

25 Meter Millimeter Wave Telescope
Memo #61

NOV. 24, 1976

TO: G. PEERY

FROM: L. J. KING

SUBJECT: RADOME AND ASTRODOME FOR 25M TELESCOPE

ENCLOSED ARE:

(I) SUMMARY & UP-DATE REPORT OF ASTRODOME BASED ON:

- (1) SKETCH DATED 9-9-1975.
- (2) MEMO. 10-30-1975
- (3) NOTES AT 1-30-1976 MEETING.
- (4) MEMO. 3-9-1976.
- (5) NOTES AT 6-1-1976 MEETING.
- (6) NOTES AT 7-20-1976 MEETING.
- (7) MEMO. 10-22-1976.

(II) RADOME SIZE VS. TELESCOPE TOWER DESIGN.

120-FT DIAMETER RADOME USED IS TOO SMALL FOR THE TELESCOPE IN THE PROPOSAL, SEPT. 1975.

(III) BECHIS' LETTER NOV. 17, 1976 ON U. MASS TELESCOPE

I CALLED BECHIS ON NOV. 19, AND WAS TOLD THAT U. MASS DOES NOT HAVE RMS CALCULATION FROM ESSCO.

WE ARE CONVINCED THAT A CONVENTIONAL TELESCOPE WILL NOT MEET THE 1.2 MM REQUIREMENTS. THE ONLY DOUBT IN ONE'S MIND, IF ANY, IS THE PERFORMANCE OF ESSCO'S "RIGID" TELESCOPE. I WOULD LIKE TO SPEND SOMETIME IF YOU FEEL IT IS WORTHWHILE, ON THE ANALYSIS. MAY BE THE DECISION SHOULD BE DELAYED UNTIL AFTER HVATJM'S CONTACT WITH ESSCO (NEXT JAN. ??) OR AFTER TESTS OF U. MASS TELESCOPE.

NOV. 24, 1976

ASTRODOME FOR 25M MM TELESCOPE

INTRODUCTION OF ASTRODOME IS GIVEN ON PP. IV-9 TO IV-12 OF SEPT. 1975 PROPOSAL.

FOLLOWING IS THE SUMMARY OF THE UP TO DATE INHOUSE EFFORT ON THE ASTRODOME.

(I) GEOMETRY.

IN ADDITION TO THE FIRST GEOMETRY GIVEN IN THE PROPOSAL, SEVERAL OTHER CONFIGURATIONS HAVE BEEN STUDIED.

(FIGURE 1) TWO RIGID WINDOW SECTIONS ARE USED FOR THE OPENING OF THE ASTRODOME. TO OPEN THE ASTRODOME, SECTION 1 SLIDES AND STORES AT THE BACK OF THE DOME; SECTION 2 ROTATES AND STORES AT THE SIDE OF THE DOME.

(FIGURE 2) THE TRANSPARENT WINDOW IS FIXED TO SECTION 2. TO OPEN ASTRODOME, SECTION 1 PIVOTS AT A-A TILL RESTS ON THE GROUND; SECTION 2 ROLLS ON RAIL 2 AWAY FROM THE TELESCOPE.

(FIGURE 3) SPHERICAL SINGLE-SHELL CONSTRUCTION WITH TWO RIGID DOOR SECTIONS. TO OPEN ASTRODOME, BOTH SECTIONS SLIDE AND STORE ONE BEHIND THE OTHER AT THE BACK OF DOME.

(FIGURE 4) DOUBLE-WALL CONSTRUCTION WITH DOOR SIMILAR TO FIGURE 3 DESIGN.

(II) LATEST CONFIGURATION

THE LATEST GEOMETRY OF THE ASTRODOME IS A REVISED FIGURE 4 GEOMETRY TO INCORPORATE THE FOLLOWING FEATURES:

- (1) INCREASED HEIGHT FOR -5.0 ELEVATION FOR POINTING PATTERN RANGE TRANSMITTER.
- (2) CENTER OF SPHERICAL DOOR LIE AT THE INTERCEPTION OF THE AXIS OF REFLECTOR AND THE ELEVATION AXIS.
- (3) BLOCKAGE OF DOOR IS 5% (GEOMETRY) OF THE APERTURE. THE TWO SECTIONS OF DOOR ARE IDENTICAL DESIGN WITH RANDOM TRIANGULAR PANELS OF A SPHERICAL RADOME. RADOME GEOMETRY IS GENERATED BY RBDCMV, A PROGRAM WRITTEN BY G. CONANT IN 1966 FOR PARKE MATHEMATICAL LAB., INC.

(FIGURE 5) IS THE CALCCOMP PLOT OF THE COMPUTER MODEL OF THE LATEST ASTRODOME GEOMETRY.

