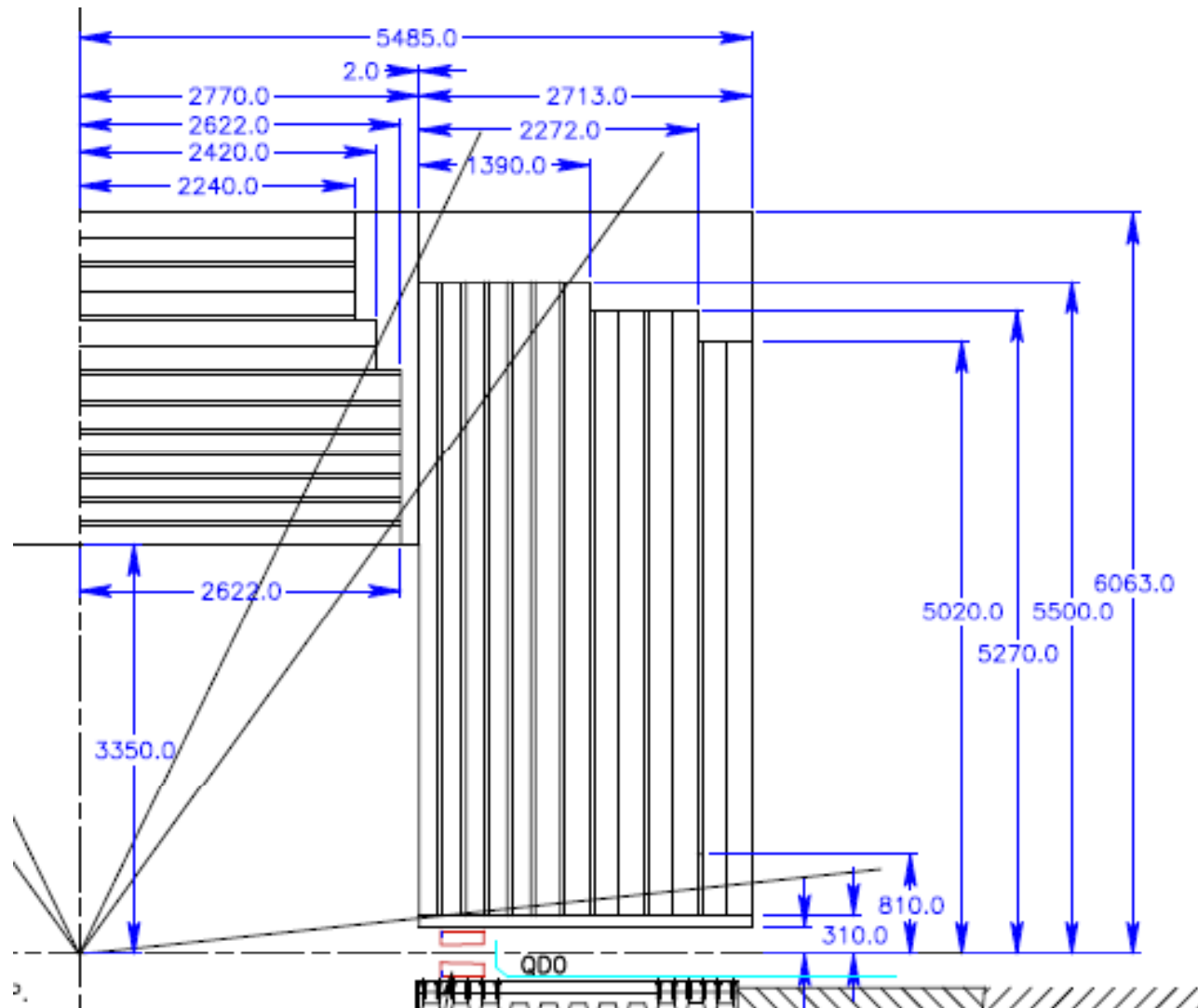# Fringe Fields for New