

M17.4 K5TOK6 AND C5TOC6: INPUT FILE CONVERSION PROGRAMS FOR KENO AND CSAS

M17.4.1 INTRODUCTION

Program K5TOK6 can be used to automatically convert a KENO V.a input file to a KENO-VI input file. Program C5TOC6 can be used to automatically convert a CSAS input file to a CSAS6 input file. This functionality can be useful when converting a KENO V.a validation sequence to a KENO-VI validation sequence. It removes the problem of introducing a mistake or inadvertently changing the data when remodeling a geometry to the KENO-VI format. For some cases, however, the converted model may be a very inefficient KENO-VI model.

M17.4.2 DESCRIPTION AND INPUT GUIDE

Program K5TOK6 is a utility program that can be used to automatically convert a KENO V.a input file to a KENO-VI input file. Program C5TOC6 is a utility program that can be used to automatically convert a CSAS input file to a CSAS6 input file. For program K5TOK6, the “=KENOVA” record in the input stream is replaced by “=K5TOK6”. The output file is then named `_geomnnn` where *nnn* is a unique 3-digit number. This allows a string of KENO V.a problems to be converted in one job. For program C5TOC6 the “=CSASBB” record in the input stream (where the *BB* is 25 or 2x) is replaced by “=C5TOC6 PARM=CSASBB”, where PARM begins in column 11 or later, with optionally a SIZE field. The output file is named `_geomnnn` where *nnn* is a unique 3-digit number.

For large problems, the output file may need to be edited to specify an increased value for parameter *NB8* in KENO-VI and also an increased value for parameter *DAB* in CSAS6. **The conversion makes no attempt to optimize the output file, so it almost surely will be inefficient in its use of storage, and in its use of bodies. This can lead to models that are very inefficient in their running time also.**

The input/output (I/O) files for K5TOK6 and C5TOC6 are given below. Note that K5TOK6 requires the cross-section library designated by the “LIB=” parameter in the KENO V.a input file.

<u>I/O File</u>	<u>Function</u>
5	KENO V.a (or CSAS) input file
6	Output
7	Input file generated for KENO-VI (or CSAS6)

Sample K5TOK6 Problem

```
#k5tok6
93.2% uo2f2 h/u-235=337
read param      npg=600 fdn=yes nub=yes  lib=4  end param
read geom
cuboid          1 1 2p3.81 2p60.325 25.50 0
reflector       2 1 4r.318 0 .318 1
cuboid          0 1 2p4.128 2p65. 150. -1.
core 0 1 -12.384 -65. -29.
cylinder        0 1 142.8 212. -60.
cylinder        3 1 144.8 212. -62.
cuboid          0 1 275.5 -638.9 475. -744.2 588. -62.
reflector       4 1 5r0 .32 1
reflector       5 1 5r0 1.27 1
reflector       3 1 5r0 .64 1
reflector       0 1 5r0 365 1
reflector       6 2 6r5 6
reflector       6 8 0 5 4r0 6
end geom
read bias id=301 2 13 end bias
read array nux=3 nuy=1 nuz=1 end array
end data
end
#shell
cp _geom000 $RTNDIR/k6.inp
end
```

Sample Converted KENO-VI Input File

```
#kenovi
93.2% uo2f2 h/u-235=337
read param      npg=600 fdn=yes nub=yes  lib=41  end param
read geometry
unit            1
cuboid          1
                3.810000E+00 -3.810000E+00 6.032500E+01
                -6.032500E+01 2.550000E+01 0.000000E+00
media           1 1 1
cuboid          2
                4.128000E+00 -4.128000E+00 6.064300E+01
                -6.064300E+01 2.550000E+01 -3.180000E-01
media           2 1 2 -1
cuboid          3
                4.128000E+00 -4.128000E+00 6.500000E+01
                -6.500000E+01 1.500000E+02 -1.000000E+00
media           0 1 3 -2 -1
boundary        3
global
unit            2
cuboid          1
                1.238399E+01 -1.238399E+01 6.499993E+01
                -6.499993E+01 1.219999E+02 -2.899997E+01
array           1 1
                place 1 1 1 -8.256000E+00 0.000000E+00 -2.800000E+01
cylinder        2
                1.428000E+02 2.120000E+02 -6.000000E+01
```

```

origin x= 0.000000E+00 y= 0.000000E+00
media 0 1 2 -1
cylinder 3
1.448000E+02 2.120000E+02 -6.200000E+01
origin x= 0.000000E+00 y= 0.000000E+00
media 3 1 3 -2 -1
cuboid 4
2.755000E+02 -6.389000E+02 4.750000E+02
-7.442000E+02 5.880000E+02 -6.200000E+01
media 0 1 4 -3 -2 -1
cuboid 5
2.755000E+02 -6.389000E+02 4.750000E+02
-7.442000E+02 5.880000E+02 -6.232000E+01
media 4 1 5 -4 -3 -2 -1
cuboid 6
2.755000E+02 -6.389000E+02 4.750000E+02
-7.442000E+02 5.880000E+02 -6.359000E+01
media 5 1 6 -5 -4 -3 -2 -1
cuboid 7
2.755000E+02 -6.389000E+02 4.750000E+02
-7.442000E+02 5.880000E+02 -6.423000E+01
media 3 1 7 -6 -5 -4 -3 -2 -1
cuboid 8
2.755000E+02 -6.389000E+02 4.750000E+02
-7.442000E+02 5.880000E+02 -4.292300E+02
media 0 1 8 -7 -6 -5 -4 -3 -2 -1
cuboid 9
2.805000E+02 -6.439000E+02 4.800000E+02
-7.492000E+02 5.930000E+02 -4.342300E+02
media 6 2 9 -8 -7 -6 -5 -4 -3 -2 -1
cuboid 10
2.855000E+02 -6.489000E+02 4.850000E+02
-7.542000E+02 5.980000E+02 -4.392300E+02
media 6 3 10 -9 -8 -7 -6 -5 -4 -3 -2 -1
cuboid 11
2.905000E+02 -6.539000E+02 4.900000E+02
-7.592000E+02 6.030000E+02 -4.442300E+02
media 6 4 11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
cuboid 12
2.955000E+02 -6.589000E+02 4.950000E+02
-7.642000E+02 6.080000E+02 -4.492300E+02
media 6 5 12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
cuboid 13
3.005000E+02 -6.639000E+02 5.000000E+02
-7.692000E+02 6.130000E+02 -4.542300E+02
media 6 6 13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
cuboid 14
3.055000E+02 -6.689000E+02 5.050000E+02
-7.742000E+02 6.180000E+02 -4.592300E+02
media 6 7 14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2
-1
cuboid 15
3.055000E+02 -6.739000E+02 5.050000E+02
-7.742000E+02 6.180000E+02 -4.592300E+02
media 6 8 15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3
-2 -1
cuboid 16
3.055000E+02 -6.789000E+02 5.050000E+02