(FIGURE 6) DOME STRUCTURE (TRUCKS AND RAILS NOT SHOWN).

(FIGURE 7) FOUR VIEWS SHOWED THE CONSECUTIVE RELATIVE POSITIONS OF DOOR SECTIONS DURING OPENING OF THE ASTRODOME.

(III) COST ESTIMATE.

DOOR

STEEL FRAME	294.3 K	
COVERING MTL (\$35/SQFT)	640.5 K	
DRIVE SYSTEM	157.7 K	

SUB-TOTAL		1092.5 K

DOME

STEEL FRAME	2014.0 K	
COVERING MTL (EXTERIOR)	141.6 K	
WALL (INTERIOR & FLOOR)	154.6 K	
AZ DRIVE SYSTEM	106.4 K	
TRUCKS	96.0 K	

SUB-TOTAL		2512.0 K

FOUNDATION

REINFORCE CONCRETE	266.4 K	
6-INCH DISK FLOOR	31.0 K	
RAIL	29.9 K	

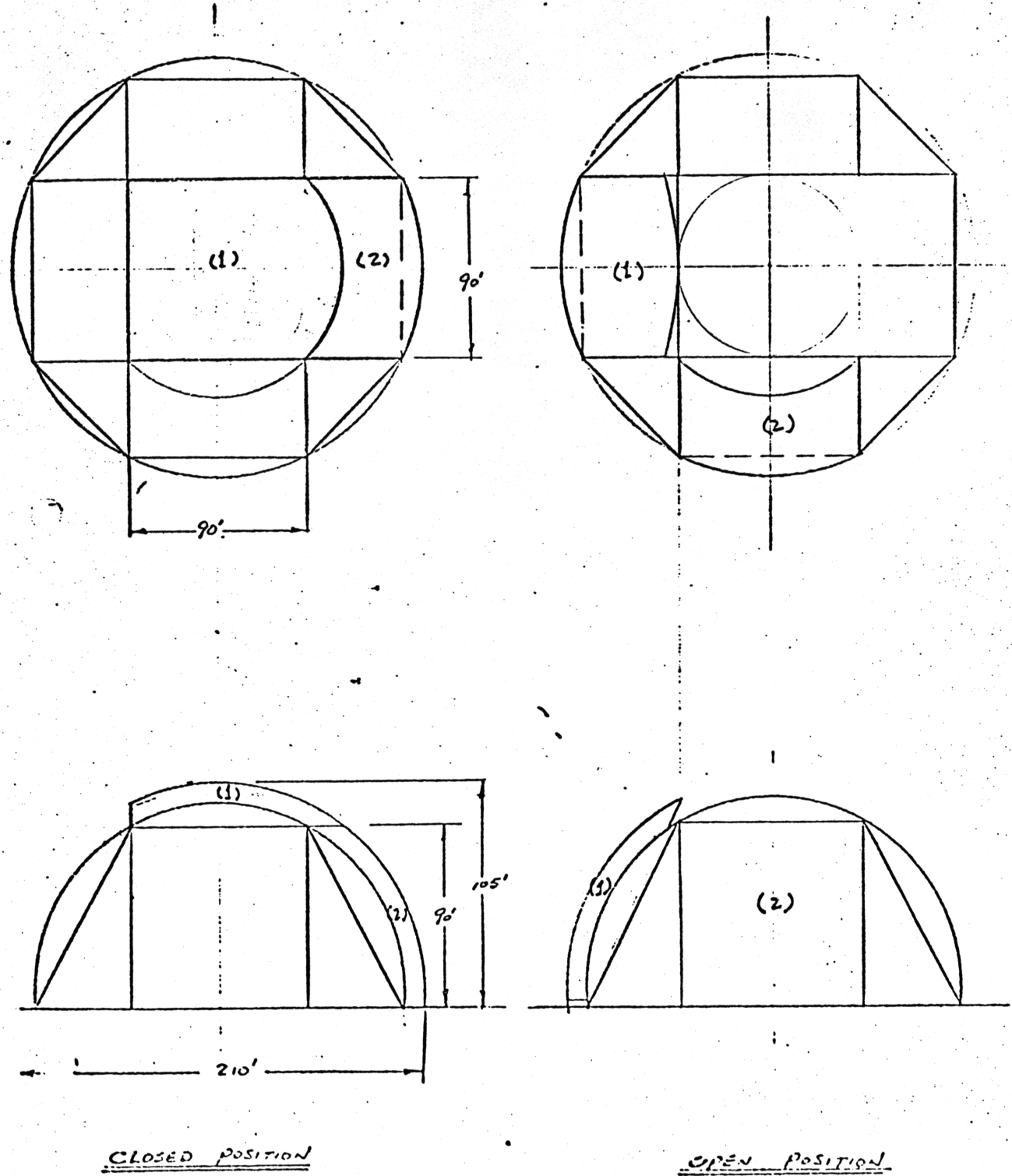
SUB-TOTAL		327.3 K

AIR HANDLING SYSTEM		688.5 K
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TOTAL		4.62 M\$

NOTE: CRANES NOT INCLUDED IN THE COST ESTIMATE
 A 45'-4000# DICG CRANE COSTS 30 K (MILLER
 EQ. CO. IN RICHMOND, NOV., 1976)
 COST OF RETRACTABLE PLATFORM NOT AVAILABLE.