Iron Geometry
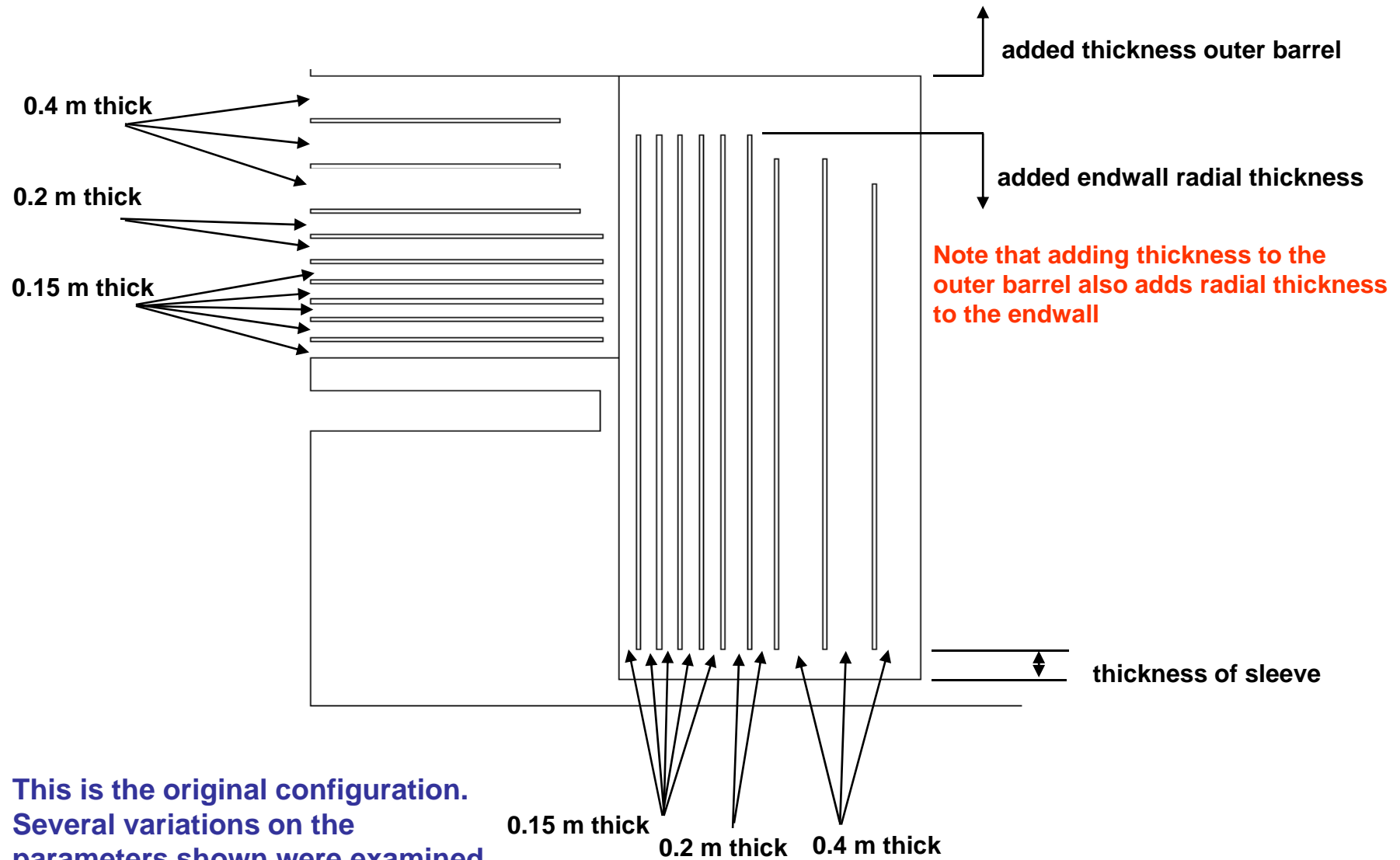
Bob Wands
