

NEDO-10084-4
March 1995

***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 7.410 ****
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= SUPPORT ROD STRESS PASS

***** GENERAL GRAPH POSTPROCESSOR (POST26) *****

ENTER /SHOW,DEVICE-NAME TO ENABLE GRAPHIC DISPLAY
ENTER FINISH TO LEAVE POST26

ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS

MINIMUM TIME= 0.00000E+00 MAXIMUM TIME= 0.13700E-01

*** NOTE ***

REDEFINITION OF TIME RANGE ERASES ALL PREVIOUSLY STORED OR CALCULATED DATA

VARIABLE 2 IS ELEMENT 629 ITEM 26 NAME= 629 SII

VARIABLE 3 IS ELEMENT 630 ITEM 26 NAME= 630 SII

VARIABLE 4 IS ELEMENT 631 ITEM 26 NAME= 631 SII

VARIABLE 5 IS ELEMENT 632 ITEM 26 NAME= 632 SII

VARIABLE 6 IS ELEMENT 633 ITEM 26 NAME= 633 SII

VARIABLE 7 IS ELEMENT 628 ITEM 30 NAME= 628 SIJ

LABY GRAPH PLOT LABEL = SI

NEW TITLE= SUPPORT ROD S.I. VS. TIME, ELEM 628

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2 ESTR	629	26	629 SII	339.1	0.2329E-03	0.3844E+05	0.3203E-02
3 ESTR	630	26	630 SII	628.0	0.2329E-03	0.5804E+05	0.3436E-02
4 ESTR	631	26	631 SII	621.8	0.2329E-03	0.5429E+05	0.3436E-02
5 ESTR	632	26	632 SII	615.5	0.2329E-03	0.5071E+05	0.3639E-02
6 ESTR	633	26	633 SII	609.3	0.2329E-03	0.4781E+05	0.3872E-02
7 ESTR	628	30	628 SIJ	261.1	0.2329E-03	0.3992E+05	0.3203E-02

VARIABLE 2 IS ELEMENT 540 ITEM 7 NAME= 540 FX

VARIABLE 3 IS ELEMENT 541 ITEM 1 NAME= 541 FX

STORAGE COMPLETE FOR 59 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2 ESTR	540	7	540 FX	-0.1374E+05	0.3436E-02	304.8	0.1348E-01
3 ESTR	541	1	541 FX	-8525.	0.7774E-02	0.4997E+05	0.3436E-02

VARIABLE 4 IS 1.0000 TIMES VARIABLE 2 PLUS 1.0000 TIMES VARIABLE 3
PLUS 1.0000 TIMES VARIABLE 0

NEW TITLE= SUPPORT ROD/SPACER DISK #2 WELD SHEAR - NODE 143

POST26 SUMMARY OF VARIABLE EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

4 OPER	4	ADD	FX	-0.1020E+05	0.8444E-02	0.3811E+05	0.4105E-02
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VARIABLE 2 IS ELEMENT 540 ITEM 11 NAME= 540 MY

VARIABLE 3 IS ELEMENT 541 ITEM 5 NAME= 541 MY

VARIABLE 4 IS ELEMENT 540 ITEM 12 NAME= 540 MZ

VARIABLE 5 IS ELEMENT 541 ITEM 6 NAME= 541 MZ

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SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
2 ESTR	540 11	540 MY	-0.4719E+05	0.4105E-02	0.1898E+05	0.8677E-02
3 ESTR	541 5	541 MY	-0.5681E+05	0.4105E-02	0.2098E+05	0.7774E-02
4 ESTR	540 12	540 MZ	-0.6175E+05	0.4105E-02	0.2495E+05	0.8444E-02
5 ESTR	541 6	541 MZ	-0.6934E+05	0.4105E-02	0.2935E+05	0.7978E-02

VARIABLE	6 IS	1.0000	TIMES VARIABLE	2 PLUS	1.0000	TIMES VARIABLE	3
	PLUS	1.0000	TIMES VARIABLE	0			

VARIABLE	7 IS	1.0000	TIMES VARIABLE	4 PLUS	1.0000	TIMES VARIABLE	5
	PLUS	1.0000	TIMES VARIABLE	0			

NEW TITLE= SUPPORT ROD/SPACER DISK #2 WELD SHEAR - NODE 143

POST26 SUMMARY OF VARIABLE EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
6 OPER	6 ADD	MY	-0.1040E+06	0.4105E-02	0.3646E+05	0.8677E-02
7 OPER	7 ADD	MZ	-0.1311E+06	0.4105E-02	0.5291E+05	0.8211E-02

VARIABLE 2 IS ELEMENT 617 ITEM 7 NAME= 617 FX

VARIABLE 3 IS ELEMENT 618 ITEM 1 NAME= 618 FX

STORAGE COMPLETE FOR 59 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
2 ESTR	617 7	617 FX	-0.1346E+06	0.3872E-02	-873.7	0.2329E-03
3 ESTR	618 1	618 FX	2270.	0.2329E-03	0.1595E+06	0.3872E-02

VARIABLE	4 IS	1.0000	TIMES VARIABLE	2 PLUS	1.0000	TIMES VARIABLE	3
	PLUS	1.0000	TIMES VARIABLE	0			

NEW TITLE= SUPPORT ROD/SPACER DISK #9 WELD SHEAR - NODE 843

POST26 SUMMARY OF VARIABLE EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
4 OPER	4 ADD	FX	-4103.	0.1188E-01	0.2933E+05	0.3203E-02

VARIABLE 2 IS ELEMENT 617 ITEM 11 NAME= 617 MY

VARIABLE 3 IS ELEMENT 618 ITEM 5 NAME= 618 MY

VARIABLE 4 IS ELEMENT 617 ITEM 12 NAME= 617 MZ

VARIABLE 5 IS ELEMENT 618 ITEM 6 NAME= 618 MZ

STORAGE COMPLETE FOR 59 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
2 ESTR	617 11	617 MY	-6860.	0.1188E-01	0.3746E+05	0.2737E-02
3 ESTR	618 5	618 MY	-0.1304E+05	0.1188E-01	0.4698E+05	0.2970E-02
4 ESTR	617 12	617 MZ	-8796.	0.1211E-01	0.4794E+05	0.2737E-02
5 ESTR	618 6	618 MZ	-0.1732E+05	0.1211E-01	0.5617E+05	0.2970E-02

VARIABLE	6 IS	1.0000	TIMES VARIABLE	2 PLUS	1.0000	TIMES VARIABLE	3
	PLUS	1.0000	TIMES VARIABLE	0			

VARIABLE	7 IS	1.0000	TIMES VARIABLE	4 PLUS	1.0000	TIMES VARIABLE	5
	PLUS	1.0000	TIMES VARIABLE	0			

NEW TITLE= SUPPORT ROD/SPACER DISK #9 WELD MOMENTS - NODE 843

POST26 SUMMARY OF VARIABLE EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
6 OPER	6 ADD	MY	-0.1990E+05	0.1188E-01	0.8431E+05	0.2737E-02
7 OPER	7 ADD	MZ	-0.2611E+05	0.1211E-01	0.1040E+06	0.2737E-02

VARIABLE 2 IS ELEMENT 628 ITEM 7 NAME= 628 FX

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VARIABLE 3 IS ELEMENT 629 ITEM 1 NAME= 629 FX

STORAGE COMPLETE FOR 59 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
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2 ESTR	628 7	628 FX	-0.1470E+06	0.3872E-02	-1643.	0.2329E-03
3 ESTR	629 1	629 FX	2246.	0.2329E-03	0.1637E+06	0.4105E-02

VARIABLE	4 IS	1.0000	TIMES VARIABLE	2 PLUS	1.0000	TIMES VARIABLE	3
	PLUS	1.0000	TIMES VARIABLE	0			

NEW TITLE= SUPPORT ROD/TOP PLATE WELD SHEAR - NODE 943

POST26 SUMMARY OF VARIABLE EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
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4 OPER	4 ADD	FX	-7850.	0.1301E-01	0.2315E+05	0.1834E-02
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VARIABLE 2 IS ELEMENT 628 ITEM 11 NAME= 628 MY

VARIABLE 3 IS ELEMENT 629 ITEM 5 NAME= 629 MY

VARIABLE 4 IS ELEMENT 628 ITEM 12 NAME= 628 MZ

VARIABLE 5 IS ELEMENT 629 ITEM 6 NAME= 629 MZ

STORAGE COMPLETE FOR 59 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
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2 ESTR	628 11	628 MY	-0.1109E+05	0.1165E-01	0.4274E+05	0.2970E-02
3 ESTR	629 5	629 MY	-9699.	0.1141E-01	0.3580E+05	0.3203E-02
4 ESTR	628 12	628 MZ	-0.1140E+05	0.1165E-01	0.3206E+05	0.2970E-02
5 ESTR	629 6	629 MZ	-0.1006E+05	0.1165E-01	0.2787E+05	0.3203E-02

VARIABLE	6 IS	1.0000	TIMES VARIABLE	2 PLUS	1.0000	TIMES VARIABLE	3
	PLUS	1.0000	TIMES VARIABLE	0			

VARIABLE	7 IS	1.0000	TIMES VARIABLE	4 PLUS	1.0000	TIMES VARIABLE	5
	PLUS	1.0000	TIMES VARIABLE	0			

NEW TITLE= SUPPORT ROD/TOP PLATE WELD MOMENTS - NODE 943

POST26 SUMMARY OF VARIABLE EXTREME VALUES

VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
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6 OPER	6 ADD	MY	-0.2038E+05	0.1165E-01	0.7845E+05	0.3203E-02
7 OPER	7 ADD	MZ	-0.2147E+05	0.1165E-01	0.5980E+05	0.2970E-02

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***** ANSYS INPUT DATA LISTING (FILE18) *****

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/PREP7
/TITLE,1 1/4" TOP PLATE END DROP ANALYSIS
C*** SPACER DISK ELEMENTS ***
ET,1,63
C*** D.U. SHIELD BLOCK ELEMENTS ***
ET,2,4
C*** POISON SHEET ELEMENTS
ET,3,4
C*** D.U. MASS ELEMENTS ***
ET,4,21
KAN,2
KAY,3,1
TREF,500
TUNIF,500
DENS,1,0.00073
NUXY,1,0.29
EX,1,26.2E6
DENS,2,0.00769
NUXY,2,0.29
EX,2,27.0E6
DENS,3,0.00650
NUXY,3,0.29
EX,3,27.0E6
DENS,4,0.00879
NUXY,4,0.29
EX,4,27.0E6
DENS,5,0.00775
NUXY,5,0.29
EX,5,27.0E6
DENS,6,0.00073
NUXY,6,0.29
EX,6,27.0E6
C*** REAL CONSTANTS
C*** D.U. SHIELD BLOCK CASING BEAM PROPERTIES ***
C*** AREA, IZZ, IYY, TKZ, TKY ***
R,1,8.475,0.323,24.99,7.5,1.13
C*** TOP PLATE THICKNESS ***
R,2,1.25
C*** POISON SHEET BEAM PROPERTIES ***
C*** AREA, IZZ, IYY, TKZ, TKY ***
R,8,1.875,0.00977,16.523,7.5,0.25
C*** NODE GENERATION
CSYS,1
N,1,18.655,-90
N,31,18.655,0
FILL
NGEN,2,31,1.31,1,-0.49
NDELE,39
CSYS,0
N,63,0,-17
N,64,0.4,-17
N,70,6.4,-17
FILL
N,71,0,-16
N,72,4,-16
N,73,6.4,-16
N,74,7.2,-16
NGEN,2,5,71,74,1,1,0
N,80,8.2,-15
N,81,9.2,-15
NGEN,2,6,76,81,1,1,0
N,88,10.2,-14
NGEN,2,7,82,88,1,1,0
N,96,11.2,-13
N,97,12.2,-13
NGEN,2,9,89,97,1,1,0
N,107,13.2,-12
N,108,0,-11
N,109,4,-11
N,115,6.4,-11
FILL
N,116,7.2,-11
N,122,13.2,-11
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FILL
NGEN.2.15.108.115.1...375
N.131.6.8.-10.625
NGEN.2.9.123.131.1...375
N.141.7.2.-10.25
N.147.13.2.-10.25
FILL
N.148.13.6.-10.25
N.149.14.6.-10.25
N.150.0.-9.25
N.151.4.-9.25
N.152.6.4.-9.25
N.153.6.8.-9.25
N.154.7.2.-9.25
N.155.13.2.-9.25
N.156.13.6.-9.25
N.157.14.6.-9.25
NGEN.2.8.150.157.1..1.0
N.166.15.6.-8.25
NGEN.2.9.158.166.1..1.0
NGEN.2.9.167.175.1..1.0
N.185.16.6.-6.25
NGEN.2.10.176.185.1..1.0
NGEN.2.64.132.148.1..6.0
N.215.16.6.-4.25
FILL.212.215
N.216.0.-3.625
N.219.3.-3.625
FILL
N.220.3.8.-3.625
N.226.9.8.-3.625
FILL
N.227.10.6.-3.625
N.233.16.6.-3.625
FILL
NGEN.2.18.216.219.1..0.625
N.238.3.4.-3.0
N.239.3.8.-3.0
N.245.9.8.-3.0
FILL
N.246.10.2.-3.0
N.247.10.6.-3.0
N.253.16.6.-3.0
FILL
NGEN.2.17.237.239.1..1.0
NGEN.2.12.245.247.1..1.0
N.260.16.6.-2
NGEN.3.7.254.260.1..1.0
C*** ELEMENT GENERATION
REAL.2
E.1.2.33.32
EGEN.6.1.-1
E.7.8.70.38
E.8.9.40.70
E.9.10.41.40
EGEN.22.1.-1
E.32.64.63
E.32.33.64
E.33.34.65.64
EGEN.5.1.-1
E.38.70.69
E.63.64.72.71
E.70.40.74.73
E.40.41.74
E.71.72.77.76
E.73.74.79.78
E.74.41.80.79
E.41.42.81.80
E.42.43.81
E.76.77.83.82
E.78.79.85.84
E.79.80.86.85
E.80.81.87.86
E.81.43.44
E.81.44.88

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E.81.88.87
E.82.83.90.89
E.84.85.92.91
EGEN.4.1.-1
E.88.45.96.95
E.44.45.88
E.45.46.96
E.46.97.96
E.46.47.97
E.89.90.99.98
E.91.92.101.100
EGEN.6.1.-1
E.97.47.106
E.47.107.106
E.47.48.107
E.98.99.109.108
E.100.101.116.115
EGEN.7.1.-1
E.48.49.107
E.107.49.122
E.49.50.122
E.108.109.124.123
EGEN.7.1.-1
E.115.131.130
E.115.116.131
E.123.124.133.132
EGEN.7.1.-1
E.130.131.140.139
E.131.116.141
E.131.141.140
E.116.117.142.141
EGEN.6.1.-1
E.122.148.147
E.122.50.148
E.148.50.149
E.50.51.149
E.132.133.151.150
E.139.140.153.152
E.140.141.154.153
E.147.148.156.155
E.148.149.157.156
E.149.51.157
E.51.52.157
E.150.151.159.158
E.152.153.161.160
E.153.154.162.161
E.155.156.164.163
E.156.157.165.164
E.157.52.166.165
E.52.53.166
E.158.159.168.167
E.160.161.170.169
E.161.162.171.170
E.163.164.173.172
E.164.165.174.173
E.165.166.175.174
E.166.53.54.175
E.167.168.177.176
E.169.170.179.178
E.170.171.180.179
E.172.173.182.181
EGEN.3.1.-1
E.175.54.185.184
E.54.55.185
E.176.177.187.186
E.178.179.189.188
E.179.180.190.189
E.181.182.192.191
EGEN.4.1.-1
E.55.56.185
E.185.56.195
E.186.187.197.196
E.188.189.204.203
E.189.190.205.204
E.191.192.212.211

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EGEN.4.1.-1
E.195.56.57
E.195.57.215
E.215.57.58
E.196.197.216
E.197.198.217.216
EGEN.3.1.-1
E.200.220.219
E.200.201.221.220
EGEN.3.1.-1
E.203.204.223
E.204.205.223
E.205.206.224.223
EGEN.3.1.-1
E.208.227.226
E.208.209.228.227
EGEN.3.1.-1
E.211.212.230
E.212.213.231.230
EGEN.3.1.-1
E.215.58.233
E.216.217.235.234
EGEN.3.1.-1
E.219.238.237
E.219.220.238
E.220.239.238
E.220.221.240.239
EGEN.6.1.-1
E.226.246.245
E.226.227.246
E.227.247.246
E.227.228.248.247
EGEN.6.1.-1
E.233.58.59.253
E.237.238.255.254
E.238.239.256.255
E.245.246.258.257
E.246.247.259.258
E.253.59.60.260
E.254.255.262.261
E.255.256.263.262
E.257.258.265.264
E.258.259.266.265
E.260.60.61.267
E.261.262.269.268
E.262.263.270.269
E.264.265.272.271
E.265.266.273.272
E.267.61.62.274
C*** DU CASING GENERATION
C*** NODES
NSEL.NODE.63.70.1
NASEL.NODE.40.55.1
NASEL.NODE.185
NASEL.NODE.195
NASEL.NODE.215
NASEL.NODE.233
NASEL.NODE.253
NASEL.NODE.260
NASEL.NODE.267
NASEL.NODE.274
NGEN.2.1000.ALL
NALL
C*** ELEMENTS
TYPE.2
REAL.1
MAT.3
E.1063.1064
EGEN.7.1.-1
MAT.4
E.1040.1041
EGEN.3.1.-1
MAT.5
E.1044.1045
EGEN.11.1.-1

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MAT.2
E.1185.1195
E.1195.1215
E.1215.1233
E.1233.1253
E.1253.1260
E.1260.1267
E.1267.1274
C*** POISON SHEET BEAM ELEMENTS
C*** GEOMETRY GENERATION
CSYS.0
NROTAT.ALL
NSEL.NODE.108.122.1
NASEL.NODE.216.232
NASEL.NODE.238
NASEL.NODE.255
NASEL.NODE.262
NASEL.NODE.269
NASEL.NODE.132
NASEL.NODE.150
NASEL.NODE.158
NASEL.NODE.167
NASEL.NODE.176
NASEL.NODE.186
NASEL.NODE.196
NGEN.2.1000.ALL
NALL
TYPE.3
MAT.1
REAL.8
E.1108.1109
EGEN.14.1.-1
E.1216.1217
EGEN.16.1.-1
E.1238.1255
E.1255.1262
E.1262.1269
E.1132.1150
E.1150.1158
E.1158.1167
E.1167.1176
E.1176.1186
E.1186.1196
C*** COUPLED NODES
CSYS.0
NROTAT.ALL
CP.1.UY.216.1216
CPSGEN.17.1.1
CP.18.UY.108.1108
CPSGEN.15.1.18
CP.35.UX.238.1238
CP.36.UZ.63.1063
CP.37.UX.65.1065
CP.38.UY.65.1065
CP.39.UZ.65.1065
CPSGEN.3.2.37
CPSGEN.3.2.38
CPSGEN.3.2.39
CP.46.UX.41.1041
CP.47.UY.41.1041
CP.48.UZ.41.1041
CPSGEN.2.1.46
CPSGEN.2.1.47
CPSGEN.2.1.48
CP.52.UX.45.1045
CP.53.UY.45.1045
CP.54.UZ.45.1045
CPSGEN.5.2.52
CPSGEN.5.2.53
CPSGEN.5.2.54
CPSGEN.2.9.52
CPSGEN.2.9.53
CPSGEN.2.9.54
CP.70.UX.195.1195
CP.71.UX.233.1233

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CP.72.UX.260.1260
CP.73.UX.267.1267
CP.74.UY.195.1195
CP.75.UY.233.1233
CP.76.UY.260.1260
CP.77.UY.267.1267
CP.78.UZ.195.1195
CP.79.UZ.233.1233
CP.80.UZ.260.1260
CP.81.UZ.267.1267
CP.82.UX.255.1255
CP.83.UX.262.1262
CP.84.UX.269.1269
CP.85.UZ.238.1238
CP.86.UZ.132.1132
CP.87.UZ.196.1196
CP.88.UZ.232.1232
CP.89.UZ.118.1118
WSORT.X
C*** BOUNDARY CONDITIONS
SYMBC
SYMBC.0.2.0
D.93.UZ.0.0..95.1
D.102.UZ.0.0..104.1
D.117.UZ.0.0..119.1
D.93.UX.0.0..95.1
D.102.UX.0.0..104.1
D.117.UX.0.0..119.1
D.93.UY.0.0..95.1
D.102.UY.0.0..104.1
D.117.UY.0.0..119.1
D.1108.ROTX.0.0..1122.1
D.1216.ROTX.0.0..1232.1
D.1238.ROTY.0.0
D.1255.ROTY.0.0
D.1262.ROTY.0.0
D.1269.ROTY.0.0
D.1132.UY.0.0
D.1064.ROTX.0.0
D.1040.ROTX.0.0
D.1040.ROTY.0.0
D.1045.ROTX.0.0
D.1045.ROTY.0.0
D.1195.ROTX.0.0
D.1195.ROTY.0.0
M.147.UZ
M.216.UZ
M.269.UZ
TOTAL.100
ITER.1.1.1
NLIST.ALL
ELIST.ALL
CPLIST.ALL
MPLIST.ALL
RLIST.ALL
ETLIST.ALL
AFWRITE
FINISH
/INPUT.27
FINISH
/PREP7
RESUME
/TITLE.TOP PLATE TOP END DROP DISPLACEMENT PASS
KAN.5
KAY.3
KAY.8.0
C*** LOADING ***
TIME.0.0
GP.70.1070.FZ.1E8.0.0
GP.40.1040.FZ.1E8.0.0
GP.43.1043.FZ.1E8.0.0
GP.44.1044.FZ.1E8.0.0
GP.65.1065.FZ.1E8.0.0
GP.185.1185.FZ.1E8.0.0
GP.274.1274.FZ.1E8.0.0

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GP.108.1108.FZ.1E8.0.0
GP.109.1109.FZ.1E8.0.0
GP.110.1110.FZ.1E8.0.0
GP.111.1111.FZ.1E8.0.0
GP.112.1112.FZ.1E8.0.0
GP.113.1113.FZ.1E8.0.0
GP.114.1114.FZ.1E8.0.0
GP.115.1115.FZ.1E8.0.0
GP.116.1116.FZ.1E8.0.0
GP.117.1117.FZ.1E8.0.0
GP.119.1119.FZ.1E8.0.0
GP.120.1120.FZ.1E8.0.0
GP.121.1121.FZ.1E8.0.0
GP.122.1122.FZ.1E8.0.0
GP.216.1216.FZ.1E8.0.0
GP.217.1217.FZ.1E8.0.0
GP.218.1218.FZ.1E8.0.0
GP.219.1219.FZ.1E8.0.0
GP.220.1220.FZ.1E8.0.0
GP.221.1221.FZ.1E8.0.0
GP.222.1222.FZ.1E8.0.0
GP.223.1223.FZ.1E8.0.0
GP.224.1224.FZ.1E8.0.0
GP.225.1225.FZ.1E8.0.0
GP.226.1226.FZ.1E8.0.0
GP.227.1227.FZ.1E8.0.0
GP.228.1228.FZ.1E8.0.0
GP.229.1229.FZ.1E8.0.0
GP.230.1230.FZ.1E8.0.0
GP.231.1232.FZ.1E8.0.0
GP.150.1150.FZ.1E8.0.0
GP.158.1158.FZ.1E8.0.0
GP.167.1167.FZ.1E8.0.0
GP.176.1176.FZ.1E8.0.0
GP.186.1186.FZ.1E8.0.0
GP.255.1255.FZ.1E8.0.0
GP.262.1262.FZ.1E8.0.0
GP.269.1269.FZ.1E8.0.0
ACEL...0.0
LWRITE
TIME.0.3E-3
ITER.12..1
ACEL...108192
LWRITE
TIME.0.48E-3
ITER.12..1
ACEL...47914
LWRITE
TIME.7.3E-3
ITER.50..1
ACEL...47914
TIME.13.7E-3
ITER.25..1
ACEL...0
LWRITE
SLOAD.1
AFWRITE
FINISH
/LNFREQ.100
/INPUT.27
FINISH
/TITLE.TOP PLATE TOP END DROP STRESS PASS
/STRESS...5
TIME.13.7E-3
NSTRES.50
END
FINISH
/POST26
ESTR.2.117.72.N147
ESTR.3.40.72.N70
ESTR.4.184.72.N216
ESTR.5.217.87.N269
ESTR.6.59.87.N95
ESTR.7.37.82.N69
ESTR.8.162.72.N196

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/SHOW,SI147
/TITLE,END DROP S.I. (ELEM. 117, NODE 147)
/GRAPH,LABY,PSI
/GRAPH,LABX,SEC.
PLVAR,2
/SHOW,SI70
/TITLE,END DROP S.I. (ELEM. 40, NODE 70)
PLVAR,3
/SHOW,SI216
/TITLE,END DROP S.I. (ELEM. 184, NODE 216)
PLVAR,4
/SHOW,SI269
/TITLE,END DROP S.I. (ELEM. 217, NODE 269)
PLVAR,5
/SHOW,SI95
/TITLE,END DROP S.I. (ELEM. 59, NODE 95)
PLVAR,6
/SHOW,SI69
/TITLE,END DROP S.I. (ELEM. 37, NODE 82)
PLVAR,7
/SHOW,SI196
/TITLE,END DROP S.I. (ELEM. 162, NODE 196)
PLVAR,8
EXTREM,1,8,1
FILE,10
DISP,9,216,UZ,UZ
DISP,10,269,UZ,UZ
DISP,11,196,UZ,UZ
DISP,12,132,UZ,UZ
DISP,13,70,UZ,UZ
DISP,14,147,UZ,UZ
/SHOW,DISP1
/TITLE,TOP PLATE END DROP DISP. VS. TIME (NODES 216 & 269)
/GRAPH,LABY,IN.
PLVAR,9,10
/SHOW,DISP2
/TITLE,TOP PLATE END DROP DISP. VS. TIME (NODES 196 & 132)
/GRAPH,LABY,IN.
PLVAR,11,12
/SHOW,DISP3
/TITLE,TOP PLATE END DROP DISP. VS. TIME (NODES 70 & 147)
/GRAPH,LABY,IN.
PLVAR,13,14
EXTREM,9,14,1
/OUTPUT
/EOF

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***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 10.550 ***
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= 1 1/4" TOP PLATE END DROP ANALYSIS

***** ANSYS STRESS PASS *****

***** GENERAL GRAPH POSTPROCESSOR (POST26) *****

ENTER /SHOW,DEVICE-NAME TO ENABLE GRAPHIC DISPLAY
ENTER FINISH TO LEAVE POST26

ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS

VARIABLE 2 IS ELEMENT 117 ITEM 72 NAME= 117 N147

VARIABLE 3 IS ELEMENT 40 ITEM 72 NAME= 40 N70

VARIABLE 4 IS ELEMENT 184 ITEM 72 NAME= 184 N216

VARIABLE 5 IS ELEMENT 217 ITEM 87 NAME= 217 N269

VARIABLE 6 IS ELEMENT 59 ITEM 87 NAME= 59 N95

VARIABLE 7 IS ELEMENT 37 ITEM 82 NAME= 37 N69

VARIABLE 8 IS ELEMENT 162 ITEM 72 NAME= 162 N196

/SHOW SWITCH PLOTS TO FILE SI147 - RASTER MODE.

NEW TITLE= END DROP S.I. (ELEM. 117, NODE 147)

LABY GRAPH PLOT LABEL = PSI

LABX GRAPH PLOT LABEL = SEC.

STORAGE COMPLETE FOR 49 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	ESTR	117	72	117	N147	2139.	0.3014E-02	0.5123E+05	0.1644E-02
3	ESTR	40	72	40	N70	1337.	0.2729E-03	0.1188E+05	0.9315E-02
4	ESTR	184	72	184	N216	97.39	0.2729E-03	0.2703E+05	0.9042E-02
5	ESTR	217	87	217	N269	23.84	0.2729E-03	0.2084E+05	0.4109E-02
6	ESTR	59	87	59	N95	3091.	0.1206E-01	0.1672E+06	0.1919E-02
7	ESTR	37	82	37	N69	1685.	0.2741E-02	0.2037E+05	0.1233E-01
8	ESTR	162	72	162	N196	360.5	0.2729E-03	0.4254E+05	0.1096E-01

DATA FILE CHANGED TO FILE10

VARIABLE 9 IS 216 UZ

VARIABLE 10 IS 269 UZ

NEW TITLE= TOP PLATE END DROP DISP. VS. TIME (NODES 216 & 269)

LABY GRAPH PLOT LABEL = IN.

