

**Structural Analysis of
DCJV's 557 Ft. Self-Supporting Tower
4001 Brandywine Street, NW
Washington, DC**

**Contract No. 2255
May 29, 2008**

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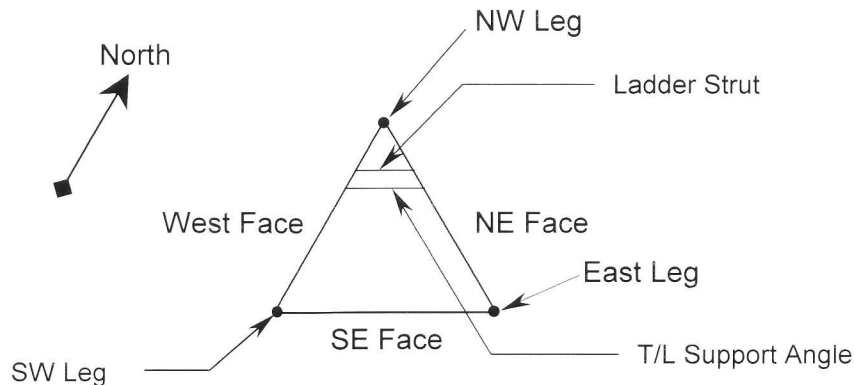
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I. INTRODUCTION

DCJV's 557'-1 $\frac{3}{4}$ " self-supporting tower is located at 4001 Brandywine Street NW, Washington, DC. The tower was designed and fabricated by Dresser Industries of Columbus, OH and was erected in 1972.

The tower is triangular in cross section with face width of 62'-2 $\frac{1}{4}$ " at the tower base and tapers to a face width of 15'-3 $\frac{1}{2}$ " at the tower top. The concrete foundations extend 10 ft. above ground level and the tower supports an antenna stack with a height to top of lightning arrestor of 127.2 ft. This gives an over-all height of the structure of 694.35 ft. above ground level.

For reference throughout this report, the tower legs and faces are identified by the following tower cross section.



The present analysis was conducted in accordance with TIA/EIA-222-F for a basic wind velocity of 75 mph.

The equipment supported by the tower for this analysis is as follows.

Equipment List

1. Dielectric TUP-04-12-2 DTV Ch. 34 and 39 antenna (CaAc = 279 sq. ft., Wt. = 8,030 lbs.) occupying the upper portion of the top antenna stack fed by an 8 $\frac{3}{16}$ " T/L mounted on the ladder strut.
2. Dielectric THP-O-2-1-R FM antenna (CaAc = 64 sq. ft., Wt. = 870 lbs.) occupying the center portion of the top antenna stack fed by a 6 $\frac{1}{8}$ " T/L mounted on the ladder strut.
3. Dielectric THP-O-10-2-R NTSC Ch. 7 and 9 antenna (CaAc = 337 sq. ft., Wt. = 4,470 lbs.) occupying the bottom portion of the top antenna stack fed by two 6 $\frac{1}{8}$ " T/L's mounted on the ladder strut.
4. Ladder full height of tower with angle rails and round tubing rungs.
5. Rail type ladder safety climbing device.
6. Horizontal ladder struts and transmission line support angles.

I. INTRODUCTION - continued

Equipment List - continued

7. 2½" (Nominal Pipe Size) conduit to the tower top mounted on the T/L support angles.
8. 2" NPS conduit to the 371 ft. level then changing to a 1½" NPS conduit to the tower top mounted on the T/L support angles.
9. 1¼" NPS deicer conduit to the 441 ft. level then changing to a 1" conduit to the tower top mounted on the T/L support angles.
10. ¾" phone conduit to the tower top mounted on the ladder strut.
11. 2½" NPS conduit to the 505 ft. level mounted on the T/L support angles.
12. SQ3 ENG antenna at the 534 ft. level fed by an WE65 and a 1⅝" heliax mounted near the SW Leg.
13. ***MRC ProScan III ENG antenna (ABC) and cluster box mounted at the 526 ft. level fed by six ⅞" heliax lines and a ⅝" control cable mounted on the conduit of Item 9.***
14. Quad horn ENG antennas at the 524 ft. level fed by a 1⅝" heliax and a ¾" control cable mounted on the 2½" conduit of Item 11.
15. SQ3 ENG antenna with RA5 radome at the 519 ft. level fed by an WE65 mounted near the East Leg and two ⅝" control cables mounted on the East Leg.
16. SQ3 ENG antenna with RA5 radome (ABC) at the 511 ft. level fed by an EW63 mounted on the East Leg, a 1⅝" heliax and three ⅝" control cables mounted on the conduit of Item 8.
17. SQ3 ENG antenna with RA5 radome at the 503 ft. level fed by an EW63 mounted on the East Leg and a ⅝" control cable mounted on the 2½" conduit of Item 7.
18. Catwalk platform and obstruction lights at the 501 ft. level.
19. One PD220 antenna (22 ft. whip) mounted on the NW Leg and one PD220 antenna mounted on the SW Leg at the 500 ft. level fed by a ⅝" control cable mounted on the 2½" conduit of Item 11.
20. SQ3 ENG antenna with RA5 radome at the 491 ft. level fed by a 1⅝" heliax mounted on the SW Leg and a ⅝" control cable mounted on the 2½" conduit of Item 7.
21. 8 bay FM antenna mounted on the East Leg from the 449 ft. level to the 473 ft. level fed by a 3⅞" T/L.
22. SQ3 ENG antenna at the 471 ft. level fed by an 1⅝" heliax and a ⅝" control cable mounted on the deicer conduit.
23. 4 ft. grid dish on the NW Leg at the 466 ft. level fed by a 1⅝" heliax mounted on the SW Leg.
24. SQ3 ENG antenna with RA5 radome at the 451 ft. level fed by a ⅞" heliax and a ¾" control cable mounted on the NW Leg.
25. MRC MicroScan ENG antenna with radome at the 451 ft. level fed by a ⅞" heliax and a ¾" control cable mounted on the deicer conduit.