```

```

        -7.742000E+02  6.180000E+02 -4.592300E+02
media      6      9      16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4
        -3 -2 -1
cuboid    17
        3.055000E+02 -6.839000E+02  5.050000E+02
        -7.742000E+02  6.180000E+02 -4.592300E+02
media      6     10      17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5
        -4 -3 -2 -1
cuboid    18
        3.055000E+02 -6.889000E+02  5.050000E+02
        -7.742000E+02  6.180000E+02 -4.592300E+02
media      6     11      18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6
        -5 -4 -3 -2 -1
cuboid    19
        3.055000E+02 -6.939000E+02  5.050000E+02
        -7.742000E+02  6.180000E+02 -4.592300E+02
media      6     12      19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7
        -6 -5 -4 -3 -2 -1
cuboid    20
        3.055000E+02 -6.989000E+02  5.050000E+02
        -7.742000E+02  6.180000E+02 -4.592300E+02
media      6     13      20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8
        -7 -6 -5 -4 -3 -2 -1
boundary  20
end geometry

read bias id=301 2 13 end bias
read array nux=3 nuy=1 nuz=1 end array
end data
end

```

Sample C5TOC6 Problem

```

#c5toc6      parm='csas25,size=500000'
tmi 1500 ppm boron
27groupndf4  latticecell
uo2      1 .925      583 92235 1.98 92238 98.02 end
uo2      2 .925      583 92235 2.64 92238 97.36 end
uo2      3 .925      583 92235 2.96 92238 97.04 end
zircalloy 4 1.0      583 end
arbmcrod      10.17 5 0 0 1
47107 41.088 47109 38.912 49113 0.632 49115 14.368 48000 5.0
5 1.0      583 end
ss304     6 1.0      583 end
arbmpois1      3.70 2 0 1 0 13027 2 8016 3
7 0.97952 583 end
b4c       7 2.048-2 583 end
arbmpois2      3.70 2 0 1 0 13027 2 8016 3
8 0.98150 583 end
b4c       8 1.85-2 583 end
arbmpois3      3.70 2 0 1 0 13027 2 8016 3
9 0.98444 583 end
b4c       9 1.556-2 583 end
arbmacid    8.5788-3 3 1 1 0 5000 1 1001 3 8016 3
10 .7707      583 5010 18.32 5011 81.68 end
h2o        10 .7707      583 end
end comp
squarepitch 1.44272 .9398 3 10 1.0922 4 .97536 0 end
more data
res=1 cylinder .4699 dan(1)=0.2858256

```

```

res=2 cylinder .4699 dan(2)=0.2858256
res=5 cylinder .5588
end more
tmi critical core 1500wppm-11/83 (fn=critical)--ti-2 583 deg kelvin homog.
read param plt=yes gen=203 npg=500 tme=120 end param
read geom
unit 20
com='layer 2 oriface rod unit'
cylinder 6 1 .60906 210.34 -210.34
cuboid 10 1 4p0.72136 210.34 -210.34
unit 21
com='layer 2 2.96% enr. fuel rod'
cylinder 3 1 .4699 2p182.88
cylinder 0 1 .48768 2p182.88
cylinder 0 1 .48768 199.84 -206.24
cylinder 4 1 .5461 199.84 -206.24
cylinder 6 1 .5461 210.34 -210.34
cuboid 10 1 4p0.72136 210.34 -210.34
unit 22
com='layer 2 2.64% enr. fuel rod'
cylinder 2 1 .4699 2p182.88
cylinder 0 1 .48768 2p182.88
cylinder 0 1 .48768 199.84 -206.24
cylinder 4 1 .5461 199.84 -206.24
cylinder 6 1 .5461 210.34 -210.34
cuboid 10 1 4p0.72136 210.34 -210.34
unit 23
com='layer 2 1.98% enr. fuel rod'
cylinder 1 1 .4699 2p182.88
cylinder 0 1 .48768 2p182.88
cylinder 0 1 .48768 199.84 -206.24
cylinder 4 1 .5461 199.84 -206.24
cylinder 6 1 .5461 210.34 -210.34
cuboid 10 1 4p0.72136 210.34 -210.34
unit 25
cylinder 5 1 .5588 2p45.72
cylinder 6 1 .6121 210.34 -49.82
cylinder 0 1 .6121 210.34 -210.34
cuboid 10 1 4p.72136 2p210.34
unit 26
com='layer 2 1.395% lumped burnable poison rod (lbp1)'
cylinder 7 1 .5461 2p160.02
cylinder 0 1 .5461 260.4875 -160.02
cylinder 4 1 .635 260.58 -160.10
cuboid 10 1 4p0.72136 260.58 -160.10
unit 27
com='layer 2 1.260% lumped burnable poison rod (lbp2)'
cylinder 8 1 .5461 2p160.02
cylinder 0 1 .5461 260.4875 -160.02
cylinder 4 1 .635 260.58 -160.10
cuboid 10 1 4p0.72136 260.58 -160.10
unit 28
com='layer 2 1.060% lumped burnable poison rod (lbp3)'
cylinder 9 1 .5461 2p160.02
cylinder 0 1 .5461 260.4875 -160.02
cylinder 4 1 .635 260.58 -160.10
cuboid 10 1 4p0.72136 260.58 -160.10
unit 29
com='layer 2 central water unit in each assembly (instrumentation)'
cuboid 10 1 4p0.72136 260.58 -160.10
'.....
com='z-layer 2--intact pins--no rubble'
unit 231
com='layer 2 2.96% enr. fuel and orifice rod assembly'
array 20 -10.824 -10.824 -210.34

```

```

cuboid      10 1 4p10.90549      2p210.34
unit 232
com='layer 2 2.96% enr. fuel and control rod assembly--out'
array      21 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
unit 233
com='layer 2 2.64% enr. fuel and 1.395% lbp1 rod assembly'
array      22 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
unit 234
com='layer 2 2.96% enr. fuel and 1.260% lbp2 rod assembly'
array      23 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
unit 235
com='layer 2 1.98% enr. fuel and control rod assembly--out'
array      24 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
unit 236
com='layer 2 2.64% enr. fuel and 1.260% lbp2 rod assembly'
array      25 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
unit 237
com='layer 2 2.64% enr. fuel and 1.060% lbp3 rod assembly'
array      26 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
unit 238
com='layer 2 1.98% enr. fuel and axial power shaping rod assembly--out'
array      27 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
unit 239
com='layer 2 2.64% enr. fuel and control rod assembly--out'
array      28 -10.824 -10.824 -210.34
cuboid      10 1 4p10.90549      2p210.34
'.....
'.....
unit 300
array      30 -54.52745 -21.81098 -210.34375
cuboid      6 1 2p54.528 21.811 -23.716 2p210.3438
unit 310
array      31 -54.52745 -21.81098 -210.34375
cuboid      6 1 2p54.528 23.716 -21.811 2p210.3438
unit 320
array      32 -21.81098 -10.90549 -210.34375
unit 330
array      33 -21.81098 -54.52745 -210.34375
cuboid      6 1 21.811 -23.716 2p54.528 2p210.3438
unit 340
array      34 -21.81098 -54.52745 -210.34375
cuboid      6 1 23.716 -21.811 2p54.528 2p210.3438
unit 350
array      35 -10.90549 -21.81098 -210.34375
com='units for ss core form'
unit 400
cuboid      6 1 2p11.85 2p.9525 2p210.34
unit 410
cuboid      6 1 2p.9525 2p20.85 2p210.34
unit 420
cuboid      6 1 2p.9525 2p9.94 2p210.34
unit 430
cuboid      6 1 2p22.76 2p.9525 2p210.34
unit 440
cuboid      6 1 2p.9525 2p10.91 2p210.34
unit 500
array      100 -119.961 -119.961 -210.34
cylinder    10 1 179.07 2p220.34

