	0.00	-0.72	-0.12	0.00	0.00	0.00	-0.72	-7.69	7.69	Pm+Pb	49.13	5.39
	Middle		-0.64	0.00	-0.72	-0.12	0.00	0.00	0.02	-0.66	-0.72	0.74	Pm	32.75	43.10
	Outside		6.42	0.00	-0.72	-0.12	0.00	0.00	6.42	0.00	-0.72	7.14	Pm+Pb	49.13	5.88
8	Inside	25j	0.66	0.00	3.30	-0.12	0.00	0.00	3.30	0.68	-0.02	3.32	Pm+Pb	49.13	13.81
	Middle		-0.64	0.00	3.30	-0.12	0.00	0.00	3.30	0.02	-0.66	3.96	Pm	32.75	7.28
	Outside		-1.93	0.00	3.30	-0.12	0.00	0.00	3.30	0.01	-1.94	5.23	Pm+Pb	49.13	8.39
9	Inside	21j	9.01	0.00	7.31	-0.12	0.00	0.00	9.01	7.31	0.00	9.01	Pm+Pb	49.13	4.45
	Middle		-0.64	0.00	7.31	-0.12	0.00	0.00	7.31	0.02	-0.66	7.97	Pm	32.75	3.11
	Outside		-10.29	0.00	7.31	-0.12	0.00	0.00	7.31	0.00	-10.29	17.60	Pm+Pb	49.13	1.79

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TABLE 2.10.9-30 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 3-E, FLAT ORIENTATION - 1-FT SIDE DROP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	9.77	0.00	7.31	1.54	0.00	0.00	10.01	7.31	-0.24	10.24	Pm+Pb	49.13	3.80
	Middle		0.12	0.00	7.48	1.54	0.00	0.00	7.48	1.60	-1.48	8.97	Pm	32.75	2.65
	Outside		-9.53	0.00	7.66	1.54	0.00	0.00	7.66	0.24	-9.77	17.43	Pm+Pb	49.13	1.82
11	Inside	15j	-3.93	0.00	7.31	-0.01	0.00	0.00	7.31	0.00	-3.93	11.24	Pm+Pb	49.13	3.37
	Middle		0.12	0.00	7.48	-0.01	0.00	0.00	7.48	0.12	0.00	7.48	Pm	32.75	3.38
	Outside		4.17	0.00	7.66	-0.01	0.00	0.00	7.66	4.17	0.00	7.66	Pm+Pb	49.13	5.42
12	Inside	11i	-2.14	0.00	7.31	-0.04	0.00	0.00	7.31	0.00	-2.14	9.45	Pm+Pb	49.13	4.20
	Middle		0.12	0.00	7.48	-0.04	0.00	0.00	7.48	0.13	-0.01	7.50	Pm	32.75	3.37
	Outside		2.38	0.00	7.66	-0.04	0.00	0.00	7.66	2.38	0.00	7.66	Pm+Pb	49.13	5.42
13	Inside	10j	-1.52	0.00	7.31	0.09	0.00	0.00	7.31	0.01	-1.53	8.84	Pm+Pb	49.13	4.56
	Middle		0.14	0.00	7.48	0.09	0.00	0.00	7.48	0.18	-0.04	7.53	Pm	32.75	3.35
	Outside		1.79	0.00	7.66	0.09	0.00	0.00	7.66	1.79	0.00	7.66	Pm+Pb	49.13	5.41
14	Inside	5j	-3.91	0.00	7.31	-0.46	0.00	0.00	7.31	0.05	-3.96	11.28	Pm+Pb	49.13	3.36
	Middle		0.14	0.00	7.48	-0.46	0.00	0.00	7.48	0.54	-0.40	7.88	Pm	32.75	3.16
	Outside		4.19	0.00	7.66	-0.46	0.00	0.00	7.66	4.24	-0.05	7.71	Pm+Pb	49.13	5.38
15	Inside	1i	10.59	0.00	7.31	-1.61	0.00	0.00	10.83	7.31	-0.24	11.07	Pm+Pb	49.13	3.44
	Middle		0.14	0.00	7.48	-1.61	0.00	0.00	7.48	1.68	-1.54	9.03	Pm	32.75	2.63
	Outside		-10.32	0.00	7.66	-1.61	0.00	0.00	7.66	0.25	-10.57	18.22	Pm+Pb	49.13	1.70
16	Inside	41i	9.59	0.00	7.31	0.14	0.00	0.00	9.59	7.31	0.00	9.59	Pm+Pb	49.13	4.12
	Middle		-0.87	0.00	7.31	0.14	0.00	0.00	7.31	0.02	-0.89	8.20	Pm	32.75	2.99
	Outside		-11.32	0.00	7.31	0.14	0.00	0.00	7.31	0.00	-11.32	18.63	Pm+Pb	49.13	1.64
17	Inside	45j	0.04	0.00	3.30	0.14	0.00	0.00	3.30	0.16	-0.12	3.42	Pm+Pb	49.13	13.38
	Middle		-0.87	0.00	3.30	0.14	0.00	0.00	3.30	0.02	-0.89	4.19	Pm	32.75	6.82
	Outside		-1.77	0.00	3.30	0.14	0.00	0.00	3.30	0.01	-1.78	5.08	Pm+Pb	49.13	8.68
18	Inside	50j	-9.51	0.00	-0.72	0.14	0.00	0.00	0.00	-0.72	-9.51	9.51	Pm+Pb	49.13	4.16
	Middle		-0.87	0.00	-0.72	0.14	0.00	0.00	0.02	-0.72	-0.89	0.91	Pm	32.75	34.83
	Outside		7.78	0.00	-0.72	0.14	0.00	0.00	7.78	0.00	-0.72	8.50	Pm+Pb	49.13	4.78

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TABLE 2.10.9-30 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 3-E, FLAT ORIENTATION - 1-FT SIDE DROP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	7.77	0.00	-1.28	0.13	0.00	0.00	7.77	0.00	-1.28	9.05	Pm+Pb	49.13	4.43
	Middle		-0.41	0.00	-1.28	0.13	0.00	0.00	0.04	-0.45	-1.28	1.32	Pm	32.75	23.87
	Outside		-8.60	0.00	-1.28	0.13	0.00	0.00	0.00	-1.28	-8.60	8.60	Pm+Pb	49.13	4.71
20	Inside	55j	-1.09	0.00	-5.30	0.13	0.00	0.00	0.02	-1.11	-5.30	5.31	Pm+Pb	49.13	8.25
	Middle		-0.41	0.00	-5.30	0.13	0.00	0.00	0.04	-0.45	-5.30	5.33	Pm	32.75	5.14
	Outside		0.26	0.00	-5.30	0.13	0.00	0.00	0.31	-0.05	-5.30	5.61	Pm+Pb	49.13	7.76
21	Inside	60j	-9.96	0.00	-9.31	0.13	0.00	0.00	0.00	-9.31	-9.96	9.96	Pm+Pb	49.13	3.93
	Middle		-0.41	0.00	-9.31	0.13	0.00	0.00	0.04	-0.45	-9.31	9.35	Pm	32.75	2.50
	Outside		9.13	0.00	-9.31	0.13	0.00	0.00	9.13	0.00	-9.31	18.44	Pm+Pb	49.13	1.66
22	Inside	61i	-9.67	0.00	-9.31	-0.41	0.00	0.00	0.02	-9.31	-9.69	9.70	Pm+Pb	49.13	4.06
	Middle		-0.13	0.00	-9.48	-0.41	0.00	0.00	0.35	-0.48	-9.48	9.83	Pm	32.75	2.33
	Outside		9.42	0.00	-9.66	-0.41	0.00	0.00	9.44	-0.02	-9.66	19.09	Pm+Pb	49.13	1.57
23	Inside	65j	6.07	0.00	-9.31	-0.03	0.00	0.00	6.07	0.00	-9.31	15.38	Pm+Pb	49.13	2.19
	Middle		-0.13	0.00	-9.48	-0.03	0.00	0.00	0.01	-0.14	-9.48	9.49	Pm	32.75	2.45
	Outside		-6.32	0.00	-9.66	-0.03	0.00	0.00	0.00	-6.32	-9.66	9.66	Pm+Pb	49.13	4.09
24	Inside	70j	-4.80	0.00	-9.31	0.34	0.00	0.00	0.02	-4.82	-9.31	9.34	Pm+Pb	49.13	4.26
	Middle		-0.13	0.00	-9.48	0.34	0.00	0.00	0.28	-0.41	-9.48	9.77	Pm	32.75	2.35
	Outside		4.55	0.00	-9.66	0.34	0.00	0.00	4.58	-0.03	-9.66	14.23	Pm+Pb	49.13	2.45
25	Inside	120j	-0.86	0.00	-8.31	-0.01	0.00	0.00	0.00	-0.86	-8.31	8.31	Pm+Pb	30.71	2.69
	Middle		-0.93	0.00	-8.31	-0.01	0.00	0.00	0.00	-0.93	-8.31	8.31	Pm	20.47	1.46
	Outside		-1.00	0.00	-8.31	-0.01	0.00	0.00	0.00	-1.00	-8.31	8.31	Pm+Pb	30.71	2.69
26	Inside	115j	-1.28	0.00	-4.30	-0.01	0.00	0.00	0.00	-1.28	-4.30	4.30	Pm+Pb	47.24	10.00
	Middle		-0.93	0.00	-4.30	-0.01	0.00	0.00	0.00	-0.93	-4.30	4.30	Pm	31.49	6.33
	Outside		-0.57	0.00	-4.30	-0.01	0.00	0.00	0.00	-0.57	-4.30	4.30	Pm+Pb	47.24	10.00
27	Inside	111i	-1.71	0.00	-0.28	-0.01	0.00	0.00	0.00	-0.28	-1.71	1.71	Pm+Pb	47.24	26.62
	Middle		-0.93	0.00	-0.28	-0.01	0.00	0.00	0.00	-0.28	-0.93	0.93	Pm	31.49	32.85
	Outside		-0.15	0.00	-0.28	-0.01	0.00	0.00	0.00	-0.15	-0.28	0.28	Pm+Pb	47.24	167.80

ca/marg-xnfe

TABLE 2.10.9-30 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 3-E, FLAT ORIENTATION - 1-FT SIDE DROP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	8.86	0.00	0.28	0.22	0.00	0.00	8.87	0.28	-0.01	8.87	Pm+Pb	47.24	4.33
	Middle		-0.01	0.00	0.00	0.22	0.00	0.00	0.22	0.00	-0.23	0.44	Pm	31.49	70.55
	Outside		-8.87	0.00	-0.28	0.22	0.00	0.00	0.01	-0.28	-8.88	8.88	Pm+Pb	47.24	4.32
29	Inside	105j	0.93	0.00	0.28	0.22	0.00	0.00	0.98	0.28	-0.05	1.03	Pm+Pb	47.24	44.92
	Middle		-0.01	0.00	0.00	0.22	0.00	0.00	0.22	0.00	-0.23	0.44	Pm	31.49	70.55
	Outside		-0.95	0.00	-0.28	0.22	0.00	0.00	0.05	-0.28	-1.00	1.05	Pm+Pb	47.24	44.12
30	Inside	110j	-6.99	0.00	0.28	0.22	0.00	0.00	0.28	0.01	-7.00	7.28	Pm+Pb	30.71	3.22
	Middle		-0.01	0.00	0.00	0.22	0.00	0.00	0.22	0.00	-0.23	0.44	Pm	20.47	45.51
	Outside		6.98	0.00	-0.28	0.22	0.00	0.00	6.99	-0.01	-0.28	7.27	Pm+Pb	30.71	3.23
31	Inside	90j	0.26	0.00	0.28	-0.02	0.00	0.00	0.28	0.26	0.00	0.28	Pm+Pb	47.24	167.27
	Middle		-0.64	0.00	0.28	-0.02	0.00	0.00	0.28	0.00	-0.64	0.92	Pm	31.49	33.23
	Outside		-1.53	0.00	0.28	-0.02	0.00	0.00	0.28	0.00	-1.53	1.81	Pm+Pb	47.24	25.11
32	Inside	85j	-0.34	0.00	4.30	-0.02	0.00	0.00	4.30	0.00	-0.34	4.64	Pm+Pb	47.24	9.19
	Middle		-0.64	0.00	4.30	-0.02	0.00	0.00	4.30	0.00	-0.64	4.94	Pm	31.49	5.38
	Outside		-0.93	0.00	4.30	-0.02	0.00	0.00	4.30	0.00	-0.93	5.23	Pm+Pb	47.24	8.04
33	Inside	81j	-0.94	0.00	8.31	-0.02	0.00	0.00	8.31	0.00	-0.94	9.25	Pm+Pb	30.71	2.32
	Middle		-0.64	0.00	8.31	-0.02	0.00	0.00	8.31	0.00	-0.64	8.95	Pm	20.47	1.29
	Outside		-0.33	0.00	8.31	-0.02	0.00	0.00	8.31	0.00	-0.33	8.64	Pm+Pb	30.71	2.55
34	Inside	100j	7.18	0.00	0.28	0.01	0.00	0.00	7.18	0.28	0.00	7.18	Pm+Pb	47.24	5.58
	Middle		-0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	-0.02	0.02	Pm	31.49	1407.28
	Outside		-7.20	0.00	-0.28	0.01	0.00	0.00	0.00	-0.28	-7.20	7.20	Pm+Pb	47.24	5.56
35	Inside	95j	3.40	0.00	0.28	-0.22	0.00	0.00	3.41	0.28	-0.01	3.43	Pm+Pb	47.24	12.78
	Middle		-0.01	0.00	0.00	-0.22	0.00	0.00	0.22	0.00	-0.23	0.44	Pm	31.49	70.55
	Outside		-3.42	0.00	-0.28	-0.22	0.00	0.00	0.01	-0.28	-3.43	3.45	Pm+Pb	47.24	12.70
36	Inside	91i	-8.48	0.00	0.28	-0.45	0.00	0.00	0.28	0.02	-8.50	8.78	Pm+Pb	30.71	2.50
	Middle		-0.01	0.00	0.00	-0.45	0.00	0.00	0.45	0.00	-0.46	0.90	Pm	20.47	21.74
	Outside		8.45	0.00	-0.28	-0.45	0.00	0.00	8.47	-0.02	-0.28	8.75	Pm+Pb	30.71	2.51

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TABLE 2.10.9-31 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 4-E, FLAT ORIENTATION - 1-FT SIDE DROP + MNOP 3 FUEL ELEMENTS SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP+ Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal +MNOP + Frame Analysis)					
(Fig. 2.10.9 -8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-8.31	-1.00	19.44	0.61	19.44	0.00	-9.31	0.61	0.00	0.00
	Middle	9.268	-8.48	-1.00	0.81	0.61	0.81	0.00	-9.48	0.61	0.00	0.00
	Outside	9.455	-8.66	-1.00	-17.83	0.61	-17.83	0.00	-9.66	0.61	0.00	0.00
2	Inside	9.080	-8.31	-1.00	-3.56	0.05	-3.56	0.00	-9.31	0.05	0.00	0.00
	Middle	9.268	-8.48	-1.00	0.81	0.05	0.81	0.00	-9.48	0.05	0.00	0.00
	Outside	9.455	-8.66	-1.00	5.17	0.05	5.17	0.00	-9.66	0.05	0.00	0.00
3	Inside	9.080	-8.31	-1.00	12.54	-0.51	12.54	0.00	-9.31	-0.51	0.00	0.00
	Middle	9.268	-8.48	-1.00	0.81	-0.51	0.81	0.00	-9.48	-0.51	0.00	0.00
	Outside	9.455	-8.66	-1.00	-10.92	-0.51	-10.92	0.00	-9.66	-0.51	0.00	0.00
4	Inside	9.080	-8.31	-1.00	12.24	0.81	12.24	0.00	-9.31	0.81	0.00	0.00
	Middle	9.080	-8.31	-1.00	0.51	0.81	0.51	0.00	-9.31	0.81	0.00	0.00
	Outside	9.080	-8.31	-1.00	-11.22	0.81	-11.22	0.00	-9.31	0.81	0.00	0.00
5	Inside	4.692	-4.30	-1.00	-11.48	-0.13	-11.48	0.00	-5.30	-0.13	0.00	0.00
	Middle	4.692	-4.30	-1.00	0.51	-0.13	0.51	0.00	-5.30	-0.13	0.00	0.00
	Outside	4.692	-4.30	-1.00	12.49	-0.13	12.49	0.00	-5.30	-0.13	0.00	0.00
6	Inside	0.305	-0.28	-1.00	30.50	-1.07	30.50	0.00	-1.28	-1.07	0.00	0.00
	Middle	0.305	-0.28	-1.00	0.51	-1.07	0.51	0.00	-1.28	-1.07	0.00	0.00
	Outside	0.305	-0.28	-1.00	-29.49	-1.07	-29.49	0.00	-1.28	-1.07	0.00	0.00
7	Inside	0.305	0.28	-1.00	14.51	0.82	14.51	0.00	-0.72	0.82	0.00	0.00
	Middle	0.305	0.28	-1.00	0.24	0.82	0.24	0.00	-0.72	0.82	0.00	0.00
	Outside	0.305	0.28	-1.00	-14.02	0.82	-14.02	0.00	-0.72	0.82	0.00	0.00
8	Inside	4.692	4.30	-1.00	-10.11	-0.12	-10.11	0.00	3.30	-0.12	0.00	0.00
	Middle	4.692	4.30	-1.00	0.24	-0.12	0.24	0.00	3.30	-0.12	0.00	0.00
	Outside	4.692	4.30	-1.00	10.60	-0.12	10.60	0.00	3.30	-0.12	0.00	0.00
9	Inside	9.080	8.31	-1.00	30.97	-1.05	30.97	0.00	7.31	-1.05	0.00	0.00
	Middle	9.080	8.31	-1.00	0.24	-1.05	0.24	0.00	7.31	-1.05	0.00	0.00
	Outside	9.080	8.31	-1.00	-30.49	-1.05	-30.49	0.00	7.31	-1.05	0.00	0.00
10	Inside	9.080	8.31	-1.00	31.78	3.16	31.78	0.00	7.31	3.16	0.00	0.00
	Middle	9.268	8.48	-1.00	1.05	3.16	1.05	0.00	7.48	3.16	0.00	0.00
	Outside	9.455	8.66	-1.00	-29.68	3.16	-29.68	0.00	7.66	3.16	0.00	0.00
11	Inside	9.080	8.31	-1.00	-3.66	0.01	-3.66	0.00	7.31	0.01	0.00	0.00
	Middle	9.268	8.48	-1.00	1.05	0.01	1.05	0.00	7.48	0.01	0.00	0.00
	Outside	9.455	8.66	-1.00	5.77	0.01	5.77	0.00	7.66	0.01	0.00	0.00
12	Inside	9.080	8.31	-1.00	-3.84	0.20	-3.84	0.00	7.31	0.20	0.00	0.00
	Middle	9.268	8.48	-1.00	1.05	0.20	1.05	0.00	7.48	0.20	0.00	0.00
	Outside	9.455	8.66	-1.00	5.94	0.20	5.94	0.00	7.66	0.20	0.00	0.00
13	Inside	9.080	8.31	-1.00	-3.21	-0.15	-3.21	0.00	7.31	-0.15	0.00	0.00
	Middle	9.268	8.48	-1.00	1.07	-0.15	1.07	0.00	7.48	-0.15	0.00	0.00
	Outside	9.455	8.66	-1.00	5.35	-0.15	5.35	0.00	7.66	-0.15	0.00	0.00
14	Inside	9.080	8.31	-1.00	-3.65	-0.44	-3.65	0.00	7.31	-0.44	0.00	0.00
	Middle	9.268	8.48	-1.00	1.07	-0.44	1.07	0.00	7.48	-0.44	0.00	0.00
	Outside	9.455	8.66	-1.00	5.79	-0.44	5.79	0.00	7.66	-0.44	0.00	0.00
15	Inside	9.080	8.31	-1.00	32.60	-3.23	32.60	0.00	7.31	-3.23	0.00	0.00
	Middle	9.268	8.48	-1.00	1.07	-3.23	1.07	0.00	7.48	-3.23	0.00	0.00
	Outside	9.455	8.66	-1.00	-30.46	-3.23	-30.46	0.00	7.66	-3.23	0.00	0.00
16	Inside	9.080	8.31	-1.00	31.55	1.07	31.55	0.00	7.31	1.07	0.00	0.00
	Middle	9.080	8.31	-1.00	0.02	1.07	0.02	0.00	7.31	1.07	0.00	0.00
	Outside	9.080	8.31	-1.00	-31.52	1.07	-31.52	0.00	7.31	1.07	0.00	0.00
17	Inside	4.692	4.30	-1.00	-10.73	0.13	-10.73	0.00	3.30	0.13	0.00	0.00
	Middle	4.692	4.30	-1.00	0.02	0.13	0.02	0.00	3.30	0.13	0.00	0.00
	Outside	4.692	4.30	-1.00	10.76	0.13	10.76	0.00	3.30	0.13	0.00	0.00
18	Inside	0.305	0.28	-1.00	12.69	-0.80	12.69	0.00	-0.72	-0.80	0.00	0.00
	Middle	0.305	0.28	-1.00	0.02	-0.80	0.02	0.00	-0.72	-0.80	0.00	0.00
	Outside	0.305	0.28	-1.00	-12.66	-0.80	-12.66	0.00	-0.72	-0.80	0.00	0.00

TABLE 2.10.9-31 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 4-E, FLAT ORIENTATION - 1-FT SIDE DROP + MNOP 3 FUEL ELEMENTS SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP+ Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal +MNOP + Frame Analysis)					
(Fig 2.10.9 -8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.28	-1.00	31.86	1.08	31.86	0.00	-1.28	1.08	0.00	0.00
	Middle	0.305	-0.28	-1.00	0.51	1.08	0.51	0.00	-1.28	1.08	0.00	0.00
	Outside	0.305	-0.28	-1.00	-30.84	1.08	-30.84	0.00	-1.28	1.08	0.00	0.00
20	Inside	4.692	-4.30	-1.00	-10.98	0.14	-10.98	0.00	-5.30	0.14	0.00	0.00
	Middle	4.692	-4.30	-1.00	0.51	0.14	0.51	0.00	-5.30	0.14	0.00	0.00
	Outside	4.692	-4.30	-1.00	11.99	0.14	11.99	0.00	-5.30	0.14	0.00	0.00
21	Inside	9.080	-8.31	-1.00	11.89	-0.79	11.89	0.00	-9.31	-0.79	0.00	0.00
	Middle	9.080	-8.31	-1.00	0.51	-0.79	0.51	0.00	-9.31	-0.79	0.00	0.00
	Outside	9.080	-8.31	-1.00	-10.88	-0.79	-10.88	0.00	-9.31	-0.79	0.00	0.00
22	Inside	9.080	-8.31	-1.00	12.18	0.51	12.18	0.00	-9.31	0.51	0.00	0.00
	Middle	9.268	-8.48	-1.00	0.79	0.51	0.79	0.00	-9.48	0.51	0.00	0.00
	Outside	9.455	-8.66	-1.00	-10.59	0.51	-10.59	0.00	-9.66	0.51	0.00	0.00
23	Inside	9.080	-8.31	-1.00	-3.81	-0.05	-3.81	0.00	-9.31	-0.05	0.00	0.00
	Middle	9.268	-8.48	-1.00	0.79	-0.05	0.79	0.00	-9.48	-0.05	0.00	0.00
	Outside	9.455	-8.66	-1.00	5.40	-0.05	5.40	0.00	-9.66	-0.05	0.00	0.00
24	Inside	9.080	-8.31	-1.00	19.29	-0.61	19.29	0.00	-9.31	-0.61	0.00	0.00
	Middle	9.268	-8.48	-1.00	0.79	-0.61	0.79	0.00	-9.48	-0.61	0.00	0.00
	Outside	9.455	-8.66	-1.00	-17.70	-0.61	-17.70	0.00	-9.66	-0.61	0.00	0.00
25	Inside	9.080	-8.31	0.00	1.70	-0.01	1.70	0.00	-8.31	-0.01	0.00	0.00
	Middle	9.080	-8.31	0.00	1.63	-0.01	1.63	0.00	-8.31	-0.01	0.00	0.00
	Outside	9.080	-8.31	0.00	1.56	-0.01	1.56	0.00	-8.31	-0.01	0.00	0.00
26	Inside	4.692	-4.30	0.00	1.28	-0.01	1.28	0.00	-4.30	-0.01	0.00	0.00
	Middle	4.692	-4.30	0.00	1.63	-0.01	1.63	0.00	-4.30	-0.01	0.00	0.00
	Outside	4.692	-4.30	0.00	1.99	-0.01	1.99	0.00	-4.30	-0.01	0.00	0.00
27	Inside	0.305	-0.28	0.00	0.85	-0.01	0.85	0.00	-0.28	-0.01	0.00	0.00
	Middle	0.305	-0.28	0.00	1.63	-0.01	1.63	0.00	-0.28	-0.01	0.00	0.00
	Outside	0.305	-0.28	0.00	2.41	-0.01	2.41	0.00	-0.28	-0.01	0.00	0.00
28	Inside	0.305	0.28	0.00	13.26	0.26	13.26	0.00	0.28	0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	0.26	2.53	0.00	0.00	0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	-8.19	0.26	-8.19	0.00	-0.28	0.26	0.00	0.00
29	Inside	0.305	0.28	0.00	3.94	0.26	3.94	0.00	0.28	0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	0.26	2.53	0.00	0.00	0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	1.13	0.26	1.13	0.00	-0.28	0.26	0.00	0.00
30	Inside	0.305	0.28	0.00	-5.38	0.26	-5.38	0.00	0.28	0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	0.26	2.53	0.00	0.00	0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	10.45	0.26	10.45	0.00	-0.28	0.26	0.00	0.00
31	Inside	0.305	0.28	0.00	2.92	-0.02	2.92	0.00	0.28	-0.02	0.00	0.00
	Middle	0.305	0.28	0.00	2.03	-0.02	2.03	0.00	0.28	-0.02	0.00	0.00
	Outside	0.305	0.28	0.00	1.14	-0.02	1.14	0.00	0.28	-0.02	0.00	0.00
32	Inside	4.692	4.30	0.00	2.32	-0.02	2.32	0.00	4.30	-0.02	0.00	0.00
	Middle	4.692	4.30	0.00	2.03	-0.02	2.03	0.00	4.30	-0.02	0.00	0.00
	Outside	4.692	4.30	0.00	1.74	-0.02	1.74	0.00	4.30	-0.02	0.00	0.00
33	Inside	9.080	8.31	0.00	1.72	-0.02	1.72	0.00	8.31	-0.02	0.00	0.00
	Middle	9.080	8.31	0.00	2.03	-0.02	2.03	0.00	8.31	-0.02	0.00	0.00
	Outside	9.080	8.31	0.00	2.34	-0.02	2.34	0.00	8.31	-0.02	0.00	0.00
34	Inside	0.305	0.28	0.00	11.57	-0.03	11.57	0.00	0.28	-0.03	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	-0.03	2.53	0.00	0.00	-0.03	0.00	0.00
	Outside	0.305	-0.28	0.00	-6.52	-0.03	-6.52	0.00	-0.28	-0.03	0.00	0.00
35	Inside	0.305	0.28	0.00	6.40	-0.26	6.40	0.00	0.28	-0.26	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	-0.26	2.53	0.00	0.00	-0.26	0.00	0.00
	Outside	0.305	-0.28	0.00	-1.35	-0.26	-1.35	0.00	-0.28	-0.26	0.00	0.00
36	Inside	0.305	0.28	0.00	-6.86	-0.49	-6.86	0.00	0.28	-0.49	0.00	0.00
	Middle	0.000	0.00	0.00	2.53	-0.49	2.53	0.00	0.00	-0.49	0.00	0.00
	Outside	0.305	-0.28	0.00	11.92	-0.49	11.92	0.00	-0.28	-0.49	0.00	0.00

TABLE 2.10.9-32 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 4-E, FLAT ORIENTATION - 1-FT SIDE DROP + MNOP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	19.44	0.00	-9.31	0.61	0.00	0.00	19.46	-0.02	-9.31	28.77	Pm+Pb	49.13	0.71
	Middle		0.81	0.00	-9.48	0.61	0.00	0.00	1.14	-0.33	-9.48	10.62	Pm	32.75	2.08
	Outside		-17.83	0.00	-9.66	0.61	0.00	0.00	0.02	-9.66	-17.85	17.87	Pm+Pb	49.13	1.75
2	Inside	75j	-3.56	0.00	-9.31	0.05	0.00	0.00	0.00	-3.56	-9.31	9.31	Pm+Pb	49.13	4.28
	Middle		0.81	0.00	-9.48	0.05	0.00	0.00	0.81	0.00	-9.48	10.30	Pm	32.75	2.18
	Outside		5.17	0.00	-9.66	0.05	0.00	0.00	5.17	0.00	-9.66	14.83	Pm+Pb	49.13	2.31
3	Inside	80j	12.54	0.00	-9.31	-0.51	0.00	0.00	12.56	-0.02	-9.31	21.87	Pm+Pb	49.13	1.25
	Middle		0.81	0.00	-9.48	-0.51	0.00	0.00	1.06	-0.25	-9.48	10.54	Pm	32.75	2.11
	Outside		-10.92	0.00	-9.66	-0.51	0.00	0.00	0.02	-9.66	-10.94	10.97	Pm+Pb	49.13	3.48
4	Inside	40j	12.24	0.00	-9.31	0.81	0.00	0.00	12.29	-0.05	-9.31	21.61	Pm+Pb	49.13	1.27
	Middle		0.51	0.00	-9.31	0.81	0.00	0.00	1.10	-0.59	-9.31	10.42	Pm	32.75	2.14
	Outside		-11.22	0.00	-9.31	0.81	0.00	0.00	0.06	-9.31	-11.28	11.34	Pm+Pb	49.13	3.33
5	Inside	35j	-11.48	0.00	-5.30	-0.13	0.00	0.00	0.00	-5.30	-11.48	11.48	Pm+Pb	49.13	3.28
	Middle		0.51	0.00	-5.30	-0.13	0.00	0.00	0.54	-0.03	-5.30	5.84	Pm	32.75	4.61
	Outside		12.49	0.00	-5.30	-0.13	0.00	0.00	12.49	0.00	-5.30	17.79	Pm+Pb	49.13	1.76
6	Inside	31i	30.50	0.00	-1.28	-1.07	0.00	0.00	30.54	-0.04	-1.28	31.82	Pm+Pb	49.13	0.54
	Middle		0.51	0.00	-1.28	-1.07	0.00	0.00	1.35	-0.84	-1.28	2.63	Pm	32.75	11.43
	Outside		-29.49	0.00	-1.28	-1.07	0.00	0.00	0.04	-1.28	-29.53	29.57	Pm+Pb	49.13	0.66
7	Inside	30j	14.51	0.00	-0.72	0.82	0.00	0.00	14.56	-0.05	-0.72	15.28	Pm+Pb	49.13	2.22
	Middle		0.24	0.00	-0.72	0.82	0.00	0.00	0.95	-0.71	-0.72	1.67	Pm	32.75	18.62
	Outside		-14.02	0.00	-0.72	0.82	0.00	0.00	0.05	-0.72	-14.07	14.12	Pm+Pb	49.13	2.48
8	Inside	25j	-10.11	0.00	3.30	-0.12	0.00	0.00	3.30	0.00	-10.11	13.41	Pm+Pb	49.13	2.66
	Middle		0.24	0.00	3.30	-0.12	0.00	0.00	3.30	0.29	-0.05	3.34	Pm	32.75	8.79
	Outside		10.60	0.00	3.30	-0.12	0.00	0.00	10.60	3.30	0.00	10.60	Pm+Pb	49.13	3.63
9	Inside	21j	30.97	0.00	7.31	-1.05	0.00	0.00	31.01	7.31	-0.04	31.04	Pm+Pb	49.13	0.58
	Middle		0.24	0.00	7.31	-1.05	0.00	0.00	7.31	1.18	-0.94	8.25	Pm	32.75	2.97
	Outside		-30.49	0.00	7.31	-1.05	0.00	0.00	7.31	0.04	-30.53	37.84	Pm+Pb	49.13	0.30

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TABLE 2.10.9-32 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 4-E, FLAT ORIENTATION - 1-FT SIDE DROP+MNOP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	31.78	0.00	7.31	3.16	0.00	0.00	32.09	7.31	-0.31	32.40	Pm+Pb	49.13	0.52
	Middle		1.05	0.00	7.48	3.16	0.00	0.00	7.48	3.73	-2.68	10.16	Pm	32.75	2.22
	Outside		-29.68	0.00	7.66	3.16	0.00	0.00	7.66	0.33	-30.01	37.67	Pm+Pb	49.13	0.30
11	Inside	15j	-3.66	0.00	7.31	0.01	0.00	0.00	7.31	0.00	-3.66	10.97	Pm+Pb	49.13	3.48
	Middle		1.05	0.00	7.48	0.01	0.00	0.00	7.48	1.05	0.00	7.48	Pm	32.75	3.38
	Outside		5.77	0.00	7.66	0.01	0.00	0.00	7.66	5.77	0.00	7.66	Pm+Pb	49.13	5.42
12	Inside	11i	-3.84	0.00	7.31	0.20	0.00	0.00	7.31	0.01	-3.85	11.16	Pm+Pb	49.13	3.40
	Middle		1.05	0.00	7.48	0.20	0.00	0.00	7.48	1.09	-0.04	7.52	Pm	32.75	3.35
	Outside		5.94	0.00	7.66	0.20	0.00	0.00	7.66	5.95	-0.01	7.66	Pm+Pb	49.13	5.41
13	Inside	10j	-3.21	0.00	7.31	-0.15	0.00	0.00	7.31	0.01	-3.22	10.53	Pm+Pb	49.13	3.67
	Middle		1.07	0.00	7.48	-0.15	0.00	0.00	7.48	1.09	-0.02	7.50	Pm	32.75	3.36
	Outside		5.35	0.00	7.66	-0.15	0.00	0.00	7.66	5.35	0.00	7.66	Pm+Pb	49.13	5.41
14	Inside	5j	-3.65	0.00	7.31	-0.44	0.00	0.00	7.31	0.05	-3.70	11.01	Pm+Pb	49.13	3.46
	Middle		1.07	0.00	7.48	-0.44	0.00	0.00	7.48	1.23	-0.16	7.64	Pm	32.75	3.29
	Outside		5.79	0.00	7.66	-0.44	0.00	0.00	7.66	5.82	-0.03	7.69	Pm+Pb	49.13	5.39
15	Inside	1i	32.60	0.00	7.31	-3.23	0.00	0.00	32.92	7.31	-0.32	33.23	Pm+Pb	49.13	0.48
	Middle		1.07	0.00	7.48	-3.23	0.00	0.00	7.48	3.81	-2.74	10.22	Pm	32.75	2.20
	Outside		-30.46	0.00	7.66	-3.23	0.00	0.00	7.66	0.34	-30.80	38.45	Pm+Pb	49.13	0.28
16	Inside	41i	31.55	0.00	7.31	1.07	0.00	0.00	31.59	7.31	-0.04	31.62	Pm+Pb	49.13	0.55
	Middle		0.02	0.00	7.31	1.07	0.00	0.00	7.31	1.08	-1.06	8.37	Pm	32.75	2.91
	Outside		-31.52	0.00	7.31	1.07	0.00	0.00	7.31	0.04	-31.56	38.87	Pm+Pb	49.13	0.26
17	Inside	45j	-10.73	0.00	3.30	0.13	0.00	0.00	3.30	0.00	-10.73	14.03	Pm+Pb	49.13	2.50
	Middle		0.02	0.00	3.30	0.13	0.00	0.00	3.30	0.14	-0.12	3.42	Pm	32.75	8.59
	Outside		10.76	0.00	3.30	0.13	0.00	0.00	10.76	3.30	0.00	10.76	Pm+Pb	49.13	3.56
18	Inside	50j	12.69	0.00	-0.72	-0.80	0.00	0.00	12.74	-0.05	-0.72	13.46	Pm+Pb	49.13	2.65
	Middle		0.02	0.00	-0.72	-0.80	0.00	0.00	0.81	-0.72	-0.79	1.60	Pm	32.75	19.47
	Outside		-12.66	0.00	-0.72	-0.80	0.00	0.00	0.05	-0.72	-12.71	12.76	Pm+Pb	49.13	2.85

TABLE 2.10.9-32 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 4-E, FLAT ORIENTATION - 1-FT SIDE DROP+MNOP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	31.86	0.00	-1.28	1.08	0.00	0.00	31.90	-0.04	-1.28	33.18	Pm+Pb	49.13	0.48
	Middle		0.51	0.00	-1.28	1.08	0.00	0.00	1.36	-0.85	-1.28	2.64	Pm	32.75	11.39
	Outside		-30.84	0.00	-1.28	1.08	0.00	0.00	0.04	-1.28	-30.88	30.92	Pm+Pb	49.13	0.59
20	Inside	55j	-10.98	0.00	-5.30	0.14	0.00	0.00	0.00	-5.30	-10.98	10.98	Pm+Pb	49.13	3.47
	Middle		0.51	0.00	-5.30	0.14	0.00	0.00	0.55	-0.04	-5.30	5.84	Pm	32.75	4.61
	Outside		11.99	0.00	-5.30	0.14	0.00	0.00	11.99	0.00	-5.30	17.29	Pm+Pb	49.13	1.84
21	Inside	60j	11.89	0.00	-9.31	-0.79	0.00	0.00	11.94	-0.05	-9.31	21.25	Pm+Pb	49.13	1.31
	Middle		0.51	0.00	-9.31	-0.79	0.00	0.00	1.09	-0.58	-9.31	10.40	Pm	32.75	2.15
	Outside		-10.88	0.00	-9.31	-0.79	0.00	0.00	0.06	-9.31	-10.94	10.99	Pm+Pb	49.13	3.47
22	Inside	61i	12.18	0.00	-9.31	0.51	0.00	0.00	12.20	-0.02	-9.31	21.51	Pm+Pb	49.13	1.28
	Middle		0.79	0.00	-9.48	0.51	0.00	0.00	1.04	-0.25	-9.48	10.52	Pm	32.75	2.11
	Outside		-10.59	0.00	-9.66	0.51	0.00	0.00	0.02	-9.66	-10.61	10.64	Pm+Pb	49.13	3.62
23	Inside	65j	-3.81	0.00	-9.31	-0.05	0.00	0.00	0.00	-3.81	-9.31	9.31	Pm+Pb	49.13	4.28
	Middle		0.79	0.00	-9.48	-0.05	0.00	0.00	0.79	0.00	-9.48	10.28	Pm	32.75	2.19
	Outside		5.40	0.00	-9.66	-0.05	0.00	0.00	5.40	0.00	-9.66	15.06	Pm+Pb	49.13	2.26
24	Inside	70j	19.29	0.00	-9.31	-0.61	0.00	0.00	19.31	-0.02	-9.31	28.62	Pm+Pb	49.13	0.72
	Middle		0.79	0.00	-9.48	-0.61	0.00	0.00	1.12	-0.33	-9.48	10.61	Pm	32.75	2.09
	Outside		-17.70	0.00	-9.66	-0.61	0.00	0.00	0.02	-9.66	-17.72	17.74	Pm+Pb	49.13	1.77
25	Inside	120j	1.70	0.00	-8.31	-0.01	0.00	0.00	1.70	0.00	-8.31	10.01	Pm+Pb	30.71	2.07
	Middle		1.63	0.00	-8.31	-0.01	0.00	0.00	1.63	0.00	-8.31	9.94	Pm	20.47	1.06
	Outside		1.56	0.00	-8.31	-0.01	0.00	0.00	1.56	0.00	-8.31	9.87	Pm+Pb	30.71	2.11
26	Inside	115j	1.28	0.00	-4.30	-0.01	0.00	0.00	1.28	0.00	-4.30	5.58	Pm+Pb	47.24	7.47
	Middle		1.63	0.00	-4.30	-0.01	0.00	0.00	1.63	0.00	-4.30	5.93	Pm	31.49	4.31
	Outside		1.99	0.00	-4.30	-0.01	0.00	0.00	1.99	0.00	-4.30	6.29	Pm+Pb	47.24	6.52
27	Inside	111i	0.85	0.00	-0.28	-0.01	0.00	0.00	0.85	0.00	-0.28	1.13	Pm+Pb	47.24	40.83
	Middle		1.63	0.00	-0.28	-0.01	0.00	0.00	1.63	0.00	-0.28	1.91	Pm	31.49	15.49
	Outside		2.41	0.00	-0.28	-0.01	0.00	0.00	2.41	0.00	-0.28	2.69	Pm+Pb	47.24	16.57

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TABLE 2.10.9-32 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 4-E, FLAT ORIENTATION - 1-FT SIDE DROP+MNOP, 3 FUEL ELEMENTS, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	13.26	0.00	0.28	0.26	0.00	0.00	13.27	0.28	-0.01	13.27	Pm+Pb	47.24	2.56
	Middle		2.53	0.00	0.00	0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	31.49	11.19
	Outside		-8.19	0.00	-0.28	0.26	0.00	0.00	0.01	-0.28	-8.20	8.21	Pm+Pb	47.24	4.76
29	Inside	105j	3.94	0.00	0.28	0.26	0.00	0.00	3.96	0.28	-0.02	3.97	Pm+Pb	47.24	10.89
	Middle		2.53	0.00	0.00	0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	31.49	11.19
	Outside		1.13	0.00	-0.28	0.26	0.00	0.00	1.19	-0.06	-0.28	1.47	Pm+Pb	47.24	31.22
30	Inside	110j	-5.38	0.00	0.28	0.26	0.00	0.00	0.28	0.01	-5.39	5.67	Pm+Pb	30.71	4.41
	Middle		2.53	0.00	0.00	0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	20.47	6.92
	Outside		10.45	0.00	-0.28	0.26	0.00	0.00	10.46	-0.01	-0.28	10.74	Pm+Pb	30.71	1.86
31	Inside	90j	2.92	0.00	0.28	-0.02	0.00	0.00	2.92	0.28	0.00	2.92	Pm+Pb	47.24	15.18
	Middle		2.03	0.00	0.28	-0.02	0.00	0.00	2.03	0.28	0.00	2.03	Pm	31.49	14.51
	Outside		1.14	0.00	0.28	-0.02	0.00	0.00	1.14	0.28	0.00	1.14	Pm+Pb	47.24	40.41
32	Inside	85j	2.32	0.00	4.30	-0.02	0.00	0.00	4.30	2.32	0.00	4.30	Pm+Pb	47.24	10.00
	Middle		2.03	0.00	4.30	-0.02	0.00	0.00	4.30	2.03	0.00	4.30	Pm	31.49	6.33
	Outside		1.74	0.00	4.30	-0.02	0.00	0.00	4.30	1.74	0.00	4.30	Pm+Pb	47.24	10.00
33	Inside	81j	1.72	0.00	8.31	-0.02	0.00	0.00	8.31	1.72	0.00	8.31	Pm+Pb	30.71	2.69
	Middle		2.03	0.00	8.31	-0.02	0.00	0.00	8.31	2.03	0.00	8.31	Pm	20.47	1.46
	Outside		2.34	0.00	8.31	-0.02	0.00	0.00	8.31	2.34	0.00	8.31	Pm+Pb	30.71	2.69
34	Inside	100j	11.57	0.00	0.28	-0.03	0.00	0.00	11.57	0.28	0.00	11.57	Pm+Pb	47.24	3.08
	Middle		2.53	0.00	0.00	-0.03	0.00	0.00	2.53	0.00	0.00	2.53	Pm	31.49	11.44
	Outside		-6.52	0.00	-0.28	-0.03	0.00	0.00	0.00	-0.28	-6.52	6.52	Pm+Pb	47.24	6.25
35	Inside	95j	6.40	0.00	0.28	-0.26	0.00	0.00	6.41	0.28	-0.01	6.42	Pm+Pb	47.24	6.36
	Middle		2.53	0.00	0.00	-0.26	0.00	0.00	2.56	0.00	-0.03	2.58	Pm	31.49	11.19
	Outside		-1.35	0.00	-0.28	-0.26	0.00	0.00	0.05	-0.28	-1.40	1.45	Pm+Pb	47.24	31.65
36	Inside	91i	-6.86	0.00	0.28	-0.49	0.00	0.00	0.28	0.03	-6.89	7.17	Pm+Pb	30.71	3.28
	Middle		2.53	0.00	0.00	-0.49	0.00	0.00	2.62	0.00	-0.09	2.71	Pm	20.47	6.54
	Outside		11.92	0.00	-0.28	-0.49	0.00	0.00	11.94	-0.02	-0.28	12.22	Pm+Pb	30.71	1.51

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TABLE 2.10.9-33 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 5-E, CORNER ORIENTATION - 1-FT SIDE DROP SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig 2.10.9 -8)		c(in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	6.636	-6.07	-1.00	1.65	-0.16	1.65	0.00	-7.07	-0.16	0.00	0.00
	Middle	6.768	-6.20	-1.00	-0.38	-0.16	-0.38	0.00	-7.20	-0.16	0.00	0.00
	Outside	6.901	-6.32	-1.00	-2.41	-0.16	-2.41	0.00	-7.32	-0.16	0.00	0.00
2	Inside	9.738	-8.91	-1.00	3.34	0.11	3.34	0.00	-9.91	0.11	0.00	0.00
	Middle	9.871	-9.04	-1.00	-0.38	0.11	-0.38	0.00	-10.04	0.11	0.00	0.00
	Outside	10.003	-9.16	-1.00	-4.10	0.11	-4.10	0.00	-10.16	0.11	0.00	0.00
3	Inside	12.840	-11.75	-1.00	-13.77	0.38	-13.77	0.00	-12.75	0.38	0.00	0.00
	Middle	12.974	-11.88	-1.00	-0.38	0.38	-0.38	0.00	-12.88	0.38	0.00	0.00
	Outside	13.106	-12.00	-1.00	13.02	0.38	13.02	0.00	-13.00	0.38	0.00	0.00
4	Inside	12.840	-11.75	-1.00	-13.77	-0.38	-13.77	0.00	-12.75	-0.38	0.00	0.00
	Middle	12.974	-11.88	-1.00	-0.38	-0.38	-0.38	0.00	-12.88	-0.38	0.00	0.00
	Outside	13.106	-12.00	-1.00	13.02	-0.38	13.02	0.00	-13.00	-0.38	0.00	0.00
5	Inside	9.738	-8.91	-1.00	3.34	-0.11	3.34	0.00	-9.91	-0.11	0.00	0.00
	Middle	9.871	-9.04	-1.00	-0.38	-0.11	-0.38	0.00	-10.04	-0.11	0.00	0.00
	Outside	10.003	-9.16	-1.00	-4.10	-0.11	-4.10	0.00	-10.16	-0.11	0.00	0.00
6	Inside	6.636	-6.07	-1.00	1.65	0.16	1.65	0.00	-7.07	0.16	0.00	0.00
	Middle	6.768	-6.20	-1.00	-0.38	0.16	-0.38	0.00	-7.20	0.16	0.00	0.00
	Outside	6.901	-6.32	-1.00	-2.41	0.16	-2.41	0.00	-7.32	0.16	0.00	0.00
7	Inside	6.205	-5.68	-1.00	-13.48	-0.36	-13.48	0.00	-6.68	-0.36	0.00	0.00
	Middle	6.338	-5.80	-1.00	-0.72	-0.36	-0.72	0.00	-6.80	-0.36	0.00	0.00
	Outside	6.470	-5.92	-1.00	12.04	-0.36	12.04	0.00	-6.92	-0.36	0.00	0.00
8	Inside	2.837	-2.60	-1.00	2.23	-0.09	2.23	0.00	-3.60	-0.09	0.00	0.00
	Middle	2.970	-2.72	-1.00	-0.72	-0.09	-0.72	0.00	-3.72	-0.09	0.00	0.00
	Outside	3.102	-2.84	-1.00	-3.67	-0.09	-3.67	0.00	-3.84	-0.09	0.00	0.00
9	Inside	0.000	0.00	-1.00	-0.87	0.18	-0.87	0.00	-1.00	0.18	0.00	0.00
	Middle	0.133	-0.12	-1.00	-0.72	0.18	-0.72	0.00	-1.12	0.18	0.00	0.00
	Outside	0.265	-0.24	-1.00	-0.58	0.18	-0.58	0.00	-1.24	0.18	0.00	0.00
10	Inside	0.000	0.00	-1.00	-2.36	-0.18	-2.36	0.00	-1.00	-0.18	0.00	0.00
	Middle	0.133	0.12	-1.00	-2.21	-0.18	-2.21	0.00	-0.88	-0.18	0.00	0.00
	Outside	0.265	0.24	-1.00	-2.06	-0.18	-2.06	0.00	-0.76	-0.18	0.00	0.00
11	Inside	2.837	2.60	-1.00	-0.03	-0.05	-0.03	0.00	1.60	-0.05	0.00	0.00
	Middle	2.970	2.72	-1.00	0.00	-0.05	0.00	0.00	1.72	-0.05	0.00	0.00
	Outside	3.102	2.84	-1.00	0.03	-0.05	0.03	0.00	1.84	-0.05	0.00	0.00
12	Inside	6.205	5.68	-1.00	-14.55	0.57	-14.55	0.00	4.68	0.57	0.00	0.00
	Middle	6.338	5.80	-1.00	-6.63	0.57	-6.63	0.00	4.80	0.57	0.00	0.00
	Outside	6.470	5.92	-1.00	1.28	0.57	1.28	0.00	4.92	0.57	0.00	0.00
13	Inside	6.636	6.07	-1.00	3.62	0.89	3.62	0.00	5.07	0.89	0.00	0.00
	Middle	6.768	6.20	-1.00	-4.42	0.89	-4.42	0.00	5.20	0.89	0.00	0.00
	Outside	6.901	6.32	-1.00	-12.46	0.89	-12.46	0.00	5.32	0.89	0.00	0.00
14	Inside	9.738	8.91	-1.00	-8.27	-0.01	-8.27	0.00	7.91	-0.01	0.00	0.00
	Middle	9.871	9.04	-1.00	-6.63	-0.01	-6.63	0.00	8.04	-0.01	0.00	0.00
	Outside	10.003	9.16	-1.00	-4.99	-0.01	-4.99	0.00	8.16	-0.01	0.00	0.00
15	Inside	12.840	11.75	-1.00	-7.06	0.23	-7.06	0.00	10.75	0.23	0.00	0.00
	Middle	12.974	11.88	-1.00	-4.42	0.23	-4.42	0.00	10.88	0.23	0.00	0.00
	Outside	13.106	12.00	-1.00	-1.78	0.23	-1.78	0.00	11.00	0.23	0.00	0.00
16	Inside	12.840	11.75	-1.00	-7.06	-0.23	-7.06	0.00	10.75	-0.23	0.00	0.00
	Middle	12.974	11.88	-1.00	-4.42	-0.23	-4.42	0.00	10.88	-0.23	0.00	0.00
	Outside	13.106	12.00	-1.00	-1.78	-0.23	-1.78	0.00	11.00	-0.23	0.00	0.00
17	Inside	9.738	8.91	-1.00	-8.27	0.01	-8.27	0.00	7.91	0.01	0.00	0.00
	Middle	9.871	9.04	-1.00	-6.63	0.01	-6.63	0.00	8.04	0.01	0.00	0.00
	Outside	10.003	9.16	-1.00	-4.99	0.01	-4.99	0.00	8.16	0.01	0.00	0.00
18	Inside	6.636	6.07	-1.00	3.62	-0.89	3.62	0.00	5.07	-0.89	0.00	0.00
	Middle	6.768	6.20	-1.00	-4.42	-0.89	-4.42	0.00	5.20	-0.89	0.00	0.00
	Outside	6.901	6.32	-1.00	-12.46	-0.89	-12.46	0.00	5.32	-0.89	0.00	0.00