STORAGE COMPLETE FOR 4568 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

9	DISP	216	UZ	216	UZ	-0.3684E-01	0.6655E-02	0.4183E-03	0.5488E-02
10	DISP	269	UZ	269	UZ	-0.3888E-01	0.6397E-02	0.2518E-03	0.1363E-01

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

/PREP7
/TITLE,D.U. SHIELD BLOCK BOTTOM END DROP ANALYSIS
KAN,0
ET,1,63
ET,2,45
C*** STAINLESS STEEL CASING MATERIAL PROPERTIES ***
DENS,1,0.000738
EX,1,25.8E6
NUXY,1,0.3
C*** DEPLETED URANIUM MATERIAL PROPERTIES ***
DENS,2,0.001757
EX,2,26.5E6
NUXY,2,0.2
C*** COVER PLATE THICKNESS ***
R,1,0.06
C*** COVER END THICKNESS ***
R,2,0.19
C*** TOP/BOTTOM BAR THICKNESS ***
R,3,0.5
C*** STUD PROPERTIES ***
R,4,0.375,0.1875
C*** CASING NODES ***
C*** BACK COVER PLATE
N,1
N,16,14.57
FILL
NGEN,8,16,1,16,1,0.1
C*** FRONT COVER PLATE ***
NGEN,2,128,1,16,15,0,0,0.47
NGEN,2,128,3,14,11,0,0,1.07
FILL,129,131,1
FILL,131,142
FILL,142,144
NGEN,8,16,129,144,1,0.1
C*** BOTTOM BAR NODES ***
NGEN,2,255,2,15,1,0,0,0.535
C*** TOP BAR NODES ***
NGEN,2,157,114,127,1,0,0,0.535
C*** D.U. CORE NODES ***
NGEN,2,1000,1,270,1
NGEN,8,14,1257,1270,1,1
C*** BACK COVER PLATE ELEMENTS ***
REAL,1
E,1,2,18,17
EGEN,15,1,-1
EGEN,7,16,-16
C*** FRONT COVER PLATE ELEMENTS ***
EGEN,2,128,-105
C*** END COVER ELEMENTS ***
REAL,2
E,1,129,145,17
EGEN,7,16,-1
E,16,144,160,32
EGEN,7,16,-1
C*** BOTTOM BAR ELEMENTS ***
REAL,3
E,1,2,257,129
E,2,3,258,257
EGEN,13,1,-1
E,15,16,144,270
E,129,257,130
E,257,258,131,130
EGEN,13,1,-1
E,270,144,143
C*** TOP BAR ELEMENTS ***
E,113,114,271,241
E,114,115,272,271
EGEN,13,1,-1
E,127,128,256,284
E,241,271,242
E,271,272,243,242
EGEN,13,1,-1
E,284,256,255

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C*** D.U. CORE ELEMENTS ***

TYPE 2

MAT 2

E.1001.1002.1257.1129.1017.1018.1271.1145
E.1002.1003.1258.1257.1018.1019.1272.1271
EGEN.13.1.-1
E.1015.1016.1144.1270.1031.1032.1160.1284
E.1129.1257.1130.1130.1145.1271.1146.1146
E.1257.1258.1131.1130.1271.1272.1147.1146
EGEN.13.1.-1
E.1270.1144.1143.1143.1284.1160.1159.1159
E.1017.1018.1271.1145.1033.1034.1285.1161
E.1018.1019.1272.1271.1034.1035.1286.1285
EGEN.13.1.-1
E.1031.1032.1160.1284.1047.1048.1176.1298
E.1145.1271.1146.1146.1161.1285.1162.1162
E.1271.1272.1147.1146.1285.1286.1163.1162
EGEN.13.1.-1
E.1284.1160.1159.1159.1298.1176.1175.1175
E.1033.1034.1285.1161.1049.1050.1299.1177
E.1034.1035.1286.1285.1050.1051.1300.1299
EGEN.13.1.-1
E.1047.1048.1176.1298.1063.1064.1192.1312
E.1161.1285.1162.1162.1177.1299.1178.1178
E.1285.1286.1163.1162.1299.1300.1179.1178
EGEN.13.1.-1
E.1298.1176.1175.1175.1312.1192.1191.1191
E.1049.1050.1299.1177.1065.1066.1313.1193
E.1050.1051.1300.1299.1066.1067.1314.1313
EGEN.13.1.-1
E.1063.1064.1192.1312.1079.1080.1208.1326
E.1177.1299.1178.1178.1193.1313.1194.1194
E.1299.1300.1179.1178.1313.1314.1195.1194
EGEN.13.1.-1
E.1312.1192.1191.1191.1326.1208.1207.1207
E.1065.1066.1313.1193.1081.1082.1327.1209
E.1066.1067.1314.1313.1082.1083.1328.1327
EGEN.13.1.-1
E.1079.1080.1208.1326.1095.1096.1224.1340
E.1193.1313.1194.1194.1209.1327.1210.1210
E.1313.1314.1195.1194.1327.1328.1211.1210
EGEN.13.1.-1
E.1326.1208.1207.1207.1340.1224.1223.1223
E.1081.1082.1327.1209.1097.1098.1341.1225
E.1082.1083.1328.1327.1098.1099.1342.1341
EGEN.13.1.-1
E.1095.1096.1224.1340.1111.1112.1240.1354
E.1209.1327.1210.1210.1225.1341.1226.1226
E.1327.1328.1211.1210.1341.1342.1227.1226
EGEN.13.1.-1
E.1340.1224.1223.1223.1354.1240.1239.1239
E.1097.1098.1341.1225.1113.1114.1355.1241
E.1098.1099.1342.1341.1114.1115.1356.1355
EGEN.13.1.-1
E.1111.1112.1240.1354.1127.1128.1256.1368
E.1225.1341.1226.1226.1241.1355.1242.1242
E.1341.1342.1227.1226.1355.1356.1243.1242
EGEN.13.1.-1
E.1354.1240.1239.1239.1368.1256.1255.1255

C*** COUPLED NODES ***

CP.1.UX.1.1001

CPSGEN.256.1.1

CP.257.UZ.1.1001

CPSGEN.256.1.257

CP.513.UY.1.1001

CPSGEN.16.1.513

CP.529.UY.129.1129

CPSGEN.16.1.529

CP.545.UY.257.1257

CPSGEN.14.1.545

C*** BOUNDARY CONSTRAINTS ***

D.272.UY.0.0..273.1.UX.UZ

D.275.UY.0.0....UX.UZ

D.277.UY.0.0..278.1.UX.UZ

D.280.UY.0.0....UX.UZ

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D.282.UY.0.0..283.1.UX.UZ
D.258.UX.0.0..259.1.UZ
D.261.UX.0.0...UZ
D.263.UX.0.0..264.1.UZ
D.266.UX.0.0...UZ
D.268.UX.0.0..269.1.UZ
NLIST,ALL
ELIST,ALL
RLIST,ALL
MPLIST,ALL
ETLIST,ALL
DLIST,ALL
CPLIST,ALL
C*** LOADING ***
WSORT,X
ACEL.0.221794
AFWRITE
FINISH
C*** SOLUTION PHASE ***
/INPUT.27
FINISH
C*** POSTPROCESSING ***
/POST1
SET.1.1
TOP
ESEL,TYPE.1
PRNSTR,SI
MID
PRNSTR,SI
BOT
PRNSTR,SI
NSEL,Y.0
NSEL,Y.7
NSEL,X.0
NSEL,X.14.15
PREFOR
NSEL,NODE.272.273
NSEL,NODE.275
NSEL,NODE.277.278
NSEL,NODE.280
NSEL,NODE.282.283
PRRFOR
FINISH
/OUTPUT
/EOF

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***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 8.840 ***
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= D.U. SHIELD BLOCK BOTTOM END DROP ANALYSIS

ANALYSIS TYPE= 0 (STATIC ANALYSIS)

SHELL STRESSES ARE AT TOP

	SIG1	SIG2	SIG3	SI	SIGE
MINIMUMS					
NODE	272	272	272	269	269
VALUE	-0.43737996E-06	-34428.339	-41701.674	4479.5807	3900.5297
MAXIMUMS					
NODE	238	237	11	272	272
VALUE	34821.915	7933.0047	0.83793993E-06	41701.674	38586.004

SHELL STRESSES ARE SHELL MIDDLE

	SIG1	SIG2	SIG3	SI	SIGE
MINIMUMS					
NODE	278	276	113	278	278
VALUE	22.829280	-24.092705	-3103.8670	161.83158	158.58038
MAXIMUMS					
NODE	238	237	223	238	238
VALUE	34214.616	7821.5795	0.33241633E-06	34214.616	31758.080

SHELL STRESSES ARE AT BOTTOM

	SIG1	SIG2	SIG3	SI	SIGE
MINIMUMS					
NODE	270	284	281	270	270
VALUE	-0.30211071E-07	-2341.0730	-16029.002	3642.7523	3179.1807
MAXIMUMS					
NODE	272	272	272	272	272
VALUE	41697.366	35342.538	0.45703880E-06	41697.366	38915.045

***** ROUTINE COMPLETED ***** CP = 467.470

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```
1 /PREP7
2 /TITLE,IF300 2" SPACER DISK 0 DEG. SIDE DROP ANALYSIS
3 ET,1,42,...3
4 ET,2,21,...4
5 ET,3,12,...1
6 KAN,4
7 KAY,5,2
8 GAMMA,0.02,20
9 DENS,1,0.00073
10 MUXY,1,0.29
11 EX,1,26,2E6
12 C*** REAL CONSTANTS
13 R,1,2,0
14 R,2,0,0.1771
15 R,3,0,0.03541
16 R,104,8.93,1,0E11,-0.080,3.0
17 R,105,11.94,1,0E11,-0.073,3.0
18 R,106,14.92,1,0E11,-0.070,3.0
19 R,107,17.92,1,0E11,-0.063,3.0
20 R,108,20.90,1,0E11,-0.061,3.0
21 R,109,23.88,1,0E11,-0.056,3.0
22 R,110,26.87,1,0E11,-0.052,3.0
23 R,111,29.85,1,0E11,-0.047,3.0
24 R,112,32.84,1,0E11,-0.043,3.0
25 R,113,35.83,1,0E11,-0.039,3.0
26 R,114,38.82,1,0E11,-0.035,3.0
27 R,115,41.81,1,0E11,-0.031,3.0
28 R,116,44.79,1,0E11,-0.028,3.0
29 R,117,47.78,1,0E11,-0.024,3.0
30 R,118,50.77,1,0E11,-0.021,3.0
31 R,119,53.77,1,0E11,-0.018,3.0
32 R,120,56.76,1,0E11,-0.015,3.0
33 R,121,59.76,1,0E11,-0.013,3.0
34 R,122,62.74,1,0E11,-0.010,3.0
35 R,123,65.73,1,0E11,-0.008,3.0
36 R,124,68.73,1,0E11,-0.006,3.0
37 R,125,71.72,1,0E11,-0.005,3.0
38 R,126,74.71,1,0E11,-0.003,3.0
39 R,127,77.72,1,0E11,-0.002,3.0
40 R,128,80.71,1,0E11,-0.001,3.0
41 C*** NODE GENERATION
42 CSTS,1
43 N,1,18.633,-90
44 N,31,18.633,0
45 FILL
46 NGEN,2,31,1,31,1,-0.49
47 NDELE,39
48 CSTS,0
49 N,63,0,-17
50 N,64,0,4,-17
51 N,70,6,4,-17
52 FILL
53 N,71,0,-16
54 N,72,4,-16
55 N,73,6,4,-16
56 N,74,7,2,-16
57 NGEN,2,5,71,74,1,1,0
58 N,80,8,2,-13
59 N,81,9,2,-13
60 NGEN,2,6,76,81,1,1,0
```

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***** AHSYS INPUT DATA LISTING (FILE16) *****

```

61  N 88,10.2,-14
62  NGEN,2,7,82,88,1,,1.0
63  N 96,11.2,-13
64  N 97,12.2,-13
65  NGEN,2,9,89,97,1,,1.0
66  N 107,13.2,-12
67  N 108,0,-11
68  N 109,.4,-11
69  N 113,6.4,-11
70  FILL
71  N 116,7.2,-11
72  N 122,13.2,-11
73  FILL
74  NGEN,2,13,108,113,1,,.375
75  N 131,6.6,-10.625
76  NGEN,2,9,123,131,1,,.375
77  N 141,7.2,-10.25
78  N 147,13.2,-10.25
79  FILL
80  N 148,13.6,-10.25
81  N 149,14.6,-10.25
82  N 150,0,-9.25
83  N 151,.4,-9.25
84  N 152,6.4,-9.25
85  N 153,6.6,-9.25
86  N 154,7.2,-9.25
87  N 155,13.2,-9.25
88  N 156,13.6,-9.25
89  N 157,14.6,-9.25
90  NGEN,2,8,150,157,1,,1.0
91  N 166,13.6,-8.25
92  NGEN,2,9,158,166,1,,1.0
93  NGEN,2,9,167,173,1,,1.0
94  N 183,16.6,-6.25
95  NGEN,2,10,176,183,1,,1.0
96  NGEN,2,64,132,148,1,,6.0
97  N 213,16.6,-4.25
98  FILL,212,213
99  N 216,0,-3.625
100 N 219,3,-3.625
101 FILL
102 N 220,3.0,-3.625
103 N 226,9.0,-3.625
104 FILL
105 N 227,10.6,-3.625
106 N 233,16.6,-3.625
107 FILL
108 NGEN,2,18,216,219,1,,0.625
109 N 238,3.4,-3.0
110 N 239,3.0,-3.0
111 N 243,9.0,-3.0
112 FILL
113 N 246,10.2,-3.0
114 N 247,10.6,-3.0
115 N 253,16.6,-3.0
116 FILL
117 NGEN,2,17,237,239,1,,1.0
118 NGEN,2,12,245,247,1,,1.0
119 N 260,16.6,-2
120 NGEN,3,7,254,260,1,,1.0

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

121 C*** ELEMENT GENERATION
122 E,1,2,33,32
123 EGEN,6,1,-1
124 E,7,8,70,38
125 E,8,9,40,70
126 E,9,10,41,40
127 EGEN,22,1,-1
128 E,32,64,63
129 E,32,33,64
130 E,33,34,63,64
131 EGEN,3,1,-1
132 E,38,70,69
133 E,63,64,72,71
134 E,70,40,74,73
135 E,40,41,74
136 E,71,72,77,76
137 E,73,74,79,78
138 E,74,41,80,79
139 E,41,42,81,80
140 E,42,43,81
141 E,76,77,83,82
142 E,78,79,83,84
143 E,79,80,86,83
144 E,80,81,87,86
145 E,81,43,44
146 E,81,44,88
147 E,81,88,87
148 E,82,83,90,89
149 E,84,85,92,91
150 EGEN,4,1,-1
151 E,82,43,95,95
152 E,44,45,88
153 E,45,46,96
154 E,46,87,96
155 E,46,47,97
156 E,89,90,99,98
157 E,91,92,101,100
158 EGEN,6,1,-1
159 E,97,47,106
160 E,47,107,106
161 E,47,48,107
162 E,98,99,109,108
163 E,100,101,116,115
164 EGEN,7,1,-1
165 E,48,49,107
166 E,107,49,122
167 E,49,50,122
168 E,108,109,124,123
169 EGEN,7,1,-1
170 E,115,131,130
171 E,115,116,131
172 E,123,124,133,132
173 EGEN,7,1,-1
174 E,130,131,140,139
175 E,131,116,141
176 E,131,141,140
177 E,116,117,142,141
178 EGEN,6,1,-1
179 E,122,148,147
180 E,122,50,148

```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

181 E,148,50,149
182 E,50,31,149
183 E,132,133,131,150
184 E,139,140,133,132
185 E,140,141,134,133
186 E,147,148,136,133
187 E,148,149,137,136
188 E,149,31,137
189 E,31,32,137
190 E,150,131,139,138
191 E,152,133,161,160
192 E,153,134,162,161
193 E,153,156,164,163
194 E,156,157,163,164
195 E,157,32,166,163
196 E,32,33,166
197 E,158,139,168,167
198 E,160,161,170,169
199 E,161,162,171,170
200 E,163,164,173,172
201 E,164,163,174,173
202 E,163,166,173,174
203 E,166,33,34,173
204 E,167,168,177,176
205 E,169,170,179,178
206 E,170,171,180,179
207 E,172,173,182,181
208 EGEN,3,1,-1
209 E,173,34,183,184
210 E,34,33,183
211 E,176,177,187,186
212 E,178,179,189,188
213 E,179,180,190,189
214 E,181,182,192,191
215 EGEN,4,1,-1
216 E,35,36,183
217 E,183,36,193
218 E,186,187,197,196
219 E,188,189,204,203
220 E,189,190,203,204
221 E,191,192,212,211
222 EGEN,4,1,-1
223 E,193,36,37
224 E,193,37,213
225 E,213,37,38
226 E,196,197,216
227 E,197,198,217,216
228 EGEN,3,1,-1
229 E,200,220,219
230 E,200,201,221,220
231 EGEN,3,1,-1
232 E,203,204,223
233 E,204,203,223
234 E,203,206,224,223
235 EGEN,3,1,-1
236 E,208,227,226
237 E,208,209,228,227
238 EGEN,3,1,-1
239 E,211,212,230
240 E,212,213,231,230

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

241 EGEN,3,1,-1
242 E,215,58,233
243 E,216,217,235,234
244 EGEN,3,1,-1
245 E,219,238,237
246 E,219,220,238
247 E,220,239,238
248 E,220,221,240,239
249 EGEN,6,1,-1
250 E,226,246,245
251 E,226,227,246
252 E,227,247,246
253 E,227,228,248,247
254 EGEN,6,1,-1
255 E,233,58,59,233
256 E,237,238,255,254
257 E,238,239,256,255
258 E,245,246,258,257
259 E,246,247,259,258
260 E,253,59,60,260
261 E,254,255,262,261
262 E,255,256,263,262
263 E,257,258,265,264
264 E,258,259,266,265
265 E,260,60,61,267
266 E,261,262,269,268
267 E,262,263,270,269
268 E,264,265,272,271
269 E,265,266,273,272
270 E,267,61,62,274
271 C*** SYMMETRIC GENERATION
272 SYM4,1,1000,1,500
273 ESYS4,2,1000,1,500
274 MERGE
275 C*** BOUNDARY NODES
276 NGEN,2,1000,4,28,1
277 CSYS,0
278 C*** MASS ELEMENTS
279 TYPE,2
280 REAL,2
281 E,253
282 E,274
283 E,147
284 E,211
285 E,245
286 E,271
287 E,70
288 E,115
289 E,139
290 E,203
291 E,237
292 E,268
293 E,1247
294 E,1273
295 E,1239
296 E,1270
297 E,1141
298 E,1205
299 E,1064
300 E,1109

```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```
301 E,1133
302 E,1197
303 REAL,3
304 E,260
305 E,267
306 E,257
307 E,264
308 E,254
309 E,261
310 E,153
311 E,163
312 E,172
313 E,181
314 E,191
315 E,152
316 E,160
317 E,169
318 E,178
319 E,188
320 E,73
321 E,78
322 E,84
323 E,91
324 E,100
325 E,1072
326 E,1077
327 E,1083
328 E,1090
329 E,1099
330 E,1151
331 E,1159
332 E,1168
333 E,1177
334 E,1187
335 E,1154
336 E,1162
337 E,1171
338 E,1180
339 E,1190
340 E,1266
341 E,1259
342 E,1263
343 E,1256
344 C*** GAP ELEMENTS
345 TYPE,3
346 REAL,104
347 E,2004,4
348 REAL,105
349 E,2005,5
350 REAL,106
351 E,2006,6
352 REAL,107
353 E,2007,7
354 REAL,108
355 E,2008,8
356 REAL,109
357 E,2009,9
358 REAL,110
359 E,2010,10
360 REAL,111
```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

361 E, 2011, 11
362 REAL, 112
363 E, 2012, 12
364 REAL, 113
365 E, 2013, 13
366 REAL, 114
367 E, 2014, 14
368 REAL, 115
369 E, 2015, 15
370 REAL, 116
371 E, 2016, 16
372 REAL, 117
373 E, 2017, 17
374 REAL, 118
375 E, 2018, 18
376 REAL, 119
377 E, 2019, 19
378 REAL, 120
379 E, 2020, 20
380 REAL, 121
381 E, 2021, 21
382 REAL, 122
383 E, 2022, 22
384 REAL, 123
385 E, 2023, 23
386 REAL, 124
387 E, 2024, 24
388 REAL, 125
389 E, 2025, 25
390 REAL, 126
391 E, 2026, 26
392 REAL, 127
393 E, 2027, 27
394 REAL, 128
395 E, 2028, 28
396 MSORT, Y
397 C*** BOUNDARY CONDITIONS
398 SYMBC, 0, 2, 0
399 D, 31, ALL, 0, 0
400 CST5, 1
401 NRODATE, 29, 30
402 D, 29, UX, 0, 0
403 D, 30, UX, 0, 0
404 CST5, 0
405 D, 93, UZ, 0, 0
406 D, 94, UZ, 0, 0
407 D, 95, UZ, 0, 0
408 D, 102, UZ, 0, 0
409 D, 103, UZ, 0, 0
410 D, 104, UZ, 0, 0
411 D, 117, UZ, 0, 0
412 D, 118, UZ, 0, 0
413 D, 119, UZ, 0, 0
414 D, 1093, UZ, 0, 0
415 D, 1094, UZ, 0, 0
416 D, 1095, UZ, 0, 0
417 D, 1102, UZ, 0, 0
418 D, 1103, UZ, 0, 0
419 D, 1104, UZ, 0, 0
420 D, 1117, UZ, 0, 0

```

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***** ANSYS INPUT DATA LISTING (FILE10) *****

```

421 D,1119,UZ,0.0
422 D,1119,UZ,0.0
423 D,2004,ALL,0.0,2028,1
424 C*** LOADING CONDITIONS
425 TIME,0.6E-3
426 ITER,12,,1
427 ACEL,-82689.6
428 LWRITE
429 TIME,0.95E-3
430 ITER,7,,1
431 ACEL,-37094.4
432 LWRITE
433 TIME,10E-3
434 ITER,50,0,1
435 LWRITE
436 TIME,19.4E-3
437 ITER,23,,1
438 ACEL,0,0,0
439 LWRITE
440 TIME,.03
441 ITER,20,,1
442 LWRITE
443 AFWRITE
444 FINISH
445 /EXEC
446 /INPUT,27
447 FINISH
448 /POST26
449 TIME,0,0.03
450 DISP,2,273,UY
451 DISP,3,171,UY
452 ESTR,4,219,40,SI
453 ESTR,5,178,43,SI
454 ESTR,6,177,43,SI
455 ESTR,7,176,43,SI
456 ESTR,8,130,40,SI
457 ESTR,9,100,43,SI
458 /SHOW,PLOTS
459 PLVAL,2,3
460 PLVAL,4,8,9
461 PLVAL,5,6,7
462 EXTRES,2,9,1
463 FINISH
464 /POST1
465 SET,....,0.4751E-2
466 AVPRIN,1
467 GLOBAL,1
468 /SHOW,PLOTS
469 PLNSTE,SI
470 PRNSTE,SI
471 SET,....,0.8733E-2
472 AVPRIN,1
473 GLOBAL,1
474 /SHOW,PLOTS
475 PLNSTE,SI
476 PRNSTE,SI
477 SET,....,0.1855E-2
478 AVPRIN,1
479 GLOBAL,1
480 /SHOW,PLOTS

```


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***** ANSYS INPUT DATA LISTING (FILE18) *****

```
481 PLNSTR,SI
482 PLNSTR,SI
483 SET,....,0.5113E-2
484 AVPRIM,1
485 GLOBAL,1
486 /SHOW,PLOTS
487 PLNSTR,SI
488 PLNSTR,SI
489 SET,....,0.1674E-2
490 AVPRIM,1
491 GLOBAL,1
492 /SHOW,PLOTS
493 PLNSTR,SI
494 PLNSTR,SI
495 FINISH
496 /EOF
```

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IF300 2" SPACER DISK 0 DEG. SIDE DROP ANALYSIS

21.8723 MAR 3, 1990 CP= 15012.340

***** GENERAL GRAPH POSTPROCESSOR (POST26) *****

ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS

MINIMUM TIME= 0.00000E+00 MAXIMUM TIME= 0.30000E-01

*** NOTE ***
REDEFINITION OF TIME RANGE ERASES ALL PREVIOUSLY STORED OR CALCULATED DATA

VARIABLE 2 IS 273 UY

VARIABLE 3 IS 171 UY

VARIABLE 4 IS ELEMENT 219 ITEM 40 NAME= 219 SI

VARIABLE 5 IS ELEMENT 178 ITEM 43 NAME= 178 SI

VARIABLE 6 IS ELEMENT 177 ITEM 43 NAME= 177 SI

VARIABLE 7 IS ELEMENT 176 ITEM 43 NAME= 176 SI

VARIABLE 8 IS ELEMENT 130 ITEM 40 NAME= 130 SI

VARIABLE 9 IS ELEMENT 100 ITEM 43 NAME= 100 SI

/SHOW SWITCH PLOTS TO FILE PLOTS - RASTER MODE

STORAGE COMPLETE FOR 114 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	273	UY	273	UY	0.0000E+00	0.3000E-01	0.0000E+00	0.3000E-01
3	DISP	171	UY	171	UY	-0.5807E-02	0.4370E-02	0.5993E-02	0.3484E-02
4	ESTR	219	40	219	SI	0.3118E-01	0.3000E-04	0.4762E+03	0.4731E-02
5	ESTR	178	43	178	SI	1.064	0.3000E-04	0.3419E+03	0.8733E-02
6	ESTR	177	43	177	SI	0.6043	0.3000E-04	0.3783E+03	0.8733E-02
7	ESTR	176	43	176	SI	0.4308	0.3000E-04	0.3466E+03	0.1855E-02
8	ESTR	130	40	130	SI	0.4209E-02	0.3000E-04	0.5635E+03	0.3113E-02
9	ESTR	100	43	100	SI	0.1595E-01	0.3000E-04	0.2482E+03	0.1674E-02

PLOT DEFINITION
CURVE VARIABLE NAME
1 2 273 UY
2 3 171 UY

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS - RASTER MODE
DISPLAY TITLE= IF300 2" SPACER DISK 0 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 4 219 SI
2 8 130 SI
3 9 100 SI

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS - RASTER MODE
DISPLAY TITLE= IF300 2" SPACER DISK 0 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 5 178 SI
2 6 177 SI
3 7 176 SI

CUMULATIVE DISPLAY NUMBER 3 WRITTEN TO FILE PLOTS - RASTER MODE
DISPLAY TITLE= IF300 2" SPACER DISK 0 DEG. SIDE DROP ANALYSIS

POST26 SUMMARY OF VARIABLE EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	273	UY	273	UY	0.0000E+00	0.3000E-01	0.0000E+00	0.3000E-01
3	DISP	171	UY	171	UY	-0.5807E-02	0.4370E-02	0.5993E-02	0.3484E-02
4	ESTR	219	40	219	SI	0.3118E-01	0.3000E-04	0.4762E+03	0.4731E-02
5	ESTR	178	43	178	SI	1.064	0.3000E-04	0.3419E+03	0.8733E-02
6	ESTR	177	43	177	SI	0.6043	0.3000E-04	0.3783E+03	0.8733E-02
7	ESTR	176	43	176	SI	0.4308	0.3000E-04	0.3466E+03	0.1855E-02
8	ESTR	130	40	130	SI	0.4209E-02	0.3000E-04	0.5635E+03	0.3113E-02
9	ESTR	100	43	100	SI	0.1595E-01	0.3000E-04	0.2482E+03	0.1674E-02

***** ROUTINE COMPLETED ***** CP = 15214.830

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***** ANSYS INPUT DATA LISTING (FILE16) *****

```

1 /PREP
2 /TITLE,IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS
3 ET,1,42,...,3
4 ET,2,21,...,4
5 ET,3,12,...,1
6 KAP,4
7 KAY,5,2
8 GAMMA,0.02,20
9 DENS,1,0.00073
10 MUZY,1,0.29
11 EX,1,26,1E4
12 C*** REAL CONSTANTS
13 R,1,2,0
14 R,2,0.01771
15 R,3,0.03541
16 R,104,8.93,1,0E2,-0.001,3,0
17 R,105,11.94,1,0E2,-0.002,3,0
18 R,106,14.92,1,0E2,-0.003,3,0
19 R,107,17.92,1,0E2,-0.003,3,0
20 R,108,20.90,1,0E2,-0.004,3,0
21 R,109,23.88,1,0E2,-0.008,3,0
22 R,110,26.87,1,0E2,-0.010,3,0
23 R,111,29.85,1,0E2,-0.013,3,0
24 R,112,32.84,1,0E2,-0.015,3,0
25 R,113,35.83,1,0E2,-0.018,3,0
26 R,114,38.82,1,0E2,-0.021,3,0
27 R,115,41.81,1,0E2,-0.024,3,0
28 R,116,44.79,1,0E2,-0.028,3,0
29 R,117,47.78,1,0E2,-0.031,3,0
30 R,118,50.77,1,0E2,-0.033,3,0
31 R,119,53.77,1,0E2,-0.039,3,0
32 R,120,56.76,1,0E2,-0.043,3,0
33 R,121,59.76,1,0E2,-0.047,3,0
34 R,122,62.74,1,0E2,-0.052,3,0
35 R,123,65.73,1,0E2,-0.056,3,0
36 R,124,68.73,1,0E2,-0.061,3,0
37 R,125,71.72,1,0E2,-0.065,3,0
38 R,126,74.71,1,0E2,-0.070,3,0
39 R,127,77.72,1,0E2,-0.075,3,0
40 R,128,80.71,1,0E2,-0.080,3,0
41 R,129,83.71,1,0E2,-0.084,3,0
42 R,130,86.71,1,0E2,-0.090,3,0
43 C*** NODE GENERATION
44 CSYS,1
45 N,1,18.635,-90
46 N,31,18.635,0
47 FILL
48 NGEN,2,31,1,31,1,-0.49
49 NDELE,39
50 CSYS,0
51 N,63,0,-17
52 N,64,0.4,-17
53 N,70,6.4,-17
54 FILL
55 N,71,0,-16
56 N,72,.4,-16
57 N,73,6.4,-16
58 N,74,7.2,-16
59 NGEN,2,5,71,74,1,.1,0
60 N,80,8.2,-15

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

```

61  N,81,9.2,-13
62  NGEN,2,6,76,81,1,,1.0
63  N,88,10.2,-14
64  NGEN,2,7,82,88,1,,1.0
65  N,96,11.2,-13
66  N,97,12.2,-13
67  NGEN,2,9,89,97,1,,1.0
68  N,107,13.2,-12
69  N,108,0,-11
70  N,109,-4,-11
71  N,113,6.4,-11
72  FILL
73  N,116,7.2,-11
74  N,122,13.2,-11
75  FILL
76  NGEN,2,13,108,113,1,...375
77  N,131,6.8,-10.625
78  NGEN,2,9,123,131,1,...375
79  N,141,7.2,-10.25
80  N,147,13.2,-10.25
81  FILL
82  N,148,13.6,-10.25
83  N,149,14.6,-10.25
84  N,150,0,-9.25
85  N,151,-4,-9.25
86  N,152,6.4,-9.25
87  N,153,6.8,-9.25
88  N,154,7.2,-9.25
89  N,155,13.2,-9.25
90  N,156,13.6,-9.25
91  N,157,14.6,-9.25
92  NGEN,2,8,150,157,1,,1.0
93  N,166,13.6,-8.25
94  NGEN,2,9,158,166,1,,1.0
95  NGEN,2,9,167,175,1,,1.0
96  N,183,16.8,-6.25
97  NGEN,2,10,176,183,1,,1.0
98  NGEN,2,64,132,148,1,,6.0
99  N,213,16.8,-4.25
100  FILL,212,213
101  N,216,0,-3.625
102  N,219,3,-3.625
103  FILL
104  N,220,3.8,-3.625
105  N,226,9.8,-3.625
106  FILL
107  N,227,10.6,-3.625
108  N,233,16.6,-3.625
109  FILL
110  NGEN,2,18,216,219,1,,0.625
111  N,238,3.4,-3.0
112  N,239,3.8,-3.0
113  N,243,9.8,-3.0
114  FILL
115  N,246,10.2,-3.0
116  N,247,10.6,-3.0
117  N,253,16.6,-3.0
118  FILL
119  NGEN,2,17,237,239,1,,1.0
120  NGEN,2,12,243,247,1,,1.0

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

```

121 E,260,16.6,-2
122 EGEN,3,7,254,260,1,,1,0
123 C*** ELEMENT GENERATION
124 E,1,2,33,32
125 EGEN,6,1,-1
126 E,7,8,70,38
127 E,8,9,40,70
128 E,9,10,41,40
129 EGEN,22,1,-1
130 E,32,64,63
131 E,32,33,64
132 E,33,34,63,64
133 EGEN,5,1,-1
134 E,38,70,69
135 E,63,64,72,71
136 E,70,40,74,73
137 E,40,41,74
138 E,71,72,77,76
139 E,73,74,79,78
140 E,74,41,80,79
141 E,41,42,81,80
142 E,42,43,81
143 E,76,77,83,82
144 E,78,79,83,84
145 E,79,80,86,83
146 E,80,81,87,86
147 E,81,43,44
148 E,81,44,88
149 E,81,88,87
150 E,82,83,90,89
151 E,84,83,92,91
152 EGEN,4,1,-1
153 E,88,43,96,93
154 E,44,43,88
155 E,43,46,96
156 E,46,97,96
157 E,46,47,97
158 E,89,90,99,98
159 E,91,92,101,100
160 EGEN,6,1,-1
161 E,97,47,106
162 E,47,107,106
163 E,47,48,107
164 E,98,99,109,108
165 E,100,101,116,113
166 EGEN,7,1,-1
167 E,48,49,107
168 E,107,49,122
169 E,49,90,122
170 E,108,109,124,123
171 EGEN,7,1,-1
172 E,113,131,130
173 E,113,116,131
174 E,123,124,133,132
175 EGEN,7,1,-1
176 E,130,131,140,139
177 E,131,116,141
178 E,131,141,140
179 E,116,117,142,141
180 EGEN,6,1,-1

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***** ARSYS INPUT DATA LISTING (FILE18) *****

181 E,122,148,147
182 E,122,50,148
183 E,148,50,149
184 E,50,51,149
185 E,132,133,151,150
186 E,139,140,153,152
187 E,140,141,154,153
188 E,147,148,156,153
189 E,148,149,157,156
190 E,149,51,157
191 E,51,52,157
192 E,150,151,159,158
193 E,152,153,161,160
194 E,153,154,162,161
195 E,155,156,164,163
196 E,158,157,165,164
197 E,157,52,166,165
198 E,52,53,166
199 E,158,159,168,167
200 E,160,161,170,169
201 E,161,162,171,170
202 E,163,164,173,172
203 E,164,165,174,173
204 E,165,166,175,174
205 E,168,53,34,173
206 E,167,168,177,176
207 E,169,170,179,178
208 E,170,171,180,179
209 E,172,173,182,181
210 EGEN,3,1,-1
211 E,175,34,185,184
212 E,34,55,185
213 E,176,177,187,186
214 E,178,179,189,188
215 E,179,180,190,189
216 E,181,182,192,191
217 EGEN,4,1,-1
218 E,55,56,185
219 E,183,56,195
220 E,184,187,197,196
221 E,188,189,204,203
222 E,189,190,205,204
223 E,191,192,212,211
224 EGEN,4,1,-1
225 E,193,56,57
226 E,193,57,215
227 E,213,57,58
228 E,196,197,216
229 E,197,198,217,216
230 EGEN,3,1,-1
231 E,200,220,219
232 E,200,201,221,220
233 EGEN,3,1,-1
234 E,203,204,223
235 E,204,205,223
236 E,203,206,224,223
237 EGEN,3,1,-1
238 E,208,227,226
239 E,208,209,228,227
240 EGEN,3,1,-1

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IF-300 Cask Channelled BWR Fuel Basket SAR

```
***** ANSYS INPUT DATA LISTING (FILE10) *****
241 E,211,212,230
242 E,212,213,231,230
243 EGEN,3,1,-1
244 E,215,28,233
245 E,216,217,235,234
246 EGEN,3,1,-1
247 E,219,238,237
248 E,219,220,238
249 E,220,239,238
250 E,220,221,240,239
251 EGEN,6,1,-1
252 E,226,246,245
253 E,226,227,246
254 E,227,247,246
255 E,227,228,248,247
256 EGEN,6,1,-1
257 E,233,38,39,253
258 E,237,238,255,254
259 E,238,239,256,255
260 E,243,246,258,257
261 E,246,247,259,258
262 E,233,39,60,260
263 E,234,253,262,261
264 E,235,256,263,262
265 E,237,258,265,264
266 E,238,259,266,265
267 E,260,60,61,267
268 E,261,262,269,268
269 E,262,263,270,269
270 E,264,265,272,271
271 E,265,266,273,272
272 E,267,61,62,274
273 C*** SYMMETRIC GENERATION
274 SYMM,2,1000,1,500
275 ESYMM,2,1000,1,500
276 MERGE
277 C*** BOUNDARY MODES
278 NGEN,2,2000,4,30,1
279 CSYS,0
280 C*** MASS ELEMENTS
281 TYPE,2
282 REAL,2
283 E,64
284 E,70
285 E,133
286 E,139
287 E,141
288 E,147
289 E,234
290 E,237
291 E,239
292 E,243
293 E,247
294 E,253
295 E,1197
296 E,1203
297 E,1205
298 E,1211
299 E,1109
300 E,1113
```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```
101 REAL, 3
102 E, 63
103 EGEN, 3, 1, -1
104 E, 134
105 EGEN, 3, 1, -1
106 E, 142
107 EGEN, 3, 1, -1
108 E, 234
109 E, 235
110 E, 236
111 E, 240
112 EGEN, 3, 1, -1
113 E, 248
114 EGEN, 3, 1, -1
115 E, 1198
116 EGEN, 3, 1, -1
117 E, 1206
118 EGEN, 3, 1, -1
119 E, 1110
120 EGEN, 3, 1, -1
121 C**** GAP ELEMENTS
122 TYPE, 3
123 REAL, 104
124 E, 2004, 4
125 REAL, 105
126 E, 2005, 5
127 REAL, 106
128 E, 2006, 6
129 REAL, 107
130 E, 2007, 7
131 REAL, 108
132 E, 2008, 8
133 REAL, 109
134 E, 2009, 9
135 REAL, 110
136 E, 2010, 10
137 REAL, 111
138 E, 2011, 11
139 REAL, 112
140 E, 2012, 12
141 REAL, 113
142 E, 2013, 13
143 REAL, 114
144 E, 2014, 14
145 REAL, 115
146 E, 2015, 15
147 REAL, 116
148 E, 2016, 16
149 REAL, 117
150 E, 2017, 17
151 REAL, 118
152 E, 2018, 18
153 REAL, 119
154 E, 2019, 19
155 REAL, 120
156 E, 2020, 20
157 REAL, 121
158 E, 2021, 21
159 REAL, 122
160 E, 2022, 22
```