```

```

hole 300      0.0    -141.78    0.0
hole 310      0.0     141.78    0.0
hole 320    -76.34  -130.87    0.0
hole 320     76.34  -130.87    0.0
hole 320    -76.34   130.87    0.0
hole 320     76.34   130.87    0.0
hole 330   -141.78     0.0    0.0
hole 340    141.78     0.0    0.0
hole 350  -130.87    76.34    0.0
hole 350   130.87    76.34    0.0
hole 350  -130.87   -76.34    0.0
hole 350   130.87   -76.34    0.0
hole 400  -153.65   -55.50    0.0
hole 400   153.65   -55.50    0.0
hole 400  -153.65    55.50    0.0
hole 400   153.65    55.50    0.0
hole 400   131.84   -99.13    0.0
hole 400  -131.84   -99.13    0.0
hole 400   131.84    99.13    0.0
hole 400  -131.84    99.13    0.0
hole 400  -110.03   120.93    0.0
hole 400   110.03   120.93    0.0
hole 400  -110.03  -120.93    0.0
hole 400   110.03  -120.93    0.0
hole 410   142.74   -77.31    0.0
hole 410  -142.74   -77.31    0.0
hole 410   142.74    77.31    0.0
hole 410  -142.74    77.31    0.0
hole 420   120.92  -110.03    0.0
hole 420  -120.92  -110.03    0.0
hole 420   120.92   110.03    0.0
hole 420  -120.92   110.03    0.0
hole 420    99.11  -131.83    0.0
hole 420   -99.11  -131.83    0.0
hole 420    99.11   131.83    0.0
hole 420   -99.11   131.83    0.0
hole 430    77.29  -142.74    0.0
hole 430   -77.29  -142.74    0.0
hole 430    77.29   142.74    0.0
hole 430   -77.29   142.74    0.0
hole 440    55.49  -154.61    0.0
hole 440   -55.49  -154.61    0.0
hole 440    55.49   154.61    0.0
hole 440   -55.49   154.61    0.0
cylinder     6 1  184.15  2p220.34
cylinder    10 1  186.69  2p220.34
cylinder     6 1  191.77  2p220.34
cylinder    10 1  217.77  250.82  -220.34
cylinder     6 1  239.17  250.82  -220.34
cuboid       0 1  4p239.17  250.82  -220.34
unit 600
hemisphe-z  10 1  217.17
hemisphe-z   6 1  239.17
cuboid       0 1  6p239.17
global unit 700
array       200  -239.17 -239.17 -478.34
end geometry
read array
ara=20 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.96% enriched fuel oriface rod assembly'
fill 30r21 5r21 20 2r21 1b7 3r21 20 4r21 1b7 15r21
2r21 20 2r21 20 2r21 1b7 15r21 7r21 29 1b112 end fill
'.....
ara=21 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.96% enriched fuel control rod assembly'

```

```

fill 30r21 5r21 29 2r21 1b7 3r21 29 4r21 1b7 15r21
2r21 29 2r21 29 2r21 1b7 15r21 7r21 29 1b112 end fill
'.....
ara=22 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel lbp1(1.395%) rod assembly'
fill 30r22 5r22 26 2r22 1b7 3r22 26 4r22 1b7 15r22
2r22 26 2r22 26 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....
ara=23 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.96% enriched fuel lbp2(1.26%) rod assembly'
fill 30r21 5r21 27 2r21 1b7 3r21 27 4r21 1b7 15r21
2r21 27 2r21 27 2r21 1b7 15r21 7r21 29 1b112 end fill
'.....
ara=24 nux=15 nuy=15 nuz=1
com='level 2 array describing 1.98% enriched fuel control rod assm with rubble'
fill 30r23 5r23 29 2r23 1b7 3r23 29 4r23 1b7 15r23
2r23 29 2r23 29 2r23 1b7 15r23 7r23 29 1b112 end fill
'.....
ara=25 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel lbp2(1.26%) rod assembly'
fill 30r22 5r22 27 2r22 1b7 3r22 27 4r22 1b7 15r22
2r22 27 2r22 27 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....
ara=26 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel lbp3(1.06%) rod assembly'
fill 30r22 5r22 28 2r22 1b7 3r22 28 4r22 1b7 15r22
2r22 28 2r22 28 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....
ara=27 nux=15 nuy=15 nuz=1
com='level 2 array describing 1.98% enr. fuel axial power shaping rod assembly'
fill 30r23 5r23 25 2r23 1b7 3r23 25 4r23 1b7 15r23
2r23 25 2r23 25 2r23 1b7 15r23 7r23 29 1b112 end fill
'.....
ara=28 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel control rod assembly'
fill 30r22 5r22 29 2r22 1b7 3r22 29 4r22 1b7 15r22
2r22 29 2r22 29 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....
ara=30 nux=5 nuy=2 nuz=1
fill 5*231 232 233 232 1b2 end fill
'.....
ara=31 nux=5 nuy=2 nuz=1
fill 232 233 232 233 232 5*231 end fill
'.....
ara=32 nux=2 nuy=1 nuz=1
fill 2*231 end fill
'.....
ara=33 nux=2 nuy=5 nuz=1
fill 231 232 231 233 231 232 1b4 end fill
'.....
ara=34 nux=2 nuy=5 nuz=1
fill 232 231 233 231 232 231 233 231 232 231 end fill
'.....
ara=35 nux=1 nuy=2 nuz=1

fill 231 231 end fill
'.....
ara=100 nux=11 nuy=11 nuz=1
com='tmi critical core 1500wppm '
fill 231 234 235 236 235 236 1b5
234 235 237 238 236 235 1b5
235 237 235 237 235 236 1b5
236 238 239 235 233 235 1b5
235 236 235 233 235 233 1b5

```



```

236 235 236 235 233 234 1b60
end fill
ara=200 nux=1 nuy=1 nuz=2 gbl=200
fill 600 500 end fill
end array
read plot ttl='x-y slice through z=50.0'
scr=yes lpi=10
xul=-180.0 yul=180.0 zul=50.0 xlr=180.0 ylr=-180.0 zlr=50.0
uax=1.0 vdn=-1.0 nax=1024 nch=' 123456789*'
end plot
end data
end
#shell
cp _geom* $RTNDIR
end