TABLE 2.10.9-33 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 5-E, CORNER ORIENTATION - 1-FT SIDE DROP SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9 -8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	6.205	5.68	-1.00	-14.55	-0.57	-14.55	0.00	4.68	-0.57	0.00	0.00
	Middle	6.338	5.80	-1.00	-6.63	-0.57	-6.63	0.00	4.80	-0.57	0.00	0.00
	Outside	6.470	5.92	-1.00	1.28	-0.57	1.28	0.00	4.92	-0.57	0.00	0.00
20	Inside	2.837	2.60	-1.00	-0.03	0.05	-0.03	0.00	1.60	0.05	0.00	0.00
	Middle	2.970	2.72	-1.00	0.00	0.05	0.00	0.00	1.72	0.05	0.00	0.00
	Outside	3.102	2.84	-1.00	0.03	0.05	0.03	0.00	1.84	0.05	0.00	0.00
21	Inside	0.000	0.00	-1.00	-2.36	0.18	-2.36	0.00	-1.00	0.18	0.00	0.00
	Middle	0.133	0.12	-1.00	-2.21	0.18	-2.21	0.00	-0.88	0.18	0.00	0.00
	Outside	0.265	0.24	-1.00	-2.06	0.18	-2.06	0.00	-0.76	0.18	0.00	0.00
22	Inside	0.000	0.00	-1.00	-0.87	-0.18	-0.87	0.00	-1.00	-0.18	0.00	0.00
	Middle	0.133	-0.12	-1.00	-0.72	-0.18	-0.72	0.00	-1.12	-0.18	0.00	0.00
	Outside	0.265	-0.24	-1.00	-0.58	-0.18	-0.58	0.00	-1.24	-0.18	0.00	0.00
23	Inside	2.837	-2.60	-1.00	2.23	0.09	2.23	0.00	-3.60	0.09	0.00	0.00
	Middle	2.970	-2.72	-1.00	-0.72	0.09	-0.72	0.00	-3.72	0.09	0.00	0.00
	Outside	3.102	-2.84	-1.00	-3.67	0.09	-3.67	0.00	-3.84	0.09	0.00	0.00
24	Inside	6.205	-5.68	-1.00	-13.48	0.36	-13.48	0.00	-6.68	0.36	0.00	0.00
	Middle	6.338	-5.80	-1.00	-0.72	0.36	-0.72	0.00	-6.80	0.36	0.00	0.00
	Outside	6.470	-5.92	-1.00	12.04	0.36	12.04	0.00	-6.92	0.36	0.00	0.00
25	Inside	6.205	-5.68	0.00	6.75	-0.35	6.75	0.00	-5.68	-0.35	0.00	0.00
	Middle	6.421	-5.88	0.00	-0.69	-0.35	-0.69	0.00	-5.88	-0.35	0.00	0.00
	Outside	6.637	-6.08	0.00	-8.13	-0.35	-8.13	0.00	-6.08	-0.35	0.00	0.00
26	Inside	3.102	-2.84	0.00	-2.57	-0.18	-2.57	0.00	-2.84	-0.18	0.00	0.00
	Middle	3.318	-3.04	0.00	-0.69	-0.18	-0.69	0.00	-3.04	-0.18	0.00	0.00
	Outside	3.534	-3.24	0.00	1.18	-0.18	1.18	0.00	-3.24	-0.18	0.00	0.00
27	Inside	0.000	0.00	0.00	-6.17	-0.02	-6.17	0.00	0.00	-0.02	0.00	0.00
	Middle	0.216	-0.20	0.00	-0.69	-0.02	-0.69	0.00	-0.20	-0.02	0.00	0.00
	Outside	0.431	-0.39	0.00	4.78	-0.02	4.78	0.00	-0.39	-0.02	0.00	0.00
28	Inside	0.000	0.00	0.00	4.78	0.02	4.78	0.00	0.00	0.02	0.00	0.00
	Middle	0.216	-0.20	0.00	-0.69	0.02	-0.69	0.00	-0.20	0.02	0.00	0.00
	Outside	0.431	-0.39	0.00	-6.17	0.02	-6.17	0.00	-0.39	0.02	0.00	0.00
29	Inside	3.102	-2.84	0.00	1.18	0.18	1.18	0.00	-2.84	0.18	0.00	0.00
	Middle	3.318	-3.04	0.00	-0.69	0.18	-0.69	0.00	-3.04	0.18	0.00	0.00
	Outside	3.534	-3.24	0.00	-2.57	0.18	-2.57	0.00	-3.24	0.18	0.00	0.00
30	Inside	6.205	-5.68	0.00	-8.13	0.35	-8.13	0.00	-5.68	0.35	0.00	0.00
	Middle	6.421	-5.88	0.00	-0.69	0.35	-0.69	0.00	-5.88	0.35	0.00	0.00
	Outside	6.637	-6.08	0.00	6.75	0.35	6.75	0.00	-6.08	0.35	0.00	0.00
31	Inside	0.000	0.00	0.00	8.15	-0.41	8.15	0.00	0.00	-0.41	0.00	0.00
	Middle	0.216	0.20	0.00	-1.22	-0.41	-1.22	0.00	0.20	-0.41	0.00	0.00
	Outside	0.431	0.39	0.00	-10.58	-0.41	-10.58	0.00	0.39	-0.41	0.00	0.00
32	Inside	3.102	2.84	0.00	-3.41	-0.25	-3.41	0.00	2.84	-0.25	0.00	0.00
	Middle	3.318	3.04	0.00	-1.22	-0.25	-1.22	0.00	3.04	-0.25	0.00	0.00
	Outside	3.534	3.24	0.00	0.98	-0.25	0.98	0.00	3.24	-0.25	0.00	0.00
33	Inside	6.205	5.68	0.00	-9.24	-0.08	-9.24	0.00	5.68	-0.08	0.00	0.00
	Middle	6.421	5.88	0.00	-1.22	-0.08	-1.22	0.00	5.88	-0.08	0.00	0.00
	Outside	6.637	6.08	0.00	6.81	-0.08	6.81	0.00	6.08	-0.08	0.00	0.00
34	Inside	0.000	0.00	0.00	-10.58	0.41	-10.58	0.00	0.00	0.41	0.00	0.00
	Middle	0.216	0.20	0.00	-1.22	0.41	-1.22	0.00	0.20	0.41	0.00	0.00
	Outside	0.431	0.39	0.00	8.15	0.41	8.15	0.00	0.39	0.41	0.00	0.00
35	Inside	3.102	2.84	0.00	0.98	0.25	0.98	0.00	2.84	0.25	0.00	0.00
	Middle	3.318	3.04	0.00	-1.22	0.25	-1.22	0.00	3.04	0.25	0.00	0.00
	Outside	3.534	3.24	0.00	-3.41	0.25	-3.41	0.00	3.24	0.25	0.00	0.00
36	Inside	6.205	5.68	0.00	6.81	0.08	6.81	0.00	5.68	0.08	0.00	0.00
	Middle	6.421	5.88	0.00	-1.22	0.08	-1.22	0.00	5.88	0.08	0.00	0.00
	Outside	6.637	6.08	0.00	-9.24	0.08	-9.24	0.00	6.08	0.08	0.00	0.00

TABLE 2.10.9-34 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E, CORNER ORIENTATION 1- FT SIDE DROP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	1.65	0.00	-7.07	-0.16	0.00	0.00	1.67	-0.02	-7.07	8.74	Pm+Pb	49.13	4.62
	Middle		-0.38	0.00	-7.20	-0.16	0.00	0.00	0.06	-0.44	-7.20	7.25	Pm	32.75	3.51
	Outside		-2.41	0.00	-7.32	-0.16	0.00	0.00	0.01	-2.42	-7.32	7.33	Pm+Pb	49.13	5.70
2	Inside	75j	3.34	0.00	-9.91	0.11	0.00	0.00	3.34	0.00	-9.91	13.26	Pm+Pb	49.13	2.71
	Middle		-0.38	0.00	-10.04	0.11	0.00	0.00	0.03	-0.41	-10.04	10.07	Pm	32.75	2.25
	Outside		-4.10	0.00	-10.16	0.11	0.00	0.00	0.00	-4.10	-10.16	10.16	Pm+Pb	49.13	3.84
3	Inside	80j	-13.77	0.00	-12.75	0.38	0.00	0.00	0.01	-12.75	-13.78	13.79	Pm+Pb	49.13	2.56
	Middle		-0.38	0.00	-12.88	0.38	0.00	0.00	0.23	-0.61	-12.88	13.11	Pm	32.75	1.50
	Outside		13.02	0.00	-13.00	0.38	0.00	0.00	13.03	-0.01	-13.00	26.03	Pm+Pb	49.13	0.89
4	Inside	40j	-13.77	0.00	-12.75	-0.38	0.00	0.00	0.01	-12.75	-13.78	13.79	Pm+Pb	49.13	2.56
	Middle		-0.38	0.00	-12.88	-0.38	0.00	0.00	0.23	-0.61	-12.88	13.11	Pm	32.75	1.50
	Outside		13.02	0.00	-13.00	-0.38	0.00	0.00	13.03	-0.01	-13.00	26.03	Pm+Pb	49.13	0.89
5	Inside	35j	3.34	0.00	-9.91	-0.11	0.00	0.00	3.34	0.00	-9.91	13.26	Pm+Pb	49.13	2.71
	Middle		-0.38	0.00	-10.04	-0.11	0.00	0.00	0.03	-0.41	-10.04	10.07	Pm	32.75	2.25
	Outside		-4.10	0.00	-10.16	-0.11	0.00	0.00	0.00	-4.10	-10.16	10.16	Pm+Pb	49.13	3.84
6	Inside	31i	1.65	0.00	-7.07	0.16	0.00	0.00	1.67	-0.02	-7.07	8.74	Pm+Pb	49.13	4.62
	Middle		-0.38	0.00	-7.20	0.16	0.00	0.00	0.06	-0.44	-7.20	7.25	Pm	32.75	3.51
	Outside		-2.41	0.00	-7.32	0.16	0.00	0.00	0.01	-2.42	-7.32	7.33	Pm+Pb	49.13	5.70
7	Inside	30j	-13.48	0.00	-6.68	-0.36	0.00	0.00	0.01	-6.68	-13.49	13.50	Pm+Pb	49.13	2.64
	Middle		-0.72	0.00	-6.80	-0.36	0.00	0.00	0.15	-0.87	-6.80	6.95	Pm	32.75	3.71
	Outside		12.04	0.00	-6.92	-0.36	0.00	0.00	12.05	-0.01	-6.92	18.97	Pm+Pb	49.13	1.59
8	Inside	25j	2.23	0.00	-3.60	-0.09	0.00	0.00	2.23	0.00	-3.60	5.83	Pm+Pb	49.13	7.43
	Middle		-0.72	0.00	-3.72	-0.09	0.00	0.00	0.01	-0.73	-3.72	3.73	Pm	32.75	7.78
	Outside		-3.67	0.00	-3.84	-0.09	0.00	0.00	0.00	-3.67	-3.84	3.84	Pm+Pb	49.13	11.79
9	Inside	21j	-0.87	0.00	-1.00	0.18	0.00	0.00	0.04	-0.91	-1.00	1.04	Pm+Pb	49.13	46.43
	Middle		-0.72	0.00	-1.12	0.18	0.00	0.00	0.04	-0.76	-1.12	1.16	Pm	32.75	27.13
	Outside		-0.58	0.00	-1.24	0.18	0.00	0.00	0.05	-0.63	-1.24	1.29	Pm+Pb	49.13	36.97

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TABLE 2.10.9-34 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E, CORNER ORIENTATION 1- FT SIDE DROP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	-2.36	0.00	-1.00	-0.18	0.00	0.00	0.01	-1.00	-2.37	2.39	Pm+Pb	49.13	19.58
	Middle		-2.21	0.00	-0.88	-0.18	0.00	0.00	0.01	-0.88	-2.22	2.24	Pm	32.75	13.63
	Outside		-2.06	0.00	-0.76	-0.18	0.00	0.00	0.02	-0.76	-2.08	2.09	Pm+Pb	49.13	22.49
11	Inside	15j	-0.03	0.00	1.60	-0.05	0.00	0.00	1.60	0.04	-0.07	1.66	Pm+Pb	49.13	28.52
	Middle		0.00	0.00	1.72	-0.05	0.00	0.00	1.72	0.05	-0.05	1.77	Pm	32.75	17.52
	Outside		0.03	0.00	1.84	-0.05	0.00	0.00	1.84	0.07	-0.04	1.88	Pm+Pb	49.13	25.18
12	Inside	11i	-14.55	0.00	4.68	0.57	0.00	0.00	4.68	0.02	-14.57	19.25	Pm+Pb	49.13	1.55
	Middle		-6.63	0.00	4.80	0.57	0.00	0.00	4.80	0.05	-6.68	11.48	Pm	32.75	1.85
	Outside		1.28	0.00	4.92	0.57	0.00	0.00	4.92	1.50	-0.22	5.14	Pm+Pb	49.13	8.56
13	Inside	10j	3.62	0.00	5.07	0.89	0.00	0.00	5.07	3.83	-0.21	5.28	Pm+Pb	49.13	8.30
	Middle		-4.42	0.00	5.20	0.89	0.00	0.00	5.20	0.17	-4.59	9.79	Pm	32.75	2.35
	Outside		-12.46	0.00	5.32	0.89	0.00	0.00	5.32	0.06	-12.52	17.84	Pm+Pb	49.13	1.75
14	Inside	5j	-8.27	0.00	7.91	-0.01	0.00	0.00	7.91	0.00	-8.27	16.18	Pm+Pb	49.13	2.04
	Middle		-6.63	0.00	8.04	-0.01	0.00	0.00	8.04	0.00	-6.63	14.67	Pm	32.75	1.23
	Outside		-4.99	0.00	8.16	-0.01	0.00	0.00	8.16	0.00	-4.99	13.15	Pm+Pb	49.13	2.74
15	Inside	1i	-7.06	0.00	10.75	0.23	0.00	0.00	10.75	0.01	-7.07	17.82	Pm+Pb	49.13	1.76
	Middle		-4.42	0.00	10.88	0.23	0.00	0.00	10.88	0.01	-4.43	15.31	Pm	32.75	1.14
	Outside		-1.78	0.00	11.00	0.23	0.00	0.00	11.00	0.03	-1.81	12.81	Pm+Pb	49.13	2.84
16	Inside	41i	-7.06	0.00	10.75	-0.23	0.00	0.00	10.75	0.01	-7.07	17.82	Pm+Pb	49.13	1.76
	Middle		-4.42	0.00	10.88	-0.23	0.00	0.00	10.88	0.01	-4.43	15.31	Pm	32.75	1.14
	Outside		-1.78	0.00	11.00	-0.23	0.00	0.00	11.00	0.03	-1.81	12.81	Pm+Pb	49.13	2.84
17	Inside	45j	-8.27	0.00	7.91	0.01	0.00	0.00	7.91	0.00	-8.27	16.18	Pm+Pb	49.13	2.04
	Middle		-6.63	0.00	8.04	0.01	0.00	0.00	8.04	0.00	-6.63	14.67	Pm	32.75	1.23
	Outside		-4.99	0.00	8.16	0.01	0.00	0.00	8.16	0.00	-4.99	13.15	Pm+Pb	49.13	2.74
18	Inside	50j	3.62	0.00	5.07	-0.89	0.00	0.00	5.07	3.83	-0.21	5.28	Pm+Pb	49.13	8.30
	Middle		-4.42	0.00	5.20	-0.89	0.00	0.00	5.20	0.17	-4.59	9.79	Pm	32.75	2.35
	Outside		-12.46	0.00	5.32	-0.89	0.00	0.00	5.32	0.06	-12.52	17.84	Pm+Pb	49.13	1.75

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TABLE 2.10.9-34 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E, CORNER ORIENTATION 1- FT SIDE DROP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	-14.55	0.00	4.68	-0.57	0.00	0.00	4.68	0.02	-14.57	19.25	Pm+Pb	49.13	1.55
	Middle		-6.63	0.00	4.80	-0.57	0.00	0.00	4.80	0.05	-6.68	11.48	Pm	32.75	1.85
	Outside		1.28	0.00	4.92	-0.57	0.00	0.00	4.92	1.50	-0.22	5.14	Pm+Pb	49.13	8.56
20	Inside	55j	-0.03	0.00	1.60	0.05	0.00	0.00	1.60	0.04	-0.07	1.66	Pm+Pb	49.13	28.52
	Middle		0.00	0.00	1.72	0.05	0.00	0.00	1.72	0.05	-0.05	1.77	Pm	32.75	17.52
	Outside		0.03	0.00	1.84	0.05	0.00	0.00	1.84	0.07	-0.04	1.88	Pm+Pb	49.13	25.18
21	Inside	60j	-2.36	0.00	-1.00	0.18	0.00	0.00	0.01	-1.00	-2.37	2.39	Pm+Pb	49.13	19.58
	Middle		-2.21	0.00	-0.88	0.18	0.00	0.00	0.01	-0.88	-2.22	2.24	Pm	32.75	13.63
	Outside		-2.06	0.00	-0.76	0.18	0.00	0.00	0.02	-0.76	-2.08	2.09	Pm+Pb	49.13	22.49
22	Inside	61i	-0.87	0.00	-1.00	-0.18	0.00	0.00	0.04	-0.91	-1.00	1.04	Pm+Pb	49.13	46.43
	Middle		-0.72	0.00	-1.12	-0.18	0.00	0.00	0.04	-0.76	-1.12	1.16	Pm	32.75	27.13
	Outside		-0.58	0.00	-1.24	-0.18	0.00	0.00	0.05	-0.63	-1.24	1.29	Pm+Pb	49.13	36.97
23	Inside	65j	2.23	0.00	-3.60	0.09	0.00	0.00	2.23	0.00	-3.60	5.83	Pm+Pb	49.13	7.43
	Middle		-0.72	0.00	-3.72	0.09	0.00	0.00	0.01	-0.73	-3.72	3.73	Pm	32.75	7.78
	Outside		-3.67	0.00	-3.84	0.09	0.00	0.00	0.00	-3.67	-3.84	3.84	Pm+Pb	49.13	11.79
24	Inside	70j	-13.48	0.00	-6.68	0.36	0.00	0.00	0.01	-6.68	-13.49	13.50	Pm+Pb	49.13	2.64
	Middle		-0.72	0.00	-6.80	0.36	0.00	0.00	0.15	-0.87	-6.80	6.95	Pm	32.75	3.71
	Outside		12.04	0.00	-6.92	0.36	0.00	0.00	12.05	-0.01	-6.92	18.97	Pm+Pb	49.13	1.59
25	Inside	120j	6.75	0.00	-5.68	-0.35	0.00	0.00	6.77	-0.02	-5.68	12.45	Pm+Pb	30.71	1.47
	Middle		-0.69	0.00	-5.88	-0.35	0.00	0.00	0.15	-0.84	-5.88	6.02	Pm	20.47	2.40
	Outside		-8.13	0.00	-6.08	-0.35	0.00	0.00	0.02	-6.08	-8.15	8.16	Pm+Pb	30.71	2.76
26	Inside	115j	-2.57	0.00	-2.84	-0.18	0.00	0.00	0.01	-2.58	-2.84	2.85	Pm+Pb	47.24	15.56
	Middle		-0.69	0.00	-3.04	-0.18	0.00	0.00	0.04	-0.73	-3.04	3.08	Pm	31.49	9.22
	Outside		1.18	0.00	-3.24	-0.18	0.00	0.00	1.21	-0.03	-3.24	4.44	Pm+Pb	47.24	9.64
27	Inside	111i	-6.17	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	-6.17	6.17	Pm+Pb	47.24	6.66
	Middle		-0.69	0.00	-0.20	-0.02	0.00	0.00	0.00	-0.20	-0.69	0.69	Pm	31.49	44.56
	Outside		4.78	0.00	-0.39	-0.02	0.00	0.00	4.78	0.00	-0.39	5.17	Pm+Pb	47.24	8.13

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TABLE 2.10.9-34 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E, CORNER ORIENTATION 1- FT SIDE DROP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	4.78	0.00	0.00	0.02	0.00	0.00	4.78	0.00	0.00	4.78	Pm+Pb	47.24	8.88
	Middle		-0.69	0.00	-0.20	0.02	0.00	0.00	0.00	-0.20	-0.69	0.69	Pm	31.49	44.56
	Outside		-6.17	0.00	-0.39	0.02	0.00	0.00	0.00	-0.39	-6.17	6.17	Pm+Pb	47.24	6.66
29	Inside	105j	1.18	0.00	-2.84	0.18	0.00	0.00	1.21	-0.03	-2.84	4.05	Pm+Pb	47.24	10.67
	Middle		-0.69	0.00	-3.04	0.18	0.00	0.00	0.04	-0.73	-3.04	3.08	Pm	31.49	9.22
	Outside		-2.57	0.00	-3.24	0.18	0.00	0.00	0.01	-2.58	-3.24	3.25	Pm+Pb	47.24	13.55
30	Inside	110j	-8.13	0.00	-5.68	0.35	0.00	0.00	0.02	-5.68	-8.15	8.16	Pm+Pb	30.71	2.76
	Middle		-0.69	0.00	-5.88	0.35	0.00	0.00	0.15	-0.84	-5.88	6.02	Pm	20.47	2.40
	Outside		6.75	0.00	-6.08	0.35	0.00	0.00	6.77	-0.02	-6.08	12.84	Pm+Pb	30.71	1.39
31	Inside	90j	8.15	0.00	0.00	-0.41	0.00	0.00	8.17	0.00	-0.02	8.19	Pm+Pb	47.24	4.77
	Middle		-1.22	0.00	0.20	-0.41	0.00	0.00	0.20	0.12	-1.34	1.54	Pm	31.49	19.41
	Outside		-10.58	0.00	0.39	-0.41	0.00	0.00	0.39	0.02	-10.60	10.99	Pm+Pb	47.24	3.30
32	Inside	85j	-3.41	0.00	2.84	-0.25	0.00	0.00	2.84	0.02	-3.43	6.27	Pm+Pb	47.24	6.54
	Middle		-1.22	0.00	3.04	-0.25	0.00	0.00	3.04	0.05	-1.27	4.31	Pm	31.49	6.31
	Outside		0.98	0.00	3.24	-0.25	0.00	0.00	3.24	1.04	-0.06	3.30	Pm+Pb	47.24	13.34
33	Inside	81j	-9.24	0.00	5.68	-0.08	0.00	0.00	5.68	0.00	-9.24	14.92	Pm+Pb	30.71	1.06
	Middle		-1.22	0.00	5.88	-0.08	0.00	0.00	5.88	0.01	-1.23	7.10	Pm	20.47	1.88
	Outside		6.81	0.00	6.08	-0.08	0.00	0.00	6.81	6.08	0.00	6.81	Pm+Pb	30.71	3.51
34	Inside	100j	-10.58	0.00	0.00	0.41	0.00	0.00	0.02	0.00	-10.60	10.61	Pm+Pb	47.24	3.45
	Middle		-1.22	0.00	0.20	0.41	0.00	0.00	0.20	0.12	-1.34	1.54	Pm	31.49	19.41
	Outside		8.15	0.00	0.39	0.41	0.00	0.00	8.17	0.39	-0.02	8.19	Pm+Pb	47.24	4.77
35	Inside	95j	0.98	0.00	2.84	0.25	0.00	0.00	2.84	1.04	-0.06	2.90	Pm+Pb	47.24	15.29
	Middle		-1.22	0.00	3.04	0.25	0.00	0.00	3.04	0.05	-1.27	4.31	Pm	31.49	6.31
	Outside		-3.41	0.00	3.24	0.25	0.00	0.00	3.24	0.02	-3.43	6.66	Pm+Pb	47.24	6.09
36	Inside	91i	6.81	0.00	5.68	0.08	0.00	0.00	6.81	5.68	0.00	6.81	Pm+Pb	30.71	3.51
	Middle		-1.22	0.00	5.88	0.08	0.00	0.00	5.88	0.01	-1.23	7.10	Pm	20.47	1.88
	Outside		-9.24	0.00	6.08	0.08	0.00	0.00	6.08	0.00	-9.24	15.32	Pm+Pb	30.71	1.00

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TABLE 2.10.9-35 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 5-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP, T–20°F SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	6.636	-6.07	6.10	1.65	-0.16	1.65	0.00	0.03	-0.16	0.00	0.00
	Middle	6.768	-6.20	6.10	-0.38	-0.16	-0.38	0.00	-0.10	-0.16	0.00	0.00
	Outside	6.901	-6.32	6.10	-2.41	-0.16	-2.41	0.00	-0.22	-0.16	0.00	0.00
2	Inside	9.738	-8.91	6.10	3.34	0.11	3.34	0.00	-2.81	0.11	0.00	0.00
	Middle	9.871	-9.04	6.10	-0.38	0.11	-0.38	0.00	-2.94	0.11	0.00	0.00
	Outside	10.003	-9.16	6.10	-4.10	0.11	-4.10	0.00	-3.06	0.11	0.00	0.00
3	Inside	12.840	-11.75	6.10	-13.77	0.38	-13.77	0.00	-5.65	0.38	0.00	0.00
	Middle	12.974	-11.88	6.10	-0.38	0.38	-0.38	0.00	-5.78	0.38	0.00	0.00
	Outside	13.106	-12.00	6.10	13.02	0.38	13.02	0.00	-5.90	0.38	0.00	0.00
4	Inside	12.840	-11.75	6.10	-13.77	-0.38	-13.77	0.00	-5.65	-0.38	0.00	0.00
	Middle	12.974	-11.88	6.10	-0.38	-0.38	-0.38	0.00	-5.78	-0.38	0.00	0.00
	Outside	13.106	-12.00	6.10	13.02	-0.38	13.02	0.00	-5.90	-0.38	0.00	0.00
5	Inside	9.738	-8.91	6.10	3.34	-0.11	3.34	0.00	-2.81	-0.11	0.00	0.00
	Middle	9.871	-9.04	6.10	-0.38	-0.11	-0.38	0.00	-2.94	-0.11	0.00	0.00
	Outside	10.003	-9.16	6.10	-4.10	-0.11	-4.10	0.00	-3.06	-0.11	0.00	0.00
6	Inside	6.636	-6.07	6.10	1.65	0.16	1.65	0.00	0.03	0.16	0.00	0.00
	Middle	6.768	-6.20	6.10	-0.38	0.16	-0.38	0.00	-0.10	0.16	0.00	0.00
	Outside	6.901	-6.32	6.10	-2.41	0.16	-2.41	0.00	-0.22	0.16	0.00	0.00
7	Inside	6.205	-5.68	6.10	-13.48	-0.36	-13.48	0.00	0.42	-0.36	0.00	0.00
	Middle	6.338	-5.80	6.10	-0.72	-0.36	-0.72	0.00	0.30	-0.36	0.00	0.00
	Outside	6.470	-5.92	6.10	12.04	-0.36	12.04	0.00	0.18	-0.36	0.00	0.00
8	Inside	2.837	-2.60	6.10	2.23	-0.09	2.23	0.00	3.50	-0.09	0.00	0.00
	Middle	2.970	-2.72	6.10	-0.72	-0.09	-0.72	0.00	3.38	-0.09	0.00	0.00
	Outside	3.102	-2.84	6.10	-3.67	-0.09	-3.67	0.00	3.26	-0.09	0.00	0.00
9	Inside	0.000	0.00	6.10	-0.87	0.18	-0.87	0.00	6.10	0.18	0.00	0.00
	Middle	0.133	-0.12	6.10	-0.72	0.18	-0.72	0.00	5.98	0.18	0.00	0.00
	Outside	0.265	-0.24	6.10	-0.58	0.18	-0.58	0.00	5.86	0.18	0.00	0.00
10	Inside	0.000	0.00	6.10	-2.36	-0.18	-2.36	0.00	6.10	-0.18	0.00	0.00
	Middle	0.133	0.12	6.10	-2.21	-0.18	-2.21	0.00	6.22	-0.18	0.00	0.00
	Outside	0.265	0.24	6.10	-2.06	-0.18	-2.06	0.00	6.34	-0.18	0.00	0.00
11	Inside	2.837	2.60	6.10	-0.03	-0.05	-0.03	0.00	8.70	-0.05	0.00	0.00
	Middle	2.970	2.72	6.10	0.00	-0.05	0.00	0.00	8.82	-0.05	0.00	0.00
	Outside	3.102	2.84	6.10	0.03	-0.05	0.03	0.00	8.94	-0.05	0.00	0.00
12	Inside	6.205	5.68	6.10	-14.55	0.57	-14.55	0.00	11.78	0.57	0.00	0.00
	Middle	6.338	5.80	6.10	-6.63	0.57	-6.63	0.00	11.90	0.57	0.00	0.00
	Outside	6.470	5.92	6.10	1.28	0.57	1.28	0.00	12.02	0.57	0.00	0.00
13	Inside	6.636	6.07	6.10	3.62	0.89	3.62	0.00	12.17	0.89	0.00	0.00
	Middle	6.768	6.20	6.10	-4.42	0.89	-4.42	0.00	12.30	0.89	0.00	0.00
	Outside	6.901	6.32	6.10	-12.46	0.89	-12.46	0.00	12.42	0.89	0.00	0.00
14	Inside	9.738	8.91	6.10	-8.27	-0.01	-8.27	0.00	15.01	-0.01	0.00	0.00
	Middle	9.871	9.04	6.10	-6.63	-0.01	-6.63	0.00	15.14	-0.01	0.00	0.00
	Outside	10.003	9.16	6.10	-4.99	-0.01	-4.99	0.00	15.26	-0.01	0.00	0.00
15	Inside	12.840	11.75	6.10	-7.06	0.23	-7.06	0.00	17.85	0.23	0.00	0.00
	Middle	12.974	11.88	6.10	-4.42	0.23	-4.42	0.00	17.98	0.23	0.00	0.00
	Outside	13.106	12.00	6.10	-1.78	0.23	-1.78	0.00	18.10	0.23	0.00	0.00
16	Inside	12.840	11.75	6.10	-7.06	-0.23	-7.06	0.00	17.85	-0.23	0.00	0.00
	Middle	12.974	11.88	6.10	-4.42	-0.23	-4.42	0.00	17.98	-0.23	0.00	0.00
	Outside	13.106	12.00	6.10	-1.78	-0.23	-1.78	0.00	18.10	-0.23	0.00	0.00
17	Inside	9.738	8.91	6.10	-8.27	0.01	-8.27	0.00	15.01	0.01	0.00	0.00
	Middle	9.871	9.04	6.10	-6.63	0.01	-6.63	0.00	15.14	0.01	0.00	0.00
	Outside	10.003	9.16	6.10	-4.99	0.01	-4.99	0.00	15.26	0.01	0.00	0.00
18	Inside	6.636	6.07	6.10	3.62	-0.89	3.62	0.00	12.17	-0.89	0.00	0.00
	Middle	6.768	6.20	6.10	-4.42	-0.89	-4.42	0.00	12.30	-0.89	0.00	0.00
	Outside	6.901	6.32	6.10	-12.46	-0.89	-12.46	0.00	12.42	-0.89	0.00	0.00

TABLE 2.10.9-35 (Cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 5-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP, T-20°F SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	6.205	5.68	6.10	-14.55	-0.57	-14.55	0.00	11.78	-0.57	0.00	0.00
	Middle	6.338	5.80	6.10	-6.63	-0.57	-6.63	0.00	11.90	-0.57	0.00	0.00
	Outside	6.470	5.92	6.10	1.28	-0.57	1.28	0.00	12.02	-0.57	0.00	0.00
20	Inside	2.837	2.60	6.10	-0.03	0.05	-0.03	0.00	8.70	0.05	0.00	0.00
	Middle	2.970	2.72	6.10	0.00	0.05	0.00	0.00	8.82	0.05	0.00	0.00
	Outside	3.102	2.84	6.10	0.03	0.05	0.03	0.00	8.94	0.05	0.00	0.00
21	Inside	0.000	0.00	6.10	-2.36	0.18	-2.36	0.00	6.10	0.18	0.00	0.00
	Middle	0.133	0.12	6.10	-2.21	0.18	-2.21	0.00	6.22	0.18	0.00	0.00
	Outside	0.265	0.24	6.10	-2.06	0.18	-2.06	0.00	6.34	0.18	0.00	0.00
22	Inside	0.000	0.00	6.10	-0.87	-0.18	-0.87	0.00	6.10	-0.18	0.00	0.00
	Middle	0.133	-0.12	6.10	-0.72	-0.18	-0.72	0.00	5.98	-0.18	0.00	0.00
	Outside	0.265	-0.24	6.10	-0.58	-0.18	-0.58	0.00	5.86	-0.18	0.00	0.00
23	Inside	2.837	-2.60	6.10	2.23	0.09	2.23	0.00	3.50	0.09	0.00	0.00
	Middle	2.970	-2.72	6.10	-0.72	0.09	-0.72	0.00	3.38	0.09	0.00	0.00
	Outside	3.102	-2.84	6.10	-3.67	0.09	-3.67	0.00	3.26	0.09	0.00	0.00
24	Inside	6.205	-5.68	6.10	-13.48	0.36	-13.48	0.00	0.42	0.36	0.00	0.00
	Middle	6.338	-5.80	6.10	-0.72	0.36	-0.72	0.00	0.30	0.36	0.00	0.00
	Outside	6.470	-5.92	6.10	12.04	0.36	12.04	0.00	0.18	0.36	0.00	0.00
25	Inside	6.205	-5.68	0.00	6.75	-0.35	6.75	0.00	-5.68	-0.35	0.00	0.00
	Middle	6.421	-5.88	0.00	-0.69	-0.35	-0.69	0.00	-5.88	-0.35	0.00	0.00
	Outside	6.637	-6.08	0.00	-8.13	-0.35	-8.13	0.00	-6.08	-0.35	0.00	0.00
26	Inside	3.102	-2.84	0.00	-2.57	-0.18	-2.57	0.00	-2.84	-0.18	0.00	0.00
	Middle	3.318	-3.04	0.00	-0.69	-0.18	-0.69	0.00	-3.04	-0.18	0.00	0.00
	Outside	3.534	-3.24	0.00	1.18	-0.18	1.18	0.00	-3.24	-0.18	0.00	0.00
27	Inside	0.000	0.00	0.00	-6.17	-0.02	-6.17	0.00	0.00	-0.02	0.00	0.00
	Middle	0.216	-0.20	0.00	-0.69	-0.02	-0.69	0.00	-0.20	-0.02	0.00	0.00
	Outside	0.431	-0.39	0.00	4.78	-0.02	4.78	0.00	-0.39	-0.02	0.00	0.00
28	Inside	0.000	0.00	0.00	4.78	0.02	4.78	0.00	0.00	0.02	0.00	0.00
	Middle	0.216	-0.20	0.00	-0.69	0.02	-0.69	0.00	-0.20	0.02	0.00	0.00
	Outside	0.431	-0.39	0.00	-6.17	0.02	-6.17	0.00	-0.39	0.02	0.00	0.00
29	Inside	3.102	-2.84	0.00	1.18	0.18	1.18	0.00	-2.84	0.18	0.00	0.00
	Middle	3.318	-3.04	0.00	-0.69	0.18	-0.69	0.00	-3.04	0.18	0.00	0.00
	Outside	3.534	-3.24	0.00	-2.57	0.18	-2.57	0.00	-3.24	0.18	0.00	0.00
30	Inside	6.205	-5.68	0.00	-8.13	0.35	-8.13	0.00	-5.68	0.35	0.00	0.00
	Middle	6.421	-5.88	0.00	-0.69	0.35	-0.69	0.00	-5.88	0.35	0.00	0.00
	Outside	6.637	-6.08	0.00	6.75	0.35	6.75	0.00	-6.08	0.35	0.00	0.00
31	Inside	0.000	0.00	0.00	8.15	-0.41	8.15	0.00	0.00	-0.41	0.00	0.00
	Middle	0.216	0.20	0.00	-1.22	-0.41	-1.22	0.00	0.20	-0.41	0.00	0.00
	Outside	0.431	0.39	0.00	-10.58	-0.41	-10.58	0.00	0.39	-0.41	0.00	0.00
32	Inside	3.102	2.84	0.00	-3.41	-0.25	-3.41	0.00	2.84	-0.25	0.00	0.00
	Middle	3.318	3.04	0.00	-1.22	-0.25	-1.22	0.00	3.04	-0.25	0.00	0.00
	Outside	3.534	3.24	0.00	0.98	-0.25	0.98	0.00	3.24	-0.25	0.00	0.00
33	Inside	6.205	5.68	0.00	-9.24	-0.08	-9.24	0.00	5.68	-0.08	0.00	0.00
	Middle	6.421	5.88	0.00	-1.22	-0.08	-1.22	0.00	5.88	-0.08	0.00	0.00
	Outside	6.637	6.08	0.00	6.81	-0.08	6.81	0.00	6.08	-0.08	0.00	0.00
34	Inside	0.000	0.00	0.00	-10.58	0.41	-10.58	0.00	0.00	0.41	0.00	0.00
	Middle	0.216	0.20	0.00	-1.22	0.41	-1.22	0.00	0.20	0.41	0.00	0.00
	Outside	0.431	0.39	0.00	8.15	0.41	8.15	0.00	0.39	0.41	0.00	0.00
35	Inside	3.102	2.84	0.00	0.98	0.25	0.98	0.00	2.84	0.25	0.00	0.00
	Middle	3.318	3.04	0.00	-1.22	0.25	-1.22	0.00	3.04	0.25	0.00	0.00
	Outside	3.534	3.24	0.00	-3.41	0.25	-3.41	0.00	3.24	0.25	0.00	0.00
36	Inside	6.205	5.68	0.00	6.81	0.08	6.81	0.00	5.68	0.08	0.00	0.00
	Middle	6.421	5.88	0.00	-1.22	0.08	-1.22	0.00	5.88	0.08	0.00	0.00
	Outside	6.637	6.08	0.00	-9.24	0.08	-9.24	0.00	6.08	0.08	0.00	0.00

TABLE 2.10.9-36 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	1.65	0.00	0.03	-0.16	0.00	0.00	1.67	0.03	-0.02	1.68	Pm+Pb	49.95	28.72
	Middle		-0.38	0.00	-0.10	-0.16	0.00	0.00	0.06	-0.10	-0.44	0.50	Pm	33.30	66.03
	Outside		-2.41	0.00	-0.22	-0.16	0.00	0.00	0.01	-0.22	-2.42	2.43	Pm+Pb	49.95	19.55
2	Inside	75j	3.34	0.00	-2.81	0.11	0.00	0.00	3.34	0.00	-2.81	6.16	Pm+Pb	49.95	7.11
	Middle		-0.38	0.00	-2.94	0.11	0.00	0.00	0.03	-0.41	-2.94	2.97	Pm	33.30	10.23
	Outside		-4.10	0.00	-3.06	0.11	0.00	0.00	0.00	-3.06	-4.10	4.11	Pm+Pb	49.95	11.17
3	Inside	80j	-13.77	0.00	-5.65	0.38	0.00	0.00	0.01	-5.65	-13.78	13.79	Pm+Pb	49.95	2.62
	Middle		-0.38	0.00	-5.78	0.38	0.00	0.00	0.23	-0.61	-5.78	6.01	Pm	33.30	4.54
	Outside		13.02	0.00	-5.90	0.38	0.00	0.00	13.03	-0.01	-5.90	18.93	Pm+Pb	49.95	1.64
4	Inside	40j	-13.77	0.00	-5.65	-0.38	0.00	0.00	0.01	-5.65	-13.78	13.79	Pm+Pb	49.95	2.62
	Middle		-0.38	0.00	-5.78	-0.38	0.00	0.00	0.23	-0.61	-5.78	6.01	Pm	33.30	4.54
	Outside		13.02	0.00	-5.90	-0.38	0.00	0.00	13.03	-0.01	-5.90	18.93	Pm+Pb	49.95	1.64
5	Inside	35j	3.34	0.00	-2.81	-0.11	0.00	0.00	3.34	0.00	-2.81	6.16	Pm+Pb	49.95	7.11
	Middle		-0.38	0.00	-2.94	-0.11	0.00	0.00	0.03	-0.41	-2.94	2.97	Pm	33.30	10.23
	Outside		-4.10	0.00	-3.06	-0.11	0.00	0.00	0.00	-3.06	-4.10	4.11	Pm+Pb	49.95	11.17
6	Inside	31i	1.65	0.00	0.03	0.16	0.00	0.00	1.67	0.03	-0.02	1.68	Pm+Pb	49.95	28.72
	Middle		-0.38	0.00	-0.10	0.16	0.00	0.00	0.06	-0.10	-0.44	0.50	Pm	33.30	66.03
	Outside		-2.41	0.00	-0.22	0.16	0.00	0.00	0.01	-0.22	-2.42	2.43	Pm+Pb	49.95	19.55
7	Inside	30j	-13.48	0.00	0.42	-0.36	0.00	0.00	0.42	0.01	-13.49	13.91	Pm+Pb	49.95	2.59
	Middle		-0.72	0.00	0.30	-0.36	0.00	0.00	0.30	0.15	-0.87	1.17	Pm	33.30	27.53
	Outside		12.04	0.00	0.18	-0.36	0.00	0.00	12.05	0.18	-0.01	12.06	Pm+Pb	49.95	3.14
8	Inside	25j	2.23	0.00	3.50	-0.09	0.00	0.00	3.50	2.23	0.00	3.51	Pm+Pb	49.95	13.24
	Middle		-0.72	0.00	3.38	-0.09	0.00	0.00	3.38	0.01	-0.73	4.11	Pm	33.30	7.10
	Outside		-3.67	0.00	3.26	-0.09	0.00	0.00	3.26	0.00	-3.67	6.93	Pm+Pb	49.95	6.21
9	Inside	21j	-0.87	0.00	6.10	0.18	0.00	0.00	6.10	0.04	-0.91	7.01	Pm+Pb	49.95	6.13
	Middle		-0.72	0.00	5.98	0.18	0.00	0.00	5.98	0.04	-0.76	6.74	Pm	33.30	3.94
	Outside		-0.58	0.00	5.86	0.18	0.00	0.00	5.86	0.05	-0.63	6.49	Pm+Pb	49.95	6.70

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TABLE 2.10.9-36 (CONT.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	-2.36	0.00	6.10	-0.18	0.00	0.00	6.10	0.01	-2.37	8.47	Pm+Pb	49.95	4.89
	Middle		-2.21	0.00	6.22	-0.18	0.00	0.00	6.22	0.01	-2.22	8.45	Pm	33.30	2.94
	Outside		-2.06	0.00	6.34	-0.18	0.00	0.00	6.34	0.02	-2.08	8.42	Pm+Pb	49.95	4.93
11	Inside	15j	-0.03	0.00	8.70	-0.05	0.00	0.00	8.70	0.04	-0.07	8.76	Pm+Pb	49.95	4.70
	Middle		0.00	0.00	8.82	-0.05	0.00	0.00	8.82	0.05	-0.05	8.87	Pm	33.30	2.75
	Outside		0.03	0.00	8.94	-0.05	0.00	0.00	8.94	0.07	-0.04	8.98	Pm+Pb	49.95	4.56
12	Inside	11i	-14.55	0.00	11.78	0.57	0.00	0.00	11.78	0.02	-14.57	26.35	Pm+Pb	49.95	0.90
	Middle		-6.63	0.00	11.90	0.57	0.00	0.00	11.90	0.05	-6.68	18.58	Pm	33.30	0.79
	Outside		1.28	0.00	12.02	0.57	0.00	0.00	12.02	1.50	-0.22	12.24	Pm+Pb	49.95	3.08
13	Inside	10j	3.62	0.00	12.17	0.89	0.00	0.00	12.17	3.83	-0.21	12.38	Pm+Pb	49.95	3.03
	Middle		-4.42	0.00	12.30	0.89	0.00	0.00	12.30	0.17	-4.59	16.89	Pm	33.30	0.97
	Outside		-12.46	0.00	12.42	0.89	0.00	0.00	12.42	0.06	-12.52	24.94	Pm+Pb	49.95	1.00
14	Inside	5j	-8.27	0.00	15.01	-0.01	0.00	0.00	15.01	0.00	-8.27	23.28	Pm+Pb	49.95	1.15
	Middle		-6.63	0.00	15.14	-0.01	0.00	0.00	15.14	0.00	-6.63	21.77	Pm	33.30	0.53
	Outside		-4.99	0.00	15.26	-0.01	0.00	0.00	15.26	0.00	-4.99	20.25	Pm+Pb	49.95	1.47
15	Inside	1i	-7.06	0.00	17.85	0.23	0.00	0.00	17.85	0.01	-7.07	24.92	Pm+Pb	49.95	1.00
	Middle		-4.42	0.00	17.98	0.23	0.00	0.00	17.98	0.01	-4.43	22.41	Pm	33.30	0.49
	Outside		-1.78	0.00	18.10	0.23	0.00	0.00	18.10	0.03	-1.81	19.91	Pm+Pb	49.95	1.51
16	Inside	41i	-7.06	0.00	17.85	-0.23	0.00	0.00	17.85	0.01	-7.07	24.92	Pm+Pb	49.95	1.00
	Middle		-4.42	0.00	17.98	-0.23	0.00	0.00	17.98	0.01	-4.43	22.41	Pm	33.30	0.49
	Outside		-1.78	0.00	18.10	-0.23	0.00	0.00	18.10	0.03	-1.81	19.91	Pm+Pb	49.95	1.51
17	Inside	45j	-8.27	0.00	15.01	0.01	0.00	0.00	15.01	0.00	-8.27	23.28	Pm+Pb	49.95	1.15
	Middle		-6.63	0.00	15.14	0.01	0.00	0.00	15.14	0.00	-6.63	21.77	Pm	33.30	0.53
	Outside		-4.99	0.00	15.26	0.01	0.00	0.00	15.26	0.00	-4.99	20.25	Pm+Pb	49.95	1.47
18	Inside	50j	3.62	0.00	12.17	-0.89	0.00	0.00	12.17	3.83	-0.21	12.38	Pm+Pb	49.95	3.03
	Middle		-4.42	0.00	12.30	-0.89	0.00	0.00	12.30	0.17	-4.59	16.89	Pm	33.30	0.97
	Outside		-12.46	0.00	12.42	-0.89	0.00	0.00	12.42	0.06	-12.52	24.94	Pm+Pb	49.95	1.00

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TABLE 2.10.9-36 (CONT.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP, T=–20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	-14.55	0.00	11.78	-0.57	0.00	0.00	11.78	0.02	-14.57	26.35	Pm+Pb	49.95	0.90
	Middle		-6.63	0.00	11.90	-0.57	0.00	0.00	11.90	0.05	-6.68	18.58	Pm	33.30	0.79
	Outside		1.28	0.00	12.02	-0.57	0.00	0.00	12.02	1.50	-0.22	12.24	Pm+Pb	49.95	3.08
20	Inside	55j	-0.03	0.00	8.70	0.05	0.00	0.00	8.70	0.04	-0.07	8.76	Pm+Pb	49.95	4.70
	Middle		0.00	0.00	8.82	0.05	0.00	0.00	8.82	0.05	-0.05	8.87	Pm	33.30	2.75
	Outside		0.03	0.00	8.94	0.05	0.00	0.00	8.94	0.07	-0.04	8.98	Pm+Pb	49.95	4.56
21	Inside	60j	-2.36	0.00	6.10	0.18	0.00	0.00	6.10	0.01	-2.37	8.47	Pm+Pb	49.95	4.89
	Middle		-2.21	0.00	6.22	0.18	0.00	0.00	6.22	0.01	-2.22	8.45	Pm	33.30	2.94
	Outside		-2.06	0.00	6.34	0.18	0.00	0.00	6.34	0.02	-2.08	8.42	Pm+Pb	49.95	4.93
22	Inside	61i	-0.87	0.00	6.10	-0.18	0.00	0.00	6.10	0.04	-0.91	7.01	Pm+Pb	49.95	6.13
	Middle		-0.72	0.00	5.98	-0.18	0.00	0.00	5.98	0.04	-0.76	6.74	Pm	33.30	3.94
	Outside		-0.58	0.00	5.86	-0.18	0.00	0.00	5.86	0.05	-0.63	6.49	Pm+Pb	49.95	6.70
23	Inside	65j	2.23	0.00	3.50	0.09	0.00	0.00	3.50	2.23	0.00	3.51	Pm+Pb	49.95	13.24
	Middle		-0.72	0.00	3.38	0.09	0.00	0.00	3.38	0.01	-0.73	4.11	Pm	33.30	7.10
	Outside		-3.67	0.00	3.26	0.09	0.00	0.00	3.26	0.00	-3.67	6.93	Pm+Pb	49.95	6.21
24	Inside	70j	-13.48	0.00	0.42	0.36	0.00	0.00	0.42	0.01	-13.49	13.91	Pm+Pb	49.95	2.59
	Middle		-0.72	0.00	0.30	0.36	0.00	0.00	0.30	0.15	-0.87	1.17	Pm	33.30	27.53
	Outside		12.04	0.00	0.18	0.36	0.00	0.00	12.05	0.18	-0.01	12.06	Pm+Pb	49.95	3.14
25	Inside	120j	6.75	0.00	-5.68	-0.35	0.00	0.00	6.77	-0.02	-5.68	12.45	Pm+Pb	32.47	1.61
	Middle		-0.69	0.00	-5.88	-0.35	0.00	0.00	0.15	-0.84	-5.88	6.02	Pm	21.65	2.59
	Outside		-8.13	0.00	-6.08	-0.35	0.00	0.00	0.02	-6.08	-8.15	8.16	Pm+Pb	32.47	2.98
26	Inside	115j	-2.57	0.00	-2.84	-0.18	0.00	0.00	0.01	-2.58	-2.84	2.85	Pm+Pb	49.95	16.51
	Middle		-0.69	0.00	-3.04	-0.18	0.00	0.00	0.04	-0.73	-3.04	3.08	Pm	33.30	9.81
	Outside		1.18	0.00	-3.24	-0.18	0.00	0.00	1.21	-0.03	-3.24	4.44	Pm+Pb	49.95	10.25
27	Inside	111i	-6.17	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	-6.17	6.17	Pm+Pb	49.95	7.10
	Middle		-0.69	0.00	-0.20	-0.02	0.00	0.00	0.00	-0.20	-0.69	0.69	Pm	33.30	47.18
	Outside		4.78	0.00	-0.39	-0.02	0.00	0.00	4.78	0.00	-0.39	5.17	Pm+Pb	49.95	8.65