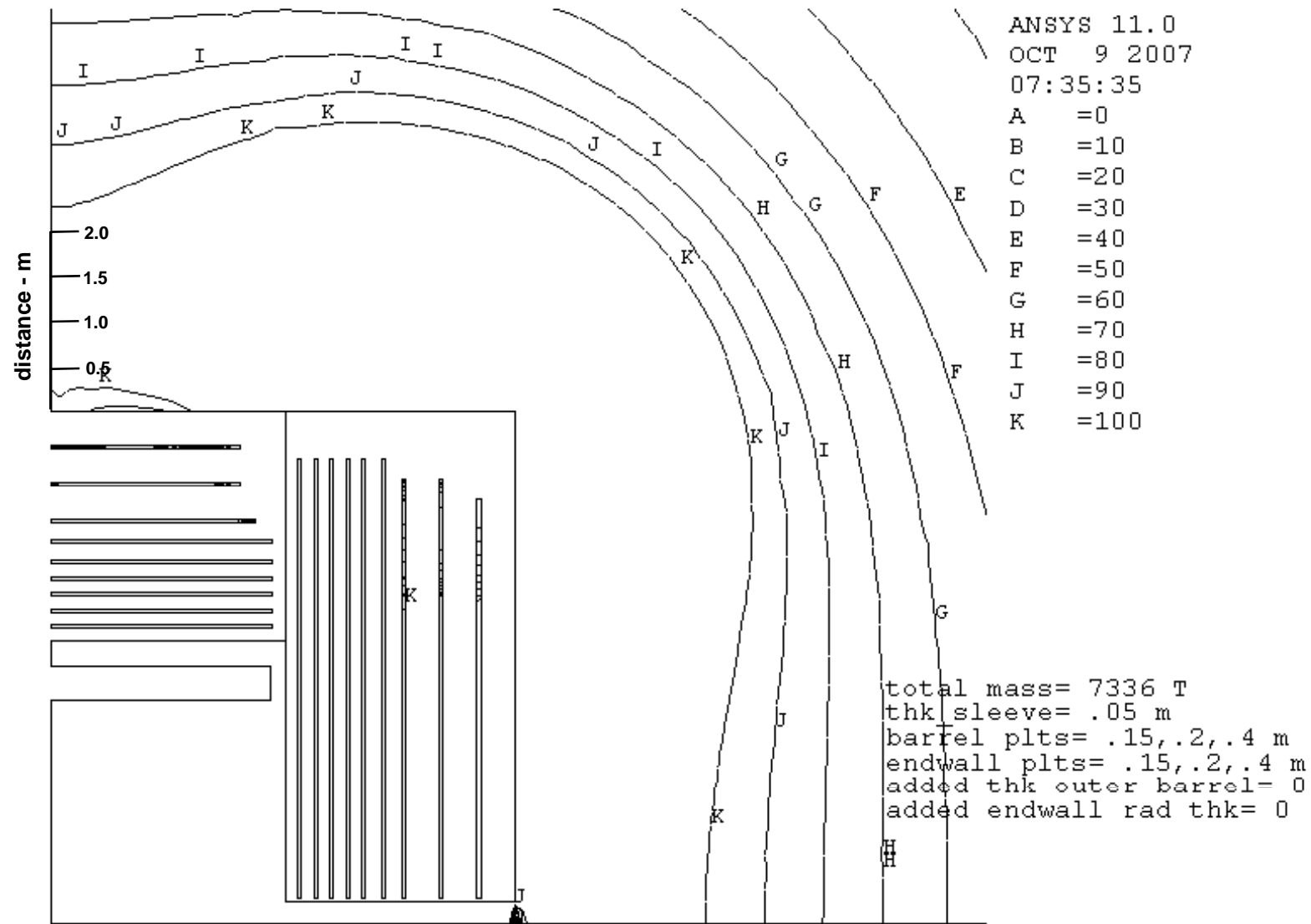
October 10, 2007