I. INTRODUCTION - continued

Equipment List - continued

26. Two vertical angles to the 451 ft. level to which the horizontal T/L support angles are bolted.
27. PD220 antenna (22 ft. whip) on the SW Leg at the 447 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the deicer conduit.
28. PD220 antenna (22 ft. whip) on the SW Leg at the 444 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the deicer conduit.
29. PD220 antenna (22 ft. whip) on the East Leg at the 434 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the deicer conduit.
30. PD220 antenna (22 ft. whip) on the East Leg at the 439 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the deicer conduit.
31. FM antenna mount on the East Leg from the 384 ft. level to the 438 ft. level.
32. 1 bay FM antenna on the East Leg with C/R at the 427 ft. level fed by a $3\frac{1}{8}$ " T/L mounted on the T/L support angles.
33. ERI P300-3 FM antenna on the East Leg with C/R at the 395 ft. level fed by a $3\frac{1}{8}$ " T/L mounted on the T/L support angles.
34. 4 ft. dish with radome on the NE Face at the 385 ft. level fed by an EW63 mounted on the phone conduit.
35. 6 ft. diameter passive reflector on the NW Leg at the 381 ft. level.
36. 6 ft. dish on the NE Face at the 381 ft. level fed by a $1\frac{5}{8}$ " heliax mounted on the SW Leg.
37. 2 ft. dish with radome on the SE Face at the 379 ft. level fed by three $\frac{5}{8}$ " heliax, four $\frac{3}{8}$ " control cables and a $\frac{1}{2}$ " coax mounted on the $2\frac{1}{2}$ " conduit of Item 11.
38. 4 ft. dish with radome on the SE Face at the 376 ft. level fed by a $\frac{1}{4}$ " coax mounted on the phone conduit and an EW122 mounted on the conduit of Item 8.
39. Catwalk and red beacon platform at the 371 ft. level.
40. DB616 antenna (18.7 ft. rod) on the East Leg at the 355 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the $2\frac{1}{2}$ " conduit of Item 7.
41. DB408 antenna on the East Leg at the 354 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the $2\frac{1}{2}$ " conduit of Item 7.
42. 6' HP dish on the East Leg at the 345 ft. level fed by a $1\frac{5}{8}$ " heliax.
43. PD220 antenna (22 ft. whip) on the SW Leg at the 348 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the SW Leg.
44. DB616 antenna (18.7 ft. rod) on the SW Leg at the 340 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the SW Leg.
45. DB616 antenna (18.7 ft. rod) on the East Leg at the 329 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the $2\frac{1}{2}$ " conduit of Item 7.

I. INTRODUCTION - continued

Equipment List - continued

46. DB616 antenna (18.7 ft. rod) on the SW Leg at the 328 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the SW Leg.
47. DB616 antenna (18.7 ft. rod) on the SW Leg at the 316 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the 2 $\frac{1}{2}$ " conduit of Item 7.
48. Catwalk and red beacon platform at the 311 ft. level.
49. DB616 antenna (18.7 ft. rod) on the East Leg at the 310 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the East Leg.
50. 6 ft. dish on the NE Face at the 305 ft. level fed by a WE65 mounted on the East Leg.
51. DB616 antenna (18.7 ft. rod) on the SE Face at the 300 ft. level fed by a $\frac{7}{8}$ " heliax.
52. DB616 antenna (18.7 ft. rod) on the SW Leg at the 300 ft. level fed by a $\frac{7}{8}$ " heliax.
53. DB616 antenna (18.7 ft. rod) on the East Leg at the 291 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the East Leg.
54. 6 ft. dish with radome on the East Leg at the 282 ft. level fed by an EW127A mounted on the East Leg.
55. DB616 antenna (18.7 ft. rod) on the SW Leg at the 280 ft. level fed by a $\frac{7}{8}$ " heliax.
56. Catwalk and red beacon platform at the 241 ft. level.
57. 6 ft. dish on the NE Face at the 238 ft. level fed by a WE130 mounted near the East Leg.
58. 6 ft. dish on the SE Face at the 238 ft. level fed by an EW127 mounted near the East Leg.
59. 4 ft. dish with radome on the SE Face at the 212 ft. level fed by a $\frac{7}{8}$ " control cable mounted on the SW Leg.
60. 6 ft. HP dish on the SE Face at the 196 ft. level fed by a $\frac{7}{8}$ " heliax.
61. DB224 antenna on the East Leg at the 187 ft. level fed by a $\frac{7}{8}$ " heliax mounted on the East Leg.
62. 4 ft. dish on the SE Face at the 164 ft. level fed by an EW127 mounted on the SW Leg.
63. 6 ft. dish on the SE Face at the 158 ft. level fed by a $\frac{7}{8}$ " heliax.
64. DB432 yagi antenna on the NW Leg at the 126 ft. level.
65. 2 ft. dish on the SE Face at the 114 ft. level fed by a $\frac{1}{2}$ " coax mounted on the SW Leg.
66. Two DB432 yagi antennas on the NW Leg at the 110 ft. level fed by two $\frac{3}{8}$ " control cables and two $\frac{1}{4}$ " control cables mounted on the $\frac{3}{4}$ " phone conduit.
67. Catwalk, obstruction light platform and antenna mount on the West Face and at the 106.5 ft. level.