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***** ANSYS INPUT DATA LISTING (FILE:8) *****

```
361 REAL,123
362 E,2023,23
363 REAL,124
364 E,2024,24
365 REAL,125
366 E,2025,25
367 REAL,126
368 E,2026,26
369 REAL,127
370 E,2027,27
371 REAL,128
372 E,2028,28
373 REAL,129
374 E,2029,29
375 REAL,130
376 E,2030,30
377 /SOFT,Y
378 C*** BOUNDARY CONDITIONS
379 SYMBC,0,0,0
380 D,1,ALL,0,0
381 CSYS,1
382 /ROTATE,2,3
383 D,2,UX,0,0
384 D,3,UY,0,0
385 CSYS,0
386 D,93,UZ,0,0
387 D,94,UZ,0,0
388 D,95,UZ,0,0
389 D,102,UZ,0,0
390 D,103,UZ,0,0
391 D,104,UZ,0,0
392 D,117,UZ,0,0
393 D,118,UZ,0,0
394 D,119,UZ,0,0
395 D,1093,UZ,0,0
396 D,1094,UZ,0,0
397 D,1095,UZ,0,0
398 D,1102,UZ,0,0
399 D,1103,UZ,0,0
400 D,1104,UZ,0,0
401 D,1117,UZ,0,0
402 D,1118,UZ,0,0
403 D,1119,UZ,0,0
404 D,2004,ALL,0,0,,2030,1
405 C*** LOADING CONDITIONS
406 TIME,0.3E-3
407 /ITER,12,0,1
408 /ACEL,,34096
409 /LWRITE
410 TIME,0.48E-3
411 /ITER,7,0,1
412 /ACEL,,23993
413 /LWRITE
414 TIME,15.8E-3
415 /ITER,100,0,1
416 /LWRITE
417 TIME,30.3E-3
418 /ITER,50,0,1
419 /ACEL,0,0,0
420 /LWRITE
```

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***** ANSYS INPUT DATA LISTING (FILE8) *****

```

421 TIME,0.03
422 ITER,25,0.1
423 LWRITE
424 AFWRITE
425 FINISH
426 /EXEC
427 /INPUT,27
428 FINISH
429 /POST26
430 TIME,0.0,0.03
431 DISP,2,82,UY
432 DISP,3,112,UY
433 ESTR,4,39,43,SI
434 ESTR,3,129,40,SI
435 ESTR,6,69,30,SI
436 ESTR,7,163,35,SI
437 ESTR,8,163,43,SI
438 ESTR,9,7,35,SI
439 ESTR,10,7,40,SI
440 /SHOW,PLOTS,,1
441 PLVAR,2,3
442 PLVAR,4,5
443 PLVAR,6,7,8
444 PLVAR,9,10
445 EXTRES,2,10,1
446 FINISH
447 /POST1
448 SET,....,0.6302E-2
449 AVPRIN,1
450 GLOBAL,1
451 /SHOW,PLOTS,,1
452 PLNSTR,SI
453 PRNSTR,SI
454 SET,....,0.2012E-2
455 AVPRIN,1
456 GLOBAL,1
457 /SHOW,PLOTS,,1
458 PLNSTR,SI
459 PRNSTR,SI
460 SET,....,0.1534E-1
461 AVPRIN,1
462 GLOBAL,1
463 /SHOW,PLOTS,,1
464 PLNSTR,SI
465 PRNSTR,SI
466 SET,....,0.2163E-2
467 AVPRIN,1
468 GLOBAL,1
469 /SHOW,PLOTS,,1
470 PLNSTR,SI
471 PRNSTR,SI
472 SET,....,0.1859E-2
473 AVPRIN,1
474 GLOBAL,1
475 /SHOW,PLOTS,,1
476 PLNSTR,SI
477 PRNSTR,SI
478 FINISH
479 /EOF

```

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NUCLEAR PACER MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS

22.9071 MAR 6, 1990 CP= 22534.060

***** GENERAL GRAPH POSTPROCESSOR (POST26) *****

ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS

MINIMUM TIME= 0.00000E+00 MAXIMUM TIME= 0.30000E-01

*** NOTE ***

REDEFINITION OF TIME RANGE ERASES ALL PREVIOUSLY STORED OR CALCULATED DATA

VARIABLE 2 IS 82 UY

VARIABLE 3 IS 112 UY

VARIABLE 4 IS ELEMENT 39 ITEM 45 NAME= 39 SI

VARIABLE 5 IS ELEMENT 129 ITEM 40 NAME= 129 SI

VARIABLE 6 IS ELEMENT 89 ITEM 30 NAME= 89 SI

VARIABLE 7 IS ELEMENT 163 ITEM 35 NAME= 163 SI

VARIABLE 8 IS ELEMENT 163 ITEM 45 NAME= 163 SI

VARIABLE 9 IS ELEMENT 7 ITEM 35 NAME= 7 SI

VARIABLE 10 IS ELEMENT 7 ITEM 40 NAME= 7 SI

/SHOW SWITCH PLOTS TO FILE PLOTS - VECTOR MODE

STORAGE COMPLETE FOR 167 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	82	UY	82	UY	-0.4069E-02	0.6302E-02	0.1980E-02	0.2624E-01
3	DISP	112	UY	112	UY	-0.1374E-01	0.1244E-02	0.1008E-01	0.2682E-01
4	ESTR	39	45	39	SI	3.129	0.2300E-04	0.3067E+03	0.6302E-02
5	ESTR	129	40	129	SI	0.4903E-05	0.2300E-04	0.2236E+03	0.2012E-02
6	ESTR	89	30	89	SI	0.3077E-02	0.2300E-04	0.3068E+03	0.1334E-01
7	ESTR	163	35	163	SI	0.3552E-04	0.2300E-04	0.3969E+03	0.2163E-02
8	ESTR	163	45	163	SI	0.1097E-02	0.2300E-04	0.2406E+03	0.6302E-02
9	ESTR	7	35	7	SI	0.1965E-01	0.2300E-04	0.3128E+03	0.1839E-02
10	ESTR	7	40	7	SI	0.2084E-01	0.2300E-04	0.3623E+03	0.1839E-02

PLOT DEFINITION

CURVE VARIABLE NAME
1 2 82 UY
2 3 112 UY

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION

CURVE VARIABLE NAME
1 4 39 SI
2 5 129 SI

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION

CURVE VARIABLE NAME
1 6 89 SI
2 7 163 SI
3 8 163 SI

CUMULATIVE DISPLAY NUMBER 3 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION

CURVE VARIABLE NAME
1 9 7 SI
2 10 7 SI

CUMULATIVE DISPLAY NUMBER 4 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS

POST26 SUMMARY OF VARIABLE EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	82	UY	82	UY	-0.4069E-02	0.6302E-02	0.1980E-02	0.2624E-01
3	DISP	112	UY	112	UY	-0.1374E-01	0.1244E-02	0.1008E-01	0.2682E-01
4	ESTR	39	45	39	SI	3.129	0.2300E-04	0.3067E+03	0.6302E-02
5	ESTR	129	40	129	SI	0.4903E-05	0.2300E-04	0.2236E+03	0.2012E-02
6	ESTR	89	30	89	SI	0.3077E-02	0.2300E-04	0.3068E+03	0.1334E-01
7	ESTR	163	35	163	SI	0.3552E-04	0.2300E-04	0.3969E+03	0.2163E-02
8	ESTR	163	45	163	SI	0.1097E-02	0.2300E-04	0.2406E+03	0.6302E-02
9	ESTR	7	35	7	SI	0.1965E-01	0.2300E-04	0.3128E+03	0.1839E-02
10	ESTR	7	40	7	SI	0.2084E-01	0.2300E-04	0.3623E+03	0.1839E-02

***** ROUTINE COMPLETED ***** CP = 22829.010

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

1  /PREP7
2  /TITLE,IF300 2" SPACER DISK 45 DEG. SIDE DROP ANALYSIS
3  ET,1,42,...3
4  ET,2,21,...4
5  ET,3,12,...1
6  KAN,4
7  KAY,3,2
8  GAMMA,0.02,20
9  DENS,1,0.00073
10  MUXX,1,0.29
11  EL,1,26,2E6
12  C*** REAL CONSTANTS
13  R,1,2,0
14  R,2,0.00886
15  R,3,0.01771
16  R,101,0.0,1,0E11,-0.028,3,0
17  R,102,2.98,1,0E11,-0.024,3,0
18  R,103,3.97,1,0E11,-0.021,3,0
19  R,104,8.95,1,0E11,-0.018,3,0
20  R,105,11.94,1,0E11,-0.015,3,0
21  R,106,14.92,1,0E11,-0.013,3,0
22  R,107,17.92,1,0E11,-0.010,3,0
23  R,108,20.90,1,0E11,-0.008,3,0
24  R,109,23.88,1,0E11,-0.006,3,0
25  R,110,26.87,1,0E11,-0.005,3,0
26  R,111,29.85,1,0E11,-0.003,3,0
27  R,112,32.84,1,0E11,-0.002,3,0
28  R,113,35.83,1,0E11,-0.001,3,0
29  R,119,53.77,1,0E11,-0.001,3,0
30  R,120,56.76,1,0E11,-0.002,3,0
31  R,121,59.76,1,0E11,-0.003,3,0
32  R,122,62.74,1,0E11,-0.005,3,0
33  R,123,65.73,1,0E11,-0.006,3,0
34  R,124,68.73,1,0E11,-0.008,3,0
35  R,125,71.72,1,0E11,-0.010,3,0
36  R,126,74.71,1,0E11,-0.013,3,0
37  R,127,77.72,1,0E11,-0.015,3,0
38  R,128,80.71,1,0E11,-0.018,3,0
39  R,129,83.71,1,0E11,-0.021,3,0
40  R,130,86.71,1,0E11,-0.024,3,0
41  R,131,90.00,1,0E11,-0.028,3,0
42  C*** NODE GENERATION
43  CSYS,1
44  N,1,18.655,-90
45  N,31,18.655,0
46  FILL
47  NGEN,2,31,1,31,1,-0.49
48  NDEL,39
49  CSYS,0
50  N,63,0,-17
51  N,64,0.4,-17
52  N,70,6.4,-17
53  FILL
54  N,71,0,-16
55  N,72,.4,-16
56  N,73,6.4,-16
57  N,74,7.2,-16
58  NGEN,2,5,71,74,1,1,0
59  N,80,8.2,-15
60  N,81,9.2,-15

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

61 NGEN,2,6,76,81,1,,1.0
62 N,88,10,2,-14
63 NGEN,2,7,82,88,1,,1.0
64 N,96,11,2,-13
65 N,97,12,2,-13
66 NGEN,2,9,89,97,1,,1.0
67 N,107,13,2,-12
68 N,108,0,-11
69 N,109,-4,-11
70 N,115,6,4,-11
71 FILL
72 N,116,7,2,-11
73 N,122,13,2,-11
74 FILL
75 NGEN,2,13,106,115,1,,,375
76 N,131,6,6,-10.625
77 NGEN,2,9,123,131,1,,,375
78 N,141,7,2,-10.25
79 N,147,13,2,-10.25
80 FILL
81 N,148,13,6,-10.25
82 N,149,14,6,-10.25
83 N,150,0,-9.25
84 N,151,-4,-9.25
85 N,152,6,4,-9.25
86 N,153,6,8,-9.25
87 N,154,7,2,-9.25
88 N,155,13,2,-9.25
89 N,156,13,6,-9.25
90 N,157,14,4,-9.25
91 NGEN,2,8,150,157,1,,1.0
92 N,166,13,6,-8.25
93 NGEN,2,9,158,166,1,,1.0
94 NGEN,2,9,167,175,1,,1.0
95 N,183,16,6,-6.25
96 NGEN,2,10,174,183,1,,1.0
97 NGEN,2,64,132,148,1,,6.0
98 N,213,16,6,-4.25
99 FILL,212,213
100 N,216,0,-3.625
101 N,219,3,-3.625
102 FILL
103 N,220,3,8,-3.625
104 N,226,9,8,-3.625
105 FILL
106 N,227,10,6,-3.625
107 N,233,16,6,-3.625
108 FILL
109 NGEN,2,18,216,219,1,,0.625
110 N,238,3,4,-3.0
111 N,239,3,8,-3.0
112 N,245,9,8,-3.0
113 FILL
114 N,246,10,2,-3.0
115 N,247,10,6,-3.0
116 N,253,16,6,-3.0
117 FILL
118 NGEN,2,17,237,239,1,,1.0
119 NGEN,2,12,245,247,1,,1.0
120 N,260,16,6,-2

```

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

```

121 NGEN,3,7,254,260,1,,1,0
122 C*** ELEMENT GENERATION
123 E,1,2,33,32
124 EGEN,4,1,-1
125 E,7,8,70,38
126 E,8,9,40,70
127 E,9,10,41,40
128 EGEN,22,1,-1
129 E,32,64,63
130 E,32,33,64
131 E,33,34,65,64
132 EGEN,5,1,-1
133 E,38,70,69
134 E,63,64,72,71
135 E,70,40,74,73
136 E,40,41,74
137 E,71,72,77,76
138 E,73,74,79,78
139 E,74,41,80,79
140 E,41,42,81,80
141 E,42,43,81
142 E,76,77,83,82
143 E,78,79,83,84
144 E,79,80,86,85
145 E,80,81,87,86
146 E,81,43,44
147 E,81,44,88
148 E,81,88,87
149 E,82,83,90,89
150 E,84,85,92,91
151 EGEN,4,1,-1
152 E,88,45,96,95
153 E,44,45,88
154 E,45,46,96
155 E,46,97,96
156 E,46,47,97
157 E,89,90,99,98
158 E,91,92,101,100
159 EGEN,6,1,-1
160 E,97,47,106
161 E,47,107,106
162 E,47,48,107
163 E,98,99,109,108
164 E,100,101,116,115
165 EGEN,7,1,-1
166 E,48,49,107
167 E,107,49,122
168 E,49,50,122
169 E,108,109,124,123
170 EGEN,7,1,-1
171 E,115,131,130
172 E,115,116,131
173 E,123,124,133,132
174 EGEN,7,1,-1
175 E,130,131,140,139
176 E,131,116,141
177 E,131,141,140
178 E,116,117,142,141
179 EGEN,6,1,-1
180 E,122,148,147

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***** ANSYS INPUT DATA LISTING (FILE18) *****

181 E,122,30,148
182 E,148,30,149
183 E,30,31,149
184 E,132,133,131,150
185 E,139,140,133,132
186 E,140,141,134,133
187 E,147,148,136,133
188 E,148,149,137,136
189 E,149,31,137
190 E,31,32,137
191 E,150,151,159,138
192 E,152,153,161,160
193 E,153,154,162,161
194 E,155,156,164,163
195 E,156,157,163,164
196 E,157,32,166,163
197 E,32,33,166
198 E,158,159,168,167
199 E,160,161,170,169
200 E,161,162,171,170
201 E,163,164,173,172
202 E,164,165,174,173
203 E,165,166,175,174
204 E,166,33,34,175
205 E,167,168,177,176
206 E,169,170,179,178
207 E,170,171,180,179
208 E,172,173,182,181
209 EGEN,3,1,-1
210 E,175,34,183,184
211 E,34,35,183
212 E,176,177,187,186
213 E,178,179,189,188
214 E,179,180,190,189
215 E,181,182,192,191
216 EGEN,4,1,-1
217 E,35,36,183
218 E,185,36,193
219 E,186,187,197,196
220 E,188,189,204,203
221 E,189,190,203,204
222 E,191,192,212,211
223 EGEN,4,1,-1
224 E,193,36,37
225 E,193,37,215
226 E,215,37,38
227 E,196,197,216
228 E,197,198,217,216
229 EGEN,3,1,-1
230 E,200,220,219
231 E,200,201,221,220
232 EGEN,3,1,-1
233 E,203,204,223
234 E,204,203,223
235 E,205,206,224,223
236 EGEN,3,1,-1
237 E,208,227,226
238 E,208,209,228,227
239 EGEN,3,1,-1
240 E,211,212,230

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***** ANSYS INPUT DATA LISTING (FILE10) *****

```

241 E, 212, 213, 231, 230
242 EGEN, 3, 1, -1
243 E, 213, 59, 233
244 E, 216, 217, 233, 234
245 EGEN, 3, 1, -1
246 E, 219, 238, 237
247 E, 219, 220, 238
248 E, 220, 239, 238
249 E, 220, 221, 240, 239
250 EGEN, 6, 1, -1
251 E, 226, 246, 243
252 E, 226, 227, 246
253 E, 227, 247, 246
254 E, 227, 228, 248, 247
255 EGEN, 6, 1, -1
256 E, 233, 59, 59, 253
257 E, 237, 238, 253, 254
258 E, 238, 239, 256, 253
259 E, 243, 246, 258, 237
260 E, 246, 247, 259, 258
261 E, 253, 59, 60, 260
262 E, 254, 255, 262, 261
263 E, 255, 256, 263, 262
264 E, 257, 258, 263, 264
265 E, 258, 259, 266, 263
266 E, 260, 60, 61, 267
267 E, 261, 262, 269, 268
268 E, 262, 263, 270, 269
269 E, 264, 265, 272, 271
270 E, 265, 266, 273, 272
271 E, 267, 61, 62, 274
272 C*** SYMMETRIC GENERATION
273 SYMM, 1, 1000, 1, 500
274 SYMM, 2, 2000, 1, 2000
275 ESYMM, 2, 1000, 1, 500
276 ESYMM, 2, 2000, 1, 2000
277 MGENE
278 C*** BOUNDARY NODES
279 NGEN, 2, 4000, 1, 31, 1
280 CSYS, 0
281 C*** MASS ELEMENTS
282 TYPE, 2
283 REAL, 2
284 E, 64
285 E, 70
286 E, 133
287 E, 139
288 E, 141
289 E, 147
290 E, 234
291 E, 237
292 E, 239
293 E, 243
294 E, 247
295 E, 253
296 E, 1064
297 E, 1070
298 E, 1133
299 E, 1139
300 E, 1141

```


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***** ANSYS INPUT DATA LISTING (FILE 8) *****

301 E.1147
302 E.1237
303 E.1239
304 E.1245
305 E.1247
306 E.1253
307 E.1211
308 E.1207
309 E.1205
310 E.1197
311 E.1203
312 E.1197
313 E.1203
314 E.1205
315 E.1211
316 E.1115
317 E.1109
318 E.1109
319 E.1115
320 E.115
321 E.1109
322 E.1203
323 E.1211
324 E.1197
325 E.1205
326 E.1253
327 E.1245
328 E.1237
329 E.1239
330 E.1247
331 E.1147
332 E.1139
333 E.1133
334 E.1141
335 E.1207
336 E.1044
337 REAL,3
338 E.65
339 EGEN,5,1,-1
340 E.134
341 EGEN,5,1,-1
342 E.142
343 EGEN,5,1,-1
344 E.234
345 E.235
346 E.236
347 E.240
348 EGEN,5,1,-1
349 E.248
350 EGEN,5,1,-1
351 E.1065
352 EGEN,5,1,-1
353 E.1134
354 EGEN,5,1,-1
355 E.1142
356 EGEN,5,1,-1
357 E.1240
358 EGEN,5,1,-1
359 E.1248
360 EGEN,5,1,-1

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***** ANSYS INPUT DATA LISTING (FILE16) *****

361 E,1233
362 E,1236
363 E,2206
364 EGEN,3,1,-1
365 E,2198
366 EGEN,3,1,-1
367 E,3198
368 EGEN,3,1,-1
369 E,3206
370 EGEN,3,1,-1
371 E,2110
372 EGEN,3,1,-1
373 E,3110
374 EGEN,3,1,-1
375 E,73
376 E,78
377 E,84
378 E,91
379 E,100
380 E,1072
381 E,1077
382 E,1083
383 E,1090
384 E,1099
385 E,133
386 E,143
387 E,172
388 E,181
389 E,191
390 E,132
391 E,160
392 E,169
393 E,178
394 E,188
395 E,151
396 E,159
397 E,168
398 E,177
399 E,187
400 E,154
401 E,162
402 E,171
403 E,180
404 E,190
405 E,260
406 E,267
407 E,274
408 E,2267
409 E,2260
410 E,257
411 E,264
412 E,271
413 E,2264
414 E,2257
415 E,254
416 E,261
417 E,268
418 E,2261
419 E,2254
420 E,1259

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***** ANSYS INPUT DATA LISTING (FILE18) *****

421 E.1266
422 E.1273
423 E.3266
424 E.3259
425 E.1236
426 E.1263
427 E.1270
428 E.3263
429 E.3256
430 E.2191
431 E.2181
432 E.2172
433 E.2163
434 E.2155
435 E.2188
436 E.2178
437 E.2169
438 E.2160
439 E.2152
440 E.3190
441 E.3180
442 E.3171
443 E.3162
444 E.3154
445 E.3187
446 E.3177
447 E.3168
448 E.3159
449 E.3151
450 E.2100
451 E.2091
452 E.2084
453 E.2078
454 E.2073
455 E.3099
456 E.3090
457 E.3083
458 E.3077
459 E.3072
460 C*** GAP ELEMENTS
461 TYPE,3
462 REAL,101
463 E,4001,1
464 REAL,102
465 E,4002,2
466 REAL,103
467 E,4003,3
468 REAL,104
469 E,4004,4
470 REAL,105
471 E,4005,5
472 REAL,106
473 E,4006,6
474 REAL,107
475 E,4007,7
476 REAL,108
477 E,4008,8
478 REAL,109
479 E,4009,9
480 REAL,110

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***** ANSYS INPUT DATA LISTING (FILES) *****

```

481 E,4010,10
482 REAL,111
483 E,4011,11
484 REAL,112
485 E,4012,12
486 REAL,113
487 E,4013,13
488 REAL,119
489 E,4019,19
490 REAL,120
491 E,4020,20
492 REAL,121
493 E,4021,21
494 REAL,122
495 E,4022,22
496 REAL,123
497 E,4023,23
498 REAL,124
499 E,4024,24
500 REAL,125
501 E,4025,25
502 REAL,126
503 E,4026,26
504 REAL,127
505 E,4027,27
506 REAL,128
507 E,4028,28
508 REAL,129
509 E,4029,29
510 REAL,130
511 E,4030,30
512 REAL,131
513 E,4031,31
514 *$ORT, Y
515 C*** BOUNDARY CONDITIONS
516 D,16, ALL, 0.0
517 CSYS, 1
518 NROTATE, 14, 18
519 D,14, UX, 0.0
520 D,15, UX, 0.0
521 D,17, UX, 0.0
522 D,18, UX, 0.0
523 CSYS, 0
524 D,4001, ALL, 0.0, 4013, 1
525 D,4019, ALL, 0.0, 4031, 1
526 C*** LOADING CONDITIONS
527 TIME, 0.6E-3
528 ITER, 12, 1
529 ACEL, -31105, 31105
530 *$WRITE
531 TIME, 0.95E-3
532 ITER, 7, 1
533 ACEL, -13795, 13795
534 *$WRITE
535 TIME, 10E-3
536 ITER, 50, 0.1
537 *$WRITE
538 TIME, 26.1E-3
539 ITER, 25, 1
540 ACEL, 0.0, 0

```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

541 LWRITE
542 TIME,.03
543 ITER,20,,1
544 LWRITE
545 AWRITE
546 FINISH
547 /EXEC
548 /INPUT,27
549 FINISH
550 /POST26
551 HNMVAR,15
552 DISP,2,273,UY
553 DISP,3,171,UY
554 DISP,4,63,UY
555 ESTE,5,201,30,SI
556 ESTE,6,201,45,SI
557 ESTE,7,100,30,SI
558 ESTE,8,219,40,SI
559 ESTE,9,217,40,SI
560 ESTE,10,436,40,SI
561 ESTE,11,438,40,SI
562 ESTE,12,130,40,SI
563 ESTE,13,128,40,SI
564 ESTE,14,349,40,SI
565 ESTE,15,47,40,SI
566 /SHOW,PLOTS,,1
567 PLVAR,2,3,4
568 PLVAR,5,6,7
569 PLVAR,8,9,10,11
570 PLVAR,12,13,14,15
571 FINISH
572 /POST1
573 SET,.....,0.158E-1
574 PLNSTR,SI
575 PLNSTR,ALL
576 SET,.....,0.4027E-2
577 PLNSTR,SI
578 PLNSTR,ALL
579 FINISH
580 /EOF

```

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IF300 2" SPACER DISK 45 DEG. SIDE DROP ANALYSIS

21.4713 MAR 26, 1990 CP= 24495.890

***** GENERAL GRAPE POSTPROCESSOR (POST26) *****

ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS

MAXIMUM NUMBER OF VARIABLES= 13

VARIABLE 2 IS 273 UY

VARIABLE 3 IS 171 UY

VARIABLE 4 IS 83 UY

VARIABLE 5 IS ELEMENT 201 ITEM 30 NAME= 201 SI

VARIABLE 6 IS ELEMENT 201 ITEM 43 NAME= 201 SI

VARIABLE 7 IS ELEMENT 100 ITEM 30 NAME= 100 SI

VARIABLE 8 IS ELEMENT 219 ITEM 40 NAME= 219 SI

VARIABLE 9 IS ELEMENT 217 ITEM 40 NAME= 217 SI

VARIABLE 10 IS ELEMENT 436 ITEM 40 NAME= 436 SI

VARIABLE 11 IS ELEMENT 438 ITEM 40 NAME= 438 SI

VARIABLE 12 IS ELEMENT 130 ITEM 40 NAME= 130 SI

VARIABLE 13 IS ELEMENT 128 ITEM 40 NAME= 128 SI

VARIABLE 14 IS ELEMENT 349 ITEM 40 NAME= 349 SI

VARIABLE 15 IS ELEMENT 47 ITEM 40 NAME= 47 SI

/SHOW SWITCH PLOTS TO FILE PLOTS - VECTOR MODE

STORAGE COMPLETE FOR 114 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	273	UY	273	UY	-0.9417E-02	0.1580E-01	0.8233E-02	0.1431E-01
3	DISP	171	UY	171	UY	-0.9110E-02	0.5836E-02	0.5819E-02	0.2981E-01
4	DISP	83	UY	83	UY	-0.3371E-01	0.4389E-02	0.3621E-01	0.2961E-01
5	ESTR	201	SI	201	SI	0.1338	0.5000E-04	0.1230E+03	0.4027E-02
6	ESTR	201	SI	201	SI	0.1327	0.5000E-04	0.2500E+03	0.1580E-01
7	ESTR	100	SI	100	SI	1.922	0.5000E-04	0.1293E+03	0.1312E-02
8	ESTR	219	SI	219	SI	0.2316E-03	0.5000E-04	0.1566E+03	0.6018E-02
9	ESTR	217	SI	217	SI	0.5141E-03	0.5000E-04	0.2362E+03	0.5837E-02
10	ESTR	436	SI	436	SI	0.1271E-06	0.5000E-04	0.4062E+03	0.4932E-02
11	ESTR	438	SI	438	SI	0.6943E-07	0.5000E-04	0.1474E+03	0.1258E-01
12	ESTR	130	SI	130	SI	0.1960	0.5000E-04	0.2161E+03	0.1580E-01
13	ESTR	128	SI	128	SI	0.3567E-03	0.5000E-04	0.2463E+03	0.5113E-02
14	ESTR	349	SI	349	SI	0.1372E-04	0.5000E-04	0.1473E+03	0.6923E-02
15	ESTR	47	SI	47	SI	0.1572E-01	0.5000E-04	0.4344E+03	0.4389E-02

PLOT DEFINITION
CURVE VARIABLE NAME
1 2 273 UY
2 3 171 UY
3 4 83 UY

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 45 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 5 201 SI
2 6 201 SI
3 7 100 SI

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 45 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 8 219 SI
2 9 217 SI
3 10 436 SI
4 11 438 SI

CUMULATIVE DISPLAY NUMBER 3 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 45 DEG. SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 12 130 SI
2 13 128 SI
3 14 349 SI
4 15 47 SI

CUMULATIVE DISPLAY NUMBER 4 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= IF300 2" SPACER DISK 45 DEG. SIDE DROP ANALYSIS

***** ROUTINE COMPLETED ***** CP = 24890.090

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```
1 /PREP7
2 /TITLE,17300 3/4" SPACER DISK SIDE DROP ANALYSIS
3 ET,1,42...3
4 ET,2,21...4
5 ET,3,12...1
6 KAX,4
7 KAY,3,2
8 GAMMA,0.02,20
9 DENS,1,0.00073
10 MUXX,1,0.29
11 EX,1,26.2E6
12 C*** REAL CONSTANTS
13 R,1,0.75
14 R,2,0.0105
15 R,3,0.0055
16 R,4,0.0075
17 R,5,0.0064
18 R,104,8.95,1.0E11,-0.080,3.0
19 R,105,11.94,1.0E11,-0.075,3.0
20 R,106,14.92,1.0E11,-0.070,3.0
21 R,107,17.92,1.0E11,-0.065,3.0
22 R,108,20.90,1.0E11,-0.061,3.0
23 R,109,23.88,1.0E11,-0.056,3.0
24 R,110,26.87,1.0E11,-0.052,3.0
25 R,111,29.85,1.0E11,-0.047,3.0
26 R,112,32.84,1.0E11,-0.043,3.0
27 R,113,35.83,1.0E11,-0.039,3.0
28 R,114,38.82,1.0E11,-0.035,3.0
29 R,115,41.81,1.0E11,-0.031,3.0
30 R,116,44.79,1.0E11,-0.028,3.0
31 R,117,47.78,1.0E11,-0.024,3.0
32 R,118,50.77,1.0E11,-0.021,3.0
33 R,119,53.77,1.0E11,-0.018,3.0
34 R,120,56.76,1.0E11,-0.015,3.0
35 R,121,59.76,1.0E11,-0.013,3.0
36 R,122,62.74,1.0E11,-0.010,3.0
37 R,123,65.73,1.0E11,-0.008,3.0
38 R,124,68.73,1.0E11,-0.006,3.0
39 R,125,71.72,1.0E11,-0.005,3.0
40 R,126,74.71,1.0E11,-0.003,3.0
41 R,127,77.72,1.0E11,-0.002,3.0
42 R,128,80.71,1.0E11,-0.001,3.0
43 C*** NODE GENERATION
44 CSYS,1
45 N,1,18.655,-90
46 N,31,18.655,0
47 FILL
48 MGEN,2,31,1,31,1,-0.49
49 NDELE,39
50 CSYS,0
51 N,63,0,-17
52 N,64,0.4,-17
53 N,70,6.4,-17
54 FILL
55 N,71,0,-16
56 N,72,.4,-16
57 N,73,6.4,-16
58 N,74,7.2,-16
59 MGEN,2,5,71,74,1,1.0
60 N,80,8.2,-15
```

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***** ANSYS INPUT DATA LISTING (FILE16) *****

```

61  N,81,9.2,-13
62  NGEN,2,6,76,81,1,,1.0
63  N,88,10.2,-14
64  NGEN,2,7,82,88,1,,1.0
65  N,96,11.2,-13
66  N,97,12.2,-13
67  NGEN,2,9,89,97,1,,1.0
68  N,107,13.2,-12
69  N,108,0,-11
70  N,109,-4,-11
71  N,113,6.4,-11
72  FILL
73  N,116,7.2,-11
74  N,122,13.2,-11
75  FILL
76  NGEN,2,13,108,113,1,...375
77  N,131,6.8,-10.625
78  NGEN,2,9,123,131,1,...375
79  N,141,7.2,-10.25
80  N,147,13.2,-10.25
81  FILL
82  N,148,13.6,-10.25
83  N,149,14.6,-10.25
84  N,150,0,-9.25
85  N,151,-4,-9.25
86  N,152,6.4,-9.25
87  N,153,6.8,-9.25
88  N,154,7.2,-9.25
89  N,155,13.2,-9.25
90  N,156,13.6,-9.25
91  N,157,14.6,-9.25
92  NGEN,2,8,150,157,1,,1.0
93  N,166,13.6,-8.25
94  NGEN,2,9,158,166,1,,1.0
95  NGEN,2,9,167,173,1,,1.0
96  N,183,16.6,-8.25
97  NGEN,2,10,176,183,1,,1.0
98  NGEN,2,64,132,148,1,,6.0
99  N,213,16.6,-4.25
100  FILL,213,213
101  N,216,0,-3.625
102  N,219,3,-3.625
103  FILL
104  N,220,3.8,-3.625
105  N,226,9.8,-3.625
106  FILL
107  N,227,10.6,-3.625
108  N,233,16.6,-3.625
109  FILL
110  NGEN,2,18,216,219,1,,0.625
111  N,238,3.4,-3.0
112  N,239,3.8,-3.0
113  N,245,9.8,-3.0
114  FILL
115  N,246,10.2,-3.0
116  N,247,10.6,-3.0
117  N,253,16.6,-3.0
118  FILL
119  NGEN,2,17,237,239,1,,1.0
120  NGEN,2,12,245,247,1,,1.0