New Iron Geometry (H.J. Krebs)

2

Axisymmetric FE Model of New Iron Geometry

added thickness outer barrel

0.4 m thick

added endwall radial thickness

0.2 m thick

Note that adding thickness to the outer barrel also adds radial thickness to the endwall

0.15 m thick

thickness of sleeve

This is the original configuration. Several variations on the parameters shown were examined

0.15 m thick

0.2 m thick   0.4 m thick

Original Configuration

distance - m

— 2.0
— 1.5
— 1.0
— 0.5

ANSYS 11.0
OCT 9 2007
07:35:35
A   =0
B   =10
C   =20
D   =30
E   =40
F   =50
G   =60
H   =70
I   =80
J   =90
K   =100

total mass= 7336 T
thk sleeve= .05 m
barrel plts= .15,.2,.4 m
endwall plts= .15,.2,.4 m
added thk outer barrel= 0
added endwall rad thk= 0

4

distance - m

— 2.0
— 1.5
— 1.0
— 0.5

total mass= 7340 T
thk sleeve= .3 m
barrel plts= .15,.2,.4 m
Endwall plts= .15,.2,.4 m
added thk outer barrel= 0
added endwall rad thk= 0

Increase sleeve from 0.05 m to 0.30 m

5

ANSYS 11.0
OCT 9 2007
07:47:42

A	=0
B	=10
C	=20
D	=30
E	=40
F	=50
G	=60
H	=70
I	=80
J	=90
K	=100

distance - m

2.0
1.5
1.0
0.5

total mass= 10494 T
thk_sleeve= .3 m
barrel plts= .25,.25,.4 m
endwall plts= .25,.25,.4 m
added thk outer barrel= 0
added endwall rad thk= 0
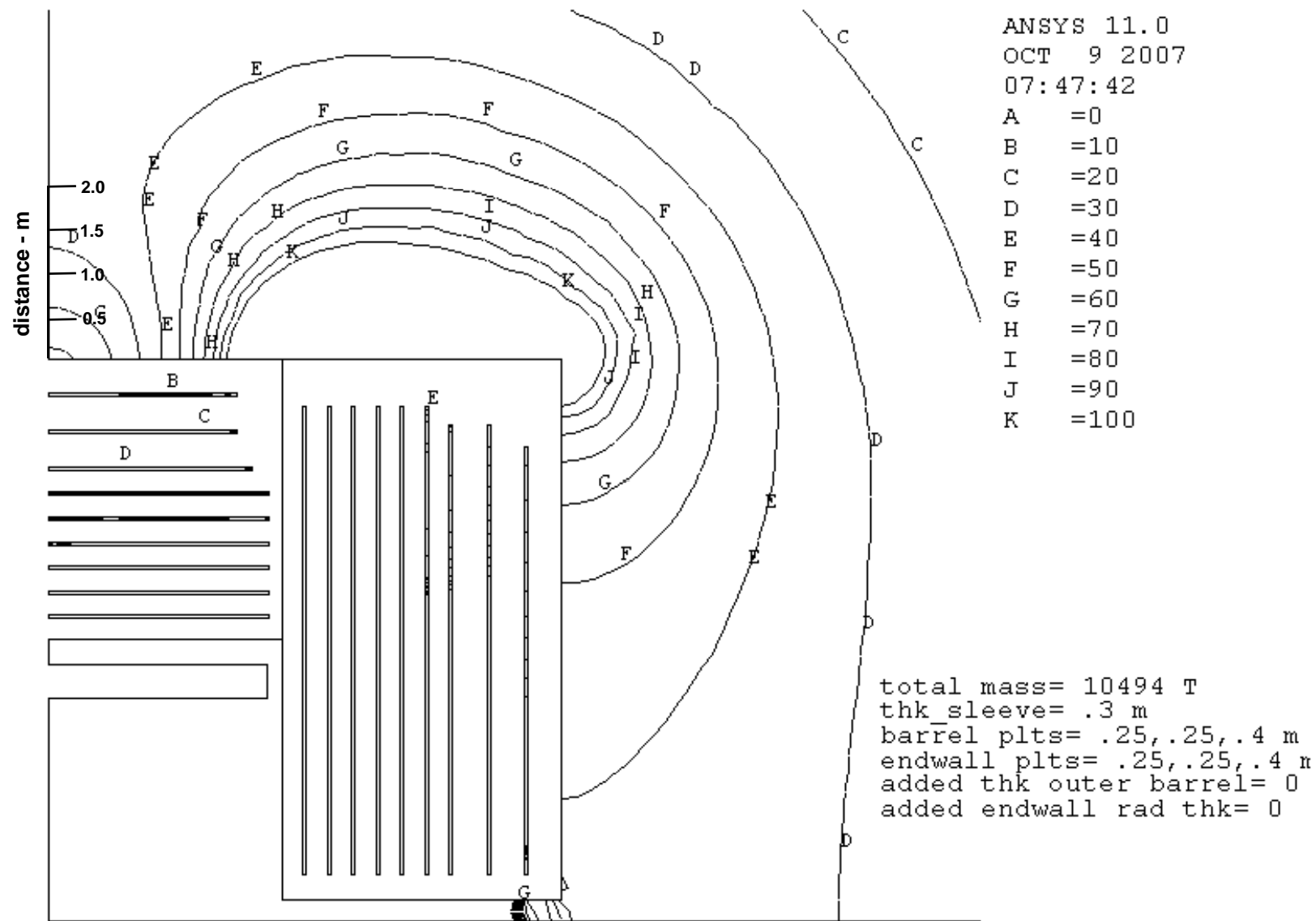
Increase thickness of first 7 plates to 0.25 m

6

Increase radial thickness of enwall corner by 0.2 m

Contour plot with axis labeled **distance - m** (vertical) showing values 2.0, 1.5, 1.0, 0.5.