I. INTRODUCTION - continued

Equipment List - continued

- 68. Doppler radar antenna with an 18 ft. diameter radome and supporting platform mounted at the 106 ft. level.
- 69. 4' HP dish on the SW Leg at the 90 ft. level fed by a 1 $\frac{5}{8}$ " heliax.
- 70. 6' HP dish on the SW Leg at the 90 ft. level fed by an 1 $\frac{5}{8}$ " heliax.
- 71. 6 ft. dish on the NW Leg at the 86 ft. level fed by an EW127 mounted on the 2 $\frac{1}{2}$ " conduit of Item 7.
- 72. 16" HP dish on the NW Leg at the 52 ft. level fed by a RG11 cable and a $\frac{1}{4}$ " control cable mounted on the 2 $\frac{1}{2}$ " conduit of Item 11.
- 73. DB432 yagi antenna on the NE Face at the 40 ft. level fed by a $\frac{1}{2}$ " heliax mounted on the $\frac{3}{4}$ " phone conduit.
- 74. 24'x24' sheet metal building and truss platform at the 16.58 ft. level.
- 75. DB432 yagi antenna on the West Face at the 9 ft. level.
- 76. 6 ft. dish with radome on the NW Leg at the 6 ft. level.
- 77. 1 $\frac{5}{8}$ " heliax to the tower top mounted on the 6 $\frac{1}{8}$ " FM T/L.

End of Equipment List

The customer should verify that that the above equipment list accurately depicts the intended tower loading condition.

II. RESULTS TIA/EIA-222-F 75 MPH

A. Legs

The tower sections are numbered from bottom to top as 1 through 25. The sections extend from one main strut level to the next and do not necessarily coincide with the actual leg splice locations. The tower legs are solid round bars of high strength steel that vary in diameter from 9.25" to 5.375".

None of the tower legs are over-stressed due to the loading of this analysis.

B. Leg Splice Connections

The leg-to-leg connections consist of flange plates that are factory welded to each end of each tower leg. The flange plates of adjoining legs are bolted together in the field during the erection process.

None of the leg splice connections are over-stressed due to the loading of this analysis.

C. Diagonals

The main tower diagonals are comprised of either back-to-back angles or solid steel round bars. The back-to-back angles resist tension and compression forces while the solid round bars are considered as tension only members.

None of the diagonals are over stressed due to the loading of this analysis.

D. Struts

The tower struts are the primary leg-to-leg horizontal bracing members on the tower face that carry compressive loads. The struts at the top of Section 1 are back-to-back channels. The struts at the top of Section 5 are two pairs of back-to-back angles. The remaining struts are back-to-back angles.

None of the struts are over stressed due to the loading of this analysis.

E. Redundants

Redundants are secondary bracing members that act to reduce the effective length of primary load carrying members. Section 3.1.13 of TIA/EIA-222-F stipulates that these members shall be capable of resisting a force equal to 1.5% of the supported member's calculated axial load.

The redundants meet the requirements of TIA/EIA-222-F Section 3.1.13.

II. RESULTS TIA/EIA-222-F 75 MPH - continued

F. Foundations

The following footing descriptions are based on Dresser Drawing No. 32801, Sheet No. FD1B, Revision B7 dated 1/26/72.

The NW Footing consists of a 7 ft. diameter drilled shaft with an embedment depth of 80 ft. and a 9 ft. diameter bell.

The East Footing consists of a 7 ft. diameter drilled shaft with an embedment depth of 66 ft. and a 15 ft. diameter bell.

The SW Footing consists of a 7 ft. diameter drilled shaft with an embedment depth of 80 ft. and a 9 ft. diameter bell.

The footings are tied together with a 4 ft. wide by 5 ft. deep grade beam. The concrete has a 28-day compressive strength of 3,000 psi.

The reactions from the loads of this analysis are shown below. One "kip" equals 1,000 pounds.

Maximum compression per pier = 2,344 kips

Maximum uplift per pier = 1,774 kips

Maximum shear per pier = 146 kips

Based on the original foundation design parameters, the foundations are capable of safely supporting the reactions of this analysis.

III. CONCLUSIONS and RECOMMENDATIONS

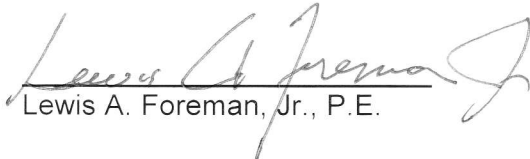
The tower structure and foundation system meet or exceed the requirements to attain a basic wind load rating of 75 mph in accordance with TIA/EIA-222-F while supporting the equipment listed in Section I of this report.

This analysis was based on the premise that the tower and foundations were properly fabricated, constructed and installed, have been maintained in good condition and that no structural component has been damaged or deteriorated to such an extent so as to reduce its load carrying capacity.

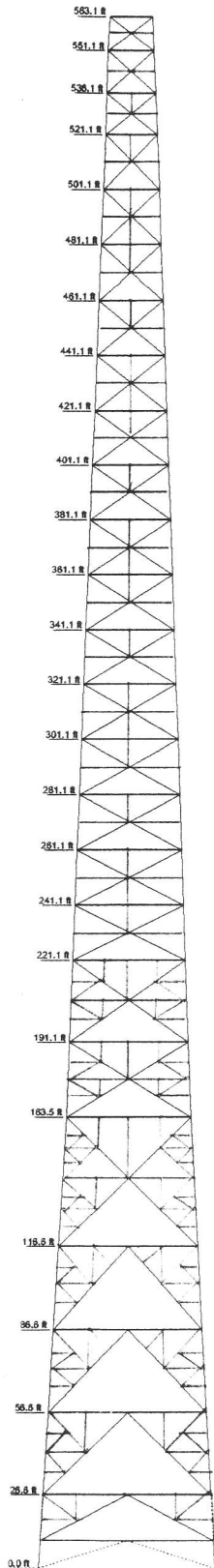
Any recommended corrective or preventive actions contained in this report should only be performed by a qualified tower erection crew. Any items related to the structural integrity of the tower should be placed under the direct control of a registered professional engineer with extensive experience in the design of, and the erection procedures for, tall towers. Under no circumstances shall any structural member be loosened nor removed without adequate temporary bracing being in place and the approval of a qualified structural engineer.