```


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***** ANSYS INPUT DATA LISTING (FILE8) *****

```

121 N,260,16.6,-2
122 NGEN,3,7,254,260,1,,1.0
123 C*** ELEMENT GENERATION
124 E,1,2,33,32
125 EGEN,6,1,-1
126 E,7,8,70,38
127 E,8,9,40,70
128 E,9,10,41,40
129 EGEN,22,1,-1
130 E,32,64,63
131 E,32,33,64
132 E,33,34,65,64
133 EGEN,3,1,-1
134 E,38,70,68
135 E,68,64,72,71
136 E,70,40,74,73
137 E,40,41,74
138 E,71,72,77,76
139 E,71,74,79,78
140 E,73,41,80,79
141 E,41,42,81,80
142 E,42,43,81
143 E,72,77,83,82
144 E,75,79,85,84
145 E,79,80,86,85
146 E,80,81,87,86
147 E,81,43,44
148 E,81,44,88
149 E,81,88,87
150 E,82,83,90,89
151 E,84,85,92,91
152 EGEN,4,1,-1
153 E,88,45,96,95
154 E,44,45,68
155 E,45,46,96
156 E,46,97,96
157 E,46,47,97
158 E,89,90,99,98
159 E,91,92,101,100
160 EGEN,6,1,-1
161 E,97,47,106
162 E,47,107,106
163 E,47,48,107
164 E,98,99,109,108
165 E,100,101,116,115
166 EGEN,7,1,-1
167 E,48,49,107
168 E,107,49,122
169 E,49,50,122
170 E,108,109,124,123
171 EGEN,7,1,-1
172 E,113,131,130
173 E,113,116,131
174 E,123,124,133,132
175 EGEN,7,1,-1
176 E,130,131,140,139
177 E,131,116,141
178 E,131,141,140
179 E,116,117,142,141
180 EGEN,6,1,-1

```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

181 E,122,148,147
182 E,122,50,148
183 E,148,50,149
184 E,50,51,149
185 E,132,133,151,150
186 E,139,140,153,152
187 E,140,141,154,153
188 E,147,148,156,155
189 E,148,149,157,156
190 E,149,51,157
191 E,51,52,157
192 E,150,151,159,158
193 E,152,153,161,160
194 E,153,154,162,161
195 E,155,156,164,163
196 E,156,157,165,164
197 E,157,52,166,165
198 E,52,53,166
199 E,158,159,168,167
200 E,160,161,170,169
201 E,161,162,171,170
202 E,163,164,173,172
203 E,164,165,174,173
204 E,165,166,175,174
205 E,168,53,54,175
206 E,167,168,177,176
207 E,169,170,179,178
208 E,170,171,180,179
209 E,172,173,182,181
210 EGEN,3,1,-1
211 E,175,54,185,184
212 E,54,55,185
213 E,176,177,187,186
214 E,178,179,189,188
215 E,179,180,190,189
216 E,181,182,192,191
217 EGEN,4,1,-1
218 E,55,56,185
219 E,185,56,195
220 E,186,187,197,196
221 E,188,189,204,203
222 E,189,190,205,204
223 E,191,192,212,211
224 EGEN,4,1,-1
225 E,193,56,57
226 E,195,57,215
227 E,215,57,58
228 E,196,197,216
229 E,197,198,217,216
230 EGEN,3,1,-1
231 E,200,220,219
232 E,200,201,221,220
233 EGEN,3,1,-1
234 E,203,204,223
235 E,204,205,223
236 E,205,206,224,223
237 EGEN,3,1,-1
238 E,208,227,226
239 E,208,209,228,227
240 EGEN,3,1,-1

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

241 E, 211, 212, 230
242 E, 212, 213, 231, 230
243 EGEN, 3, 1, -1
244 E, 215, 238, 233
245 E, 216, 217, 235, 234
246 EGEN, 3, 1, -1
247 E, 219, 238, 237
248 E, 219, 220, 238
249 E, 220, 239, 238
250 E, 220, 221, 240, 239
251 EGEN, 6, 1, -1
252 E, 226, 246, 245
253 E, 226, 227, 246
254 E, 227, 247, 246
255 E, 227, 228, 248, 247
256 EGEN, 6, 1, -1
257 E, 233, 238, 235, 234
258 E, 237, 238, 235, 234
259 E, 238, 239, 236, 235
260 E, 245, 246, 238, 237
261 E, 246, 247, 239, 238
262 E, 233, 239, 240, 260
263 E, 254, 255, 262, 261
264 E, 255, 256, 263, 262
265 E, 257, 258, 265, 264
266 E, 258, 259, 266, 265
267 E, 260, 261, 267
268 E, 261, 262, 269, 268
269 E, 262, 263, 270, 269
270 E, 264, 265, 272, 271
271 E, 265, 266, 273, 272
272 E, 267, 261, 262, 274
273 C**** SYMMETRIC GENERATION
274 SYMM, 1, 1000, 1, 500
275 ESYMM, 2, 1000, 1, 500
276 MERGE
277 C**** BOUNDARY MODES
278 MGEN, 2, 2000, 4, 28, 1
279 CSYS, 0
280 C**** MASS ELEMENTS
281 TYPE, 2
282 REAL, 2
283 E, 185
284 E, 195
285 E, 215
286 E, 233
287 E, 253
288 E, 267
289 E, 274
290 E, 1185
291 E, 1195
292 E, 1215
293 E, 1233
294 E, 1253
295 E, 1267
296 E, 1274
297 REAL, 3
298 E, 63
299 EGEN, 6, 1, -1
300 E, 1064

```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

301 EGEN,7,1,-1
302 REAL,4
303 E,40
304 EGEN,3,1,-1
305 E,1040
306 EGEN,3,1,-1
307 REAL,3
308 E,43
309 EGEN,11,1,-1
310 E,1043
311 EGEN,11,1,-1
312 C*** GAP ELEMENTS
313 TYPE,3
314 REAL,104
315 E,2004,4
316 REAL,103
317 E,2003,3
318 REAL,106
319 E,2006,6
320 REAL,107
321 E,2007,7
322 REAL,108
323 E,2008,8
324 REAL,109
325 E,2009,9
326 REAL,110
327 E,2010,10
328 REAL,111
329 E,2011,11
330 REAL,112
331 E,2012,12
332 REAL,113
333 E,2013,13
334 REAL,114
335 E,2014,14
336 REAL,115
337 E,2015,15
338 REAL,116
339 E,2016,16
340 REAL,117
341 E,2017,17
342 REAL,118
343 E,2018,18
344 REAL,119
345 E,2019,19
346 REAL,120
347 E,2020,20
348 REAL,121
349 E,2021,21
350 REAL,122
351 E,2022,22
352 REAL,123
353 E,2023,23
354 REAL,124
355 E,2024,24
356 REAL,125
357 E,2025,25
358 REAL,126
359 E,2026,26
360 REAL,127

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

361 E, 2027, 27
362 REAL, 128
363 E, 2028, 28
364 MEOBT, Y
365 C*** BOUNDARY CONDITIONS
366 SYMBC, 0, 2, 0
367 D, 31, ALL, 0, 0
368 CSYS, 1
369 MROTATE, 29, 30
370 D, 29, UZ, 0, 0
371 D, 30, UZ, 0, 0
372 CSYS, 0
373 D, 93, UZ, 0, 0
374 D, 94, UZ, 0, 0
375 D, 95, UZ, 0, 0
376 D, 102, UZ, 0, 0
377 D, 103, UZ, 0, 0
378 D, 104, UZ, 0, 0
379 D, 117, UZ, 0, 0
380 D, 118, UZ, 0, 0
381 D, 119, UZ, 0, 0
382 D, 1093, UZ, 0, 0
383 D, 1094, UZ, 0, 0
384 D, 1095, UZ, 0, 0
385 D, 1102, UZ, 0, 0
386 D, 1103, UZ, 0, 0
387 D, 1104, UZ, 0, 0
388 D, 1117, UZ, 0, 0
389 D, 1118, UZ, 0, 0
390 D, 1119, UZ, 0, 0
391 D, 2004, ALL, 0, 0, 2028, 1
392 C*** LOADING CONDITIONS
393 TIME, 0.6E-3
394 ITER, 12, 1
395 ACCEL, -82689.6
396 LWRITE
397 TIME, 0.95E-3
398 ITER, 7, 1
399 ACCEL, -37094.4
400 LWRITE
401 TIME, 10E-3
402 ITER, 50, 0, 1
403 LWRITE
404 TIME, 19.4E-3
405 ITER, 25, 1
406 ACCEL, 0, 0, 0
407 LWRITE
408 TIME, .03
409 ITER, 20, 1
410 LWRITE
411 AFWRITE
412 FINISH
413 /EXEC
414 /INPUT, 27
415 FINISH
416 /POST26
417 TIME, 0, 0, 0.03
418 DISP, 2, 273, UY
419 DISP, 3, 171, UY
420 ESTB, 4, 219, 40, SI

```

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```
***** ANSYS INPUT DATA LISTING (FILE10) *****  
421 ESTB,5,178,45,SI  
422 ESTB,6,177,45,SI  
423 ESTB,7,176,45,SI  
424 ESTB,8,130,40,SI  
425 ESTB,9,100,45,SI  
426 /SHOW,PLOTS  
427 PLVAL,2,3  
428 PLVAL,4,8,9  
429 PLVAL,5,6,7  
430 EXTREM,2,9,1  
431 FINISH  
432 /EOF
```

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IF300 3/4" SPACER DISK SIDE DROP ANALYSIS

16.1285 MAR 29, 1990 CP= 10316.740

***** GENERAL GRAPH POSTPROCESSOR (POST26) *****
ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS
MINIMUM TIME= 0.00000E+00 MAXIMUM TIME= 0.30000E-01
*** NOTE ***
REDEFINITION OF TIME RANGE ERASES ALL PREVIOUSLY STORED OR CALCULATED DATA
VARIABLE 2 IS 273 UY
VARIABLE 3 IS 171 UY
VARIABLE 4 IS ELEMENT 219 ITEM 40 NAME= 219 SI
VARIABLE 5 IS ELEMENT 178 ITEM 45 NAME= 178 SI
VARIABLE 6 IS ELEMENT 177 ITEM 45 NAME= 177 SI
VARIABLE 7 IS ELEMENT 176 ITEM 45 NAME= 176 SI
VARIABLE 8 IS ELEMENT 130 ITEM 40 NAME= 130 SI
VARIABLE 9 IS ELEMENT 100 ITEM 45 NAME= 100 SI
/SHOW SWITCH PLOTS TO FILE PLOTS - RASTER MODE
STORAGE COMPLETE FOR 114 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME
2 DISP 273 UY 273 UY 0.0000E+00 0.3000E-01 0.0000E+00 0.3000E-01
3 DISP 171 UY 171 UY -0.2258E-02 0.1312E-02 0.1164E-02 0.3473E-02
4 ESTE 219 40 219 SI 0.1534 0.3000E-04 7228. 0.3846E-02
5 ESTE 178 45 178 SI 0.8871 0.3000E-04 0.1925E+05 0.4027E-02
6 ESTE 177 45 177 SI 0.5392 0.3000E-04 0.1708E+05 0.1312E-02
7 ESTE 176 45 176 SI 0.4723 0.3000E-04 0.1853E+05 0.1312E-02
8 ESTE 130 40 130 SI 0.3768E-01 0.3000E-04 7282. 0.1131E-02
9 ESTE 100 45 100 SI 0.2250E-01 0.3000E-04 0.1956E+05 0.1312E-02

PLOT DEFINITION
CURVE VARIABLE NAME
1 2 273 UY
2 3 171 UY

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS - RASTER MODE
DISPLAY TITLE= IF300 3/4" SPACER DISK SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 4 219 SI
2 6 130 SI
3 9 100 SI

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS - RASTER MODE
DISPLAY TITLE= IF300 3/4" SPACER DISK SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 5 178 SI
2 6 177 SI
3 7 176 SI

CUMULATIVE DISPLAY NUMBER 3 WRITTEN TO FILE PLOTS - RASTER MODE
DISPLAY TITLE= IF300 3/4" SPACER DISK SIDE DROP ANALYSIS

POST26 SUMMARY OF VARIABLE EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME
2 DISP 273 UY 273 UY 0.0000E+00 0.3000E-01 0.0000E+00 0.3000E-01
3 DISP 171 UY 171 UY -0.2258E-02 0.1312E-02 0.1164E-02 0.3473E-02
4 ESTE 219 40 219 SI 0.1534 0.3000E-04 7228. 0.3846E-02
5 ESTE 178 45 178 SI 0.8871 0.3000E-04 0.1925E+05 0.4027E-02
6 ESTE 177 45 177 SI 0.5392 0.3000E-04 0.1708E+05 0.1312E-02
7 ESTE 176 45 176 SI 0.4723 0.3000E-04 0.1853E+05 0.1312E-02
8 ESTE 130 40 130 SI 0.3768E-01 0.3000E-04 7282. 0.1131E-02
9 ESTE 100 45 100 SI 0.2250E-01 0.3000E-04 0.1956E+05 0.1312E-02

***** ROUTINE COMPLETED ***** CP = 10306.690

/EOF ENCOUNTERED ON FILE 6

PREP7 AWRITE OR SPWRITE WARNING MESSAGES = 1
NUMBER OF SOLUTION PHASE WARNING MESSAGES = 0

***** RUN COMPLETED ***** CP= 10307.1900 TIME= 16.1808

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

1  /PREP7
2  /TITLE,IF300 2" SPACER DISK 1 FOOT SIDE DROP ANALYSIS
3  ET,1,42,...3
4  ET,2,21,...4
5  ET,3,12,...1
6  KAN,4
7  KAY,3,2
8  GAMMA,0.02,20
9  DENS,1,0.00073
10  NUXY,1,0.29
11  EX,1,26.2E6
12  C*** REAL CONSTANTS
13  R,1,2,0
14  R,2,0.01771
15  R,3,0.03341
16  R,104,8.93,1,0E11,-0.080,3,0
17  R,105,11.94,1,0E11,-0.075,3,0
18  R,106,14.92,1,0E11,-0.070,3,0
19  R,107,17.92,1,0E11,-0.065,3,0
20  R,108,20.90,1,0E11,-0.061,3,0
21  R,109,23.88,1,0E11,-0.056,3,0
22  R,110,26.87,1,0E11,-0.052,3,0
23  R,111,29.85,1,0E11,-0.047,3,0
24  R,112,32.84,1,0E11,-0.043,3,0
25  R,113,35.83,1,0E11,-0.039,3,0
26  R,114,38.82,1,0E11,-0.035,3,0
27  R,115,41.81,1,0E11,-0.031,3,0
28  R,116,44.79,1,0E11,-0.028,3,0
29  R,117,47.78,1,0E11,-0.024,3,0
30  R,118,50.77,1,0E11,-0.021,3,0
31  R,119,53.77,1,0E11,-0.018,3,0
32  R,120,56.76,1,0E11,-0.015,3,0
33  R,121,59.76,1,0E11,-0.013,3,0
34  R,122,62.74,1,0E11,-0.010,3,0
35  R,123,65.73,1,0E11,-0.008,3,0
36  R,124,68.73,1,0E11,-0.006,3,0
37  R,125,71.72,1,0E11,-0.005,3,0
38  R,126,74.71,1,0E11,-0.003,3,0
39  R,127,77.72,1,0E11,-0.002,3,0
40  R,128,80.71,1,0E11,-0.001,3,0
41  C*** NODE GENERATION
42  CSYS,1
43  N,1,18.655,-90
44  N,31,18.655,0
45  FILL
46  NGEN,2,31,1,31,1,-0.49
47  NDELE,39
48  CSYS,0
49  N,63,0,-17
50  N,64,0.4,-17
51  N,70,6.4,-17
52  FILL
53  N,71,0,-16
54  N,72,.4,-16
55  N,73,6.4,-16
56  N,74,7.2,-16
57  NGEN,2,5,71,74,1,1,0
58  N,80,8.2,-15
59  N,81,9.2,-15
60  NGEN,2,6,76,81,1,1,0

```


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***** ANSYS INPUT DATA LISTING (FILE16) *****

```

61  N,88,10.2,-14
62  NGEN,2,7,82,88,1,,1.0
63  N,96,11.2,-13
64  N,97,12.2,-13
65  NGEN,2,9,89,97,1,,1.0
66  N,107,13.2,-12
67  N,108,0,-11
68  N,109,-4,-11
69  N,115,6.4,-11
70  FILL
71  N,116,7.2,-11
72  N,122,13.2,-11
73  FILL
74  NGEN,2,15,108,115,1,,.375
75  N,131,6.6,-10.625
76  NGEN,2,9,123,131,1,,.375
77  N,141,7.2,-10.25
78  N,147,13.2,-10.25
79  FILL
80  N,148,13.6,-10.25
81  N,149,14.6,-10.25
82  N,150,0,-9.25
83  N,151,-4,-9.25
84  N,152,6.4,-9.25
85  N,153,6.6,-9.25
86  N,154,7.2,-9.25
87  N,155,13.2,-9.25
88  N,156,13.6,-9.25
89  N,157,14.6,-9.25
90  NGEN,2,8,150,157,1,,1.0
91  N,166,15.6,-8.25
92  NGEN,2,9,158,166,1,,1.0
93  NGEN,2,9,167,175,1,,1.0
94  N,183,16.6,-6.25
95  NGEN,2,10,176,183,1,,1.0
96  NGEN,2,64,132,148,1,,6.0
97  N,213,16.6,-4.25
98  FILL,212,213
99  N,216,0,-3.625
100  N,219,3,-3.625
101  FILL
102  N,220,3.8,-3.625
103  N,226,9.8,-3.625
104  FILL
105  N,227,10.6,-3.625
106  N,233,16.6,-3.625
107  FILL
108  NGEN,2,18,216,219,1,,0.625
109  N,238,3.4,-3.0
110  N,239,3.8,-3.0
111  N,245,9.8,-3.0
112  FILL
113  N,246,10.2,-3.0
114  N,247,10.6,-3.0
115  N,253,16.6,-3.0
116  FILL
117  NGEN,2,17,237,239,1,,1.0
118  NGEN,2,12,245,247,1,,1.0
119  N,260,16.6,-2
120  NGEN,3,7,254,260,1,,1.0

```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

121 C*** ELEMENT GENERATION

122 E.1,2,33,32
123 EGEN,6,1,-1
124 E.7,8,70,38
125 E.8,9,40,70
126 E.9,10,41,40
127 EGEN,22,1,-1
128 E.32,44,63
129 E.32,33,64
130 E.33,34,63,64
131 EGEN,5,1,-1
132 E.38,70,69
133 E.63,64,72,71
134 E.70,40,74,73
135 E.40,41,74
136 E.71,72,77,76
137 E.73,74,79,78
138 E.74,41,80,79
139 E.41,42,81,80
140 E.42,43,81
141 E.76,77,83,82
142 E.78,79,83,84
143 E.79,80,84,83
144 E.80,81,87,86
145 E.81,43,44
146 E.81,44,88
147 E.81,88,87
148 E.83,83,90,89
149 E.84,83,92,91
150 EGEN,4,1,-1
151 E.88,43,86,93
152 E.44,43,88
153 E.43,46,96
154 E.46,97,96
155 E.46,47,97
156 E.89,90,99,98
157 E.91,92,101,100
158 EGEN,4,1,-1
159 E.97,47,106
160 E.47,107,106
161 E.47,48,107
162 E.98,99,109,108
163 E.100,101,116,115
164 EGEN,7,1,-1
165 E.48,49,107
166 E.107,49,122
167 E.49,50,122
168 E.108,109,124,123
169 EGEN,7,1,-1
170 E.113,131,130
171 E.115,116,131
172 E.123,124,133,132
173 EGEN,7,1,-1
174 E.130,131,140,139
175 E.131,116,141
176 E.131,141,140
177 E.116,117,142,141
178 EGEN,6,1,-1
179 E.122,143,147
180 E.122,50,148

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***** ANSYS INPUT DATA LISTING (FILE:8) *****

181 E.148,30,149
182 E.30,31,149
183 E.132,133,131,130
184 E.139,140,133,132
185 E.140,141,134,133
186 E.147,148,136,133
187 E.148,149,137,136
188 E.149,31,137
189 E.31,32,137
190 E.130,131,139,138
191 E.132,133,141,140
192 E.133,134,142,141
193 E.135,136,144,143
194 E.136,137,143,144
195 E.137,32,144,143
196 E.32,33,144
197 E.138,139,146,147
198 E.140,141,170,149
199 E.141,142,171,170
200 E.143,144,173,172
201 E.144,145,174,173
202 E.145,146,175,174
203 E.146,33,34,175
204 E.147,148,177,176
205 E.149,170,179,178
206 E.170,171,180,179
207 E.172,173,182,181
208 EGEN,3,1,-1
209 E.173,34,183,184
210 E.34,35,183
211 E.174,177,187,186
212 E.178,179,189,188
213 E.179,180,190,189
214 E.181,182,192,191
215 EGEN,4,1,-1
216 E.35,36,183
217 E.183,36,193
218 E.184,187,197,196
219 E.188,189,204,203
220 E.189,190,203,204
221 E.191,192,212,211
222 EGEN,4,1,-1
223 E.193,36,37
224 E.193,37,213
225 E.213,37,38
226 E.196,197,216
227 E.197,198,217,216
228 EGEN,3,1,-1
229 E.200,220,219
230 E.200,201,221,220
231 EGEN,3,1,-1
232 E.203,204,223
233 E.204,205,223
234 E.203,206,224,223
235 EGEN,3,1,-1
236 E.208,227,226
237 E.208,209,228,227
238 EGEN,3,1,-1
239 E.211,212,230
240 E.212,213,231,230

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

```

241 EGEN,3,1,-1
242 E,215,58,233
243 E,216,217,235,234
244 EGEN,3,1,-1
245 E,219,238,237
246 E,219,220,238
247 E,220,239,238
248 E,220,221,240,239
249 EGEN,6,1,-1
250 E,226,246,243
251 E,226,227,246
252 E,227,247,246
253 E,227,228,248,247
254 EGEN,6,1,-1
255 E,233,58,59,233
256 E,237,238,235,234
257 E,238,239,236,233
258 E,243,246,238,237
259 E,246,247,239,238
260 E,233,59,60,260
261 E,254,233,262,261
262 E,233,256,263,262
263 E,237,258,265,264
264 E,238,239,266,263
265 E,260,60,61,267
266 E,261,262,269,268
267 E,262,263,270,269
268 E,264,265,272,271
269 E,265,266,273,272
270 E,267,61,62,274
271 C*** SYMMETRIC GENERATION
272 SYM4,1,1000,1,500
273 ESTY4,2,1000,1,500
274 MERGE
275 C*** BOUNDARY NODES
276 NGEN,2,2000,4,28,1
277 CSYS,0
278 C*** MASS ELEMENTS
279 TYPE,2
280 REAL,2
281 E,233
282 E,274
283 E,147
284 E,211
285 E,243
286 E,271
287 E,70
288 E,113
289 E,139
290 E,203
291 E,237
292 E,268
293 E,1247
294 E,1273
295 E,1239
296 E,1270
297 E,1141
298 E,1203
299 E,1064
300 E,1109

```

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***** ANSYS INPUT DATA LISTING (FILE16) *****

301 E.1133
302 E.1197
303 REAL,3
304 E.260
305 E.267
306 E.257
307 E.264
308 E.254
309 E.261
310 E.155
311 E.163
312 E.172
313 E.181
314 E.191
315 E.152
316 E.160
317 E.169
318 E.178
319 E.188
320 E.73
321 E.78
322 E.84
323 E.91
324 E.100
325 E.1072
326 E.1077
327 E.1083
328 E.1090
329 E.1099
330 E.1131
331 E.1139
332 E.1168
333 E.1177
334 E.1187
335 E.1134
336 E.1162
337 E.1171
338 E.1180
339 E.1190
340 E.1266
341 E.1239
342 E.1263
343 E.1236
344 C*** GAP ELEMENTS
345 TYPE,3
346 REAL,104
347 E.2004,4
348 REAL,103
349 E.2003,3
350 REAL,106
351 E.2006,6
352 REAL,107
353 E.2007,7
354 REAL,108
355 E.2008,8
356 REAL,109
357 E.2009,9
358 REAL,110
359 E.2010,10
360 REAL,111

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

361 E,2011,11
362 REAL,112
363 E,2012,12
364 REAL,113
365 E,2013,13
366 REAL,114
367 E,2014,14
368 REAL,115
369 E,2015,15
370 REAL,116
371 E,2016,16
372 REAL,117
373 E,2017,17
374 REAL,118
375 E,2018,18
376 REAL,119
377 E,2019,19
378 REAL,120
379 E,2020,20
380 REAL,121
381 E,2021,21
382 REAL,122
383 E,2022,22
384 REAL,123
385 E,2023,23
386 REAL,124
387 E,2024,24
388 REAL,125
389 E,2025,25
390 REAL,126
391 E,2026,26
392 REAL,127
393 E,2027,27
394 REAL,128
395 E,2028,28
396 *$OKT, Y
397 C*** BOUNDARY CONDITIONS
398 SYMBC, 0, 2, 0
399 D, 31, ALL, 0, 0
400 CSYS, 1
401 *$ROTATE, 29, 30
402 D, 29, UZ, 0, 0
403 D, 30, UZ, 0, 0
404 CSYS, 0
405 D, 93, UZ, 0, 0
406 D, 94, UZ, 0, 0
407 D, 95, UZ, 0, 0
408 D, 102, UZ, 0, 0
409 D, 103, UZ, 0, 0
410 D, 104, UZ, 0, 0
411 D, 117, UZ, 0, 0
412 D, 118, UZ, 0, 0
413 D, 119, UZ, 0, 0
414 D, 1093, UZ, 0, 0
415 D, 1094, UZ, 0, 0
416 D, 1095, UZ, 0, 0
417 D, 1102, UZ, 0, 0
418 D, 1103, UZ, 0, 0
419 D, 1104, UZ, 0, 0
420 D, 1117, UZ, 0, 0

```

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```
421 D,1118,UZ,0.0
422 D,1119,UZ,0.0
423 D,2004,ALL,0.0,,2018,1
424 C*** LOADING CONDITIONS
425 TIME,0.25E-3
426 ITEL,12,,1
427 ACEL,-81144
428 LWRITE
429 TIME,0.5E-3
430 ITEL,12,,1
431 ACEL,0.0
432 LWRITE
433 TIME,.02
434 ITEL,30,,1
435 LWRITE
436 AFWRITE
437 FINISH
438 /EXEC
439 /INPUT,27
440 FINISH
441 /POST26
442 TIME,0.0,0.03
443 DISP,2.273,UY
444 DISP,3.171,UY
445 ESTE,4.219,40,SI
446 ESTE,5.178,43,SI
447 ESTE,6.177,43,SI
448 ESTE,7.176,43,SI
449 ESTE,8.130,40,SI
450 ESTE,9.100,43,SI
451 /SHOW,PLOTS,,1
452 PLVAL,2,3
453 PLVAL,4,8,9
454 PLVAL,5,6,7
455 EXTEND,2,9,1
456 FINISH
457 /EOF
```

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March 1995

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NUCLEAR PACEL MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK.

IP300 2" SPACER DISK 1 FOOT SIDE DROP ANALYSIS

21.1019 MAR 22, 1990 CP= 6551.680

***** GENERAL GRAPH POSTPROCESSOR (POST26) *****

ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS

MINIMUM TIME= 0.00000E+00 MAXIMUM TIME= 0.30000E-01

*** NOTE ***

REDEFINITION OF TIME RANGE ERASES ALL PREVIOUSLY STORED OR CALCULATED DATA

VARIABLE 2 IS 273 UY

VARIABLE 3 IS 171 UY

VARIABLE 4 IS ELEMENT 219 ITEM 40 NAME= 219 SI

VARIABLE 5 IS ELEMENT 178 ITEM 43 NAME= 178 SI

VARIABLE 6 IS ELEMENT 177 ITEM 43 NAME= 177 SI

VARIABLE 7 IS ELEMENT 176 ITEM 43 NAME= 176 SI

VARIABLE 8 IS ELEMENT 130 ITEM 40 NAME= 130 SI

VARIABLE 9 IS ELEMENT 100 ITEM 43 NAME= 100 SI

/SHOW SWITCH PLOTS TO FILE PLOTS - VECTOR MODE

STORAGE COMPLETE FOR 74 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	273	UY	273	UY	0.0000E+00	0.2000E-01	0.0000E+00	0.2000E-01
3	DISP	171	UY	171	UY	-0.1384E-02	0.1298E-01	0.1168E-02	0.1142E-01
4	ESTR	219	40	219	SI	0.2022E-03	0.2083E-04	0.2375E+03	0.3620E-02
5	ESTR	178	43	178	SI	0.3431E-01	0.2083E-04	0.1333E+03	0.1280E-02
6	ESTR	177	43	177	SI	0.1127E-01	0.2083E-04	0.1164E+03	0.8900E-03
7	ESTR	176	43	176	SI	0.6358E-02	0.2083E-04	0.1147E+03	0.1280E-02
8	ESTR	130	40	130	SI	0.1996E-03	0.2083E-04	0.1990E+03	0.1280E-02
9	ESTR	100	43	100	SI	0.3668E-03	0.2083E-04	3391.	0.1670E-02

PLOT DEFINITION

CURVE VARIABLE NAME
1 2 273 UY
2 3 171 UY

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS
DISPLAY TITLE= IP300 2" SPACER DISK 1 FOOT SIDE DROP ANALYSIS

- VECTOR MODE

PLOT DEFINITION

CURVE VARIABLE NAME
1 4 219 SI
2 8 130 SI
3 9 100 SI

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS
DISPLAY TITLE= IP300 2" SPACER DISK 1 FOOT SIDE DROP ANALYSIS

- VECTOR MODE

PLOT DEFINITION

CURVE VARIABLE NAME
1 5 178 SI
2 6 177 SI
3 7 176 SI

CUMULATIVE DISPLAY NUMBER 3 WRITTEN TO FILE PLOTS
DISPLAY TITLE= IP300 2" SPACER DISK 1 FOOT SIDE DROP ANALYSIS

- VECTOR MODE

POST26 SUMMARY OF VARIABLE EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	273	UY	273	UY	0.0000E+00	0.2000E-01	0.0000E+00	0.2000E-01
3	DISP	171	UY	171	UY	-0.1384E-02	0.1298E-01	0.1168E-02	0.1142E-01
4	ESTR	219	40	219	SI	0.2022E-03	0.2083E-04	0.2375E+03	0.3620E-02
5	ESTR	178	43	178	SI	0.3431E-01	0.2083E-04	0.1333E+03	0.1280E-02
6	ESTR	177	43	177	SI	0.1127E-01	0.2083E-04	0.1164E+03	0.8900E-03
7	ESTR	176	43	176	SI	0.6358E-02	0.2083E-04	0.1147E+03	0.1280E-02
8	ESTR	130	40	130	SI	0.1996E-03	0.2083E-04	0.1990E+03	0.1280E-02
9	ESTR	100	43	100	SI	0.3668E-03	0.2083E-04	3391.	0.1670E-02

***** ROUTINE COMPLETED ***** CP = 5679.770

/EOF ENCOUNTERED ON FILE 8

PREP7 AFWRITE OR SPWRITE WARNING MESSAGES = 1
NUMBER OF SOLUTION PHASE WARNING MESSAGES = 1

***** RUN COMPLETED ***** CP= 6680.2600 TIME= 21.1376

***** ANSYS INPUT DATA LISTING (FILE18) *****

```
/OUTPUT,PS1FOOT.RES
/PREP7
/TITLE,POISON SHEET 1' DROP ANALYSIS 7/16" X 19 1/16" 0 DEG.
KAN,2
KAY,3,1
ET,1,3
ET,2,21...4
EX,1,25.8E6
NUXY,1,0.29
DENS,1,0.000725
GAMMA,0,02.20
C*** REAL CONSTANTS
R,1,0.44,0.0071,0.44
C*** NODES
N,1,0,0
N,11,19.0625,0
FILL
C*** ELEMENTS
E,1,2
EGEN,10,1,-1
ITER,1,1,1
C*** BOUNDARY CONDITIONS
D,1,UY,0,0
D,1,UX,0,0
D,11,UY,0,0
ITER,1,1,1
M,6,UY
M,11,UX
TOTAL,5
AFWRITE
FINISH
/INPUT,27
FINISH
/PREP7
RESUME
KAN,5
KAY,3
C*** INITIAL CONDITIONS AT REST
TIME,0
ACEL,,0
LWRITE
TIME,0.25E-3
C*** LOADING STEP 1
ACEL,,81144
ITER,20,0,1
LWRITE
C*** LOADING STEP 2
TIME,0.5E-3
ITER,20,0,1
ACEL,,0,0
LWRITE
C*** LOADING STEP 3
TIME,1
ITER,100,0,1
LWRITE
SLOAD,1
AFWRITE
FINISH
/LNFREQ,5
/INPUT,27
FINISH
/POST26
FILE,10
DISP,2,6,UY,UY
DISP,3,11,UX,UX
EXTREM,2,3,1
/GRAPH,LABX,SEC.
/GRAPH,LABY,IN.
/TITLE,7/16" X 19 1/16" POISON SHEET 1' 0 DEG. SIDE DROP DISPLACEMENT
/SHOW,PLOT1..1
PLVAR,2
/SHOW,PLOT2..1
PLVAR,3
```

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FINISH
/STRESS..5
TIME.1
NSTRES.100
END
FINISH
/POST26
ESTR.4.5.11.SB
RFORCE.5.1.FY
RFORCE.6.11.FY
/TITLE.7/16" X 19 1/16" POISON SHEET 1' SIDE DROP BENDING STRESS
/SHOW.PLOT3..1
/GRAPH.LABY.PSI
PLVAR.4
/SHOW.PLOT4..1
/TITLE.7/16" X 19 1/16" POISON SHEET 1' SIDE DROP END REACTIONS
/GRAPH.LABY.#/IN
PLVAR.5.6
FINISH
/OUTPUT
/EOF

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***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 9.060 ***
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= POISON SHEET 1' DROP ANALYSIS 7/16" X 19 1/16" 0 DEG.