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TABLE 2.10.9-36 (CONT.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 5-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP, T=–20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	4.78	0.00	0.00	0.02	0.00	0.00	4.78	0.00	0.00	4.78	Pm+Pb	49.95	9.45
	Middle		-0.69	0.00	-0.20	0.02	0.00	0.00	0.00	-0.20	-0.69	0.69	Pm	33.30	47.18
	Outside		-6.17	0.00	-0.39	0.02	0.00	0.00	0.00	-0.39	-6.17	6.17	Pm+Pb	49.95	7.10
29	Inside	105j	1.18	0.00	-2.84	0.18	0.00	0.00	1.21	-0.03	-2.84	4.05	Pm+Pb	49.95	11.34
	Middle		-0.69	0.00	-3.04	0.18	0.00	0.00	0.04	-0.73	-3.04	3.08	Pm	33.30	9.81
	Outside		-2.57	0.00	-3.24	0.18	0.00	0.00	0.01	-2.58	-3.24	3.25	Pm+Pb	49.95	14.38
30	Inside	110j	-8.13	0.00	-5.68	0.35	0.00	0.00	0.02	-5.68	-8.15	8.16	Pm+Pb	32.47	2.98
	Middle		-0.69	0.00	-5.88	0.35	0.00	0.00	0.15	-0.84	-5.88	6.02	Pm	21.65	2.59
	Outside		6.75	0.00	-6.08	0.35	0.00	0.00	6.77	-0.02	-6.08	12.84	Pm+Pb	32.47	1.53
31	Inside	90j	8.15	0.00	0.00	-0.41	0.00	0.00	8.17	0.00	-0.02	8.19	Pm+Pb	49.95	5.10
	Middle		-1.22	0.00	0.20	-0.41	0.00	0.00	0.20	0.12	-1.34	1.54	Pm	33.30	20.59
	Outside		-10.58	0.00	0.39	-0.41	0.00	0.00	0.39	0.02	-10.60	10.99	Pm+Pb	49.95	3.54
32	Inside	85j	-3.41	0.00	2.84	-0.25	0.00	0.00	2.84	0.02	-3.43	6.27	Pm+Pb	49.95	6.97
	Middle		-1.22	0.00	3.04	-0.25	0.00	0.00	3.04	0.05	-1.27	4.31	Pm	33.30	6.73
	Outside		0.98	0.00	3.24	-0.25	0.00	0.00	3.24	1.04	-0.06	3.30	Pm+Pb	49.95	14.16
33	Inside	81j	-9.24	0.00	5.68	-0.08	0.00	0.00	5.68	0.00	-9.24	14.92	Pm+Pb	32.47	1.18
	Middle		-1.22	0.00	5.88	-0.08	0.00	0.00	5.88	0.01	-1.23	7.10	Pm	21.65	2.05
	Outside		6.81	0.00	6.08	-0.08	0.00	0.00	6.81	6.08	0.00	6.81	Pm+Pb	32.47	3.77
34	Inside	100j	-10.58	0.00	0.00	0.41	0.00	0.00	0.02	0.00	-10.60	10.61	Pm+Pb	49.95	3.71
	Middle		-1.22	0.00	0.20	0.41	0.00	0.00	0.20	0.12	-1.34	1.54	Pm	33.30	20.59
	Outside		8.15	0.00	0.39	0.41	0.00	0.00	8.17	0.39	-0.02	8.19	Pm+Pb	49.95	5.10
35	Inside	95j	0.98	0.00	2.84	0.25	0.00	0.00	2.84	1.04	-0.06	2.90	Pm+Pb	49.95	16.23
	Middle		-1.22	0.00	3.04	0.25	0.00	0.00	3.04	0.05	-1.27	4.31	Pm	33.30	6.73
	Outside		-3.41	0.00	3.24	0.25	0.00	0.00	3.24	0.02	-3.43	6.66	Pm+Pb	49.95	6.50
36	Inside	91i	6.81	0.00	5.68	0.08	0.00	0.00	6.81	5.68	0.00	6.81	Pm+Pb	32.47	3.77
	Middle		-1.22	0.00	5.88	0.08	0.00	0.00	5.88	0.01	-1.23	7.10	Pm	21.65	2.05
	Outside		-9.24	0.00	6.08	0.08	0.00	0.00	6.08	0.00	-9.24	15.32	Pm+Pb	32.47	1.12

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TABLE 2.10.9-37 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 6-E, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	6.636	-6.07	-1.00	27.63	0.82	27.63	0.00	-7.07	0.82	0.00	0.00
	Middle	6.768	-6.20	-1.00	0.52	0.82	0.52	0.00	-7.20	0.82	0.00	0.00
	Outside	6.901	-6.32	-1.00	-26.59	0.82	-26.59	0.00	-7.32	0.82	0.00	0.00
2	Inside	9.738	-8.91	-1.00	-6.37	0.15	-6.37	0.00	-9.91	0.15	0.00	0.00
	Middle	9.871	-9.04	-1.00	0.52	0.15	0.52	0.00	-10.04	0.15	0.00	0.00
	Outside	10.003	-9.16	-1.00	7.41	0.15	7.41	0.00	-10.16	0.15	0.00	0.00
3	Inside	12.840	-11.75	-1.00	6.51	-0.52	6.51	0.00	-12.75	-0.52	0.00	0.00
	Middle	12.974	-11.88	-1.00	0.52	-0.52	0.52	0.00	-12.88	-0.52	0.00	0.00
	Outside	13.106	-12.00	-1.00	-5.48	-0.52	-5.48	0.00	-13.00	-0.52	0.00	0.00
4	Inside	12.840	-11.75	-1.00	6.51	0.52	6.51	0.00	-12.75	0.52	0.00	0.00
	Middle	12.974	-11.88	-1.00	0.52	0.52	0.52	0.00	-12.88	0.52	0.00	0.00
	Outside	13.106	-12.00	-1.00	-5.48	0.52	-5.48	0.00	-13.00	0.52	0.00	0.00
5	Inside	9.738	-8.91	-1.00	-6.37	-0.15	-6.37	0.00	-9.91	-0.15	0.00	0.00
	Middle	9.871	-9.04	-1.00	0.52	-0.15	0.52	0.00	-10.04	-0.15	0.00	0.00
	Outside	10.003	-9.16	-1.00	7.41	-0.15	7.41	0.00	-10.16	-0.15	0.00	0.00
6	Inside	6.636	-6.07	-1.00	27.63	-0.82	27.63	0.00	-7.07	-0.82	0.00	0.00
	Middle	6.768	-6.20	-1.00	0.52	-0.82	0.52	0.00	-7.20	-0.82	0.00	0.00
	Outside	6.901	-6.32	-1.00	-26.59	-0.82	-26.59	0.00	-7.32	-0.82	0.00	0.00
7	Inside	6.205	-5.68	-1.00	10.25	0.60	10.25	0.00	-6.68	0.60	0.00	0.00
	Middle	6.338	-5.80	-1.00	0.13	0.60	0.13	0.00	-6.80	0.60	0.00	0.00
	Outside	6.470	-5.92	-1.00	-10.00	0.60	-10.00	0.00	-6.92	0.60	0.00	0.00
8	Inside	2.837	-2.60	-1.00	-8.68	-0.06	-8.68	0.00	-3.60	-0.06	0.00	0.00
	Middle	2.970	-2.72	-1.00	0.13	-0.06	0.13	0.00	-3.72	-0.06	0.00	0.00
	Outside	3.102	-2.84	-1.00	8.94	-0.06	8.94	0.00	-3.84	-0.06	0.00	0.00
9	Inside	0.000	0.00	-1.00	19.27	-0.73	19.27	0.00	-1.00	-0.73	0.00	0.00
	Middle	0.133	-0.12	-1.00	0.13	-0.73	0.13	0.00	-1.12	-0.73	0.00	0.00
	Outside	0.265	-0.24	-1.00	-19.01	-0.73	-19.01	0.00	-1.24	-0.73	0.00	0.00
10	Inside	0.000	0.00	-1.00	14.72	1.34	14.72	0.00	-1.00	1.34	0.00	0.00
	Middle	0.133	0.12	-1.00	-4.42	1.34	-4.42	0.00	-0.88	1.34	0.00	0.00
	Outside	0.265	0.24	-1.00	-23.56	1.34	-23.56	0.00	-0.76	1.34	0.00	0.00
11	Inside	2.837	2.60	-1.00	-3.36	-0.50	-3.36	0.00	1.60	-0.50	0.00	0.00
	Middle	2.970	2.72	-1.00	-2.21	-0.50	-2.21	0.00	1.72	-0.50	0.00	0.00
	Outside	3.102	2.84	-1.00	-1.06	-0.50	-1.06	0.00	1.84	-0.50	0.00	0.00
12	Inside	6.205	5.68	-1.00	-18.80	0.42	-18.80	0.00	4.68	0.42	0.00	0.00
	Middle	6.338	5.80	-1.00	-11.05	0.42	-11.05	0.00	4.80	0.42	0.00	0.00
	Outside	6.470	5.92	-1.00	-3.31	0.42	-3.31	0.00	4.92	0.42	0.00	0.00
13	Inside	6.636	6.07	-1.00	-5.32	0.57	-5.32	0.00	5.07	0.57	0.00	0.00
	Middle	6.768	6.20	-1.00	-8.84	0.57	-8.84	0.00	5.20	0.57	0.00	0.00
	Outside	6.901	6.32	-1.00	-12.37	0.57	-12.37	0.00	5.32	0.57	0.00	0.00
14	Inside	9.738	8.91	-1.00	-9.88	-0.31	-9.88	0.00	7.91	-0.31	0.00	0.00
	Middle	9.871	9.04	-1.00	-6.63	-0.31	-6.63	0.00	8.04	-0.31	0.00	0.00
	Outside	10.003	9.16	-1.00	-3.39	-0.31	-3.39	0.00	8.16	-0.31	0.00	0.00
15	Inside	12.840	11.75	-1.00	-3.14	-0.20	-3.14	0.00	10.75	-0.20	0.00	0.00
	Middle	12.974	11.88	-1.00	-6.63	-0.20	-6.63	0.00	10.88	-0.20	0.00	0.00
	Outside	13.106	12.00	-1.00	-10.12	-0.20	-10.12	0.00	11.00	-0.20	0.00	0.00
16	Inside	12.840	11.75	-1.00	-3.14	0.20	-3.14	0.00	10.75	0.20	0.00	0.00
	Middle	12.974	11.88	-1.00	-6.63	0.20	-6.63	0.00	10.88	0.20	0.00	0.00
	Outside	13.106	12.00	-1.00	-10.12	0.20	-10.12	0.00	11.00	0.20	0.00	0.00
17	Inside	9.738	8.91	-1.00	-9.88	0.31	-9.88	0.00	7.91	0.31	0.00	0.00
	Middle	9.871	9.04	-1.00	-6.63	0.31	-6.63	0.00	8.04	0.31	0.00	0.00
	Outside	10.003	9.16	-1.00	-3.39	0.31	-3.39	0.00	8.16	0.31	0.00	0.00
18	Inside	6.636	6.07	-1.00	-5.32	-0.57	-5.32	0.00	5.07	-0.57	0.00	0.00
	Middle	6.768	6.20	-1.00	-8.84	-0.57	-8.84	0.00	5.20	-0.57	0.00	0.00
	Outside	6.901	6.32	-1.00	-12.37	-0.57	-12.37	0.00	5.32	-0.57	0.00	0.00

TABLE 2.10.9-37 (Cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 6-E, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	6.205	5.68	-1.00	-18.80	-0.42	-18.80	0.00	4.68	-0.42	0.00	0.00
	Middle	6.338	5.80	-1.00	-11.05	-0.42	-11.05	0.00	4.80	-0.42	0.00	0.00
	Outside	6.470	5.92	-1.00	-3.31	-0.42	-3.31	0.00	4.92	-0.42	0.00	0.00
20	Inside	2.837	2.60	-1.00	-4.24	0.57	-4.24	0.00	1.60	0.57	0.00	0.00
	Middle	2.970	2.72	-1.00	-2.21	0.57	-2.21	0.00	1.72	0.57	0.00	0.00
	Outside	3.102	2.84	-1.00	-0.18	0.57	-0.18	0.00	1.84	0.57	0.00	0.00
21	Inside	0.000	0.00	-1.00	14.72	-1.34	14.72	0.00	-1.00	-1.34	0.00	0.00
	Middle	0.133	0.12	-1.00	-4.42	-1.34	-4.42	0.00	-0.88	-1.34	0.00	0.00
	Outside	0.265	0.24	-1.00	-23.56	-1.34	-23.56	0.00	-0.76	-1.34	0.00	0.00
22	Inside	0.000	0.00	-1.00	19.27	0.73	19.27	0.00	-1.00	0.73	0.00	0.00
	Middle	0.133	-0.12	-1.00	0.13	0.73	0.13	0.00	-1.12	0.73	0.00	0.00
	Outside	0.265	-0.24	-1.00	-19.01	0.73	-19.01	0.00	-1.24	0.73	0.00	0.00
23	Inside	2.837	-2.60	-1.00	-8.68	0.06	-8.68	0.00	-3.60	0.06	0.00	0.00
	Middle	2.970	-2.72	-1.00	0.13	0.06	0.13	0.00	-3.72	0.06	0.00	0.00
	Outside	3.102	-2.84	-1.00	8.94	0.06	8.94	0.00	-3.84	0.06	0.00	0.00
24	Inside	6.205	-5.68	-1.00	10.25	-0.60	10.25	0.00	-6.68	-0.60	0.00	0.00
	Middle	6.338	-5.80	-1.00	0.13	-0.60	0.13	0.00	-6.80	-0.60	0.00	0.00
	Outside	6.470	-5.92	-1.00	-10.00	-0.60	-10.00	0.00	-6.92	-0.60	0.00	0.00
25	Inside	6.205	-5.68	0.00	10.45	-0.39	10.45	0.00	-5.68	-0.39	0.00	0.00
	Middle	6.421	-5.88	0.00	1.91	-0.39	1.91	0.00	-5.88	-0.39	0.00	0.00
	Outside	6.637	-6.08	0.00	-6.63	-0.39	-6.63	0.00	-6.08	-0.39	0.00	0.00
26	Inside	3.102	-2.84	0.00	-0.50	-0.23	-0.50	0.00	-2.84	-0.23	0.00	0.00
	Middle	3.318	-3.04	0.00	1.91	-0.23	1.91	0.00	-3.04	-0.23	0.00	0.00
	Outside	3.534	-3.24	0.00	4.32	-0.23	4.32	0.00	-3.24	-0.23	0.00	0.00
27	Inside	0.000	0.00	0.00	-5.72	-0.07	-5.72	0.00	0.00	-0.07	0.00	0.00
	Middle	0.216	-0.20	0.00	1.91	-0.07	1.91	0.00	-0.20	-0.07	0.00	0.00
	Outside	0.431	-0.39	0.00	9.55	-0.07	9.55	0.00	-0.39	-0.07	0.00	0.00
28	Inside	0.000	0.00	0.00	9.55	0.07	9.55	0.00	0.00	0.07	0.00	0.00
	Middle	0.216	-0.20	0.00	1.91	0.07	1.91	0.00	-0.20	0.07	0.00	0.00
	Outside	0.431	-0.39	0.00	-5.72	0.07	-5.72	0.00	-0.39	0.07	0.00	0.00
29	Inside	3.102	-2.84	0.00	4.32	0.23	4.32	0.00	-2.84	0.23	0.00	0.00
	Middle	3.318	-3.04	0.00	1.91	0.23	1.91	0.00	-3.04	0.23	0.00	0.00
	Outside	3.534	-3.24	0.00	-0.50	0.23	-0.50	0.00	-3.24	0.23	0.00	0.00
30	Inside	6.205	-5.68	0.00	-6.63	0.39	-6.63	0.00	-5.68	0.39	0.00	0.00
	Middle	6.421	-5.88	0.00	1.91	0.39	1.91	0.00	-5.88	0.39	0.00	0.00
	Outside	6.637	-6.08	0.00	10.45	0.39	10.45	0.00	-6.08	0.39	0.00	0.00
31	Inside	0.000	0.00	0.00	8.31	-0.34	8.31	0.00	0.00	-0.34	0.00	0.00
	Middle	0.216	0.20	0.00	1.55	-0.34	1.55	0.00	0.20	-0.34	0.00	0.00
	Outside	0.431	0.39	0.00	-5.21	-0.34	-5.21	0.00	0.39	-0.34	0.00	0.00
32	Inside	3.102	2.84	0.00	-0.77	-0.18	-0.77	0.00	2.84	-0.18	0.00	0.00
	Middle	3.318	3.04	0.00	1.55	-0.18	1.55	0.00	3.04	-0.18	0.00	0.00
	Outside	3.534	3.24	0.00	3.86	-0.18	3.86	0.00	3.24	-0.18	0.00	0.00
33	Inside	6.205	5.68	0.00	-4.12	-0.01	-4.12	0.00	5.68	-0.01	0.00	0.00
	Middle	6.421	5.88	0.00	1.55	-0.01	1.55	0.00	5.88	-0.01	0.00	0.00
	Outside	6.637	6.08	0.00	7.21	-0.01	7.21	0.00	6.08	-0.01	0.00	0.00
34	Inside	0.000	0.00	0.00	-5.21	0.34	-5.21	0.00	0.00	0.34	0.00	0.00
	Middle	0.216	0.20	0.00	1.55	0.34	1.55	0.00	0.20	0.34	0.00	0.00
	Outside	0.431	0.39	0.00	8.31	0.34	8.31	0.00	0.39	0.34	0.00	0.00
35	Inside	3.102	2.84	0.00	3.86	0.18	3.86	0.00	2.84	0.18	0.00	0.00
	Middle	3.318	3.04	0.00	1.55	0.18	1.55	0.00	3.04	0.18	0.00	0.00
	Outside	3.534	3.24	0.00	-0.77	0.18	-0.77	0.00	3.24	0.18	0.00	0.00
36	Inside	6.205	5.68	0.00	7.21	0.01	7.21	0.00	5.68	0.01	0.00	0.00
	Middle	6.421	5.88	0.00	1.55	0.01	1.55	0.00	5.88	0.01	0.00	0.00
	Outside	6.637	6.08	0.00	-4.12	0.01	-4.12	0.00	6.08	0.01	0.00	0.00

TABLE 2.10.9-38 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	27.63	0.00	-7.07	0.82	0.00	0.00	27.65	-0.02	-7.07	34.73	Pm+Pb	49.13	0.41
	Middle		0.52	0.00	-7.20	0.82	0.00	0.00	1.12	-0.60	-7.20	8.32	Pm	32.75	2.94
	Outside		-26.59	0.00	-7.32	0.82	0.00	0.00	0.03	-7.32	-26.62	26.64	Pm+Pb	49.13	0.84
2	Inside	75j	-6.37	0.00	-9.91	0.15	0.00	0.00	0.00	-6.37	-9.91	9.92	Pm+Pb	49.13	3.95
	Middle		0.52	0.00	-10.04	0.15	0.00	0.00	0.56	-0.04	-10.04	10.60	Pm	32.75	2.09
	Outside		7.41	0.00	-10.16	0.15	0.00	0.00	7.41	0.00	-10.16	17.57	Pm+Pb	49.13	1.80
3	Inside	80j	6.51	0.00	-12.75	-0.52	0.00	0.00	6.55	-0.04	-12.75	19.31	Pm+Pb	49.13	1.54
	Middle		0.52	0.00	-12.88	-0.52	0.00	0.00	0.84	-0.32	-12.88	13.72	Pm	32.75	1.39
	Outside		-5.48	0.00	-13.00	-0.52	0.00	0.00	0.05	-5.53	-13.00	13.05	Pm+Pb	49.13	2.77
4	Inside	40j	6.51	0.00	-12.75	0.52	0.00	0.00	6.55	-0.04	-12.75	19.31	Pm+Pb	49.13	1.54
	Middle		0.52	0.00	-12.88	0.52	0.00	0.00	0.84	-0.32	-12.88	13.72	Pm	32.75	1.39
	Outside		-5.48	0.00	-13.00	0.52	0.00	0.00	0.05	-5.53	-13.00	13.05	Pm+Pb	49.13	2.77
5	Inside	35j	-6.37	0.00	-9.91	-0.15	0.00	0.00	0.00	-6.37	-9.91	9.92	Pm+Pb	49.13	3.95
	Middle		0.52	0.00	-10.04	-0.15	0.00	0.00	0.56	-0.04	-10.04	10.60	Pm	32.75	2.09
	Outside		7.41	0.00	-10.16	-0.15	0.00	0.00	7.41	0.00	-10.16	17.57	Pm+Pb	49.13	1.80
6	Inside	31i	27.63	0.00	-7.07	-0.82	0.00	0.00	27.65	-0.02	-7.07	34.73	Pm+Pb	49.13	0.41
	Middle		0.52	0.00	-7.20	-0.82	0.00	0.00	1.12	-0.60	-7.20	8.32	Pm	32.75	2.94
	Outside		-26.59	0.00	-7.32	-0.82	0.00	0.00	0.03	-7.32	-26.62	26.64	Pm+Pb	49.13	0.84
7	Inside	30j	10.25	0.00	-6.68	0.60	0.00	0.00	10.29	-0.04	-6.68	16.97	Pm+Pb	49.13	1.90
	Middle		0.13	0.00	-6.80	0.60	0.00	0.00	0.67	-0.54	-6.80	7.47	Pm	32.75	3.38
	Outside		-10.00	0.00	-6.92	0.60	0.00	0.00	0.04	-6.92	-10.04	10.07	Pm+Pb	49.13	3.88
8	Inside	25j	-8.68	0.00	-3.60	-0.06	0.00	0.00	0.00	-3.60	-8.68	8.68	Pm+Pb	49.13	4.66
	Middle		0.13	0.00	-3.72	-0.06	0.00	0.00	0.15	-0.02	-3.72	3.87	Pm	32.75	7.46
	Outside		8.94	0.00	-3.84	-0.06	0.00	0.00	8.94	0.00	-3.84	12.78	Pm+Pb	49.13	2.84
9	Inside	21j	19.27	0.00	-1.00	-0.73	0.00	0.00	19.30	-0.03	-1.00	20.30	Pm+Pb	49.13	1.42
	Middle		0.13	0.00	-1.12	-0.73	0.00	0.00	0.80	-0.67	-1.12	1.92	Pm	32.75	16.06
	Outside		-19.01	0.00	-1.24	-0.73	0.00	0.00	0.03	-1.24	-19.04	19.07	Pm+Pb	49.13	1.58

ca/marg-ncep

TABLE 2.10.9-38 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	14.72	0.00	-1.00	1.34	0.00	0.00	14.84	-0.12	-1.00	15.84	Pm+Pb	49.13	2.10
	Middle		-4.42	0.00	-0.88	1.34	0.00	0.00	0.37	-0.88	-4.79	5.17	Pm	32.75	5.34
	Outside		-23.56	0.00	-0.76	1.34	0.00	0.00	0.08	-0.76	-23.64	23.71	Pm+Pb	49.13	1.07
11	Inside	15j	-3.36	0.00	1.60	-0.50	0.00	0.00	1.60	0.07	-3.43	5.03	Pm+Pb	49.13	8.77
	Middle		-2.21	0.00	1.72	-0.50	0.00	0.00	1.72	0.11	-2.32	4.04	Pm	32.75	7.11
	Outside		-1.06	0.00	1.84	-0.50	0.00	0.00	1.84	0.20	-1.26	3.10	Pm+Pb	49.13	14.86
12	Inside	11l	-18.80	0.00	4.68	0.42	0.00	0.00	4.68	0.01	-18.81	23.49	Pm+Pb	49.13	1.09
	Middle		-11.05	0.00	4.80	0.42	0.00	0.00	4.80	0.02	-11.07	15.87	Pm	32.75	1.06
	Outside		-3.31	0.00	4.92	0.42	0.00	0.00	4.92	0.05	-3.36	8.29	Pm+Pb	49.13	4.93
13	Inside	10j	-5.32	0.00	5.07	0.57	0.00	0.00	5.07	0.06	-5.38	10.46	Pm+Pb	49.13	3.70
	Middle		-8.84	0.00	5.20	0.57	0.00	0.00	5.20	0.04	-8.88	14.07	Pm	32.75	1.33
	Outside		-12.37	0.00	5.32	0.57	0.00	0.00	5.32	0.03	-12.40	17.71	Pm+Pb	49.13	1.77
14	Inside	5j	-9.88	0.00	7.91	-0.31	0.00	0.00	7.91	0.01	-9.89	17.80	Pm+Pb	49.13	1.76
	Middle		-6.63	0.00	8.04	-0.31	0.00	0.00	8.04	0.01	-6.64	14.68	Pm	32.75	1.23
	Outside		-3.39	0.00	8.16	-0.31	0.00	0.00	8.16	0.03	-3.42	11.58	Pm+Pb	49.13	3.24
15	Inside	1i	-3.14	0.00	10.75	-0.20	0.00	0.00	10.75	0.01	-3.15	13.91	Pm+Pb	49.13	2.53
	Middle		-6.63	0.00	10.88	-0.20	0.00	0.00	10.88	0.01	-6.64	17.51	Pm	32.75	0.87
	Outside		-10.12	0.00	11.00	-0.20	0.00	0.00	11.00	0.00	-10.12	21.12	Pm+Pb	49.13	1.33
16	Inside	41i	-3.14	0.00	10.75	0.20	0.00	0.00	10.75	0.01	-3.15	13.91	Pm+Pb	49.13	2.53
	Middle		-6.63	0.00	10.88	0.20	0.00	0.00	10.88	0.01	-6.64	17.51	Pm	32.75	0.87
	Outside		-10.12	0.00	11.00	0.20	0.00	0.00	11.00	0.00	-10.12	21.12	Pm+Pb	49.13	1.33
17	Inside	45j	-9.88	0.00	7.91	0.31	0.00	0.00	7.91	0.01	-9.89	17.80	Pm+Pb	49.13	1.76
	Middle		-6.63	0.00	8.04	0.31	0.00	0.00	8.04	0.01	-6.64	14.68	Pm	32.75	1.23
	Outside		-3.39	0.00	8.16	0.31	0.00	0.00	8.16	0.03	-3.42	11.58	Pm+Pb	49.13	3.24
18	Inside	50j	-5.32	0.00	5.07	-0.57	0.00	0.00	5.07	0.06	-5.38	10.46	Pm+Pb	49.13	3.70
	Middle		-8.84	0.00	5.20	-0.57	0.00	0.00	5.20	0.04	-8.88	14.07	Pm	32.75	1.33
	Outside		-12.37	0.00	5.32	-0.57	0.00	0.00	5.32	0.03	-12.40	17.71	Pm+Pb	49.13	1.77

TABLE 2.10.9-38 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	-18.80	0.00	4.68	-0.42	0.00	0.00	4.68	0.01	-18.81	23.49	Pm+Pb	49.13	1.09
	Middle		-11.05	0.00	4.80	-0.42	0.00	0.00	4.80	0.02	-11.07	15.87	Pm	32.75	1.06
	Outside		-3.31	0.00	4.92	-0.42	0.00	0.00	4.92	0.05	-3.36	8.29	Pm+Pb	49.13	4.93
20	Inside	55j	-4.24	0.00	1.60	0.57	0.00	0.00	1.60	0.08	-4.32	5.91	Pm+Pb	49.13	7.31
	Middle		-2.21	0.00	1.72	0.57	0.00	0.00	1.72	0.14	-2.35	4.07	Pm	32.75	7.05
	Outside		-0.18	0.00	1.84	0.57	0.00	0.00	1.84	0.49	-0.67	2.51	Pm+Pb	49.13	18.60
21	Inside	60j	14.72	0.00	-1.00	-1.34	0.00	0.00	14.84	-0.12	-1.00	15.84	Pm+Pb	49.13	2.10
	Middle		-4.42	0.00	-0.88	-1.34	0.00	0.00	0.37	-0.88	-4.79	5.17	Pm	32.75	5.34
	Outside		-23.56	0.00	-0.76	-1.34	0.00	0.00	0.08	-0.76	-23.64	23.71	Pm+Pb	49.13	1.07
22	Inside	61i	19.27	0.00	-1.00	0.73	0.00	0.00	19.30	-0.03	-1.00	20.30	Pm+Pb	49.13	1.42
	Middle		0.13	0.00	-1.12	0.73	0.00	0.00	0.80	-0.67	-1.12	1.92	Pm	32.75	16.06
	Outside		-19.01	0.00	-1.24	0.73	0.00	0.00	0.03	-1.24	-19.04	19.07	Pm+Pb	49.13	1.58
23	Inside	65j	-8.68	0.00	-3.60	0.06	0.00	0.00	0.00	-3.60	-8.68	8.68	Pm+Pb	49.13	4.66
	Middle		0.13	0.00	-3.72	0.06	0.00	0.00	0.15	-0.02	-3.72	3.87	Pm	32.75	7.46
	Outside		8.94	0.00	-3.84	0.06	0.00	0.00	8.94	0.00	-3.84	12.78	Pm+Pb	49.13	2.84
24	Inside	70j	10.25	0.00	-6.68	-0.60	0.00	0.00	10.29	-0.04	-6.68	16.97	Pm+Pb	49.13	1.90
	Middle		0.13	0.00	-6.80	-0.60	0.00	0.00	0.67	-0.54	-6.80	7.47	Pm	32.75	3.38
	Outside		-10.00	0.00	-6.92	-0.60	0.00	0.00	0.04	-6.92	-10.04	10.07	Pm+Pb	49.13	3.88
25	Inside	120j	10.45	0.00	-5.68	-0.39	0.00	0.00	10.46	-0.01	-5.68	16.14	Pm+Pb	30.71	0.90
	Middle		1.91	0.00	-5.88	-0.39	0.00	0.00	1.99	-0.08	-5.88	7.86	Pm	20.47	1.60
	Outside		-6.63	0.00	-6.08	-0.39	0.00	0.00	0.02	-6.08	-6.65	6.68	Pm+Pb	30.71	3.60
26	Inside	115j	-0.50	0.00	-2.84	-0.23	0.00	0.00	0.09	-0.59	-2.84	2.93	Pm+Pb	47.24	15.13
	Middle		1.91	0.00	-3.04	-0.23	0.00	0.00	1.94	-0.03	-3.04	4.97	Pm	31.49	5.33
	Outside		4.32	0.00	-3.24	-0.23	0.00	0.00	4.33	-0.01	-3.24	7.57	Pm+Pb	47.24	5.24
27	Inside	111i	-5.72	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	-5.72	5.72	Pm+Pb	47.24	7.26
	Middle		1.91	0.00	-0.20	-0.07	0.00	0.00	1.91	0.00	-0.20	2.11	Pm	31.49	13.92
	Outside		9.55	0.00	-0.39	-0.07	0.00	0.00	9.55	0.00	-0.39	9.95	Pm+Pb	47.24	3.75

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TABLE 2.10.9-38 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	9.55	0.00	0.00	0.07	0.00	0.00	9.55	0.00	0.00	9.55	Pm+Pb	47.24	3.95
	Middle		1.91	0.00	-0.20	0.07	0.00	0.00	1.91	0.00	-0.20	2.11	Pm	31.49	13.92
	Outside		-5.72	0.00	-0.39	0.07	0.00	0.00	0.00	-0.39	-5.72	5.72	Pm+Pb	47.24	7.26
29	Inside	105j	4.32	0.00	-2.84	0.23	0.00	0.00	4.33	-0.01	-2.84	7.17	Pm+Pb	47.24	5.59
	Middle		1.91	0.00	-3.04	0.23	0.00	0.00	1.94	-0.03	-3.04	4.97	Pm	31.49	5.33
	Outside		-0.50	0.00	-3.24	0.23	0.00	0.00	0.09	-0.59	-3.24	3.32	Pm+Pb	47.24	13.21
30	Inside	110j	-6.63	0.00	-5.68	0.39	0.00	0.00	0.02	-5.68	-6.65	6.68	Pm+Pb	30.71	3.60
	Middle		1.91	0.00	-5.88	0.39	0.00	0.00	1.99	-0.08	-5.88	7.86	Pm	20.47	1.60
	Outside		10.45	0.00	-6.08	0.39	0.00	0.00	10.46	-0.01	-6.08	16.54	Pm+Pb	30.71	0.86
31	Inside	90j	8.31	0.00	0.00	-0.34	0.00	0.00	8.32	0.00	-0.01	8.34	Pm+Pb	47.24	4.67
	Middle		1.55	0.00	0.20	-0.34	0.00	0.00	1.62	0.20	-0.07	1.69	Pm	31.49	17.60
	Outside		-5.21	0.00	0.39	-0.34	0.00	0.00	0.39	0.02	-5.23	5.63	Pm+Pb	47.24	7.40
32	Inside	85j	-0.77	0.00	2.84	-0.18	0.00	0.00	2.84	0.04	-0.81	3.65	Pm+Pb	47.24	11.94
	Middle		1.55	0.00	3.04	-0.18	0.00	0.00	3.04	1.57	-0.02	3.06	Pm	31.49	9.30
	Outside		3.86	0.00	3.24	-0.18	0.00	0.00	3.87	3.24	-0.01	3.88	Pm+Pb	47.24	11.19
33	Inside	81j	-4.12	0.00	5.68	-0.01	0.00	0.00	5.68	0.00	-4.12	9.80	Pm+Pb	30.71	2.13
	Middle		1.55	0.00	5.88	-0.01	0.00	0.00	5.88	1.55	0.00	5.88	Pm	20.47	2.48
	Outside		7.21	0.00	6.08	-0.01	0.00	0.00	7.21	6.08	0.00	7.21	Pm+Pb	30.71	3.26
34	Inside	100j	-5.21	0.00	0.00	0.34	0.00	0.00	0.02	0.00	-5.23	5.25	Pm+Pb	47.24	7.99
	Middle		1.55	0.00	0.20	0.34	0.00	0.00	1.62	0.20	-0.07	1.69	Pm	31.49	17.60
	Outside		8.31	0.00	0.39	0.34	0.00	0.00	8.32	0.39	-0.01	8.34	Pm+Pb	47.24	4.67
35	Inside	95j	3.86	0.00	2.84	0.18	0.00	0.00	3.87	2.84	-0.01	3.88	Pm+Pb	47.24	11.19
	Middle		1.55	0.00	3.04	0.18	0.00	0.00	3.04	1.57	-0.02	3.06	Pm	31.49	9.30
	Outside		-0.77	0.00	3.24	0.18	0.00	0.00	3.24	0.04	-0.81	4.05	Pm+Pb	47.24	10.68
36	Inside	91i	7.21	0.00	5.68	0.01	0.00	0.00	7.21	5.68	0.00	7.21	Pm+Pb	30.71	3.26
	Middle		1.55	0.00	5.88	0.01	0.00	0.00	5.88	1.55	0.00	5.88	Pm	20.47	2.48
	Outside		-4.12	0.00	6.08	0.01	0.00	0.00	6.08	0.00	-4.12	10.20	Pm+Pb	30.71	2.01

TABLE 2.10.9-39 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 6-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP T=-20°F SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	6.636	-6.07	6.10	27.63	0.82	27.63	0.00	0.03	0.82	0.00	0.00
	Middle	6.768	-6.20	6.10	0.52	0.82	0.52	0.00	-0.10	0.82	0.00	0.00
	Outside	6.901	-6.32	6.10	-26.59	0.82	-26.59	0.00	-0.22	0.82	0.00	0.00
2	Inside	9.738	-8.91	6.10	-6.37	0.15	-6.37	0.00	-2.81	0.15	0.00	0.00
	Middle	9.871	-9.04	6.10	0.52	0.15	0.52	0.00	-2.94	0.15	0.00	0.00
	Outside	10.003	-9.16	6.10	7.41	0.15	7.41	0.00	-3.06	0.15	0.00	0.00
3	Inside	12.840	-11.75	6.10	6.51	-0.52	6.51	0.00	-5.65	-0.52	0.00	0.00
	Middle	12.974	-11.88	6.10	0.52	-0.52	0.52	0.00	-5.78	-0.52	0.00	0.00
	Outside	13.106	-12.00	6.10	-5.48	-0.52	-5.48	0.00	-5.90	-0.52	0.00	0.00
4	Inside	12.840	-11.75	6.10	6.51	0.52	6.51	0.00	-5.65	0.52	0.00	0.00
	Middle	12.974	-11.88	6.10	0.52	0.52	0.52	0.00	-5.78	0.52	0.00	0.00
	Outside	13.106	-12.00	6.10	-5.48	0.52	-5.48	0.00	-5.90	0.52	0.00	0.00
5	Inside	9.738	-8.91	6.10	-6.37	-0.15	-6.37	0.00	-2.81	-0.15	0.00	0.00
	Middle	9.871	-9.04	6.10	0.52	-0.15	0.52	0.00	-2.94	-0.15	0.00	0.00
	Outside	10.003	-9.16	6.10	7.41	-0.15	7.41	0.00	-3.06	-0.15	0.00	0.00
6	Inside	6.636	-6.07	6.10	27.63	-0.82	27.63	0.00	0.03	-0.82	0.00	0.00
	Middle	6.768	-6.20	6.10	0.52	-0.82	0.52	0.00	-0.10	-0.82	0.00	0.00
	Outside	6.901	-6.32	6.10	-26.59	-0.82	-26.59	0.00	-0.22	-0.82	0.00	0.00
7	Inside	6.205	-5.68	6.10	10.25	0.60	10.25	0.00	0.42	0.60	0.00	0.00
	Middle	6.338	-5.80	6.10	0.13	0.60	0.13	0.00	0.30	0.60	0.00	0.00
	Outside	6.470	-5.92	6.10	-10.00	0.60	-10.00	0.00	0.18	0.60	0.00	0.00
8	Inside	2.837	-2.60	6.10	-8.68	-0.06	-8.68	0.00	3.50	-0.06	0.00	0.00
	Middle	2.970	-2.72	6.10	0.13	-0.06	0.13	0.00	3.38	-0.06	0.00	0.00
	Outside	3.102	-2.84	6.10	8.94	-0.06	8.94	0.00	3.26	-0.06	0.00	0.00
9	Inside	0.000	0.00	6.10	19.27	-0.73	19.27	0.00	6.10	-0.73	0.00	0.00
	Middle	0.133	-0.12	6.10	0.13	-0.73	0.13	0.00	5.98	-0.73	0.00	0.00
	Outside	0.265	-0.24	6.10	-19.01	-0.73	-19.01	0.00	5.86	-0.73	0.00	0.00
10	Inside	0.000	0.00	6.10	14.72	1.34	14.72	0.00	6.10	1.34	0.00	0.00
	Middle	0.133	0.12	6.10	-4.42	1.34	-4.42	0.00	6.22	1.34	0.00	0.00
	Outside	0.265	0.24	6.10	-23.56	1.34	-23.56	0.00	6.34	1.34	0.00	0.00
11	Inside	2.837	2.60	6.10	-3.36	-0.50	-3.36	0.00	8.70	-0.50	0.00	0.00
	Middle	2.970	2.72	6.10	-2.21	-0.50	-2.21	0.00	8.82	-0.50	0.00	0.00
	Outside	3.102	2.84	6.10	-1.06	-0.50	-1.06	0.00	8.94	-0.50	0.00	0.00
12	Inside	6.205	5.68	6.10	-18.80	0.42	-18.80	0.00	11.78	0.42	0.00	0.00
	Middle	6.338	5.80	6.10	-11.05	0.42	-11.05	0.00	11.90	0.42	0.00	0.00
	Outside	6.470	5.92	6.10	-3.31	0.42	-3.31	0.00	12.02	0.42	0.00	0.00
13	Inside	6.636	6.07	6.10	-5.32	0.57	-5.32	0.00	12.17	0.57	0.00	0.00
	Middle	6.768	6.20	6.10	-8.84	0.57	-8.84	0.00	12.30	0.57	0.00	0.00
	Outside	6.901	6.32	6.10	-12.37	0.57	-12.37	0.00	12.42	0.57	0.00	0.00
14	Inside	9.738	8.91	6.10	-9.88	-0.31	-9.88	0.00	15.01	-0.31	0.00	0.00
	Middle	9.871	9.04	6.10	-6.63	-0.31	-6.63	0.00	15.14	-0.31	0.00	0.00
	Outside	10.003	9.16	6.10	-3.39	-0.31	-3.39	0.00	15.26	-0.31	0.00	0.00
15	Inside	12.840	11.75	6.10	-3.14	-0.20	-3.14	0.00	17.85	-0.20	0.00	0.00
	Middle	12.974	11.88	6.10	-6.63	-0.20	-6.63	0.00	17.98	-0.20	0.00	0.00
	Outside	13.106	12.00	6.10	-10.12	-0.20	-10.12	0.00	18.10	-0.20	0.00	0.00
16	Inside	12.840	11.75	6.10	-3.14	0.20	-3.14	0.00	17.85	0.20	0.00	0.00
	Middle	12.974	11.88	6.10	-6.63	0.20	-6.63	0.00	17.98	0.20	0.00	0.00
	Outside	13.106	12.00	6.10	-10.12	0.20	-10.12	0.00	18.10	0.20	0.00	0.00
17	Inside	9.738	8.91	6.10	-9.88	0.31	-9.88	0.00	15.01	0.31	0.00	0.00
	Middle	9.871	9.04	6.10	-6.63	0.31	-6.63	0.00	15.14	0.31	0.00	0.00
	Outside	10.003	9.16	6.10	-3.39	0.31	-3.39	0.00	15.26	0.31	0.00	0.00
18	Inside	6.636	6.07	6.10	-5.32	-0.57	-5.32	0.00	12.17	-0.57	0.00	0.00
	Middle	6.768	6.20	6.10	-8.84	-0.57	-8.84	0.00	12.30	-0.57	0.00	0.00
	Outside	6.901	6.32	6.10	-12.37	-0.57	-12.37	0.00	12.42	-0.57	0.00	0.00

TABLE 2.10.9-39 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 6-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP + MNOP T=-20°F SECTION E MOM. = 15 X 10^6 in-lb

Stress Location	Location in Wall	1-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	6.205	5.68	6.10	-18.80	-0.42	-18.80	0.00	11.78	-0.42	0.00	0.00
	Middle	6.338	5.80	6.10	-11.05	-0.42	-11.05	0.00	11.90	-0.42	0.00	0.00
	Outside	6.470	5.92	6.10	-3.31	-0.42	-3.31	0.00	12.02	-0.42	0.00	0.00
20	Inside	2.837	2.60	6.10	-4.24	0.57	-4.24	0.00	8.70	0.57	0.00	0.00
	Middle	2.970	2.72	6.10	-2.21	0.57	-2.21	0.00	8.82	0.57	0.00	0.00
	Outside	3.102	2.84	6.10	-0.18	0.57	-0.18	0.00	8.94	0.57	0.00	0.00
21	Inside	0.000	0.00	6.10	14.72	-1.34	14.72	0.00	6.10	-1.34	0.00	0.00
	Middle	0.133	0.12	6.10	-4.42	-1.34	-4.42	0.00	6.22	-1.34	0.00	0.00
	Outside	0.265	0.24	6.10	-23.56	-1.34	-23.56	0.00	6.34	-1.34	0.00	0.00
22	Inside	0.000	0.00	6.10	19.27	0.73	19.27	0.00	6.10	0.73	0.00	0.00
	Middle	0.133	-0.12	6.10	0.13	0.73	0.13	0.00	5.98	0.73	0.00	0.00
	Outside	0.265	-0.24	6.10	-19.01	0.73	-19.01	0.00	5.86	0.73	0.00	0.00
23	Inside	2.837	-2.60	6.10	-8.68	0.06	-8.68	0.00	3.50	0.06	0.00	0.00
	Middle	2.970	-2.72	6.10	0.13	0.06	0.13	0.00	3.38	0.06	0.00	0.00
	Outside	3.102	-2.84	6.10	8.94	0.06	8.94	0.00	3.26	0.06	0.00	0.00
24	Inside	6.205	-5.68	6.10	10.25	-0.60	10.25	0.00	0.42	-0.60	0.00	0.00
	Middle	6.338	-5.80	6.10	0.13	-0.60	0.13	0.00	0.30	-0.60	0.00	0.00
	Outside	6.470	-5.92	6.10	-10.00	-0.60	-10.00	0.00	0.18	-0.60	0.00	0.00
25	Inside	6.205	-5.68	0.00	10.45	-0.39	10.45	0.00	-5.68	-0.39	0.00	0.00
	Middle	6.421	-5.88	0.00	1.91	-0.39	1.91	0.00	-5.88	-0.39	0.00	0.00
	Outside	6.637	-6.08	0.00	-6.63	-0.39	-6.63	0.00	-6.08	-0.39	0.00	0.00
26	Inside	3.102	-2.84	0.00	-0.50	-0.23	-0.50	0.00	-2.84	-0.23	0.00	0.00
	Middle	3.318	-3.04	0.00	1.91	-0.23	1.91	0.00	-3.04	-0.23	0.00	0.00
	Outside	3.534	-3.24	0.00	4.32	-0.23	4.32	0.00	-3.24	-0.23	0.00	0.00
27	Inside	0.000	0.00	0.00	-5.72	-0.07	-5.72	0.00	0.00	-0.07	0.00	0.00
	Middle	0.216	-0.20	0.00	1.91	-0.07	1.91	0.00	-0.20	-0.07	0.00	0.00
	Outside	0.431	-0.39	0.00	9.55	-0.07	9.55	0.00	-0.39	-0.07	0.00	0.00
28	Inside	0.000	0.00	0.00	9.55	0.07	9.55	0.00	0.00	0.07	0.00	0.00
	Middle	0.216	-0.20	0.00	1.91	0.07	1.91	0.00	-0.20	0.07	0.00	0.00
	Outside	0.431	-0.39	0.00	-5.72	0.07	-5.72	0.00	-0.39	0.07	0.00	0.00
29	Inside	3.102	-2.84	0.00	4.32	0.23	4.32	0.00	-2.84	0.23	0.00	0.00
	Middle	3.318	-3.04	0.00	1.91	0.23	1.91	0.00	-3.04	0.23	0.00	0.00
	Outside	3.534	-3.24	0.00	-0.50	0.23	-0.50	0.00	-3.24	0.23	0.00	0.00
30	Inside	6.205	-5.68	0.00	-6.63	0.39	-6.63	0.00	-5.68	0.39	0.00	0.00
	Middle	6.421	-5.88	0.00	1.91	0.39	1.91	0.00	-5.88	0.39	0.00	0.00
	Outside	6.637	-6.08	0.00	10.45	0.39	10.45	0.00	-6.08	0.39	0.00	0.00
31	Inside	0.000	0.00	0.00	8.31	-0.34	8.31	0.00	0.00	-0.34	0.00	0.00
	Middle	0.216	0.20	0.00	1.55	-0.34	1.55	0.00	0.20	-0.34	0.00	0.00
	Outside	0.431	0.39	0.00	-5.21	-0.34	-5.21	0.00	0.39	-0.34	0.00	0.00
32	Inside	3.102	2.84	0.00	-0.77	-0.18	-0.77	0.00	2.84	-0.18	0.00	0.00
	Middle	3.318	3.04	0.00	1.55	-0.18	1.55	0.00	3.04	-0.18	0.00	0.00
	Outside	3.534	3.24	0.00	3.86	-0.18	3.86	0.00	3.24	-0.18	0.00	0.00
33	Inside	6.205	5.68	0.00	-4.12	-0.01	-4.12	0.00	5.68	-0.01	0.00	0.00
	Middle	6.421	5.88	0.00	1.55	-0.01	1.55	0.00	5.88	-0.01	0.00	0.00
	Outside	6.637	6.08	0.00	7.21	-0.01	7.21	0.00	6.08	-0.01	0.00	0.00
34	Inside	0.000	0.00	0.00	-5.21	0.34	-5.21	0.00	0.00	0.34	0.00	0.00
	Middle	0.216	0.20	0.00	1.55	0.34	1.55	0.00	0.20	0.34	0.00	0.00
	Outside	0.431	0.39	0.00	8.31	0.34	8.31	0.00	0.39	0.34	0.00	0.00
35	Inside	3.102	2.84	0.00	3.86	0.18	3.86	0.00	2.84	0.18	0.00	0.00
	Middle	3.318	3.04	0.00	1.55	0.18	1.55	0.00	3.04	0.18	0.00	0.00
	Outside	3.534	3.24	0.00	-0.77	0.18	-0.77	0.00	3.24	0.18	0.00	0.00
36	Inside	6.205	5.68	0.00	7.21	0.01	7.21	0.00	5.68	0.01	0.00	0.00
	Middle	6.421	5.88	0.00	1.55	0.01	1.55	0.00	5.88	0.01	0.00	0.00
	Outside	6.637	6.08	0.00	-4.12	0.01	-4.12	0.00	6.08	0.01	0.00	0.00