25 M TELESCOPE ASTRODCME (MODIFIED TWO-SECTION)
(REF A.II-11) (SLIDING DOOR, 9-9-75)



CLOSED POSITION

OPEN POSITION

FIGURE 1

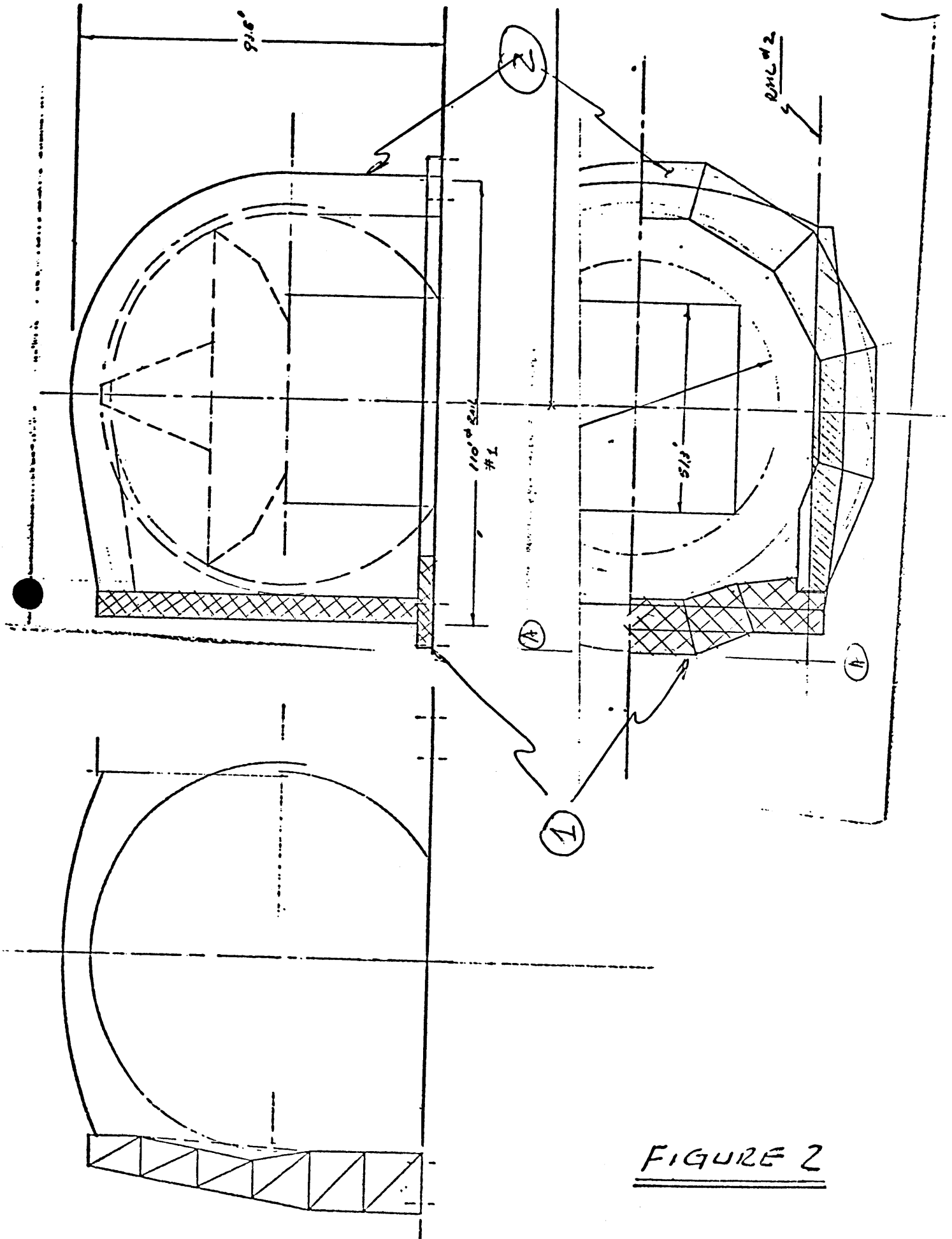
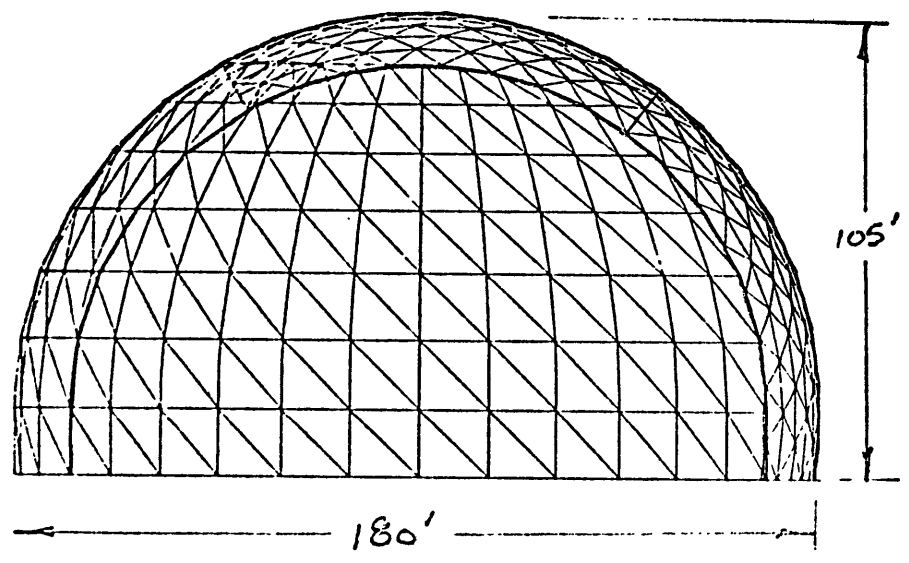