VARIABLE 2 IS 6 UY

VARIABLE 3 IS 11 UX

POST26 SUMMARY OF VARIABLE EXTREME VALUES							
VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME	
2 DISP	6 UY	6 UY	-0.3780E-01	0.2203E-01	0.3791E-01	0.7515E-02	
3 DISP	11 UX	11 UX	-0.9012E-17	0.8981E-03	0.1733E-16	0.2933E-03	

VARIABLE 4 IS ELEMENT 5 ITEM 11 NAME= 5 SB

VARIABLE 5 IS REACTION FORCE 1 FY

VARIABLE 6 IS REACTION FORCE 11 FY

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES							
VARI TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME	
4 ESTR	5 11	5 SB	-6147.	0.2200	6394.	0.7000E-01	
5 RFOR	1 FY	1 FY	-33.70	0.5000	33.76	0.3600	
6 RFOR	11 FY	11 FY	-27.15	0.4800	27.00	0.3400	

***** ROUTINE COMPLETED ***** CP = 465.880

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***** ANSYS INPUT DATA LISTING (FILES) *****

```

1 /PREP7
2 /TITLE,SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS
3 KAP,-1
4 ET,1,35
5 DENS,1,0.00073
6 NUXY,1,0.29
7 EL,1,28.2E6
8 KEX,1,8.8
9 ALPX,1,8.92E-6
10 C=000 NODE GENERATION
11 CSYS,1
12 N,1,18.655,-90
13 N,31,18.655,0
14 FILL
15 NGEN,2,31,1,31,1,-0.49
16 NDEL,39
17 CSYS,0
18 N,63,0,-17
19 N,64,0.4,-17
20 N,70,6.4,-17
21 FILL
22 N,71,0,-16
23 N,72,6.4,-16
24 N,73,6.4,-16
25 N,74,7.2,-16
26 NGEN,2,71,74,1,,1.0
27 N,80,8.2,-13
28 N,81,9.2,-13
29 NGEN,2,8,74,81,1,,1.0
30 N,88,10.2,-14
31 NGEN,2,7,82,88,1,,1.0
32 N,96,11.2,-13
33 N,97,12.2,-13
34 NGEN,2,9,89,97,1,,1.0
35 N,107,13.2,-12
36 N,108,0,-11
37 N,109,4,-11
38 N,113,6.4,-11
39 FILL
40 N,116,7.2,-11
41 N,122,13.2,-11
42 FILL
43 NGEN,2,13,108,113,1,...373
44 N,131,6.8,-10.623
45 NGEN,2,9,123,131,1,...373
46 N,141,7.2,-10.23
47 N,147,13.2,-10.23
48 FILL
49 N,148,13.6,-10.23
50 N,149,14.6,-10.23
51 N,150,0,-9.23
52 N,151,4,-9.23
53 N,152,6.4,-9.23
54 N,153,6.8,-9.23
55 N,154,7.2,-9.23
56 N,155,13.2,-9.23
57 N,156,13.6,-9.23
58 N,157,14.6,-9.23
59 NGEN,2,8,150,157,1,,1.0
60 N,166,13.6,-8.23

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***** AMSYS INPUT DATA LISTING (FILE16) *****

```

61 NGEN 2,9,158,166,1,,1.0
62 NGEN 2,9,167,173,1,,1.0
63 M 163,16.6,-6.25
64 NGEN 2,10,176,183,1,,1.0
65 NGEN 2,66,132,148,1,,6.0
66 M 215,16.6,-4.25
67 FILL 212,213
68 M 216,0,-3.625
69 M 219,3,-3.625
70 FILL
71 M 220,3.8,-3.625
72 M 226,9.8,-3.625
73 FILL
74 M 227,10.6,-3.625
75 M 233,16.6,-3.625
76 FILL
77 NGEN 2,16,216,219,1,,0.625
78 M 238,3.4,-3.0
79 M 239,3.8,-3.0
80 M 243,9.8,-3.0
81 FILL
82 M 246,10.2,-3.0
83 M 247,10.6,-3.0
84 M 253,16.6,-3.0
85 FILL
86 NGEN 2,17,237,239,1,,1.0
87 NGEN 2,12,243,247,1,,1.0
88 M 260,16.6,-2
89 NGEN 3,7,254,260,1,,1.0
90 C*** ELEMENT GENERATION
91 E 1,2,33,32
92 EGEN 6,1,-1
93 E 7,8,70,38
94 E 8,9,40,70
95 E 9,10,41,40
96 EGEN 22,1,-1
97 E 32,64,63
98 E 32,33,64
99 E 33,34,63,64
100 EGEN 3,1,-1
101 E 38,70,69
102 E 63,64,72,71
103 E 70,40,74,73
104 E 40,41,74
105 E 71,72,77,76
106 E 73,74,79,78
107 E 74,41,80,79
108 E 41,42,81,80
109 E 42,43,81
110 E 76,77,83,82
111 E 78,79,85,84
112 E 79,80,86,83
113 E 80,81,87,86
114 E 81,43,44
115 E 81,44,88
116 E 81,88,87
117 E 82,83,90,89
118 E 84,85,92,91
119 EGEN 4,1,-1
120 E 88,45,96,95

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***** ANSYS INPUT DATA LISTING (FILE18) *****

121 E,44,45,88
122 E,43,46,96
123 E,46,97,96
124 E,46,47,97
125 E,89,90,99,98
126 E,91,92,101,100
127 EGEN,6,1,-1
128 E,97,47,106
129 E,47,107,106
130 E,47,48,107
131 E,98,99,109,108
132 E,100,101,116,115
133 EGEN,7,1,-1
134 E,48,49,107
135 E,107,49,122
136 E,49,50,122
137 E,108,109,124,123
138 EGEN,7,1,-1
139 E,115,131,130
140 E,115,116,131
141 E,123,124,133,132
142 EGEN,7,1,-1
143 E,130,131,140,139
144 E,131,116,141
145 E,131,141,149
146 E,116,117,142,141
147 EGEN,6,1,-1
148 E,122,148,147
149 E,122,50,148
150 E,148,50,149
151 E,50,51,149
152 E,132,133,151,150
153 E,139,140,153,152
154 E,140,141,154,153
155 E,147,148,156,155
156 E,148,149,157,156
157 E,149,51,157
158 E,51,52,157
159 E,150,151,159,158
160 E,152,153,161,160
161 E,153,154,162,161
162 E,155,156,164,163
163 E,156,157,165,164
164 E,157,52,166,165
165 E,52,53,166
166 E,158,159,168,167
167 E,160,161,170,169
168 E,161,162,171,170
169 E,163,164,173,172
170 E,164,165,174,173
171 E,165,166,175,174
172 E,166,53,54,173
173 E,167,168,177,176
174 E,169,170,179,178
175 E,170,171,180,179
176 E,172,173,182,181
177 EGEN,3,1,-1
178 E,175,54,183,184
179 E,54,55,183
180 E,176,177,187,186

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***** ANSYS INPUT DATA LISTING (FILE10) *****

```

181 E,178,179,189,188
182 E,179,180,190,189
183 E,181,182,192,191
184 EGEN,4,1,-1
185 E,35,36,183
186 E,183,36,193
187 E,186,187,197,196
188 E,188,189,204,203
189 E,189,190,205,204
190 E,191,192,212,211
191 EGEN,4,1,-1
192 E,193,36,37
193 E,193,37,213
194 E,213,37,38
195 E,196,197,216
196 E,197,198,217,216
197 EGEN,3,1,-1
198 E,200,220,219
199 E,200,201,221,220
200 EGEN,3,1,-1
201 E,203,204,223
202 E,204,205,223
203 E,203,206,224,223
204 EGEN,3,1,-1
205 E,208,227,226
206 E,208,209,228,227
207 EGEN,3,1,-1
208 E,211,212,230
209 E,212,213,231,230
210 EGEN,3,1,-1
211 E,213,38,233
212 E,216,217,233,234
213 EGEN,3,1,-1
214 E,219,238,237
215 E,219,220,238
216 E,220,239,238
217 E,220,221,240,239
218 EGEN,6,1,-1
219 E,226,246,243
220 E,226,227,246
221 E,227,247,246
222 E,227,228,248,247
223 EGEN,6,1,-1
224 E,233,38,39,233
225 E,237,238,233,234
226 E,238,239,236,233
227 E,243,246,238,237
228 E,246,247,239,238
229 E,253,39,40,260
230 E,254,255,262,261
231 E,253,256,263,262
232 E,257,258,263,264
233 E,258,259,266,263
234 E,260,60,61,267
235 E,261,262,269,268
236 E,262,263,270,269
237 E,264,265,272,271
238 E,263,266,273,272
239 E,267,61,62,274
240 C*** NODE TEMPERATURES

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***** ARSYS INPUT DATA LISTING (FILE#) *****

241 NT, 1, TEMP, 231.0
242 NT, 2, TEMP, 230.8
243 NT, 3, TEMP, 230.6
244 NT, 4, TEMP, 230.4
245 NT, 5, TEMP, 230.2
246 NT, 6, TEMP, 230.0
247 NT, 7, TEMP, 230.0
248 NT, 8, TEMP, 229.9
249 NT, 9, TEMP, 229.9
250 NT, 10, TEMP, 229.9
251 NT, 11, TEMP, 229.9
252 NT, 12, TEMP, 229.9
253 NT, 13, TEMP, 229.9
254 NT, 14, TEMP, 229.9
255 NT, 15, TEMP, 229.9
256 NT, 16, TEMP, 229.9
257 NT, 17, TEMP, 229.9
258 NT, 18, TEMP, 229.9
259 NT, 19, TEMP, 229.9
260 NT, 20, TEMP, 229.9
261 NT, 21, TEMP, 230
262 NT, 22, TEMP, 230
263 NT, 23, TEMP, 230.1
264 NT, 24, TEMP, 230.2
265 NT, 25, TEMP, 230.3
266 NT, 26, TEMP, 230.4
267 NT, 27, TEMP, 230.5
268 NT, 28, TEMP, 230.5
269 NT, 29, TEMP, 230.5
270 NT, 30, TEMP, 230.5
271 NT, 31, TEMP, 230.5
272 NT, 63, TEMP, 340.8
273 NT, 64, TEMP, 345.2
274 NT, 65, TEMP, 341.3
275 NT, 66, TEMP, 341.1
276 NT, 67, TEMP, 335.7
277 NT, 68, TEMP, 335.2
278 NT, 69, TEMP, 321.9
279 NT, 70, TEMP, 230.1
280 NT, 71, TEMP, 342.9
281 NT, 72, TEMP, 345.6
282 NT, 73, TEMP, 321.9
283 NT, 82, TEMP, 369.8
284 NT, 83, TEMP, 370.1
285 NT, 84, TEMP, 344.3
286 NT, 98, TEMP, 387.8
287 NT, 99, TEMP, 385.1
288 NT, 100, TEMP, 341.1
289 NT, 108, TEMP, 389.7
290 NT, 109, TEMP, 385.3
291 NT, 110, TEMP, 385.3
292 NT, 111, TEMP, 383.5
293 NT, 112, TEMP, 383.0
294 NT, 113, TEMP, 377.1
295 NT, 114, TEMP, 361.6
296 NT, 115, TEMP, 361.1
297 NT, 132, TEMP, 438.7
298 NT, 133, TEMP, 449.3
299 NT, 134, TEMP, 449.3
300 NT, 135, TEMP, 447.6

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***** ANSYS INPUT DATA LISTING (FILE16) *****

301 WT,136,TEQ,443.9
302 WT,137,TEQ,443.7
303 WT,138,TEQ,435.7
304 WT,139,TEQ,435.2
305 WT,141,TEQ,403.3
306 WT,142,TEQ,403.0
307 WT,143,TEQ,388.9
308 WT,144,TEQ,388.2
309 WT,145,TEQ,377.1
310 WT,146,TEQ,376.4
311 WT,147,TEQ,357.4
312 WT,150,TEQ,442.6
313 WT,151,TEQ,449.6
314 WT,152,TEQ,435.8
315 WT,154,TEQ,403.5
316 WT,155,TEQ,358.2
317 WT,167,TEQ,460.6
318 WT,168,TEQ,461.0
319 WT,169,TEQ,450.2
320 WT,171,TEQ,420.0
321 WT,172,TEQ,370.0
322 WT,186,TEQ,464.6
323 WT,187,TEQ,464.9
324 WT,188,TEQ,454.7
325 WT,190,TEQ,426.0
326 WT,191,TEQ,376.0
327 WT,196,TEQ,464.5
328 WT,197,TEQ,464.9
329 WT,198,TEQ,464.9
330 WT,199,TEQ,464.0
331 WT,200,TEQ,461.5
332 WT,201,TEQ,461.3
333 WT,202,TEQ,455.0
334 WT,203,TEQ,454.5
335 WT,205,TEQ,426.3
336 WT,206,TEQ,425.9
337 WT,207,TEQ,413.6
338 WT,208,TEQ,413.0
339 WT,209,TEQ,403.2
340 WT,210,TEQ,376.6
341 WT,211,TEQ,375.5
342 WT,234,TEQ,486.6
343 WT,235,TEQ,486.5
344 WT,236,TEQ,485.3
345 WT,237,TEQ,485.1
346 WT,239,TEQ,473.5
347 WT,240,TEQ,473.3
348 WT,241,TEQ,468.9
349 WT,242,TEQ,468.7
350 WT,243,TEQ,464.1
351 WT,244,TEQ,456.1
352 WT,245,TEQ,455.5
353 WT,247,TEQ,419.8
354 WT,248,TEQ,419.3
355 WT,249,TEQ,404.3
356 WT,250,TEQ,403.6
357 WT,251,TEQ,387.5
358 WT,252,TEQ,371.3
359 WT,253,TEQ,371.1
360 WT,254,TEQ,486.5

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***** AHSYS INPUT DATA LISTING (FILE18) *****

```

361 WT, 256, TEMP, 474.0
362 WT, 257, TEMP, 458.4
363 WT, 259, TEMP, 422.3
364 WT, 260, TEMP, 371.2
365 WT, 261, TEMP, 487.2
366 WT, 263, TEMP, 475.7
367 WT, 264, TEMP, 460.0
368 WT, 266, TEMP, 423.8
369 WT, 267, TEMP, 371.8
370 WT, 268, TEMP, 487.4
371 WT, 270, TEMP, 476.0
372 WT, 271, TEMP, 460.5
373 WT, 273, TEMP, 424.4
374 WT, 274, TEMP, 372.0
375 ITER, -20., 20
376 AFWHITE
377 FINE
378 /INPUT, 27
379 FINE
380 /PREP7
381 RESUME
382 KAN, 0
383 ET, 2, 42, ...3
384 EL, 2, 0
385 TEMP, 70
386 KTEMP, 1, 20
387 REAL, 1
388 TYPE, 2
389 EXODIS, ALL, 0
390 SYMBC, 0, 0
391 SYMBC, 2, 0
392 D, 234, UL, 0, 0
393 ITER, 1., 1
394 AFWHITE
395 FINE
396 /INPUT, 27
397 FINE
398 /POST1
399 SET, 1, 1
400 PLNSYS, SI
401 PDISP
402 /SHOW, PLOTS, .1
403 PLNSYS, TEMP
404 PLNSYS, SI
405 FINE
406 /EOF

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NUCLEAR PACE. MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK.

SPACE DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2773 MAY 1, 1990 CP= 263.370

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
 TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGE
1	0.4274E+05	-19.78	0.0000E+00	904.1	0.0000E+00	0.0000E+00	0.4274E+05	0.0000E+00	-38.89	0.4279E+05	0.4277E+05
2	0.4107E+05	-858.0	0.0000E+00	2360.	0.0000E+00	0.0000E+00	0.4107E+05	0.0000E+00	-1046.	0.4230E+05	0.4179E+05
3	0.3761E+05	-166.9	0.0000E+00	4891.	0.0000E+00	0.0000E+00	0.3761E+05	0.0000E+00	-633.8	0.3912E+05	0.3871E+05
4	0.3324E+05	1071.	0.0000E+00	6114.	0.0000E+00	0.0000E+00	0.3324E+05	0.0000E+00	-364.9	0.3474E+05	0.3442E+05
5	0.2861E+05	789.4	0.0000E+00	6808.	0.0000E+00	0.0000E+00	0.2861E+05	0.0000E+00	-808.2	0.3101E+05	0.3063E+05
6	0.2369E+05	3079.	0.0000E+00	6740.	0.0000E+00	0.0000E+00	0.2369E+05	0.0000E+00	-1992.	0.2733E+05	0.2696E+05
7	0.2248E+05	2966.	0.0000E+00	3997.	0.0000E+00	0.0000E+00	0.2248E+05	0.0000E+00	-3749.	0.2617E+05	0.2407E+05
8	0.2023E+05	-725.2	0.0000E+00	8444.	0.0000E+00	0.0000E+00	0.2023E+05	0.0000E+00	-638.5	0.2701E+05	0.2534E+05
9	0.2934E+05	6229.	0.0000E+00	0.1336E+05	0.0000E+00	0.0000E+00	0.2934E+05	0.0000E+00	-284.9	0.3476E+05	0.3406E+05
10	0.2231E+05	7363.	0.0000E+00	0.1309E+05	0.0000E+00	0.0000E+00	0.2231E+05	0.0000E+00	-222.4	0.3036E+05	0.3018E+05
11	0.1673E+05	6391.	0.0000E+00	0.1035E+05	0.0000E+00	0.0000E+00	0.1673E+05	0.0000E+00	-232.6	0.2339E+05	0.2339E+05
12	0.1371E+05	1193.	0.0000E+00	9477.	0.0000E+00	0.0000E+00	0.1371E+05	0.0000E+00	-214.2	0.2041E+05	0.2029E+05
13	0.1183E+05	6578.	0.0000E+00	9020.	0.0000E+00	0.0000E+00	0.1183E+05	0.0000E+00	-140.7	0.1883E+05	0.1872E+05
14	0.1060E+05	7046.	0.0000E+00	8778.	0.0000E+00	0.0000E+00	0.1060E+05	0.0000E+00	-133.0	0.1793E+05	0.1786E+05
15	9998.	7836.	0.0000E+00	8977.	0.0000E+00	0.0000E+00	9998.	0.0000E+00	-369.7	0.1610E+05	0.1603E+05
16	9420.	9041.	0.0000E+00	9582.	0.0000E+00	0.0000E+00	9420.	0.0000E+00	-73.13	0.1920E+05	0.1902E+05
17	9128.	0.1072E+05	0.0000E+00	9952.	0.0000E+00	0.0000E+00	9128.	0.0000E+00	-382.3	0.1999E+05	0.1995E+05
18	8403.	0.1239E+05	0.0000E+00	0.1048E+05	0.0000E+00	0.0000E+00	8403.	0.0000E+00	-147.4	0.2138E+05	0.2123E+05
19	7096.	0.1404E+05	0.0000E+00	0.1035E+05	0.0000E+00	0.0000E+00	7096.	0.0000E+00	-378.8	0.2189E+05	0.2171E+05
20	5937.	0.1473E+05	0.0000E+00	9444.	0.0000E+00	0.0000E+00	5937.	0.0000E+00	-382.3	0.2091E+05	0.2081E+05
21	4631.	0.1488E+05	0.0000E+00	8749.	0.0000E+00	0.0000E+00	4631.	0.0000E+00	-142.3	0.2030E+05	0.2011E+05
22	4034.	0.1574E+05	0.0000E+00	8134.	0.0000E+00	0.0000E+00	4034.	0.0000E+00	-287.9	0.2008E+05	0.2001E+05
23	3335.	0.1694E+05	0.0000E+00	7884.	0.0000E+00	0.0000E+00	3335.	0.0000E+00	-197.6	0.2083E+05	0.2071E+05
24	2885.	0.1871E+05	0.0000E+00	7620.	0.0000E+00	0.0000E+00	2885.	0.0000E+00	-340.0	0.2199E+05	0.2189E+05
25	2375.	0.2133E+05	0.0000E+00	7653.	0.0000E+00	0.0000E+00	2375.	0.0000E+00	-207.6	0.2440E+05	0.2423E+05
26	2241.	0.2593E+05	0.0000E+00	7978.	0.0000E+00	0.0000E+00	2241.	0.0000E+00	-739.5	0.2839E+05	0.2849E+05
27	1035.	0.3118E+05	0.0000E+00	7411.	0.0000E+00	0.0000E+00	1035.	0.0000E+00	-937.5	0.3369E+05	0.3333E+05
28	-176.7	0.3198E+05	0.0000E+00	4829.	0.0000E+00	0.0000E+00	-176.7	0.0000E+00	-491.7	0.3368E+05	0.3322E+05
29	-147.5	0.3016E+05	0.0000E+00	2131.	0.0000E+00	0.0000E+00	-147.5	0.0000E+00	-2.888	0.3086E+05	0.3055E+05
30	306.1	0.2679E+05	0.0000E+00	877.9	0.0000E+00	0.0000E+00	306.1	0.0000E+00	-397.1	0.2683E+05	0.2674E+05
31	-384.5	0.2527E+05	0.0000E+00	567.0	0.0000E+00	0.0000E+00	-384.5	0.0000E+00	0.0000E+00	0.2568E+05	0.2548E+05
32	0.2169E+05	3437.	0.0000E+00	1411.	0.0000E+00	0.0000E+00	0.2169E+05	0.0000E+00	1811.	0.2190E+05	0.2027E+05
33	0.2373E+05	817.4	0.0000E+00	3097.	0.0000E+00	0.0000E+00	0.2373E+05	0.0000E+00	-387.3	0.2773E+05	0.2634E+05
34	0.2464E+05	150.9	0.0000E+00	3623.	0.0000E+00	0.0000E+00	0.2464E+05	0.0000E+00	-391.0	0.2580E+05	0.2542E+05
35	0.2200E+05	833.1	0.0000E+00	4067.	0.0000E+00	0.0000E+00	0.2200E+05	0.0000E+00	-911.0	0.2316E+05	0.2273E+05
36	0.2127E+05	602.0	0.0000E+00	4513.	0.0000E+00	0.0000E+00	0.2127E+05	0.0000E+00	-631.2	0.2313E+05	0.2246E+05
37	0.2285E+05	1796.	0.0000E+00	4947.	0.0000E+00	0.0000E+00	0.2285E+05	0.0000E+00	-2887.	0.2485E+05	0.2381E+05
38	0.3288E+05	-1035.	0.0000E+00	7062.	0.0000E+00	0.0000E+00	0.3288E+05	0.0000E+00	-4720.	0.3762E+05	0.3630E+05
39	0.1693E+05	350.1	0.0000E+00	0.1017E+05	0.0000E+00	0.0000E+00	0.1693E+05	0.0000E+00	-172.1	0.2692E+05	0.2510E+05
40	0.1399E+05	6939.	0.0000E+00	8573.	0.0000E+00	0.0000E+00	0.1399E+05	0.0000E+00	-798.5	0.1993E+05	0.1923E+05
41	0.1299E+05	5537.	0.0000E+00	8823.	0.0000E+00	0.0000E+00	0.1299E+05	0.0000E+00	-107.1	0.1967E+05	0.1906E+05
42	0.1193E+05	6536.	0.0000E+00	8146.	0.0000E+00	0.0000E+00	0.1193E+05	0.0000E+00	-62.37	0.1794E+05	0.1753E+05
43	0.1119E+05	7486.	0.0000E+00	7500.	0.0000E+00	0.0000E+00	0.1119E+05	0.0000E+00		0.1714E+05	0.1640E+05

NEDO-10084-4
March 1995

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NUCLEAR PACER MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2776 MAY 1, 1990 CP= 264.190

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGC
43	9948.	7217.	0.0000E+00	6846.	0.0000E+00	0.0000E+00	0.1357E+05	1626.	-28.71	0.1360E+05	0.1492E+05
46	0.1048E+03	8238.	0.0000E+00	7185.	0.0000E+00	0.0000E+00	0.1664E+05	2143.	-44.04	0.1670E+05	0.1378E+05
47	0.1020E+03	9662.	0.0000E+00	7268.	0.0000E+00	0.0000E+00	0.1724E+05	2733.	-105.9	0.1734E+05	0.1622E+05
48	8306.	9137.	0.0000E+00	8054.	0.0000E+00	0.0000E+00	0.1680E+05	773.3	-126.3	0.1692E+05	0.1650E+05
49	9231.	0.1121E+05	0.0000E+00	7799.	0.0000E+00	0.0000E+00	0.1812E+05	2547.	-226.9	0.1835E+05	0.1730E+05
50	0.1002E+03	0.1408E+05	0.0000E+00	7205.	0.0000E+00	0.0000E+00	0.1964E+05	4664.	-206.7	0.1985E+05	0.1817E+05
51	6737.	0.1339E+05	0.0000E+00	6911.	0.0000E+00	0.0000E+00	0.1775E+05	2491.	-84.58	0.1783E+05	0.1677E+05
52	4883.	0.1294E+05	0.0000E+00	6612.	0.0000E+00	0.0000E+00	0.1667E+05	1238.	-83.26	0.1675E+05	0.1621E+05
53	3153.	0.1312E+05	0.0000E+00	6837.	0.0000E+00	0.0000E+00	0.1661E+05	421.1	-758.3	0.1737E+05	0.1683E+05
54	3438.	0.1432E+05	0.0000E+00	6384.	0.0000E+00	0.0000E+00	0.1744E+05	614.3	-97.86	0.1754E+05	0.1720E+05
55	3484.	0.1603E+05	0.0000E+00	6674.	0.0000E+00	0.0000E+00	0.1893E+05	698.8	-113.7	0.1904E+05	0.1863E+05
56	4429.	0.1775E+05	0.0000E+00	6699.	0.0000E+00	0.0000E+00	0.2057E+05	1760.	-133.8	0.2073E+05	0.1988E+05
57	5692.	0.1963E+05	0.0000E+00	6299.	0.0000E+00	0.0000E+00	0.2211E+05	3369.	-158.3	0.2227E+05	0.2084E+05
58	1680.	0.2024E+05	0.0000E+00	5241.	0.0000E+00	0.0000E+00	0.2181E+05	2024.	-1893.	0.2370E+05	0.2211E+05
59	-2208.	0.2426E+05	0.0000E+00	2608.	0.0000E+00	0.0000E+00	0.2464E+05	0.0000E+00	-1627.	0.2731E+05	0.2618E+05
60	147.1	0.2167E+05	0.0000E+00	780.6	0.0000E+00	0.0000E+00	0.2173E+05	420.9	-333.8	0.2206E+05	0.2170E+05
61	24.22	0.2025E+05	0.0000E+00	273.2	0.0000E+00	0.0000E+00	0.2026E+05	164.9	-147.0	0.2040E+05	0.2025E+05
62	-227.3	0.2001E+05	0.0000E+00	203.2	0.0000E+00	0.0000E+00	0.2002E+05	0.0000E+00	-231.8	0.2025E+05	0.2014E+05
63	-9987.	-0.1441E+05	0.0000E+00	647.9	0.0000E+00	0.0000E+00	0.0000E+00	-9839.	-0.1433E+05	0.1433E+05	0.1292E+05
64	-0.1051E+03	-0.1422E+05	0.0000E+00	2182.	0.0000E+00	0.0000E+00	0.0000E+00	-6331.	-0.1839E+05	0.1839E+05	0.1697E+05
65	-0.1348E+03	420.7	0.0000E+00	1893.	0.0000E+00	0.0000E+00	843.3	-146.6	-0.1376E+05	0.1460E+05	0.1414E+05
66	-3568.	-497.2	0.0000E+00	1833.	0.0000E+00	0.0000E+00	349.3	-32.14	-6362.	7112.	6835.
67	2771.	17.31	0.0000E+00	2011.	0.0000E+00	0.0000E+00	4843.	0.0000E+00	-2034.	4897.	6141.
68	0.1358E+05	-582.3	0.0000E+00	3071.	0.0000E+00	0.0000E+00	0.1429E+05	304.4	-1794.	0.1608E+05	0.1307E+05
69	0.2977E+05	-3751.	0.0000E+00	3332.	0.0000E+00	0.0000E+00	0.3015E+05	2163.	-8298.	0.3845E+05	0.3454E+05
70	0.4139E+05	6887.	0.0000E+00	9331.	0.0000E+00	0.0000E+00	0.4439E+05	4616.	-727.9	0.4312E+05	0.4281E+05
71	2264.	-0.1272E+05	0.0000E+00	136.0	0.0000E+00	0.0000E+00	2284.	0.0000E+00	-0.1274E+05	0.1302E+05	0.1402E+05
72	2127.	-0.1334E+05	0.0000E+00	136.0	0.0000E+00	0.0000E+00	2145.	0.0000E+00	-0.1335E+05	0.1370E+05	0.1474E+05
73	-6970.	-0.2013E+05	0.0000E+00	2904.	0.0000E+00	0.0000E+00	0.0000E+00	-3379.	-0.2132E+05	0.2132E+05	0.1942E+05
74	4587.	2064.	0.0000E+00	4797.	0.0000E+00	0.0000E+00	8939.	337.6	-2663.	0.1162E+05	0.1049E+05
76	-498.4	-0.1348E+05	0.0000E+00	-66.94	0.0000E+00	0.0000E+00	0.0000E+00	-490.1	-0.1349E+05	0.1349E+05	0.1325E+05
77	-142.3	-0.1277E+05	0.0000E+00	-66.94	0.0000E+00	0.0000E+00	0.0000E+00	-133.6	-0.1278E+05	0.1278E+05	0.1271E+05
78	4589.	-0.1311E+05	0.0000E+00	-448.0	0.0000E+00	0.0000E+00	4604.	0.0000E+00	-0.1312E+05	0.1973E+05	0.1788E+05
79	173.9	-3220.	0.0000E+00	1268.	0.0000E+00	0.0000E+00	2043.	-796.0	-6293.	8336.	7471.
80	2867.	2631.	0.0000E+00	4324.	0.0000E+00	0.0000E+00	7129.	233.5	-1866.	8993.	8171.
81	6679.	4633.	0.0000E+00	6662.	0.0000E+00	0.0000E+00	0.1245E+05	604.3	-1736.	0.1418E+05	0.1323E+05
82	-107.3	-0.1286E+05	0.0000E+00	12.37	0.0000E+00	0.0000E+00	0.0000E+00	-102.6	-0.1287E+05	0.1287E+05	0.1282E+05
83	-167.6	-0.1339E+05	0.0000E+00	12.37	0.0000E+00	0.0000E+00	0.0000E+00	-163.1	-0.1339E+05	0.1339E+05	0.1331E+05
84	-2677.	-0.1696E+05	0.0000E+00	-622.2	0.0000E+00	0.0000E+00	0.0000E+00	-2650.	-0.1698E+05	0.1698E+05	0.1583E+05
85	1031.	-6033.	0.0000E+00	-211.6	0.0000E+00	0.0000E+00	1173.	-88.80	-6086.	7258.	6747.
86	1176.	148.8	0.0000E+00	1338.	0.0000E+00	0.0000E+00	2703.	0.0000E+00	-1379.	4082.	3697.
87	2382.	2091.	0.0000E+00	3762.	0.0000E+00	0.0000E+00	6031.	178.0	-1736.	7767.	7112.
88	4344.	2713.	0.0000E+00	5824.	0.0000E+00	0.0000E+00	9332.	80.24	-2334.	0.1189E+05	0.1102E+05

NEDO-10084-4

March 1995

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SPACECRAFT THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2777 MAY 1, 1990 CP- 244.790