TABLE 2.10.9-40 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E COLD, CORNER ORIENTATION - 1-FT SIDE DROP +MNOP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	27.63	0.00	0.03	0.82	0.00	0.00	27.65	0.03	-0.02	27.68	Pm+Pb	49.95	0.80
	Middle		0.52	0.00	-0.10	0.82	0.00	0.00	1.12	-0.10	-0.60	1.72	Pm	33.30	18.36
	Outside		-26.59	0.00	-0.22	0.82	0.00	0.00	0.03	-0.22	-26.62	26.64	Pm+Pb	49.95	0.87
2	Inside	75j	-6.37	0.00	-2.81	0.15	0.00	0.00	0.00	-2.81	-6.37	6.38	Pm+Pb	49.95	6.83
	Middle		0.52	0.00	-2.94	0.15	0.00	0.00	0.56	-0.04	-2.94	3.50	Pm	33.30	8.52
	Outside		7.41	0.00	-3.06	0.15	0.00	0.00	7.41	0.00	-3.06	10.47	Pm+Pb	49.95	3.77
3	Inside	80j	6.51	0.00	-5.65	-0.52	0.00	0.00	6.55	-0.04	-5.65	12.21	Pm+Pb	49.95	3.09
	Middle		0.52	0.00	-5.78	-0.52	0.00	0.00	0.84	-0.32	-5.78	6.62	Pm	33.30	4.03
	Outside		-5.48	0.00	-5.90	-0.52	0.00	0.00	0.05	-5.53	-5.90	5.95	Pm+Pb	49.95	7.40
4	Inside	40j	6.51	0.00	-5.65	0.52	0.00	0.00	6.55	-0.04	-5.65	12.21	Pm+Pb	49.95	3.09
	Middle		0.52	0.00	-5.78	0.52	0.00	0.00	0.84	-0.32	-5.78	6.62	Pm	33.30	4.03
	Outside		-5.48	0.00	-5.90	0.52	0.00	0.00	0.05	-5.53	-5.90	5.95	Pm+Pb	49.95	7.40
5	Inside	35j	-6.37	0.00	-2.81	-0.15	0.00	0.00	0.00	-2.81	-6.37	6.38	Pm+Pb	49.95	6.83
	Middle		0.52	0.00	-2.94	-0.15	0.00	0.00	0.56	-0.04	-2.94	3.50	Pm	33.30	8.52
	Outside		7.41	0.00	-3.06	-0.15	0.00	0.00	7.41	0.00	-3.06	10.47	Pm+Pb	49.95	3.77
6	Inside	31i	27.63	0.00	0.03	-0.82	0.00	0.00	27.65	0.03	-0.02	27.68	Pm+Pb	49.95	0.80
	Middle		0.52	0.00	-0.10	-0.82	0.00	0.00	1.12	-0.10	-0.60	1.72	Pm	33.30	18.36
	Outside		-26.59	0.00	-0.22	-0.82	0.00	0.00	0.03	-0.22	-26.62	26.64	Pm+Pb	49.95	0.87
7	Inside	30j	10.25	0.00	0.42	0.60	0.00	0.00	10.29	0.42	-0.04	10.32	Pm+Pb	49.95	3.84
	Middle		0.13	0.00	0.30	0.60	0.00	0.00	0.67	0.30	-0.54	1.21	Pm	33.30	26.59
	Outside		-10.00	0.00	0.18	0.60	0.00	0.00	0.18	0.04	-10.04	10.21	Pm+Pb	49.95	3.89
8	Inside	25j	-8.68	0.00	3.50	-0.06	0.00	0.00	3.50	0.00	-8.68	12.18	Pm+Pb	49.95	3.10
	Middle		0.13	0.00	3.38	-0.06	0.00	0.00	3.38	0.15	-0.02	3.40	Pm	33.30	8.78
	Outside		8.94	0.00	3.26	-0.06	0.00	0.00	8.94	3.26	0.00	8.94	Pm+Pb	49.95	4.59
9	Inside	21j	19.27	0.00	6.10	-0.73	0.00	0.00	19.30	6.10	-0.03	19.33	Pm+Pb	49.95	1.58
	Middle		0.13	0.00	5.98	-0.73	0.00	0.00	5.98	0.80	-0.67	6.65	Pm	33.30	4.01
	Outside		-19.01	0.00	5.86	-0.73	0.00	0.00	5.86	0.03	-19.04	24.90	Pm+Pb	49.95	1.01

ca/marg-ncep-cold

TABLE 2.10.9-40 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E COLD, CORNER ORIENT.-1-FT SIDE DROP +MNOP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	14.72	0.00	6.10	1.34	0.00	0.00	14.84	6.10	-0.12	14.96	Pm+Pb	49.95	2.34
	Middle		-4.42	0.00	6.22	1.34	0.00	0.00	6.22	0.37	-4.79	11.02	Pm	33.30	2.02
	Outside		-23.56	0.00	6.34	1.34	0.00	0.00	6.34	0.08	-23.64	29.98	Pm+Pb	49.95	0.67
11	Inside	15j	-3.36	0.00	8.70	-0.50	0.00	0.00	8.70	0.07	-3.43	12.13	Pm+Pb	49.95	3.12
	Middle		-2.21	0.00	8.82	-0.50	0.00	0.00	8.82	0.11	-2.32	11.14	Pm	33.30	1.99
	Outside		-1.06	0.00	8.94	-0.50	0.00	0.00	8.94	0.20	-1.26	10.20	Pm+Pb	49.95	3.90
12	Inside	11i	-18.80	0.00	11.78	0.42	0.00	0.00	11.78	0.01	-18.81	30.59	Pm+Pb	49.95	0.63
	Middle		-11.05	0.00	11.90	0.42	0.00	0.00	11.90	0.02	-11.07	22.97	Pm	33.30	0.45
	Outside		-3.31	0.00	12.02	0.42	0.00	0.00	12.02	0.05	-3.36	15.39	Pm+Pb	49.95	2.25
13	Inside	10j	-5.32	0.00	12.17	0.57	0.00	0.00	12.17	0.06	-5.38	17.56	Pm+Pb	49.95	1.85
	Middle		-8.84	0.00	12.30	0.57	0.00	0.00	12.30	0.04	-8.88	21.17	Pm	33.30	0.57
	Outside		-12.37	0.00	12.42	0.57	0.00	0.00	12.42	0.03	-12.40	24.81	Pm+Pb	49.95	1.01
14	Inside	5j	-9.88	0.00	15.01	-0.31	0.00	0.00	15.01	0.01	-9.89	24.90	Pm+Pb	49.95	1.01
	Middle		-6.63	0.00	15.14	-0.31	0.00	0.00	15.14	0.01	-6.64	21.78	Pm	33.30	0.53
	Outside		-3.39	0.00	15.26	-0.31	0.00	0.00	15.26	0.03	-3.42	18.68	Pm+Pb	49.95	1.67
15	Inside	1i	-3.14	0.00	17.85	-0.20	0.00	0.00	17.85	0.01	-3.15	21.01	Pm+Pb	49.95	1.38
	Middle		-6.63	0.00	17.98	-0.20	0.00	0.00	17.98	0.01	-6.64	24.61	Pm	33.30	0.35
	Outside		-10.12	0.00	18.10	-0.20	0.00	0.00	18.10	0.00	-10.12	28.22	Pm+Pb	49.95	0.77
16	Inside	41i	-3.14	0.00	17.85	0.20	0.00	0.00	17.85	0.01	-3.15	21.01	Pm+Pb	49.95	1.38
	Middle		-6.63	0.00	17.98	0.20	0.00	0.00	17.98	0.01	-6.64	24.61	Pm	33.30	0.35
	Outside		-10.12	0.00	18.10	0.20	0.00	0.00	18.10	0.00	-10.12	28.22	Pm+Pb	49.95	0.77
17	Inside	45j	-9.88	0.00	15.01	0.31	0.00	0.00	15.01	0.01	-9.89	24.90	Pm+Pb	49.95	1.01
	Middle		-6.63	0.00	15.14	0.31	0.00	0.00	15.14	0.01	-6.64	21.78	Pm	33.30	0.53
	Outside		-3.39	0.00	15.26	0.31	0.00	0.00	15.26	0.03	-3.42	18.68	Pm+Pb	49.95	1.67
18	Inside	50j	-5.32	0.00	12.17	-0.57	0.00	0.00	12.17	0.06	-5.38	17.56	Pm+Pb	49.95	1.85
	Middle		-8.84	0.00	12.30	-0.57	0.00	0.00	12.30	0.04	-8.88	21.17	Pm	33.30	0.57
	Outside		-12.37	0.00	12.42	-0.57	0.00	0.00	12.42	0.03	-12.40	24.81	Pm+Pb	49.95	1.01

ca/marg-ncep-cold

TABLE 2.10.9-40 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E COLD, CORNER ORIENT.-1-FT SIDE DROP +MNOP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	-18.80	0.00	11.78	-0.42	0.00	0.00	11.78	0.01	-18.81	30.59	Pm+Pb	49.95	0.63
	Middle		-11.05	0.00	11.90	-0.42	0.00	0.00	11.90	0.02	-11.07	22.97	Pm	33.30	0.45
	Outside		-3.31	0.00	12.02	-0.42	0.00	0.00	12.02	0.05	-3.36	15.39	Pm+Pb	49.95	2.25
20	Inside	55j	-4.24	0.00	8.70	0.57	0.00	0.00	8.70	0.08	-4.32	13.01	Pm+Pb	49.95	2.84
	Middle		-2.21	0.00	8.82	0.57	0.00	0.00	8.82	0.14	-2.35	11.17	Pm	33.30	1.98
	Outside		-0.18	0.00	8.94	0.57	0.00	0.00	8.94	0.49	-0.67	9.61	Pm+Pb	49.95	4.20
21	Inside	60j	14.72	0.00	6.10	-1.34	0.00	0.00	14.84	6.10	-0.12	14.96	Pm+Pb	49.95	2.34
	Middle		-4.42	0.00	6.22	-1.34	0.00	0.00	6.22	0.37	-4.79	11.02	Pm	33.30	2.02
	Outside		-23.56	0.00	6.34	-1.34	0.00	0.00	6.34	0.08	-23.64	29.98	Pm+Pb	49.95	0.67
22	Inside	61i	19.27	0.00	6.10	0.73	0.00	0.00	19.30	6.10	-0.03	19.33	Pm+Pb	49.95	1.58
	Middle		0.13	0.00	5.98	0.73	0.00	0.00	5.98	0.80	-0.67	6.65	Pm	33.30	4.01
	Outside		-19.01	0.00	5.86	0.73	0.00	0.00	5.86	0.03	-19.04	24.90	Pm+Pb	49.95	1.01
23	Inside	65j	-8.68	0.00	3.50	0.06	0.00	0.00	3.50	0.00	-8.68	12.18	Pm+Pb	49.95	3.10
	Middle		0.13	0.00	3.38	0.06	0.00	0.00	3.38	0.15	-0.02	3.40	Pm	33.30	8.78
	Outside		8.94	0.00	3.26	0.06	0.00	0.00	8.94	3.26	0.00	8.94	Pm+Pb	49.95	4.59
24	Inside	70j	10.25	0.00	0.42	-0.60	0.00	0.00	10.29	0.42	-0.04	10.32	Pm+Pb	49.95	3.84
	Middle		0.13	0.00	0.30	-0.60	0.00	0.00	0.67	0.30	-0.54	1.21	Pm	33.30	26.59
	Outside		-10.00	0.00	0.18	-0.60	0.00	0.00	0.18	0.04	-10.04	10.21	Pm+Pb	49.95	3.89
25	Inside	120j	10.45	0.00	-5.68	-0.39	0.00	0.00	10.46	-0.01	-5.68	16.14	Pm+Pb	32.47	1.01
	Middle		1.91	0.00	-5.88	-0.39	0.00	0.00	1.99	-0.08	-5.88	7.86	Pm	21.65	1.75
	Outside		-6.63	0.00	-6.08	-0.39	0.00	0.00	0.02	-6.08	-6.65	6.68	Pm+Pb	32.47	3.86
26	Inside	115j	-0.50	0.00	-2.84	-0.23	0.00	0.00	0.09	-0.59	-2.84	2.93	Pm+Pb	49.95	16.05
	Middle		1.91	0.00	-3.04	-0.23	0.00	0.00	1.94	-0.03	-3.04	4.97	Pm	33.30	5.69
	Outside		4.32	0.00	-3.24	-0.23	0.00	0.00	4.33	-0.01	-3.24	7.57	Pm+Pb	49.95	5.60
27	Inside	111i	-5.72	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	-5.72	5.72	Pm+Pb	49.95	7.73
	Middle		1.91	0.00	-0.20	-0.07	0.00	0.00	1.91	0.00	-0.20	2.11	Pm	33.30	14.78
	Outside		9.55	0.00	-0.39	-0.07	0.00	0.00	9.55	0.00	-0.39	9.95	Pm+Pb	49.95	4.02

ca/marg-ncep-cold

TABLE 2.10.9-40 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 6-E COLD, CORNER ORIENT.-1-FT SIDE DROP +MNOP, T=–20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	9.55	0.00	0.00	0.07	0.00	0.00	9.55	0.00	0.00	9.55	Pm+Pb	49.95	4.23
	Middle		1.91	0.00	-0.20	0.07	0.00	0.00	1.91	0.00	-0.20	2.11	Pm	33.30	14.78
	Outside		-5.72	0.00	-0.39	0.07	0.00	0.00	0.00	-0.39	-5.72	5.72	Pm+Pb	49.95	7.73
29	Inside	105j	4.32	0.00	-2.84	0.23	0.00	0.00	4.33	-0.01	-2.84	7.17	Pm+Pb	49.95	5.96
	Middle		1.91	0.00	-3.04	0.23	0.00	0.00	1.94	-0.03	-3.04	4.97	Pm	33.30	5.69
	Outside		-0.50	0.00	-3.24	0.23	0.00	0.00	0.09	-0.59	-3.24	3.32	Pm+Pb	49.95	14.02
30	Inside	110j	-6.63	0.00	-5.68	0.39	0.00	0.00	0.02	-5.68	-6.65	6.68	Pm+Pb	32.47	3.86
	Middle		1.91	0.00	-5.88	0.39	0.00	0.00	1.99	-0.08	-5.88	7.86	Pm	21.65	1.75
	Outside		10.45	0.00	-6.08	0.39	0.00	0.00	10.46	-0.01	-6.08	16.54	Pm+Pb	32.47	0.96
31	Inside	90j	8.31	0.00	0.00	-0.34	0.00	0.00	8.32	0.00	-0.01	8.34	Pm+Pb	49.95	4.99
	Middle		1.55	0.00	0.20	-0.34	0.00	0.00	1.62	0.20	-0.07	1.69	Pm	33.30	18.67
	Outside		-5.21	0.00	0.39	-0.34	0.00	0.00	0.39	0.02	-5.23	5.63	Pm+Pb	49.95	7.88
32	Inside	85j	-0.77	0.00	2.84	-0.18	0.00	0.00	2.84	0.04	-0.81	3.65	Pm+Pb	49.95	12.69
	Middle		1.55	0.00	3.04	-0.18	0.00	0.00	3.04	1.57	-0.02	3.06	Pm	33.30	9.89
	Outside		3.86	0.00	3.24	-0.18	0.00	0.00	3.87	3.24	-0.01	3.88	Pm+Pb	49.95	11.88
33	Inside	81j	-4.12	0.00	5.68	-0.01	0.00	0.00	5.68	0.00	-4.12	9.80	Pm+Pb	32.47	2.31
	Middle		1.55	0.00	5.88	-0.01	0.00	0.00	5.88	1.55	0.00	5.88	Pm	21.65	2.68
	Outside		7.21	0.00	6.08	-0.01	0.00	0.00	7.21	6.08	0.00	7.21	Pm+Pb	32.47	3.50
34	Inside	100j	-5.21	0.00	0.00	0.34	0.00	0.00	0.02	0.00	-5.23	5.25	Pm+Pb	49.95	8.51
	Middle		1.55	0.00	0.20	0.34	0.00	0.00	1.62	0.20	-0.07	1.69	Pm	33.30	18.67
	Outside		8.31	0.00	0.39	0.34	0.00	0.00	8.32	0.39	-0.01	8.34	Pm+Pb	49.95	4.99
35	Inside	95j	3.86	0.00	2.84	0.18	0.00	0.00	3.87	2.84	-0.01	3.88	Pm+Pb	49.95	11.88
	Middle		1.55	0.00	3.04	0.18	0.00	0.00	3.04	1.57	-0.02	3.06	Pm	33.30	9.89
	Outside		-0.77	0.00	3.24	0.18	0.00	0.00	3.24	0.04	-0.81	4.05	Pm+Pb	49.95	11.35
36	Inside	91i	7.21	0.00	5.68	0.01	0.00	0.00	7.21	5.68	0.00	7.21	Pm+Pb	32.47	3.50
	Middle		1.55	0.00	5.88	0.01	0.00	0.00	5.88	1.55	0.00	5.88	Pm	21.65	2.68
	Outside		-4.12	0.00	6.08	0.01	0.00	0.00	6.08	0.00	-4.12	10.20	Pm+Pb	32.47	2.18

ca/marg-ncep-cold

TABLE 2.10.9-41 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 17-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP T=-20°F MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-25.49	6.10	-14.21	-1.05	-14.21	0.00	-19.39	-1.05	0.00	0.00
	Middle	9.268	-26.02	6.10	-0.38	-1.05	-0.38	0.00	-19.92	-1.05	0.00	0.00
	Outside	9.455	-26.54	6.10	13.45	-1.05	13.45	0.00	-20.44	-1.05	0.00	0.00
2	Inside	9.080	-25.49	6.10	18.86	0.11	18.86	0.00	-19.39	0.11	0.00	0.00
	Middle	9.268	-26.02	6.10	-0.38	0.11	-0.38	0.00	-19.92	0.11	0.00	0.00
	Outside	9.455	-26.54	6.10	-19.63	0.11	-19.63	0.00	-20.44	0.11	0.00	0.00
3	Inside	9.080	-25.49	6.10	-29.53	1.27	-29.53	0.00	-19.39	1.27	0.00	0.00
	Middle	9.268	-26.02	6.10	-0.38	1.27	-0.38	0.00	-19.92	1.27	0.00	0.00
	Outside	9.455	-26.54	6.10	28.77	1.27	28.77	0.00	-20.44	1.27	0.00	0.00
4	Inside	9.080	-25.49	6.10	-30.42	-0.38	-30.42	0.00	-19.39	-0.38	0.00	0.00
	Middle	9.080	-25.49	6.10	-1.27	-0.38	-1.27	0.00	-19.39	-0.38	0.00	0.00
	Outside	9.080	-25.49	6.10	27.88	-0.38	27.88	0.00	-19.39	-0.38	0.00	0.00
5	Inside	4.692	-13.17	6.10	-3.59	-0.38	-3.59	0.00	-7.07	-0.38	0.00	0.00
	Middle	4.692	-13.17	6.10	-1.27	-0.38	-1.27	0.00	-7.07	-0.38	0.00	0.00
	Outside	4.692	-13.17	6.10	1.05	-0.38	1.05	0.00	-7.07	-0.38	0.00	0.00
6	Inside	0.305	-0.86	6.10	23.23	-0.38	23.23	0.00	5.24	-0.38	0.00	0.00
	Middle	0.305	-0.86	6.10	-1.27	-0.38	-1.27	0.00	5.24	-0.38	0.00	0.00
	Outside	0.305	-0.86	6.10	-25.77	-0.38	-25.77	0.00	5.24	-0.38	0.00	0.00
7	Inside	0.305	0.86	6.10	-28.26	-0.41	-28.26	0.00	6.96	-0.41	0.00	0.00
	Middle	0.305	0.86	6.10	-2.60	-0.41	-2.60	0.00	6.96	-0.41	0.00	0.00
	Outside	0.305	0.86	6.10	23.05	-0.41	23.05	0.00	6.96	-0.41	0.00	0.00
8	Inside	4.692	13.17	6.10	0.31	-0.41	0.31	0.00	19.27	-0.41	0.00	0.00
	Middle	4.692	13.17	6.10	-2.60	-0.41	-2.60	0.00	19.27	-0.41	0.00	0.00
	Outside	4.692	13.17	6.10	-5.51	-0.41	-5.51	0.00	19.27	-0.41	0.00	0.00
9	Inside	9.080	25.49	6.10	28.88	-0.41	28.88	0.00	31.59	-0.41	0.00	0.00
	Middle	9.080	25.49	6.10	-2.60	-0.41	-2.60	0.00	31.59	-0.41	0.00	0.00
	Outside	9.080	25.49	6.10	-34.08	-0.41	-34.08	0.00	31.59	-0.41	0.00	0.00
10	Inside	9.080	25.49	6.10	31.89	4.89	31.89	0.00	31.59	4.89	0.00	0.00
	Middle	9.268	26.02	6.10	0.41	4.89	0.41	0.00	32.12	4.89	0.00	0.00
	Outside	9.455	26.54	6.10	-31.07	4.89	-31.07	0.00	32.64	4.89	0.00	0.00
11	Inside	9.080	25.49	6.10	-11.98	-0.03	-11.98	0.00	31.59	-0.03	0.00	0.00
	Middle	9.268	26.02	6.10	0.41	-0.03	0.41	0.00	32.12	-0.03	0.00	0.00
	Outside	9.455	26.54	6.10	12.79	-0.03	12.79	0.00	32.64	-0.03	0.00	0.00
12	Inside	9.080	25.49	6.10	-5.58	-0.21	-5.58	0.00	31.59	-0.21	0.00	0.00
	Middle	9.268	26.02	6.10	0.41	-0.21	0.41	0.00	32.12	-0.21	0.00	0.00
	Outside	9.455	26.54	6.10	6.40	-0.21	6.40	0.00	32.64	-0.21	0.00	0.00
13	Inside	9.080	25.49	6.10	-5.58	0.21	-5.58	0.00	31.59	0.21	0.00	0.00
	Middle	9.268	26.02	6.10	0.41	0.21	0.41	0.00	32.12	0.21	0.00	0.00
	Outside	9.455	26.54	6.10	6.40	0.21	6.40	0.00	32.64	0.21	0.00	0.00
14	Inside	9.080	25.49	6.10	-11.98	-1.39	-11.98	0.00	31.59	-1.39	0.00	0.00
	Middle	9.268	26.02	6.10	0.41	-1.39	0.41	0.00	32.12	-1.39	0.00	0.00
	Outside	9.455	26.54	6.10	12.79	-1.39	12.79	0.00	32.64	-1.39	0.00	0.00
15	Inside	9.080	25.49	6.10	31.89	-4.89	31.89	0.00	31.59	-4.89	0.00	0.00
	Middle	9.268	26.02	6.10	0.41	-4.89	0.41	0.00	32.12	-4.89	0.00	0.00
	Outside	9.455	26.54	6.10	-31.07	-4.89	-31.07	0.00	32.64	-4.89	0.00	0.00
16	Inside	9.080	25.49	6.10	28.88	0.41	28.88	0.00	31.59	0.41	0.00	0.00
	Middle	9.080	25.49	6.10	-2.60	0.41	-2.60	0.00	31.59	0.41	0.00	0.00
	Outside	9.080	25.49	6.10	-34.08	0.41	-34.08	0.00	31.59	0.41	0.00	0.00
17	Inside	4.692	13.17	6.10	0.31	0.41	0.31	0.00	19.27	0.41	0.00	0.00
	Middle	4.692	13.17	6.10	-2.60	0.41	-2.60	0.00	19.27	0.41	0.00	0.00
	Outside	4.692	13.17	6.10	-5.51	0.41	-5.51	0.00	19.27	0.41	0.00	0.00
18	Inside	0.305	0.86	6.10	-28.26	0.41	-28.26	0.00	6.96	0.41	0.00	0.00
	Middle	0.305	0.86	6.10	-2.60	0.41	-2.60	0.00	6.96	0.41	0.00	0.00
	Outside	0.305	0.86	6.10	23.05	0.41	23.05	0.00	6.96	0.41	0.00	0.00

TABLE 2.10.9-41 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 17-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP T=–20°F MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.86	6.10	23.23	0.38	23.23	0.00	5.24	0.38	0.00	0.00
	Middle	0.305	-0.86	6.10	-1.27	0.38	-1.27	0.00	5.24	0.38	0.00	0.00
	Outside	0.305	-0.86	6.10	-25.77	0.38	-25.77	0.00	5.24	0.38	0.00	0.00
20	Inside	4.692	-13.17	6.10	-3.59	0.38	-3.59	0.00	-7.07	0.38	0.00	0.00
	Middle	4.692	-13.17	6.10	-1.27	0.38	-1.27	0.00	-7.07	0.38	0.00	0.00
	Outside	4.692	-13.17	6.10	1.05	0.38	1.05	0.00	-7.07	0.38	0.00	0.00
21	Inside	9.080	-25.49	6.10	-30.42	0.38	-30.42	0.00	-19.39	0.38	0.00	0.00
	Middle	9.080	-25.49	6.10	-1.27	0.38	-1.27	0.00	-19.39	0.38	0.00	0.00
	Outside	9.080	-25.49	6.10	27.88	0.38	27.88	0.00	-19.39	0.38	0.00	0.00
22	Inside	9.080	-25.49	6.10	-29.53	-1.27	-29.53	0.00	-19.39	-1.27	0.00	0.00
	Middle	9.268	-26.02	6.10	-0.38	-1.27	-0.38	0.00	-19.92	-1.27	0.00	0.00
	Outside	9.455	-26.54	6.10	28.77	-1.27	28.77	0.00	-20.44	-1.27	0.00	0.00
23	Inside	9.080	-25.49	6.10	18.86	-0.11	18.86	0.00	-19.39	-0.11	0.00	0.00
	Middle	9.268	-26.02	6.10	-0.38	-0.11	-0.38	0.00	-19.92	-0.11	0.00	0.00
	Outside	9.455	-26.54	6.10	-19.63	-0.11	-19.63	0.00	-20.44	-0.11	0.00	0.00
24	Inside	9.080	-25.49	6.10	-14.21	1.05	-14.21	0.00	-19.39	1.05	0.00	0.00
	Middle	9.268	-26.02	6.10	-0.38	1.05	-0.38	0.00	-19.92	1.05	0.00	0.00
	Outside	9.455	-26.54	6.10	13.45	1.05	13.45	0.00	-20.44	1.05	0.00	0.00
25	Inside	9.080	-25.49	0.00	-2.83	0.00	-2.83	0.00	-25.49	0.00	0.00	0.00
	Middle	9.080	-25.49	0.00	-2.83	0.00	-2.83	0.00	-25.49	0.00	0.00	0.00
	Outside	9.080	-25.49	0.00	-2.83	0.00	-2.83	0.00	-25.49	0.00	0.00	0.00
26	Inside	4.692	-13.17	0.00	-2.83	0.00	-2.83	0.00	-13.17	0.00	0.00	0.00
	Middle	4.692	-13.17	0.00	-2.83	0.00	-2.83	0.00	-13.17	0.00	0.00	0.00
	Outside	4.692	-13.17	0.00	-2.83	0.00	-2.83	0.00	-13.17	0.00	0.00	0.00
27	Inside	0.305	-0.86	0.00	-2.83	0.00	-2.83	0.00	-0.86	0.00	0.00	0.00
	Middle	0.305	-0.86	0.00	-2.83	0.00	-2.83	0.00	-0.86	0.00	0.00	0.00
	Outside	0.305	-0.86	0.00	-2.83	0.00	-2.83	0.00	-0.86	0.00	0.00	0.00
28	Inside	0.305	0.86	0.00	19.25	-0.07	19.25	0.00	0.86	-0.07	0.00	0.00
	Middle	0.000	0.00	0.00	-0.03	-0.07	-0.03	0.00	0.00	-0.07	0.00	0.00
	Outside	0.305	-0.86	0.00	-19.32	-0.07	-19.32	0.00	-0.86	-0.07	0.00	0.00
29	Inside	0.305	0.86	0.00	9.35	0.63	9.35	0.00	0.86	0.63	0.00	0.00
	Middle	0.000	0.00	0.00	-0.03	0.63	-0.03	0.00	0.00	0.63	0.00	0.00
	Outside	0.305	-0.86	0.00	-9.41	0.63	-9.41	0.00	-0.86	0.63	0.00	0.00
30	Inside	0.305	0.86	0.00	-25.25	1.33	-25.25	0.00	0.86	1.33	0.00	0.00
	Middle	0.000	0.00	0.00	-0.03	1.33	-0.03	0.00	0.00	1.33	0.00	0.00
	Outside	0.305	-0.86	0.00	25.19	1.33	25.19	0.00	-0.86	1.33	0.00	0.00
31	Inside	0.305	0.86	0.00	-3.01	0.00	-3.01	0.00	0.86	0.00	0.00	0.00
	Middle	0.305	0.86	0.00	-3.01	0.00	-3.01	0.00	0.86	0.00	0.00	0.00
	Outside	0.305	0.86	0.00	-3.01	0.00	-3.01	0.00	0.86	0.00	0.00	0.00
32	Inside	4.692	13.17	0.00	-3.01	0.00	-3.01	0.00	13.17	0.00	0.00	0.00
	Middle	4.692	13.17	0.00	-3.01	0.00	-3.01	0.00	13.17	0.00	0.00	0.00
	Outside	4.692	13.17	0.00	-3.01	0.00	-3.01	0.00	13.17	0.00	0.00	0.00
33	Inside	9.080	25.49	0.00	-3.01	0.00	-3.01	0.00	25.49	0.00	0.00	0.00
	Middle	9.080	25.49	0.00	-3.01	0.00	-3.01	0.00	25.49	0.00	0.00	0.00
	Outside	9.080	25.49	0.00	-3.01	0.00	-3.01	0.00	25.49	0.00	0.00	0.00
34	Inside	0.305	0.86	0.00	19.25	0.07	19.25	0.00	0.86	0.07	0.00	0.00
	Middle	0.000	0.00	0.00	-0.03	0.07	-0.03	0.00	0.00	0.07	0.00	0.00
	Outside	0.305	-0.86	0.00	-19.32	0.07	-19.32	0.00	-0.86	0.07	0.00	0.00
35	Inside	0.305	0.86	0.00	9.35	-0.63	9.35	0.00	0.86	-0.63	0.00	0.00
	Middle	0.000	0.00	0.00	-0.03	-0.63	-0.03	0.00	0.00	-0.63	0.00	0.00
	Outside	0.305	-0.86	0.00	-9.41	-0.63	-9.41	0.00	-0.86	-0.63	0.00	0.00
36	Inside	0.305	0.86	0.00	-25.25	-1.33	-25.25	0.00	0.86	-1.33	0.00	0.00
	Middle	0.000	0.00	0.00	-0.03	-1.33	-0.03	0.00	0.00	-1.33	0.00	0.00
	Outside	0.305	-0.86	0.00	25.19	-1.33	25.19	0.00	-0.86	-1.33	0.00	0.00

TABLE 2.10.9-42 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 17-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP T=-20°F SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	-14.21	0.00	-19.39	-1.05	0.00	0.00	0.08	-14.29	-19.39	19.47	Pm+Pb	100.00	4.14
	Middle		-0.38	0.00	-19.92	-1.05	0.00	0.00	0.88	-1.26	-19.92	20.79	Pm	70.00	2.37
	Outside		13.45	0.00	-20.44	-1.05	0.00	0.00	13.53	-0.08	-20.44	33.97	Pm+Pb	100.00	1.94
2	Inside	75j	18.86	0.00	-19.39	0.11	0.00	0.00	18.86	0.00	-19.39	38.25	Pm+Pb	100.00	1.61
	Middle		-0.38	0.00	-19.92	0.11	0.00	0.00	0.03	-0.41	-19.92	19.95	Pm	70.00	2.51
	Outside		-19.63	0.00	-20.44	0.11	0.00	0.00	0.00	-19.63	-20.44	20.44	Pm+Pb	100.00	3.89
3	Inside	80j	-29.53	0.00	-19.39	1.27	0.00	0.00	0.05	-19.39	-29.58	29.64	Pm+Pb	100.00	2.37
	Middle		-0.38	0.00	-19.92	1.27	0.00	0.00	1.09	-1.47	-19.92	21.01	Pm	70.00	2.33
	Outside		28.77	0.00	-20.44	1.27	0.00	0.00	28.83	-0.06	-20.44	49.27	Pm+Pb	100.00	1.03
4	Inside	40j	-30.42	0.00	-19.39	-0.38	0.00	0.00	0.00	-19.39	-30.42	30.43	Pm+Pb	100.00	2.29
	Middle		-1.27	0.00	-19.39	-0.38	0.00	0.00	0.11	-1.38	-19.39	19.50	Pm	70.00	2.59
	Outside		27.88	0.00	-19.39	-0.38	0.00	0.00	27.89	-0.01	-19.39	47.28	Pm+Pb	100.00	1.12
5	Inside	35j	-3.59	0.00	-7.07	-0.38	0.00	0.00	0.04	-3.63	-7.07	7.11	Pm+Pb	100.00	13.06
	Middle		-1.27	0.00	-7.07	-0.38	0.00	0.00	0.11	-1.38	-7.07	7.18	Pm	70.00	8.75
	Outside		1.05	0.00	-7.07	-0.38	0.00	0.00	1.17	-0.12	-7.07	8.24	Pm+Pb	100.00	11.13
6	Inside	31i	23.23	0.00	5.24	-0.38	0.00	0.00	23.24	5.24	-0.01	23.24	Pm+Pb	100.00	3.30
	Middle		-1.27	0.00	5.24	-0.38	0.00	0.00	5.24	0.11	-1.38	6.62	Pm	70.00	9.58
	Outside		-25.77	0.00	5.24	-0.38	0.00	0.00	5.24	0.01	-25.78	31.02	Pm+Pb	100.00	2.22
7	Inside	30j	-28.26	0.00	6.96	-0.41	0.00	0.00	6.96	0.01	-28.27	35.22	Pm+Pb	100.00	1.84
	Middle		-2.60	0.00	6.96	-0.41	0.00	0.00	6.96	0.06	-2.66	9.62	Pm	70.00	6.28
	Outside		23.05	0.00	6.96	-0.41	0.00	0.00	23.06	6.96	-0.01	23.06	Pm+Pb	100.00	3.34
8	Inside	25j	0.31	0.00	19.27	-0.41	0.00	0.00	19.27	0.59	-0.28	19.56	Pm+Pb	100.00	4.11
	Middle		-2.60	0.00	19.27	-0.41	0.00	0.00	19.27	0.06	-2.66	21.93	Pm	70.00	2.19
	Outside		-5.51	0.00	19.27	-0.41	0.00	0.00	19.27	0.03	-5.54	24.81	Pm+Pb	100.00	3.03
9	Inside	21j	28.88	0.00	31.59	-0.41	0.00	0.00	31.59	28.89	-0.01	31.60	Pm+Pb	100.00	2.16
	Middle		-2.60	0.00	31.59	-0.41	0.00	0.00	31.59	0.06	-2.66	34.25	Pm	70.00	1.04
	Outside		-34.08	0.00	31.59	-0.41	0.00	0.00	31.59	0.00	-34.08	65.67	Pm+Pb	100.00	0.52

ca/marg-afe-cold

TABLE 2.10.9-42 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 17-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP T=–20°F SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	31.89	0.00	31.59	4.89	0.00	0.00	32.62	31.59	-0.73	33.36	Pm+Pb	100.00	2.00
	Middle		0.41	0.00	32.12	4.89	0.00	0.00	32.12	5.10	-4.69	36.81	Pm	70.00	0.90
	Outside		-31.07	0.00	32.64	4.89	0.00	0.00	32.64	0.75	-31.82	64.46	Pm+Pb	100.00	0.55
11	Inside	15j	-11.98	0.00	31.59	-0.03	0.00	0.00	31.59	0.00	-11.98	43.57	Pm+Pb	100.00	1.30
	Middle		0.41	0.00	32.12	-0.03	0.00	0.00	32.12	0.41	0.00	32.12	Pm	70.00	1.18
	Outside		12.79	0.00	32.64	-0.03	0.00	0.00	32.64	12.79	0.00	32.64	Pm+Pb	100.00	2.06
12	Inside	11i	-5.58	0.00	31.59	-0.21	0.00	0.00	31.59	0.01	-5.59	37.18	Pm+Pb	100.00	1.69
	Middle		0.41	0.00	32.12	-0.21	0.00	0.00	32.12	0.50	-0.09	32.21	Pm	70.00	1.17
	Outside		6.40	0.00	32.64	-0.21	0.00	0.00	32.64	6.41	-0.01	32.65	Pm+Pb	100.00	2.06
13	Inside	10j	-5.58	0.00	31.59	0.21	0.00	0.00	31.59	0.01	-5.59	37.18	Pm+Pb	100.00	1.69
	Middle		0.41	0.00	32.12	0.21	0.00	0.00	32.12	0.50	-0.09	32.21	Pm	70.00	1.17
	Outside		6.40	0.00	32.64	0.21	0.00	0.00	32.64	6.41	-0.01	32.65	Pm+Pb	100.00	2.06
14	Inside	5j	-11.98	0.00	31.59	-1.39	0.00	0.00	31.59	0.16	-12.14	43.73	Pm+Pb	100.00	1.29
	Middle		0.41	0.00	32.12	-1.39	0.00	0.00	32.12	1.61	-1.20	33.32	Pm	70.00	1.10
	Outside		12.79	0.00	32.64	-1.39	0.00	0.00	32.64	12.94	-0.15	32.79	Pm+Pb	100.00	2.05
15	Inside	1i	31.89	0.00	31.59	-4.89	0.00	0.00	32.62	31.59	-0.73	33.36	Pm+Pb	100.00	2.00
	Middle		0.41	0.00	32.12	-4.89	0.00	0.00	32.12	5.10	-4.69	36.81	Pm	70.00	0.90
	Outside		-31.07	0.00	32.64	-4.89	0.00	0.00	32.64	0.75	-31.82	64.46	Pm+Pb	100.00	0.55
16	Inside	41i	28.88	0.00	31.59	0.41	0.00	0.00	31.59	28.89	-0.01	31.60	Pm+Pb	100.00	2.16
	Middle		-2.60	0.00	31.59	0.41	0.00	0.00	31.59	0.06	-2.66	34.25	Pm	70.00	1.04
	Outside		-34.08	0.00	31.59	0.41	0.00	0.00	31.59	0.00	-34.08	65.67	Pm+Pb	100.00	0.52
17	Inside	45j	0.31	0.00	19.27	0.41	0.00	0.00	19.27	0.59	-0.28	19.56	Pm+Pb	100.00	4.11
	Middle		-2.60	0.00	19.27	0.41	0.00	0.00	19.27	0.06	-2.66	21.93	Pm	70.00	2.19
	Outside		-5.51	0.00	19.27	0.41	0.00	0.00	19.27	0.03	-5.54	24.81	Pm+Pb	100.00	3.03
18	Inside	50j	-28.26	0.00	6.96	0.41	0.00	0.00	6.96	0.01	-28.27	35.22	Pm+Pb	100.00	1.84
	Middle		-2.60	0.00	6.96	0.41	0.00	0.00	6.96	0.06	-2.66	9.62	Pm	70.00	6.28
	Outside		23.05	0.00	6.96	0.41	0.00	0.00	23.06	6.96	-0.01	23.06	Pm+Pb	100.00	3.34

ca/marg-afe-cold

TABLE 2.10.9-42 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 17-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP T=-20°F SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	23.23	0.00	5.24	0.38	0.00	0.00	23.24	5.24	-0.01	23.24	Pm+Pb	100.00	3.30
	Middle		-1.27	0.00	5.24	0.38	0.00	0.00	5.24	0.11	-1.38	6.62	Pm	70.00	9.58
	Outside		-25.77	0.00	5.24	0.38	0.00	0.00	5.24	0.01	-25.78	31.02	Pm+Pb	100.00	2.22
20	Inside	55j	-3.59	0.00	-7.07	0.38	0.00	0.00	0.04	-3.63	-7.07	7.11	Pm+Pb	100.00	13.06
	Middle		-1.27	0.00	-7.07	0.38	0.00	0.00	0.11	-1.38	-7.07	7.18	Pm	70.00	8.75
	Outside		1.05	0.00	-7.07	0.38	0.00	0.00	1.17	-0.12	-7.07	8.24	Pm+Pb	100.00	11.13
21	Inside	60j	-30.42	0.00	-19.39	0.38	0.00	0.00	0.00	-19.39	-30.42	30.43	Pm+Pb	100.00	2.29
	Middle		-1.27	0.00	-19.39	0.38	0.00	0.00	0.11	-1.38	-19.39	19.50	Pm	70.00	2.59
	Outside		27.88	0.00	-19.39	0.38	0.00	0.00	27.89	-0.01	-19.39	47.28	Pm+Pb	100.00	1.12
22	Inside	61i	-29.53	0.00	-19.39	-1.27	0.00	0.00	0.05	-19.39	-29.58	29.64	Pm+Pb	100.00	2.37
	Middle		-0.38	0.00	-19.92	-1.27	0.00	0.00	1.09	-1.47	-19.92	21.01	Pm	70.00	2.33
	Outside		28.77	0.00	-20.44	-1.27	0.00	0.00	28.83	-0.06	-20.44	49.27	Pm+Pb	100.00	1.03
23	Inside	65j	18.86	0.00	-19.39	-0.11	0.00	0.00	18.86	0.00	-19.39	38.25	Pm+Pb	100.00	1.61
	Middle		-0.38	0.00	-19.92	-0.11	0.00	0.00	0.03	-0.41	-19.92	19.95	Pm	70.00	2.51
	Outside		-19.63	0.00	-20.44	-0.11	0.00	0.00	0.00	-19.63	-20.44	20.44	Pm+Pb	100.00	3.89
24	Inside	70j	-14.21	0.00	-19.39	1.05	0.00	0.00	0.08	-14.29	-19.39	19.47	Pm+Pb	100.00	4.14
	Middle		-0.38	0.00	-19.92	1.05	0.00	0.00	0.88	-1.26	-19.92	20.79	Pm	70.00	2.37
	Outside		13.45	0.00	-20.44	1.05	0.00	0.00	13.53	-0.08	-20.44	33.97	Pm+Pb	100.00	1.94
25	Inside	120j	-2.83	0.00	-25.49	0.00	0.00	0.00	0.00	-2.83	-25.49	25.49	Pm+Pb	65.00	1.55
	Middle		-2.83	0.00	-25.49	0.00	0.00	0.00	0.00	-2.83	-25.49	25.49	Pm	45.50	0.79
	Outside		-2.83	0.00	-25.49	0.00	0.00	0.00	0.00	-2.83	-25.49	25.49	Pm+Pb	65.00	1.55
26	Inside	115j	-2.83	0.00	-13.17	0.00	0.00	0.00	0.00	-2.83	-13.17	13.17	Pm+Pb	100.00	6.59
	Middle		-2.83	0.00	-13.17	0.00	0.00	0.00	0.00	-2.83	-13.17	13.17	Pm	70.00	4.31
	Outside		-2.83	0.00	-13.17	0.00	0.00	0.00	0.00	-2.83	-13.17	13.17	Pm+Pb	100.00	6.59
27	Inside	111i	-2.83	0.00	-0.86	0.00	0.00	0.00	0.00	-0.86	-2.83	2.83	Pm+Pb	100.00	34.34
	Middle		-2.83	0.00	-0.86	0.00	0.00	0.00	0.00	-0.86	-2.83	2.83	Pm	70.00	23.73
	Outside		-2.83	0.00	-0.86	0.00	0.00	0.00	0.00	-0.86	-2.83	2.83	Pm+Pb	100.00	34.34

ca/marg-afe-cold

TABLE 2.10.9-42 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 17-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP T=-20°F SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	19.25	0.00	0.86	-0.07	0.00	0.00	19.25	0.86	0.00	19.25	Pm+Pb	100.00	4.19
	Middle		-0.03	0.00	0.00	-0.07	0.00	0.00	0.06	0.00	-0.09	0.14	Pm	70.00	487.90
	Outside		-19.32	0.00	-0.86	-0.07	0.00	0.00	0.00	-0.86	-19.32	19.32	Pm+Pb	100.00	4.18
29	Inside	105j	9.35	0.00	0.86	0.63	0.00	0.00	9.39	0.86	-0.04	9.43	Pm+Pb	100.00	9.60
	Middle		-0.03	0.00	0.00	0.63	0.00	0.00	0.62	0.00	-0.65	1.26	Pm	70.00	54.54
	Outside		-9.41	0.00	-0.86	0.63	0.00	0.00	0.04	-0.86	-9.45	9.49	Pm+Pb	100.00	9.53
30	Inside	110j	-25.25	0.00	0.86	1.33	0.00	0.00	0.86	0.07	-25.32	26.18	Pm+Pb	65.00	1.48
	Middle		-0.03	0.00	0.00	1.33	0.00	0.00	1.32	0.00	-1.35	2.66	Pm	45.50	16.10
	Outside		25.19	0.00	-0.86	1.33	0.00	0.00	25.26	-0.07	-0.86	26.12	Pm+Pb	65.00	1.49
31	Inside	90j	-3.01	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-3.01	3.87	Pm+Pb	100.00	24.87
	Middle		-3.01	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-3.01	3.87	Pm	70.00	17.11
	Outside		-3.01	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-3.01	3.87	Pm+Pb	100.00	24.87
32	Inside	85j	-3.01	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-3.01	16.18	Pm+Pb	100.00	5.18
	Middle		-3.01	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-3.01	16.18	Pm	70.00	3.33
	Outside		-3.01	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-3.01	16.18	Pm+Pb	100.00	5.18
33	Inside	81j	-3.01	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-3.01	28.50	Pm+Pb	65.00	1.28
	Middle		-3.01	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-3.01	28.50	Pm	45.50	0.60
	Outside		-3.01	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-3.01	28.50	Pm+Pb	65.00	1.28
34	Inside	100j	19.25	0.00	0.86	0.07	0.00	0.00	19.25	0.86	0.00	19.25	Pm+Pb	100.00	4.19
	Middle		-0.03	0.00	0.00	0.07	0.00	0.00	0.06	0.00	-0.09	0.14	Pm	70.00	487.90
	Outside		-19.32	0.00	-0.86	0.07	0.00	0.00	0.00	-0.86	-19.32	19.32	Pm+Pb	100.00	4.18
35	Inside	95j	9.35	0.00	0.86	-0.63	0.00	0.00	9.39	0.86	-0.04	9.43	Pm+Pb	100.00	9.60
	Middle		-0.03	0.00	0.00	-0.63	0.00	0.00	0.62	0.00	-0.65	1.26	Pm	70.00	54.54
	Outside		-9.41	0.00	-0.86	-0.63	0.00	0.00	0.04	-0.86	-9.45	9.49	Pm+Pb	100.00	9.53
36	Inside	91i	-25.25	0.00	0.86	-1.33	0.00	0.00	0.86	0.07	-25.32	26.18	Pm+Pb	65.00	1.48
	Middle		-0.03	0.00	0.00	-1.33	0.00	0.00	1.32	0.00	-1.35	2.66	Pm	45.50	16.10
	Outside		25.19	0.00	-0.86	-1.33	0.00	0.00	25.26	-0.07	-0.86	26.12	Pm+Pb	65.00	1.49

ca/marg-afe-cold

TABLE 2.10.9-43 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 18-E, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP+ Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-25.49	-1.00	9.86	-0.10	9.86	0.00	-26.49	-0.10	0.00	0.00
	Middle	9.268	-26.02	-1.00	0.54	-0.10	0.54	0.00	-27.02	-0.10	0.00	0.00
	Outside	9.455	-26.54	-1.00	-8.78	-0.10	-8.78	0.00	-27.54	-0.10	0.00	0.00
2	Inside	9.080	-25.49	-1.00	8.98	0.12	8.98	0.00	-26.49	0.12	0.00	0.00
	Middle	9.268	-26.02	-1.00	0.54	0.12	0.54	0.00	-27.02	0.12	0.00	0.00
	Outside	9.455	-26.54	-1.00	-7.90	0.12	-7.90	0.00	-27.54	0.12	0.00	0.00
3	Inside	9.080	-25.49	-1.00	-7.66	0.35	-7.66	0.00	-26.49	0.35	0.00	0.00
	Middle	9.268	-26.02	-1.00	0.54	0.35	0.54	0.00	-27.02	0.35	0.00	0.00
	Outside	9.455	-26.54	-1.00	8.74	0.35	8.74	0.00	-27.54	0.35	0.00	0.00
4	Inside	9.080	-25.49	-1.00	-8.55	0.54	-8.55	0.00	-26.49	0.54	0.00	0.00
	Middle	9.080	-25.49	-1.00	-0.35	0.54	-0.35	0.00	-26.49	0.54	0.00	0.00
	Outside	9.080	-25.49	-1.00	7.85	0.54	7.85	0.00	-26.49	0.54	0.00	0.00
5	Inside	4.692	-13.17	-1.00	-13.48	-0.40	-13.48	0.00	-14.17	-0.40	0.00	0.00
	Middle	4.692	-13.17	-1.00	-0.35	-0.40	-0.35	0.00	-14.17	-0.40	0.00	0.00
	Outside	4.692	-13.17	-1.00	12.78	-0.40	12.78	0.00	-14.17	-0.40	0.00	0.00
6	Inside	0.305	-0.86	-1.00	47.29	-1.33	47.29	0.00	-1.86	-1.33	0.00	0.00
	Middle	0.305	-0.86	-1.00	-0.35	-1.33	-0.35	0.00	-1.86	-1.33	0.00	0.00
	Outside	0.305	-0.86	-1.00	-47.99	-1.33	-47.99	0.00	-1.86	-1.33	0.00	0.00
7	Inside	0.305	0.86	-1.00	-6.09	0.53	-6.09	0.00	-0.14	0.53	0.00	0.00
	Middle	0.305	0.86	-1.00	-1.72	0.53	-1.72	0.00	-0.14	0.53	0.00	0.00
	Outside	0.305	0.86	-1.00	2.65	0.53	2.65	0.00	-0.14	0.53	0.00	0.00
8	Inside	4.692	13.17	-1.00	-10.42	-0.41	-10.42	0.00	12.17	-0.41	0.00	0.00
	Middle	4.692	13.17	-1.00	-1.72	-0.41	-1.72	0.00	12.17	-0.41	0.00	0.00
	Outside	4.692	13.17	-1.00	6.98	-0.41	6.98	0.00	12.17	-0.41	0.00	0.00
9	Inside	9.080	25.49	-1.00	50.94	-1.34	50.94	0.00	24.49	-1.34	0.00	0.00
	Middle	9.080	25.49	-1.00	-1.72	-1.34	-1.72	0.00	24.49	-1.34	0.00	0.00
	Outside	9.080	25.49	-1.00	-54.38	-1.34	-54.38	0.00	24.49	-1.34	0.00	0.00
10	Inside	9.080	25.49	-1.00	54.01	6.57	54.01	0.00	24.49	6.57	0.00	0.00
	Middle	9.268	26.02	-1.00	1.34	6.57	1.34	0.00	25.02	6.57	0.00	0.00
	Outside	9.455	26.54	-1.00	-51.32	6.57	-51.32	0.00	25.54	6.57	0.00	0.00
11	Inside	9.080	25.49	-1.00	-10.79	0.04	-10.79	0.00	24.49	0.04	0.00	0.00
	Middle	9.268	26.02	-1.00	1.34	0.04	1.34	0.00	25.02	0.04	0.00	0.00
	Outside	9.455	26.54	-1.00	13.48	0.04	13.48	0.00	25.54	0.04	0.00	0.00
12	Inside	9.080	25.49	-1.00	-4.74	-0.34	-4.74	0.00	24.49	-0.34	0.00	0.00
	Middle	9.268	26.02	-1.00	1.34	-0.34	1.34	0.00	25.02	-0.34	0.00	0.00
	Outside	9.455	26.54	-1.00	7.42	-0.34	7.42	0.00	25.54	-0.34	0.00	0.00
13	Inside	9.080	25.49	-1.00	-4.74	0.34	-4.74	0.00	24.49	0.34	0.00	0.00
	Middle	9.268	26.02	-1.00	1.34	0.34	1.34	0.00	25.02	0.34	0.00	0.00
	Outside	9.455	26.54	-1.00	7.42	0.34	7.42	0.00	25.54	0.34	0.00	0.00
14	Inside	9.080	25.49	-1.00	-10.79	-1.31	-10.79	0.00	24.49	-1.31	0.00	0.00
	Middle	9.268	26.02	-1.00	1.34	-1.31	1.34	0.00	25.02	-1.31	0.00	0.00
	Outside	9.455	26.54	-1.00	13.48	-1.31	13.48	0.00	25.54	-1.31	0.00	0.00
15	Inside	9.080	25.49	-1.00	54.01	-6.57	54.01	0.00	24.49	-6.57	0.00	0.00
	Middle	9.268	26.02	-1.00	1.34	-6.57	1.34	0.00	25.02	-6.57	0.00	0.00
	Outside	9.455	26.54	-1.00	-51.32	-6.57	-51.32	0.00	25.54	-6.57	0.00	0.00
16	Inside	9.080	25.49	-1.00	50.94	1.34	50.94	0.00	24.49	1.34	0.00	0.00
	Middle	9.080	25.49	-1.00	-1.72	1.34	-1.72	0.00	24.49	1.34	0.00	0.00
	Outside	9.080	25.49	-1.00	-54.38	1.34	-54.38	0.00	24.49	1.34	0.00	0.00
17	Inside	4.692	13.17	-1.00	-10.42	0.41	-10.42	0.00	12.17	0.41	0.00	0.00
	Middle	4.692	13.17	-1.00	-1.72	0.41	-1.72	0.00	12.17	0.41	0.00	0.00
	Outside	4.692	13.17	-1.00	6.98	0.41	6.98	0.00	12.17	0.41	0.00	0.00
18	Inside	0.305	0.86	-1.00	-6.09	-0.53	-6.09	0.00	-0.14	-0.53	0.00	0.00
	Middle	0.305	0.86	-1.00	-1.72	-0.53	-1.72	0.00	-0.14	-0.53	0.00	0.00
	Outside	0.305	0.86	-1.00	2.65	-0.53	2.65	0.00	-0.14	-0.53	0.00	0.00