```

Sample Converted CSAS6 Output File

```

#csas26      parm='size=00500000'
tmi 1500 ppm boron
27groupndf4 latticecell
uo2      1 .925      583 92235 1.98 92238 98.02 end
uo2      2 .925      583 92235 2.64 92238 97.36 end
uo2      3 .925      583 92235 2.96 92238 97.04 end
zircalloy 4 1.0      583 end
arbmcrod      10.17 5 0 0 1
47107 41.088 47109 38.912 49113 0.632 49115 14.368 48000 5.0
5 1.0      583 end
ss304      6 1.0      583 end
arbmpois1      3.70 2 0 1 0 13027 2 8016 3
7 0.97952 583 end
b4c      7 2.048-2 583 end
arbmpois2      3.70 2 0 1 0 13027 2 8016 3
8 0.98150 583 end
b4c      8 1.85-2 583 end
arbmpois3      3.70 2 0 1 0 13027 2 8016 3
9 0.98444 583 end
b4c      9 1.556-2 583 end
arbmbackid      8.5788-3 3 1 1 0 5000 1 1001 3 8016 3
10 .7707 583 5010 18.32 5011 81.68 end
h2o      10 .7707 583 end
end comp
squarepitch 1.44272 .9398 3 10 1.0922 4 .97536 0 end
more data
res=1 cylinder .4699 dan(1)=0.2858256
res=2 cylinder .4699 dan(2)=0.2858256
res=5 cylinder .5588
end more
read param plt=yes gen=203 npg=500 tme=120 end param
read geometry
unit      20
com=^layer 2 oriface rod unit^
cylinder  1
        6.090600E-01 2.103400E+02 -2.103400E+02
        origin x= 0.000000E+00 y= 0.000000E+00
media    6 1 1
cuboid   2
        7.213600E-01 -7.213600E-01 7.213600E-01
        -7.213600E-01 2.103400E+02 -2.103400E+02
media    10 1 2 -1
boundary 2
unit     21
com=^layer 2 2.96% enr. fuel rod^

```

```

cylinder 1
    4.699000E-01 1.828800E+02 -1.828800E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 3 1 1
cylinder 2
    4.876800E-01 1.828800E+02 -1.828800E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 0 1 2 -1
cylinder 3
    4.876800E-01 1.998400E+02 -2.062400E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 0 1 3 -2 -1
cylinder 4
    5.461000E-01 1.998400E+02 -2.062400E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 4 1 4 -3 -2 -1

cylinder 5
    5.461000E-01 2.103400E+02 -2.103400E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 6 1 5 -4 -3 -2 -1
cuboid 6
    7.213600E-01 -7.213600E-01 7.213600E-01
    -7.213600E-01 2.103400E+02 -2.103400E+02
media 10 1 6 -5 -4 -3 -2 -1
boundary 6
unit 22
com=^layer 2 2.64% enr. fuel rod^
cylinder 1
    4.699000E-01 1.828800E+02 -1.828800E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 2 1 1
cylinder 2
    4.876800E-01 1.828800E+02 -1.828800E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 0 1 2 -1
cylinder 3
    4.876800E-01 1.998400E+02 -2.062400E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 0 1 3 -2 -1

cylinder 4
    5.461000E-01 1.998400E+02 -2.062400E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 4 1 4 -3 -2 -1
cylinder 5
    5.461000E-01 2.103400E+02 -2.103400E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 6 1 5 -4 -3 -2 -1
cuboid 6
    7.213600E-01 -7.213600E-01 7.213600E-01
    -7.213600E-01 2.103400E+02 -2.103400E+02
media 10 1 6 -5 -4 -3 -2 -1
boundary 6
unit 23
com=^layer 2 1.98% enr. fuel rod^
cylinder 1
    4.699000E-01 1.828800E+02 -1.828800E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 1 1 1
cylinder 2
    4.876800E-01 1.828800E+02 -1.828800E+02
    origin x= 0.000000E+00 y= 0.000000E+00
media 0 1 2 -1
cylinder 3

```

```

      4.876800E-01  1.998400E+02 -2.062400E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   0   1   3  -2  -1

cylinder  4
      5.461000E-01  1.998400E+02 -2.062400E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   4   1   4  -3  -2  -1
cylinder  5
      5.461000E-01  2.103400E+02 -2.103400E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   6   1   5  -4  -3  -2  -1
cuboid   6
      7.213600E-01 -7.213600E-01  7.213600E-01
      -7.213600E-01  2.103400E+02 -2.103400E+02
media  10   1   6  -5  -4  -3  -2  -1
boundary  6
unit     25
cylinder  1
      5.588000E-01  4.572000E+01 -4.572000E+01
origin  x= 0.000000E+00  y= 0.000000E+00
media   5   1   1
cylinder  2
      6.121000E-01  2.103400E+02 -4.982000E+01
origin  x= 0.000000E+00  y= 0.000000E+00
media   6   1   2  -1
cylinder  3
      6.121000E-01  2.103400E+02 -2.103400E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   0   1   3  -2  -1
cuboid   4
      7.213600E-01 -7.213600E-01  7.213600E-01
      -7.213600E-01  2.103400E+02 -2.103400E+02
media  10   1   4  -3  -2  -1
boundary  4
unit     26
com=^layer 2 1.395% lumped burnable poison rod (lbp1)^
cylinder  1
      5.461000E-01  1.600200E+02 -1.600200E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   7   1   1
cylinder  2
      5.461000E-01  2.604875E+02 -1.600200E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   0   1   2  -1
cylinder  3
      6.350000E-01  2.605800E+02 -1.601000E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   4   1   3  -2  -1
cuboid   4
      7.213600E-01 -7.213600E-01  7.213600E-01
      -7.213600E-01  2.605800E+02 -1.601000E+02
media  10   1   4  -3  -2  -1
boundary  4
unit     27
com=^layer 2 1.260% lumped burnable poison rod (lbp2)^
cylinder  1
      5.461000E-01  1.600200E+02 -1.600200E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   8   1   1
cylinder  2
      5.461000E-01  2.604875E+02 -1.600200E+02
origin  x= 0.000000E+00  y= 0.000000E+00
media   0   1   2  -1

```

```

cylinder 3
        6.350000E-01 2.605800E+02 -1.601000E+02
        origin x= 0.000000E+00 y= 0.000000E+00
media 4
cuboid 4
        7.213600E-01 -7.213600E-01 7.213600E-01
        -7.213600E-01 2.605800E+02 -1.601000E+02
media 10
boundary 4
unit 28
com=^layer 2 1.060% lumped burnable poison rod (lbp3)^
cylinder 1
        5.461000E-01 1.600200E+02 -1.600200E+02
        origin x= 0.000000E+00 y= 0.000000E+00
media 9
cylinder 2
        5.461000E-01 2.604875E+02 -1.600200E+02
        origin x= 0.000000E+00 y= 0.000000E+00
media 0
cylinder 3
        6.350000E-01 2.605800E+02 -1.601000E+02
        origin x= 0.000000E+00 y= 0.000000E+00
media 4
cuboid 4
        7.213600E-01 -7.213600E-01 7.213600E-01
        -7.213600E-01 2.605800E+02 -1.601000E+02
media 10
boundary 4
unit 29
com=^z-layer 2--intact pins--no rubble^
cuboid 1
        7.213600E-01 -7.213600E-01 7.213600E-01
        -7.213600E-01 2.605800E+02 -1.601000E+02
media 10
boundary 1
unit 231
com=^layer 2 2.96% enr. fuel and orifice rod assembly^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02
array 20
        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00
cuboid 2
        1.090549E+01 -1.090549E+01 1.090549E+01
        -1.090549E+01 2.103400E+02 -2.103400E+02
media 10
boundary 2
unit 232
com=^layer 2 2.96% enr. fuel and control rod assembly--out^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02
array 21
        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00
cuboid 2
        1.090549E+01 -1.090549E+01 1.090549E+01
        -1.090549E+01 2.103400E+02 -2.103400E+02
media 10
boundary 2
unit 233
com=^layer 2 2.64% enr. fuel and 1.395% lbp1 rod assembly^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02
array 22
        1