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
 TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SE	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SE	SIG1
89	426.5	-0.1337E+05	0.0000E+00	70.65	0.0000E+00	0.0000E+00	433.4	0.0000E+00	-0.1338E+05	0.1381E+05	0.1360E+05
90	141.7	-0.1288E+05	0.0000E+00	70.65	0.0000E+00	0.0000E+00	149.2	0.0000E+00	-0.1289E+05	0.1303E+05	0.1296E+05
91	141.2	-0.1100E+05	0.0000E+00	-441.4	0.0000E+00	0.0000E+00	1426	0.0000E+00	-0.1102E+05	0.1244E+05	0.1181E+05
92	-723.7	-8801.	0.0000E+00	-286.7	0.0000E+00	0.0000E+00	119.0	-828.1	-8818.	8937.	8524.
93	84.03	-1990.	0.0000E+00	447.2	0.0000E+00	0.0000E+00	483.3	-119.1	-2370.	2735.	2334.
94	802.3	1642.	0.0000E+00	1823.	0.0000E+00	0.0000E+00	3166.	0.0000E+00	-724.3	3893.	3585.
95	3232.	3403.	0.0000E+00	3314.	0.0000E+00	0.0000E+00	6896.	74.23	-317.4	7214.	7038.
96	2809.	1107.	0.0000E+00	3489.	0.0000E+00	0.0000E+00	7523.	169.2	-3776.	0.1130E+05	0.1018E+05
97	7003.	3372.	0.0000E+00	6413.	0.0000E+00	0.0000E+00	0.1269E+05	412.3	-725.8	0.1341E+05	0.1289E+05
98	-336.0	-0.1297E+05	0.0000E+00	-131.9	0.0000E+00	0.0000E+00	0.0000E+00	-311.1	-0.1299E+05	0.1299E+05	0.1284E+05
99	-210.0	-0.1326E+05	0.0000E+00	-131.9	0.0000E+00	0.0000E+00	2.239	-190.4	-0.1330E+05	0.1331E+05	0.1321E+05
100	-1769.	-0.1396E+05	0.0000E+00	371.7	0.0000E+00	0.0000E+00	0.0000E+00	-1479.	-0.1403E+05	0.1403E+05	0.1331E+05
101	-353.6	-7323.	0.0000E+00	342.1	0.0000E+00	0.0000E+00	352.9	-783.4	-7444.	7997.	7444.
102	-2083.	-2594.	0.0000E+00	428.0	0.0000E+00	0.0000E+00	0.0000E+00	-1784.	-2891.	2891.	2597.
103	-1378.	671.0	0.0000E+00	478.1	0.0000E+00	0.0000E+00	909.4	0.0000E+00	-1817.	2726.	2445.
104	-198.9	1434.	0.0000E+00	1283.	0.0000E+00	0.0000E+00	2343.	0.0000E+00	-1128.	3492.	3127.
105	2097.	2249.	0.0000E+00	2864.	0.0000E+00	0.0000E+00	3119.	34.60	-807.3	5926.	5537.
106	1396.	391.2	0.0000E+00	5211.	0.0000E+00	0.0000E+00	6244.	96.90	-4354.	0.1040E+05	9644.
107	3429.	3793.	0.0000E+00	6783.	0.0000E+00	0.0000E+00	0.1243E+05	475.3	-1698.	0.1415E+05	0.1324E+05
108	-39.02	-0.1144E+05	0.0000E+00	-1307.	0.0000E+00	0.0000E+00	415.4	-275.8	-0.1164E+05	0.1205E+05	0.1172E+05
109	1341.	-8782.	0.0000E+00	-1004.	0.0000E+00	0.0000E+00	1813.	-93.23	-8962.	0.1078E+05	0.1008E+05
110	3448.	1213.	0.0000E+00	133.0	0.0000E+00	0.0000E+00	3772.	1049.	0.0000E+00	3772.	3371.
111	1923.	-14.29	0.0000E+00	332.9	0.0000E+00	0.0000E+00	1994.	0.0000E+00	-82.77	2077.	2043.
112	-1103.	-217.4	0.0000E+00	284.7	0.0000E+00	0.0000E+00	21.43	-113.8	-1228.	1250.	1191.
113	-2830.	-406.3	0.0000E+00	204.8	0.0000E+00	0.0000E+00	120.1	-449.4	-2907.	3027.	2793.
114	-3034.	2193.	0.0000E+00	440.4	0.0000E+00	0.0000E+00	2232.	0.0000E+00	-5093.	7344.	6382.
115	-1108.	-3617.	0.0000E+00	1117.	0.0000E+00	0.0000E+00	1281.	-1931.	-6054.	7333.	6815.
116	-3377.	-8371.	0.0000E+00	1868.	0.0000E+00	0.0000E+00	244.2	-3174.	-9218.	9462.	8380.
117	-4263.	-324.1	0.0000E+00	709.3	0.0000E+00	0.0000E+00	892.1	-1004.	-4475.	5367.	4916.
118	-4844.	-77.64	0.0000E+00	-313.3	0.0000E+00	0.0000E+00	294.8	-332.5	-4884.	3179.	4907.
119	-3348.	739.7	0.0000E+00	55.41	0.0000E+00	0.0000E+00	804.0	0.0000E+00	-3413.	4217.	3904.
120	-2631.	321.2	0.0000E+00	1006.	0.0000E+00	0.0000E+00	1086.	-104.0	-3109.	4193.	3843.
121	6.418	1469.	0.0000E+00	2638.	0.0000E+00	0.0000E+00	3628.	0.0000E+00	-2152.	3780.	3089.
122	-616.9	1368.	0.0000E+00	4826.	0.0000E+00	0.0000E+00	3376.	1090.	-5713.	0.1109E+05	0.1011E+05
123	-7136.	-0.1096E+05	0.0000E+00	-228.4	0.0000E+00	0.0000E+00	0.0000E+00	-6472.	-0.1162E+05	0.1162E+05	0.1009E+05
124	-7618.	-3911.	0.0000E+00	27.32	0.0000E+00	0.0000E+00	0.0000E+00	-3189.	-8340.	8340.	7336.
125	-9669.	1377.	0.0000E+00	283.3	0.0000E+00	0.0000E+00	1414.	0.0000E+00	-9707.	0.1112E+05	0.1049E+05
126	-0.1012E+05	-126.9	0.0000E+00	283.3	0.0000E+00	0.0000E+00	69.68	-176.3	-0.1014E+05	0.1021E+05	0.1009E+05
127	-9613.	-140.8	0.0000E+00	283.3	0.0000E+00	0.0000E+00	49.46	-173.2	-9630.	9680.	9371.
128	-0.1001E+05	9.263	0.0000E+00	283.3	0.0000E+00	0.0000E+00	66.72	-36.48	-0.1003E+05	0.1010E+05	0.1003E+05
129	-9863.	1202.	0.0000E+00	283.3	0.0000E+00	0.0000E+00	1246.	0.0000E+00	-9909.	0.1116E+05	0.1059E+05
130	-7415.	-7190.	0.0000E+00	-316.3	0.0000E+00	0.0000E+00	0.0000E+00	-3444.	-8961.	8961.	8049.
131	-6313.	-0.1184E+05	0.0000E+00	942.4	0.0000E+00	0.0000E+00	0.0000E+00	-5831.	-0.1232E+05	0.1232E+05	0.1117E+05

NEDO-10084-4
March 1995

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SPACE DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2779 MAY 1, 1990 CP= 263.400

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.0000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	XX	YY	ZZ	XY	YZ	SIG1	SIG2	SIG3	SI	SIGR
132	-8311.	-0.1030E+03	0.0000E+00	1262.	0.0000E+00	0.0000E+00	-7486.	-0.1093E+03	0.1093E+03	9764.
133	-0.1494E+03	-9826.	0.0000E+00	1162.	0.0000E+00	0.0000E+00	-7349.	-0.1741E+03	0.1741E+03	0.1331E+03
134	-0.2368E+03	1646.	0.0000E+00	413.3	0.0000E+00	0.0000E+00	1683.	0.0000E+00	0.2370E+03	0.2370E+03
135	-0.2105E+03	-259.6	0.0000E+00	213.6	0.0000E+00	0.0000E+00	-251.4	-0.2106E+03	0.2106E+03	0.2094E+03
136	-0.1904E+03	151.8	0.0000E+00	281.9	0.0000E+00	0.0000E+00	203.2	-0.1903E+03	0.1923E+03	0.1913E+03
137	-0.1632E+03	-231.2	0.0000E+00	361.7	0.0000E+00	0.0000E+00	86.11	-0.1632E+03	0.1662E+03	0.1642E+03
138	-0.1481E+03	1484.	0.0000E+00	126.1	0.0000E+00	0.0000E+00	1308.	0.0000E+00	0.1463E+03	0.1344E+03
139	-9796.	-9548.	0.0000E+00	-1239.	0.0000E+00	0.0000E+00	-6218.	-0.1313E+03	0.1313E+03	0.1137E+03
140	-3503.	-0.1342E+03	0.0000E+00	106.1	0.0000E+00	0.0000E+00	-3096.	-0.1383E+03	0.1383E+03	0.1219E+03
141	-7130.	-0.1378E+03	0.0000E+00	2314.	0.0000E+00	0.0000E+00	-6281.	-0.1667E+03	0.1667E+03	0.1464E+03
142	-6279.	373.2	0.0000E+00	839.8	0.0000E+00	0.0000E+00	731.3	0.0000E+00	-4635.	7407.
143	-4608.	490.4	0.0000E+00	-361.4	0.0000E+00	0.0000E+00	568.8	0.0000E+00	-4686.	5254.
144	-7616.	-198.8	0.0000E+00	-240.1	0.0000E+00	0.0000E+00	28.46	-0.0000E+00	-7428.	7637.
145	-7122.	931.3	0.0000E+00	284.3	0.0000E+00	0.0000E+00	978.1	0.0000E+00	-7149.	8127.
146	-5703.	323.3	0.0000E+00	1403.	0.0000E+00	0.0000E+00	1277.	-469.7	-6166.	7443.
147	-4232.	-2484.	0.0000E+00	1939.	0.0000E+00	0.0000E+00	434.8	-1571.	-5579.	4013.
148	-2396.	-432.3	0.0000E+00	4267.	0.0000E+00	0.0000E+00	3332.	154.1	-6317.	9648.
149	4072.	8552.	0.0000E+00	6164.	0.0000E+00	0.0000E+00	744.3	-1113.	0.1410E+03	0.1329E+03
150	2197.	-0.1245E+03	0.0000E+00	236.6	0.0000E+00	0.0000E+00	2249.	0.0000E+00	-0.1250E+03	0.1475E+03
151	1782.	-0.1486E+03	0.0000E+00	236.6	0.0000E+00	0.0000E+00	1823.	0.0000E+00	-0.1490E+03	0.1672E+03
152	679.9	-0.1348E+03	0.0000E+00	139.8	0.0000E+00	0.0000E+00	1072.	-335.8	-0.1353E+03	0.1460E+03
153	634.8	-0.1713E+03	0.0000E+00	399.9	0.0000E+00	0.0000E+00	731.3	-59.01	-0.1721E+03	0.1794E+03
154	2898.	-0.2124E+03	0.0000E+00	640.9	0.0000E+00	0.0000E+00	2941.	0.0000E+00	-0.2129E+03	0.2423E+03
155	-603.2	-4549.	0.0000E+00	1133.	0.0000E+00	0.0000E+00	1373.	-1432.	-3096.	6467.
156	1123.	62.43	0.0000E+00	2373.	0.0000E+00	0.0000E+00	3188.	16.69	-2019.	3208.
157	-368.8	4673.	0.0000E+00	3143.	0.0000E+00	0.0000E+00	7853.	258.8	-4008.	0.1184E+03
158	-587.3	-0.1442E+03	0.0000E+00	-68.79	0.0000E+00	0.0000E+00	-568.4	-0.1444E+03	0.1444E+03	0.1418E+03
159	291.0	-0.1290E+03	0.0000E+00	-68.79	0.0000E+00	0.0000E+00	311.2	0.0000E+00	-0.1292E+03	0.1323E+03
160	1709.	-0.1336E+03	0.0000E+00	473.6	0.0000E+00	0.0000E+00	1749.	0.0000E+00	-0.1340E+03	0.1314E+03
161	191.8	-0.1772E+03	0.0000E+00	399.9	0.0000E+00	0.0000E+00	908.9	-691.1	-0.1775E+03	0.1864E+03
162	-1737.	-0.2022E+03	0.0000E+00	326.2	0.0000E+00	0.0000E+00	-1714.	-0.2024E+03	0.2024E+03	0.1944E+03
163	2961.	-4841.	0.0000E+00	341.6	0.0000E+00	0.0000E+00	2994.	0.0000E+00	-4874.	7868.
164	-247.0	-4281.	0.0000E+00	1266.	0.0000E+00	0.0000E+00	1437.	-1139.	-4828.	6263.
165	840.3	3572.	0.0000E+00	3549.	0.0000E+00	0.0000E+00	6080.	0.0000E+00	-1647.	7747.
166	1819.	9250.	0.0000E+00	5401.	0.0000E+00	0.0000E+00	1211E+03	373.6	-1413.	0.1353E+03
167	-67.33	-0.1313E+03	0.0000E+00	-37.74	0.0000E+00	0.0000E+00	4.337	-53.41	-0.1315E+03	0.1315E+03
168	-280.6	-0.1418E+03	0.0000E+00	-37.74	0.0000E+00	0.0000E+00	-263.5	-0.1420E+03	0.1420E+03	0.1407E+03
169	-1863.	-0.2070E+03	0.0000E+00	478.3	0.0000E+00	0.0000E+00	-1837.	-0.2073E+03	0.2073E+03	0.1988E+03
170	-194.9	-0.1665E+03	0.0000E+00	399.9	0.0000E+00	0.0000E+00	729.4	-894.5	-0.1668E+03	0.1741E+03
171	1333.	-0.1502E+03	0.0000E+00	321.3	0.0000E+00	0.0000E+00	1358.	0.0000E+00	-0.1504E+03	0.1640E+03
172	-2859.	-0.1159E+03	0.0000E+00	283.0	0.0000E+00	0.0000E+00	-2842.	-0.1161E+03	0.1161E+03	0.1048E+03
173	894.7	-4372.	0.0000E+00	742.8	0.0000E+00	0.0000E+00	1368.	-300.4	-4544.	5912.
174	1148.	1699.	0.0000E+00	2402.	0.0000E+00	0.0000E+00	3924.	30.12	-1106.	5030.

NEDO-10084-4
March 1995

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SPACE DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2781 MAY 1, 1990 CP= 266.000

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SE	SY	SZ	SXT	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGX
173	1026.	7043.	0.0000E+00	4391.	0.0000E+00	0.0000E+00	0.0000E+00	9367.	0.0000E+00	-1499.	0.1107E+03	0.1043E+03
176	-363.3	-0.1426E+03	0.0000E+00	168.0	0.0000E+00	0.0000E+00	0.0000E+00	-330.3	-0.1429E+03	0.1429E+03	0.1413E+03	0.1413E+03
177	-282.4	-0.1306E+03	0.0000E+00	168.0	0.0000E+00	0.0000E+00	0.0000E+00	-240.6	-0.1310E+03	0.1310E+03	0.1298E+03	0.1298E+03
178	1017.	-0.1917E+03	0.0000E+00	133.3	0.0000E+00	0.0000E+00	0.0000E+00	1037.	0.0000E+00	-0.1921E+03	0.2027E+03	0.1976E+03
179	-387.2	-0.1801E+03	0.0000E+00	399.9	0.0000E+00	0.0000E+00	0.0000E+00	371.3	-1184.	-0.1807E+03	0.1864E+03	0.1786E+03
180	-1914.	-0.1382E+03	0.0000E+00	446.3	0.0000E+00	0.0000E+00	0.0000E+00	-1782.	-0.1393E+03	0.1393E+03	0.1313E+03	0.1313E+03
181	2123.	-3426.	0.0000E+00	-372.2	0.0000E+00	0.0000E+00	0.0000E+00	2281.	0.0000E+00	-3383.	7864.	7011.
182	-228.0	-7943.	0.0000E+00	266.4	0.0000E+00	0.0000E+00	0.0000E+00	933.3	-1872.	-8036.	9011.	8238.
183	789.1	-1108.	0.0000E+00	1781.	0.0000E+00	0.0000E+00	0.0000E+00	1928.	0.0000E+00	-2246.	4174.	3634.
184	1494.	3447.	0.0000E+00	3770.	0.0000E+00	0.0000E+00	0.0000E+00	7772.	0.0000E+00	-831.7	8604.	8234.
185	696.7	0.1131E+03	0.0000E+00	3942.	0.0000E+00	0.0000E+00	0.1414E+03	0.0000E+00	-1938.	0.0000E+00	0.1608E+03	0.1326E+03
186	3146.	-0.1331E+03	0.0000E+00	-286.2	0.0000E+00	0.0000E+00	0.0000E+00	3237.	0.0000E+00	-0.1341E+03	0.1664E+03	0.1329E+03
187	3117.	-0.1400E+03	0.0000E+00	-286.2	0.0000E+00	0.0000E+00	0.0000E+00	3194.	0.0000E+00	-0.1408E+03	0.1727E+03	0.1392E+03
188	3880.	-0.2371E+03	0.0000E+00	779.0	0.0000E+00	0.0000E+00	0.0000E+00	3968.	0.0000E+00	-0.2380E+03	0.2976E+03	0.2799E+03
189	4390.	-0.1678E+03	0.0000E+00	399.9	0.0000E+00	0.0000E+00	0.0000E+00	4719.	0.0000E+00	-0.1691E+03	0.2163E+03	0.1976E+03
190	4638.	-9738.	0.0000E+00	20.83	0.0000E+00	0.0000E+00	0.0000E+00	4818.	0.0000E+00	-9897.	0.1472E+03	0.1304E+03
191	619.1	-0.1320E+03	0.0000E+00	1342.	0.0000E+00	0.0000E+00	0.0000E+00	1193.	0.0000E+00	-0.1378E+03	0.1497E+03	0.1442E+03
192	879.9	-7084.	0.0000E+00	1472.	0.0000E+00	0.0000E+00	0.0000E+00	2248.	-689.2	-7764.	0.1001E+03	8978.
193	-1183.	-913.9	0.0000E+00	1246.	0.0000E+00	0.0000E+00	0.0000E+00	338.2	-192.2	-2463.	3023.	2743.
194	-307.7	2894.	0.0000E+00	2143.	0.0000E+00	0.0000E+00	0.0000E+00	421.3	0.0000E+00	-1627.	3840.	3244.
195	-1038.	8381.	0.0000E+00	3116.	0.0000E+00	0.0000E+00	0.0000E+00	0.1082E+03	0.0000E+00	-3292.	0.1411E+03	0.1293E+03
196	-0.1356E+03	-7714.	0.0000E+00	-1910.	0.0000E+00	0.0000E+00	0.0000E+00	-7141.	-0.1413E+03	0.1413E+03	0.1238E+03	0.1238E+03
197	-0.1767E+03	-8931.	0.0000E+00	-2188.	0.0000E+00	0.0000E+00	0.0000E+00	-7871.	-0.1873E+03	0.1873E+03	0.1703E+03	0.1703E+03
198	-0.1120E+03	21.79	0.0000E+00	-3330.	0.0000E+00	0.0000E+00	0.0000E+00	3121.	0.0000E+00	-0.1430E+03	0.1742E+03	0.1469E+03
199	7849.	381.3	0.0000E+00	-4087.	0.0000E+00	0.0000E+00	0.1043E+03	0.0000E+00	-1998.	0.0000E+00	0.1243E+03	0.1173E+03
200	6116.	-1939.	0.0000E+00	387.3	0.0000E+00	0.0000E+00	0.0000E+00	8488.	0.0000E+00	-4331.	0.1282E+03	0.1134E+03
201	2213.	363.0	0.0000E+00	5202.	0.0000E+00	0.0000E+00	0.0000E+00	8303.	0.0000E+00	-3923.	0.1443E+03	0.1330E+03
202	-0.2233E+03	444.3	0.0000E+00	7104.	0.0000E+00	0.0000E+00	0.0000E+00	2837.	0.0000E+00	-0.2472E+03	0.2736E+03	0.2632E+03
203	-0.2817E+03	-0.1614E+03	0.0000E+00	2463.	0.0000E+00	0.0000E+00	0.0000E+00	-0.1336E+03	-0.3093E+03	0.3093E+03	0.2764E+03	0.2764E+03
204	-0.1939E+03	-9960.	0.0000E+00	-333.1	0.0000E+00	0.0000E+00	0.0000E+00	-9321.	-0.2003E+03	0.2003E+03	0.1779E+03	0.1779E+03
205	-0.2289E+03	-3640.	0.0000E+00	-3394.	0.0000E+00	0.0000E+00	0.0000E+00	137.7	-3090.	-0.2360E+03	0.2375E+03	0.2221E+03
206	-0.1964E+03	-929.3	0.0000E+00	-6280.	0.0000E+00	0.0000E+00	0.0000E+00	1898.	-291.1	-0.2218E+03	0.2408E+03	0.2326E+03
207	3767.	1298.	0.0000E+00	-3240.	0.0000E+00	0.0000E+00	0.1076E+03	0.0000E+00	-3693.	0.0000E+00	0.1445E+03	0.1336E+03
208	6750.	-2138.	0.0000E+00	36.87	0.0000E+00	0.0000E+00	0.0000E+00	8914.	0.0000E+00	-4302.	0.1322E+03	0.1189E+03
209	6174.	-281.0	0.0000E+00	4196.	0.0000E+00	0.0000E+00	0.0000E+00	9224.	0.0000E+00	-3331.	0.1236E+03	0.1173E+03
210	-0.1308E+03	696.7	0.0000E+00	5897.	0.0000E+00	0.0000E+00	0.0000E+00	3617.	0.0000E+00	-0.1600E+03	0.1962E+03	0.1893E+03
211	-0.1914E+03	-9720.	0.0000E+00	2930.	0.0000E+00	0.0000E+00	0.0000E+00	-7492.	-0.2137E+03	0.2137E+03	0.1897E+03	0.1897E+03
212	-0.1223E+03	-5348.	0.0000E+00	1441.	0.0000E+00	0.0000E+00	0.0000E+00	-4370.	-0.1303E+03	0.1303E+03	0.1150E+03	0.1150E+03
213	-7811.	-14.91	0.0000E+00	-753.9	0.0000E+00	0.0000E+00	0.0000E+00	806.9	-403.4	-8227.	9034.	8313.
214	-3010.	526.1	0.0000E+00	-353.7	0.0000E+00	0.0000E+00	0.0000E+00	1283.	-31.91	-3736.	3021.	4646.
215	-4800.	4261.	0.0000E+00	3668.	0.0000E+00	0.0000E+00	0.0000E+00	3787.	0.0000E+00	-6326.	0.1211E+03	0.1072E+03
216	-0.1167E+03	-5277.	0.0000E+00	-2370.	0.0000E+00	0.0000E+00	0.0000E+00	-4431.	-0.1231E+03	0.1231E+03	0.1111E+03	0.1111E+03
217	-0.1193E+03	-914.3	0.0000E+00	-4382.	0.0000E+00	0.0000E+00	0.0000E+00	1193.	-403.9	-0.1364E+03	0.1463E+03	0.1412E+03

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NUCLEAR FACILITY MAY 1, 1989

SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2783 MAY 1, 1990 CP= 266.660

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STY	STX	STY	SIG1	SIG2	SIG3	SI	SIGX
218	-0.1234E+03	1384.	0.0000E+00	-4354.	0.0000E+00	0.0000E+00	2833.	0.0000E+00	-0.1379E+03	0.1662E+03	0.1342E+03
219	-0.1079E+03	-4350.	0.0000E+00	-1293.	0.0000E+00	0.0000E+00	0.0000E+00	-3476.	-0.1167E+03	0.1167E+03	0.1061E+03
220	-0.1035E+03	-4188.	0.0000E+00	2263.	0.0000E+00	0.0000E+00	0.0000E+00	-2963.	-0.1138E+03	0.1138E+03	0.1061E+03
221	-0.1264E+03	1993.	0.0000E+00	3824.	0.0000E+00	0.0000E+00	4146.	0.0000E+00	-0.1479E+03	0.1394E+03	0.1727E+03
222	-0.1172E+03	-1971.	0.0000E+00	3619.	0.0000E+00	0.0000E+00	1843.	-881.9	-0.1465E+03	0.1649E+03	0.1334E+03
223	-0.1265E+03	-4323.	0.0000E+00	-777.9	0.0000E+00	0.0000E+00	0.0000E+00	-4702.	-0.1427E+03	0.1427E+03	0.1273E+03
224	-0.1120E+03	-749.9	0.0000E+00	5318.	0.0000E+00	0.0000E+00	1987.	-312.2	-0.1362E+03	0.1361E+03	0.1464E+03
225	-0.1260E+03	1353.	0.0000E+00	-5674.	0.0000E+00	0.0000E+00	3479.	0.0000E+00	-0.1472E+03	0.1820E+03	0.1676E+03
226	-0.1061E+03	-3149.	0.0000E+00	-1734.	0.0000E+00	0.0000E+00	0.0000E+00	-3811.	-0.1195E+03	0.1195E+03	0.1083E+03
227	-9647.	-2701.	0.0000E+00	1883.	0.0000E+00	0.0000E+00	144.4	-2158.	-0.1033E+03	0.1048E+03	9818.
228	-0.1173E+03	2077.	0.0000E+00	4780.	0.0000E+00	0.0000E+00	3660.	0.0000E+00	-0.1332E+03	0.1698E+03	0.1349E+03
229	-0.1151E+03	-2041.	0.0000E+00	4573.	0.0000E+00	0.0000E+00	1106.	-948.4	-0.1371E+03	0.1482E+03	0.1393E+03
230	-9157.	-4147.	0.0000E+00	349.8	0.0000E+00	0.0000E+00	0.0000E+00	-3249.	-0.1005E+03	0.1005E+03	9004.
231	-8223.	568.0	0.0000E+00	-2120.	0.0000E+00	0.0000E+00	1118.	-53.87	-8721.	9839.	9336.
232	-7252.	-377.9	0.0000E+00	-1921.	0.0000E+00	0.0000E+00	570.8	-379.3	-7821.	8392.	7977.
233	-4760.	-369.3	0.0000E+00	734.7	0.0000E+00	0.0000E+00	1463.	-246.3	-6348.	7809.	7382.
234	-91.28	-1621.	0.0000E+00	-1977.	0.0000E+00	0.0000E+00	1264.	0.0000E+00	-2978.	4239.	3770.
235	-6383.	-1928.	0.0000E+00	-3413.	0.0000E+00	0.0000E+00	833.8	-688.3	-8673.	9329.	8949.
236	-0.2643E+03	2426.	0.0000E+00	-3021.	0.0000E+00	0.0000E+00	3398.	0.0000E+00	-0.2740E+03	0.3080E+03	0.2941E+03
237	-0.2711E+03	-0.1020E+03	0.0000E+00	-2861.	0.0000E+00	0.0000E+00	0.0000E+00	-9620.	-0.2769E+03	0.2769E+03	0.2331E+03
238	-0.1795E+03	-8831.	0.0000E+00	149.3	0.0000E+00	0.0000E+00	0.0000E+00	-8382.	-0.1822E+03	0.1822E+03	0.1605E+03
239	-0.2434E+03	-0.1074E+03	0.0000E+00	3253.	0.0000E+00	0.0000E+00	0.0000E+00	-9607.	-0.2367E+03	0.2367E+03	0.2375E+03
240	-0.1877E+03	2707.	0.0000E+00	6448.	0.0000E+00	0.0000E+00	3307.	0.0000E+00	-0.2137E+03	0.2668E+03	0.2335E+03
241	6337.	-2703.	0.0000E+00	4134.	0.0000E+00	0.0000E+00	8944.	0.0000E+00	-3299.	0.1423E+03	0.1331E+03
242	0.1224E+03	-1831.	0.0000E+00	-340.1	0.0000E+00	0.0000E+00	0.1284E+03	0.0000E+00	-2216.	0.1486E+03	0.1388E+03
243	2603.	-2471.	0.0000E+00	-4356.	0.0000E+00	0.0000E+00	6309.	0.0000E+00	-6173.	0.1248E+03	0.1193E+03
244	-0.2134E+03	3251.	0.0000E+00	-6108.	0.0000E+00	0.0000E+00	5098.	0.0000E+00	-0.2318E+03	0.2827E+03	0.2661E+03
245	-0.2782E+03	-0.1492E+03	0.0000E+00	-3338.	0.0000E+00	0.0000E+00	0.1305E+03	-0.1305E+03	-0.2949E+03	0.2949E+03	0.2673E+03
246	-0.1832E+03	-9150.	0.0000E+00	139.7	0.0000E+00	0.0000E+00	0.0000E+00	-8838.	-0.1843E+03	0.1843E+03	0.1637E+03
247	-0.2465E+03	-6466.	0.0000E+00	2913.	0.0000E+00	0.0000E+00	0.0000E+00	-3973.	-0.2315E+03	0.2315E+03	0.2345E+03
248	-0.2481E+03	1473.	0.0000E+00	5363.	0.0000E+00	0.0000E+00	2773.	0.0000E+00	-0.2611E+03	0.2888E+03	0.2786E+03
249	-3829.	-2213.	0.0000E+00	3234.	0.0000E+00	0.0000E+00	1032.	-237.9	-6818.	7849.	7532.
250	71.37	-1812.	0.0000E+00	-486.9	0.0000E+00	0.0000E+00	1067.	0.0000E+00	-2808.	3874.	3469.
251	-4783.	300.6	0.0000E+00	-1930.	0.0000E+00	0.0000E+00	1343.	-43.68	-3781.	7124.	6825.
252	-0.1416E+03	2209.	0.0000E+00	-2113.	0.0000E+00	0.0000E+00	2483.	0.0000E+00	-0.1443E+03	0.1491E+03	0.1382E+03
253	-0.1307E+03	-6316.	0.0000E+00	-1208.	0.0000E+00	0.0000E+00	0.0000E+00	-3133.	-0.1443E+03	0.1443E+03	0.1272E+03
254	4336.	-0.1429E+03	0.0000E+00	-387.2	0.0000E+00	0.0000E+00	4672.	0.0000E+00	-0.1442E+03	0.1910E+03	0.1723E+03
255	4351.	-0.1522E+03	0.0000E+00	0.4734E-09	0.0000E+00	0.0000E+00	4301.	0.0000E+00	-0.1537E+03	0.1987E+03	0.1806E+03
256	4421.	-0.1772E+03	0.0000E+00	387.2	0.0000E+00	0.0000E+00	4537.	0.0000E+00	-0.1784E+03	0.2237E+03	0.2049E+03
257	4767.	-0.2217E+03	0.0000E+00	-396.1	0.0000E+00	0.0000E+00	4867.	0.0000E+00	-0.2227E+03	0.2714E+03	0.2507E+03
258	4383.	-0.1532E+03	0.0000E+00	0.1324E-08	0.0000E+00	0.0000E+00	4538.	0.0000E+00	-0.1547E+03	0.2001E+03	0.1816E+03
259	4359.	-0.1001E+03	0.0000E+00	396.1	0.0000E+00	0.0000E+00	4342.	0.0000E+00	-0.1020E+03	0.1474E+03	0.1310E+03
260	601.3	-4822.	0.0000E+00	-1293.	0.0000E+00	0.0000E+00	903.6	0.0000E+00	-3123.	6028.	5674.

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SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2784 MAY 1, 1990 CP= 267.210

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	ST	SIGC
261	-470.4	-0.1308E+05	0.0000E+00	216.0	0.0000E+00	0.0000E+00	0.0000E+00	-383.0	-0.1317E+03	0.1317E+03	0.1298E+03
262	-434.9	-0.1643E+05	0.0000E+00	0.2671E-09	0.0000E+00	0.0000E+00	0.0000E+00	-372.2	-0.1649E+03	0.1649E+03	0.1631E+03
263	-435.6	-0.1631E+05	0.0000E+00	-216.0	0.0000E+00	0.0000E+00	0.0000E+00	-367.8	-0.1637E+03	0.1637E+03	0.1639E+03
264	-326.7	-0.2097E+05	0.0000E+00	219.9	0.0000E+00	0.0000E+00	0.0000E+00	-470.2	-0.2103E+03	0.2103E+03	0.2079E+03
265	-434.4	-0.1634E+05	0.0000E+00	0.7483E-09	0.0000E+00	0.0000E+00	0.0000E+00	-370.0	-0.1660E+03	0.1660E+03	0.1642E+03
266	-394.1	-8777.	0.0000E+00	-219.9	0.0000E+00	0.0000E+00	0.0000E+00	-233.4	-8917.	8917.	8794.
267	-348.2	-2621.	0.0000E+00	-527.4	0.0000E+00	0.0000E+00	0.0000E+00	-433.3	-2736.	2736.	2574.
268	-230.9	-0.1448E+05	0.0000E+00	-780.9	0.0000E+00	0.0000E+00	0.0000E+00	-188.8	-0.1472E+03	0.1472E+03	0.1463E+03
269	-249.2	-0.1482E+05	0.0000E+00	0.9663E-10	0.0000E+00	0.0000E+00	0.0000E+00	-207.3	-0.1487E+03	0.1487E+03	0.1476E+03
270	-234.9	-0.1812E+05	0.0000E+00	780.9	0.0000E+00	0.0000E+00	0.0000E+00	-222.8	-0.1815E+03	0.1815E+03	0.1804E+03
271	-214.8	-0.2239E+05	0.0000E+00	-793.7	0.0000E+00	0.0000E+00	0.0000E+00	-184.7	-0.2262E+03	0.2262E+03	0.2233E+03
272	-235.6	-0.1440E+05	0.0000E+00	-0.9703E-10	0.0000E+00	0.0000E+00	0.0000E+00	-212.7	-0.1493E+03	0.1493E+03	0.1484E+03
273	-283.2	-0.1043E+05	0.0000E+00	793.7	0.0000E+00	0.0000E+00	0.0000E+00	-223.4	-0.1049E+03	0.1049E+03	0.1038E+03
274	-504.3	-2068.	0.0000E+00	-298.0	0.0000E+00	0.0000E+00	0.0000E+00	-448.6	-2123.	2123.	1937.

MINIMUMS
NODE 203 188 1 206 1 1 63 203 203 112 112
VALUE -0.2817E+05 -0.2571E+05 0.0000E+00 -6280. 0.0000E+00 0.0000E+00 0.0000E+00 -0.1336E+03 -0.3093E+03 1230. 1191.