Anderson-Foreman Engineers, Inc. disclaims any liability arising from original design, material, fabrication, erection deficiencies and the present condition of the tower. The maximum liability that shall be incurred as a result of any information or conclusions contained in this Report shall be limited to the total funds received for the preparation of this Report.

The opportunity to be of service on this project is appreciated and any questions concerning this report are invited.


Lewis A. Foreman, Jr., P.E.

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Legs - in	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25
Leg Yield - in	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25	B 8.25
Str. Yld - in	DC 12 x20.7	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16	DL 5 x3 1/2x27/16
Diagonals	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2
Diagonal Yield - in	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2
Full Yield - in	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2	DL 5 x4 x1/2
# Panels @ 5'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



SYMBOL LIST

MARK	SIZE
A	DL 6 x4 x9/16
B	DL 6 x4 x7/16
C	DL 5 x3 1/2x7/16
D	DL 5 x3 1/2x5/16
E	DL 4 x3 1/2x3/8
F	DL 3 1/2x4 x1/2
G	DL 3 1/2x4 x7/16
H	DL 3 1/2x4 x3/8
I	DL 3 1/2x4 x5/16
J	DL 3 x3 1/2x3/8
K	DL 3 x3 1/2x5/16
L	DL 2 1/2x3 x3/8
M	DL 6 x6 x5/8
N	DL 3 x2 1/2x3/8
O	DL 3 x2 x5/16
P	1@10.00
Q	1@12.00

DESIGN NOTES

- EIA/TIA-222-F 75 mph Basic Wind Speed.

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Columbia, SC 29205-2230 Fax (803) 799-6915

537 DECO SS TOWER	Location
WASHINGTON, DC	Location
DC JV	Company
LAF	Drawn by
	Approved
2255	Date
	Scale
	NTS
	Sheet
	E1

25 RC 21/25 75 MPH-F NO STRESS INCREASE USED
 1 1 2 4 63.3333 60.2865 SECT 1-PAN 1 DUMMY FOR 10' FOUNDATION
 2 2 1 4 60.2865 56.8490
 3 3 1 4 56.8490 53.4115
 4 4 1 4 53.4115 49.9740
 5 5 1 5 49.9740 44.5938
 6 6 1 5 44.5938 42.5833
 7 7 1 5 42.5833 40.3958
 8 8 1 2 40.3958 38.9375
 9 9 1 2 38.9375 37.4792
 10 10 1 2 37.4792 36.0208
 11 11 1 2 36.0208 34.5625
 12 12 1 2 34.5625 33.1042
 13 13 1 2 33.1042 31.6458
 14 14 1 2 31.6458 30.1875
 15 15 1 2 30.1875 28.7292
 16 16 1 2 28.7292 27.2708
 17 17 1 2 27.2708 25.8125
 18 18 1 2 25.8125 24.3542
 19 19 1 2 24.3542 22.8958
 20 20 1 2 22.8958 21.4375
 21 21 1 2 21.4375 19.9792
 22 22 1 2 19.9792 18.5208
 23 23 1 2 18.5208 17.4271
 24 24 1 5 17.4271 16.3333
 25 25 1 5 16.3333 15.4583
 0 0 0 0 0 0

1 1 80.0 .50 26x2.0A490
 2 4 80.0 .25 26x2.0A490
 5 5 80.0 .125 25x2.0A490
 6 6 80.0 .25 26x2.0A490
 7 7 80.0 .25 25x2.0A490
 8 8 80.0 .50 18x2.0A490
 9 13 90.0 .50 18x2.0A490
 14 16 90.0 .50 18x1.75A490
 17 17 95.0 .50 18x1.75A490
 18 22 95.0 .50 18x1.50A490
 23 25 50.0 .50 18x1.25A490
 0 0 0 0 0 0

LEG PROPERTIES

0 0 0 0 0 0 0
 1 1 7 1 36.0 .244 58.0 36.0
 8 1 25 1 36.0 .488 58.0 36.0
 0 0 0 0 0 0 0
 1 1 1 2 36.0 .475 58.0 36.0
 2 1 7 1 36.0 .238 58.0 36.0
 8 1 23 1 50.0 .475 58.0 36.0
 24 1 25 1 36.0 .475 58.0 36.0
 0 0 0 0 0 0 0

LEG PROPERTY OVER-RIDE
STRUT PROPERTIES

DIAGONAL PROPERTIES

1 1 1 2 DC12x20.7 32x.875A325 0
 2 1 3 1 DL5x3.5x.3125 14x.75A325 0
 4 1 4 1 DL5x3.5x.4375 14x.875A325 0
 5 1 5 1 DL3.5x3.5x.3752 24x.75A325 0
 6 1 6 1 DL5x3.5x.4375 15x.875A325 0
 7 1 7 1 DL5x3.5x.375 14x.875A325 0
 8 1 8 1 DL6x4x.5625 22x.875A325 0
 9 1 9 1 DL6x4.0x.50 22x.875A325 0
 10 1 10 1 DL6x4x.4375 22x.875A325 0
 11 1 11 1 DL6x4x.375 22x.875A325 0
 12 1 12 1 DL5x3.5x.4375 14x.75A325 0
 13 1 14 1 DL5x3.5x.375 14x.75A325 0