```

```

        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00
cuboid 2
        1.090549E+01 -1.090549E+01 1.090549E+01
        -1.090549E+01 2.103400E+02 -2.103400E+02
media 10 1 2 -1
boundary 2
unit 234
com=^layer 2 2.96% enr. fuel and 1.260% lbp2 rod assembly^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02
array 23 1
        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00

cuboid 2
        1.090549E+01 -1.090549E+01 1.090549E+01
        -1.090549E+01 2.103400E+02 -2.103400E+02
media 10 1 2 -1
boundary 2
unit 235
com=^layer 2 1.98% enr. fuel and control rod assembly--out^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02
array 24 1
        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00
cuboid 2
        1.090549E+01 -1.090549E+01 1.090549E+01
        -1.090549E+01 2.103400E+02 -2.103400E+02
media 10 1 2 -1
boundary 2
unit 236
com=^layer 2 2.64% enr. fuel and 1.260% lbp2 rod assembly^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02

array 25 1
        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00
cuboid 2
        1.090549E+01 -1.090549E+01 1.090549E+01
        -1.090549E+01 2.103400E+02 -2.103400E+02
media 10 1 2 -1
boundary 2
unit 237
com=^layer 2 2.64% enr. fuel and 1.060% lbp3 rod assembly^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02
array 26 1
        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00
cuboid 2
        1.090549E+01 -1.090549E+01 1.090549E+01
        -1.090549E+01 2.103400E+02 -2.103400E+02
media 10 1 2 -1
boundary 2
unit 238
com=^layer 2 1.98% enr. fuel and axial power shaping rod assembly--out^
cuboid 1
        1.081679E+01 -1.082399E+01 1.081679E+01
        -1.082399E+01 2.103398E+02 -2.103398E+02
array 27 1
        place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00

cuboid 2

```

```

1.090549E+01 -1.090549E+01 1.090549E+01
-1.090549E+01 2.103400E+02 -2.103400E+02
media 10 1 2 -1
boundary 2
unit 239
com=^layer 2 2.64% enr. fuel and control rod assembly--out^
cuboid 1
1.081679E+01 -1.082399E+01 1.081679E+01
-1.082399E+01 2.103398E+02 -2.103398E+02
array 28 1
place 1 1 1 -1.010264E+01 -1.010264E+01 0.000000E+00
cuboid 2
1.090549E+01 -1.090549E+01 1.090549E+01
-1.090549E+01 2.103400E+02 -2.103400E+02
media 10 1 2 -1
boundary 2
unit 300
cuboid 1
5.452740E+01 -5.452740E+01 2.181096E+01
-2.181096E+01 2.103360E+02 -2.103435E+02
array 30 1
place 1 1 1 -4.362196E+01 -1.090549E+01 -3.753662E-03
cuboid 2
5.452800E+01 -5.452800E+01 2.181100E+01
-2.371600E+01 2.103438E+02 -2.103438E+02
media 6 1 2 -1
boundary 2
unit 310
cuboid 1
5.452740E+01 -5.452740E+01 2.181096E+01
-2.181096E+01 2.103360E+02 -2.103435E+02
array 31 1
place 1 1 1 -4.362196E+01 -1.090549E+01 -3.753662E-03
cuboid 2
5.452800E+01 -5.452800E+01 2.371600E+01
-2.181100E+01 2.103438E+02 -2.103438E+02
media 6 1 2 -1
boundary 2
unit 320
cuboid 1
2.181096E+01 -2.181096E+01 1.090548E+01
-1.090548E+01 2.103360E+02 -2.103435E+02
array 32 1
place 1 1 1 -1.090549E+01 0.000000E+00 -3.753662E-03
boundary 1
unit 330
cuboid 1
2.181096E+01 -2.181096E+01 5.452740E+01
-5.452740E+01 2.103360E+02 -2.103435E+02
array 33 1
place 1 1 1 -1.090549E+01 -4.362196E+01 -3.753662E-03
cuboid 2
2.181100E+01 -2.371600E+01 5.452800E+01
-5.452800E+01 2.103438E+02 -2.103438E+02
media 6 1 2 -1
boundary 2
unit 340
cuboid 1
2.181096E+01 -2.181096E+01 5.452740E+01
-5.452740E+01 2.103360E+02 -2.103435E+02
array 34 1
place 1 1 1 -1.090549E+01 -4.362196E+01 -3.753662E-03
cuboid 2
2.371600E+01 -2.181100E+01 5.452800E+01
-5.452800E+01 2.103438E+02 -2.103438E+02

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```

media      6      1          2  -1
boundary   2
unit       350
com=^units for ss core form^
cuboid     1
           1.090548E+01 -1.090548E+01  2.181096E+01
           -2.181096E+01  2.103360E+02 -2.103435E+02
array      35      1
           place 1 1 1  0.000000E+00 -1.090549E+01 -3.753662E-03
boundary   1
unit       400

cuboid     1
           1.185000E+01 -1.185000E+01  9.525000E-01
           -9.525000E-01  2.103400E+02 -2.103400E+02
media      6      1          1
boundary   1
unit       410
cuboid     1
           9.525000E-01 -9.525000E-01  2.085000E+01
           -2.085000E+01  2.103400E+02 -2.103400E+02
media      6      1          1
boundary   1
unit       420
cuboid     1
           9.525000E-01 -9.525000E-01  9.940000E+00
           -9.940000E+00  2.103400E+02 -2.103400E+02
media      6      1          1
boundary   1
unit       430
cuboid     1
           2.276000E+01 -2.276000E+01  9.525000E-01
           -9.525000E-01  2.103400E+02 -2.103400E+02
media      6      1          1
boundary   1
unit       440

cuboid     1
           9.525000E-01 -9.525000E-01  1.091000E+01
           -1.091000E+01  2.103400E+02 -2.103400E+02
media      6      1          1
boundary   1
unit       500
cuboid     1
           1.199597E+02 -1.199609E+02  1.199597E+02
           -1.199609E+02  2.103398E+02 -2.103398E+02
array      100     1
           place 1 1 1  -1.090555E+02 -1.090555E+02  0.000000E+00
cylinder   2
           1.790700E+02  2.203400E+02 -2.203400E+02
           origin x= 0.000000E+00 y= 0.000000E+00
media      10      1          2  -1
           -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20 -21
           -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33 -34
           -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46 -47
           -48 -49 -50 -51 -52
cuboid     9
           5.452800E+01 -5.452800E+01  2.181100E+01
           -2.371600E+01  2.103438E+02 -2.103438E+02
           origin x= 0.000000E+00 y= -1.417800E+02 z= 0.000000E+00
hole       300     9  -1 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
           -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
           -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
           -47 -48 -49 -50 -51 -52

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```

origin x= 0.000000E+00 y= -1.417800E+02 z= 0.000000E+00
cuboid 10
5.452800E+01 -5.452800E+01 2.371600E+01
-2.181100E+01 2.103438E+02 -2.103438E+02
origin x= 0.000000E+00 y= 1.417800E+02 z= 0.000000E+00
hole 310 10 -1 -9 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 0.000000E+00 y= 1.417800E+02 z= 0.000000E+00

cuboid 11
2.181096E+01 -2.181096E+01 1.090548E+01
-1.090548E+01 2.103360E+02 -2.103435E+02
origin x= -7.634000E+01 y= -1.308700E+02 z= 0.000000E+00
hole 320 11 -1 -9 -10 -12 -13 -14 -15 -16 -17 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -7.634000E+01 y= -1.308700E+02 z= 0.000000E+00

cuboid 12
2.181096E+01 -2.181096E+01 1.090548E+01
-1.090548E+01 2.103360E+02 -2.103435E+02
origin x= 7.634000E+01 y= -1.308700E+02 z= 0.000000E+00
hole 320 12 -1 -9 -10 -11 -13 -14 -15 -16 -17 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 7.634000E+01 y= -1.308700E+02 z= 0.000000E+00

cuboid 13
2.181096E+01 -2.181096E+01 1.090548E+01
-1.090548E+01 2.103360E+02 -2.103435E+02
origin x= -7.634000E+01 y= 1.308700E+02 z= 0.000000E+00
hole 320 13 -1 -9 -10 -11 -12 -14 -15 -16 -17 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -7.634000E+01 y= 1.308700E+02 z= 0.000000E+00

cuboid 14
2.181096E+01 -2.181096E+01 1.090548E+01
-1.090548E+01 2.103360E+02 -2.103435E+02
origin x= 7.634000E+01 y= 1.308700E+02 z= 0.000000E+00
hole 320 14 -1 -9 -10 -11 -12 -13 -15 -16 -17 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 7.634000E+01 y= 1.308700E+02 z= 0.000000E+00

cuboid 15
2.181100E+01 -2.371600E+01 5.452800E+01
-5.452800E+01 2.103438E+02 -2.103438E+02
origin x= -1.417800E+02 y= 0.000000E+00 z= 0.000000E+00
hole 330 15 -1 -9 -10 -11 -12 -13 -14 -16 -17 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -1.417800E+02 y= 0.000000E+00 z= 0.000000E+00

cuboid 16
2.371600E+01 -2.181100E+01 5.452800E+01
-5.452800E+01 2.103438E+02 -2.103438E+02
origin x= 1.417800E+02 y= 0.000000E+00 z= 0.000000E+00
hole 340 16 -1 -9 -10 -11 -12 -13 -14 -15 -17 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46