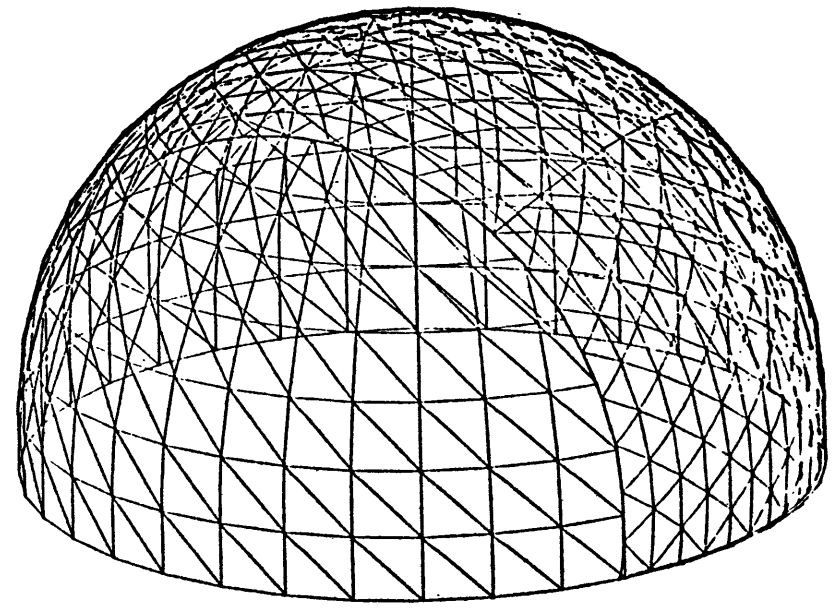
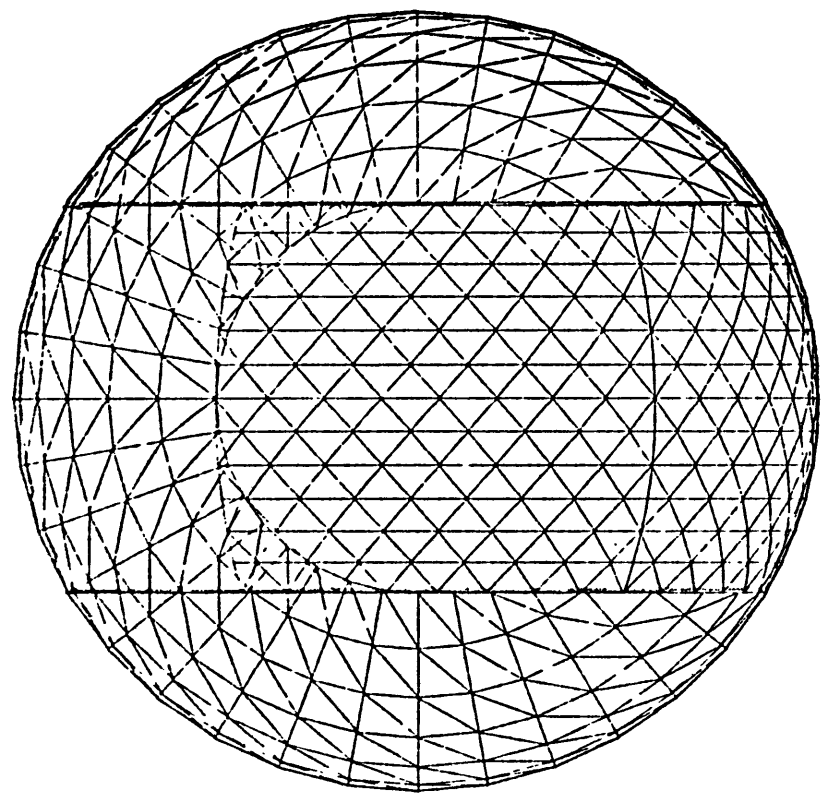
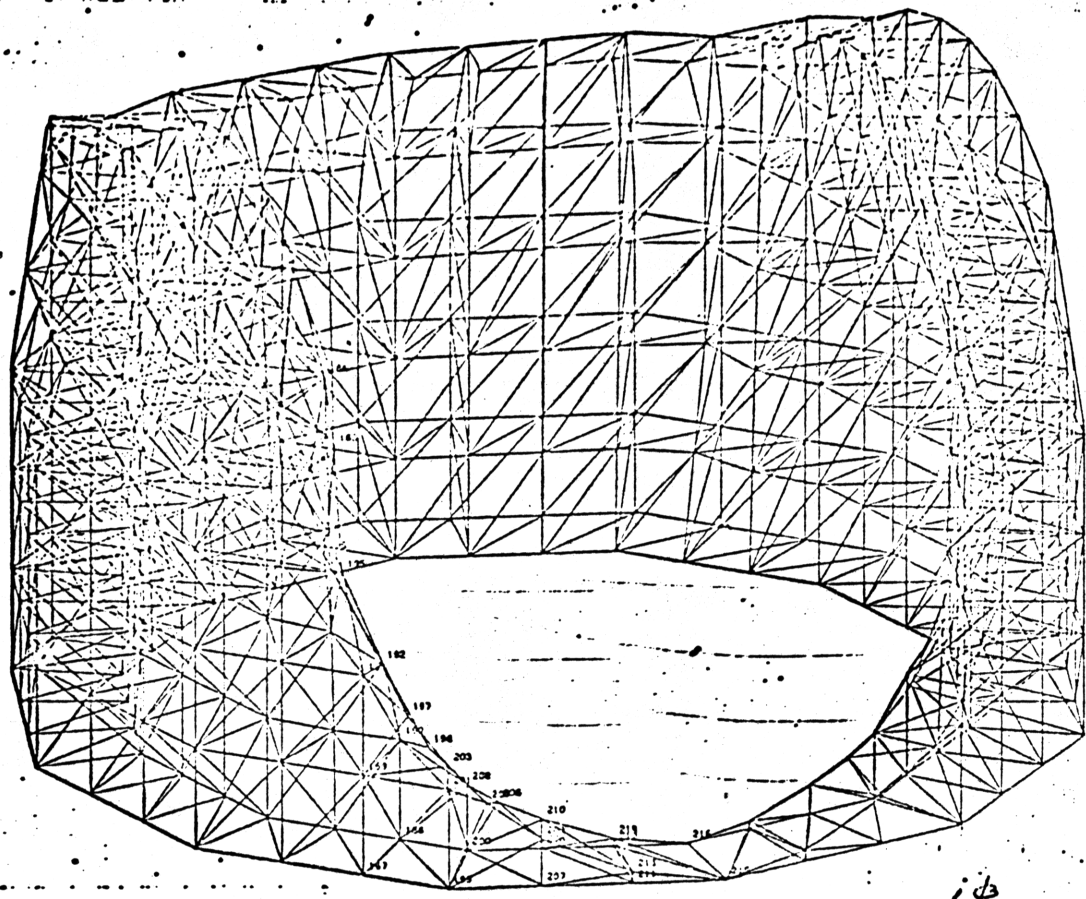