STRUT DEFINITIONS

17	17	6.75	0	2.50	17.50	8.0	14.00	.625	0
18	18	6.50	0	2.25	16.00	8.0	14.00	.625	0
19	19	6.50	0	2.25	15.00	8.0	14.00	.625	0
20	20	6.375	0	2.25	15.00	8.0	14.00	.625	0
21	21	6.25	0	2.00	15.00	8.0	14.00	.625	0
22	22	6.25	0	2.00	14.50	8.0	14.00	.50	0
23	23	5.875	0	2.625	14.50	6.0	12.00	.50	0
24	24	5.875	0	3.25	14.50	6.0	12.00	.50	0
25	25	5.375	0	3.00	13.50	6.0	12.00	.50	0
0	0	0	0	0	0	0	0	0	0

SECTION LOADS

	S1	P1	S2	P2	Af	Ar	WT	ICE	ICE
								A	WT
1	1	1	1	0	0	0	0		
1	2	1	2	21.49	0	205.7	0		
2	1	2	1	20.63	0	207.1	0		
3	1	3	1	18.86	0	210.1	0		
4	1	4	1	18.20	0	225.1	0		
5	1	5	1	23.76	0	268.9	0		
6	1	6	1	21.31	0	229.0	0		
7	1	7	1	19.09	0	191.4	0		
8	1	8	1	11.99	0	115.0	0		
9	1	9	1	12.70	0	123.2	0		
10	1	10	1	11.18	0	119.5	0		
11	1	11	1	10.78	0	98.3	0		
12	1	12	1	9.64	0	109.7	0		
13	1	13	1	8.20	0	81.4	0		
14	1	14	1	7.87	0	78.2	0		
15	1	15	1	7.87	0	87.1	0		
16	1	16	1	6.45	0	62.7	0		
17	1	17	1	6.18	0	74.4	0		
18	1	18	1	6.45	0	74.6	0		
19	1	19	1	4.96	0	58.2	0		
20	1	20	1	4.72	0	55.3	0		
21	1	21	1	5.04	0	58.2	0		
22	1	22	1	3.70	0	43.8	0		
23	1	23	1	4.62	0	54.8	0		
24	1	24	1	4.15	0	49.2	0		
25	1	25	1	5.12	0	59.2	0		
0	0	0	0	0	0	0	0		

0	163.5	4.5	1.05	5.94	0	26.43	0	0	LAD&SAF RL
163.5	281	4.5	1.05	5.94	0	18.60	0	0	LAD&SAF RL
281	421	4.5	1.05	5.94	0	13.18	0	0	LAD&SAF RL
421	563	4.5	1.05	5.94	0	7.25	0	0	LAD&SAF RL
10	163.5	1.11	0	2.67	0	26.43	0	0	LAD STRUT
163.5	281	1.32	0	3.17	0	18.60	0	0	LAD STRUT
281	421	1.55	0	3.72	0	13.18	0	0	LAD STRUT
421	536	1.62	0	3.88	0	7.25	0	0	LAD STRUT
10	163.5	1.60	0	3.85	0	24.83	0	0	T/L L3x3X.38
163.5	281	1.90	0	4.57	0	17.00	0	0	T/L L3x3X.38
281	421	2.24	0	5.37	0	11.58	0	0	T/L L3x3X.38
421	536	2.33	0	5.60	0	5.65	0	0	T/L L3x3X.38
10	281	0	18.3	27.3	-1.28	23.11	0	0	3-6.125" T/L
281	563	0	18.3	27.3	-1.28	9.62	0	0	3-6.125" T/L
10	281	0	8.19	13.3	-.43	23.11	0	0	8.1875" T/L
281	563	0	8.19	13.3	-.43	9.62	0	0	8.1875" T/L
10	563	.13	2.88	6.79	-3.03	16.14	0	0	2.5" CONDUIT
10	381	.13	2.38	4.29	-2.28	19.97	0	0	2" CONDUIT
381	563	.13	1.90	3.22	-2.28	6.50	0	0	1.5" CONDUIT
10	441	.13	1.66	2.62	-1.53	18.70	0	0	1.25" DEICER
441	563	.13	1.32	2.05	-1.53	5.22	0	0	1" DEICER CND
10	563	0	1.05	1.38	-1.28	5.07	0	0	.75" PHONE
10	515	.13	2.88	6.79	1.88	16.14	0	0	2.5" CONDUIT