TABLE 2.10.9-43 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 18-E, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP+ Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.86	-1.00	47.29	1.33	47.29	0.00	-1.86	1.33	0.00	0.00
	Middle	0.305	-0.86	-1.00	-0.35	1.33	-0.35	0.00	-1.86	1.33	0.00	0.00
	Outside	0.305	-0.86	-1.00	-47.99	1.33	-47.99	0.00	-1.86	1.33	0.00	0.00
20	Inside	4.692	-13.17	-1.00	-13.48	0.40	-13.48	0.00	-14.17	0.40	0.00	0.00
	Middle	4.692	-13.17	-1.00	-0.35	0.40	-0.35	0.00	-14.17	0.40	0.00	0.00
	Outside	4.692	-13.17	-1.00	12.78	0.40	12.78	0.00	-14.17	0.40	0.00	0.00
21	Inside	9.080	-25.49	-1.00	-8.55	-0.54	-8.55	0.00	-26.49	-0.54	0.00	0.00
	Middle	9.080	-25.49	-1.00	-0.35	-0.54	-0.35	0.00	-26.49	-0.54	0.00	0.00
	Outside	9.080	-25.49	-1.00	7.85	-0.54	7.85	0.00	-26.49	-0.54	0.00	0.00
22	Inside	9.080	-25.49	-1.00	-7.66	-0.35	-7.66	0.00	-26.49	-0.35	0.00	0.00
	Middle	9.268	-26.02	-1.00	0.54	-0.35	0.54	0.00	-27.02	-0.35	0.00	0.00
	Outside	9.455	-26.54	-1.00	8.74	-0.35	8.74	0.00	-27.54	-0.35	0.00	0.00
23	Inside	9.080	-25.49	-1.00	8.98	-0.12	8.98	0.00	-26.49	-0.12	0.00	0.00
	Middle	9.268	-26.02	-1.00	0.54	-0.12	0.54	0.00	-27.02	-0.12	0.00	0.00
	Outside	9.455	-26.54	-1.00	-7.90	-0.12	-7.90	0.00	-27.54	-0.12	0.00	0.00
24	Inside	9.080	-25.49	-1.00	9.86	0.10	9.86	0.00	-26.49	0.10	0.00	0.00
	Middle	9.268	-26.02	-1.00	0.54	0.10	0.54	0.00	-27.02	0.10	0.00	0.00
	Outside	9.455	-26.54	-1.00	-8.78	0.10	-8.78	0.00	-27.54	0.10	0.00	0.00
25	Inside	9.080	-25.49	0.00	-0.27	0.00	-0.27	0.00	-25.49	0.00	0.00	0.00
	Middle	9.080	-25.49	0.00	-0.27	0.00	-0.27	0.00	-25.49	0.00	0.00	0.00
	Outside	9.080	-25.49	0.00	-0.27	0.00	-0.27	0.00	-25.49	0.00	0.00	0.00
26	Inside	4.692	-13.17	0.00	-0.27	0.00	-0.27	0.00	-13.17	0.00	0.00	0.00
	Middle	4.692	-13.17	0.00	-0.27	0.00	-0.27	0.00	-13.17	0.00	0.00	0.00
	Outside	4.692	-13.17	0.00	-0.27	0.00	-0.27	0.00	-13.17	0.00	0.00	0.00
27	Inside	0.305	-0.86	0.00	-0.27	0.00	-0.27	0.00	-0.86	0.00	0.00	0.00
	Middle	0.305	-0.86	0.00	-0.27	0.00	-0.27	0.00	-0.86	0.00	0.00	0.00
	Outside	0.305	-0.86	0.00	-0.27	0.00	-0.27	0.00	-0.86	0.00	0.00	0.00
28	Inside	0.305	0.86	0.00	23.64	-0.03	23.64	0.00	0.86	-0.03	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	-0.03	2.51	0.00	0.00	-0.03	0.00	0.00
	Outside	0.305	-0.86	0.00	-18.62	-0.03	-18.62	0.00	-0.86	-0.03	0.00	0.00
29	Inside	0.305	0.86	0.00	12.34	0.67	12.34	0.00	0.86	0.67	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	0.67	2.51	0.00	0.00	0.67	0.00	0.00
	Outside	0.305	-0.86	0.00	-7.33	0.67	-7.33	0.00	-0.86	0.67	0.00	0.00
30	Inside	0.305	0.86	0.00	-23.65	1.37	-23.65	0.00	0.86	1.37	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	1.37	2.51	0.00	0.00	1.37	0.00	0.00
	Outside	0.305	-0.86	0.00	28.66	1.37	28.66	0.00	-0.86	1.37	0.00	0.00
31	Inside	0.305	0.86	0.00	-0.35	0.00	-0.35	0.00	0.86	0.00	0.00	0.00
	Middle	0.305	0.86	0.00	-0.35	0.00	-0.35	0.00	0.86	0.00	0.00	0.00
	Outside	0.305	0.86	0.00	-0.35	0.00	-0.35	0.00	0.86	0.00	0.00	0.00
32	Inside	4.692	13.17	0.00	-0.35	0.00	-0.35	0.00	13.17	0.00	0.00	0.00
	Middle	4.692	13.17	0.00	-0.35	0.00	-0.35	0.00	13.17	0.00	0.00	0.00
	Outside	4.692	13.17	0.00	-0.35	0.00	-0.35	0.00	13.17	0.00	0.00	0.00
33	Inside	9.080	25.49	0.00	-0.35	0.00	-0.35	0.00	25.49	0.00	0.00	0.00
	Middle	9.080	25.49	0.00	-0.35	0.00	-0.35	0.00	25.49	0.00	0.00	0.00
	Outside	9.080	25.49	0.00	-0.35	0.00	-0.35	0.00	25.49	0.00	0.00	0.00
34	Inside	0.305	0.86	0.00	23.64	0.03	23.64	0.00	0.86	0.03	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	0.03	2.51	0.00	0.00	0.03	0.00	0.00
	Outside	0.305	-0.86	0.00	-18.62	0.03	-18.62	0.00	-0.86	0.03	0.00	0.00
35	Inside	0.305	0.86	0.00	12.34	-0.67	12.34	0.00	0.86	-0.67	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	-0.67	2.51	0.00	0.00	-0.67	0.00	0.00
	Outside	0.305	-0.86	0.00	-7.33	-0.67	-7.33	0.00	-0.86	-0.67	0.00	0.00
36	Inside	0.305	0.86	0.00	-23.65	-1.37	-23.65	0.00	0.86	-1.37	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	-1.37	2.51	0.00	0.00	-1.37	0.00	0.00
	Outside	0.305	-0.86	0.00	28.66	-1.37	28.66	0.00	-0.86	-1.37	0.00	0.00

TABLE 2.10.9-44 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	9.86	0.00	-26.49	-0.10	0.00	0.00	9.86	0.00	-26.49	36.35	Pm+Pb	98.20	1.70
	Middle		0.54	0.00	-27.02	-0.10	0.00	0.00	0.56	-0.02	-27.02	27.58	Pm	68.74	1.49
	Outside		-8.78	0.00	-27.54	-0.10	0.00	0.00	0.00	-8.78	-27.54	27.54	Pm+Pb	98.20	2.57
2	Inside	75j	8.98	0.00	-26.49	0.12	0.00	0.00	8.98	0.00	-26.49	35.47	Pm+Pb	98.20	1.77
	Middle		0.54	0.00	-27.02	0.12	0.00	0.00	0.57	-0.03	-27.02	27.58	Pm	68.74	1.49
	Outside		-7.90	0.00	-27.54	0.12	0.00	0.00	0.00	-7.90	-27.54	27.54	Pm+Pb	98.20	2.57
3	Inside	80j	-7.66	0.00	-26.49	0.35	0.00	0.00	0.02	-7.68	-26.49	26.51	Pm+Pb	98.20	2.70
	Middle		0.54	0.00	-27.02	0.35	0.00	0.00	0.71	-0.17	-27.02	27.73	Pm	68.74	1.48
	Outside		8.74	0.00	-27.54	0.35	0.00	0.00	8.75	-0.01	-27.54	36.30	Pm+Pb	98.20	1.71
4	Inside	40j	-8.55	0.00	-26.49	0.54	0.00	0.00	0.03	-8.58	-26.49	26.52	Pm+Pb	98.20	2.70
	Middle		-0.35	0.00	-26.49	0.54	0.00	0.00	0.39	-0.74	-26.49	26.88	Pm	68.74	1.56
	Outside		7.85	0.00	-26.49	0.54	0.00	0.00	7.89	-0.04	-26.49	34.38	Pm+Pb	98.20	1.86
5	Inside	35j	-13.48	0.00	-14.17	-0.40	0.00	0.00	0.01	-13.49	-14.17	14.18	Pm+Pb	98.20	5.92
	Middle		-0.35	0.00	-14.17	-0.40	0.00	0.00	0.26	-0.61	-14.17	14.43	Pm	68.74	3.76
	Outside		12.78	0.00	-14.17	-0.40	0.00	0.00	12.79	-0.01	-14.17	26.96	Pm+Pb	98.20	2.64
6	Inside	31i	47.29	0.00	-1.86	-1.33	0.00	0.00	47.33	-0.04	-1.86	49.18	Pm+Pb	98.20	1.00
	Middle		-0.35	0.00	-1.86	-1.33	0.00	0.00	1.17	-1.52	-1.86	3.02	Pm	68.74	21.74
	Outside		-47.99	0.00	-1.86	-1.33	0.00	0.00	0.04	-1.86	-48.03	48.06	Pm+Pb	98.20	1.04
7	Inside	30j	-6.09	0.00	-0.14	0.53	0.00	0.00	0.05	-0.14	-6.14	6.18	Pm+Pb	98.20	14.89
	Middle		-1.72	0.00	-0.14	0.53	0.00	0.00	0.15	-0.14	-1.87	2.02	Pm	68.74	33.02
	Outside		2.65	0.00	-0.14	0.53	0.00	0.00	2.75	-0.10	-0.14	2.90	Pm+Pb	98.20	32.91
8	Inside	25j	-10.42	0.00	12.17	-0.41	0.00	0.00	12.17	0.02	-10.44	22.61	Pm+Pb	98.20	3.34
	Middle		-1.72	0.00	12.17	-0.41	0.00	0.00	12.17	0.09	-1.81	13.98	Pm	68.74	3.92
	Outside		6.98	0.00	12.17	-0.41	0.00	0.00	12.17	7.00	-0.02	12.20	Pm+Pb	98.20	7.05
9	Inside	21j	50.94	0.00	24.49	-1.34	0.00	0.00	50.98	24.49	-0.04	51.01	Pm+Pb	98.20	0.93
	Middle		-1.72	0.00	24.49	-1.34	0.00	0.00	24.49	0.73	-2.45	26.94	Pm	68.74	1.55
	Outside		-54.38	0.00	24.49	-1.34	0.00	0.00	24.49	0.03	-54.41	78.90	Pm+Pb	98.20	0.24

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TABLE 2.10.9-44 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	54.01	0.00	24.49	6.57	0.00	0.00	54.80	24.49	-0.79	55.59	Pm+Pb	98.20	0.77
	Middle		1.34	0.00	25.02	6.57	0.00	0.00	25.02	7.27	-5.93	30.95	Pm	68.74	1.22
	Outside		-51.32	0.00	25.54	6.57	0.00	0.00	25.54	0.83	-52.15	77.69	Pm+Pb	98.20	0.26
11	Inside	15j	-10.79	0.00	24.49	0.04	0.00	0.00	24.49	0.00	-10.79	35.28	Pm+Pb	98.20	1.78
	Middle		1.34	0.00	25.02	0.04	0.00	0.00	25.02	1.34	0.00	25.02	Pm	68.74	1.75
	Outside		13.48	0.00	25.54	0.04	0.00	0.00	25.54	13.48	0.00	25.54	Pm+Pb	98.20	2.84
12	Inside	11i	-4.74	0.00	24.49	-0.34	0.00	0.00	24.49	0.02	-4.76	29.25	Pm+Pb	98.20	2.36
	Middle		1.34	0.00	25.02	-0.34	0.00	0.00	25.02	1.42	-0.08	25.10	Pm	68.74	1.74
	Outside		7.42	0.00	25.54	-0.34	0.00	0.00	25.54	7.44	-0.02	25.56	Pm+Pb	98.20	2.84
13	Inside	10j	-4.74	0.00	24.49	0.34	0.00	0.00	24.49	0.02	-4.76	29.25	Pm+Pb	98.20	2.36
	Middle		1.34	0.00	25.02	0.34	0.00	0.00	25.02	1.42	-0.08	25.10	Pm	68.74	1.74
	Outside		7.42	0.00	25.54	0.34	0.00	0.00	25.54	7.44	-0.02	25.56	Pm+Pb	98.20	2.84
14	Inside	5j	-10.79	0.00	24.49	-1.31	0.00	0.00	24.49	0.16	-10.95	35.44	Pm+Pb	98.20	1.77
	Middle		1.34	0.00	25.02	-1.31	0.00	0.00	25.02	2.14	-0.80	25.82	Pm	68.74	1.66
	Outside		13.48	0.00	25.54	-1.31	0.00	0.00	25.54	13.61	-0.13	25.67	Pm+Pb	98.20	2.83
15	Inside	1i	54.01	0.00	24.49	-6.57	0.00	0.00	54.80	24.49	-0.79	55.59	Pm+Pb	98.20	0.77
	Middle		1.34	0.00	25.02	-6.57	0.00	0.00	25.02	7.27	-5.93	30.95	Pm	68.74	1.22
	Outside		-51.32	0.00	25.54	-6.57	0.00	0.00	25.54	0.83	-52.15	77.69	Pm+Pb	98.20	0.26
16	Inside	41i	50.94	0.00	24.49	1.34	0.00	0.00	50.98	24.49	-0.04	51.01	Pm+Pb	98.20	0.93
	Middle		-1.72	0.00	24.49	1.34	0.00	0.00	24.49	0.73	-2.45	26.94	Pm	68.74	1.55
	Outside		-54.38	0.00	24.49	1.34	0.00	0.00	24.49	0.03	-54.41	78.90	Pm+Pb	98.20	0.24
17	Inside	45j	-10.42	0.00	12.17	0.41	0.00	0.00	12.17	0.02	-10.44	22.61	Pm+Pb	98.20	3.34
	Middle		-1.72	0.00	12.17	0.41	0.00	0.00	12.17	0.09	-1.81	13.98	Pm	68.74	3.92
	Outside		6.98	0.00	12.17	0.41	0.00	0.00	12.17	7.00	-0.02	12.20	Pm+Pb	98.20	7.05
18	Inside	50j	-6.09	0.00	-0.14	-0.53	0.00	0.00	0.05	-0.14	-6.14	6.18	Pm+Pb	98.20	14.89
	Middle		-1.72	0.00	-0.14	-0.53	0.00	0.00	0.15	-0.14	-1.87	2.02	Pm	68.74	33.02
	Outside		2.65	0.00	-0.14	-0.53	0.00	0.00	2.75	-0.10	-0.14	2.90	Pm+Pb	98.20	32.91

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TABLE 2.10.9-44 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	47.29	0.00	-1.86	1.33	0.00	0.00	47.33	-0.04	-1.86	49.18	Pm+Pb	98.20	1.00
	Middle		-0.35	0.00	-1.86	1.33	0.00	0.00	1.17	-1.52	-1.86	3.02	Pm	68.74	21.74
	Outside		-47.99	0.00	-1.86	1.33	0.00	0.00	0.04	-1.86	-48.03	48.06	Pm+Pb	98.20	1.04
20	Inside	55j	-13.48	0.00	-14.17	0.40	0.00	0.00	0.01	-13.49	-14.17	14.18	Pm+Pb	98.20	5.92
	Middle		-0.35	0.00	-14.17	0.40	0.00	0.00	0.26	-0.61	-14.17	14.43	Pm	68.74	3.76
	Outside		12.78	0.00	-14.17	0.40	0.00	0.00	12.79	-0.01	-14.17	26.96	Pm+Pb	98.20	2.64
21	Inside	60j	-8.55	0.00	-26.49	-0.54	0.00	0.00	0.03	-8.58	-26.49	26.52	Pm+Pb	98.20	2.70
	Middle		-0.35	0.00	-26.49	-0.54	0.00	0.00	0.39	-0.74	-26.49	26.88	Pm	68.74	1.56
	Outside		7.85	0.00	-26.49	-0.54	0.00	0.00	7.89	-0.04	-26.49	34.38	Pm+Pb	98.20	1.86
22	Inside	61i	-7.66	0.00	-26.49	-0.35	0.00	0.00	0.02	-7.68	-26.49	26.51	Pm+Pb	98.20	2.70
	Middle		0.54	0.00	-27.02	-0.35	0.00	0.00	0.71	-0.17	-27.02	27.73	Pm	68.74	1.48
	Outside		8.74	0.00	-27.54	-0.35	0.00	0.00	8.75	-0.01	-27.54	36.30	Pm+Pb	98.20	1.71
23	Inside	65j	8.98	0.00	-26.49	-0.12	0.00	0.00	8.98	0.00	-26.49	35.47	Pm+Pb	98.20	1.77
	Middle		0.54	0.00	-27.02	-0.12	0.00	0.00	0.57	-0.03	-27.02	27.58	Pm	68.74	1.49
	Outside		-7.90	0.00	-27.54	-0.12	0.00	0.00	0.00	-7.90	-27.54	27.54	Pm+Pb	98.20	2.57
24	Inside	70j	9.86	0.00	-26.49	0.10	0.00	0.00	9.86	0.00	-26.49	36.35	Pm+Pb	98.20	1.70
	Middle		0.54	0.00	-27.02	0.10	0.00	0.00	0.56	-0.02	-27.02	27.58	Pm	68.74	1.49
	Outside		-8.78	0.00	-27.54	0.10	0.00	0.00	0.00	-8.78	-27.54	27.54	Pm+Pb	98.20	2.57
25	Inside	120j	-0.27	0.00	-25.49	0.00	0.00	0.00	0.00	-0.27	-25.49	25.49	Pm+Pb	61.46	1.41
	Middle		-0.27	0.00	-25.49	0.00	0.00	0.00	0.00	-0.27	-25.49	25.49	Pm	43.02	0.69
	Outside		-0.27	0.00	-25.49	0.00	0.00	0.00	0.00	-0.27	-25.49	25.49	Pm+Pb	61.46	1.41
26	Inside	115j	-0.27	0.00	-13.17	0.00	0.00	0.00	0.00	-0.27	-13.17	13.17	Pm+Pb	94.56	6.18
	Middle		-0.27	0.00	-13.17	0.00	0.00	0.00	0.00	-0.27	-13.17	13.17	Pm	66.19	4.03
	Outside		-0.27	0.00	-13.17	0.00	0.00	0.00	0.00	-0.27	-13.17	13.17	Pm+Pb	94.56	6.18
27	Inside	111i	-0.27	0.00	-0.86	0.00	0.00	0.00	0.00	-0.27	-0.86	0.86	Pm+Pb	94.56	109.44
	Middle		-0.27	0.00	-0.86	0.00	0.00	0.00	0.00	-0.27	-0.86	0.86	Pm	66.19	76.31
	Outside		-0.27	0.00	-0.86	0.00	0.00	0.00	0.00	-0.27	-0.86	0.86	Pm+Pb	94.56	109.44

ca/marg-afep

TABLE 2.10.9-44 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	23.64	0.00	0.86	-0.03	0.00	0.00	23.64	0.86	0.00	23.64	Pm+Pb	94.56	3.00
	Middle		2.51	0.00	0.00	-0.03	0.00	0.00	2.51	0.00	0.00	2.51	Pm	66.19	25.36
	Outside		-18.62	0.00	-0.86	-0.03	0.00	0.00	0.00	-0.86	-18.62	18.62	Pm+Pb	94.56	4.08
29	Inside	105j	12.34	0.00	0.86	0.67	0.00	0.00	12.38	0.86	-0.04	12.41	Pm+Pb	94.56	6.62
	Middle		2.51	0.00	0.00	0.67	0.00	0.00	2.68	0.00	-0.17	2.85	Pm	66.19	22.26
	Outside		-7.33	0.00	-0.86	0.67	0.00	0.00	0.06	-0.86	-7.39	7.45	Pm+Pb	94.56	11.69
30	Inside	110j	-23.65	0.00	0.86	1.37	0.00	0.00	0.86	0.08	-23.73	24.59	Pm+Pb	61.46	1.50
	Middle		2.51	0.00	0.00	1.37	0.00	0.00	3.11	0.00	-0.60	3.72	Pm	43.02	10.58
	Outside		28.66	0.00	-0.86	1.37	0.00	0.00	28.73	-0.07	-0.86	29.58	Pm+Pb	61.46	1.08
31	Inside	90j	-0.35	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-0.35	1.21	Pm+Pb	94.56	77.39
	Middle		-0.35	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-0.35	1.21	Pm	66.19	53.87
	Outside		-0.35	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-0.35	1.21	Pm+Pb	94.56	77.39
32	Inside	85j	-0.35	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-0.35	13.52	Pm+Pb	94.56	5.99
	Middle		-0.35	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-0.35	13.52	Pm	66.19	3.90
	Outside		-0.35	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-0.35	13.52	Pm+Pb	94.56	5.99
33	Inside	81j	-0.35	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-0.35	25.84	Pm+Pb	61.46	1.38
	Middle		-0.35	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-0.35	25.84	Pm	43.02	0.66
	Outside		-0.35	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-0.35	25.84	Pm+Pb	61.46	1.38
34	Inside	100j	23.64	0.00	0.86	0.03	0.00	0.00	23.64	0.86	0.00	23.64	Pm+Pb	94.56	3.00
	Middle		2.51	0.00	0.00	0.03	0.00	0.00	2.51	0.00	0.00	2.51	Pm	66.19	25.36
	Outside		-18.62	0.00	-0.86	0.03	0.00	0.00	0.00	-0.86	-18.62	18.62	Pm+Pb	94.56	4.08
35	Inside	95j	12.34	0.00	0.86	-0.67	0.00	0.00	12.38	0.86	-0.04	12.41	Pm+Pb	94.56	6.62
	Middle		2.51	0.00	0.00	-0.67	0.00	0.00	2.68	0.00	-0.17	2.85	Pm	66.19	22.26
	Outside		-7.33	0.00	-0.86	-0.67	0.00	0.00	0.06	-0.86	-7.39	7.45	Pm+Pb	94.56	11.69
36	Inside	91i	-23.65	0.00	0.86	-1.37	0.00	0.00	0.86	0.08	-23.73	24.59	Pm+Pb	61.46	1.50
	Middle		2.51	0.00	0.00	-1.37	0.00	0.00	3.11	0.00	-0.60	3.72	Pm	43.02	10.58
	Outside		28.66	0.00	-0.86	-1.37	0.00	0.00	28.73	-0.07	-0.86	29.58	Pm+Pb	61.46	1.08

ca/marg-afep

TABLE 2.10.9-45 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 18-E COLD, FLAT ORIENTATION
30-FT SIDE DROP + MNOP MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP+ Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-25.49	6.10	9.86	-0.10	9.86	0.00	-19.39	-0.10	0.00	0.00
	Middle	9.268	-26.02	6.10	0.54	-0.10	0.54	0.00	-19.92	-0.10	0.00	0.00
	Outside	9.455	-26.54	6.10	-8.78	-0.10	-8.78	0.00	-20.44	-0.10	0.00	0.00
2	Inside	9.080	-25.49	6.10	8.98	0.12	8.98	0.00	-19.39	0.12	0.00	0.00
	Middle	9.268	-26.02	6.10	0.54	0.12	0.54	0.00	-19.92	0.12	0.00	0.00
	Outside	9.455	-26.54	6.10	-7.90	0.12	-7.90	0.00	-20.44	0.12	0.00	0.00
3	Inside	9.080	-25.49	6.10	-7.66	0.35	-7.66	0.00	-19.39	0.35	0.00	0.00
	Middle	9.268	-26.02	6.10	0.54	0.35	0.54	0.00	-19.92	0.35	0.00	0.00
	Outside	9.455	-26.54	6.10	8.74	0.35	8.74	0.00	-20.44	0.35	0.00	0.00
4	Inside	9.080	-25.49	6.10	-8.55	0.54	-8.55	0.00	-19.39	0.54	0.00	0.00
	Middle	9.080	-25.49	6.10	-0.35	0.54	-0.35	0.00	-19.39	0.54	0.00	0.00
	Outside	9.080	-25.49	6.10	7.85	0.54	7.85	0.00	-19.39	0.54	0.00	0.00
5	Inside	4.692	-13.17	6.10	-13.48	-0.40	-13.48	0.00	-7.07	-0.40	0.00	0.00
	Middle	4.692	-13.17	6.10	-0.35	-0.40	-0.35	0.00	-7.07	-0.40	0.00	0.00
	Outside	4.692	-13.17	6.10	12.78	-0.40	12.78	0.00	-7.07	-0.40	0.00	0.00
6	Inside	0.305	-0.86	6.10	47.29	-1.33	47.29	0.00	5.24	-1.33	0.00	0.00
	Middle	0.305	-0.86	6.10	-0.35	-1.33	-0.35	0.00	5.24	-1.33	0.00	0.00
	Outside	0.305	-0.86	6.10	-47.99	-1.33	-47.99	0.00	5.24	-1.33	0.00	0.00
7	Inside	0.305	0.86	6.10	-6.09	0.53	-6.09	0.00	6.96	0.53	0.00	0.00
	Middle	0.305	0.86	6.10	-1.72	0.53	-1.72	0.00	6.96	0.53	0.00	0.00
	Outside	0.305	0.86	6.10	2.65	0.53	2.65	0.00	6.96	0.53	0.00	0.00
8	Inside	4.692	13.17	6.10	-10.42	-0.41	-10.42	0.00	19.27	-0.41	0.00	0.00
	Middle	4.692	13.17	6.10	-1.72	-0.41	-1.72	0.00	19.27	-0.41	0.00	0.00
	Outside	4.692	13.17	6.10	6.98	-0.41	6.98	0.00	19.27	-0.41	0.00	0.00
9	Inside	9.080	25.49	6.10	50.94	-1.34	50.94	0.00	31.59	-1.34	0.00	0.00
	Middle	9.080	25.49	6.10	-1.72	-1.34	-1.72	0.00	31.59	-1.34	0.00	0.00
	Outside	9.080	25.49	6.10	-54.38	-1.34	-54.38	0.00	31.59	-1.34	0.00	0.00
10	Inside	9.080	25.49	6.10	54.01	6.57	54.01	0.00	31.59	6.57	0.00	0.00
	Middle	9.268	26.02	6.10	1.34	6.57	1.34	0.00	32.12	6.57	0.00	0.00
	Outside	9.455	26.54	6.10	-51.32	6.57	-51.32	0.00	32.64	6.57	0.00	0.00
11	Inside	9.080	25.49	6.10	-10.79	0.04	-10.79	0.00	31.59	0.04	0.00	0.00
	Middle	9.268	26.02	6.10	1.34	0.04	1.34	0.00	32.12	0.04	0.00	0.00
	Outside	9.455	26.54	6.10	13.48	0.04	13.48	0.00	32.64	0.04	0.00	0.00
12	Inside	9.080	25.49	6.10	-4.74	-0.34	-4.74	0.00	31.59	-0.34	0.00	0.00
	Middle	9.268	26.02	6.10	1.34	-0.34	1.34	0.00	32.12	-0.34	0.00	0.00
	Outside	9.455	26.54	6.10	7.42	-0.34	7.42	0.00	32.64	-0.34	0.00	0.00
13	Inside	9.080	25.49	6.10	-4.74	0.34	-4.74	0.00	31.59	0.34	0.00	0.00
	Middle	9.268	26.02	6.10	1.34	0.34	1.34	0.00	32.12	0.34	0.00	0.00
	Outside	9.455	26.54	6.10	7.42	0.34	7.42	0.00	32.64	0.34	0.00	0.00
14	Inside	9.080	25.49	6.10	-10.79	-1.31	-10.79	0.00	31.59	-1.31	0.00	0.00
	Middle	9.268	26.02	6.10	1.34	-1.31	1.34	0.00	32.12	-1.31	0.00	0.00
	Outside	9.455	26.54	6.10	13.48	-1.31	13.48	0.00	32.64	-1.31	0.00	0.00
15	Inside	9.080	25.49	6.10	54.01	-6.57	54.01	0.00	31.59	-6.57	0.00	0.00
	Middle	9.268	26.02	6.10	1.34	-6.57	1.34	0.00	32.12	-6.57	0.00	0.00
	Outside	9.455	26.54	6.10	-51.32	-6.57	-51.32	0.00	32.64	-6.57	0.00	0.00
16	Inside	9.080	25.49	6.10	50.94	1.34	50.94	0.00	31.59	1.34	0.00	0.00
	Middle	9.080	25.49	6.10	-1.72	1.34	-1.72	0.00	31.59	1.34	0.00	0.00
	Outside	9.080	25.49	6.10	-54.38	1.34	-54.38	0.00	31.59	1.34	0.00	0.00
17	Inside	4.692	13.17	6.10	-10.42	0.41	-10.42	0.00	19.27	0.41	0.00	0.00
	Middle	4.692	13.17	6.10	-1.72	0.41	-1.72	0.00	19.27	0.41	0.00	0.00
	Outside	4.692	13.17	6.10	6.98	0.41	6.98	0.00	19.27	0.41	0.00	0.00
18	Inside	0.305	0.86	6.10	-6.09	-0.53	-6.09	0.00	6.96	-0.53	0.00	0.00
	Middle	0.305	0.86	6.10	-1.72	-0.53	-1.72	0.00	6.96	-0.53	0.00	0.00
	Outside	0.305	0.86	6.10	2.65	-0.53	2.65	0.00	6.96	-0.53	0.00	0.00

TABLE 2.10.9-45 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 18-E COLD, FLAT ORIENTATION 30-FT SIDE DROP + MNOP MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress +MNOP+ Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.86	6.10	47.29	1.33	47.29	0.00	5.24	1.33	0.00	0.00
	Middle	0.305	-0.86	6.10	-0.35	1.33	-0.35	0.00	5.24	1.33	0.00	0.00
	Outside	0.305	-0.86	6.10	-47.99	1.33	-47.99	0.00	5.24	1.33	0.00	0.00
20	Inside	4.692	-13.17	6.10	-13.48	0.40	-13.48	0.00	-7.07	0.40	0.00	0.00
	Middle	4.692	-13.17	6.10	-0.35	0.40	-0.35	0.00	-7.07	0.40	0.00	0.00
	Outside	4.692	-13.17	6.10	12.78	0.40	12.78	0.00	-7.07	0.40	0.00	0.00
21	Inside	9.080	-25.49	6.10	-8.55	-0.54	-8.55	0.00	-19.39	-0.54	0.00	0.00
	Middle	9.080	-25.49	6.10	-0.35	-0.54	-0.35	0.00	-19.39	-0.54	0.00	0.00
	Outside	9.080	-25.49	6.10	7.85	-0.54	7.85	0.00	-19.39	-0.54	0.00	0.00
22	Inside	9.080	-25.49	6.10	-7.66	-0.35	-7.66	0.00	-19.39	-0.35	0.00	0.00
	Middle	9.268	-26.02	6.10	0.54	-0.35	0.54	0.00	-19.92	-0.35	0.00	0.00
	Outside	9.455	-26.54	6.10	8.74	-0.35	8.74	0.00	-20.44	-0.35	0.00	0.00
23	Inside	9.080	-25.49	6.10	8.98	-0.12	8.98	0.00	-19.39	-0.12	0.00	0.00
	Middle	9.268	-26.02	6.10	0.54	-0.12	0.54	0.00	-19.92	-0.12	0.00	0.00
	Outside	9.455	-26.54	6.10	-7.90	-0.12	-7.90	0.00	-20.44	-0.12	0.00	0.00
24	Inside	9.080	-25.49	6.10	9.86	0.10	9.86	0.00	-19.39	0.10	0.00	0.00
	Middle	9.268	-26.02	6.10	0.54	0.10	0.54	0.00	-19.92	0.10	0.00	0.00
	Outside	9.455	-26.54	6.10	-8.78	0.10	-8.78	0.00	-20.44	0.10	0.00	0.00
25	Inside	9.080	-25.49	0.00	-0.27	0.00	-0.27	0.00	-25.49	0.00	0.00	0.00
	Middle	9.080	-25.49	0.00	-0.27	0.00	-0.27	0.00	-25.49	0.00	0.00	0.00
	Outside	9.080	-25.49	0.00	-0.27	0.00	-0.27	0.00	-25.49	0.00	0.00	0.00
26	Inside	4.692	-13.17	0.00	-0.27	0.00	-0.27	0.00	-13.17	0.00	0.00	0.00
	Middle	4.692	-13.17	0.00	-0.27	0.00	-0.27	0.00	-13.17	0.00	0.00	0.00
	Outside	4.692	-13.17	0.00	-0.27	0.00	-0.27	0.00	-13.17	0.00	0.00	0.00
27	Inside	0.305	-0.86	0.00	-0.27	0.00	-0.27	0.00	-0.86	0.00	0.00	0.00
	Middle	0.305	-0.86	0.00	-0.27	0.00	-0.27	0.00	-0.86	0.00	0.00	0.00
	Outside	0.305	-0.86	0.00	-0.27	0.00	-0.27	0.00	-0.86	0.00	0.00	0.00
28	Inside	0.305	0.86	0.00	23.64	-0.03	23.64	0.00	0.86	-0.03	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	-0.03	2.51	0.00	0.00	-0.03	0.00	0.00
	Outside	0.305	-0.86	0.00	-18.62	-0.03	-18.62	0.00	-0.86	-0.03	0.00	0.00
29	Inside	0.305	0.86	0.00	12.34	0.67	12.34	0.00	0.86	0.67	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	0.67	2.51	0.00	0.00	0.67	0.00	0.00
	Outside	0.305	-0.86	0.00	-7.33	0.67	-7.33	0.00	-0.86	0.67	0.00	0.00
30	Inside	0.305	0.86	0.00	-23.65	1.37	-23.65	0.00	0.86	1.37	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	1.37	2.51	0.00	0.00	1.37	0.00	0.00
	Outside	0.305	-0.86	0.00	28.66	1.37	28.66	0.00	-0.86	1.37	0.00	0.00
31	Inside	0.305	0.86	0.00	-0.35	0.00	-0.35	0.00	0.86	0.00	0.00	0.00
	Middle	0.305	0.86	0.00	-0.35	0.00	-0.35	0.00	0.86	0.00	0.00	0.00
	Outside	0.305	0.86	0.00	-0.35	0.00	-0.35	0.00	0.86	0.00	0.00	0.00
32	Inside	4.692	13.17	0.00	-0.35	0.00	-0.35	0.00	13.17	0.00	0.00	0.00
	Middle	4.692	13.17	0.00	-0.35	0.00	-0.35	0.00	13.17	0.00	0.00	0.00
	Outside	4.692	13.17	0.00	-0.35	0.00	-0.35	0.00	13.17	0.00	0.00	0.00
33	Inside	9.080	25.49	0.00	-0.35	0.00	-0.35	0.00	25.49	0.00	0.00	0.00
	Middle	9.080	25.49	0.00	-0.35	0.00	-0.35	0.00	25.49	0.00	0.00	0.00
	Outside	9.080	25.49	0.00	-0.35	0.00	-0.35	0.00	25.49	0.00	0.00	0.00
34	Inside	0.305	0.86	0.00	23.64	0.03	23.64	0.00	0.86	0.03	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	0.03	2.51	0.00	0.00	0.03	0.00	0.00
	Outside	0.305	-0.86	0.00	-18.62	0.03	-18.62	0.00	-0.86	0.03	0.00	0.00
35	Inside	0.305	0.86	0.00	12.34	-0.67	12.34	0.00	0.86	-0.67	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	-0.67	2.51	0.00	0.00	-0.67	0.00	0.00
	Outside	0.305	-0.86	0.00	-7.33	-0.67	-7.33	0.00	-0.86	-0.67	0.00	0.00
36	Inside	0.305	0.86	0.00	-23.65	-1.37	-23.65	0.00	0.86	-1.37	0.00	0.00
	Middle	0.000	0.00	0.00	2.51	-1.37	2.51	0.00	0.00	-1.37	0.00	0.00
	Outside	0.305	-0.86	0.00	28.66	-1.37	28.66	0.00	-0.86	-1.37	0.00	0.00

TABLE 2.10.9-46 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP T= -20° SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	9.86	0.00	-19.39	-0.10	0.00	0.00	9.86	0.00	-19.39	29.25	Pm+Pb	100.00	2.42
	Middle		0.54	0.00	-19.92	-0.10	0.00	0.00	0.56	-0.02	-19.92	20.48	Pm	70.00	2.42
	Outside		-8.78	0.00	-20.44	-0.10	0.00	0.00	0.00	-8.78	-20.44	20.44	Pm+Pb	100.00	3.89
2	Inside	75j	8.98	0.00	-19.39	0.12	0.00	0.00	8.98	0.00	-19.39	28.37	Pm+Pb	100.00	2.52
	Middle		0.54	0.00	-19.92	0.12	0.00	0.00	0.57	-0.03	-19.92	20.48	Pm	70.00	2.42
	Outside		-7.90	0.00	-20.44	0.12	0.00	0.00	0.00	-7.90	-20.44	20.44	Pm+Pb	100.00	3.89
3	Inside	80j	-7.66	0.00	-19.39	0.35	0.00	0.00	0.02	-7.68	-19.39	19.41	Pm+Pb	100.00	4.15
	Middle		0.54	0.00	-19.92	0.35	0.00	0.00	0.71	-0.17	-19.92	20.63	Pm	70.00	2.39
	Outside		8.74	0.00	-20.44	0.35	0.00	0.00	8.75	-0.01	-20.44	29.20	Pm+Pb	100.00	2.43
4	Inside	40j	-8.55	0.00	-19.39	0.54	0.00	0.00	0.03	-8.58	-19.39	19.42	Pm+Pb	100.00	4.15
	Middle		-0.35	0.00	-19.39	0.54	0.00	0.00	0.39	-0.74	-19.39	19.78	Pm	70.00	2.54
	Outside		7.85	0.00	-19.39	0.54	0.00	0.00	7.89	-0.04	-19.39	27.28	Pm+Pb	100.00	2.67
5	Inside	35j	-13.48	0.00	-7.07	-0.40	0.00	0.00	0.01	-7.07	-13.49	13.50	Pm+Pb	100.00	6.41
	Middle		-0.35	0.00	-7.07	-0.40	0.00	0.00	0.26	-0.61	-7.07	7.33	Pm	70.00	8.55
	Outside		12.78	0.00	-7.07	-0.40	0.00	0.00	12.79	-0.01	-7.07	19.86	Pm+Pb	100.00	4.03
6	Inside	31i	47.29	0.00	5.24	-1.33	0.00	0.00	47.33	5.24	-0.04	47.36	Pm+Pb	100.00	1.11
	Middle		-0.35	0.00	5.24	-1.33	0.00	0.00	5.24	1.17	-1.52	6.76	Pm	70.00	9.35
	Outside		-47.99	0.00	5.24	-1.33	0.00	0.00	5.24	0.04	-48.03	53.27	Pm+Pb	100.00	0.88
7	Inside	30j	-6.09	0.00	6.96	0.53	0.00	0.00	6.96	0.05	-6.14	13.09	Pm+Pb	100.00	6.64
	Middle		-1.72	0.00	6.96	0.53	0.00	0.00	6.96	0.15	-1.87	8.83	Pm	70.00	6.93
	Outside		2.65	0.00	6.96	0.53	0.00	0.00	6.96	2.75	-0.10	7.06	Pm+Pb	100.00	13.17
8	Inside	25j	-10.42	0.00	19.27	-0.41	0.00	0.00	19.27	0.02	-10.44	29.71	Pm+Pb	100.00	2.37
	Middle		-1.72	0.00	19.27	-0.41	0.00	0.00	19.27	0.09	-1.81	21.08	Pm	70.00	2.32
	Outside		6.98	0.00	19.27	-0.41	0.00	0.00	19.27	7.00	-0.02	19.30	Pm+Pb	100.00	4.18
9	Inside	21j	50.94	0.00	31.59	-1.34	0.00	0.00	50.98	31.59	-0.04	51.01	Pm+Pb	100.00	0.96
	Middle		-1.72	0.00	31.59	-1.34	0.00	0.00	31.59	0.73	-2.45	34.04	Pm	70.00	1.06
	Outside		-54.38	0.00	31.59	-1.34	0.00	0.00	31.59	0.03	-54.41	86.00	Pm+Pb	100.00	0.16

ca/marg-afep-cold

TABLE 2.10.9-46 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP T= -20° SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	54.01	0.00	31.59	6.57	0.00	0.00	54.80	31.59	-0.79	55.59	Pm+Pb	100.00	0.80
	Middle		1.34	0.00	32.12	6.57	0.00	0.00	32.12	7.27	-5.93	38.05	Pm	70.00	0.84
	Outside		-51.32	0.00	32.64	6.57	0.00	0.00	32.64	0.83	-52.15	84.79	Pm+Pb	100.00	0.18
11	Inside	15j	-10.79	0.00	31.59	0.04	0.00	0.00	31.59	0.00	-10.79	42.38	Pm+Pb	100.00	1.36
	Middle		1.34	0.00	32.12	0.04	0.00	0.00	32.12	1.34	0.00	32.12	Pm	70.00	1.18
	Outside		13.48	0.00	32.64	0.04	0.00	0.00	32.64	13.48	0.00	32.64	Pm+Pb	100.00	2.06
12	Inside	11i	-4.74	0.00	31.59	-0.34	0.00	0.00	31.59	0.02	-4.76	36.35	Pm+Pb	100.00	1.75
	Middle		1.34	0.00	32.12	-0.34	0.00	0.00	32.12	1.42	-0.08	32.20	Pm	70.00	1.17
	Outside		7.42	0.00	32.64	-0.34	0.00	0.00	32.64	7.44	-0.02	32.66	Pm+Pb	100.00	2.06
13	Inside	10j	-4.74	0.00	31.59	0.34	0.00	0.00	31.59	0.02	-4.76	36.35	Pm+Pb	100.00	1.75
	Middle		1.34	0.00	32.12	0.34	0.00	0.00	32.12	1.42	-0.08	32.20	Pm	70.00	1.17
	Outside		7.42	0.00	32.64	0.34	0.00	0.00	32.64	7.44	-0.02	32.66	Pm+Pb	100.00	2.06
14	Inside	5j	-10.79	0.00	31.59	-1.31	0.00	0.00	31.59	0.16	-10.95	42.54	Pm+Pb	100.00	1.35
	Middle		1.34	0.00	32.12	-1.31	0.00	0.00	32.12	2.14	-0.80	32.92	Pm	70.00	1.13
	Outside		13.48	0.00	32.64	-1.31	0.00	0.00	32.64	13.61	-0.13	32.77	Pm+Pb	100.00	2.05
15	Inside	1i	54.01	0.00	31.59	-6.57	0.00	0.00	54.80	31.59	-0.79	55.59	Pm+Pb	100.00	0.80
	Middle		1.34	0.00	32.12	-6.57	0.00	0.00	32.12	7.27	-5.93	38.05	Pm	70.00	0.84
	Outside		-51.32	0.00	32.64	-6.57	0.00	0.00	32.64	0.83	-52.15	84.79	Pm+Pb	100.00	0.18
16	Inside	41i	50.94	0.00	31.59	1.34	0.00	0.00	50.98	31.59	-0.04	51.01	Pm+Pb	100.00	0.96
	Middle		-1.72	0.00	31.59	1.34	0.00	0.00	31.59	0.73	-2.45	34.04	Pm	70.00	1.06
	Outside		-54.38	0.00	31.59	1.34	0.00	0.00	31.59	0.03	-54.41	86.00	Pm+Pb	100.00	0.16
17	Inside	45j	-10.42	0.00	19.27	0.41	0.00	0.00	19.27	0.02	-10.44	29.71	Pm+Pb	100.00	2.37
	Middle		-1.72	0.00	19.27	0.41	0.00	0.00	19.27	0.09	-1.81	21.08	Pm	70.00	2.32
	Outside		6.98	0.00	19.27	0.41	0.00	0.00	19.27	7.00	-0.02	19.30	Pm+Pb	100.00	4.18
18	Inside	50j	-6.09	0.00	6.96	-0.53	0.00	0.00	6.96	0.05	-6.14	13.09	Pm+Pb	100.00	6.64
	Middle		-1.72	0.00	6.96	-0.53	0.00	0.00	6.96	0.15	-1.87	8.83	Pm	70.00	6.93
	Outside		2.65	0.00	6.96	-0.53	0.00	0.00	6.96	2.75	-0.10	7.06	Pm+Pb	100.00	13.17

ca/marg-afep-cold

TABLE 2.10.9-46 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP T= -20° SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	47.29	0.00	5.24	1.33	0.00	0.00	47.33	5.24	-0.04	47.36	Pm+Pb	100.00	1.11
	Middle		-0.35	0.00	5.24	1.33	0.00	0.00	5.24	1.17	-1.52	6.76	Pm	70.00	9.35
	Outside		-47.99	0.00	5.24	1.33	0.00	0.00	5.24	0.04	-48.03	53.27	Pm+Pb	100.00	0.88
20	Inside	55j	-13.48	0.00	-7.07	0.40	0.00	0.00	0.01	-7.07	-13.49	13.50	Pm+Pb	100.00	6.41
	Middle		-0.35	0.00	-7.07	0.40	0.00	0.00	0.26	-0.61	-7.07	7.33	Pm	70.00	8.55
	Outside		12.78	0.00	-7.07	0.40	0.00	0.00	12.79	-0.01	-7.07	19.86	Pm+Pb	100.00	4.03
21	Inside	60j	-8.55	0.00	-19.39	-0.54	0.00	0.00	0.03	-8.58	-19.39	19.42	Pm+Pb	100.00	4.15
	Middle		-0.35	0.00	-19.39	-0.54	0.00	0.00	0.39	-0.74	-19.39	19.78	Pm	70.00	2.54
	Outside		7.85	0.00	-19.39	-0.54	0.00	0.00	7.89	-0.04	-19.39	27.28	Pm+Pb	100.00	2.67
22	Inside	61i	-7.66	0.00	-19.39	-0.35	0.00	0.00	0.02	-7.68	-19.39	19.41	Pm+Pb	100.00	4.15
	Middle		0.54	0.00	-19.92	-0.35	0.00	0.00	0.71	-0.17	-19.92	20.63	Pm	70.00	2.39
	Outside		8.74	0.00	-20.44	-0.35	0.00	0.00	8.75	-0.01	-20.44	29.20	Pm+Pb	100.00	2.43
23	Inside	65j	8.98	0.00	-19.39	-0.12	0.00	0.00	8.98	0.00	-19.39	28.37	Pm+Pb	100.00	2.52
	Middle		0.54	0.00	-19.92	-0.12	0.00	0.00	0.57	-0.03	-19.92	20.48	Pm	70.00	2.42
	Outside		-7.90	0.00	-20.44	-0.12	0.00	0.00	0.00	-7.90	-20.44	20.44	Pm+Pb	100.00	3.89
24	Inside	70j	9.86	0.00	-19.39	0.10	0.00	0.00	9.86	0.00	-19.39	29.25	Pm+Pb	100.00	2.42
	Middle		0.54	0.00	-19.92	0.10	0.00	0.00	0.56	-0.02	-19.92	20.48	Pm	70.00	2.42
	Outside		-8.78	0.00	-20.44	0.10	0.00	0.00	0.00	-8.78	-20.44	20.44	Pm+Pb	100.00	3.89
25	Inside	120j	-0.27	0.00	-25.49	0.00	0.00	0.00	0.00	-0.27	-25.49	25.49	Pm+Pb	65.00	1.55
	Middle		-0.27	0.00	-25.49	0.00	0.00	0.00	0.00	-0.27	-25.49	25.49	Pm	45.50	0.79
	Outside		-0.27	0.00	-25.49	0.00	0.00	0.00	0.00	-0.27	-25.49	25.49	Pm+Pb	65.00	1.55
26	Inside	115j	-0.27	0.00	-13.17	0.00	0.00	0.00	0.00	-0.27	-13.17	13.17	Pm+Pb	100.00	6.59
	Middle		-0.27	0.00	-13.17	0.00	0.00	0.00	0.00	-0.27	-13.17	13.17	Pm	70.00	4.31
	Outside		-0.27	0.00	-13.17	0.00	0.00	0.00	0.00	-0.27	-13.17	13.17	Pm+Pb	100.00	6.59
27	Inside	111i	-0.27	0.00	-0.86	0.00	0.00	0.00	0.00	-0.27	-0.86	0.86	Pm+Pb	100.00	115.79
	Middle		-0.27	0.00	-0.86	0.00	0.00	0.00	0.00	-0.27	-0.86	0.86	Pm	70.00	80.75
	Outside		-0.27	0.00	-0.86	0.00	0.00	0.00	0.00	-0.27	-0.86	0.86	Pm+Pb	100.00	115.79