```



```

-47 -48 -49 -50 -51 -52
origin x= 1.417800E+02 y= 0.000000E+00 z= 0.000000E+00
cuboid 17
1.090548E+01 -1.090548E+01 2.181096E+01
-2.181096E+01 2.103360E+02 -2.103435E+02
origin x= -1.308700E+02 y= 7.634000E+01 z= 0.000000E+00
hole 350 17 -1 -9 -10 -11 -12 -13 -14 -15 -16 -18 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -1.308700E+02 y= 7.634000E+01 z= 0.000000E+00
cuboid 18
1.090548E+01 -1.090548E+01 2.181096E+01
-2.181096E+01 2.103360E+02 -2.103435E+02
origin x= 1.308700E+02 y= 7.634000E+01 z= 0.000000E+00
hole 350 18 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -19 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 1.308700E+02 y= 7.634000E+01 z= 0.000000E+00
cuboid 19
1.090548E+01 -1.090548E+01 2.181096E+01
-2.181096E+01 2.103360E+02 -2.103435E+02
origin x= -1.308700E+02 y= -7.634000E+01 z= 0.000000E+00
hole 350 19 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -20
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -1.308700E+02 y= -7.634000E+01 z= 0.000000E+00
cuboid 20
1.090548E+01 -1.090548E+01 2.181096E+01
-2.181096E+01 2.103360E+02 -2.103435E+02
origin x= 1.308700E+02 y= -7.634000E+01 z= 0.000000E+00
hole 350 20 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 1.308700E+02 y= -7.634000E+01 z= 0.000000E+00
cuboid 21
1.185000E+01 -1.185000E+01 9.525000E-01
-9.525000E-01 2.103400E+02 -2.103400E+02
origin x= -1.536500E+02 y= -5.550000E+01 z= 0.000000E+00
hole 400 21 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -1.536500E+02 y= -5.550000E+01 z= 0.000000E+00
cuboid 22
1.185000E+01 -1.185000E+01 9.525000E-01
-9.525000E-01 2.103400E+02 -2.103400E+02
origin x= 1.536500E+02 y= -5.550000E+01 z= 0.000000E+00
hole 400 22 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 1.536500E+02 y= -5.550000E+01 z= 0.000000E+00
cuboid 23
1.185000E+01 -1.185000E+01 9.525000E-01
-9.525000E-01 2.103400E+02 -2.103400E+02
origin x= -1.536500E+02 y= 5.550000E+01 z= 0.000000E+00
hole 400 23 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
-34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -1.536500E+02 y= 5.550000E+01 z= 0.000000E+00