544	544	2045	0	229	0	0	0	0	SQ3 ENG	12.
10	544	0	2.64	1.29	-2.28	6.92	0	0	WE65+.625"CC	
536	536	0	3520	385	0	0	0	0	MRC PSIII	13.
10	536	0	3.33	3.12	-1.53	5.22	0	0	6-.875" HLX	
10	536	0	.62	.27	-1.53	5.22	0	0	.625 CC	
534	534	1127	0	100	0	0	0	0	QUAD HORNS	14.
10	534	0	1.98	2.50	1.88	4.11	0	0	1.62 HLX+.75C	
529	529	0	4752	379	0	0	0	0	SQ3 W/ RA5	15.
10	529	0	2.03	1.03	8.99	-5.19	0	0	WE65+2(.6"CC)	
521	521	0	4752	379	0	0	0	0	SQ3 W/ RA5	16.
10	521	0	2.01	1.27	-1.53	16.14	0	0	EW63+1.6+3(.6)	
513	513	0	4752	379	0	0	0	0	SQ3 W/ RA5	17.
10	513	0	1.16	.75	-3.03	5.26	0	0	EW63+.625" CC	
511	511	648	0	350	0	0	0	0	CATWALK+OBS L	
510	510	0	856	146	-4.81	2.08	0	0	TWO PD220	19.
10	510	0	.66	.25	1.88	4.84	0	0	.625" CC	
501	501	0	4752	379	0	0	0	0	SQ3 W/ RA5	20.
10	501	0	1.98	1.29	0	5.26	0	0	1.62"H+.62"CC	
459	483	0	21.84	23.02	9.99	-5.77	0	0	8 BAY FM	21.
10	471	0	3.12	3.10	9.99	-5.77	0	0	3.125" T/L	
481	481	2045	0	229	0	0	0	0	SQ3 ENG	22.
10	481	0	2.64	1.29	-2.28	6.92	0	0	1.62"H+.62"CC	
476	476	0	2020	169	7.00	4.04	0	0	4' GRID	23.
10	476	0	1.98	1.04	-1.28	11.64	0	0	1.625" HLX	
461	461	0	4752	379	0	0	0	0	SQ3 W/ RA5	24.
10	461	0	1.86	.94	0	12.85	0	0	.875"H+.75"CC	
461	461	0	1720	200	0	0	0	0	MICROSCAN-R25.	
10	461	0	1.86	.94	-2.28	6.92	0	0	.875"H+.75"CC	
10	461	4.00	0	7.24	-1.78	9.74	0	0	T/L SUPP. L's	
457	457	0	428	73	11.81	-6.82	0	0	PD220	27.
10	457	0	0	.52	-2.28	7.37	0	0	.875" HLX	
454	454	0	428	73	-11.81	-6.82	0	0	PD220	28.
10	454	0	0	.52	-2.28	7.37	0	0	.875" HLX	
444	444	0	428	73	0	13.64	0	0	PD220	29.
10	444	0	0	.52	-2.28	7.37	0	0	.875" HLX	
449	449	0	428	73	-11.81	-6.82	0	0	PD220	30.
10	449	0	0	.52	-2.28	7.37	0	0	.875" HLX	
394	448	0	4.50	14.98	13.50	-7.79	0	0	FM ANT. MT	31.
437	437	0	670	116	12.25	-7.07	0	0	1 BAY FM	32.
10	437	0	3.12	3.10	-1.78	9.74	0	0	3.125 T/L	
405	405	0	3474	246	13.50	-7.79	0	0	P300-3 FM	33.
10	405	0	3.12	3.10	-1.78	9.74	0	0	3.125 T/L	
395	395	0	2020	169	7.00	4.04	0	0	4' DISH-R	34.
10	395	0	1.16	.50	-1.28	11.64	0	0	EW63	
391	391	6912	0	500	0	-16.16	0	0	6' DIA REFL35.	
391	391	4985	0	243	8.37	4.84	0	0	6' DISH	36.
10	391	0	1.11	.52	17.25	-9.96	0	0	.875" HLX	
389	389	0	732	67	0	-8.08	0	0	2' DISH	37.
10	389	0	2.62	1.85	1.88	9.90	0	0	3-.62+4-.38+.5	
386	386	0	2020	169	7.06	-8.15	0	0	4' DISH-R	38.
10	386	0	0	.06	-1.28	11.64	0	0	.25" COAX	
10	386	0	.67	.29	-2.28	10.04	0	0	EW122	
381	381	4028	0	1650	0	0	0	0	CATWALK & BCN	
365	365	0	780	76	15.00	-8.66	0	0	DB616	40.
10	365	0	1.11	.52	-3.03	11.07	0	0	.875" HLX	
364	364	0	410	67	15.00	-8.66	0	0	DB408	41.
10	364	0	1.11	.52	-3.03	11.07	0	0	.875" HLX	
355	355	4181	0	331	7.19	4.15	0	0	6' HP DISH	42.
10	355	0	1.98	1.04	0	0	0	0	1.625" HLX	
358	358	0	478	73	0	-8.66	0	0	PD220	43.