ca/marg-afep-cold

TABLE 2.10.9-46 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 18-E COLD, FLAT ORIENTATION - 30-FT SIDE DROP + MNOP T= -20° SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	23.64	0.00	0.86	-0.03	0.00	0.00	23.64	0.86	0.00	23.64	Pm+Pb	100.00	3.23
	Middle		2.51	0.00	0.00	-0.03	0.00	0.00	2.51	0.00	0.00	2.51	Pm	70.00	26.88
	Outside		-18.62	0.00	-0.86	-0.03	0.00	0.00	0.00	-0.86	-18.62	18.62	Pm+Pb	100.00	4.37
29	Inside	105j	12.34	0.00	0.86	0.67	0.00	0.00	12.38	0.86	-0.04	12.41	Pm+Pb	100.00	7.06
	Middle		2.51	0.00	0.00	0.67	0.00	0.00	2.68	0.00	-0.17	2.85	Pm	70.00	23.60
	Outside		-7.33	0.00	-0.86	0.67	0.00	0.00	0.06	-0.86	-7.39	7.45	Pm+Pb	100.00	12.42
30	Inside	110j	-23.65	0.00	0.86	1.37	0.00	0.00	0.86	0.08	-23.73	24.59	Pm+Pb	65.00	1.64
	Middle		2.51	0.00	0.00	1.37	0.00	0.00	3.11	0.00	-0.60	3.72	Pm	45.50	11.24
	Outside		28.66	0.00	-0.86	1.37	0.00	0.00	28.73	-0.07	-0.86	29.58	Pm+Pb	65.00	1.20
31	Inside	90j	-0.35	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-0.35	1.21	Pm+Pb	100.00	81.90
	Middle		-0.35	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-0.35	1.21	Pm	70.00	57.03
	Outside		-0.35	0.00	0.86	0.00	0.00	0.00	0.86	0.00	-0.35	1.21	Pm+Pb	100.00	81.90
32	Inside	85j	-0.35	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-0.35	13.52	Pm+Pb	100.00	6.40
	Middle		-0.35	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-0.35	13.52	Pm	70.00	4.18
	Outside		-0.35	0.00	13.17	0.00	0.00	0.00	13.17	0.00	-0.35	13.52	Pm+Pb	100.00	6.40
33	Inside	81j	-0.35	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-0.35	25.84	Pm+Pb	65.00	1.52
	Middle		-0.35	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-0.35	25.84	Pm	45.50	0.76
	Outside		-0.35	0.00	25.49	0.00	0.00	0.00	25.49	0.00	-0.35	25.84	Pm+Pb	65.00	1.52
34	Inside	100j	23.64	0.00	0.86	0.03	0.00	0.00	23.64	0.86	0.00	23.64	Pm+Pb	100.00	3.23
	Middle		2.51	0.00	0.00	0.03	0.00	0.00	2.51	0.00	0.00	2.51	Pm	70.00	26.88
	Outside		-18.62	0.00	-0.86	0.03	0.00	0.00	0.00	-0.86	-18.62	18.62	Pm+Pb	100.00	4.37
35	Inside	95j	12.34	0.00	0.86	-0.67	0.00	0.00	12.38	0.86	-0.04	12.41	Pm+Pb	100.00	7.06
	Middle		2.51	0.00	0.00	-0.67	0.00	0.00	2.68	0.00	-0.17	2.85	Pm	70.00	23.60
	Outside		-7.33	0.00	-0.86	-0.67	0.00	0.00	0.06	-0.86	-7.39	7.45	Pm+Pb	100.00	12.42
36	Inside	91i	-23.65	0.00	0.86	-1.37	0.00	0.00	0.86	0.08	-23.73	24.59	Pm+Pb	65.00	1.64
	Middle		2.51	0.00	0.00	-1.37	0.00	0.00	3.11	0.00	-0.60	3.72	Pm	45.50	11.24
	Outside		28.66	0.00	-0.86	-1.37	0.00	0.00	28.73	-0.07	-0.86	29.58	Pm+Pb	65.00	1.20

ca/marg-afep-cold

TABLE 2.10.9-47 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 19-E, FLAT ORIENTATION - 30-FT SIDE DROP 3 FUEL ELEMENTS, MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
Fig (2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080	-25.49	-1.00	-14.25	-1.06	-14.25	0.00	-26.49	-1.06	0.00	0.00
	Middle	9.268	-26.02	-1.00	-0.35	-1.06	-0.35	0.00	-27.02	-1.06	0.00	0.00
	Outside	9.455	-26.54	-1.00	13.55	-1.06	13.55	0.00	-27.54	-1.06	0.00	0.00
2	Inside	9.080	-25.49	-1.00	19.36	0.10	19.36	0.00	-26.49	0.10	0.00	0.00
	Middle	9.268	-26.02	-1.00	-0.35	0.10	-0.35	0.00	-27.02	0.10	0.00	0.00
	Outside	9.455	-26.54	-1.00	-20.06	0.10	-20.06	0.00	-27.54	0.10	0.00	0.00
3	Inside	9.080	-25.49	-1.00	-28.50	1.26	-28.50	0.00	-26.49	1.26	0.00	0.00
	Middle	9.268	-26.02	-1.00	-0.35	1.26	-0.35	0.00	-27.02	1.26	0.00	0.00
	Outside	9.455	-26.54	-1.00	27.80	1.26	27.80	0.00	-27.54	1.26	0.00	0.00
4	Inside	9.080	-25.49	-1.00	-29.42	-0.35	-29.42	0.00	-26.49	-0.35	0.00	0.00
	Middle	9.080	-25.49	-1.00	-1.26	-0.35	-1.26	0.00	-26.49	-0.35	0.00	0.00
	Outside	9.080	-25.49	-1.00	26.89	-0.35	26.89	0.00	-26.49	-0.35	0.00	0.00
5	Inside	4.692	-13.17	-1.00	-4.88	-0.35	-4.88	0.00	-14.17	-0.35	0.00	0.00
	Middle	4.692	-13.17	-1.00	-1.26	-0.35	-1.26	0.00	-14.17	-0.35	0.00	0.00
	Outside	4.692	-13.17	-1.00	2.36	-0.35	2.36	0.00	-14.17	-0.35	0.00	0.00
6	Inside	0.305	-0.86	-1.00	19.65	-0.35	19.65	0.00	-1.86	-0.35	0.00	0.00
	Middle	0.305	-0.86	-1.00	-1.26	-0.35	-1.26	0.00	-1.86	-0.35	0.00	0.00
	Outside	0.305	-0.86	-1.00	-22.17	-0.35	-22.17	0.00	-1.86	-0.35	0.00	0.00
7	Inside	0.305	0.86	-1.00	-23.53	-0.36	-23.53	0.00	-0.14	-0.36	0.00	0.00
	Middle	0.305	0.86	-1.00	-1.95	-0.36	-1.95	0.00	-0.14	-0.36	0.00	0.00
	Outside	0.305	0.86	-1.00	19.63	-0.36	19.63	0.00	-0.14	-0.36	0.00	0.00
8	Inside	4.692	13.17	-1.00	2.02	-0.36	2.02	0.00	12.17	-0.36	0.00	0.00
	Middle	4.692	13.17	-1.00	-1.95	-0.36	-1.95	0.00	12.17	-0.36	0.00	0.00
	Outside	4.692	13.17	-1.00	-5.92	-0.36	-5.92	0.00	12.17	-0.36	0.00	0.00
9	Inside	9.080	25.49	-1.00	27.56	-0.36	27.56	0.00	24.49	-0.36	0.00	0.00
	Middle	9.080	25.49	-1.00	-1.95	-0.36	-1.95	0.00	24.49	-0.36	0.00	0.00
	Outside	9.080	25.49	-1.00	-31.46	-0.36	-31.46	0.00	24.49	-0.36	0.00	0.00
10	Inside	9.080	25.49	-1.00	29.87	4.72	29.87	0.00	24.49	4.72	0.00	0.00
	Middle	9.268	26.02	-1.00	0.36	4.72	0.36	0.00	25.02	4.72	0.00	0.00
	Outside	9.455	26.54	-1.00	-29.15	4.72	-29.15	0.00	25.54	4.72	0.00	0.00
11	Inside	9.080	25.49	-1.00	-12.02	-0.03	-12.02	0.00	24.49	-0.03	0.00	0.00
	Middle	9.268	26.02	-1.00	0.36	-0.03	0.36	0.00	25.02	-0.03	0.00	0.00
	Outside	9.455	26.54	-1.00	12.75	-0.03	12.75	0.00	25.54	-0.03	0.00	0.00
12	Inside	9.080	25.49	-1.00	-6.56	-0.13	-6.56	0.00	24.49	-0.13	0.00	0.00
	Middle	9.268	26.02	-1.00	0.36	-0.13	0.36	0.00	25.02	-0.13	0.00	0.00
	Outside	9.455	26.54	-1.00	7.28	-0.13	7.28	0.00	25.54	-0.13	0.00	0.00
13	Inside	9.080	25.49	-1.00	-4.64	0.28	-4.64	0.00	24.49	0.28	0.00	0.00
	Middle	9.268	26.02	-1.00	0.42	0.28	0.42	0.00	25.02	0.28	0.00	0.00
	Outside	9.455	26.54	-1.00	5.47	0.28	5.47	0.00	25.54	0.28	0.00	0.00
14	Inside	9.080	25.49	-1.00	-11.97	-1.39	-11.97	0.00	24.49	-1.39	0.00	0.00
	Middle	9.268	26.02	-1.00	0.42	-1.39	0.42	0.00	25.02	-1.39	0.00	0.00
	Outside	9.455	26.54	-1.00	12.80	-1.39	12.80	0.00	25.54	-1.39	0.00	0.00
15	Inside	9.080	25.49	-1.00	32.37	-4.92	32.37	0.00	24.49	-4.92	0.00	0.00
	Middle	9.268	26.02	-1.00	0.42	-4.92	0.42	0.00	25.02	-4.92	0.00	0.00
	Outside	9.455	26.54	-1.00	-31.54	-4.92	-31.54	0.00	25.54	-4.92	0.00	0.00
16	Inside	9.080	25.49	-1.00	29.31	0.42	29.31	0.00	24.49	0.42	0.00	0.00
	Middle	9.080	25.49	-1.00	-2.65	0.42	-2.65	0.00	24.49	0.42	0.00	0.00
	Outside	9.080	25.49	-1.00	-34.60	0.42	-34.60	0.00	24.49	0.42	0.00	0.00
17	Inside	4.692	13.17	-1.00	0.13	0.42	0.13	0.00	12.17	0.42	0.00	0.00
	Middle	4.692	13.17	-1.00	-2.65	0.42	-2.65	0.00	12.17	0.42	0.00	0.00
	Outside	4.692	13.17	-1.00	-5.42	0.42	-5.42	0.00	12.17	0.42	0.00	0.00
18	Inside	0.305	0.86	-1.00	-29.06	0.42	-29.06	0.00	-0.14	0.42	0.00	0.00
	Middle	0.305	0.86	-1.00	-2.65	0.42	-2.65	0.00	-0.14	0.42	0.00	0.00
	Outside	0.305	0.86	-1.00	23.77	0.42	23.77	0.00	-0.14	0.42	0.00	0.00

TABLE 2.10.9-47 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 19-E, FLAT ORIENTATION - 30-FT SIDE DROP 3 FUEL ELEMENTS, MOM. = 46 X 10^6 in-lb SECTION E

Stress Location	Location in Wall	30 ft Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305	-0.86	-1.00	23.77	0.39	23.77	0.00	-1.86	0.39	0.00	0.00
	Middle	0.305	-0.86	-1.00	-1.27	0.39	-1.27	0.00	-1.86	0.39	0.00	0.00
	Outside	0.305	-0.86	-1.00	-26.31	0.39	-26.31	0.00	-1.86	0.39	0.00	0.00
20	Inside	4.692	-13.17	-1.00	-3.35	0.39	-3.35	0.00	-14.17	0.39	0.00	0.00
	Middle	4.692	-13.17	-1.00	-1.27	0.39	-1.27	0.00	-14.17	0.39	0.00	0.00
	Outside	4.692	-13.17	-1.00	0.81	0.39	0.81	0.00	-14.17	0.39	0.00	0.00
21	Inside	9.080	-25.49	-1.00	-30.47	0.39	-30.47	0.00	-26.49	0.39	0.00	0.00
	Middle	9.080	-25.49	-1.00	-1.27	0.39	-1.27	0.00	-26.49	0.39	0.00	0.00
	Outside	9.080	-25.49	-1.00	27.93	0.39	27.93	0.00	-26.49	0.39	0.00	0.00
22	Inside	9.080	-25.49	-1.00	-29.58	-1.27	-29.58	0.00	-26.49	-1.27	0.00	0.00
	Middle	9.268	-26.02	-1.00	-0.39	-1.27	-0.39	0.00	-27.02	-1.27	0.00	0.00
	Outside	9.455	-26.54	-1.00	28.81	-1.27	28.81	0.00	-27.54	-1.27	0.00	0.00
23	Inside	9.080	-25.49	-1.00	18.58	-0.11	18.58	0.00	-26.49	-0.11	0.00	0.00
	Middle	9.268	-26.02	-1.00	-0.39	-0.11	-0.39	0.00	-27.02	-0.11	0.00	0.00
	Outside	9.455	-26.54	-1.00	-19.35	-0.11	-19.35	0.00	-27.54	-0.11	0.00	0.00
24	Inside	9.080	-25.49	-1.00	-14.72	1.06	-14.72	0.00	-26.49	1.06	0.00	0.00
	Middle	9.268	-26.02	-1.00	-0.39	1.06	-0.39	0.00	-27.02	1.06	0.00	0.00
	Outside	9.455	-26.54	-1.00	13.95	1.06	13.95	0.00	-27.54	1.06	0.00	0.00
25	Inside	9.080	-25.49	0.00	-2.62	-0.04	-2.62	0.00	-25.49	-0.04	0.00	0.00
	Middle	9.080	-25.49	0.00	-2.84	-0.04	-2.84	0.00	-25.49	-0.04	0.00	0.00
	Outside	9.080	-25.49	0.00	-3.06	-0.04	-3.06	0.00	-25.49	-0.04	0.00	0.00
26	Inside	4.692	-13.17	0.00	-3.92	-0.04	-3.92	0.00	-13.17	-0.04	0.00	0.00
	Middle	4.692	-13.17	0.00	-2.84	-0.04	-2.84	0.00	-13.17	-0.04	0.00	0.00
	Outside	4.692	-13.17	0.00	-1.76	-0.04	-1.76	0.00	-13.17	-0.04	0.00	0.00
27	Inside	0.305	-0.86	0.00	-5.23	-0.04	-5.23	0.00	-0.86	-0.04	0.00	0.00
	Middle	0.305	-0.86	0.00	-2.84	-0.04	-2.84	0.00	-0.86	-0.04	0.00	0.00
	Outside	0.305	-0.86	0.00	-0.46	-0.04	-0.46	0.00	-0.86	-0.04	0.00	0.00
28	Inside	0.305	0.86	0.00	27.09	0.69	27.09	0.00	0.86	0.69	0.00	0.00
	Middle	0.000	0.00	0.00	-0.02	0.69	-0.02	0.00	0.00	0.69	0.00	0.00
	Outside	0.305	-0.86	0.00	-27.13	0.69	-27.13	0.00	-0.86	0.69	0.00	0.00
29	Inside	0.305	0.86	0.00	2.85	0.69	2.85	0.00	0.86	0.69	0.00	0.00
	Middle	0.000	0.00	0.00	-0.02	0.69	-0.02	0.00	0.00	0.69	0.00	0.00
	Outside	0.305	-0.86	0.00	-2.89	0.69	-2.89	0.00	-0.86	0.69	0.00	0.00
30	Inside	0.305	0.86	0.00	-21.39	0.69	-21.39	0.00	0.86	0.69	0.00	0.00
	Middle	0.000	0.00	0.00	-0.02	0.69	-0.02	0.00	0.00	0.69	0.00	0.00
	Outside	0.305	-0.86	0.00	21.35	0.69	21.35	0.00	-0.86	0.69	0.00	0.00
31	Inside	0.305	0.86	0.00	0.78	-0.05	0.78	0.00	0.86	-0.05	0.00	0.00
	Middle	0.305	0.86	0.00	-1.95	-0.05	-1.95	0.00	0.86	-0.05	0.00	0.00
	Outside	0.305	0.86	0.00	-4.67	-0.05	-4.67	0.00	0.86	-0.05	0.00	0.00
32	Inside	4.692	13.17	0.00	-1.05	-0.05	-1.05	0.00	13.17	-0.05	0.00	0.00
	Middle	4.692	13.17	0.00	-1.95	-0.05	-1.95	0.00	13.17	-0.05	0.00	0.00
	Outside	4.692	13.17	0.00	-2.84	-0.05	-2.84	0.00	13.17	-0.05	0.00	0.00
33	Inside	9.080	25.49	0.00	-2.88	-0.05	-2.88	0.00	25.49	-0.05	0.00	0.00
	Middle	9.080	25.49	0.00	-1.95	-0.05	-1.95	0.00	25.49	-0.05	0.00	0.00
	Outside	9.080	25.49	0.00	-1.01	-0.05	-1.01	0.00	25.49	-0.05	0.00	0.00
34	Inside	0.305	0.86	0.00	21.97	0.02	21.97	0.00	0.86	0.02	0.00	0.00
	Middle	0.000	0.00	0.00	-0.04	0.02	-0.04	0.00	0.00	0.02	0.00	0.00
	Outside	0.305	-0.86	0.00	-22.05	0.02	-22.05	0.00	-0.86	0.02	0.00	0.00
35	Inside	0.305	0.86	0.00	10.37	-0.68	10.37	0.00	0.86	-0.68	0.00	0.00
	Middle	0.000	0.00	0.00	-0.04	-0.68	-0.04	0.00	0.00	-0.68	0.00	0.00
	Outside	0.305	-0.86	0.00	-10.45	-0.68	-10.45	0.00	-0.86	-0.68	0.00	0.00
36	Inside	0.305	0.86	0.00	-25.91	-1.38	-25.91	0.00	0.86	-1.38	0.00	0.00
	Middle	0.000	0.00	0.00	-0.04	-1.38	-0.04	0.00	0.00	-1.38	0.00	0.00
	Outside	0.305	-0.86	0.00	25.83	-1.38	25.83	0.00	-0.86	-1.38	0.00	0.00

TABLE 2.10.9-48 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 19-E, FLAT ORIENTATION - 30-FT SIDE DROP, 3 FUEL ELEMENTS SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	-14.25	0.00	-26.49	-1.06	0.00	0.00	0.08	-14.33	-26.49	26.57	Pm+Pb	98.20	2.70
	Middle		-0.35	0.00	-27.02	-1.06	0.00	0.00	0.90	-1.25	-27.02	27.92	Pm	68.74	1.46
	Outside		13.55	0.00	-27.54	-1.06	0.00	0.00	13.63	-0.08	-27.54	41.18	Pm+Pb	98.20	1.38
2	Inside	75j	19.36	0.00	-26.49	0.10	0.00	0.00	19.36	0.00	-26.49	45.85	Pm+Pb	98.20	1.14
	Middle		-0.35	0.00	-27.02	0.10	0.00	0.00	0.03	-0.38	-27.02	27.04	Pm	68.74	1.54
	Outside		-20.06	0.00	-27.54	0.10	0.00	0.00	0.00	-20.06	-27.54	27.54	Pm+Pb	98.20	2.57
3	Inside	80j	-28.50	0.00	-26.49	1.26	0.00	0.00	0.06	-26.49	-28.56	28.61	Pm+Pb	98.20	2.43
	Middle		-0.35	0.00	-27.02	1.26	0.00	0.00	1.10	-1.45	-27.02	28.11	Pm	68.74	1.44
	Outside		27.80	0.00	-27.54	1.26	0.00	0.00	27.86	-0.06	-27.54	55.40	Pm+Pb	98.20	0.77
4	Inside	40j	-29.42	0.00	-26.49	-0.35	0.00	0.00	0.00	-26.49	-29.42	29.43	Pm+Pb	98.20	2.34
	Middle		-1.26	0.00	-26.49	-0.35	0.00	0.00	0.09	-1.35	-26.49	26.58	Pm	68.74	1.59
	Outside		26.89	0.00	-26.49	-0.35	0.00	0.00	26.89	0.00	-26.49	53.38	Pm+Pb	98.20	0.84
5	Inside	35j	-4.88	0.00	-14.17	-0.35	0.00	0.00	0.02	-4.90	-14.17	14.20	Pm+Pb	98.20	5.92
	Middle		-1.26	0.00	-14.17	-0.35	0.00	0.00	0.09	-1.35	-14.17	14.26	Pm	68.74	3.82
	Outside		2.36	0.00	-14.17	-0.35	0.00	0.00	2.41	-0.05	-14.17	16.58	Pm+Pb	98.20	4.92
6	Inside	31i	19.65	0.00	-1.86	-0.35	0.00	0.00	19.66	-0.01	-1.86	21.51	Pm+Pb	98.20	3.56
	Middle		-1.26	0.00	-1.86	-0.35	0.00	0.00	0.09	-1.35	-1.86	1.95	Pm	68.74	34.31
	Outside		-22.17	0.00	-1.86	-0.35	0.00	0.00	0.01	-1.86	-22.18	22.18	Pm+Pb	98.20	3.43
7	Inside	30j	-23.53	0.00	-0.14	-0.36	0.00	0.00	0.01	-0.14	-23.54	23.54	Pm+Pb	98.20	3.17
	Middle		-1.95	0.00	-0.14	-0.36	0.00	0.00	0.06	-0.14	-2.01	2.08	Pm	68.74	32.07
	Outside		19.63	0.00	-0.14	-0.36	0.00	0.00	19.64	-0.01	-0.14	19.78	Pm+Pb	98.20	3.96
8	Inside	25j	2.02	0.00	12.17	-0.36	0.00	0.00	12.17	2.08	-0.06	12.23	Pm+Pb	98.20	7.03
	Middle		-1.95	0.00	12.17	-0.36	0.00	0.00	12.17	0.06	-2.01	14.19	Pm	68.74	3.85
	Outside		-5.92	0.00	12.17	-0.36	0.00	0.00	12.17	0.02	-5.94	18.11	Pm+Pb	98.20	4.42
9	Inside	21j	27.56	0.00	24.49	-0.36	0.00	0.00	27.56	24.49	0.00	27.57	Pm+Pb	98.20	2.56
	Middle		-1.95	0.00	24.49	-0.36	0.00	0.00	24.49	0.06	-2.01	26.50	Pm	68.74	1.59
	Outside		-31.46	0.00	24.49	-0.36	0.00	0.00	24.49	0.00	-31.46	55.95	Pm+Pb	98.20	0.76

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TABLE 2.10.9-48 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 19-E, FLAT ORIENTATION - 30-FT SIDE DROP, 3 FUEL ELEMENTS SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	29.87	0.00	24.49	4.72	0.00	0.00	30.60	24.49	-0.73	31.33	Pm+Pb	98.20	2.13
	Middle		0.36	0.00	25.02	4.72	0.00	0.00	25.02	4.90	-4.54	29.56	Pm	68.74	1.33
	Outside		-29.15	0.00	25.54	4.72	0.00	0.00	25.54	0.75	-29.90	55.44	Pm+Pb	98.20	0.77
11	Inside	15j	-12.02	0.00	24.49	-0.03	0.00	0.00	24.49	0.00	-12.02	36.51	Pm+Pb	98.20	1.69
	Middle		0.36	0.00	25.02	-0.03	0.00	0.00	25.02	0.36	0.00	25.02	Pm	68.74	1.75
	Outside		12.75	0.00	25.54	-0.03	0.00	0.00	25.54	12.75	0.00	25.54	Pm+Pb	98.20	2.84
12	Inside	11i	-6.56	0.00	24.49	-0.13	0.00	0.00	24.49	0.00	-6.56	31.05	Pm+Pb	98.20	2.16
	Middle		0.36	0.00	25.02	-0.13	0.00	0.00	25.02	0.40	-0.04	25.06	Pm	68.74	1.74
	Outside		7.28	0.00	25.54	-0.13	0.00	0.00	25.54	7.28	0.00	25.55	Pm+Pb	98.20	2.84
13	Inside	10j	-4.64	0.00	24.49	0.28	0.00	0.00	24.49	0.02	-4.66	29.15	Pm+Pb	98.20	2.37
	Middle		0.42	0.00	25.02	0.28	0.00	0.00	25.02	0.56	-0.14	25.16	Pm	68.74	1.73
	Outside		5.47	0.00	25.54	0.28	0.00	0.00	25.54	5.48	-0.01	25.56	Pm+Pb	98.20	2.84
14	Inside	5j	-11.97	0.00	24.49	-1.39	0.00	0.00	24.49	0.16	-12.13	36.62	Pm+Pb	98.20	1.68
	Middle		0.42	0.00	25.02	-1.39	0.00	0.00	25.02	1.62	-1.20	26.21	Pm	68.74	1.62
	Outside		12.80	0.00	25.54	-1.39	0.00	0.00	25.54	12.95	-0.15	25.69	Pm+Pb	98.20	2.82
15	Inside	1i	32.37	0.00	24.49	-4.92	0.00	0.00	33.10	24.49	-0.73	33.83	Pm+Pb	98.20	1.90
	Middle		0.42	0.00	25.02	-4.92	0.00	0.00	25.02	5.13	-4.71	29.73	Pm	68.74	1.31
	Outside		-31.54	0.00	25.54	-4.92	0.00	0.00	25.54	0.75	-32.29	57.83	Pm+Pb	98.20	0.70
16	Inside	41i	29.31	0.00	24.49	0.42	0.00	0.00	29.32	24.49	-0.01	29.32	Pm+Pb	98.20	2.35
	Middle		-2.65	0.00	24.49	0.42	0.00	0.00	24.49	0.06	-2.71	27.21	Pm	68.74	1.53
	Outside		-34.60	0.00	24.49	0.42	0.00	0.00	24.49	0.01	-34.61	59.10	Pm+Pb	98.20	0.66
17	Inside	45j	0.13	0.00	12.17	0.42	0.00	0.00	12.17	0.49	-0.36	12.53	Pm+Pb	98.20	6.84
	Middle		-2.65	0.00	12.17	0.42	0.00	0.00	12.17	0.06	-2.71	14.89	Pm	68.74	3.62
	Outside		-5.42	0.00	12.17	0.42	0.00	0.00	12.17	0.03	-5.45	17.62	Pm+Pb	98.20	4.57
18	Inside	50j	-29.06	0.00	-0.14	0.42	0.00	0.00	0.01	-0.14	-29.07	29.07	Pm+Pb	98.20	2.38
	Middle		-2.65	0.00	-0.14	0.42	0.00	0.00	0.06	-0.14	-2.71	2.78	Pm	68.74	23.73
	Outside		23.77	0.00	-0.14	0.42	0.00	0.00	23.78	-0.01	-0.14	23.92	Pm+Pb	98.20	3.11

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TABLE 2.10.9-48 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 19-E, FLAT ORIENTATION - 30-FT SIDE DROP, 3 FUEL ELEMENTS SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	23.77	0.00	-1.86	0.39	0.00	0.00	23.78	-0.01	-1.86	25.63	Pm+Pb	98.20	2.83
	Middle		-1.27	0.00	-1.86	0.39	0.00	0.00	0.11	-1.38	-1.86	1.97	Pm	68.74	33.96
	Outside		-26.31	0.00	-1.86	0.39	0.00	0.00	0.01	-1.86	-26.32	26.32	Pm+Pb	98.20	2.73
20	Inside	55j	-3.35	0.00	-14.17	0.39	0.00	0.00	0.04	-3.39	-14.17	14.22	Pm+Pb	98.20	5.91
	Middle		-1.27	0.00	-14.17	0.39	0.00	0.00	0.11	-1.38	-14.17	14.28	Pm	68.74	3.81
	Outside		0.81	0.00	-14.17	0.39	0.00	0.00	0.97	-0.16	-14.17	15.14	Pm+Pb	98.20	5.49
21	Inside	60j	-30.47	0.00	-26.49	0.39	0.00	0.00	0.00	-26.49	-30.47	30.48	Pm+Pb	98.20	2.22
	Middle		-1.27	0.00	-26.49	0.39	0.00	0.00	0.11	-1.38	-26.49	26.60	Pm	68.74	1.58
	Outside		27.93	0.00	-26.49	0.39	0.00	0.00	27.94	-0.01	-26.49	54.43	Pm+Pb	98.20	0.80
22	Inside	61i	-29.58	0.00	-26.49	-1.27	0.00	0.00	0.05	-26.49	-29.63	29.69	Pm+Pb	98.20	2.31
	Middle		-0.39	0.00	-27.02	-1.27	0.00	0.00	1.09	-1.48	-27.02	28.11	Pm	68.74	1.45
	Outside		28.81	0.00	-27.54	-1.27	0.00	0.00	28.87	-0.06	-27.54	56.41	Pm+Pb	98.20	0.74
23	Inside	65j	18.58	0.00	-26.49	-0.11	0.00	0.00	18.58	0.00	-26.49	45.07	Pm+Pb	98.20	1.18
	Middle		-0.39	0.00	-27.02	-0.11	0.00	0.00	0.03	-0.42	-27.02	27.05	Pm	68.74	1.54
	Outside		-19.35	0.00	-27.54	-0.11	0.00	0.00	0.00	-19.35	-27.54	27.54	Pm+Pb	98.20	2.57
24	Inside	70j	-14.72	0.00	-26.49	1.06	0.00	0.00	0.08	-14.80	-26.49	26.57	Pm+Pb	98.20	2.70
	Middle		-0.39	0.00	-27.02	1.06	0.00	0.00	0.88	-1.27	-27.02	27.90	Pm	68.74	1.46
	Outside		13.95	0.00	-27.54	1.06	0.00	0.00	14.03	-0.08	-27.54	41.57	Pm+Pb	98.20	1.36
25	Inside	120j	-2.62	0.00	-25.49	-0.04	0.00	0.00	0.00	-2.62	-25.49	25.49	Pm+Pb	61.46	1.41
	Middle		-2.84	0.00	-25.49	-0.04	0.00	0.00	0.00	-2.84	-25.49	25.49	Pm	43.02	0.69
	Outside		-3.06	0.00	-25.49	-0.04	0.00	0.00	0.00	-3.06	-25.49	25.49	Pm+Pb	61.46	1.41
26	Inside	115j	-3.92	0.00	-13.17	-0.04	0.00	0.00	0.00	-3.92	-13.17	13.17	Pm+Pb	94.56	6.18
	Middle		-2.84	0.00	-13.17	-0.04	0.00	0.00	0.00	-2.84	-13.17	13.17	Pm	66.19	4.02
	Outside		-1.76	0.00	-13.17	-0.04	0.00	0.00	0.00	-1.76	-13.17	13.17	Pm+Pb	94.56	6.18
27	Inside	111i	-5.23	0.00	-0.86	-0.04	0.00	0.00	0.00	-0.86	-5.23	5.23	Pm+Pb	94.56	17.08
	Middle		-2.84	0.00	-0.86	-0.04	0.00	0.00	0.00	-0.86	-2.84	2.84	Pm	66.19	22.30
	Outside		-0.46	0.00	-0.86	-0.04	0.00	0.00	0.00	-0.46	-0.86	0.86	Pm+Pb	94.56	109.00

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TABLE 2.10.9-48 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 19-E, FLAT ORIENTATION - 30-FT SIDE DROP, 3 FUEL ELEMENTS SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	27.09	0.00	0.86	0.69	0.00	0.00	27.11	0.86	-0.02	27.13	Pm+Pb	94.56	2.49
	Middle		-0.02	0.00	0.00	0.69	0.00	0.00	0.68	0.00	-0.70	1.38	Pm	66.19	46.96
	Outside		-27.13	0.00	-0.86	0.69	0.00	0.00	0.02	-0.86	-27.15	27.17	Pm+Pb	94.56	2.48
29	Inside	105j	2.85	0.00	0.86	0.69	0.00	0.00	3.01	0.86	-0.16	3.17	Pm+Pb	94.56	28.86
	Middle		-0.02	0.00	0.00	0.69	0.00	0.00	0.68	0.00	-0.70	1.38	Pm	66.19	46.96
	Outside		-2.89	0.00	-0.86	0.69	0.00	0.00	0.16	-0.86	-3.05	3.20	Pm+Pb	94.56	28.53
30	Inside	110j	-21.39	0.00	0.86	0.69	0.00	0.00	0.86	0.02	-21.41	22.27	Pm+Pb	61.46	1.76
	Middle		-0.02	0.00	0.00	0.69	0.00	0.00	0.68	0.00	-0.70	1.38	Pm	43.02	30.17
	Outside		21.35	0.00	-0.86	0.69	0.00	0.00	21.37	-0.02	-0.86	22.23	Pm+Pb	61.46	1.77
31	Inside	90j	0.78	0.00	0.86	-0.05	0.00	0.00	0.86	0.78	0.00	0.86	Pm+Pb	94.56	109.03
	Middle		-1.95	0.00	0.86	-0.05	0.00	0.00	0.86	0.00	-1.95	2.81	Pm	66.19	22.58
	Outside		-4.67	0.00	0.86	-0.05	0.00	0.00	0.86	0.00	-4.67	5.53	Pm+Pb	94.56	16.11
32	Inside	85j	-1.05	0.00	13.17	-0.05	0.00	0.00	13.17	0.00	-1.05	14.22	Pm+Pb	94.56	5.65
	Middle		-1.95	0.00	13.17	-0.05	0.00	0.00	13.17	0.00	-1.95	15.12	Pm	66.19	3.38
	Outside		-2.84	0.00	13.17	-0.05	0.00	0.00	13.17	0.00	-2.84	16.01	Pm+Pb	94.56	4.91
33	Inside	81j	-2.88	0.00	25.49	-0.05	0.00	0.00	25.49	0.00	-2.88	28.37	Pm+Pb	61.46	1.17
	Middle		-1.95	0.00	25.49	-0.05	0.00	0.00	25.49	0.00	-1.95	27.44	Pm	43.02	0.57
	Outside		-1.01	0.00	25.49	-0.05	0.00	0.00	25.49	0.00	-1.01	26.50	Pm+Pb	61.46	1.32
34	Inside	100j	21.97	0.00	0.86	0.02	0.00	0.00	21.97	0.86	0.00	21.97	Pm+Pb	94.56	3.30
	Middle		-0.04	0.00	0.00	0.02	0.00	0.00	0.01	0.00	-0.05	0.06	Pm	66.19	1169.08
	Outside		-22.05	0.00	-0.86	0.02	0.00	0.00	0.00	-0.86	-22.05	22.05	Pm+Pb	94.56	3.29
35	Inside	95j	10.37	0.00	0.86	-0.68	0.00	0.00	10.41	0.86	-0.04	10.46	Pm+Pb	94.56	8.04
	Middle		-0.04	0.00	0.00	-0.68	0.00	0.00	0.66	0.00	-0.70	1.36	Pm	66.19	47.65
	Outside		-10.45	0.00	-0.86	-0.68	0.00	0.00	0.04	-0.86	-10.49	10.54	Pm+Pb	94.56	7.97
36	Inside	91i	-25.91	0.00	0.86	-1.38	0.00	0.00	0.86	0.07	-25.98	26.84	Pm+Pb	61.46	1.29
	Middle		-0.04	0.00	0.00	-1.38	0.00	0.00	1.36	0.00	-1.40	2.76	Pm	43.02	14.59
	Outside		25.83	0.00	-0.86	-1.38	0.00	0.00	25.90	-0.07	-0.86	26.76	Pm+Pb	61.46	1.30

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TABLE 2.10.9-49 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 21-E, CORNER ORIENTATION - 30-FT SIDE DROP SECTION E MOM. = 46 X 10^6 in-lb

Stress Location	Location in Wall	30-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	6.636	-18.63	-1.00	5.29	-0.48	5.29	0.00	-19.63	-0.48	0.00	0.00
	Middle	6.768	-19.00	-1.00	-1.16	-0.48	-1.16	0.00	-20.00	-0.48	0.00	0.00
	Outside	6.901	-19.37	-1.00	-7.60	-0.48	-7.60	0.00	-20.37	-0.48	0.00	0.00
2	Inside	9.738	-27.34	-1.00	10.32	0.34	10.32	0.00	-28.34	0.34	0.00	0.00
	Middle	9.871	-27.71	-1.00	-1.16	0.34	-1.16	0.00	-28.71	0.34	0.00	0.00
	Outside	10.003	-28.08	-1.00	-12.64	0.34	-12.64	0.00	-29.08	0.34	0.00	0.00
3	Inside	12.840	-36.05	-1.00	-42.24	1.16	-42.24	0.00	-37.05	1.16	0.00	0.00
	Middle	12.974	-36.42	-1.00	-1.16	1.16	-1.16	0.00	-37.42	1.16	0.00	0.00
	Outside	13.106	-36.79	-1.00	39.92	1.16	39.92	0.00	-37.79	1.16	0.00	0.00
4	Inside	12.840	-36.05	-1.00	-42.24	-1.16	-42.24	0.00	-37.05	-1.16	0.00	0.00
	Middle	12.974	-36.42	-1.00	-1.16	-1.16	-1.16	0.00	-37.42	-1.16	0.00	0.00
	Outside	13.106	-36.79	-1.00	39.92	-1.16	39.92	0.00	-37.79	-1.16	0.00	0.00
5	Inside	9.738	-27.34	-1.00	10.21	-0.34	10.21	0.00	-28.34	-0.34	0.00	0.00
	Middle	9.871	-27.71	-1.00	-1.16	-0.34	-1.16	0.00	-28.71	-0.34	0.00	0.00
	Outside	10.003	-28.08	-1.00	-12.53	-0.34	-12.53	0.00	-29.08	-0.34	0.00	0.00
6	Inside	6.636	-18.63	-1.00	5.06	0.48	5.06	0.00	-19.63	0.48	0.00	0.00
	Middle	6.768	-19.00	-1.00	-1.16	0.48	-1.16	0.00	-20.00	0.48	0.00	0.00
	Outside	6.901	-19.37	-1.00	-7.38	0.48	-7.38	0.00	-20.37	0.48	0.00	0.00
7	Inside	6.205	-17.42	-1.00	-41.29	-1.10	-41.29	0.00	-18.42	-1.10	0.00	0.00
	Middle	6.338	-17.79	-1.00	-2.21	-1.10	-2.21	0.00	-18.79	-1.10	0.00	0.00
	Outside	6.470	-18.16	-1.00	36.86	-1.10	36.86	0.00	-19.16	-1.10	0.00	0.00
8	Inside	2.837	-7.96	-1.00	6.86	-0.28	6.86	0.00	-8.96	-0.28	0.00	0.00
	Middle	2.970	-8.34	-1.00	-2.21	-0.28	-2.21	0.00	-9.34	-0.28	0.00	0.00
	Outside	3.102	-8.71	-1.00	-11.29	-0.28	-11.29	0.00	-9.71	-0.28	0.00	0.00
9	Inside	0.000	0.00	-1.00	-2.59	0.55	-2.59	0.00	-1.00	0.55	0.00	0.00
	Middle	0.133	-0.37	-1.00	-2.21	0.55	-2.21	0.00	-1.37	0.55	0.00	0.00
	Outside	0.265	-0.74	-1.00	-1.84	0.55	-1.84	0.00	-1.74	0.55	0.00	0.00
10	Inside	0.000	0.00	-1.00	-9.22	-0.48	-9.22	0.00	-1.00	-0.48	0.00	0.00
	Middle	0.133	0.37	-1.00	-8.84	-0.48	-8.84	0.00	-0.63	-0.48	0.00	0.00
	Outside	0.265	0.74	-1.00	-8.47	-0.48	-8.47	0.00	-0.26	-0.48	0.00	0.00
11	Inside	2.837	7.96	-1.00	-0.22	-0.12	-0.22	0.00	6.96	-0.12	0.00	0.00
	Middle	2.970	8.34	-1.00	0.00	-0.12	0.00	0.00	7.34	-0.12	0.00	0.00
	Outside	3.102	8.71	-1.00	0.22	-0.12	0.22	0.00	7.71	-0.12	0.00	0.00
12	Inside	6.205	17.42	-1.00	-43.99	1.88	-43.99	0.00	16.42	1.88	0.00	0.00
	Middle	6.338	17.79	-1.00	-17.69	1.88	-17.69	0.00	16.79	1.88	0.00	0.00
	Outside	6.470	18.16	-1.00	8.61	1.88	8.61	0.00	17.16	1.88	0.00	0.00
13	Inside	6.636	18.63	-1.00	3.78	2.13	3.78	0.00	17.63	2.13	0.00	0.00
	Middle	6.768	19.00	-1.00	-17.69	2.13	-17.69	0.00	18.00	2.13	0.00	0.00
	Outside	6.901	19.37	-1.00	-39.15	2.13	-39.15	0.00	18.37	2.13	0.00	0.00
14	Inside	9.738	27.34	-1.00	-27.81	0.10	-27.81	0.00	26.34	0.10	0.00	0.00
	Middle	9.871	27.71	-1.00	-24.32	0.10	-24.32	0.00	26.71	0.10	0.00	0.00
	Outside	10.003	28.08	-1.00	-20.82	0.10	-20.82	0.00	27.08	0.10	0.00	0.00
15	Inside	12.840	36.05	-1.00	-20.94	0.60	-20.94	0.00	35.05	0.60	0.00	0.00
	Middle	12.974	36.42	-1.00	-13.26	0.60	-13.26	0.00	35.42	0.60	0.00	0.00
	Outside	13.106	36.79	-1.00	-5.58	0.60	-5.58	0.00	35.79	0.60	0.00	0.00
16	Inside	12.840	36.05	-1.00	-20.94	-0.60	-20.94	0.00	35.05	-0.60	0.00	0.00
	Middle	12.974	36.42	-1.00	-13.26	-0.60	-13.26	0.00	35.42	-0.60	0.00	0.00
	Outside	13.106	36.79	-1.00	-5.58	-0.60	-5.58	0.00	35.79	-0.60	0.00	0.00
17	Inside	9.738	27.34	-1.00	-27.81	-0.10	-27.81	0.00	26.34	-0.10	0.00	0.00
	Middle	9.871	27.71	-1.00	-24.32	-0.10	-24.32	0.00	26.71	-0.10	0.00	0.00
	Outside	10.003	28.08	-1.00	-20.82	-0.10	-20.82	0.00	27.08	-0.10	0.00	0.00
18	Inside	6.636	18.63	-1.00	3.74	-2.12	3.74	0.00	17.63	-2.12	0.00	0.00
	Middle	6.768	19.00	-1.00	-17.69	-2.12	-17.69	0.00	18.00	-2.12	0.00	0.00
	Outside	6.901	19.37	-1.00	-39.11	-2.12	-39.11	0.00	18.37	-2.12	0.00	0.00

TABLE 2.10.9-49 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 21-E, CORNER ORIENTATION - 30-FT SIDE DROP SECTION E MOM. = 46 X 10^6 in-lb

Stress Location	Location in Wall	30-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU + Contents + Distortion)		Combined Stress (out-of-plane bending stress + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	6.205	17.42	-1.00	-43.95	-1.87	-43.95	0.00	16.42	-1.87	0.00	0.00
	Middle	6.338	17.79	-1.00	-17.69	-1.87	-17.69	0.00	16.79	-1.87	0.00	0.00
	Outside	6.470	18.16	-1.00	8.57	-1.87	8.57	0.00	17.16	-1.87	0.00	0.00
20	Inside	2.837	7.96	-1.00	-0.18	0.12	-0.18	0.00	6.96	0.12	0.00	0.00
	Middle	2.970	8.34	-1.00	0.00	0.12	0.00	0.00	7.34	0.12	0.00	0.00
	Outside	3.102	8.71	-1.00	0.18	0.12	0.18	0.00	7.71	0.12	0.00	0.00
21	Inside	0.000	0.00	-1.00	-38.26	1.86	-38.26	0.00	-1.00	1.86	0.00	0.00
	Middle	0.133	0.37	-1.00	-35.37	1.86	-35.37	0.00	-0.63	1.86	0.00	0.00
	Outside	0.265	0.74	-1.00	-32.48	1.86	-32.48	0.00	-0.26	1.86	0.00	0.00
22	Inside	0.000	0.00	-1.00	-5.10	-0.57	-5.10	0.00	-1.00	-0.57	0.00	0.00
	Middle	0.133	-0.37	-1.00	-2.21	-0.57	-2.21	0.00	-1.37	-0.57	0.00	0.00
	Outside	0.265	-0.74	-1.00	0.68	-0.57	0.68	0.00	-1.74	-0.57	0.00	0.00
23	Inside	2.837	-7.96	-1.00	6.12	0.25	6.12	0.00	-8.96	0.25	0.00	0.00
	Middle	2.970	-8.34	-1.00	-2.21	0.25	-2.21	0.00	-9.34	0.25	0.00	0.00
	Outside	3.102	-8.71	-1.00	-10.53	0.25	-10.53	0.00	-9.71	0.25	0.00	0.00
24	Inside	6.205	-17.42	-1.00	-40.26	1.07	-40.26	0.00	-18.42	1.07	0.00	0.00
	Middle	6.338	-17.79	-1.00	-2.21	1.07	-2.21	0.00	-18.79	1.07	0.00	0.00
	Outside	6.470	-18.16	-1.00	35.85	1.07	35.85	0.00	-19.16	1.07	0.00	0.00
25	Inside	6.205	-17.42	0.00	20.29	-1.05	20.29	0.00	-17.42	-1.05	0.00	0.00
	Middle	6.421	-18.03	0.00	-2.09	-1.05	-2.09	0.00	-18.03	-1.05	0.00	0.00
	Outside	6.637	-18.63	0.00	-24.47	-1.05	-24.47	0.00	-18.63	-1.05	0.00	0.00
26	Inside	3.102	-8.71	0.00	-7.95	-0.55	-7.95	0.00	-8.71	-0.55	0.00	0.00
	Middle	3.318	-9.31	0.00	-2.09	-0.55	-2.09	0.00	-9.31	-0.55	0.00	0.00
	Outside	3.534	-9.92	0.00	3.77	-0.55	3.77	0.00	-9.92	-0.55	0.00	0.00
27	Inside	0.000	0.00	0.00	-18.73	-0.06	-18.73	0.00	0.00	-0.06	0.00	0.00
	Middle	0.216	-0.61	0.00	-2.09	-0.06	-2.09	0.00	-0.61	-0.06	0.00	0.00
	Outside	0.431	-1.21	0.00	14.55	-0.06	14.55	0.00	-1.21	-0.06	0.00	0.00
28	Inside	0.000	0.00	0.00	14.62	0.07	14.62	0.00	0.00	0.07	0.00	0.00
	Middle	0.216	-0.61	0.00	-2.12	0.07	-2.12	0.00	-0.61	0.07	0.00	0.00
	Outside	0.431	-1.21	0.00	-18.86	0.07	-18.86	0.00	-1.21	0.07	0.00	0.00
29	Inside	3.102	-8.71	0.00	3.59	0.56	3.59	0.00	-8.71	0.56	0.00	0.00
	Middle	3.318	-9.31	0.00	-2.12	0.56	-2.12	0.00	-9.31	0.56	0.00	0.00
	Outside	3.534	-9.92	0.00	-7.84	0.56	-7.84	0.00	-9.92	0.56	0.00	0.00
30	Inside	6.205	-17.42	0.00	-24.90	1.06	-24.90	0.00	-17.42	1.06	0.00	0.00
	Middle	6.421	-18.03	0.00	-2.12	1.06	-2.12	0.00	-18.03	1.06	0.00	0.00
	Outside	6.637	-18.63	0.00	20.65	1.06	20.65	0.00	-18.63	1.06	0.00	0.00
31	Inside	0.000	0.00	0.00	24.77	-1.24	24.77	0.00	0.00	-1.24	0.00	0.00
	Middle	0.216	0.61	0.00	-3.66	-1.24	-3.66	0.00	0.61	-1.24	0.00	0.00
	Outside	0.431	1.21	0.00	-32.09	-1.24	-32.09	0.00	1.21	-1.24	0.00	0.00
32	Inside	3.102	8.71	0.00	-10.19	-0.74	-10.19	0.00	8.71	-0.74	0.00	0.00
	Middle	3.318	9.31	0.00	-3.66	-0.74	-3.66	0.00	9.31	-0.74	0.00	0.00
	Outside	3.534	9.92	0.00	2.86	-0.74	2.86	0.00	9.92	-0.74	0.00	0.00
33	Inside	6.205	17.42	0.00	-27.68	-0.25	-27.68	0.00	17.42	-0.25	0.00	0.00
	Middle	6.421	18.03	0.00	-3.66	-0.25	-3.66	0.00	18.03	-0.25	0.00	0.00
	Outside	6.637	18.63	0.00	20.36	-0.25	20.36	0.00	18.63	-0.25	0.00	0.00
34	Inside	0.000	0.00	0.00	-32.04	1.24	-32.04	0.00	0.00	1.24	0.00	0.00
	Middle	0.216	0.61	0.00	-3.71	1.24	-3.71	0.00	0.61	1.24	0.00	0.00
	Outside	0.431	1.21	0.00	24.62	1.24	24.62	0.00	1.21	1.24	0.00	0.00
35	Inside	3.102	8.71	0.00	2.85	0.74	2.85	0.00	8.71	0.74	0.00	0.00
	Middle	3.318	9.31	0.00	-3.71	0.74	-3.71	0.00	9.31	0.74	0.00	0.00
	Outside	3.534	9.92	0.00	-10.27	0.74	-10.27	0.00	9.92	0.74	0.00	0.00
36	Inside	6.205	17.42	0.00	20.27	0.25	20.27	0.00	17.42	0.25	0.00	0.00
	Middle	6.421	18.03	0.00	-3.71	0.25	-3.71	0.00	18.03	0.25	0.00	0.00
	Outside	6.637	18.63	0.00	-27.69	0.25	-27.69	0.00	18.63	0.25	0.00	0.00