```

```

cuboid 24
  1.185000E+01 -1.185000E+01 9.525000E-01
  -9.525000E-01 2.103400E+02 -2.103400E+02
  origin x= 1.536500E+02 y= 5.550000E+01 z= 0.000000E+00
hole 400 24 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
  -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
  -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
  -47 -48 -49 -50 -51 -52
  origin x= 1.536500E+02 y= 5.550000E+01 z= 0.000000E+00

cuboid 25
  1.185000E+01 -1.185000E+01 9.525000E-01
  -9.525000E-01 2.103400E+02 -2.103400E+02
  origin x= 1.318400E+02 y= -9.913000E+01 z= 0.000000E+00
hole 400 25 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
  -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
  -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
  -47 -48 -49 -50 -51 -52
  origin x= 1.318400E+02 y= -9.913000E+01 z= 0.000000E+00

cuboid 26
  1.185000E+01 -1.185000E+01 9.525000E-01
  -9.525000E-01 2.103400E+02 -2.103400E+02
  origin x= -1.318400E+02 y= -9.913000E+01 z= 0.000000E+00
hole 400 26 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
  -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
  -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
  -47 -48 -49 -50 -51 -52
  origin x= -1.318400E+02 y= -9.913000E+01 z= 0.000000E+00

cuboid 27
  1.185000E+01 -1.185000E+01 9.525000E-01
  -9.525000E-01 2.103400E+02 -2.103400E+02
  origin x= 1.318400E+02 y= 9.913000E+01 z= 0.000000E+00
hole 400 27 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
  -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
  -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
  -47 -48 -49 -50 -51 -52
  origin x= 1.318400E+02 y= 9.913000E+01 z= 0.000000E+00

cuboid 28
  1.185000E+01 -1.185000E+01 9.525000E-01
  -9.525000E-01 2.103400E+02 -2.103400E+02
  origin x= -1.318400E+02 y= 9.913000E+01 z= 0.000000E+00
hole 400 28 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
  -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
  -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
  -47 -48 -49 -50 -51 -52
  origin x= -1.318400E+02 y= 9.913000E+01 z= 0.000000E+00

cuboid 29
  1.185000E+01 -1.185000E+01 9.525000E-01
  -9.525000E-01 2.103400E+02 -2.103400E+02
  origin x= -1.100300E+02 y= 1.209300E+02 z= 0.000000E+00
hole 400 29 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
  -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
  -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
  -47 -48 -49 -50 -51 -52
  origin x= -1.100300E+02 y= 1.209300E+02 z= 0.000000E+00

cuboid 30
  1.185000E+01 -1.185000E+01 9.525000E-01
  -9.525000E-01 2.103400E+02 -2.103400E+02
  origin x= 1.100300E+02 y= 1.209300E+02 z= 0.000000E+00
hole 400 30 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
  -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32 -33
  -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
  -47 -48 -49 -50 -51 -52
  origin x= 1.100300E+02 y= 1.209300E+02 z= 0.000000E+00

cuboid 31

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```

    1.185000E+01 -1.185000E+01 9.525000E-01
    -9.525000E-01 2.103400E+02 -2.103400E+02
hole 400 origin x= -1.100300E+02 y= -1.209300E+02 z= 0.000000E+00
    31 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
    -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -32 -33
    -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
    -47 -48 -49 -50 -51 -52
    origin x= -1.100300E+02 y= -1.209300E+02 z= 0.000000E+00

cuboid 32
    1.185000E+01 -1.185000E+01 9.525000E-01
    -9.525000E-01 2.103400E+02 -2.103400E+02
hole 400 origin x= 1.100300E+02 y= -1.209300E+02 z= 0.000000E+00
    32 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
    -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -33
    -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
    -47 -48 -49 -50 -51 -52
    origin x= 1.100300E+02 y= -1.209300E+02 z= 0.000000E+00

cuboid 33
    9.525000E-01 -9.525000E-01 2.085000E+01
    -2.085000E+01 2.103400E+02 -2.103400E+02
hole 410 origin x= 1.427400E+02 y= -7.731000E+01 z= 0.000000E+00
    33 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
    -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
    -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
    -47 -48 -49 -50 -51 -52
    origin x= 1.427400E+02 y= -7.731000E+01 z= 0.000000E+00

cuboid 34
    9.525000E-01 -9.525000E-01 2.085000E+01
    -2.085000E+01 2.103400E+02 -2.103400E+02
hole 410 origin x= -1.427400E+02 y= -7.731000E+01 z= 0.000000E+00
    34 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
    -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
    -33 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
    -47 -48 -49 -50 -51 -52
    origin x= -1.427400E+02 y= -7.731000E+01 z= 0.000000E+00

cuboid 35
    9.525000E-01 -9.525000E-01 2.085000E+01
    -2.085000E+01 2.103400E+02 -2.103400E+02
hole 410 origin x= 1.427400E+02 y= 7.731000E+01 z= 0.000000E+00
    35 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
    -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
    -33 -34 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
    -47 -48 -49 -50 -51 -52
    origin x= 1.427400E+02 y= 7.731000E+01 z= 0.000000E+00

cuboid 36
    9.525000E-01 -9.525000E-01 2.085000E+01
    -2.085000E+01 2.103400E+02 -2.103400E+02
hole 410 origin x= -1.427400E+02 y= 7.731000E+01 z= 0.000000E+00
    36 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
    -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
    -33 -34 -35 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
    -47 -48 -49 -50 -51 -52
    origin x= -1.427400E+02 y= 7.731000E+01 z= 0.000000E+00

cuboid 37
    9.525000E-01 -9.525000E-01 9.940000E+00
    -9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 origin x= 1.209200E+02 y= -1.100300E+02 z= 0.000000E+00
    37 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
    -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
    -33 -34 -35 -36 -38 -39 -40 -41 -42 -43 -44 -45 -46
    -47 -48 -49 -50 -51 -52
    origin x= 1.209200E+02 y= -1.100300E+02 z= 0.000000E+00

cuboid 38
    9.525000E-01 -9.525000E-01 9.940000E+00

```

```

-9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 38 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -1.209200E+02 y= -1.100300E+02 z= 0.000000E+00
cuboid 39
9.525000E-01 -9.525000E-01 9.940000E+00
-9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 39 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 1.209200E+02 y= 1.100300E+02 z= 0.000000E+00
cuboid 40
9.525000E-01 -9.525000E-01 9.940000E+00
-9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 40 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -1.209200E+02 y= 1.100300E+02 z= 0.000000E+00
cuboid 41
9.525000E-01 -9.525000E-01 9.940000E+00
-9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 41 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 9.911000E+01 y= -1.318300E+02 z= 0.000000E+00
cuboid 42
9.525000E-01 -9.525000E-01 9.940000E+00
-9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 42 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
-33 -34 -35 -36 -37 -38 -39 -40 -41 -43 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -9.911000E+01 y= -1.318300E+02 z= 0.000000E+00
cuboid 43
9.525000E-01 -9.525000E-01 9.940000E+00
-9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 43 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -44 -45 -46
-47 -48 -49 -50 -51 -52
origin x= 9.911000E+01 y= 1.318300E+02 z= 0.000000E+00
cuboid 44
9.525000E-01 -9.525000E-01 9.940000E+00
-9.940000E+00 2.103400E+02 -2.103400E+02
hole 420 44 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
-20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -45 -46
-47 -48 -49 -50 -51 -52
origin x= -9.911000E+01 y= 1.318300E+02 z= 0.000000E+00
cuboid 45
2.276000E+01 -2.276000E+01 9.525000E-01
-9.525000E-01 2.103400E+02 -2.103400E+02
origin x= 7.729000E+01 y= -1.427400E+02 z= 0.000000E+00