MAXIMUMS
NODE 1 28 1 9 1 1 70 32 6 70 70
VALUE 0.4274E+05 0.3198E+05 0.0000E+00 0.1336E+03 0.0000E+00 0.0000E+00 0.4439E+03 3234. 0.0000E+00 0.4312E+03 0.4281E+03

PRINT MODAL DISPLACEMENTS

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March 1995

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NUCLEAR PACS MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2786 MAY 1, 1990 CP= 267.820

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING U, V, W DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
1	0.00000000E+00	-0.47108977E-01
2	0.29887904E-02	-0.46583080E-01
3	0.37737240E-02	-0.45191440E-01
4	0.83114496E-02	-0.43201383E-01
5	0.10317384E-01	-0.40847292E-01
6	0.12478290E-01	-0.38489600E-01
7	0.14371348E-01	-0.36468230E-01
8	0.16425386E-01	-0.34048154E-01
9	0.19414282E-01	-0.32278335E-01
10	0.22031237E-01	-0.35448770E-01
11	0.24101737E-01	-0.34343025E-01
12	0.25937630E-01	-0.33192405E-01
13	0.27700571E-01	-0.32000985E-01
14	0.29376140E-01	-0.30783794E-01
15	0.31033726E-01	-0.29570206E-01
16	0.32721717E-01	-0.28324441E-01
17	0.34419742E-01	-0.27018138E-01
18	0.36161038E-01	-0.25667006E-01
19	0.37919030E-01	-0.24247543E-01
20	0.39615154E-01	-0.22753314E-01
21	0.41241928E-01	-0.21229985E-01
22	0.42819735E-01	-0.19637514E-01
23	0.44337039E-01	-0.18011284E-01
24	0.45833037E-01	-0.16259478E-01
25	0.47260441E-01	-0.14387562E-01
26	0.48629962E-01	-0.12337052E-01
27	0.49788033E-01	-0.99671279E-02
28	0.50467393E-01	-0.73878328E-02
29	0.50771796E-01	-0.48079976E-02
30	0.50803491E-01	-0.23431719E-02
31	0.50796092E-01	0.00000000E+00
32	0.00000000E+00	-0.46309760E-01
33	0.24994169E-02	-0.46029415E-01
34	0.50563030E-02	-0.44671620E-01
35	0.73299437E-02	-0.42721147E-01
36	0.94408305E-02	-0.40429130E-01
37	0.11483862E-01	-0.38049045E-01
38	0.13686016E-01	-0.36071554E-01
40	0.19628186E-01	-0.33314159E-01
41	0.21860737E-01	-0.34860889E-01
42	0.23813777E-01	-0.33799232E-01
43	0.25623913E-01	-0.32663749E-01

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SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2787 MAY 1, 1990 CP= 268.090

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
44	0.27349344E-01	-0.31473778E-01
45	0.29011044E-01	-0.30258220E-01
46	0.30677224E-01	-0.29026031E-01
47	0.32365319E-01	-0.27774552E-01
48	0.34058892E-01	-0.26451090E-01
49	0.35809990E-01	-0.25080290E-01
50	0.37572443E-01	-0.23638118E-01
51	0.39236322E-01	-0.22159179E-01
52	0.40850383E-01	-0.20643399E-01
53	0.42403896E-01	-0.19073324E-01
54	0.43920182E-01	-0.17449922E-01
55	0.45370232E-01	-0.15721823E-01
56	0.46779478E-01	-0.13870341E-01
57	0.48114910E-01	-0.11874440E-01
58	0.49230443E-01	-0.97000434E-02
59	0.49881426E-01	-0.73444026E-02
60	0.50147180E-01	-0.47613144E-02
61	0.50133491E-01	-0.23686134E-02
62	0.50153782E-01	0.00000000E+00
63	0.00000000E+00	-0.44323919E-01
64	0.88370402E-03	-0.44300975E-01
65	0.26313742E-02	-0.43238881E-01
66	0.47270254E-02	-0.41686348E-01
67	0.70471434E-02	-0.39729387E-01
68	0.97086294E-02	-0.37631461E-01
69	0.12833143E-01	-0.35838881E-01
70	0.16349310E-01	-0.33314883E-01
71	0.00000000E+00	-0.42308330E-01
72	0.10701331E-02	-0.42355680E-01
73	0.18311843E-01	-0.33836792E-01
74	0.19908708E-01	-0.34442032E-01
76	0.00000000E+00	-0.40346342E-01
77	0.10773943E-02	-0.40332949E-01
78	0.18633443E-01	-0.32463736E-01
79	0.20443093E-01	-0.32392416E-01
80	0.22468831E-01	-0.32699314E-01
81	0.24393670E-01	-0.32502943E-01
82	0.00000000E+00	-0.38213524E-01
83	0.11262360E-02	-0.38226361E-01
84	0.18310829E-01	-0.30827440E-01
85	0.20446315E-01	-0.30717436E-01
86	0.22662319E-01	-0.30682006E-01

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NUCLEAR PACER MAY 1, 1989
STANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2787 MAY 1, 1990 CP- 268.310

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
87	0.24733160E-01	-0.30584295E-01
88	0.26714828E-01	-0.30373340E-01
89	0.00000000E+00	-0.33999491E-01
90	0.11621081E-02	-0.36019267E-01
91	0.18246449E-01	-0.28904745E-01
92	0.20248496E-01	-0.28711414E-01
93	0.22633507E-01	-0.28568836E-01
94	0.24860485E-01	-0.28460837E-01
95	0.27000050E-01	-0.28354670E-01
96	0.29088829E-01	-0.28263132E-01
97	0.31047124E-01	-0.28172372E-01
98	0.00000000E+00	-0.33744875E-01
99	0.11830387E-02	-0.33704076E-01
100	0.17851389E-01	-0.26843700E-01
101	0.19981871E-01	-0.26546185E-01
102	0.22480644E-01	-0.26272285E-01
103	0.24868378E-01	-0.26135063E-01
104	0.27172348E-01	-0.26117332E-01
105	0.29423180E-01	-0.26145063E-01
106	0.31616088E-01	-0.26181890E-01
107	0.33615880E-01	-0.26183469E-01
108	0.00000000E+00	-0.31346735E-01
109	0.11840499E-02	-0.31441284E-01
110	0.41634159E-02	-0.31241688E-01
111	0.70976438E-02	-0.30279713E-01
112	0.98990071E-02	-0.28927756E-01
113	0.12585515E-01	-0.27584389E-01
114	0.15127589E-01	-0.25943214E-01
115	0.17460722E-01	-0.24735794E-01
116	0.19612488E-01	-0.24190454E-01
117	0.22275787E-01	-0.23707474E-01
118	0.24788212E-01	-0.23538391E-01
119	0.27264869E-01	-0.23613492E-01
120	0.29684563E-01	-0.23756432E-01
121	0.32053632E-01	-0.23923649E-01
122	0.34350310E-01	-0.24083996E-01
123	0.00000000E+00	-0.30372215E-01
124	0.11461864E-02	-0.30411217E-01
125	0.39619386E-02	-0.30104130E-01
126	0.68368145E-02	-0.29161452E-01
127	0.93459059E-02	-0.27809089E-01
128	0.12028319E-01	-0.26279845E-01

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NUCLEAR PAC, MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

SPACE DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2788 MAY 1, 1990 CP- 268.380

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
129	0.14393163E-01	-0.24847050E-01
130	0.17233260E-01	-0.23804222E-01
131	0.16316864E-01	-0.23533962E-01
132	0.00000000E+00	-0.29301112E-01
133	0.12460835E-02	-0.29230768E-01
134	0.36732208E-02	-0.28796332E-01
135	0.62200479E-02	-0.27890180E-01
136	0.87948283E-02	-0.26550334E-01
137	0.11437084E-01	-0.25033675E-01
138	0.14170010E-01	-0.23613370E-01
139	0.16889062E-01	-0.22497633E-01
140	0.18113289E-01	-0.22383161E-01
141	0.19286706E-01	-0.22281020E-01
142	0.22012687E-01	-0.21301489E-01
143	0.24766103E-01	-0.21432803E-01
144	0.27337378E-01	-0.21528446E-01
145	0.29842594E-01	-0.21737783E-01
146	0.32288684E-01	-0.21966671E-01
147	0.34798451E-01	-0.22292028E-01
148	0.35745463E-01	-0.22448312E-01
149	0.37786253E-01	-0.22731686E-01
150	0.00000000E+00	-0.26367408E-01
151	0.14327650E-02	-0.26430203E-01
152	0.16736145E-01	-0.19925497E-01
153	0.18097003E-01	-0.20028431E-01
154	0.19428977E-01	-0.20261813E-01
155	0.35564593E-01	-0.19734833E-01
156	0.36561373E-01	-0.20088340E-01
157	0.38716010E-01	-0.20636933E-01
158	0.00000000E+00	-0.23552862E-01
159	0.14263327E-02	-0.23532439E-01
160	0.17422914E-01	-0.17214475E-01
161	0.18766181E-01	-0.17372731E-01
162	0.20131734E-01	-0.17906301E-01
163	0.36446318E-01	-0.17600695E-01
164	0.37375072E-01	-0.17869471E-01
165	0.39538286E-01	-0.18462633E-01
166	0.41449656E-01	-0.18899181E-01
167	0.00000000E+00	-0.20611261E-01
168	0.14521832E-02	-0.20606656E-01
169	0.18336780E-01	-0.14590143E-01
170	0.19761305E-01	-0.15010048E-01

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NUCLEAR PACER MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2789 MAY 1, 1990 CP= 268.800

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.000002E+00 LOAD CASE= 1

THE FOLLOWING U, V, W DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
171	0.21106159E-01	-0.13394724E-01
172	0.37028971E-01	-0.13460480E-01
173	0.38078813E-01	-0.13708133E-01
174	0.40378039E-01	-0.16290306E-01
175	0.42376732E-01	-0.16786630E-01
176	0.00000000E+00	-0.17608797E-01
177	0.14369402E-02	-0.17636612E-01
178	0.19342327E-01	-0.12077891E-01
179	0.20722124E-01	-0.12334632E-01
180	0.22101300E-01	-0.12771391E-01
181	0.37684240E-01	-0.13291483E-01
182	0.38679965E-01	-0.13502771E-01
183	0.41108892E-01	-0.14119962E-01
184	0.43244637E-01	-0.14624790E-01
185	0.45068375E-01	-0.15063306E-01
186	0.00000000E+00	-0.14702981E-01
187	0.13167381E-02	-0.14611290E-01
188	0.13919542E-01	-0.93480277E-02
189	0.21431372E-01	-0.98433393E-02
190	0.22847964E-01	-0.98883074E-02
191	0.38201263E-01	-0.10862968E-01
192	0.39338730E-01	-0.11324275E-01
193	0.41822825E-01	-0.11855925E-01
194	0.44027585E-01	-0.12398760E-01
195	0.46007369E-01	-0.12863900E-01
196	0.00000000E+00	-0.11344889E-01
197	0.12404692E-02	-0.11639012E-01
198	0.38619798E-02	-0.12874354E-01
199	0.74141480E-02	-0.13908050E-01
200	0.11460446E-01	-0.13742186E-01
201	0.13393371E-01	-0.12035068E-01
202	0.18581615E-01	-0.94202956E-02
203	0.20328439E-01	-0.71299187E-02
204	0.21638206E-01	-0.69801980E-02
205	0.22696494E-01	-0.70750669E-02
206	0.24371194E-01	-0.68243034E-02
207	0.27544891E-01	-0.10959634E-01
208	0.31151256E-01	-0.12151880E-01
209	0.34710634E-01	-0.11782469E-01
210	0.37541064E-01	-0.10310304E-01
211	0.39217449E-01	-0.88437178E-02
212	0.40129613E-01	-0.88600211E-02

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NUCLEAR PAC. MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK.

SPACE DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2789 MAY 1, 1990 CP- 269.020

***** POST1 MODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
213	0.42395126E-01	-0.93632409E-02
214	0.44671063E-01	-0.10035890E-01
215	0.46823527E-01	-0.10629901E-01
216	0.00000000E+00	-0.93628691E-02
217	0.32992927E-02	-0.99103634E-02
218	0.63179023E-02	-0.11303266E-01
219	0.93811342E-02	-0.11863171E-01
220	0.12209346E-01	-0.11106073E-01
221	0.15414161E-01	-0.67333096E-02
222	0.18286443E-01	-0.39448117E-02
223	0.21925492E-01	-0.49130053E-02
224	0.24627204E-01	-0.57221979E-02
225	0.27342043E-01	-0.60687627E-02
226	0.30276234E-01	-0.69693208E-02
227	0.32389970E-01	-0.10341017E-01
228	0.35293023E-01	-0.93681872E-02
229	0.37611277E-01	-0.76893674E-02
230	0.40241220E-01	-0.71622991E-02
231	0.42690071E-01	-0.76413462E-02
232	0.44992088E-01	-0.83049811E-02
233	0.47209837E-01	-0.91729714E-02
234	0.00000000E+00	-0.70792681E-02
235	0.37236964E-02	-0.75999636E-02
236	0.69334471E-02	-0.68263012E-02
237	0.91401768E-02	-0.93682271E-02
238	0.10349224E-01	-0.93413323E-02
239	0.11551890E-01	-0.88648691E-02
240	0.13811761E-01	-0.63481346E-02
241	0.17339832E-01	-0.37931277E-02
242	0.21418036E-01	-0.27893924E-02
243	0.23404108E-01	-0.36003430E-02
244	0.28666868E-01	-0.37773059E-02
245	0.30700331E-01	-0.79203700E-02
246	0.31786166E-01	-0.62573450E-02
247	0.32804766E-01	-0.63420939E-02
248	0.34472349E-01	-0.72840787E-02
249	0.37136807E-01	-0.56622274E-02
250	0.40191094E-01	-0.33642607E-02
251	0.43091427E-01	-0.36660415E-02
252	0.45476965E-01	-0.47494274E-02
253	0.47390868E-01	-0.76501450E-02
254	0.80107288E-02	-0.64243384E-02

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March 1995

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NUCLEAR PAC. MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK.

SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

10.2790 MAY 1, 1990 CP= 269.240

***** POST1 MODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
255	0.86203234E-02	-0.60646467E-02
256	0.11214970E-01	-0.59582277E-02
257	0.30728185E-01	-0.53340208E-02
258	0.32236622E-01	-0.53478764E-02
259	0.33647223E-01	-0.56207058E-02
260	0.47014474E-01	-0.51874163E-02
261	0.74460460E-02	-0.31653703E-02
262	0.91825232E-02	-0.31089269E-02
263	0.10706612E-01	-0.29324247E-02
264	0.31068108E-01	-0.26225832E-02
265	0.32302385E-01	-0.27340235E-02
266	0.33847012E-01	-0.27643954E-02
267	0.46919641E-01	-0.26203824E-02
268	0.74862084E-02	0.00000000E+00
269	0.90369633E-02	0.00000000E+00
270	0.10364702E-01	0.00000000E+00
271	0.31131085E-01	0.00000000E+00
272	0.32591684E-01	0.00000000E+00
273	0.33939963E-01	0.00000000E+00
274	0.46862087E-01	0.00000000E+00