TABLE 2.10.9-50 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 21-E, CORNER ORIENTATION - 30-FT SIDE DROP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	5.29	0.00	-19.63	-0.48	0.00	0.00	5.33	-0.04	-19.63	24.96	Pm+Pb	98.20	2.93
	Middle		-1.16	0.00	-20.00	-0.48	0.00	0.00	0.17	-1.33	-20.00	20.17	Pm	68.74	2.41
	Outside		-7.60	0.00	-20.37	-0.48	0.00	0.00	0.03	-7.63	-20.37	20.40	Pm+Pb	98.20	3.81
2	Inside	75j	10.32	0.00	-28.34	0.34	0.00	0.00	10.33	-0.01	-28.34	38.67	Pm+Pb	98.20	1.54
	Middle		-1.16	0.00	-28.71	0.34	0.00	0.00	0.09	-1.25	-28.71	28.80	Pm	68.74	1.39
	Outside		-12.64	0.00	-29.08	0.34	0.00	0.00	0.01	-12.65	-29.08	29.09	Pm+Pb	98.20	2.38
3	Inside	80j	-42.24	0.00	-37.05	1.16	0.00	0.00	0.03	-37.05	-42.27	42.30	Pm+Pb	98.20	1.32
	Middle		-1.16	0.00	-37.42	1.16	0.00	0.00	0.72	-1.88	-37.42	38.14	Pm	68.74	0.80
	Outside		39.92	0.00	-37.79	1.16	0.00	0.00	39.95	-0.03	-37.79	77.75	Pm+Pb	98.20	0.26
4	Inside	40j	-42.24	0.00	-37.05	-1.16	0.00	0.00	0.03	-37.05	-42.27	42.30	Pm+Pb	98.20	1.32
	Middle		-1.16	0.00	-37.42	-1.16	0.00	0.00	0.72	-1.88	-37.42	38.14	Pm	68.74	0.80
	Outside		39.92	0.00	-37.79	-1.16	0.00	0.00	39.95	-0.03	-37.79	77.75	Pm+Pb	98.20	0.26
5	Inside	35j	10.21	0.00	-28.34	-0.34	0.00	0.00	10.22	-0.01	-28.34	38.56	Pm+Pb	98.20	1.55
	Middle		-1.16	0.00	-28.71	-0.34	0.00	0.00	0.09	-1.25	-28.71	28.80	Pm	68.74	1.39
	Outside		-12.53	0.00	-29.08	-0.34	0.00	0.00	0.01	-12.54	-29.08	29.09	Pm+Pb	98.20	2.38
6	Inside	31i	5.06	0.00	-19.63	0.48	0.00	0.00	5.11	-0.05	-19.63	24.73	Pm+Pb	98.20	2.97
	Middle		-1.16	0.00	-20.00	0.48	0.00	0.00	0.17	-1.33	-20.00	20.17	Pm	68.74	2.41
	Outside		-7.38	0.00	-20.37	0.48	0.00	0.00	0.03	-7.41	-20.37	20.40	Pm+Pb	98.20	3.81
7	Inside	30j	-41.29	0.00	-18.42	-1.10	0.00	0.00	0.03	-18.42	-41.32	41.35	Pm+Pb	98.20	1.37
	Middle		-2.21	0.00	-18.79	-1.10	0.00	0.00	0.45	-2.66	-18.79	19.25	Pm	68.74	2.57
	Outside		36.86	0.00	-19.16	-1.10	0.00	0.00	36.89	-0.03	-19.16	56.06	Pm+Pb	98.20	0.75
8	Inside	25j	6.86	0.00	-8.96	-0.28	0.00	0.00	6.87	-0.01	-8.96	15.84	Pm+Pb	98.20	5.20
	Middle		-2.21	0.00	-9.34	-0.28	0.00	0.00	0.03	-2.24	-9.34	9.37	Pm	68.74	6.33
	Outside		-11.29	0.00	-9.71	-0.28	0.00	0.00	0.01	-9.71	-11.30	11.30	Pm+Pb	98.20	7.69
9	Inside	21j	-2.59	0.00	-1.00	0.55	0.00	0.00	0.11	-1.00	-2.70	2.81	Pm+Pb	98.20	33.90
	Middle		-2.21	0.00	-1.37	0.55	0.00	0.00	0.13	-1.37	-2.34	2.47	Pm	68.74	26.85
	Outside		-1.84	0.00	-1.74	0.55	0.00	0.00	0.15	-1.74	-1.99	2.14	Pm+Pb	98.20	44.81

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TABLE 2.10.9-50 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 21-E, CORNER ORIENTATION - 30-FT SIDE DROP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	-9.22	0.00	-1.00	-0.48	0.00	0.00	0.02	-1.00	-9.24	9.27	Pm+Pb	98.20	9.59
	Middle		-8.84	0.00	-0.63	-0.48	0.00	0.00	0.03	-0.63	-8.87	8.89	Pm	68.74	6.73
	Outside		-8.47	0.00	-0.26	-0.48	0.00	0.00	0.03	-0.26	-8.50	8.52	Pm+Pb	98.20	10.52
11	Inside	15j	-0.22	0.00	6.96	-0.12	0.00	0.00	6.96	0.05	-0.27	7.24	Pm+Pb	98.20	12.57
	Middle		0.00	0.00	7.34	-0.12	0.00	0.00	7.34	0.12	-0.12	7.46	Pm	68.74	8.22
	Outside		0.22	0.00	7.71	-0.12	0.00	0.00	7.71	0.27	-0.05	7.76	Pm+Pb	98.20	11.65
12	Inside	11i	-43.99	0.00	16.42	1.88	0.00	0.00	16.42	0.08	-44.07	60.49	Pm+Pb	98.20	0.62
	Middle		-17.69	0.00	16.79	1.88	0.00	0.00	16.79	0.20	-17.89	34.68	Pm	68.74	0.98
	Outside		8.61	0.00	17.16	1.88	0.00	0.00	17.16	9.00	-0.39	17.56	Pm+Pb	98.20	4.59
13	Inside	10j	3.78	0.00	17.63	2.13	0.00	0.00	17.63	4.74	-0.96	18.59	Pm+Pb	98.20	4.28
	Middle		-17.69	0.00	18.00	2.13	0.00	0.00	18.00	0.25	-17.94	35.94	Pm	68.74	0.91
	Outside		-39.15	0.00	18.37	2.13	0.00	0.00	18.37	0.12	-39.27	57.64	Pm+Pb	98.20	0.70
14	Inside	5j	-27.81	0.00	26.34	0.10	0.00	0.00	26.34	0.00	-27.81	54.15	Pm+Pb	98.20	0.81
	Middle		-24.32	0.00	26.71	0.10	0.00	0.00	26.71	0.00	-24.32	51.03	Pm	68.74	0.35
	Outside		-20.82	0.00	27.08	0.10	0.00	0.00	27.08	0.00	-20.82	47.90	Pm+Pb	98.20	1.05
15	Inside	1i	-20.94	0.00	35.05	0.60	0.00	0.00	35.05	0.02	-20.96	56.00	Pm+Pb	98.20	0.75
	Middle		-13.26	0.00	35.42	0.60	0.00	0.00	35.42	0.03	-13.29	48.71	Pm	68.74	0.41
	Outside		-5.58	0.00	35.79	0.60	0.00	0.00	35.79	0.06	-5.64	41.44	Pm+Pb	98.20	1.37
16	Inside	41i	-20.94	0.00	35.05	-0.60	0.00	0.00	35.05	0.02	-20.96	56.00	Pm+Pb	98.20	0.75
	Middle		-13.26	0.00	35.42	-0.60	0.00	0.00	35.42	0.03	-13.29	48.71	Pm	68.74	0.41
	Outside		-5.58	0.00	35.79	-0.60	0.00	0.00	35.79	0.06	-5.64	41.44	Pm+Pb	98.20	1.37
17	Inside	45j	-27.81	0.00	26.34	-0.10	0.00	0.00	26.34	0.00	-27.81	54.15	Pm+Pb	98.20	0.81
	Middle		-24.32	0.00	26.71	-0.10	0.00	0.00	26.71	0.00	-24.32	51.03	Pm	68.74	0.35
	Outside		-20.82	0.00	27.08	-0.10	0.00	0.00	27.08	0.00	-20.82	47.90	Pm+Pb	98.20	1.05
18	Inside	50j	3.74	0.00	17.63	-2.12	0.00	0.00	17.63	4.70	-0.96	18.59	Pm+Pb	98.20	4.28
	Middle		-17.69	0.00	18.00	-2.12	0.00	0.00	18.00	0.25	-17.94	35.94	Pm	68.74	0.91
	Outside		-39.11	0.00	18.37	-2.12	0.00	0.00	18.37	0.11	-39.22	57.60	Pm+Pb	98.20	0.70

TABLE 2.10.9-50 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 21-E, CORNER ORIENTATION - 30-FT SIDE DROP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	-43.95	0.00	16.42	-1.87	0.00	0.00	16.42	0.08	-44.03	60.45	Pm+Pb	98.20	0.62
	Middle		-17.69	0.00	16.79	-1.87	0.00	0.00	16.79	0.20	-17.89	34.68	Pm	68.74	0.98
	Outside		8.57	0.00	17.16	-1.87	0.00	0.00	17.16	8.96	-0.39	17.55	Pm+Pb	98.20	4.59
20	Inside	55j	-0.18	0.00	6.96	0.12	0.00	0.00	6.96	0.06	-0.24	7.20	Pm+Pb	98.20	12.63
	Middle		0.00	0.00	7.34	0.12	0.00	0.00	7.34	0.12	-0.12	7.46	Pm	68.74	8.22
	Outside		0.18	0.00	7.71	0.12	0.00	0.00	7.71	0.24	-0.06	7.77	Pm+Pb	98.20	11.64
21	Inside	60j	-38.26	0.00	-1.00	1.86	0.00	0.00	0.09	-1.00	-38.35	38.44	Pm+Pb	98.20	1.55
	Middle		-35.37	0.00	-0.63	1.86	0.00	0.00	0.10	-0.63	-35.47	35.57	Pm	68.74	0.93
	Outside		-32.48	0.00	-0.26	1.86	0.00	0.00	0.11	-0.26	-32.59	32.69	Pm+Pb	98.20	2.00
22	Inside	61i	-5.10	0.00	-1.00	-0.57	0.00	0.00	0.06	-1.00	-5.16	5.23	Pm+Pb	98.20	17.79
	Middle		-2.21	0.00	-1.37	-0.57	0.00	0.00	0.14	-1.37	-2.35	2.49	Pm	68.74	26.64
	Outside		0.68	0.00	-1.74	-0.57	0.00	0.00	1.00	-0.32	-1.74	2.75	Pm+Pb	98.20	34.74
23	Inside	65j	6.12	0.00	-8.96	0.25	0.00	0.00	6.13	-0.01	-8.96	15.09	Pm+Pb	98.20	5.51
	Middle		-2.21	0.00	-9.34	0.25	0.00	0.00	0.03	-2.24	-9.34	9.37	Pm	68.74	6.34
	Outside		-10.53	0.00	-9.71	0.25	0.00	0.00	0.01	-9.71	-10.54	10.54	Pm+Pb	98.20	8.32
24	Inside	70j	-40.26	0.00	-18.42	1.07	0.00	0.00	0.03	-18.42	-40.29	40.32	Pm+Pb	98.20	1.44
	Middle		-2.21	0.00	-18.79	1.07	0.00	0.00	0.43	-2.64	-18.79	19.23	Pm	68.74	2.58
	Outside		35.85	0.00	-19.16	1.07	0.00	0.00	35.88	-0.03	-19.16	55.04	Pm+Pb	98.20	0.78
25	Inside	120j	20.29	0.00	-17.42	-1.05	0.00	0.00	20.34	-0.05	-17.42	37.76	Pm+Pb	61.46	0.63
	Middle		-2.09	0.00	-18.03	-1.05	0.00	0.00	0.44	-2.53	-18.03	18.46	Pm	43.02	1.33
	Outside		-24.47	0.00	-18.63	-1.05	0.00	0.00	0.04	-18.63	-24.51	24.56	Pm+Pb	61.46	1.50
26	Inside	115j	-7.95	0.00	-8.71	-0.55	0.00	0.00	0.04	-7.99	-8.71	8.75	Pm+Pb	94.56	9.81
	Middle		-2.09	0.00	-9.31	-0.55	0.00	0.00	0.14	-2.23	-9.31	9.45	Pm	66.19	6.00
	Outside		3.77	0.00	-9.92	-0.55	0.00	0.00	3.85	-0.08	-9.92	13.77	Pm+Pb	94.56	5.87
27	Inside	111i	-18.73	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	-18.73	18.73	Pm+Pb	94.56	4.05
	Middle		-2.09	0.00	-0.61	-0.06	0.00	0.00	0.00	-0.61	-2.09	2.09	Pm	66.19	30.62
	Outside		14.55	0.00	-1.21	-0.06	0.00	0.00	14.55	0.00	-1.21	15.76	Pm+Pb	94.56	5.00

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TABLE 2.10.9-50 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 21-E, CORNER ORIENTATION - 30-FT SIDE DROP SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	14.62	0.00	0.00	0.07	0.00	0.00	14.62	0.00	0.00	14.62	Pm+Pb	94.56	5.47
	Middle		-2.12	0.00	-0.61	0.07	0.00	0.00	0.00	-0.61	-2.12	2.12	Pm	66.19	30.15
	Outside		-18.86	0.00	-1.21	0.07	0.00	0.00	0.00	-1.21	-18.86	18.86	Pm+Pb	94.56	4.01
29	Inside	105j	3.59	0.00	-8.71	0.56	0.00	0.00	3.68	-0.09	-8.71	12.38	Pm+Pb	94.56	6.64
	Middle		-2.12	0.00	-9.31	0.56	0.00	0.00	0.14	-2.26	-9.31	9.45	Pm	66.19	6.00
	Outside		-7.84	0.00	-9.92	0.56	0.00	0.00	0.04	-7.88	-9.92	9.96	Pm+Pb	94.56	8.49
30	Inside	110j	-24.90	0.00	-17.42	1.06	0.00	0.00	0.05	-17.42	-24.95	24.99	Pm+Pb	61.46	1.46
	Middle		-2.12	0.00	-18.03	1.06	0.00	0.00	0.44	-2.56	-18.03	18.46	Pm	43.02	1.33
	Outside		20.65	0.00	-18.63	1.06	0.00	0.00	20.70	-0.05	-18.63	39.34	Pm+Pb	61.46	0.56
31	Inside	90j	24.77	0.00	0.00	-1.24	0.00	0.00	24.83	0.00	-0.06	24.89	Pm+Pb	94.56	2.80
	Middle		-3.66	0.00	0.61	-1.24	0.00	0.00	0.61	0.38	-4.04	4.65	Pm	66.19	13.24
	Outside		-32.09	0.00	1.21	-1.24	0.00	0.00	1.21	0.05	-32.14	33.35	Pm+Pb	94.56	1.84
32	Inside	85j	-10.19	0.00	8.71	-0.74	0.00	0.00	8.71	0.05	-10.24	18.95	Pm+Pb	94.56	3.99
	Middle		-3.66	0.00	9.31	-0.74	0.00	0.00	9.31	0.14	-3.80	13.12	Pm	66.19	4.05
	Outside		2.86	0.00	9.92	-0.74	0.00	0.00	9.92	3.04	-0.18	10.10	Pm+Pb	94.56	8.36
33	Inside	81i	-27.68	0.00	17.42	-0.25	0.00	0.00	17.42	0.00	-27.68	45.10	Pm+Pb	61.46	0.36
	Middle		-3.66	0.00	18.03	-0.25	0.00	0.00	18.03	0.02	-3.68	21.70	Pm	43.02	0.98
	Outside		20.36	0.00	18.63	-0.25	0.00	0.00	20.36	18.63	0.00	20.37	Pm+Pb	61.46	2.02
34	Inside	100j	-32.04	0.00	0.00	1.24	0.00	0.00	0.05	0.00	-32.09	32.14	Pm+Pb	94.56	1.94
	Middle		-3.71	0.00	0.61	1.24	0.00	0.00	0.61	0.38	-4.09	4.69	Pm	66.19	13.11
	Outside		24.62	0.00	1.21	1.24	0.00	0.00	24.68	1.21	-0.06	24.74	Pm+Pb	94.56	2.82
35	Inside	95j	2.85	0.00	8.71	0.74	0.00	0.00	8.71	3.03	-0.18	8.89	Pm+Pb	94.56	9.64
	Middle		-3.71	0.00	9.31	0.74	0.00	0.00	9.31	0.14	-3.85	13.17	Pm	66.19	4.03
	Outside		-10.27	0.00	9.92	0.74	0.00	0.00	9.92	0.05	-10.32	20.24	Pm+Pb	94.56	3.67
36	Inside	91i	20.27	0.00	17.42	0.25	0.00	0.00	20.27	17.42	0.00	20.28	Pm+Pb	61.46	2.03
	Middle		-3.71	0.00	18.03	0.25	0.00	0.00	18.03	0.02	-3.73	21.75	Pm	43.02	0.98
	Outside		-27.69	0.00	18.63	0.25	0.00	0.00	18.63	0.00	-27.69	46.32	Pm+Pb	61.46	0.33

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TABLE 2.10.9-51 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 22-E, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP SECTION E MOM. = 46 X 10^6 in-lb

Stress Location	Location in Wall	30-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress+MNOP + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	6.636	-18.63	-1.00	31.24	0.49	31.24	0.00	-19.63	0.49	0.00	0.00
	Middle	6.768	-19.00	-1.00	-0.26	0.49	-0.26	0.00	-20.00	0.49	0.00	0.00
	Outside	6.901	-19.37	-1.00	-31.76	0.49	-31.76	0.00	-20.37	0.49	0.00	0.00
2	Inside	9.738	-27.34	-1.00	0.60	0.38	0.60	0.00	-28.34	0.38	0.00	0.00
	Middle	9.871	-27.71	-1.00	-0.26	0.38	-0.26	0.00	-28.71	0.38	0.00	0.00
	Outside	10.003	-28.08	-1.00	-1.12	0.38	-1.12	0.00	-29.08	0.38	0.00	0.00
3	Inside	12.840	-36.05	-1.00	-21.94	0.26	-21.94	0.00	-37.05	0.26	0.00	0.00
	Middle	12.974	-36.42	-1.00	-0.26	0.26	-0.26	0.00	-37.42	0.26	0.00	0.00
	Outside	13.106	-36.79	-1.00	21.41	0.26	21.41	0.00	-37.79	0.26	0.00	0.00
4	Inside	12.840	-36.05	-1.00	-21.94	-0.26	-21.94	0.00	-37.05	-0.26	0.00	0.00
	Middle	12.974	-36.42	-1.00	-0.26	-0.26	-0.26	0.00	-37.42	-0.26	0.00	0.00
	Outside	13.106	-36.79	-1.00	21.41	-0.26	21.41	0.00	-37.79	-0.26	0.00	0.00
5	Inside	9.738	-27.34	-1.00	0.49	-0.38	0.49	0.00	-28.34	-0.38	0.00	0.00
	Middle	9.871	-27.71	-1.00	-0.26	-0.38	-0.26	0.00	-28.71	-0.38	0.00	0.00
	Outside	10.003	-28.08	-1.00	-1.01	-0.38	-1.01	0.00	-29.08	-0.38	0.00	0.00
6	Inside	6.636	-18.63	-1.00	31.02	-0.49	31.02	0.00	-19.63	-0.49	0.00	0.00
	Middle	6.768	-19.00	-1.00	-0.26	-0.49	-0.26	0.00	-20.00	-0.49	0.00	0.00
	Outside	6.901	-19.37	-1.00	-31.54	-0.49	-31.54	0.00	-20.37	-0.49	0.00	0.00
7	Inside	6.205	-17.42	-1.00	-17.64	-0.14	-17.64	0.00	-18.42	-0.14	0.00	0.00
	Middle	6.338	-17.79	-1.00	-1.37	-0.14	-1.37	0.00	-18.79	-0.14	0.00	0.00
	Outside	6.470	-18.16	-1.00	14.91	-0.14	14.91	0.00	-19.16	-0.14	0.00	0.00
8	Inside	2.837	-7.96	-1.00	-3.99	-0.25	-3.99	0.00	-8.96	-0.25	0.00	0.00
	Middle	2.970	-8.34	-1.00	-1.37	-0.25	-1.37	0.00	-9.34	-0.25	0.00	0.00
	Outside	3.102	-8.71	-1.00	1.26	-0.25	1.26	0.00	-9.71	-0.25	0.00	0.00
9	Inside	0.000	0.00	-1.00	17.76	-0.37	17.76	0.00	-1.00	-0.37	0.00	0.00
	Middle	0.133	-0.37	-1.00	-1.37	-0.37	-1.37	0.00	-1.37	-0.37	0.00	0.00
	Outside	0.265	-0.74	-1.00	-20.49	-0.37	-20.49	0.00	-1.74	-0.37	0.00	0.00
10	Inside	0.000	0.00	-1.00	10.28	1.15	10.28	0.00	-1.00	1.15	0.00	0.00
	Middle	0.133	0.37	-1.00	-8.84	1.15	-8.84	0.00	-0.63	1.15	0.00	0.00
	Outside	0.265	0.74	-1.00	-27.97	1.15	-27.97	0.00	-0.26	1.15	0.00	0.00
11	Inside	2.837	7.96	-1.00	-3.73	-0.65	-3.73	0.00	6.96	-0.65	0.00	0.00
	Middle	2.970	8.34	-1.00	-2.21	-0.65	-2.21	0.00	7.34	-0.65	0.00	0.00
	Outside	3.102	8.71	-1.00	-0.70	-0.65	-0.70	0.00	7.71	-0.65	0.00	0.00
12	Inside	6.205	17.42	-1.00	-44.67	1.45	-44.67	0.00	16.42	1.45	0.00	0.00
	Middle	6.338	17.79	-1.00	-19.90	1.45	-19.90	0.00	16.79	1.45	0.00	0.00
	Outside	6.470	18.16	-1.00	4.88	1.45	4.88	0.00	17.16	1.45	0.00	0.00
13	Inside	6.636	18.63	-1.00	-4.14	1.95	-4.14	0.00	17.63	1.95	0.00	0.00
	Middle	6.768	19.00	-1.00	-22.11	1.95	-22.11	0.00	18.00	1.95	0.00	0.00
	Outside	6.901	19.37	-1.00	-40.07	1.95	-40.07	0.00	18.37	1.95	0.00	0.00
14	Inside	9.738	27.34	-1.00	-29.59	-0.28	-29.59	0.00	26.34	-0.28	0.00	0.00
	Middle	9.871	27.71	-1.00	-24.32	-0.28	-24.32	0.00	26.71	-0.28	0.00	0.00
	Outside	10.003	28.08	-1.00	-19.05	-0.28	-19.05	0.00	27.08	-0.28	0.00	0.00
15	Inside	12.840	36.05	-1.00	-13.01	-0.08	-13.01	0.00	35.05	-0.08	0.00	0.00
	Middle	12.974	36.42	-1.00	-13.26	-0.08	-13.26	0.00	35.42	-0.08	0.00	0.00
	Outside	13.106	36.79	-1.00	-13.52	-0.08	-13.52	0.00	35.79	-0.08	0.00	0.00
16	Inside	12.840	36.05	-1.00	-13.01	0.08	-13.01	0.00	35.05	0.08	0.00	0.00
	Middle	12.974	36.42	-1.00	-13.26	0.08	-13.26	0.00	35.42	0.08	0.00	0.00
	Outside	13.106	36.79	-1.00	-13.52	0.08	-13.52	0.00	35.79	0.08	0.00	0.00
17	Inside	9.738	27.34	-1.00	-29.59	0.28	-29.59	0.00	26.34	0.28	0.00	0.00
	Middle	9.871	27.71	-1.00	-24.32	0.28	-24.32	0.00	26.71	0.28	0.00	0.00
	Outside	10.003	28.08	-1.00	-19.05	0.28	-19.05	0.00	27.08	0.28	0.00	0.00
18	Inside	6.636	18.63	-1.00	-4.18	-1.95	-4.18	0.00	17.63	-1.95	0.00	0.00
	Middle	6.768	19.00	-1.00	-22.11	-1.95	-22.11	0.00	18.00	-1.95	0.00	0.00
	Outside	6.901	19.37	-1.00	-40.04	-1.95	-40.04	0.00	18.37	-1.95	0.00	0.00

TABLE 2.10.9-51 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 22-E, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP SECTION E MOM. = 46 X 10^6 in-lb

Stress Location	Location in Wall	30-FTt Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress+MNOP + Thermal + Frame Analysis)					
(Fig 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	6.205	17.42	-1.00	-44.63	-1.45	-44.63	0.00	16.42	-1.45	0.00	0.00
	Middle	6.338	17.79	-1.00	-19.90	-1.45	-19.90	0.00	16.79	-1.45	0.00	0.00
	Outside	6.470	18.16	-1.00	4.84	-1.45	4.84	0.00	17.16	-1.45	0.00	0.00
20	Inside	2.837	7.96	-1.00	-3.68	0.65	-3.68	0.00	6.96	0.65	0.00	0.00
	Middle	2.970	8.34	-1.00	-2.21	0.65	-2.21	0.00	7.34	0.65	0.00	0.00
	Outside	3.102	8.71	-1.00	-0.74	0.65	-0.74	0.00	7.71	0.65	0.00	0.00
21	Inside	0.000	0.00	-1.00	-18.76	0.23	-18.76	0.00	-1.00	0.23	0.00	0.00
	Middle	0.133	0.37	-1.00	-35.37	0.23	-35.37	0.00	-0.63	0.23	0.00	0.00
	Outside	0.265	0.74	-1.00	-51.98	0.23	-51.98	0.00	-0.26	0.23	0.00	0.00
22	Inside	0.000	0.00	-1.00	15.25	0.34	15.25	0.00	-1.00	0.34	0.00	0.00
	Middle	0.133	-0.37	-1.00	-1.36	0.34	-1.36	0.00	-1.37	0.34	0.00	0.00
	Outside	0.265	-0.74	-1.00	-17.97	0.34	-17.97	0.00	-1.74	0.34	0.00	0.00
23	Inside	2.837	-7.96	-1.00	-4.73	0.23	-4.73	0.00	-8.96	0.23	0.00	0.00
	Middle	2.970	-8.34	-1.00	-1.36	0.23	-1.36	0.00	-9.34	0.23	0.00	0.00
	Outside	3.102	-8.71	-1.00	2.02	0.23	2.02	0.00	-9.71	0.23	0.00	0.00
24	Inside	6.205	-17.42	-1.00	-16.61	0.11	-16.61	0.00	-18.42	0.11	0.00	0.00
	Middle	6.338	-17.79	-1.00	-1.36	0.11	-1.36	0.00	-18.79	0.11	0.00	0.00
	Outside	6.470	-18.16	-1.00	13.90	0.11	13.90	0.00	-19.16	0.11	0.00	0.00
25	Inside	6.205	-17.42	0.00	24.03	-1.09	24.03	0.00	-17.42	-1.09	0.00	0.00
	Middle	6.421	-18.03	0.00	0.51	-1.09	0.51	0.00	-18.03	-1.09	0.00	0.00
	Outside	6.637	-18.63	0.00	-23.00	-1.09	-23.00	0.00	-18.63	-1.09	0.00	0.00
26	Inside	3.102	-8.71	0.00	-5.87	-0.60	-5.87	0.00	-8.71	-0.60	0.00	0.00
	Middle	3.318	-9.31	0.00	0.51	-0.60	0.51	0.00	-9.31	-0.60	0.00	0.00
	Outside	3.534	-9.92	0.00	6.90	-0.60	6.90	0.00	-9.92	-0.60	0.00	0.00
27	Inside	0.000	0.00	0.00	-18.30	-0.10	-18.30	0.00	0.00	-0.10	0.00	0.00
	Middle	0.216	-0.61	0.00	0.51	-0.10	0.51	0.00	-0.61	-0.10	0.00	0.00
	Outside	0.431	-1.21	0.00	19.33	-0.10	19.33	0.00	-1.21	-0.10	0.00	0.00
28	Inside	0.000	0.00	0.00	19.40	0.11	19.40	0.00	0.00	0.11	0.00	0.00
	Middle	0.216	-0.61	0.00	0.48	0.11	0.48	0.00	-0.61	0.11	0.00	0.00
	Outside	0.431	-1.21	0.00	-18.44	0.11	-18.44	0.00	-1.21	0.11	0.00	0.00
29	Inside	3.102	-8.71	0.00	6.71	0.61	6.71	0.00	-8.71	0.61	0.00	0.00
	Middle	3.318	-9.31	0.00	0.48	0.61	0.48	0.00	-9.31	0.61	0.00	0.00
	Outside	3.534	-9.92	0.00	-5.75	0.61	-5.75	0.00	-9.92	0.61	0.00	0.00
30	Inside	6.205	-17.42	0.00	-23.43	1.10	-23.43	0.00	-17.42	1.10	0.00	0.00
	Middle	6.421	-18.03	0.00	0.48	1.10	0.48	0.00	-18.03	1.10	0.00	0.00
	Outside	6.637	-18.63	0.00	24.39	1.10	24.39	0.00	-18.63	1.10	0.00	0.00
31	Inside	0.000	0.00	0.00	24.85	-1.16	24.85	0.00	0.00	-1.16	0.00	0.00
	Middle	0.216	0.61	0.00	-0.90	-1.16	-0.90	0.00	0.61	-1.16	0.00	0.00
	Outside	0.431	1.21	0.00	-26.64	-1.16	-26.64	0.00	1.21	-1.16	0.00	0.00
32	Inside	3.102	8.71	0.00	-7.50	-0.67	-7.50	0.00	8.71	-0.67	0.00	0.00
	Middle	3.318	9.31	0.00	-0.90	-0.67	-0.90	0.00	9.31	-0.67	0.00	0.00
	Outside	3.534	9.92	0.00	5.71	-0.67	5.71	0.00	9.92	-0.67	0.00	0.00
33	Inside	6.205	17.42	0.00	-22.39	-0.17	-22.39	0.00	17.42	-0.17	0.00	0.00
	Middle	6.421	18.03	0.00	-0.90	-0.17	-0.90	0.00	18.03	-0.17	0.00	0.00
	Outside	6.637	18.63	0.00	20.60	-0.17	20.60	0.00	18.63	-0.17	0.00	0.00
34	Inside	0.000	0.00	0.00	-26.58	1.16	-26.58	0.00	0.00	1.16	0.00	0.00
	Middle	0.216	0.61	0.00	-0.95	1.16	-0.95	0.00	0.61	1.16	0.00	0.00
	Outside	0.431	1.21	0.00	24.69	1.16	24.69	0.00	1.21	1.16	0.00	0.00
35	Inside	3.102	8.71	0.00	5.69	0.67	5.69	0.00	8.71	0.67	0.00	0.00
	Middle	3.318	9.31	0.00	-0.95	0.67	-0.95	0.00	9.31	0.67	0.00	0.00
	Outside	3.534	9.92	0.00	-7.58	0.67	-7.58	0.00	9.92	0.67	0.00	0.00
36	Inside	6.205	17.42	0.00	20.51	0.17	20.51	0.00	17.42	0.17	0.00	0.00
	Middle	6.421	18.03	0.00	-0.95	0.17	-0.95	0.00	18.03	0.17	0.00	0.00
	Outside	6.637	18.63	0.00	-22.40	0.17	-22.40	0.00	18.63	0.17	0.00	0.00

TABLE 2.10.9-52 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress Int	Stress Type	Stress Limit	Design Margin
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3				
1	Inside	71i	31.24	0.00	-19.63	0.49	0.00	0.00	31.25	-0.01	-19.63	50.88	Pm+Pb	98.20	0.93
	Middle		-0.26	0.00	-20.00	0.49	0.00	0.00	0.38	-0.64	-20.00	20.38	Pm	68.74	2.37
	Outside		-31.76	0.00	-20.37	0.49	0.00	0.00	0.01	-20.37	-31.77	31.78	Pm+Pb	98.20	2.09
2	Inside	75j	0.60	0.00	-28.34	0.38	0.00	0.00	0.78	-0.18	-28.34	29.12	Pm+Pb	98.20	2.37
	Middle		-0.26	0.00	-28.71	0.38	0.00	0.00	0.27	-0.53	-28.71	28.98	Pm	68.74	1.37
	Outside		-1.12	0.00	-29.08	0.38	0.00	0.00	0.12	-1.24	-29.08	29.20	Pm+Pb	98.20	2.36
3	Inside	80j	-21.94	0.00	-37.05	0.26	0.00	0.00	0.00	-21.94	-37.05	37.05	Pm+Pb	98.20	1.65
	Middle		-0.26	0.00	-37.42	0.26	0.00	0.00	0.16	-0.42	-37.42	37.58	Pm	68.74	0.83
	Outside		21.41	0.00	-37.79	0.26	0.00	0.00	21.41	0.00	-37.79	59.21	Pm+Pb	98.20	0.66
4	Inside	40j	-21.94	0.00	-37.05	-0.26	0.00	0.00	0.00	-21.94	-37.05	37.05	Pm+Pb	98.20	1.65
	Middle		-0.26	0.00	-37.42	-0.26	0.00	0.00	0.16	-0.42	-37.42	37.58	Pm	68.74	0.83
	Outside		21.41	0.00	-37.79	-0.26	0.00	0.00	21.41	0.00	-37.79	59.21	Pm+Pb	98.20	0.66
5	Inside	35j	0.49	0.00	-28.34	-0.38	0.00	0.00	0.70	-0.21	-28.34	29.03	Pm+Pb	98.20	2.38
	Middle		-0.26	0.00	-28.71	-0.38	0.00	0.00	0.27	-0.53	-28.71	28.98	Pm	68.74	1.37
	Outside		-1.01	0.00	-29.08	-0.38	0.00	0.00	0.13	-1.14	-29.08	29.21	Pm+Pb	98.20	2.36
6	Inside	31i	31.02	0.00	-19.63	-0.49	0.00	0.00	31.03	-0.01	-19.63	50.66	Pm+Pb	98.20	0.94
	Middle		-0.26	0.00	-20.00	-0.49	0.00	0.00	0.38	-0.64	-20.00	20.38	Pm	68.74	2.37
	Outside		-31.54	0.00	-20.37	-0.49	0.00	0.00	0.01	-20.37	-31.55	31.56	Pm+Pb	98.20	2.11
7	Inside	30j	-17.64	0.00	-18.42	-0.14	0.00	0.00	0.00	-17.64	-18.42	18.42	Pm+Pb	98.20	4.33
	Middle		-1.37	0.00	-18.79	-0.14	0.00	0.00	0.01	-1.38	-18.79	18.81	Pm	68.74	2.66
	Outside		14.91	0.00	-19.16	-0.14	0.00	0.00	14.91	0.00	-19.16	34.07	Pm+Pb	98.20	1.88
8	Inside	25j	-3.99	0.00	-8.96	-0.25	0.00	0.00	0.02	-4.01	-8.96	8.98	Pm+Pb	98.20	9.94
	Middle		-1.37	0.00	-9.34	-0.25	0.00	0.00	0.04	-1.41	-9.34	9.38	Pm	68.74	6.33
	Outside		1.26	0.00	-9.71	-0.25	0.00	0.00	1.31	-0.05	-9.71	11.02	Pm+Pb	98.20	7.91
9	Inside	21j	17.76	0.00	-1.00	-0.37	0.00	0.00	17.77	-0.01	-1.00	18.77	Pm+Pb	98.20	4.23
	Middle		-1.37	0.00	-1.37	-0.37	0.00	0.00	0.09	-1.37	-1.46	1.56	Pm	68.74	43.15
	Outside		-20.49	0.00	-1.74	-0.37	0.00	0.00	0.01	-1.74	-20.50	20.50	Pm+Pb	98.20	3.79

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TABLE 2.10.9-52 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	10.28	0.00	-1.00	1.15	0.00	0.00	10.41	-0.13	-1.00	11.41	Pm+Pb	98.20	7.61
	Middle		-8.84	0.00	-0.63	1.15	0.00	0.00	0.15	-0.63	-8.99	9.13	Pm	68.74	6.53
	Outside		-27.97	0.00	-0.26	1.15	0.00	0.00	0.05	-0.26	-28.02	28.06	Pm+Pb	98.20	2.50
11	Inside	15j	-3.73	0.00	6.96	-0.65	0.00	0.00	6.96	0.11	-3.84	10.80	Pm+Pb	98.20	8.09
	Middle		-2.21	0.00	7.34	-0.65	0.00	0.00	7.34	0.18	-2.39	9.72	Pm	68.74	6.07
	Outside		-0.70	0.00	7.71	-0.65	0.00	0.00	7.71	0.39	-1.09	8.80	Pm+Pb	98.20	10.16
12	Inside	11i	-44.67	0.00	16.42	1.45	0.00	0.00	16.42	0.05	-44.72	61.14	Pm+Pb	98.20	0.61
	Middle		-19.90	0.00	16.79	1.45	0.00	0.00	16.79	0.11	-20.01	36.80	Pm	68.74	0.87
	Outside		4.88	0.00	17.16	1.45	0.00	0.00	17.16	5.28	-0.40	17.56	Pm+Pb	98.20	4.59
13	Inside	10j	-4.14	0.00	17.63	1.95	0.00	0.00	17.63	0.77	-4.91	22.54	Pm+Pb	98.20	3.36
	Middle		-22.11	0.00	18.00	1.95	0.00	0.00	18.00	0.17	-22.28	40.28	Pm	68.74	0.71
	Outside		-40.07	0.00	18.37	1.95	0.00	0.00	18.37	0.09	-40.16	58.54	Pm+Pb	98.20	0.68
14	Inside	5j	-29.59	0.00	26.34	-0.28	0.00	0.00	26.34	0.00	-29.59	55.93	Pm+Pb	98.20	0.76
	Middle		-24.32	0.00	26.71	-0.28	0.00	0.00	26.71	0.00	-24.32	51.03	Pm	68.74	0.35
	Outside		-19.05	0.00	27.08	-0.28	0.00	0.00	27.08	0.00	-19.05	46.14	Pm+Pb	98.20	1.13
15	Inside	1i	-13.01	0.00	35.05	-0.08	0.00	0.00	35.05	0.00	-13.01	48.06	Pm+Pb	98.20	1.04
	Middle		-13.26	0.00	35.42	-0.08	0.00	0.00	35.42	0.00	-13.26	48.68	Pm	68.74	0.41
	Outside		-13.52	0.00	35.79	-0.08	0.00	0.00	35.79	0.00	-13.52	49.31	Pm+Pb	98.20	0.99
16	Inside	41i	-13.01	0.00	35.05	0.08	0.00	0.00	35.05	0.00	-13.01	48.06	Pm+Pb	98.20	1.04
	Middle		-13.26	0.00	35.42	0.08	0.00	0.00	35.42	0.00	-13.26	48.68	Pm	68.74	0.41
	Outside		-13.52	0.00	35.79	0.08	0.00	0.00	35.79	0.00	-13.52	49.31	Pm+Pb	98.20	0.99
17	Inside	45j	-29.59	0.00	26.34	0.28	0.00	0.00	26.34	0.00	-29.59	55.93	Pm+Pb	98.20	0.76
	Middle		-24.32	0.00	26.71	0.28	0.00	0.00	26.71	0.00	-24.32	51.03	Pm	68.74	0.35
	Outside		-19.05	0.00	27.08	0.28	0.00	0.00	27.08	0.00	-19.05	46.14	Pm+Pb	98.20	1.13
18	Inside	50j	-4.18	0.00	17.63	-1.95	0.00	0.00	17.63	0.77	-4.95	22.58	Pm+Pb	98.20	3.35
	Middle		-22.11	0.00	18.00	-1.95	0.00	0.00	18.00	0.17	-22.28	40.28	Pm	68.74	0.71
	Outside		-40.04	0.00	18.37	-1.95	0.00	0.00	18.37	0.09	-40.13	58.51	Pm+Pb	98.20	0.68

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TABLE 2.10.9-52 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	-44.63	0.00	16.42	-1.45	0.00	0.00	16.42	0.05	-44.68	61.10	Pm+Pb	98.20	0.61
	Middle		-19.90	0.00	16.79	-1.45	0.00	0.00	16.79	0.11	-20.01	36.80	Pm	68.74	0.87
	Outside		4.84	0.00	17.16	-1.45	0.00	0.00	17.16	5.24	-0.40	17.56	Pm+Pb	98.20	4.59
20	Inside	55j	-3.68	0.00	6.96	0.65	0.00	0.00	6.96	0.11	-3.79	10.76	Pm+Pb	98.20	8.13
	Middle		-2.21	0.00	7.34	0.65	0.00	0.00	7.34	0.18	-2.39	9.72	Pm	68.74	6.07
	Outside		-0.74	0.00	7.71	0.65	0.00	0.00	7.71	0.38	-1.12	8.83	Pm+Pb	98.20	10.13
21	Inside	60j	-18.76	0.00	-1.00	0.23	0.00	0.00	0.00	-1.00	-18.76	18.77	Pm+Pb	98.20	4.23
	Middle		-35.37	0.00	-0.63	0.23	0.00	0.00	0.00	-0.63	-35.37	35.37	Pm	68.74	0.94
	Outside		-51.98	0.00	-0.26	0.23	0.00	0.00	0.00	-0.26	-51.98	51.98	Pm+Pb	98.20	0.89
22	Inside	61i	15.25	0.00	-1.00	0.34	0.00	0.00	15.26	-0.01	-1.00	16.26	Pm+Pb	98.20	5.04
	Middle		-1.36	0.00	-1.37	0.34	0.00	0.00	0.08	-1.37	-1.44	1.52	Pm	68.74	44.21
	Outside		-17.97	0.00	-1.74	0.34	0.00	0.00	0.01	-1.74	-17.98	17.98	Pm+Pb	98.20	4.46
23	Inside	65j	-4.73	0.00	-8.96	0.23	0.00	0.00	0.01	-4.74	-8.96	8.98	Pm+Pb	98.20	9.94
	Middle		-1.36	0.00	-9.34	0.23	0.00	0.00	0.04	-1.40	-9.34	9.38	Pm	68.74	6.33
	Outside		2.02	0.00	-9.71	0.23	0.00	0.00	2.05	-0.03	-9.71	11.75	Pm+Pb	98.20	7.35
24	Inside	70j	-16.61	0.00	-18.42	0.11	0.00	0.00	0.00	-16.61	-18.42	18.42	Pm+Pb	98.20	4.33
	Middle		-1.36	0.00	-18.79	0.11	0.00	0.00	0.01	-1.37	-18.79	18.80	Pm	68.74	2.66
	Outside		13.90	0.00	-19.16	0.11	0.00	0.00	13.90	0.00	-19.16	33.06	Pm+Pb	98.20	1.97
25	Inside	120j	24.03	0.00	-17.42	-1.09	0.00	0.00	24.08	-0.05	-17.42	41.50	Pm+Pb	61.46	0.48
	Middle		0.51	0.00	-18.03	-1.09	0.00	0.00	1.37	-0.86	-18.03	19.40	Pm	43.02	1.22
	Outside		-23.00	0.00	-18.63	-1.09	0.00	0.00	0.05	-18.63	-23.05	23.10	Pm+Pb	61.46	1.66
26	Inside	115j	-5.87	0.00	-8.71	-0.60	0.00	0.00	0.06	-5.93	-8.71	8.77	Pm+Pb	94.56	9.78
	Middle		0.51	0.00	-9.31	-0.60	0.00	0.00	0.91	-0.40	-9.31	10.22	Pm	66.19	5.48
	Outside		6.90	0.00	-9.92	-0.60	0.00	0.00	6.95	-0.05	-9.92	16.87	Pm+Pb	94.56	4.60
27	Inside	111i	-18.30	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	-18.30	18.30	Pm+Pb	94.56	4.17
	Middle		0.51	0.00	-0.61	-0.10	0.00	0.00	0.53	-0.02	-0.61	1.14	Pm	66.19	57.30
	Outside		19.33	0.00	-1.21	-0.10	0.00	0.00	19.33	0.00	-1.21	20.54	Pm+Pb	94.56	3.60

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TABLE 2.10.9-52 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	19.40	0.00	0.00	0.11	0.00	0.00	19.40	0.00	0.00	19.40	Pm+Pb	94.56	3.87
	Middle		0.48	0.00	-0.61	0.11	0.00	0.00	0.50	-0.02	-0.61	1.11	Pm	66.19	58.61
	Outside		-18.44	0.00	-1.21	0.11	0.00	0.00	0.00	-1.21	-18.44	18.44	Pm+Pb	94.56	4.13
29	Inside	105j	6.71	0.00	-8.71	0.61	0.00	0.00	6.77	-0.06	-8.71	15.47	Pm+Pb	94.56	5.11
	Middle		0.48	0.00	-9.31	0.61	0.00	0.00	0.90	-0.42	-9.31	10.21	Pm	66.19	5.48
	Outside		-5.75	0.00	-9.92	0.61	0.00	0.00	0.06	-5.81	-9.92	9.98	Pm+Pb	94.56	8.47
30	Inside	110j	-23.43	0.00	-17.42	1.10	0.00	0.00	0.05	-17.42	-23.48	23.53	Pm+Pb	61.46	1.61
	Middle		0.48	0.00	-18.03	1.10	0.00	0.00	1.37	-0.89	-18.03	19.39	Pm	43.02	1.22
	Outside		24.39	0.00	-18.63	1.10	0.00	0.00	24.44	-0.05	-18.63	43.07	Pm+Pb	61.46	0.43
31	Inside	90j	24.85	0.00	0.00	-1.16	0.00	0.00	24.90	0.00	-0.05	24.96	Pm+Pb	94.56	2.79
	Middle		-0.90	0.00	0.61	-1.16	0.00	0.00	0.79	0.61	-1.69	2.49	Pm	66.19	25.60
	Outside		-26.64	0.00	1.21	-1.16	0.00	0.00	1.21	0.05	-26.69	27.90	Pm+Pb	94.56	2.39
32	Inside	85j	-7.50	0.00	8.71	-0.67	0.00	0.00	8.71	0.06	-7.56	16.27	Pm+Pb	94.56	4.81
	Middle		-0.90	0.00	9.31	-0.67	0.00	0.00	9.31	0.36	-1.26	10.57	Pm	66.19	5.26
	Outside		5.71	0.00	9.92	-0.67	0.00	0.00	9.92	5.79	-0.08	10.00	Pm+Pb	94.56	8.46
33	Inside	81i	-22.39	0.00	17.42	-0.17	0.00	0.00	17.42	0.00	-22.39	39.81	Pm+Pb	61.46	0.54
	Middle		-0.90	0.00	18.03	-0.17	0.00	0.00	18.03	0.03	-0.93	18.96	Pm	43.02	1.27
	Outside		20.60	0.00	18.63	-0.17	0.00	0.00	20.60	18.63	0.00	20.60	Pm+Pb	61.46	1.98
34	Inside	100j	-26.58	0.00	0.00	1.16	0.00	0.00	0.05	0.00	-26.63	26.68	Pm+Pb	94.56	2.54
	Middle		-0.95	0.00	0.61	1.16	0.00	0.00	0.78	0.61	-1.73	2.51	Pm	66.19	25.40
	Outside		24.69	0.00	1.21	1.16	0.00	0.00	24.74	1.21	-0.05	24.80	Pm+Pb	94.56	2.81
35	Inside	95j	5.69	0.00	8.71	0.67	0.00	0.00	8.71	5.77	-0.08	8.79	Pm+Pb	94.56	9.76
	Middle		-0.95	0.00	9.31	0.67	0.00	0.00	9.31	0.35	-1.30	10.61	Pm	66.19	5.24
	Outside		-7.58	0.00	9.92	0.67	0.00	0.00	9.92	0.06	-7.64	17.56	Pm+Pb	94.56	4.39
36	Inside	91i	20.51	0.00	17.42	0.17	0.00	0.00	20.51	17.42	0.00	20.51	Pm+Pb	61.46	2.00
	Middle		-0.95	0.00	18.03	0.17	0.00	0.00	18.03	0.03	-0.98	19.01	Pm	43.02	1.26
	Outside		-22.40	0.00	18.63	0.17	0.00	0.00	18.63	0.00	-22.40	41.03	Pm+Pb	61.46	0.50

TABLE 2.10.9-53 CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 22-E COLD, CORNER ORIENTATION - 30-FT SIDE DROP +MNOP T=–20°F SECTION E MOM. = 46 X 10^6 in-lb