```

```

hole 430 45 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
        -33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -46
        -47 -48 -49 -50 -51 -52
        origin x= 7.729000E+01 y= -1.427400E+02 z= 0.000000E+00
cuboid 46
        2.276000E+01 -2.276000E+01 9.525000E-01
        -9.525000E-01 2.103400E+02 -2.103400E+02
        origin x= -7.729000E+01 y= -1.427400E+02 z= 0.000000E+00
hole 430 46 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
        -33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45
        -47 -48 -49 -50 -51 -52
        origin x= -7.729000E+01 y= -1.427400E+02 z= 0.000000E+00
cuboid 47
        2.276000E+01 -2.276000E+01 9.525000E-01
        -9.525000E-01 2.103400E+02 -2.103400E+02
        origin x= 7.729000E+01 y= 1.427400E+02 z= 0.000000E+00
hole 430 47 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
        -33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45
        -46 -48 -49 -50 -51 -52
        origin x= 7.729000E+01 y= 1.427400E+02 z= 0.000000E+00
cuboid 48
        2.276000E+01 -2.276000E+01 9.525000E-01
        -9.525000E-01 2.103400E+02 -2.103400E+02
        origin x= -7.729000E+01 y= 1.427400E+02 z= 0.000000E+00
hole 430 48 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
        -33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45
        -46 -47 -49 -50 -51 -52
        origin x= -7.729000E+01 y= 1.427400E+02 z= 0.000000E+00
cuboid 49
        9.525000E-01 -9.525000E-01 1.091000E+01
        -1.091000E+01 2.103400E+02 -2.103400E+02
        origin x= 5.549000E+01 y= -1.546100E+02 z= 0.000000E+00
hole 440 49 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
        -33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45
        -46 -47 -48 -50 -51 -52
        origin x= 5.549000E+01 y= -1.546100E+02 z= 0.000000E+00
cuboid 50
        9.525000E-01 -9.525000E-01 1.091000E+01
        -1.091000E+01 2.103400E+02 -2.103400E+02
        origin x= -5.549000E+01 y= -1.546100E+02 z= 0.000000E+00
hole 440 50 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
        -33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45
        -46 -47 -48 -49 -51 -52
        origin x= -5.549000E+01 y= -1.546100E+02 z= 0.000000E+00
cuboid 51
        9.525000E-01 -9.525000E-01 1.091000E+01
        -1.091000E+01 2.103400E+02 -2.103400E+02
        origin x= 5.549000E+01 y= 1.546100E+02 z= 0.000000E+00
hole 440 51 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32
        -33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45
        -46 -47 -48 -49 -50 -52
        origin x= 5.549000E+01 y= 1.546100E+02 z= 0.000000E+00
cuboid 52
        9.525000E-01 -9.525000E-01 1.091000E+01
        -1.091000E+01 2.103400E+02 -2.103400E+02
        origin x= -5.549000E+01 y= 1.546100E+02 z= 0.000000E+00
hole 440 52 -1 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19
        -20 -21 -22 -23 -24 -25 -26 -27 -28 -29 -30 -31 -32

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-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45
-46 -47 -48 -49 -50 -51
origin x= -5.549000E+01 y= 1.546100E+02 z= 0.000000E+00
cylinder 3
1.841500E+02 2.203400E+02 -2.203400E+02
origin x= 0.000000E+00 y= 0.000000E+00
media 6 1 3 -2 -1
cylinder 4
1.866900E+02 2.203400E+02 -2.203400E+02
origin x= 0.000000E+00 y= 0.000000E+00
media 10 1 4 -3 -2 -1
cylinder 5
1.917700E+02 2.203400E+02 -2.203400E+02
origin x= 0.000000E+00 y= 0.000000E+00
media 6 1 5 -4 -3 -2 -1
cylinder 6
2.177700E+02 2.508200E+02 -2.203400E+02
origin x= 0.000000E+00 y= 0.000000E+00
media 10 1 6 -5 -4 -3 -2 -1
cylinder 7
2.391700E+02 2.508200E+02 -2.203400E+02
origin x= 0.000000E+00 y= 0.000000E+00
media 6 1 7 -6 -5 -4 -3 -2 -1
cuboid 8
2.391700E+02 -2.391700E+02 2.391700E+02
-2.391700E+02 2.508200E+02 -2.203400E+02
media 0 1 8 -7 -6 -5 -4 -3 -2 -1
boundary
unit
600
sphere 1
2.171700E+02
origin
x= 0.000000E+00
y= 0.000000E+00
z= 0.000000E+00
chord -z= 0.000000E+00
media 10 1 1
sphere 2
2.391700E+02
origin
x= 0.000000E+00
y= 0.000000E+00
z= 0.000000E+00
chord -z= 0.000000E+00
media 6 1 2 -1
cuboid 3
2.391700E+02 -2.391700E+02 2.391700E+02
-2.391700E+02 2.391700E+02 -2.391700E+02
media 0 1 3 -2 -1
boundary
global
unit
700
cuboid 1
2.391698E+02 -2.391698E+02 2.391698E+02
-2.391698E+02 4.711595E+02 -4.783395E+02
array 200 1
place 1 1 1 0.000000E+00 0.000000E+00 -2.391700E+02
boundary 1
end geometry

read array
ara=20 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.96% enriched fuel oriface rod assembly'
fill 30r21 5r21 20 2r21 1b7 3r21 20 4r21 1b7 15r21

```

```

2r21 20 2r21 20 2r21 1b7 15r21 7r21 29 1b112 end fill
'.....'
ara=21 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.96% enriched fuel control rod assembly'
fill 30r21 5r21 29 2r21 1b7 3r21 29 4r21 1b7 15r21
2r21 29 2r21 29 2r21 1b7 15r21 7r21 29 1b112 end fill
'.....'
ara=22 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel lbp1(1.395%) rod assembly'
fill 30r22 5r22 26 2r22 1b7 3r22 26 4r22 1b7 15r22
2r22 26 2r22 26 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....'
ara=23 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.96% enriched fuel lbp2(1.26%) rod assembly'
fill 30r21 5r21 27 2r21 1b7 3r21 27 4r21 1b7 15r21
2r21 27 2r21 27 2r21 1b7 15r21 7r21 29 1b112 end fill
'.....'
ara=24 nux=15 nuy=15 nuz=1
com='level 2 array describing 1.98% enriched fuel control rod assm with rubble'
fill 30r23 5r23 29 2r23 1b7 3r23 29 4r23 1b7 15r23
2r23 29 2r23 29 2r23 1b7 15r23 7r23 29 1b112 end fill
'.....'
ara=25 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel lbp2(1.26%) rod assembly'
fill 30r22 5r22 27 2r22 1b7 3r22 27 4r22 1b7 15r22
2r22 27 2r22 27 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....'
ara=26 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel lbp3(1.06%) rod assembly'
fill 30r22 5r22 28 2r22 1b7 3r22 28 4r22 1b7 15r22
2r22 28 2r22 28 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....'
ara=27 nux=15 nuy=15 nuz=1
com='level 2 array describing 1.98% enr. fuel axial power shaping rod assembly'
fill 30r23 5r23 25 2r23 1b7 3r23 25 4r23 1b7 15r23
2r23 25 2r23 25 2r23 1b7 15r23 7r23 29 1b112 end fill
'.....'
ara=28 nux=15 nuy=15 nuz=1
com='level 2 array describing 2.64% enriched fuel control rod assembly'
fill 30r22 5r22 29 2r22 1b7 3r22 29 4r22 1b7 15r22
2r22 29 2r22 29 2r22 1b7 15r22 7r22 29 1b112 end fill
'.....'
ara=30 nux=5 nuy=2 nuz=1
fill 5*231 232 233 232 1b2 end fill
'.....'
ara=31 nux=5 nuy=2 nuz=1
fill 232 233 232 233 232 5*231 end fill
'.....'
ara=32 nux=2 nuy=1 nuz=1
fill 2*231 end fill
'.....'
ara=33 nux=2 nuy=5 nuz=1
fill 231 232 231 233 231 232 1b4 end fill
'.....'
ara=34 nux=2 nuy=5 nuz=1
fill 232 231 233 231 232 231 233 231 232 231 end fill
'.....'
ara=35 nux=1 nuy=2 nuz=1
fill 231 231 end fill
'.....'
'.....'
ara=100 nux=11 nuy=11 nuz=1
com='tmi critical core 1500wppm '
fill 231 234 235 236 235 236 1b5
234 235 237 238 236 235 1b5

```

```
235 237 235 237 235 236 1b5
236 238 239 235 233 235 1b5
235 236 235 233 235 233 1b5
236 235 236 235 233 234 1b60
end fill
ara=200 nux=1 nuy=1 nuz=2 gbl=200
fill 600 500 end fill
end array
read plot ttl='x-y slice through z=50.0'
scr=yes lpi=10
xul=-180.0 yul=180.00 zul=50.0 xlr=180.00 ylr=-180.0 zlr=50.0
uax=1.0 vdn=-1.0 nax=1024 nch=' 123456789*'
end plot
end data
end
```