shown together with the allowable stress intensity range which is twice the yield stress at the temperature.]*

3H.5.6 Shield Building Roof

[*The shield building roof is a reinforced concrete shell supporting the passive containment cooling system tank and air diffuser. The structural configuration is shown on sheets 7, 8 and 9 of Figure 3.7.2-12. Air intakes are located at the top of the cylindrical portion of the shield building. The conical roof supports the passive containment cooling system tank as shown in Figure 3.8.4-7. The conical roof is constructed using double tee precast concrete panels with temporary support during erection on the containment vessel. The location of the precast panels and double tee webs are shown on sheet 1 of Figure 3H.5-11. The precast panels are six inches thick and the remaining 18 inches of concrete is cast in place after erection of the precast panels. The design of critical areas is discussed below. These areas include the tension ring at the connection of the conical roof to the cylindrical wall, the columns between the air inlets just below the air inlets, and the connection of the exterior wall of the passive containment cooling system tank to the conical roof.*]*

3H.5.6.1 Tension Ring

[*The connection between the conical roof and the air inlet columns is designated as the tension ring. It spans as a beam across the air inlets. The governing load for the tension ring is axial tension. The maximum tension is about 1200 kips under normal operating loads. SSE seismic loads result in maximum axial loads of about ~~17~~ 1800 kips. The combined load ranges from ~~29~~ 3000 kips tension to ~~5~~ 600 kips compression. The maximum axial tension results in a reinforcement stress of 3~~7~~ 6 ksi. The reinforcement will also see tensile stresses due to other member force components, primarily torsion and bending about the horizontal axis. The maximum axial compression results in a concrete compressive stress of ~~24~~ 270 psi. This is less than 10 percent of the concrete compressive strength. The ring is designed as a tension member; shear stirrups are provided to carry the shear and torsion without taking credit for concrete shear strength. The reinforcement is shown in Figure 3H.5-11. The reinforcement required and provided is summarized in sheet 1 of Table 3H.~~5~~ ~~11~~5-9.*]*

3H.5.6.2 Column (shear wall) between Air Inlets

[*The column between the air inlets has plan dimensions of 36" x 183" and is 78" high. Its primary loading is vertical load due to dead and seismic loads and horizontal seismic shear. It is designed as a shear wall. The axial compression is about 1400 kips under normal operating loads. SSE seismic loads result in maximum axial loads of about 1600 kips. The combined load ranges from 3000 kips compression to 300 kips tension. The maximum horizontal shear is ~~22~~ 2600 kips in-plane and 800 kips out-of-plane (D.L. = 300, SSE = 500). The 3000 kips compression corresponds to an axial compressive stress of about 460 psi These loads and the associated bending moments result in a maximum concrete compressive stress of ~~400~~ 1000 psi and a maximum concrete tensile stress of ~~100~~ 600 psi at the base of the column assuming gross concrete section properties. The reinforcement is shown in Figure 3H.5-11. The reinforcement required and provided is summarized in sheet 2 of Table 3H.~~5~~ ~~11~~5-9.*]*

*NRC Staff approval is required prior to implementing a change in this information; see DCD Introduction Section 3.5

Table 3H.5-9 (Sheet 1 of 3)

[*SHIELD BUILDING ROOF REINFORCEMENT SUMMARY*]*

(Tension Ring)

Member force	*Reinforcement required sq.in/in. length*	*Reinforcement provided*	*Reinforcement provided sq.in/in. length*	*Ratio required/ provided*
Axial + bending		*36 # 14 bars*		*0.77 6*[1]
Torsion	*0.078 4*	*#9 hoop @ 0.45°*	*0.15*	*0.50 49*
Torsion + vertical shear	*2 x 0.078 4 + 0 26 20 = 0.42 35*	*2 legs # 9 hoop @ 0.45° 2 # 8 ties @ 0.9°*	*0.42*	*0.99 83*
Torsion + horizontal shear	*2 x 0.078 4 + 0.15 42 = 0.31 29*	*2 legs # 9 hoop stirrup @ 0 45° 3 # 5 ties @ 1.8°*	*0.33*	*0.92 88*

Notes

1) *This ratio is calculated from the interaction diagram for axial load and moments for the section and does not include the effect of torsion loading. It is the ratio of the loads on the interaction surface divided by the design loads for the same ratio of axial loads and moments.*

*NRC Staff approval is required prior to implementing a change in this information, see DCD Introduction Section 3 5

Table 3H.5-9 (Sheet 2 of 3)

*[SHIELD BUILDING ROOF REINFORCEMENT SUMMARY]**

(Air Inlet Column)

Member force	*Reinforcement required sq.in/in. height*	*Reinforcement provided*	*Reinforcement provided sq.in/in. height*	*Ratio required/ provided*
Axial + bending		*48 # 11 bars*		*0.58 42(1,2)*
Torsion	*0.015*	*#5 hoop at 6"*	*0.05*	*0.30*
Torsion + in-plane shear	*2 x 0 015 + 0.20 = 0.23*	*3 # 7 ties @ 6"*	*0.30*	*0.77*
Torsion + out-of-plane shear	*0.37*	*# 5 hoop @ 6"* *9 # 5 ties @ 6"*	*0.56*	*0 66*

Notes

1) This ratio is calculated from the interaction diagram for axial load and moments for the section and does not include the effect of torsion loading It is the ratio of the loads on the interaction surface divided by the design loads for the same ratio of axial loads and moments.

2) The vertical reinforcement in the column is provided to meet minimum vertical reinforcement requirements for shear walls.

*NRC Staff approval is required prior to implementing a change in this information, see DCD Introduction Section 3 5

Table 3H.5-9 (Sheet 3 of 3)

*[SHIELD BUILDING ROOF REINFORCEMENT SUMMARY]**

(Exterior Wall of the Passive Containment Cooling System Tank)

		Reinforcement on each face, sq.in./ft		
Wall Segment	*Location*	*Required*	*Provided*	
Elevation 298'9" to 321'6"	*Horizontal*	*1.81 ~~77~~*	*#9 @ 6"*	*2.00*
Elevation 321'6" to 332'2"	*Horizontal*	*1.10*	*#7 @ 6"*	*1.20*
Elevation 298'9" to 303'	*Vertical*	*1.95 ~~2.44~~*	*#11 @ 0.9°* *#11 @ 3.6°*	*2.80*
Elevation 303' to 317'	*Vertical*	*1.16 ~~88~~*	*#11 @ 0.9°*	*2.24*
Elevation 317' to 332'2"	*Vertical*	*0.98*	*#11 @ 1.8°*	*1.12*

*NRC Staff approval is required prior to implementing a change in this information, see DCD Introduction Section 3.5