10	358	0	0	.52	-9.02	1.88	0	0	.875" HLX	
350	350	0	780	76	15.46	-8.92	0	0	DB616	44.
10	350	0	0	.52	15.46	-8.92	0	0	.875" HLX	
339	339	0	780	76	15.79	-9.12	0	0	DB616	45.
10	339	0	0	.52	-3.03	11.96	0	0	.875" HLX	
338	338	0	780	76	-15.79	-9.12	0	0	DB616	46.
10	338	0	0	.52	-15.79	-9.12	0	0	.875" HLX	
326	326	0	780	76	-16.19	-9.35	0	0	DB616	47.
10	326	0	1.11	.52	-3.03	12.43	0	0	.875" HLX	
321	321	3763	0	1650	0	0	0	0	CATWALK & BCN	
320	320	0	780	76	-16.19	-9.35	0	0	DB616	49.
10	320	0	0	.52	-3.03	12.43	0	0	.875" HLX	
315	315	4985	0	243	8.37	4.84	0	0	6' DISH	50.
10	315	0	1.18	.53	16.75	-9.67	0	0	WE657	
310	310	0	780	76	16.50	-9.53	0	0	DB616	51.
10	310	0	1.11	.52	16.50	-9.53	0	0	.875" HLX	
310	310	0	780	76	16.50	-9.53	0	0	DB616	52.
10	310	0	1.11	.52	16.50	-9.53	0	0	.875" HLX	
301	301	0	780	76	17.25	-9.96	0	0	DB616	53.
10	301	0	1.11	.52	17.25	-9.96	0	0	.875" HLX	
292	292	0	8048	262	17.62	-10.18	0	0	6' DISH-R	54.
10	292	0	.67	.29	17.62	-10.18	0	0	EW127A	
290	290	0	780	76	16.50	-9.53	0	0	DB616	55.
10	290	0	1.11	.52	16.50	-9.53	0	0	.875" HLX	
251	251	4300	0	2000	0	0	0	0	CATWALK & BCN	
248	248	4985	0	243	9.62	5.56	0	0	6' DISH	57.
10	248	0	1.12	.25	16.75	-9.11	0	0	WE130	
248	248	4985	0	243	9.62	5.56	0	0	6' DISH	58.
10	248	0	1.12	.25	16.75	-9.11	0	0	EW127	
222	222	0	2228	154	0	-12.02	0	0	4' DISH-R	59.
10	222	0	.85	.44	-20.82	-12.02	0	0	.875" CC	
206	206	4985	0	243	8.37	4.84	0	0	6' HP DISH	60.
10	206	0	1.11	.52	17.25	-9.96	0	0	.875" HLX	
197	197	0	680	82	20.50	-11.84	0	0	DB224	61.
10	197	0	1.11	.52	1.88	17.42	0	0	.875" HLX	
174	174	2228	0	154	0	-12.29	0	0	4' DISH	62.
10	174	0	.67	.29	-21.29	-12.29	0	0	EW127	
168	168	4985	0	243	8.37	4.84	0	0	6' DISH	63.
10	168	0	1.11	.52	17.25	-9.96	0	0	.875" HLX	
136	136	0	112	30	0	27.71	0	0	YAGI DB432	64.
124	124	732	0	67	0	-14.14	0	0	2' DISH	65.
10	124	0	.58	.25	-24.50	-14.14	0	0	.5" COAX	
120	120	0	224	60	0	27.71	0	0	2-YAGI	66.
10	120	0	1.25	.35	-1.28	23.04	0	0	2(.375+.25)	
116.5	116.5	5400	0	5000	0	0	0	0	PLATFORM	67.
116.5	116.5	3500	0	2000	-16.83	9.72	0	0	ANTENNA MT	67.
116	116	1440	29619	2985	0	0	0	0	18'RADOME	68.
100	100	2228	0	154	0	-12.02	0	0	4' HP DISH	69.
10	100	0	1.98	1.04	-20.82	-12.02	0	0	1.625" HLX	
100	100	4985	0	243	0	28.87	0	0	6' HP DISH	70.
10	100	0	1.98	1.04	-3.03	22.62	0	0	1.625" HLX	
96	96	4985	0	243	0	28.87	0	0	6' DISH	71.
10	96	0	1.11	.29	-3.03	22.62	0	0	EW127	
62	62	247	0	165	0	32.81	0	0	16" HP DISH	72.
10	62	0	.62	.25	1.88	26.10	0	0	RG11 & .25"CC	
50	50	0	112	30	14.64	8.45	0	0	YAGI DB432	73.
10	50	0	.58	.25	-1.53	18.70	0	0	.5" HELIAX	
26.5	26.5	42857	0	14100	0	0	0	0	24'x24'BDG	74.
19	19	0	112	30	-15.07	-8.70	0	0	YAGI DB432	75.
16	16	0	4521	262	0	36.72	0	0	6' DISH-R	76.

10	281	0	1.98	1.04	-1.28	23.11	0	0	1.625"	HLX 77.
281	563	0	1.98	1.04	-1.28	9.62	0	0	1.625"	HLX 77.
0	0	0	0	0	0	0	0	0		
1110	23.37	1000	53.21	0	0	TUP04/THP021R/THP0102R				
0	0	0	0	0	0					
0	0	0	0	0	0					
0	0	0	0	0	0					

Total Self Gravity Load = 570.841
 Total App Gravity Load = 104.180
 Total Gravity Load = 675.021

Total Wind, Dir 1 = 324.118
 Total Wind, Dir 2 = 306.266
 Total Wind, Dir 3 = 310.729

ANTENNA

CaAc OR Af	WEIGHT	H4	D1	ICE AREA	ICE WT.
1110.000	23.370	1000.000	53.210	0.000	0.000

TOWER ELEMENT JOINT LOADS - WIND DIRECTION - 1

SECTION	PANEL	CODE	X	Y	Z
25	1	0	0.00	43.30	-23.37
25	1	4	-2304.20	0.00	0.00

TOWER ELEMENT JOINT LOADS - WIND DIRECTION - 2

SECTION	PANEL	CODE	X	Y	Z
25	1	0	0.00	-43.30	-23.37
25	1	4	2304.20	0.00	0.00

TOWER ELEMENT JOINT LOADS - WIND DIRECTION - 3

SECTION	PANEL	CODE	X	Y	Z
25	1	0	-43.30	0.00	-23.37
25	1	4	0.00	-2304.20	0.00

SEC	PAN	Typ	Dir.	#	Max. C.	All. C.	Dir.	#	Max. T.	All. T.
1	1	S	1	3	-48.84	-61.68	1	4	45.88	206.09
		L	1	3	-2315.00	-2881.28	2	3	1754.90	2035.75
		D	1	4	-49.67	-111.62	1	3	49.67	144.32
	2	S	1	3	-48.74	-65.63	2	3	43.74	206.09
		L	1	3	-2253.78	-2542.47	2	3	1723.55	2035.75
		D	1	4	-51.99	-102.90	1	3	51.99	144.32
2	1	S	1	3	-47.28	-61.07	2	3	42.37	106.03
		L	1	3	-2150.22	-2631.08	2	3	1659.52	2035.75
		D	1	4	-62.76	-116.38	1	3	62.76	144.32
3	1	S	1	3	-46.76	-65.44	2	3	41.85	106.03
		L	1	3	-2044.66	-2469.10	2	3	1591.94	2035.75
		D	1	4	-63.08	-85.78	1	3	63.08	144.32
4	1	S	3	3	-50.75	-97.43	3	6	58.94	144.32
		L	1	3	-1937.97	-2311.88	2	3	1526.58	2035.75
		D	1	4	-61.40	-89.44	1	3	61.40	144.32
5	1	S	1	1	-21.40	-156.61	2	1	29.68	212.06
		L	1	3	-1809.37	-2397.39	2	3	1466.77	1696.46
		D	3	6	-86.45	-43.64 *	3	2	72.25	144.82