Stress Location	Location in Wall	30-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress+MNOP + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	6.636	-18.63	6.10	31.24	0.49	31.24	0.00	-12.53	0.49	0.00	0.00
	Middle	6.768	-19.00	6.10	-0.26	0.49	-0.26	0.00	-12.90	0.49	0.00	0.00
	Outside	6.901	-19.37	6.10	-31.76	0.49	-31.76	0.00	-13.27	0.49	0.00	0.00
2	Inside	9.738	-27.34	6.10	0.60	0.38	0.60	0.00	-21.24	0.38	0.00	0.00
	Middle	9.871	-27.71	6.10	-0.26	0.38	-0.26	0.00	-21.61	0.38	0.00	0.00
	Outside	10.003	-28.08	6.10	-1.12	0.38	-1.12	0.00	-21.98	0.38	0.00	0.00
3	Inside	12.840	-36.05	6.10	-21.94	0.26	-21.94	0.00	-29.95	0.26	0.00	0.00
	Middle	12.974	-36.42	6.10	-0.26	0.26	-0.26	0.00	-30.32	0.26	0.00	0.00
	Outside	13.106	-36.79	6.10	21.41	0.26	21.41	0.00	-30.69	0.26	0.00	0.00
4	Inside	12.840	-36.05	6.10	-21.94	-0.26	-21.94	0.00	-29.95	-0.26	0.00	0.00
	Middle	12.974	-36.42	6.10	-0.26	-0.26	-0.26	0.00	-30.32	-0.26	0.00	0.00
	Outside	13.106	-36.79	6.10	21.41	-0.26	21.41	0.00	-30.69	-0.26	0.00	0.00
5	Inside	9.738	-27.34	6.10	0.49	-0.38	0.49	0.00	-21.24	-0.38	0.00	0.00
	Middle	9.871	-27.71	6.10	-0.26	-0.38	-0.26	0.00	-21.61	-0.38	0.00	0.00
	Outside	10.003	-28.08	6.10	-1.01	-0.38	-1.01	0.00	-21.98	-0.38	0.00	0.00
6	Inside	6.636	-18.63	6.10	31.02	-0.49	31.02	0.00	-12.53	-0.49	0.00	0.00
	Middle	6.768	-19.00	6.10	-0.26	-0.49	-0.26	0.00	-12.90	-0.49	0.00	0.00
	Outside	6.901	-19.37	6.10	-31.54	-0.49	-31.54	0.00	-13.27	-0.49	0.00	0.00
7	Inside	6.205	-17.42	6.10	-17.64	-0.14	-17.64	0.00	-11.32	-0.14	0.00	0.00
	Middle	6.338	-17.79	6.10	-1.37	-0.14	-1.37	0.00	-11.69	-0.14	0.00	0.00
	Outside	6.470	-18.16	6.10	14.91	-0.14	14.91	0.00	-12.06	-0.14	0.00	0.00
8	Inside	2.837	-7.96	6.10	-3.99	-0.25	-3.99	0.00	-1.86	-0.25	0.00	0.00
	Middle	2.970	-8.34	6.10	-1.37	-0.25	-1.37	0.00	-2.24	-0.25	0.00	0.00
	Outside	3.102	-8.71	6.10	1.26	-0.25	1.26	0.00	-2.61	-0.25	0.00	0.00
9	Inside	0.000	0.00	6.10	17.76	-0.37	17.76	0.00	6.10	-0.37	0.00	0.00
	Middle	0.133	-0.37	6.10	-1.37	-0.37	-1.37	0.00	5.73	-0.37	0.00	0.00
	Outside	0.265	-0.74	6.10	-20.49	-0.37	-20.49	0.00	5.36	-0.37	0.00	0.00
10	Inside	0.000	0.00	6.10	10.28	1.15	10.28	0.00	6.10	1.15	0.00	0.00
	Middle	0.133	0.37	6.10	-8.84	1.15	-8.84	0.00	6.47	1.15	0.00	0.00
	Outside	0.265	0.74	6.10	-27.97	1.15	-27.97	0.00	6.84	1.15	0.00	0.00
11	Inside	2.837	7.96	6.10	-3.73	-0.65	-3.73	0.00	14.06	-0.65	0.00	0.00
	Middle	2.970	8.34	6.10	-2.21	-0.65	-2.21	0.00	14.44	-0.65	0.00	0.00
	Outside	3.102	8.71	6.10	-0.70	-0.65	-0.70	0.00	14.81	-0.65	0.00	0.00
12	Inside	6.205	17.42	6.10	-44.67	1.45	-44.67	0.00	23.52	1.45	0.00	0.00
	Middle	6.338	17.79	6.10	-19.90	1.45	-19.90	0.00	23.89	1.45	0.00	0.00
	Outside	6.470	18.16	6.10	4.88	1.45	4.88	0.00	24.26	1.45	0.00	0.00
13	Inside	6.636	18.63	6.10	-4.14	1.95	-4.14	0.00	24.73	1.95	0.00	0.00
	Middle	6.768	19.00	6.10	-22.11	1.95	-22.11	0.00	25.10	1.95	0.00	0.00
	Outside	6.901	19.37	6.10	-40.07	1.95	-40.07	0.00	25.47	1.95	0.00	0.00
14	Inside	9.738	27.34	6.10	-29.59	-0.28	-29.59	0.00	33.44	-0.28	0.00	0.00
	Middle	9.871	27.71	6.10	-24.32	-0.28	-24.32	0.00	33.81	-0.28	0.00	0.00
	Outside	10.003	28.08	6.10	-19.05	-0.28	-19.05	0.00	34.18	-0.28	0.00	0.00
15	Inside	12.840	36.05	6.10	-13.01	-0.08	-13.01	0.00	42.15	-0.08	0.00	0.00
	Middle	12.974	36.42	6.10	-13.26	-0.08	-13.26	0.00	42.52	-0.08	0.00	0.00
	Outside	13.106	36.79	6.10	-13.52	-0.08	-13.52	0.00	42.89	-0.08	0.00	0.00
16	Inside	12.840	36.05	6.10	-13.01	0.08	-13.01	0.00	42.15	0.08	0.00	0.00
	Middle	12.974	36.42	6.10	-13.26	0.08	-13.26	0.00	42.52	0.08	0.00	0.00
	Outside	13.106	36.79	6.10	-13.52	0.08	-13.52	0.00	42.89	0.08	0.00	0.00
17	Inside	9.738	27.34	6.10	-29.59	0.28	-29.59	0.00	33.44	0.28	0.00	0.00
	Middle	9.871	27.71	6.10	-24.32	0.28	-24.32	0.00	33.81	0.28	0.00	0.00
	Outside	10.003	28.08	6.10	-19.05	0.28	-19.05	0.00	34.18	0.28	0.00	0.00
18	Inside	6.636	18.63	6.10	-4.18	-1.95	-4.18	0.00	24.73	-1.95	0.00	0.00
	Middle	6.768	19.00	6.10	-22.11	-1.95	-22.11	0.00	25.10	-1.95	0.00	0.00
	Outside	6.901	19.37	6.10	-40.04	-1.95	-40.04	0.00	25.47	-1.95	0.00	0.00

TABLE 2.10.9-53 (cont.) CAVITY LINER AND FSS STRESSES (ksi), LOAD CASE 22-E COLD, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP T=-20°F SECTION E MOM. = 46 X 10^6 in-lb

Stress Location	Location in Wall	30-FT Side Drop, Bending Stress		Thermal	Frame Analysis, (DU +MNOP + Contents + Distortion)		Combined Stress (out-of-plane bending stress+MNOP + Thermal + Frame Analysis)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	6.205	17.42	6.10	-44.63	-1.45	-44.63	0.00	23.52	-1.45	0.00	0.00
	Middle	6.338	17.79	6.10	-19.90	-1.45	-19.90	0.00	23.89	-1.45	0.00	0.00
	Outside	6.470	18.16	6.10	4.84	-1.45	4.84	0.00	24.26	-1.45	0.00	0.00
20	Inside	2.837	7.96	6.10	-3.68	0.65	-3.68	0.00	14.06	0.65	0.00	0.00
	Middle	2.970	8.34	6.10	-2.21	0.65	-2.21	0.00	14.44	0.65	0.00	0.00
	Outside	3.102	8.71	6.10	-0.74	0.65	-0.74	0.00	14.81	0.65	0.00	0.00
21	Inside	0.000	0.00	6.10	-18.76	0.23	-18.76	0.00	6.10	0.23	0.00	0.00
	Middle	0.133	0.37	6.10	-35.37	0.23	-35.37	0.00	6.47	0.23	0.00	0.00
	Outside	0.265	0.74	6.10	-51.98	0.23	-51.98	0.00	6.84	0.23	0.00	0.00
22	Inside	0.000	0.00	6.10	15.25	0.34	15.25	0.00	6.10	0.34	0.00	0.00
	Middle	0.133	-0.37	6.10	-1.36	0.34	-1.36	0.00	5.73	0.34	0.00	0.00
	Outside	0.265	-0.74	6.10	-17.97	0.34	-17.97	0.00	5.36	0.34	0.00	0.00
23	Inside	2.837	-7.96	6.10	-4.73	0.23	-4.73	0.00	-1.86	0.23	0.00	0.00
	Middle	2.970	-8.34	6.10	-1.36	0.23	-1.36	0.00	-2.24	0.23	0.00	0.00
	Outside	3.102	-8.71	6.10	2.02	0.23	2.02	0.00	-2.61	0.23	0.00	0.00
24	Inside	6.205	-17.42	6.10	-16.61	0.11	-16.61	0.00	-11.32	0.11	0.00	0.00
	Middle	6.338	-17.79	6.10	-1.36	0.11	-1.36	0.00	-11.69	0.11	0.00	0.00
	Outside	6.470	-18.16	6.10	13.90	0.11	13.90	0.00	-12.06	0.11	0.00	0.00
25	Inside	6.205	-17.42	0.00	24.03	-1.09	24.03	0.00	-17.42	-1.09	0.00	0.00
	Middle	6.421	-18.03	0.00	0.51	-1.09	0.51	0.00	-18.03	-1.09	0.00	0.00
	Outside	6.637	-18.63	0.00	-23.00	-1.09	-23.00	0.00	-18.63	-1.09	0.00	0.00
26	Inside	3.102	-8.71	0.00	-5.87	-0.60	-5.87	0.00	-8.71	-0.60	0.00	0.00
	Middle	3.318	-9.31	0.00	0.51	-0.60	0.51	0.00	-9.31	-0.60	0.00	0.00
	Outside	3.534	-9.92	0.00	6.90	-0.60	6.90	0.00	-9.92	-0.60	0.00	0.00
27	Inside	0.000	0.00	0.00	-18.30	-0.10	-18.30	0.00	0.00	-0.10	0.00	0.00
	Middle	0.216	-0.61	0.00	0.51	-0.10	0.51	0.00	-0.61	-0.10	0.00	0.00
	Outside	0.431	-1.21	0.00	19.33	-0.10	19.33	0.00	-1.21	-0.10	0.00	0.00
28	Inside	0.000	0.00	0.00	19.40	0.11	19.40	0.00	0.00	0.11	0.00	0.00
	Middle	0.216	-0.61	0.00	0.48	0.11	0.48	0.00	-0.61	0.11	0.00	0.00
	Outside	0.431	-1.21	0.00	-18.44	0.11	-18.44	0.00	-1.21	0.11	0.00	0.00
29	Inside	3.102	-8.71	0.00	6.71	0.61	6.71	0.00	-8.71	0.61	0.00	0.00
	Middle	3.318	-9.31	0.00	0.48	0.61	0.48	0.00	-9.31	0.61	0.00	0.00
	Outside	3.534	-9.92	0.00	-5.75	0.61	-5.75	0.00	-9.92	0.61	0.00	0.00
30	Inside	6.205	-17.42	0.00	-23.43	1.10	-23.43	0.00	-17.42	1.10	0.00	0.00
	Middle	6.421	-18.03	0.00	0.48	1.10	0.48	0.00	-18.03	1.10	0.00	0.00
	Outside	6.637	-18.63	0.00	24.39	1.10	24.39	0.00	-18.63	1.10	0.00	0.00
31	Inside	0.000	0.00	0.00	24.85	-1.16	24.85	0.00	0.00	-1.16	0.00	0.00
	Middle	0.216	0.61	0.00	-0.90	-1.16	-0.90	0.00	0.61	-1.16	0.00	0.00
	Outside	0.431	1.21	0.00	-26.64	-1.16	-26.64	0.00	1.21	-1.16	0.00	0.00
32	Inside	3.102	8.71	0.00	-7.50	-0.67	-7.50	0.00	8.71	-0.67	0.00	0.00
	Middle	3.318	9.31	0.00	-0.90	-0.67	-0.90	0.00	9.31	-0.67	0.00	0.00
	Outside	3.534	9.92	0.00	5.71	-0.67	5.71	0.00	9.92	-0.67	0.00	0.00
33	Inside	6.205	17.42	0.00	-22.39	-0.17	-22.39	0.00	17.42	-0.17	0.00	0.00
	Middle	6.421	18.03	0.00	-0.90	-0.17	-0.90	0.00	18.03	-0.17	0.00	0.00
	Outside	6.637	18.63	0.00	20.60	-0.17	20.60	0.00	18.63	-0.17	0.00	0.00
34	Inside	0.000	0.00	0.00	-26.58	1.16	-26.58	0.00	0.00	1.16	0.00	0.00
	Middle	0.216	0.61	0.00	-0.95	1.16	-0.95	0.00	0.61	1.16	0.00	0.00
	Outside	0.431	1.21	0.00	24.69	1.16	24.69	0.00	1.21	1.16	0.00	0.00
35	Inside	3.102	8.71	0.00	5.69	0.67	5.69	0.00	8.71	0.67	0.00	0.00
	Middle	3.318	9.31	0.00	-0.95	0.67	-0.95	0.00	9.31	0.67	0.00	0.00
	Outside	3.534	9.92	0.00	-7.58	0.67	-7.58	0.00	9.92	0.67	0.00	0.00
36	Inside	6.205	17.42	0.00	20.51	0.17	20.51	0.00	17.42	0.17	0.00	0.00
	Middle	6.421	18.03	0.00	-0.95	0.17	-0.95	0.00	18.03	0.17	0.00	0.00
	Outside	6.637	18.63	0.00	-22.40	0.17	-22.40	0.00	18.63	0.17	0.00	0.00

TABLE 2.10.9-54 CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E COLD, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	31.24	0.00	-12.53	0.49	0.00	0.00	31.25	-0.01	-12.53	43.78	Pm+Pb	100.00	1.28
	Middle		-0.26	0.00	-12.90	0.49	0.00	0.00	0.38	-0.64	-12.90	13.28	Pm	70.00	4.27
	Outside		-31.76	0.00	-13.27	0.49	0.00	0.00	0.01	-13.27	-31.77	31.78	Pm+Pb	100.00	2.15
2	Inside	75j	0.60	0.00	-21.24	0.38	0.00	0.00	0.78	-0.18	-21.24	22.02	Pm+Pb	100.00	3.54
	Middle		-0.26	0.00	-21.61	0.38	0.00	0.00	0.27	-0.53	-21.61	21.88	Pm	70.00	2.20
	Outside		-1.12	0.00	-21.98	0.38	0.00	0.00	0.12	-1.24	-21.98	22.10	Pm+Pb	100.00	3.53
3	Inside	80j	-21.94	0.00	-29.95	0.26	0.00	0.00	0.00	-21.94	-29.95	29.95	Pm+Pb	100.00	2.34
	Middle		-0.26	0.00	-30.32	0.26	0.00	0.00	0.16	-0.42	-30.32	30.48	Pm	70.00	1.30
	Outside		21.41	0.00	-30.69	0.26	0.00	0.00	21.41	0.00	-30.69	52.11	Pm+Pb	100.00	0.92
4	Inside	40j	-21.94	0.00	-29.95	-0.26	0.00	0.00	0.00	-21.94	-29.95	29.95	Pm+Pb	100.00	2.34
	Middle		-0.26	0.00	-30.32	-0.26	0.00	0.00	0.16	-0.42	-30.32	30.48	Pm	70.00	1.30
	Outside		21.41	0.00	-30.69	-0.26	0.00	0.00	21.41	0.00	-30.69	52.11	Pm+Pb	100.00	0.92
5	Inside	35j	0.49	0.00	-21.24	-0.38	0.00	0.00	0.70	-0.21	-21.24	21.93	Pm+Pb	100.00	3.56
	Middle		-0.26	0.00	-21.61	-0.38	0.00	0.00	0.27	-0.53	-21.61	21.88	Pm	70.00	2.20
	Outside		-1.01	0.00	-21.98	-0.38	0.00	0.00	0.13	-1.14	-21.98	22.11	Pm+Pb	100.00	3.52
6	Inside	31i	31.02	0.00	-12.53	-0.49	0.00	0.00	31.03	-0.01	-12.53	43.56	Pm+Pb	100.00	1.30
	Middle		-0.26	0.00	-12.90	-0.49	0.00	0.00	0.38	-0.64	-12.90	13.28	Pm	70.00	4.27
	Outside		-31.54	0.00	-13.27	-0.49	0.00	0.00	0.01	-13.27	-31.55	31.56	Pm+Pb	100.00	2.17
7	Inside	30j	-17.64	0.00	-11.32	-0.14	0.00	0.00	0.00	-11.32	-17.64	17.64	Pm+Pb	100.00	4.67
	Middle		-1.37	0.00	-11.69	-0.14	0.00	0.00	0.01	-1.38	-11.69	11.71	Pm	70.00	4.98
	Outside		14.91	0.00	-12.06	-0.14	0.00	0.00	14.91	0.00	-12.06	26.97	Pm+Pb	100.00	2.71
8	Inside	25j	-3.99	0.00	-1.86	-0.25	0.00	0.00	0.02	-1.86	-4.01	4.02	Pm+Pb	100.00	23.87
	Middle		-1.37	0.00	-2.24	-0.25	0.00	0.00	0.04	-1.41	-2.24	2.28	Pm	70.00	29.68
	Outside		1.26	0.00	-2.61	-0.25	0.00	0.00	1.31	-0.05	-2.61	3.92	Pm+Pb	100.00	24.54
9	Inside	21j	17.76	0.00	6.10	-0.37	0.00	0.00	17.77	6.10	-0.01	17.78	Pm+Pb	100.00	4.63
	Middle		-1.37	0.00	5.73	-0.37	0.00	0.00	5.73	0.09	-1.46	7.19	Pm	70.00	8.74
	Outside		-20.49	0.00	5.36	-0.37	0.00	0.00	5.36	0.01	-20.50	25.85	Pm+Pb	100.00	2.87

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TABLE 2.10.9-54 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E COLD, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	10.28	0.00	6.10	1.15	0.00	0.00	10.41	6.10	-0.13	10.53	Pm+Pb	100.00	8.49
	Middle		-8.84	0.00	6.47	1.15	0.00	0.00	6.47	0.15	-8.99	15.46	Pm	70.00	3.53
	Outside		-27.97	0.00	6.84	1.15	0.00	0.00	6.84	0.05	-28.02	34.86	Pm+Pb	100.00	1.87
11	Inside	15j	-3.73	0.00	14.06	-0.65	0.00	0.00	14.06	0.11	-3.84	17.90	Pm+Pb	100.00	4.59
	Middle		-2.21	0.00	14.44	-0.65	0.00	0.00	14.44	0.18	-2.39	16.82	Pm	70.00	3.16
	Outside		-0.70	0.00	14.81	-0.65	0.00	0.00	14.81	0.39	-1.09	15.90	Pm+Pb	100.00	5.29
12	Inside	11i	-44.67	0.00	23.52	1.45	0.00	0.00	23.52	0.05	-44.72	68.24	Pm+Pb	100.00	0.47
	Middle		-19.90	0.00	23.89	1.45	0.00	0.00	23.89	0.11	-20.01	43.90	Pm	70.00	0.59
	Outside		4.88	0.00	24.26	1.45	0.00	0.00	24.26	5.28	-0.40	24.66	Pm+Pb	100.00	3.05
13	Inside	10j	-4.14	0.00	24.73	1.95	0.00	0.00	24.73	0.77	-4.91	29.64	Pm+Pb	100.00	2.37
	Middle		-22.11	0.00	25.10	1.95	0.00	0.00	25.10	0.17	-22.28	47.38	Pm	70.00	0.48
	Outside		-40.07	0.00	25.47	1.95	0.00	0.00	25.47	0.09	-40.16	65.64	Pm+Pb	100.00	0.52
14	Inside	5j	-29.59	0.00	33.44	-0.28	0.00	0.00	33.44	0.00	-29.59	63.03	Pm+Pb	100.00	0.59
	Middle		-24.32	0.00	33.81	-0.28	0.00	0.00	33.81	0.00	-24.32	58.13	Pm	70.00	0.20
	Outside		-19.05	0.00	34.18	-0.28	0.00	0.00	34.18	0.00	-19.05	53.24	Pm+Pb	100.00	0.88
15	Inside	1i	-13.01	0.00	42.15	-0.08	0.00	0.00	42.15	0.00	-13.01	55.16	Pm+Pb	100.00	0.81
	Middle		-13.26	0.00	42.52	-0.08	0.00	0.00	42.52	0.00	-13.26	55.78	Pm	70.00	0.25
	Outside		-13.52	0.00	42.89	-0.08	0.00	0.00	42.89	0.00	-13.52	56.41	Pm+Pb	100.00	0.77
16	Inside	41i	-13.01	0.00	42.15	0.08	0.00	0.00	42.15	0.00	-13.01	55.16	Pm+Pb	100.00	0.81
	Middle		-13.26	0.00	42.52	0.08	0.00	0.00	42.52	0.00	-13.26	55.78	Pm	70.00	0.25
	Outside		-13.52	0.00	42.89	0.08	0.00	0.00	42.89	0.00	-13.52	56.41	Pm+Pb	100.00	0.77
17	Inside	45j	-29.59	0.00	33.44	0.28	0.00	0.00	33.44	0.00	-29.59	63.03	Pm+Pb	100.00	0.59
	Middle		-24.32	0.00	33.81	0.28	0.00	0.00	33.81	0.00	-24.32	58.13	Pm	70.00	0.20
	Outside		-19.05	0.00	34.18	0.28	0.00	0.00	34.18	0.00	-19.05	53.24	Pm+Pb	100.00	0.88
18	Inside	50j	-4.18	0.00	24.73	-1.95	0.00	0.00	24.73	0.77	-4.95	29.68	Pm+Pb	100.00	2.37
	Middle		-22.11	0.00	25.10	-1.95	0.00	0.00	25.10	0.17	-22.28	47.38	Pm	70.00	0.48
	Outside		-40.04	0.00	25.47	-1.95	0.00	0.00	25.47	0.09	-40.13	65.61	Pm+Pb	100.00	0.52

TABLE 2.10.9-54 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E COLD, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	-44.63	0.00	23.52	-1.45	0.00	0.00	23.52	0.05	-44.68	68.20	Pm+Pb	100.00	0.47
	Middle		-19.90	0.00	23.89	-1.45	0.00	0.00	23.89	0.11	-20.01	43.90	Pm	70.00	0.59
	Outside		4.84	0.00	24.26	-1.45	0.00	0.00	24.26	5.24	-0.40	24.66	Pm+Pb	100.00	3.05
20	Inside	55j	-3.68	0.00	14.06	0.65	0.00	0.00	14.06	0.11	-3.79	17.86	Pm+Pb	100.00	4.60
	Middle		-2.21	0.00	14.44	0.65	0.00	0.00	14.44	0.18	-2.39	16.82	Pm	70.00	3.16
	Outside		-0.74	0.00	14.81	0.65	0.00	0.00	14.81	0.38	-1.12	15.93	Pm+Pb	100.00	5.28
21	Inside	60j	-18.76	0.00	6.10	0.23	0.00	0.00	6.10	0.00	-18.76	24.86	Pm+Pb	100.00	3.02
	Middle		-35.37	0.00	6.47	0.23	0.00	0.00	6.47	0.00	-35.37	41.84	Pm	70.00	0.67
	Outside		-51.98	0.00	6.84	0.23	0.00	0.00	6.84	0.00	-51.98	58.82	Pm+Pb	100.00	0.70
22	Inside	61i	15.25	0.00	6.10	0.34	0.00	0.00	15.26	6.10	-0.01	15.27	Pm+Pb	100.00	5.55
	Middle		-1.36	0.00	5.73	0.34	0.00	0.00	5.73	0.08	-1.44	7.17	Pm	70.00	8.77
	Outside		-17.97	0.00	5.36	0.34	0.00	0.00	5.36	0.01	-17.98	23.33	Pm+Pb	100.00	3.29
23	Inside	65j	-4.73	0.00	-1.86	0.23	0.00	0.00	0.01	-1.86	-4.74	4.75	Pm+Pb	100.00	20.04
	Middle		-1.36	0.00	-2.24	0.23	0.00	0.00	0.04	-1.40	-2.24	2.28	Pm	70.00	29.76
	Outside		2.02	0.00	-2.61	0.23	0.00	0.00	2.05	-0.03	-2.61	4.65	Pm+Pb	100.00	20.49
24	Inside	70j	-16.61	0.00	-11.32	0.11	0.00	0.00	0.00	-11.32	-16.61	16.61	Pm+Pb	100.00	5.02
	Middle		-1.36	0.00	-11.69	0.11	0.00	0.00	0.01	-1.37	-11.69	11.70	Pm	70.00	4.98
	Outside		13.90	0.00	-12.06	0.11	0.00	0.00	13.90	0.00	-12.06	25.96	Pm+Pb	100.00	2.85
25	Inside	120j	24.03	0.00	-17.42	-1.09	0.00	0.00	24.08	-0.05	-17.42	41.50	Pm+Pb	65.00	0.57
	Middle		0.51	0.00	-18.03	-1.09	0.00	0.00	1.37	-0.86	-18.03	19.40	Pm	45.50	1.35
	Outside		-23.00	0.00	-18.63	-1.09	0.00	0.00	0.05	-18.63	-23.05	23.10	Pm+Pb	65.00	1.81
26	Inside	115j	-5.87	0.00	-8.71	-0.60	0.00	0.00	0.06	-5.93	-8.71	8.77	Pm+Pb	100.00	10.40
	Middle		0.51	0.00	-9.31	-0.60	0.00	0.00	0.91	-0.40	-9.31	10.22	Pm	70.00	5.85
	Outside		6.90	0.00	-9.92	-0.60	0.00	0.00	6.95	-0.05	-9.92	16.87	Pm+Pb	100.00	4.93
27	Inside	111i	-18.30	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	-18.30	18.30	Pm+Pb	100.00	4.46
	Middle		0.51	0.00	-0.61	-0.10	0.00	0.00	0.53	-0.02	-0.61	1.14	Pm	70.00	60.66
	Outside		19.33	0.00	-1.21	-0.10	0.00	0.00	19.33	0.00	-1.21	20.54	Pm+Pb	100.00	3.87

ca/marg-acep-cold

TABLE 2.10.9-54 (cont.) CAVITY LINER AND FSS STRESSES (ksi) AND DESIGN MARGINS, LOAD CASE 22-E COLD, CORNER ORIENTATION - 30-FT SIDE DROP + MNOP, T=-20°F, SECTION E

Stress	Location	Element	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	19.40	0.00	0.00	0.11	0.00	0.00	19.40	0.00	0.00	19.40	Pm+Pb	100.00	4.15
	Middle		0.48	0.00	-0.61	0.11	0.00	0.00	0.50	-0.02	-0.61	1.11	Pm	70.00	62.04
	Outside		-18.44	0.00	-1.21	0.11	0.00	0.00	0.00	-1.21	-18.44	18.44	Pm+Pb	100.00	4.42
29	Inside	105j	6.71	0.00	-8.71	0.61	0.00	0.00	6.77	-0.06	-8.71	15.47	Pm+Pb	100.00	5.46
	Middle		0.48	0.00	-9.31	0.61	0.00	0.00	0.90	-0.42	-9.31	10.21	Pm	70.00	5.86
	Outside		-5.75	0.00	-9.92	0.61	0.00	0.00	0.06	-5.81	-9.92	9.98	Pm+Pb	100.00	9.02
30	Inside	110j	-23.43	0.00	-17.42	1.10	0.00	0.00	0.05	-17.42	-23.48	23.53	Pm+Pb	65.00	1.76
	Middle		0.48	0.00	-18.03	1.10	0.00	0.00	1.37	-0.89	-18.03	19.39	Pm	45.50	1.35
	Outside		24.39	0.00	-18.63	1.10	0.00	0.00	24.44	-0.05	-18.63	43.07	Pm+Pb	65.00	0.51
31	Inside	90j	24.85	0.00	0.00	-1.16	0.00	0.00	24.90	0.00	-0.05	24.96	Pm+Pb	100.00	3.01
	Middle		-0.90	0.00	0.61	-1.16	0.00	0.00	0.79	0.61	-1.69	2.49	Pm	70.00	27.13
	Outside		-26.64	0.00	1.21	-1.16	0.00	0.00	1.21	0.05	-26.69	27.90	Pm+Pb	100.00	2.58
32	Inside	85j	-7.50	0.00	8.71	-0.67	0.00	0.00	8.71	0.06	-7.56	16.27	Pm+Pb	100.00	5.15
	Middle		-0.90	0.00	9.31	-0.67	0.00	0.00	9.31	0.36	-1.26	10.57	Pm	70.00	5.62
	Outside		5.71	0.00	9.92	-0.67	0.00	0.00	9.92	5.79	-0.08	10.00	Pm+Pb	100.00	9.00
33	Inside	81i	-22.39	0.00	17.42	-0.17	0.00	0.00	17.42	0.00	-22.39	39.81	Pm+Pb	65.00	0.63
	Middle		-0.90	0.00	18.03	-0.17	0.00	0.00	18.03	0.03	-0.93	18.96	Pm	45.50	1.40
	Outside		20.60	0.00	18.63	-0.17	0.00	0.00	20.60	18.63	0.00	20.60	Pm+Pb	65.00	2.15
34	Inside	100j	-26.58	0.00	0.00	1.16	0.00	0.00	0.05	0.00	-26.63	26.68	Pm+Pb	100.00	2.75
	Middle		-0.95	0.00	0.61	1.16	0.00	0.00	0.78	0.61	-1.73	2.51	Pm	70.00	26.92
	Outside		24.69	0.00	1.21	1.16	0.00	0.00	24.74	1.21	-0.05	24.80	Pm+Pb	100.00	3.03
35	Inside	95j	5.69	0.00	8.71	0.67	0.00	0.00	8.71	5.77	-0.08	8.79	Pm+Pb	100.00	10.38
	Middle		-0.95	0.00	9.31	0.67	0.00	0.00	9.31	0.35	-1.30	10.61	Pm	70.00	5.60
	Outside		-7.58	0.00	9.92	0.67	0.00	0.00	9.92	0.06	-7.64	17.56	Pm+Pb	100.00	4.69
36	Inside	91i	20.51	0.00	17.42	0.17	0.00	0.00	20.51	17.42	0.00	20.51	Pm+Pb	65.00	2.17
	Middle		-0.95	0.00	18.03	0.17	0.00	0.00	18.03	0.03	-0.98	19.01	Pm	45.50	1.39
	Outside		-22.40	0.00	18.63	0.17	0.00	0.00	18.63	0.00	-22.40	41.03	Pm+Pb	65.00	0.58

ca/marg-acep-cold

TABLE 2.10.9-55 CAVITY LINER AND FSS STRESSES (ksi), FLAT ORIENTATION - MNOP

Stress Location	Location in wall	1- ft side drop, Bending Stress		Thermal	Frame analysis, (MNOP)		Combined Stress (MNOP)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
1	Inside	9.080			22.63	0.93	22.63	0.00	0.00	0.93	0.00	0.00
	Middle	9.268			0.94	0.93	0.94	0.00	0.00	0.93	0.00	0.00
	Outside	9.455			-20.76	0.93	-20.76	0.00	0.00	0.93	0.00	0.00
2	Inside	9.080			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	9.268			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	9.455			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
3	Inside	9.080			23.04	-0.94	23.04	0.00	0.00	-0.94	0.00	0.00
	Middle	9.268			0.94	-0.94	0.94	0.00	0.00	-0.94	0.00	0.00
	Outside	9.455			-21.17	-0.94	-21.17	0.00	0.00	-0.94	0.00	0.00
4	Inside	9.080			23.04	0.94	23.04	0.00	0.00	0.94	0.00	0.00
	Middle	9.080			0.94	0.94	0.94	0.00	0.00	0.94	0.00	0.00
	Outside	9.080			-21.17	0.94	-21.17	0.00	0.00	0.94	0.00	0.00
5	Inside	4.692			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	4.692			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	4.692			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
6	Inside	0.305			22.63	-0.93	22.63	0.00	0.00	-0.93	0.00	0.00
	Middle	0.305			0.94	-0.93	0.94	0.00	0.00	-0.93	0.00	0.00
	Outside	0.305			-20.76	-0.93	-20.76	0.00	0.00	-0.93	0.00	0.00
7	Inside	0.305			22.63	0.93	22.63	0.00	0.00	0.93	0.00	0.00
	Middle	0.305			0.94	0.93	0.94	0.00	0.00	0.93	0.00	0.00
	Outside	0.305			-20.76	0.93	-20.76	0.00	0.00	0.93	0.00	0.00
8	Inside	4.692			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	4.692			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	4.692			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
9	Inside	9.080			23.04	-0.94	23.04	0.00	0.00	-0.94	0.00	0.00
	Middle	9.080			0.94	-0.94	0.94	0.00	0.00	-0.94	0.00	0.00
	Outside	9.080			-21.17	-0.94	-21.17	0.00	0.00	-0.94	0.00	0.00
10	Inside	9.080			23.04	0.94	23.04	0.00	0.00	0.94	0.00	0.00
	Middle	9.268			0.94	0.94	0.94	0.00	0.00	0.94	0.00	0.00
	Outside	9.455			-21.17	0.94	-21.17	0.00	0.00	0.94	0.00	0.00
11	Inside	9.080			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	9.268			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	9.455			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
12	Inside	9.080			22.63	-0.93	22.63	0.00	0.00	-0.93	0.00	0.00
	Middle	9.268			0.94	-0.93	0.94	0.00	0.00	-0.93	0.00	0.00
	Outside	9.455			-20.76	-0.93	-20.76	0.00	0.00	-0.93	0.00	0.00
13	Inside	9.080			22.63	0.93	22.63	0.00	0.00	0.93	0.00	0.00
	Middle	9.268			0.94	0.93	0.94	0.00	0.00	0.93	0.00	0.00
	Outside	9.455			-20.76	0.93	-20.76	0.00	0.00	0.93	0.00	0.00
14	Inside	9.080			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	9.268			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	9.455			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
15	Inside	9.080			23.04	-0.94	23.04	0.00	0.00	-0.94	0.00	0.00
	Middle	9.268			0.94	-0.94	0.94	0.00	0.00	-0.94	0.00	0.00
	Outside	9.455			-21.17	-0.94	-21.17	0.00	0.00	-0.94	0.00	0.00
16	Inside	9.080			23.04	0.94	23.04	0.00	0.00	0.94	0.00	0.00
	Middle	9.080			0.94	0.94	0.94	0.00	0.00	0.94	0.00	0.00
	Outside	9.080			-21.17	0.94	-21.17	0.00	0.00	0.94	0.00	0.00
17	Inside	4.692			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	4.692			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	4.692			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
18	Inside	0.305			22.63	-0.93	22.63	0.00	0.00	-0.93	0.00	0.00
	Middle	0.305			0.94	-0.93	0.94	0.00	0.00	-0.93	0.00	0.00
	Outside	0.305			-20.76	-0.93	-20.76	0.00	0.00	-0.93	0.00	0.00

TABLE 2.10.9-55 (cont.) CAVITY LINER AND FSS STRESSES, FLAT ORIENTATION - MNOP

Stress Location	Location in wall	1- ft side drop, Bending Stress		Thermal	Frame analysis, (MNOP)		Combined Stress (MNOP)					
(Fig. 2.10.9-8)		c (in.)	Sz	Sz	Sx	Sxy	Sx	Sy	Sz	Sxy	Syz	Sxz
19	Inside	0.305			22.63	0.93	22.63	0.00	0.00	0.93	0.00	0.00
	Middle	0.305			0.94	0.93	0.94	0.00	0.00	0.93	0.00	0.00
	Outside	0.305			-20.76	0.93	-20.76	0.00	0.00	0.93	0.00	0.00
20	Inside	4.692			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	4.692			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	4.692			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
21	Inside	9.080			23.04	-0.94	23.04	0.00	0.00	-0.94	0.00	0.00
	Middle	9.080			0.94	-0.94	0.94	0.00	0.00	-0.94	0.00	0.00
	Outside	9.080			-21.17	-0.94	-21.17	0.00	0.00	-0.94	0.00	0.00
22	Inside	9.080			23.04	0.94	23.04	0.00	0.00	0.94	0.00	0.00
	Middle	9.268			0.94	0.94	0.94	0.00	0.00	0.94	0.00	0.00
	Outside	9.455			-21.17	0.94	-21.17	0.00	0.00	0.94	0.00	0.00
23	Inside	9.080			-10.01	0.00	-10.01	0.00	0.00	0.00	0.00	0.00
	Middle	9.268			0.94	0.00	0.94	0.00	0.00	0.00	0.00	0.00
	Outside	9.455			11.89	0.00	11.89	0.00	0.00	0.00	0.00	0.00
24	Inside	9.080			22.63	-0.93	22.63	0.00	0.00	-0.93	0.00	0.00
	Middle	9.268			0.94	-0.93	0.94	0.00	0.00	-0.93	0.00	0.00
	Outside	9.455			-20.76	-0.93	-20.76	0.00	0.00	-0.93	0.00	0.00
25	Inside	9.080			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	9.080			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	9.080			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
26	Inside	4.692			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	4.692			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	4.692			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
27	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
28	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.000			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
29	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.000			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
30	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.000			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
31	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
32	Inside	4.692			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	4.692			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	4.692			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
33	Inside	9.080			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	9.080			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	9.080			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
34	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.000			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
35	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.000			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
36	Inside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Middle	0.000			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00
	Outside	0.305			2.51	0.00	2.51	0.00	0.00	0.00	0.00	0.00

TABLE 2.10.9-56 CAVITY LINER AND FSS DESIGN MARGINS, FLAT ORIENTATION - MNOP

Stress	Location	Node	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
1	Inside	71i	22.63	0.00	0.00	0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36
2	Inside	75j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
3	Inside	80j	23.04	0.00	0.00	-0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	-0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	-0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31
4	Inside	40j	23.04	0.00	0.00	0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31
5	Inside	35j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
6	Inside	31i	22.63	0.00	0.00	-0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	-0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	-0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36
7	Inside	30j	22.63	0.00	0.00	0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36
8	Inside	25j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
9	Inside	21j	23.04	0.00	0.00	-0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	-0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	-0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31

ca/marg-MNOP

TABLE 2.10.9-56 (cont.) CAVITY LINER AND FSS DESIGN MARGINS, FLAT ORIENTATION - MNOP

Stress	Location	Node	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
10	Inside	20j	23.04	0.00	0.00	0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31
11	Inside	15j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
12	Inside	11i	22.63	0.00	0.00	-0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	-0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	-0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36
13	Inside	10j	22.63	0.00	0.00	0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36
14	Inside	5j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
15	Inside	1i	23.04	0.00	0.00	-0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	-0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	-0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31
16	Inside	41i	23.04	0.00	0.00	0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31
17	Inside	45j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
18	Inside	50j	22.63	0.00	0.00	-0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	-0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	-0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36

ca/marg-MNOP

TABLE 2.10.9-56 (cont.) CAVITY LINER AND FSS DESIGN MARGINS, FLAT ORIENTATION - MNOP

Stress	Location	Node	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
19	Inside	51i	22.63	0.00	0.00	0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36
20	Inside	55j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
21	Inside	60j	23.04	0.00	0.00	-0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	-0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	-0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31
22	Inside	61i	23.04	0.00	0.00	0.94	0.00	0.00	23.08	0.00	-0.04	23.12	Pm+Pb	49.13	1.13
	Middle		0.94	0.00	0.00	0.94	0.00	0.00	1.52	0.00	-0.58	2.10	Pm	32.75	14.58
	Outside		-21.17	0.00	0.00	0.94	0.00	0.00	0.04	0.00	-21.21	21.25	Pm+Pb	49.13	1.31
23	Inside	65j	-10.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.01	10.01	Pm+Pb	49.13	3.91
	Middle		0.94	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.94	Pm	32.75	33.84
	Outside		11.89	0.00	0.00	0.00	0.00	0.00	11.89	0.00	0.00	11.89	Pm+Pb	49.13	3.13
24	Inside	70j	22.63	0.00	0.00	-0.93	0.00	0.00	22.67	0.00	-0.04	22.71	Pm+Pb	49.13	1.16
	Middle		0.94	0.00	0.00	-0.93	0.00	0.00	1.51	0.00	-0.57	2.08	Pm	32.75	14.71
	Outside		-20.76	0.00	0.00	-0.93	0.00	0.00	0.04	0.00	-20.80	20.84	Pm+Pb	49.13	1.36
25	Inside	120j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	20.47	7.15
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23
26	Inside	115j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
27	Inside	111i	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82

ca/marg-MNOP

TABLE 2.10.9-56 (cont.) CAVITY LINER AND FSS DESIGN MARGINS, FLAT ORIENTATION - MNOP

Stress	Location	Node	Stress Components						Principal Stresses			Stress	Stress	Stress	Design
			Sx	Sy	Sz	Sxy	Syz	Sxz	S1	S2	S3	Int	Type	Limit	Margin
28	Inside	101i	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
29	Inside	105j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
30	Inside	110j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	20.47	7.15
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23
31	Inside	90j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
32	Inside	85j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
33	Inside	81j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	20.47	7.15
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23
34	Inside	100j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
35	Inside	95j	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	31.49	11.55
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	47.24	17.82
36	Inside	91i	2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23
	Middle		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm	20.47	7.15
	Outside		2.51	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	2.51	Pm+Pb	30.71	11.23

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2.10.10 Cask Fuel Support Structure Additional Analysis

2.10.10.1 Introduction. The FSS supports the fuel assemblies and non-fuel assembly hardware (NFAH). We considered two loading conditions on the FSS in order to envelop all possible combinations. The two loading conditions are

1. The spent fuel plus the NFAH assemblies load the FSS uniformly along its length. This analysis is presented in Section 2.10.9.

2. The spent fuel plus NFAH assemblies load the FSS at concentrated points along its length (at the spent fuel element support grid and end-plate locations). We consider this assumption to be conservative for the 30-ft drop during which the fuel assembly load will tend to distribute along the total length of the FSS.

This section describes the concentrated load assumption analysis. The analysis was performed at cask drop angular orientations around the cask axes ranging from flat to corner, in order to bound the stresses. The flat orientation is where the cask flat side is parallel to the ground. The corner orientation is where a cask corner is oriented in the down position.

The analysis includes the cask out-of plane bending due to the 1-ft and 30-ft drops. Since the temperature, g-levels, out-of-plane moment, cask ovality, and FSS geometry are different at the midlength of the cask than at the ends, the analysis is divided into two regions: midcavity region (Section E) and cavity end region (Sections A and H), see Fig 2.10.10-1. The analyses were performed using strength of material calculations and the ANSYS computer program. Several models were run which represent the various loading conditions and cask locations. The models include one leg of the FSS, using a fixed-fixed boundary condition to represent the restraint at the center of the FSS and at the connection to the cavity liner.

2.10.10.2 Concentrated Load Model. An ANSYS 3-D flat plate model was used with the load positioned either in the middle or at the end of the model to represent a midcavity or cavity end loading condition on the FSS respectively.

The 3-D plate model used the STIF63 element which is an elastic quadrilateral shell element. The element has six degrees of freedom at each node: translation in the nodal x, y, and z directions and rotations about the nodal x, y, and z axes.

The overall configuration of the FSS is presented in Fig. 2.10.10-2. This figure illustrates the FSS B_4C hole layout.

Figure 2.10.10-3a illustrates the overall model configuration and boundary conditions for the concentrated load in the midcavity region. The model is 31.5 in. long and 8.77 in. wide. Both sides of the model (the center of the FSS side and the cavity liner side) are fixed in all six degrees of freedom. The length of the B_4C holes are 8.22 in. from the center of the FSS, thus leaving a solid material strip on the cavity liner side.

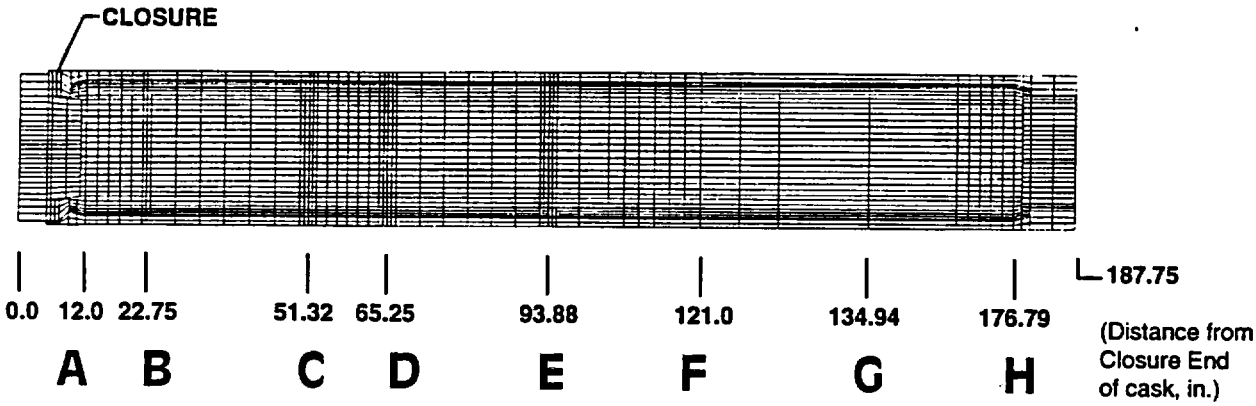

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Fig. 2.10.10-1. Sections for cavity liner stress point location and identification as shown on containment model

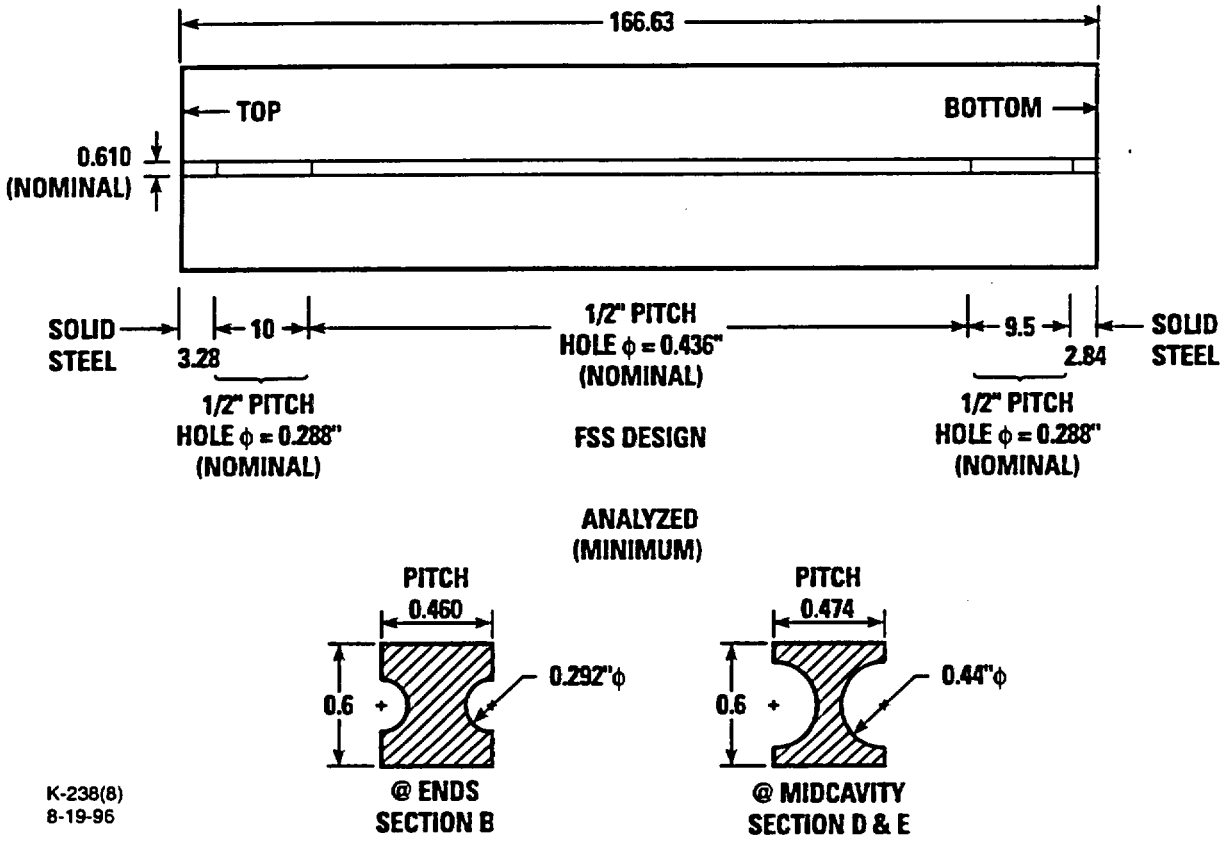
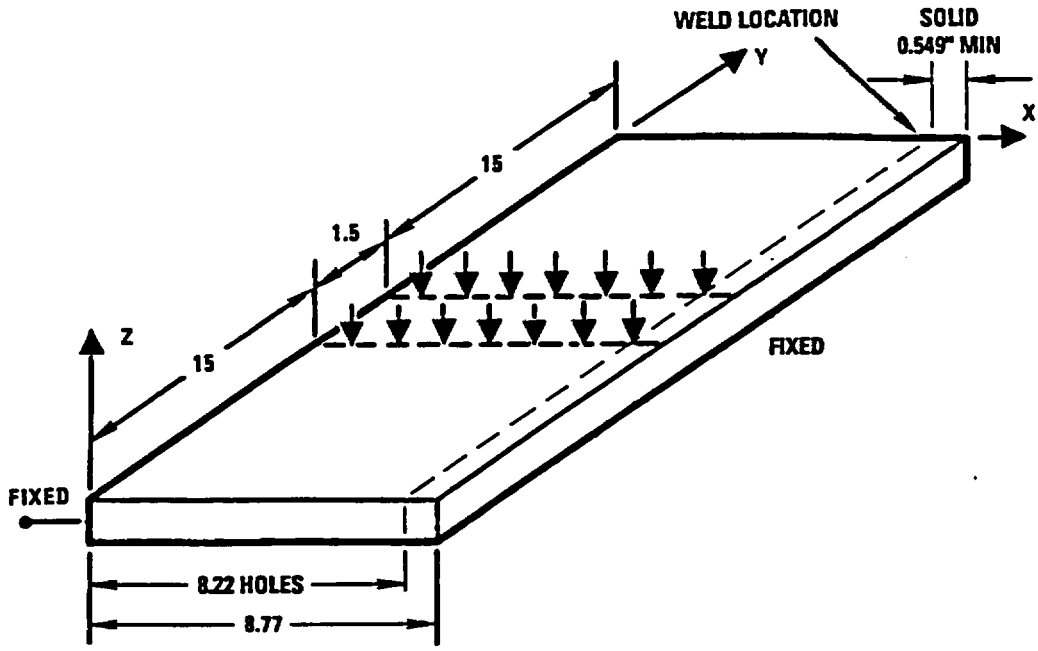


Fig. 2.10.10-2. GA-4 fuel support structure



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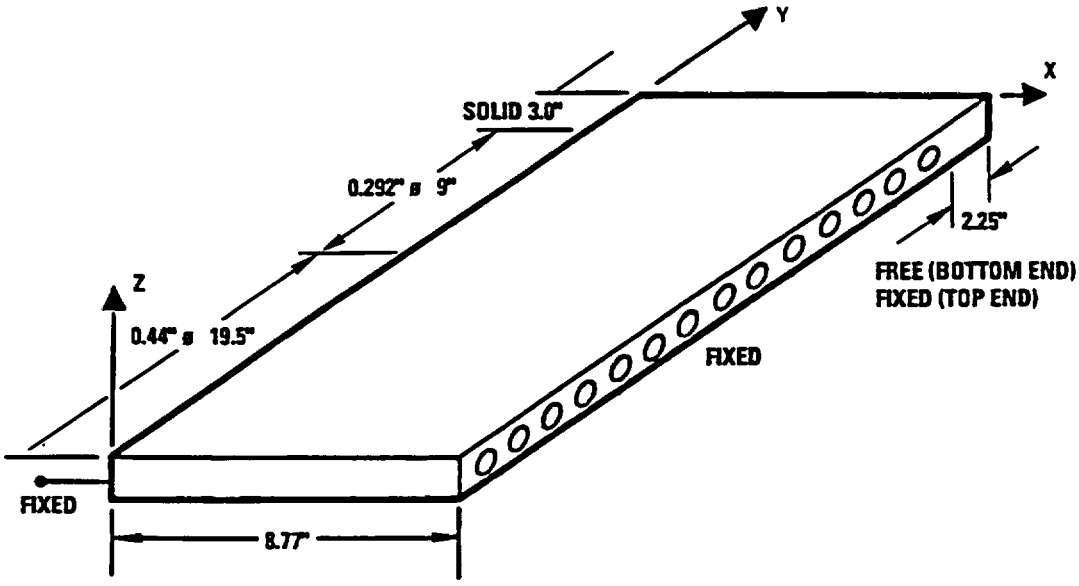
a) MIDCAVITY



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b) END REGIONS

Fig. 2.10.10-3. FSS plate models for the concentrated load case