FIGURE 2

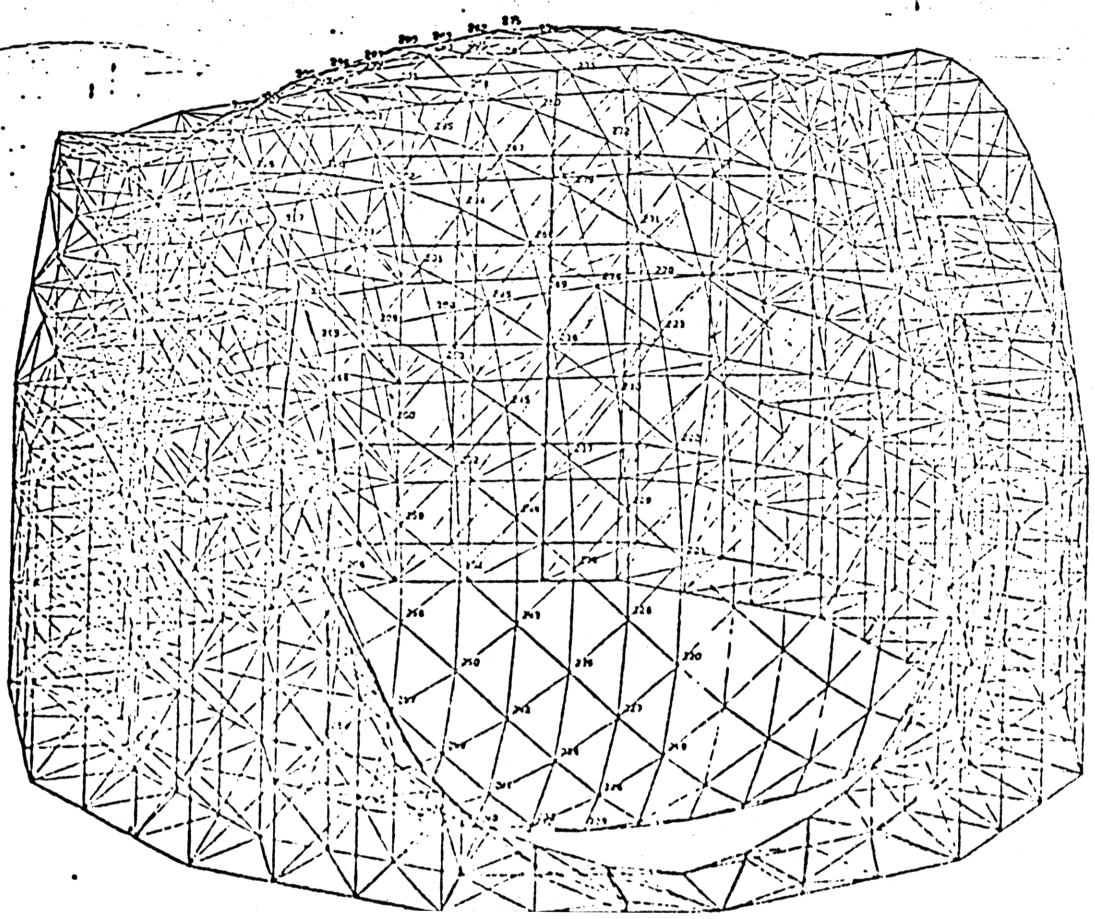


WT. = 290 TONS

FIGURE 3



130' ϕ RAIL
93.5' HEIGHT