SEC	PAN	Typ	Dir.	#	Max. C.	All. C.	Dir.	#	Max. T.	All. T.
6	1	S	1	1	-19.90	-108.71	3	3	28.28	152.21
		L	1	3	-1688.71	-2073.70	2	3	1372.51	2035.75
		D	1	5	-66.79	-72.25	2	5	62.16	144.82
7	1	S	3	2	-30.35	-96.31	2	1	15.85	131.54
		L	1	3	-1534.62	-1939.64	2	3	1273.20	1696.46
		D	1	5	-77.92	-73.09 *	2	5	54.21	144.82
8	1	S	1	2	-60.78	-93.24	2	1	-1.87	144.32
		L	1	3	-1469.91	-1733.05	2	3	1149.83	1357.17
		D	1	3	0.00	-2.33	1	2	83.89	106.40
9	1	S	1	2	-55.62	-88.14	2	1	-1.73	144.32
		L	1	3	-1372.96	-1635.53	2	3	1079.31	1357.17
		D	1	3	0.00	-2.47	1	2	77.58	106.40
10	1	S	1	2	-51.72	-82.87	2	1	-1.46	143.99
		L	1	3	-1280.42	-1635.53	2	3	1008.57	1357.17
		D	1	3	0.00	-2.06	1	2	73.80	94.25
11	1	S	1	2	-48.13	-75.93	2	1	-1.65	124.41
		L	1	3	-1190.02	-1488.25	2	3	938.67	1357.17
		D	1	3	0.00	-2.19	2	5	69.54	94.25
12	1	S	1	2	-44.83	-68.94	2	1	-1.54	106.03
		L	1	3	-1102.04	-1346.30	2	3	869.23	1357.17
		D	1	3	0.00	-1.81	2	5	65.57	82.83
13	1	S	1	2	-42.08	-63.67	2	1	-1.40	106.03
		L	1	3	-1015.89	-1346.30	2	3	801.84	1357.17
		D	1	3	0.00	-1.93	2	5	61.75	82.83
14	1	S	1	2	-39.62	-68.33	2	1	-1.54	106.03
		L	1	3	-932.96	-1209.66	2	3	734.44	1039.08
		D	1	3	0.00	-1.56	2	5	59.33	72.16
15	1	S	1	2	-36.66	-60.28	2	1	-1.83	106.03
		L	1	3	-850.43	-1143.33	2	3	669.64	1039.08
		D	1	3	0.00	-1.67	2	5	55.63	72.16
16	1	S	1	2	-33.96	-48.86	2	1	-1.83	79.52
		L	1	3	-771.83	-1143.33	2	3	606.57	1039.08
		D	1	3	0.00	-1.33	2	5	51.67	62.22
17	1	S	1	2	-31.82	-49.48	2	1	-1.51	79.52
		L	1	3	-696.64	-1030.81	2	3	545.84	1039.08
		D	1	3	0.00	-1.42	2	5	47.79	62.22
18	1	S	1	3	-29.79	-50.02	2	1	-1.58	79.52
		L	1	3	-625.36	-900.89	2	3	486.42	763.41
		D	1	3	0.00	-1.11	2	5	45.62	53.01
19	1	S	1	3	-26.74	-49.84	2	1	-1.65	53.01
		L	1	3	-554.27	-900.89	2	3	429.94	763.41
		D	1	3	0.00	-1.19	2	5	42.39	53.01
20	1	S	1	3	-23.90	-47.88	2	1	-1.44	53.01
		L	1	3	-485.61	-837.98	2	3	375.81	763.41
		D	1	3	0.00	-1.28	2	3	39.05	53.01

SEC	PAN	Typ	Dir.	#	Max. C.	All. C.	Dir.	#	Max. T.	All. T.
21	1	S	1	3	-21.84	-40.29	2	1	-1.42	53.01
		L	1	3	-420.22	-776.42	2	3	323.56	763.41
		D	1	3	0.00	-1.38	2	3	36.60	53.01
22	1	S	1	3	-20.06	-36.82	2	1	-1.39	36.82
		L	1	3	-358.11	-776.42	2	3	272.77	763.41
		D	1	3	0.00	-1.05	2	3	34.15	44.55
23	1	S	2	3	-9.16	-29.83	2	1	3.29	36.82
		L	1	3	-300.52	-533.11	2	3	236.02	530.14
		D	1	3	0.00	-1.00	1	6	27.46	36.82
24	1	S	1	1	-5.94	-182.70	2	1	7.36	182.70
		L	1	3	-235.83	-506.38	2	3	216.49	530.14
		D	1	3	-19.83	-29.80	2	3	14.44	36.82
25	1	S	2	1	-8.02	-182.70	1	1	6.47	182.70
		L	1	3	-193.46	-400.14	2	3	175.49	530.14
		D	1	3	-14.77	-27.68	2	3	14.34	36.82

BASE REACTIONS FOR WIND DIRECTION 1					
X	Y	Z	MX	MY	MZ
0.01	-367.41	698.30	115788.14	8.20	-169.48

BASE REACTIONS FOR WIND DIRECTION 2					
X	Y	Z	MX	MY	MZ
0.00	349.58	698.36	-110084.13	7.35	169.39

BASE REACTIONS FOR WIND DIRECTION 3					
X	Y	Z	MX	MY	MZ
354.03	0.01	698.36	761.01	111926.16	-1560.00