total mass= 8030 T
thk_sleeve= .3 m
barrel plts= .15,.2,.4 m
endwall plts= .15,.2,.4 m
added thk outer barrel= .2 m
added endwall rad thk= .2
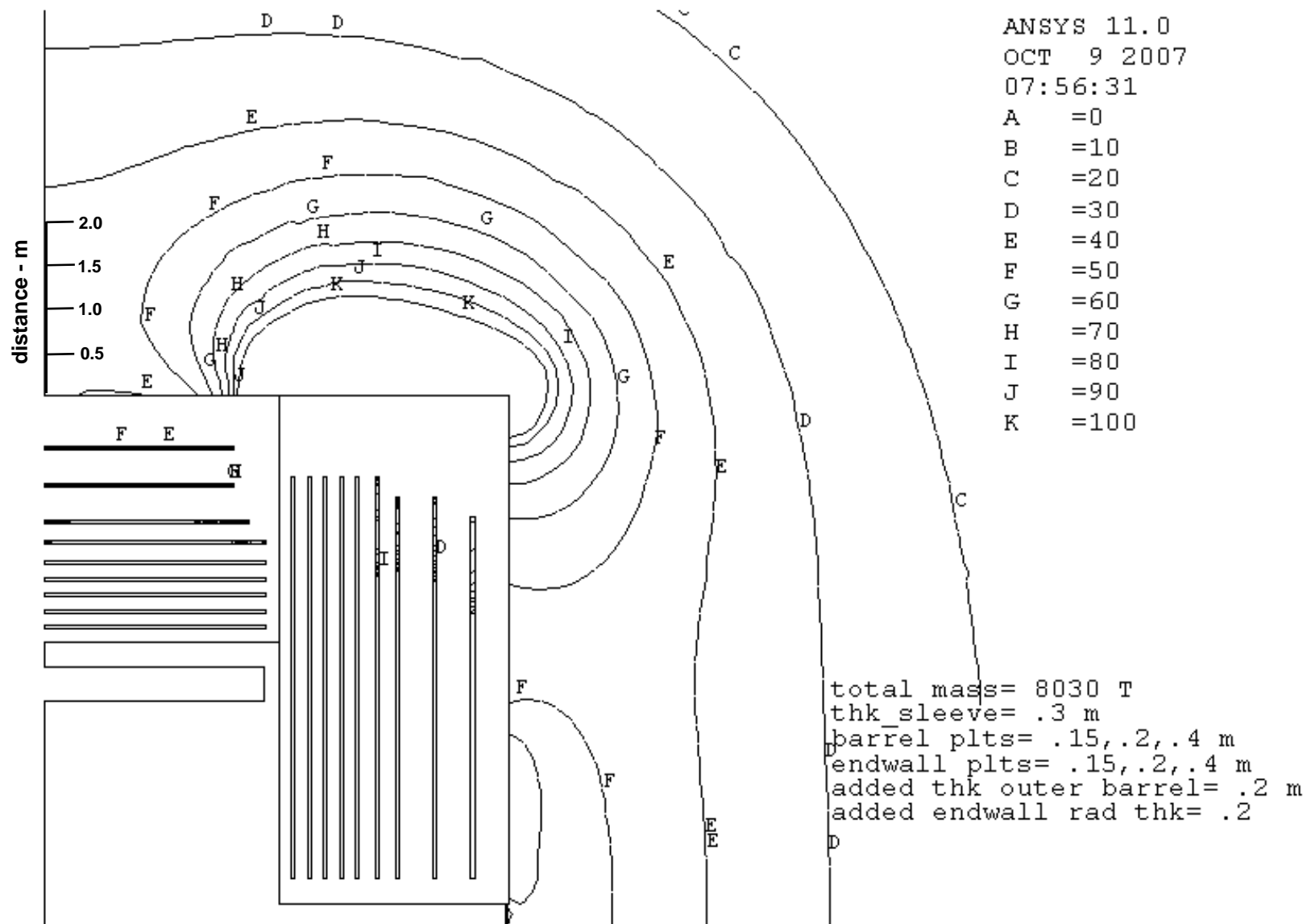
Increase thickness of outer barrel by 0.2 m, increase radial thickness of endwall corner by 0.2 m