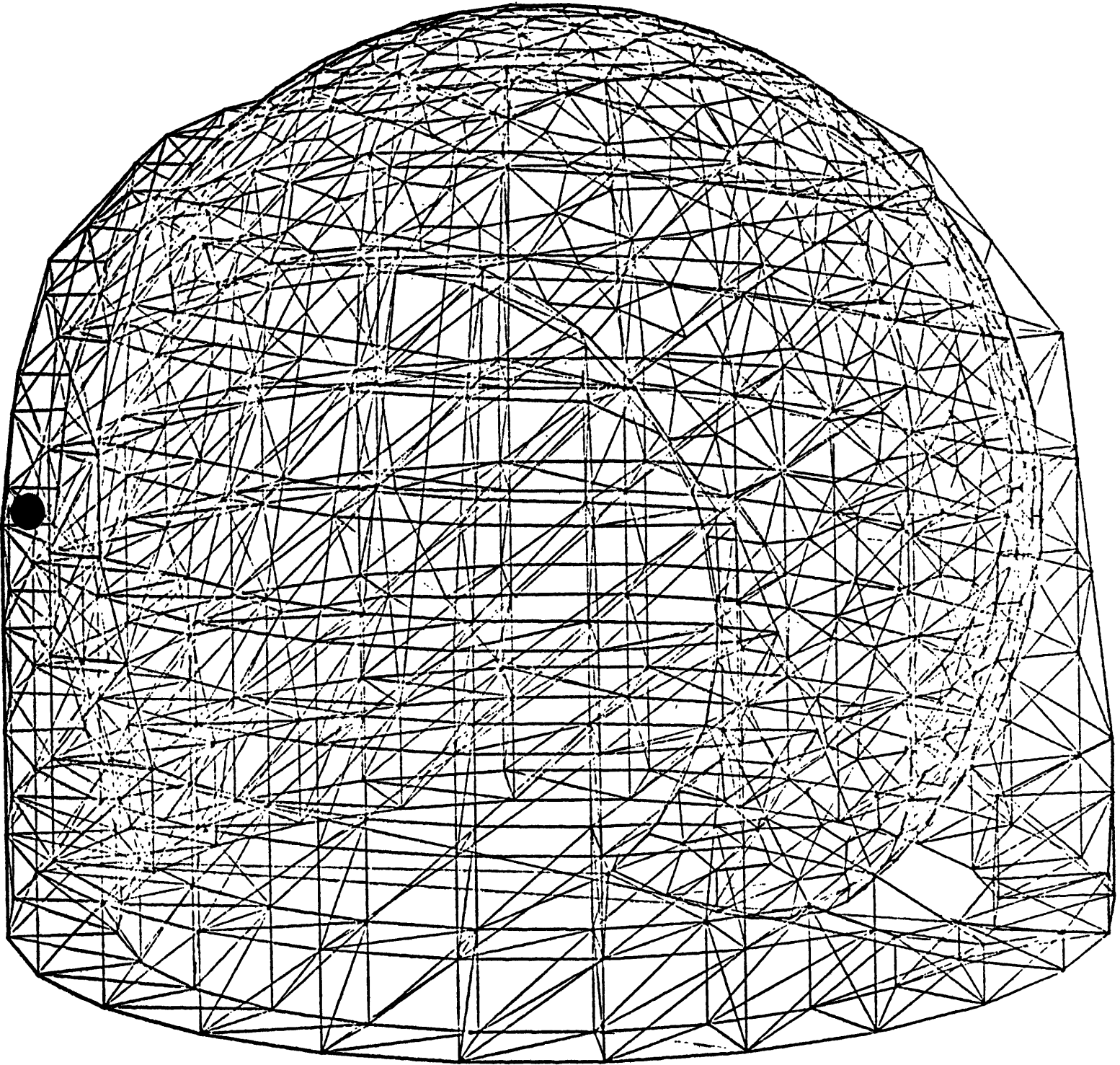


FIGURE 5

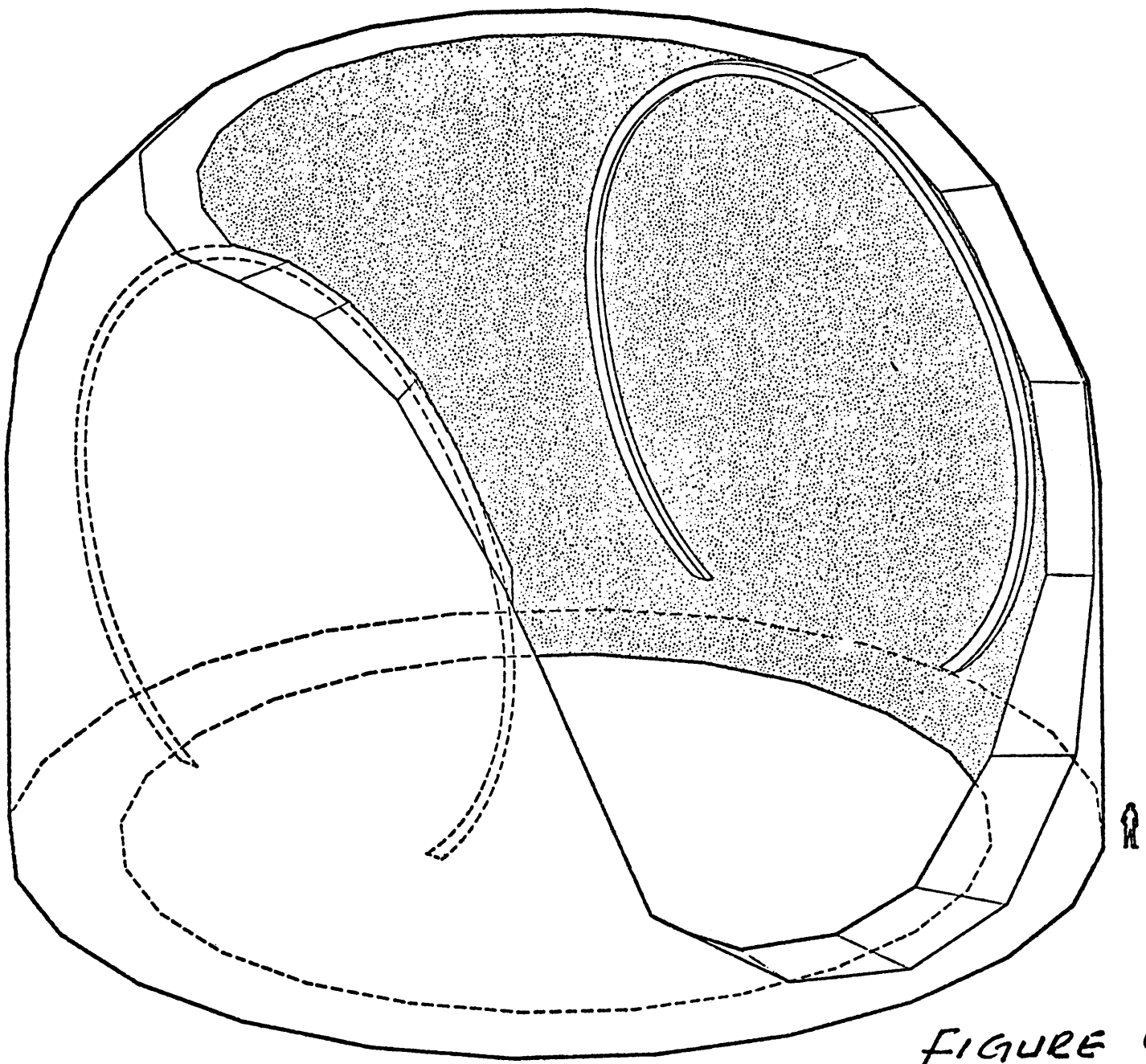


FIGURE 6