8

distance - m

ANSYS 11.0
OCT 9 2007
07:59:33
A =0
B =10
C =20
D =30
E =40
F =50
G =60
H =70
I =80
J =90
K =100

total mass= 9325 T
thk_sleeve= .3 m
barrel plts= .2,.2,.4 m
endwall plts= .2,.2,.4 m
added thk outer barrel= .2 m
added endwall rad thk= .2
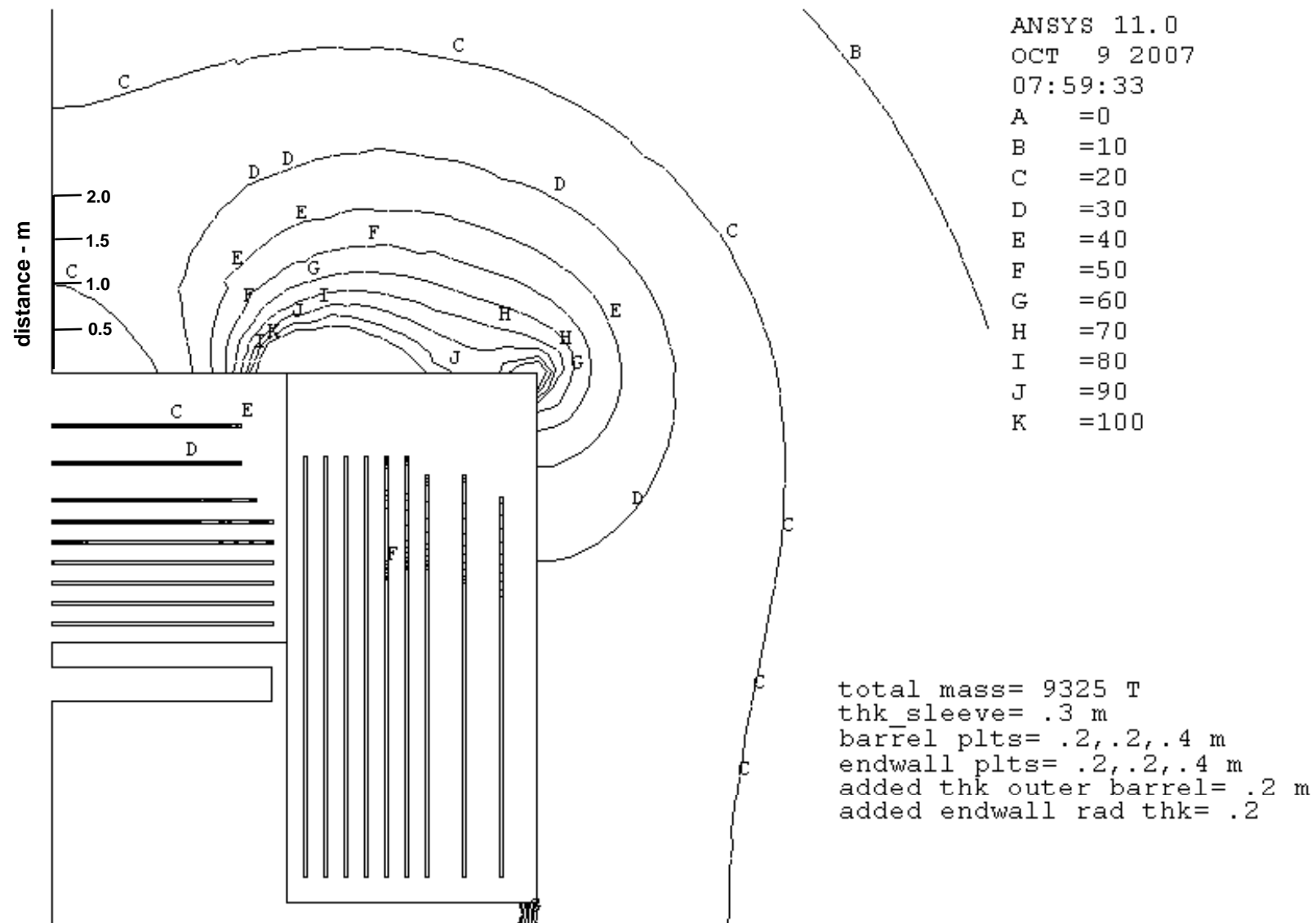
**Same changes as slide 8, with thickness
of first 5 plates increased to 0.2 m**

9

Conclusions

1. Increasing thickness of sleeve at inner radius of endwall has not effect

2. Increasing the thickness of the first seven plates to 0.25 m (slide 6) improves situation, but with 40% increase in mass

3. Increasing the iron available at the "corner" of the endwall by 0.2 m, and increasing the thickness of the barrel outer plate by 0.2 m (slide 8) improves situation similar to 2), but with only 10% increase in mass

4. Maintaining conditions of 3), and increasing thickness of first five plates to 0.2 m improves the situation further, with an increase in mass of 25%

5. Much of the benefit of adding thickness to the inner plates is probably due to the overall increase in radius required of the whole assembly to accommodate the thicker plates