ASTRODOME FOR 25-METER MILLIMETER WAVELENGTH TELESCOPE

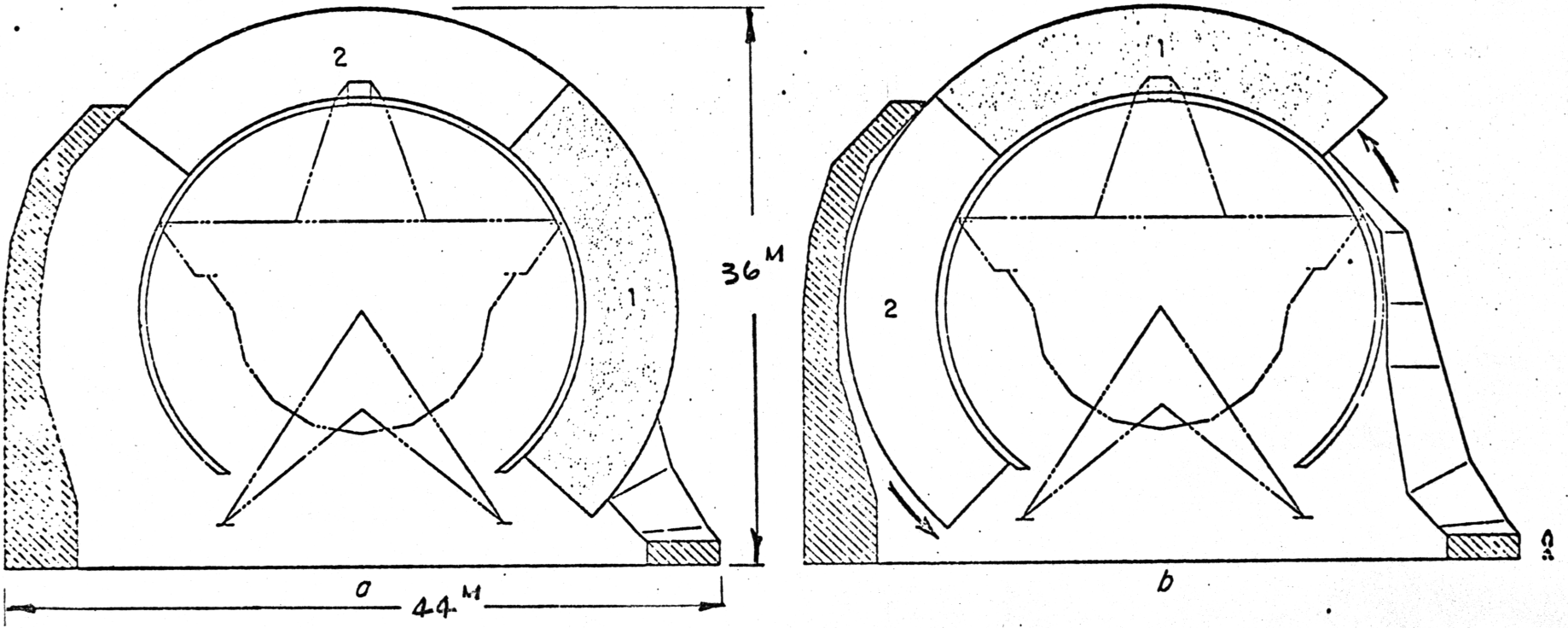


FIGURE 7

WT = 350 TONS