MAXIMUMS

NODE 30
VALUE 0.30803491E-01 -0.47108977E-01

/SHOW SWITCH PLOTS TO FILE PLOTS - VECTOR MODE

PRODUCE STRESS PLOT, LABEL= TEMP KAVG= 0

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

PRODUCE STRESS PLOT, LABEL= S1 KAVG= 0

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= SPACER DISK THERMAL STRESS ANALYSIS, NORMAL CONDITIONS

***** ROUTINE COMPLETED ***** CP = 278.420

/EOF ENCOUNTERED ON FILES

PREP7 AFWRITE OR SPWRITE WARNING MESSAGES = 1
NUMBER OF SOLUTION PHASE WARNING MESSAGES = 0

***** RUN COMPLETED ***** CP= 278.8400 TIME= 10.2817

March 1995

60 K. 166, 15.6, -6.2

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March 1995

***** ANSYS INPUT DATA LISTING (FILE8) *****

```

61 NGEN 2,9,158,166,1,,1.0
62 NGEN 2,9,167,175,1,,1.0
63 N,183,16.6,-4.25
64 NGEN 2,10,176,185,1,,1.0
65 NGEN 2,64,132,148,1,,6.0
66 N,213,16.6,-4.25
67 FILL,212,215
68 N,216,0,-3.625
69 N,219,3,-3.625
70 FILL
71 N,220,3.8,-3.625
72 N,228,9.8,-3.625
73 FILL
74 N,227,10.6,-3.625
75 N,233,16.6,-3.625
76 FILL
77 NGEN 2,18,216,219,1,,0.625
78 N,238,3.4,-3.0
79 N,239,3.8,-3.0
80 N,245,9.8,-3.0
81 FILL
82 N,246,10.2,-3.0
83 N,247,10.6,-3.0
84 N,253,16.6,-3.0
85 FILL
86 NGEN 2,17,237,239,1,,1.0
87 NGEN 2,12,245,247,1,,1.0
88 N,260,16.6,-3
89 NGEN 3,7,254,260,1,,1.0
90 C*** ELEMENT GENERATION
91 E,1,2,33,32
92 EGEN 6,1,-1
93 E,7,8,70,38
94 E,8,9,40,70
95 E,9,10,41,40
96 EGEN 22,1,-1
97 E,12,64,63
98 E,12,33,64
99 E,33,34,63,64
100 EGEN 5,1,-1
101 E,38,70,69
102 E,63,64,72,71
103 E,70,40,74,73
104 E,40,41,74
105 E,71,72,77,76
106 E,73,74,79,78
107 E,74,41,80,79
108 E,41,42,81,80
109 E,42,43,81
110 E,76,77,83,82
111 E,78,79,85,84
112 E,79,80,86,83
113 E,80,81,87,86
114 E,81,43,44
115 E,81,44,88
116 E,81,88,87
117 E,82,83,90,89
118 E,84,85,92,91
119 EGEN 4,1,-1
120 E,88,43,96,95

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***** ANSYS INPUT DATA LISTING (FILE16) *****

121 E, 44, 45, 88
122 E, 43, 46, 96
123 E, 46, 97, 96
124 E, 46, 47, 97
125 E, 89, 90, 99, 98
126 E, 91, 92, 101, 100
127 EGEN, 6, 1, -1
128 E, 97, 47, 106
129 E, 47, 107, 106
130 E, 47, 48, 107
131 E, 98, 99, 109, 108
132 E, 100, 101, 116, 115
133 EGEN, 7, 1, -1
134 E, 48, 49, 107
135 E, 107, 49, 122
136 E, 49, 50, 122
137 E, 108, 109, 124, 123
138 EGEN, 7, 1, -1
139 E, 113, 131, 130
140 E, 113, 116, 131
141 E, 123, 124, 133, 132
142 EGEN, 7, 1, -1
143 E, 130, 131, 140, 139
144 E, 131, 116, 141
145 E, 131, 141, 140
146 E, 116, 117, 142, 141
147 EGEN, 6, 1, -1
148 E, 122, 148, 147
149 E, 122, 50, 148
150 E, 148, 50, 149
151 E, 50, 51, 149
152 E, 132, 133, 151, 150
153 E, 139, 140, 153, 152
154 E, 140, 141, 154, 153
155 E, 147, 148, 156, 155
156 E, 148, 149, 157, 156
157 E, 149, 51, 157
158 E, 51, 52, 157
159 E, 150, 151, 159, 158
160 E, 132, 153, 161, 160
161 E, 133, 154, 162, 161
162 E, 133, 156, 164, 163
163 E, 156, 157, 165, 164
164 E, 157, 52, 166, 165
165 E, 52, 53, 166
166 E, 158, 159, 168, 167
167 E, 160, 161, 170, 169
168 E, 161, 162, 171, 170
169 E, 163, 164, 173, 172
170 E, 164, 165, 174, 173
171 E, 165, 166, 175, 174
172 E, 168, 53, 54, 175
173 E, 167, 168, 177, 176
174 E, 169, 170, 179, 178
175 E, 170, 171, 180, 179
176 E, 172, 173, 182, 181
177 EGEN, 3, 1, -1
178 E, 175, 54, 183, 184
179 E, 54, 55, 185
180 E, 176, 177, 187, 186

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

181 E,179,179,189,188
182 E,179,180,190,189
183 E,181,182,192,191
184 EGEN,4,1,-1
185 E,153,158,183
186 E,183,184,193
187 E,186,187,197,196
188 E,188,189,204,203
189 E,189,190,205,204
190 E,191,192,212,211
191 EGEN,4,1,-1
192 E,193,198,217,216
193 E,193,197,216
194 E,213,197,216
195 E,196,197,216
196 E,197,198,217,216
197 EGEN,3,1,-1
198 E,200,220,219
199 E,200,201,221,220
200 EGEN,3,1,-1
201 E,203,204,223
202 E,204,203,223
203 E,203,206,224,223
204 EGEN,3,1,-1
205 E,208,227,226
206 E,208,209,228,227
207 EGEN,3,1,-1
208 E,211,212,230
209 E,212,213,231,230
210 EGEN,3,1,-1
211 E,215,218,233
212 E,216,217,233,234
213 EGEN,3,1,-1
214 E,219,238,237
215 E,219,220,238
216 E,220,239,238
217 E,220,221,240,239
218 EGEN,6,1,-1
219 E,226,246,245
220 E,226,227,246
221 E,227,247,246
222 E,227,228,248,247
223 EGEN,6,1,-1
224 E,233,238,239,253
225 E,237,238,253,254
226 E,238,239,254,253
227 E,243,244,258,257
228 E,246,247,259,258
229 E,253,259,260,260
230 E,254,255,262,261
231 E,255,256,263,262
232 E,257,258,263,264
233 E,258,259,264,263
234 E,260,261,267,267
235 E,261,262,269,268
236 E,262,263,270,269
237 E,264,265,272,271
238 E,265,266,273,272
239 E,267,61,62,274
240 C*** NODE TEMPERATURES

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***** ANSYS INPUT DATA LISTING (FILE16) *****

241 WT, 1, TDO, 433.3
242 WT, 2, TDO, 433.3
243 WT, 3, TDO, 433.1
244 WT, 4, TDO, 433.0
245 WT, 5, TDO, 434.7
246 WT, 6, TDO, 434.4
247 WT, 7, TDO, 434.0
248 WT, 8, TDO, 433.7
249 WT, 9, TDO, 433.6
250 WT, 10, TDO, 433.6
251 WT, 11, TDO, 433.6
252 WT, 12, TDO, 433.6
253 WT, 13, TDO, 433.6
254 WT, 14, TDO, 433.6
255 WT, 15, TDO, 433.6
256 WT, 16, TDO, 433.6
257 WT, 17, TDO, 433.6
258 WT, 18, TDO, 433.6
259 WT, 19, TDO, 433.6
260 WT, 20, TDO, 434.3
261 WT, 21, TDO, 434.6
262 WT, 22, TDO, 433.1
263 WT, 23, TDO, 433.3
264 WT, 24, TDO, 436.0
265 WT, 25, TDO, 436.4
266 WT, 26, TDO, 436.7
267 WT, 27, TDO, 436.0
268 WT, 28, TDO, 433.0
269 WT, 29, TDO, 433.0
270 WT, 30, TDO, 433.0
271 WT, 31, TDO, 433.0
272 WT, 63, TDO, 320.6
273 WT, 64, TDO, 323.2
274 WT, 65, TDO, 323.2
275 WT, 66, TDO, 320.1
276 WT, 67, TDO, 319.9
277 WT, 68, TDO, 313.2
278 WT, 69, TDO, 304.2
279 WT, 70, TDO, 302.6
280 WT, 71, TDO, 322.0
281 WT, 72, TDO, 323.3
282 WT, 73, TDO, 304.2
283 WT, 82, TDO, 344.3
284 WT, 83, TDO, 344.3
285 WT, 84, TDO, 324.4
286 WT, 98, TDO, 339.4
287 WT, 99, TDO, 337.6
288 WT, 100, TDO, 336.7
289 WT, 108, TDO, 360.8
290 WT, 109, TDO, 337.8
291 WT, 110, TDO, 337.8
292 WT, 111, TDO, 336.2
293 WT, 2, TDO, 336.0
294 WT, 3, TDO, 330.6
295 WT, 4, TDO, 337.1
296 WT, 115, TDO, 336.6
297 WT, 132, TDO, 398.2
298 WT, 133, TDO, 606.3
299 WT, 134, TDO, 606.4
300 WT, 135, TDO, 603.0

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

301 NT, 136, TEMP, 604.8
302 NT, 137, TEMP, 601.7
303 NT, 138, TEMP, 594.3
304 NT, 139, TEMP, 593.8
305 NT, 141, TEMP, 567.1
306 NT, 142, TEMP, 567.8
307 NT, 143, TEMP, 555.5
308 NT, 144, TEMP, 554.9
309 NT, 145, TEMP, 543.3
310 NT, 146, TEMP, 529.6
311 NT, 147, TEMP, 528.9
312 NT, 150, TEMP, 601.2
313 NT, 151, TEMP, 606.6
314 NT, 152, TEMP, 594.4
315 NT, 154, TEMP, 568.3
316 NT, 155, TEMP, 529.6
317 NT, 167, TEMP, 615.9
318 NT, 168, TEMP, 616.3
319 NT, 169, TEMP, 606.9
320 NT, 171, TEMP, 582.2
321 NT, 172, TEMP, 539.7
322 NT, 186, TEMP, 619.3
323 NT, 187, TEMP, 619.6
324 NT, 188, TEMP, 610.7
325 NT, 190, TEMP, 587.5
326 NT, 191, TEMP, 544.5
327 NT, 196, TEMP, 619.3
328 NT, 197, TEMP, 619.6
329 NT, 198, TEMP, 619.6
330 NT, 199, TEMP, 618.9
331 NT, 200, TEMP, 618.7
332 NT, 201, TEMP, 616.4
333 NT, 202, TEMP, 616.4
334 NT, 203, TEMP, 610.5
335 NT, 203, TEMP, 587.8
336 NT, 206, TEMP, 587.4
337 NT, 207, TEMP, 578.5
338 NT, 208, TEMP, 578.0
339 NT, 209, TEMP, 568.1
340 NT, 210, TEMP, 545.1
341 NT, 211, TEMP, 545.9
342 NT, 234, TEMP, 637.0
343 NT, 235, TEMP, 637.0
344 NT, 236, TEMP, 636.0
345 NT, 237, TEMP, 635.7
346 NT, 239, TEMP, 625.9
347 NT, 240, TEMP, 625.7
348 NT, 241, TEMP, 621.9
349 NT, 242, TEMP, 621.7
350 NT, 243, TEMP, 617.7
351 NT, 244, TEMP, 610.5
352 NT, 245, TEMP, 610.0
353 NT, 247, TEMP, 580.9
354 NT, 248, TEMP, 580.4
355 NT, 249, TEMP, 567.2
356 NT, 250, TEMP, 566.6
357 NT, 251, TEMP, 552.2
358 NT, 252, TEMP, 538.6
359 NT, 253, TEMP, 538.4
360 NT, 254, TEMP, 636.0

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***** ARMS INPUT DATA LISTING (FILE 6) *****

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361 WT. 254, TEMP. 623.9
362 WT. 257, TEMP. 618.5
363 WT. 259, TEMP. 580.3
364 WT. 260, TEMP. 538.3
365 WT. 261, TEMP. 436.9
366 WT. 263, TEMP. 627.6
367 WT. 264, TEMP. 612.7
368 WT. 266, TEMP. 584.3
369 WT. 267, TEMP. 539.4
370 WT. 268, TEMP. 637.7
371 WT. 270, TEMP. 627.9
372 WT. 271, TEMP. 614.5
373 WT. 273, TEMP. 584.7
374 WT. 274, TEMP. 539.6
375 ITEL, -20., 20
376 AFWRITE
377 FINI
378 /INPUT, 27
379 FINI
380 /PREP7
381 RESUME
382 KAL, 0
383 ET, 2, 42., 3
384 E, 1, 3, 0
385 TEMP, 70
386 KTEMP, 1, 20
387 REAL, 1
388 TYPE, 2
389 EMODEL, ALL, 0
390 SYMBC, 0, 0
391 SYMBC, 2, 0
392 D, 234, 02, 0, 0
393 ITEL, 1., 1
394 AFWRITE
395 FINI
396 /INPUT, 27
397 FINI
398 /POST1
399 SET, 1, 1
400 PLNSTL, SI
401 PREDISP
402 /SHOW, PLOTS., 1
403 PLNSTL, TEMP
404 PLNSTL, SI
405 FINI
406 /EOF

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NUCLEAR PACS MAY 1, 1989
JOHNSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7935 MAY 1, 1990 CP= 264.520

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SIGX	SIGY
1	0.2868E+03	13.37	0.0000E+00	358.7	0.0000E+00	0.0000E+00	0.2869E+03	2.690	0.0000E+00	0.2869E+03	0.2869E+03
2	0.2767E+03	-351.7	0.0000E+00	1363.	0.0000E+00	0.0000E+00	0.2779E+03	0.0000E+00	-673.3	0.2847E+03	0.2814E+03
3	0.2555E+03	-197.8	0.0000E+00	3301.	0.0000E+00	0.0000E+00	0.2580E+03	0.0000E+00	-649.6	0.2645E+03	0.2614E+03
4	0.2254E+03	834.4	0.0000E+00	4113.	0.0000E+00	0.0000E+00	0.2330E+03	249.9	-177.4	0.2347E+03	0.2326E+03
5	0.1924E+03	472.7	0.0000E+00	4628.	0.0000E+00	0.0000E+00	0.2045E+03	0.0000E+00	-618.3	0.2107E+03	0.2077E+03
6	0.1729E+03	2104.	0.0000E+00	4478.	0.0000E+00	0.0000E+00	0.1831E+03	881.4	0.0000E+00	0.1831E+03	0.1809E+03
7	0.1421E+03	-29.21	0.0000E+00	4334.	0.0000E+00	0.0000E+00	0.1543E+03	246.5	-1491.	0.1692E+03	0.1614E+03
8	0.1959E+03	3970.	0.0000E+00	6177.	0.0000E+00	0.0000E+00	0.2160E+03	1769.	0.0000E+00	0.2160E+03	0.2081E+03
9	0.1859E+03	2027.	0.0000E+00	9742.	0.0000E+00	0.0000E+00	0.2324E+03	0.0000E+00	-2626.	0.2387E+03	0.2468E+03
10	0.1359E+03	3370.	0.0000E+00	9009.	0.0000E+00	0.0000E+00	0.2084E+03	236.1	-119.4	0.2096E+03	0.2078E+03
11	0.1153E+03	4394.	0.0000E+00	7186.	0.0000E+00	0.0000E+00	0.1384E+03	76.23	-197.9	0.1604E+03	0.1591E+03
12	9290.	4254.	0.0000E+00	6429.	0.0000E+00	0.0000E+00	0.1368E+03	20.78	-160.2	0.1384E+03	0.1375E+03
13	7944.	4442.	0.0000E+00	6077.	0.0000E+00	0.0000E+00	0.1252E+03	12.24	-150.4	0.1267E+03	0.1259E+03
14	6996.	4718.	0.0000E+00	5841.	0.0000E+00	0.0000E+00	0.1181E+03	3.794	-102.6	0.1192E+03	0.1186E+03
15	6414.	3131.	0.0000E+00	5838.	0.0000E+00	0.0000E+00	0.1166E+03	0.0000E+00	-95.56	0.1176E+03	0.1171E+03
16	5822.	3762.	0.0000E+00	6021.	0.0000E+00	0.0000E+00	0.1182E+03	0.0000E+00	-239.3	0.1206E+03	0.1193E+03
17	3462.	6591.	0.0000E+00	6022.	0.0000E+00	0.0000E+00	0.1208E+03	23.59	-52.26	0.1213E+03	0.1209E+03
18	4837.	7307.	0.0000E+00	6158.	0.0000E+00	0.0000E+00	0.1237E+03	0.0000E+00	-209.3	0.1258E+03	0.1248E+03
19	4328.	8272.	0.0000E+00	6043.	0.0000E+00	0.0000E+00	0.1267E+03	0.0000E+00	-67.91	0.1274E+03	0.1270E+03
20	3684.	8838.	0.0000E+00	5847.	0.0000E+00	0.0000E+00	0.1266E+03	27.18	-162.0	0.1282E+03	0.1273E+03
21	3065.	9436.	0.0000E+00	5624.	0.0000E+00	0.0000E+00	0.1272E+03	0.0000E+00	-222.1	0.1295E+03	0.1284E+03
22	2692.	0.1026E+03	0.0000E+00	5392.	0.0000E+00	0.0000E+00	0.1307E+03	0.0000E+00	-117.1	0.1319E+03	0.1313E+03
23	2231.	0.1128E+03	0.0000E+00	5285.	0.0000E+00	0.0000E+00	0.1373E+03	0.0000E+00	-194.3	0.1392E+03	0.1382E+03
24	1945.	0.1237E+03	0.0000E+00	5134.	0.0000E+00	0.0000E+00	0.1465E+03	0.0000E+00	-138.1	0.1479E+03	0.1472E+03
25	1577.	0.1435E+03	0.0000E+00	5130.	0.0000E+00	0.0000E+00	0.1616E+03	0.0000E+00	-236.0	0.1640E+03	0.1628E+03
26	1431.	0.1725E+03	0.0000E+00	5261.	0.0000E+00	0.0000E+00	0.1885E+03	0.0000E+00	-148.9	0.1900E+03	0.1893E+03
27	383.2	0.2035E+03	0.0000E+00	4773.	0.0000E+00	0.0000E+00	0.2149E+03	0.0000E+00	-553.9	0.2205E+03	0.2177E+03
28	-77.60	0.2054E+03	0.0000E+00	3013.	0.0000E+00	0.0000E+00	0.2103E+03	0.0000E+00	-539.2	0.2156E+03	0.2130E+03
29	-83.24	0.1908E+03	0.0000E+00	1441.	0.0000E+00	0.0000E+00	0.1921E+03	97.01	-304.4	0.1951E+03	0.1931E+03
30	118.5	0.1686E+03	0.0000E+00	346.2	0.0000E+00	0.0000E+00	0.1688E+03	110.2	-11.33	0.1689E+03	0.1683E+03
31	-227.8	0.1590E+03	0.0000E+00	350.2	0.0000E+00	0.0000E+00	0.1591E+03	0.0000E+00	-233.4	0.1614E+03	0.1603E+03
32	0.1400E+03	3016.	0.0000E+00	980.0	0.0000E+00	0.0000E+00	0.1414E+03	2872.	0.0000E+00	0.1414E+03	0.1318E+03
33	0.1723E+03	241.8	0.0000E+00	2072.	0.0000E+00	0.0000E+00	0.1756E+03	979.9	-1072.	0.1863E+03	0.1774E+03
34	0.1694E+03	182.9	0.0000E+00	2473.	0.0000E+00	0.0000E+00	0.1731E+03	162.8	-353.8	0.1766E+03	0.1741E+03
35	0.1480E+03	441.3	0.0000E+00	2739.	0.0000E+00	0.0000E+00	0.1531E+03	234.2	-302.7	0.1561E+03	0.1536E+03
36	0.1465E+03	451.8	0.0000E+00	3078.	0.0000E+00	0.0000E+00	0.1531E+03	386.7	-596.3	0.1591E+03	0.1544E+03
37	0.1372E+03	1224.	0.0000E+00	3436.	0.0000E+00	0.0000E+00	0.1653E+03	1082.	-663.7	0.1719E+03	0.1640E+03
38	0.2446E+03	1373.	0.0000E+00	4446.	0.0000E+00	0.0000E+00	0.2563E+03	1192.	-991.7	0.2662E+03	0.2564E+03
40	0.1401E+03	3377.	0.0000E+00	6733.	0.0000E+00	0.0000E+00	0.1751E+03	719.5	-840.0	0.1835E+03	0.1763E+03
41	9600.	4801.	0.0000E+00	5754.	0.0000E+00	0.0000E+00	0.1344E+03	1044.	-85.40	0.1353E+03	0.1301E+03
42	8883.	3733.	0.0000E+00	6086.	0.0000E+00	0.0000E+00	0.1294E+03	223.7	-544.9	0.1348E+03	0.1312E+03
43	8005.	4424.	0.0000E+00	5537.	0.0000E+00	0.0000E+00	0.1206E+03	435.7	-71.03	0.1214E+03	0.1189E+03
44	7410.	5022.	0.0000E+00	5096.	0.0000E+00	0.0000E+00	0.1146E+03	1021.	-47.44	0.1151E+03	0.1104E+03

NEDO-10084-4
March 1995

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NUCLEAR PACS MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

10.7938 MAY 1, 1990 CP= 263.400

SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGE
43	6463.	4843.	0.0000E+00	4638.	0.0000E+00	0.0000E+00	0.1037E+05	947.9	-26.73	0.1039E+05	9973.
46	6618.	5463.	0.0000E+00	4767.	0.0000E+00	0.0000E+00	0.1083E+05	1266.	-31.90	0.1088E+05	0.1033E+05
47	6244.	6320.	0.0000E+00	4733.	0.0000E+00	0.0000E+00	0.1104E+05	1596.	-67.68	0.1110E+05	0.1043E+05
48	5044.	5903.	0.0000E+00	5027.	0.0000E+00	0.0000E+00	0.1053E+05	470.8	-49.68	0.1038E+05	0.1033E+05
49	5623.	7078.	0.0000E+00	4858.	0.0000E+00	0.0000E+00	0.1128E+05	1537.	-129.3	0.1142E+05	0.1079E+05
50	6377.	8685.	0.0000E+00	4614.	0.0000E+00	0.0000E+00	0.1238E+05	2789.	-90.59	0.1245E+05	0.1144E+05
51	4434.	8168.	0.0000E+00	4329.	0.0000E+00	0.0000E+00	0.1120E+05	1437.	-40.53	0.1125E+05	0.1063E+05
52	3266.	8185.	0.0000E+00	4460.	0.0000E+00	0.0000E+00	0.1083E+05	689.3	-67.74	0.1090E+05	0.1057E+05
53	2176.	8561.	0.0000E+00	4611.	0.0000E+00	0.0000E+00	0.1099E+05	212.7	-463.4	0.1143E+05	0.1113E+05
54	2317.	9633.	0.0000E+00	4363.	0.0000E+00	0.0000E+00	0.1168E+05	354.2	-79.63	0.1173E+05	0.1153E+05
55	2237.	0.1073E+05	0.0000E+00	4330.	0.0000E+00	0.0000E+00	0.1271E+05	359.4	-77.80	0.1278E+05	0.1257E+05
56	2706.	0.1184E+05	0.0000E+00	4314.	0.0000E+00	0.0000E+00	0.1371E+05	929.4	-101.6	0.1382E+05	0.1335E+05
57	3390.	0.1300E+05	0.0000E+00	4173.	0.0000E+00	0.0000E+00	0.1440E+05	1887.	-91.14	0.1469E+05	0.1386E+05
58	885.8	0.1352E+05	0.0000E+00	3403.	0.0000E+00	0.0000E+00	0.1448E+05	1130.	-1211.	0.1569E+05	0.1471E+05
59	-1426.	0.1591E+05	0.0000E+00	1640.	0.0000E+00	0.0000E+00	0.1617E+05	0.0000E+00	-1480.	0.1783E+05	0.1712E+05
60	89.58	0.1413E+05	0.0000E+00	482.3	0.0000E+00	0.0000E+00	0.1617E+05	245.4	-192.6	0.1436E+05	0.1415E+05
61	25.16	0.1321E+05	0.0000E+00	171.7	0.0000E+00	0.0000E+00	0.1321E+05	116.8	-93.15	0.1331E+05	0.1320E+05
62	-137.7	0.1501E+05	0.0000E+00	125.9	0.0000E+00	0.0000E+00	0.1301E+05	0.0000E+00	-140.3	0.1315E+05	0.1309E+05
63	-6228.	-9253.	0.0000E+00	491.3	0.0000E+00	0.0000E+00	0.0000E+00	-6142.	-9339.	9339.	8253.
64	-6209.	-8911.	0.0000E+00	1502.	0.0000E+00	0.0000E+00	0.0000E+00	415.4	-3830.	-0.1171E+05	0.1212E+05
65	-9123.	-26.20	0.0000E+00	1323.	0.0000E+00	0.0000E+00	0.0000E+00	409.1	-226.4	-9334.	9441.
66	-3126.	27.24	0.0000E+00	1242.	0.0000E+00	0.0000E+00	0.0000E+00	770.7	0.0000E+00	-3870.	4641.
67	1968.	-210.7	0.0000E+00	1347.	0.0000E+00	0.0000E+00	0.0000E+00	3243.	0.0000E+00	-1483.	4309.
68	9349.	-736.7	0.0000E+00	2331.	0.0000E+00	0.0000E+00	0.0000E+00	9894.	188.6	-1471.	4208.
69	0.2438E+05	223.6	0.0000E+00	2157.	0.0000E+00	0.0000E+00	0.0000E+00	0.2478E+05	2464.	-2431.	0.1137E+05
70	0.2060E+05	-2616.	0.0000E+00	6335.	0.0000E+00	0.0000E+00	0.2260E+05	0.0000E+00	-4620.	0.2721E+05	0.1063E+05
71	1412.	-8623.	0.0000E+00	94.64	0.0000E+00	0.0000E+00	0.0000E+00	1426.	0.0000E+00	-8637.	0.2721E+05
72	1348.	-9174.	0.0000E+00	94.64	0.0000E+00	0.0000E+00	0.0000E+00	1360.	0.0000E+00	-9186.	0.2549E+05
73	-139.2	-0.1030E+05	0.0000E+00	2127.	0.0000E+00	0.0000E+00	0.0000E+00	2596.	-1688.	-0.1137E+05	0.1004E+05
74	1470.	-399.8	0.0000E+00	3223.	0.0000E+00	0.0000E+00	0.0000E+00	4208.	0.0000E+00	-0.1397E+05	0.1230E+05
76	-293.8	-9123.	0.0000E+00	-43.73	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-3337.	7343.	6803.
77	-92.06	-8675.	0.0000E+00	-43.73	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-288.6	9128.	8987.
78	2031.	-0.1136E+05	0.0000E+00	-389.3	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-8680.	8680.	8637.
79	328.0	-2992.	0.0000E+00	864.9	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-0.1137E+05	0.1361E+05	0.1271E+05
80	1825.	1772.	0.0000E+00	3032.	0.0000E+00	0.0000E+00	0.0000E+00	1483.	-333.8	-3814.	4923.
81	4520.	3212.	0.0000E+00	4602.	0.0000E+00	0.0000E+00	0.0000E+00	4880.	108.7	-1392.	5684.
82	-85.03	-8736.	0.0000E+00	9.882	0.0000E+00	0.0000E+00	0.0000E+00	8546.	322.4	-1138.	9082.
83	-119.8	-9062.	0.0000E+00	9.882	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-82.23	-8739.	8698.
84	-1444.	-4416.	0.0000E+00	-116.7	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-117.1	-9064.	9007.
85	549.1	-0.1149E+05	0.0000E+00	-116.2	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-1426.	-0.1131E+05	0.1151E+05
86	733.7	184.1	0.0000E+00	1127.	0.0000E+00	0.0000E+00	0.0000E+00	649.2	-66.06	-4430.	4792.
87	1531.	1558.	0.0000E+00	2676.	0.0000E+00	0.0000E+00	0.0000E+00	1876.	0.0000E+00	-936.4	2576.
88	3106.	2040.	0.0000E+00	4026.	0.0000E+00	0.0000E+00	0.0000E+00	4255.	68.80	-1215.	5018.
								6640.	10.67	-1505.	7392.

NEDO-10084-4
March 1995

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SPACECRAFT THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7941 MAY 1, 1990 CP= 266.610

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SE	SIGE
132	-5930.	-4949.	0.0000E+00	837.8	0.0000E+00	0.0000E+00	0.0000E+00	-5432.	-7447.	7447.	6694.
133	-0.1078E+03	-6771.	0.0000E+00	784.4	0.0000E+00	0.0000E+00	0.0000E+00	-5159.	-0.1239E+03	0.1239E+03	0.1094E+03
134	-0.1712E+03	1143.	0.0000E+00	317.4	0.0000E+00	0.0000E+00	1153.	0.0000E+00	-0.1711E+03	0.1829E+03	0.1774E+03
135	-0.1494E+03	-112.4	0.0000E+00	191.8	0.0000E+00	0.0000E+00	24.13	-130.2	-0.1494E+03	0.1497E+03	0.1489E+03
136	-0.1339E+03	-4.202	0.0000E+00	234.3	0.0000E+00	0.0000E+00	108.3	-108.2	-0.1340E+03	0.1350E+03	0.1340E+03
137	-0.1118E+03	-110.3	0.0000E+00	287.8	0.0000E+00	0.0000E+00	77.64	-173.7	-0.1119E+03	0.1127E+03	0.1113E+03
138	-9540.	1054.	0.0000E+00	131.1	0.0000E+00	0.0000E+00	1073.	0.0000E+00	-9377.	0.1065E+03	0.1016E+03
139	-6483.	-6804.	0.0000E+00	-850.8	0.0000E+00	0.0000E+00	-4294.	-8993.	-4294.	8993.	7794.
140	-3533.	-9552.	0.0000E+00	67.60	0.0000E+00	0.0000E+00	-3283.	-9820.	-9820.	9820.	8722.
141	-4456.	-0.1114E+03	0.0000E+00	1613.	0.0000E+00	0.0000E+00	-3918.	-0.1168E+03	0.1168E+03	0.1032E+03	0.1032E+03
142	-3882.	171.3	0.0000E+00	587.3	0.0000E+00	0.0000E+00	463.8	0.0000E+00	-4160.	4624.	4411.
143	-2482.	469.6	0.0000E+00	-371.9	0.0000E+00	0.0000E+00	534.9	0.0000E+00	-2348.	3082.	2864.
144	-4344.	-101.9	0.0000E+00	-102.9	0.0000E+00	0.0000E+00	80.43	-173.8	-4531.	4631.	4509.
145	-4617.	47.93	0.0000E+00	267.8	0.0000E+00	0.0000E+00	73.78	0.0000E+00	-4444.	4720.	4683.
146	-1142.	1227.	0.0000E+00	1331.	0.0000E+00	0.0000E+00	2238.	0.0000E+00	-2153.	4392.	4209.
147	-1060.	63.41	0.0000E+00	1842.	0.0000E+00	0.0000E+00	1883.	-418.7	-2464.	4349.	3923.
148	-363.2	837.2	0.0000E+00	3118.	0.0000E+00	0.0000E+00	3491.	419.4	-3438.	6929.	6393.
149	3126.	5283.	0.0000E+00	4239.	0.0000E+00	0.0000E+00	8644.	383.3	-618.8	9263.	8810.
150	1593.	-8434.	0.0000E+00	169.0	0.0000E+00	0.0000E+00	1630.	0.0000E+00	-8472.	0.1010E+03	9393.
151	1263.	-0.1023E+03	0.0000E+00	169.0	0.0000E+00	0.0000E+00	1294.	0.0000E+00	-0.1028E+03	0.1137E+03	0.1098E+03
152	347.4	-9553.	0.0000E+00	133.8	0.0000E+00	0.0000E+00	737.3	-378.6	-9594.	0.1035E+03	9843.
153	336.3	-0.1218E+03	0.0000E+00	303.3	0.0000E+00	0.0000E+00	481.4	-103.9	-0.1222E+03	0.1270E+03	0.1243E+03
154	2070.	-0.1506E+03	0.0000E+00	474.9	0.0000E+00	0.0000E+00	2101.	0.0000E+00	-0.1509E+03	0.1719E+03	0.1626E+03
155	-331.7	-918.3	0.0000E+00	1073.	0.0000E+00	0.0000E+00	2142.	-943.3	-2647.	4789.	4403.
156	713.4	1199.	0.0000E+00	1973.	0.0000E+00	0.0000E+00	3004.	118.4	-1208.	4212.	3812.
157	59.71	3107.	0.0000E+00	3684.	0.0000E+00	0.0000E+00	3583.	113.8	-2530.	8114.	7293.
158	-458.4	-9893.	0.0000E+00	-41.92	0.0000E+00	0.0000E+00	-443.0	-9908.	-9908.	9908.	9693.
159	230.0	-8786.	0.0000E+00	-41.92	0.0000E+00	0.0000E+00	244.3	0.0000E+00	-8801.	9043.	8927.
160	1401.	-9407.	0.0000E+00	354.4	0.0000E+00	0.0000E+00	1430.	0.0000E+00	-9436.	0.1087E+03	0.1023E+03
161	153.7	-0.1257E+03	0.0000E+00	303.3	0.0000E+00	0.0000E+00	740.0	-363.3	-0.1259E+03	0.1333E+03	0.1273E+03
162	-1390.	-0.1443E+03	0.0000E+00	256.2	0.0000E+00	0.0000E+00	1833.	-1373.	-0.1444E+03	0.1444E+03	0.1381E+03
163	1830.	-2614.	0.0000E+00	273.3	0.0000E+00	0.0000E+00	1158.	0.0000E+00	-2640.	4493.	3919.
164	-76.58	-1932.	0.0000E+00	1024.	0.0000E+00	0.0000E+00	4466.	-613.4	-2573.	3732.	3321.
165	643.7	2567.	0.0000E+00	2646.	0.0000E+00	0.0000E+00	8174.	198.1	-938.8	9111.	8636.
166	1384.	6031.	0.0000E+00	3784.	0.0000E+00	0.0000E+00	14.13	-30.20	-8977.	8991.	8969.
167	-28.84	-8964.	0.0000E+00	-24.01	0.0000E+00	0.0000E+00	-201.0	-9729.	-9729.	9729.	9630.
168	-213.0	-9717.	0.0000E+00	-24.01	0.0000E+00	0.0000E+00	-1483.	-0.1315E+03	0.1315E+03	0.1446E+03	0.1446E+03
169	-1504.	-0.1311E+03	0.0000E+00	363.4	0.0000E+00	0.0000E+00	607.3	-719.0	-0.1183E+03	0.1244E+03	0.1183E+03
170	-133.6	-0.1181E+03	0.0000E+00	303.3	0.0000E+00	0.0000E+00	1124.	0.0000E+00	-0.1023E+03	0.1137E+03	0.1085E+03
171	1106.	-0.1023E+03	0.0000E+00	247.2	0.0000E+00	0.0000E+00	-1711.	-7029.	-7029.	7029.	6349.
172	-1723.	-7013.	0.0000E+00	246.3	0.0000E+00	0.0000E+00	913.8	-155.9	-2696.	3610.	3292.
173	580.1	-2318.	0.0000E+00	623.7	0.0000E+00	0.0000E+00	2963.	0.0000E+00	-818.8	3782.	3485.
174	811.8	1332.	0.0000E+00	1820.	0.0000E+00	0.0000E+00					

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SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7943 MAY 1, 1990 CP= 267.210

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SE	SY	SZ	SEY	SEZ	SIG1	SIG2	SIG3	SI	SIGZ
175	818.1	4747.	0.0000E+00	3261.	0.0000E+00	6612.	0.0000E+00	-1048.	7660.	7212.
176	-252.2	-9764.	0.0000E+00	112.8	0.0000E+00	0.0000E+00	-228.1	-9788.	9788.	9676.
177	-169.1	-8918.	0.0000E+00	112.8	0.0000E+00	0.0000E+00	-140.7	-8946.	8946.	8877.
178	888.8	-0.1385E+03	0.0000E+00	138.8	0.0000E+00	914.4	0.0000E+00	-0.1385E+03	0.1480E+03	0.1436E+03
179	-424.7	-0.1279E+03	0.0000E+00	303.3	0.0000E+00	486.8	-871.4	-0.1283E+03	0.1332E+03	0.1269E+03
180	-1501.	-9541.	0.0000E+00	481.8	0.0000E+00	0.0000E+00	-1394.	-9647.	9647.	9030.
181	1279.	-3627.	0.0000E+00	-222.3	0.0000E+00	1390.	0.0000E+00	-3538.	4929.	4404.
182	-122.8	-3024.	0.0000E+00	276.3	0.0000E+00	641.7	-463.8	-5123.	3764.	3269.
183	553.0	-362.3	0.0000E+00	1390.	0.0000E+00	1323.	0.0000E+00	-1332.	3037.	2664.
184	1001.	3747.	0.0000E+00	2709.	0.0000E+00	5433.	0.0000E+00	-484.8	6122.	5616.
185	563.7	7877.	0.0000E+00	4093.	0.0000E+00	9713.	0.0000E+00	-1273.	0.1099E+03	0.1044E+03
186	2119.	-9089.	0.0000E+00	-194.7	0.0000E+00	2181.	0.0000E+00	-9131.	0.1133E+03	0.1042E+03
187	2081.	-9593.	0.0000E+00	-194.7	0.0000E+00	2134.	0.0000E+00	-9443.	0.1178E+03	0.1087E+03
188	2682.	-0.1892E+03	0.0000E+00	575.6	0.0000E+00	3743.	0.0000E+00	-0.1898E+03	0.2172E+03	0.2049E+03
189	3276.	-0.1169E+03	0.0000E+00	305.3	0.0000E+00	3367.	0.0000E+00	-0.1199E+03	0.1533E+03	0.1402E+03
190	3340.	-6248.	0.0000E+00	34.83	0.0000E+00	3462.	0.0000E+00	-4390.	9832.	8702.
191	519.3	-6784.	0.0000E+00	1114.	0.0000E+00	923.2	0.0000E+00	-9180.	0.1011E+03	9702.
192	404.1	-4694.	0.0000E+00	1117.	0.0000E+00	1543.	-417.8	-3213.	6737.	6073.
193	-843.6	-501.0	0.0000E+00	1037.	0.0000E+00	512.7	-62.96	-1794.	2307.	2089.
194	-294.0	2119.	0.0000E+00	1626.	0.0000E+00	3063.	0.0000E+00	-1242.	4307.	3837.
195	-611.3	6111.	0.0000E+00	3319.	0.0000E+00	7634.	0.0000E+00	-2134.	9768.	8967.
196	-9093.	-3204.	0.0000E+00	-1308.	0.0000E+00	0.0000E+00	-4801.	-9496.	9496.	8476.
197	-0.1181E+03	-6047.	0.0000E+00	-1490.	0.0000E+00	0.0000E+00	-3301.	-0.1258E+03	0.1238E+03	0.1142E+03
198	-7203.	20.43	0.0000E+00	-3663.	0.0000E+00	2277.	0.0000E+00	-9461.	0.1174E+03	0.1124E+03
199	5832.	479.1	0.0000E+00	-2798.	0.0000E+00	7304.	0.0000E+00	-1173.	8676.	8237.
200	4061.	-1528.	0.0000E+00	473.2	0.0000E+00	3791.	0.0000E+00	-3238.	9048.	8132.
201	1554.	569.3	0.0000E+00	3698.	0.0000E+00	6194.	0.0000E+00	-4071.	0.1027E+03	9443.
202	-0.1630E+03	-48.40	0.0000E+00	5039.	0.0000E+00	1600.	0.0000E+00	-0.1813E+03	0.1973E+03	0.1913E+03
203	-0.2008E+03	-0.1167E+03	0.0000E+00	1733.	0.0000E+00	0.0000E+00	-9531.	-0.2223E+03	0.2223E+03	0.1983E+03
204	-0.1377E+03	-6994.	0.0000E+00	-260.3	0.0000E+00	0.0000E+00	-4537.	-0.1423E+03	0.1423E+03	0.1266E+03
205	-0.1602E+03	-3481.	0.0000E+00	-3462.	0.0000E+00	329.3	-3299.	-0.1653E+03	0.1686E+03	0.1570E+03
206	-0.1397E+03	-763.2	0.0000E+00	-4432.	0.0000E+00	1304.	-263.6	-0.1377E+03	0.1707E+03	0.1647E+03
207	4226.	1003.	0.0000E+00	-3731.	0.0000E+00	7733.	0.0000E+00	-2323.	0.1028E+03	9671.
208	4836.	-1480.	0.0000E+00	38.93	0.0000E+00	6381.	0.0000E+00	-3004.	9383.	8446.
209	4380.	-346.7	0.0000E+00	2920.	0.0000E+00	6434.	0.0000E+00	-2401.	8833.	8260.
210	-8844.	598.8	0.0000E+00	4127.	0.0000E+00	2693.	0.0000E+00	-0.1096E+03	0.1366E+03	0.1321E+03
211	-0.1323E+03	-6337.	0.0000E+00	2064.	0.0000E+00	0.0000E+00	-3034.	-0.1473E+03	0.1473E+03	0.1313E+03
212	-8497.	-3579.	0.0000E+00	1078.	0.0000E+00	0.0000E+00	-3031.	-9046.	9046.	8003.
213	-5439.	36.45	0.0000E+00	-339.2	0.0000E+00	311.8	-222.3	-5693.	6204.	5891.
214	-2148.	529.4	0.0000E+00	-30.40	0.0000E+00	936.2	-6.372	-2388.	3547.	3273.
215	-3013.	3532.	0.0000E+00	2330.	0.0000E+00	4336.	0.0000E+00	-4000.	8338.	7517.
216	-8304.	-3717.	0.0000E+00	-1619.	0.0000E+00	0.0000E+00	-3170.	-8832.	8832.	7639.
217	-8506.	-611.8	0.0000E+00	-3001.	0.0000E+00	798.9	-283.8	-9633.	0.1043E+03	9947.

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SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7945 MAY 1, 1990 CP= 267.820

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	SHX	SHY	SHZ	SIG1	SIG2	SIG3	SI	SIGR
218	-8784.	933.3	0.0000E+00	-3118.	0.0000E+00	0.0000E+00	1897.	0.0000E+00	-8748.	0.1163E+03	0.1084E+03
219	-7678.	-3022.	0.0000E+00	-847.3	0.0000E+00	0.0000E+00	-2427.	-8273.	8273.	7322.	7322.
220	-7267.	-2828.	0.0000E+00	1433.	0.0000E+00	0.0000E+00	0.0000E+00	-1960.	-8135.	8135.	7480.
221	-9146.	1294.	0.0000E+00	4138.	0.0000E+00	0.0000E+00	2818.	0.0000E+00	-0.1067E+03	0.1349E+03	0.1235E+03
222	-8193.	-1324.	0.0000E+00	3978.	0.0000E+00	0.0000E+00	1478.	-708.3	-0.1029E+03	0.1176E+03	0.1086E+03
223	-9146.	-4590.	0.0000E+00	-611.8	0.0000E+00	0.0000E+00	0.0000E+00	-3429.	-0.1031E+03	0.1031E+03	9200.
224	-7903.	-477.6	0.0000E+00	-3767.	0.0000E+00	0.0000E+00	1441.	-209.8	-9613.	0.1105E+03	0.1036E+03
225	-6998.	913.1	0.0000E+00	-4032.	0.0000E+00	0.0000E+00	2423.	0.0000E+00	-0.1051E+03	0.1293E+03	0.1193E+03
226	-7553.	-3709.	0.0000E+00	-1217.	0.0000E+00	0.0000E+00	0.0000E+00	-2733.	-8531.	8531.	7731.
227	-6783.	-1868.	0.0000E+00	1352.	0.0000E+00	0.0000E+00	136.8	-1404.	-7402.	7538.	6938.
228	-8228.	1528.	0.0000E+00	3233.	0.0000E+00	0.0000E+00	2618.	0.0000E+00	-9320.	0.1194E+03	0.1048E+03
229	-8250.	-1475.	0.0000E+00	3204.	0.0000E+00	0.0000E+00	711.7	-467.2	-6770.	0.1048E+03	9883.
230	-4529.	-2887.	0.0000E+00	293.9	0.0000E+00	0.0000E+00	0.0000E+00	-2293.	-7123.	7123.	6389.
231	-5703.	421.3	0.0000E+00	-1358.	0.0000E+00	0.0000E+00	713.8	0.0000E+00	-6000.	6713.	6403.
232	-4931.	-216.3	0.0000E+00	-1093.	0.0000E+00	0.0000E+00	322.8	-249.7	-3221.	3543.	3289.
233	-3163.	632.8	0.0000E+00	443.3	0.0000E+00	0.0000E+00	1342.	47.63	-3942.	3284.	4927.
234	-1128.	-1114.	0.0000E+00	-1363.	0.0000E+00	0.0000E+00	242.6	0.0000E+00	-2484.	2727.	2614.
235	-5600.	-1324.	0.0000E+00	-2338.	0.0000E+00	0.0000E+00	346.8	-549.8	-6720.	7066.	6674.
236	-0.1921E+03	1688.	0.0000E+00	-3439.	0.0000E+00	0.0000E+00	2310.	0.0000E+00	-0.1983E+03	0.2214E+03	0.2117E+03
237	-0.1931E+03	-7173.	0.0000E+00	-1979.	0.0000E+00	0.0000E+00	0.0000E+00	-6790.	-0.1970E+03	0.1970E+03	0.1798E+03
238	-0.1267E+03	-6172.	0.0000E+00	126.9	0.0000E+00	0.0000E+00	0.0000E+00	-5979.	-0.1286E+03	0.1286E+03	0.1133E+03
239	-0.1724E+03	-7331.	0.0000E+00	2292.	0.0000E+00	0.0000E+00	0.0000E+00	-6739.	-0.1804E+03	0.1804E+03	0.1669E+03
240	-0.1303E+03	1963.	0.0000E+00	4379.	0.0000E+00	0.0000E+00	3863.	0.0000E+00	-0.1493E+03	0.1880E+03	0.1785E+03
241	4839.	-1903.	0.0000E+00	2917.	0.0000E+00	0.0000E+00	6618.	0.0000E+00	-3684.	0.1030E+03	9644.
242	8713.	-1319.	0.0000E+00	-433.7	0.0000E+00	0.0000E+00	8983.	0.0000E+00	-1590.	0.1058E+03	9877.
243	1723.	-1796.	0.0000E+00	-3102.	0.0000E+00	0.0000E+00	4389.	0.0000E+00	-4462.	8831.	8469.
244	-0.1518E+03	2404.	0.0000E+00	-4333.	0.0000E+00	0.0000E+00	3692.	0.0000E+00	-0.1647E+03	0.2016E+03	0.1896E+03
245	-0.1988E+03	-0.1100E+03	0.0000E+00	-2383.	0.0000E+00	0.0000E+00	0.0000E+00	-9594.	-0.2129E+03	0.2129E+03	0.1926E+03
246	-0.1303E+03	-6443.	0.0000E+00	110.8	0.0000E+00	0.0000E+00	0.0000E+00	-6214.	-0.1326E+03	0.1326E+03	0.1165E+03
247	-0.1742E+03	-4214.	0.0000E+00	2032.	0.0000E+00	0.0000E+00	0.0000E+00	-3882.	-0.1775E+03	0.1775E+03	0.1662E+03
248	-0.1791E+03	837.0	0.0000E+00	3749.	0.0000E+00	0.0000E+00	1802.	-62.64	-0.1879E+03	0.2059E+03	0.1989E+03
249	-3074.	-1462.	0.0000E+00	2281.	0.0000E+00	0.0000E+00	579.2	-203.2	-4912.	3491.	3263.
250	-402.0	-1387.	0.0000E+00	-296.0	0.0000E+00	0.0000E+00	358.3	0.0000E+00	-2146.	2302.	2343.
251	-3478.	282.8	0.0000E+00	-1304.	0.0000E+00	0.0000E+00	978.3	-84.81	-4088.	5067.	4842.
252	-9414.	1389.	0.0000E+00	-1248.	0.0000E+00	0.0000E+00	1538.	0.0000E+00	-9564.	0.1110E+03	0.1042E+03
253	-8304.	-2880.	0.0000E+00	-664.7	0.0000E+00	0.0000E+00	0.0000E+00	-2368.	-8816.	8816.	7905.
254	3222.	-8893.	0.0000E+00	-270.6	0.0000E+00	0.0000E+00	3317.	0.0000E+00	-9988.	0.1331E+03	0.1200E+03
255	3053.	-0.1065E+03	0.0000E+00	0.7886E-09	0.0000E+00	0.0000E+00	3137.	0.0000E+00	-0.1076E+03	0.1392E+03	0.1264E+03
256	3162.	-0.1240E+03	0.0000E+00	270.6	0.0000E+00	0.0000E+00	3243.	0.0000E+00	-0.1248E+03	0.1573E+03	0.1439E+03
257	3440.	-0.1615E+03	0.0000E+00	-279.6	0.0000E+00	0.0000E+00	3508.	0.0000E+00	-0.1622E+03	0.1973E+03	0.1823E+03
258	3071.	-0.1084E+03	0.0000E+00	0.1924E-08	0.0000E+00	0.0000E+00	3179.	0.0000E+00	-0.1097E+03	0.1415E+03	0.1287E+03
259	3206.	-6423.	0.0000E+00	279.6	0.0000E+00	0.0000E+00	3341.	0.0000E+00	-6538.	9898.	8747.
260	413.7	-1221.	0.0000E+00	-781.6	0.0000E+00	0.0000E+00	730.3	0.0000E+00	-1536.	2266.	2133.

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NUCLEAR PACK. MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK.

SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7946 MAY 1, 1990 CP= 266.420

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
 TIME= 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	SHX	SHY	SHZ	SHX	SIG1	SIG2	SIG3	SI	SIGX
261	-326.1	-9038.	0.0000E+00	151.0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-244.2	-9100.	9100.	8971.
262	-303.4	-0.1146E+03	0.0000E+00	0.4310E-09	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-239.3	-0.1131E+03	0.1131E+03	0.1138E+03
263	-349.1	-0.1164E+03	0.0000E+00	-151.0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-301.9	-0.1169E+03	0.1169E+03	0.1154E+03
264	-337.0	-0.1528E+03	0.0000E+00	154.7	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-320.3	-0.1332E+03	0.1332E+03	0.1316E+03
265	-291.4	-0.1163E+03	0.0000E+00	0.1130E-08	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-246.3	-0.1168E+03	0.1168E+03	0.1156E+03
266	-382.3	-3749.	0.0000E+00	-154.7	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-273.1	-3839.	3839.	3727.
267	-382.4	99.23	0.0000E+00	-317.4	0.0000E+00	0.0000E+00	0.0000E+00	328.2	-33.64	-377.7	906.0	858.9
268	-178.2	-0.1020E+03	0.0000E+00	-546.2	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-148.3	-0.1023E+03	0.1023E+03	0.1013E+03
269	-169.3	-0.1033E+03	0.0000E+00	0.1576E-09	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-140.3	-0.1038E+03	0.1038E+03	0.1031E+03
270	-152.6	-0.1271E+03	0.0000E+00	546.2	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-128.9	-0.1273E+03	0.1273E+03	0.1267E+03
271	-192.3	-0.1651E+03	0.0000E+00	-536.3	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-173.3	-0.1653E+03	0.1653E+03	0.1644E+03
272	-177.4	-0.1052E+03	0.0000E+00	-0.3042E-10	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-147.6	-0.1055E+03	0.1055E+03	0.1048E+03
273	-126.9	-6748.	0.0000E+00	536.3	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-80.49	-6794.	6794.	6735.
274	-303.7	482.7	0.0000E+00	-178.3	0.0000E+00	0.0000E+00	0.0000E+00	321.3	0.0000E+00	-342.3	863.3	733.2

MINIMUMS
 NODE 203 188 1 206 1 1 63 243 203 274 274
 VALUE -0.2008E+03 -0.1892E+03 0.0000E+00 -4432. 0.0000E+00 0.0000E+00 0.0000E+00 -9394. -0.2223E+03 863.3 733.2

MAXIMUMS
 NODE 1 28 1 9 1 1 1 32 1 1 1
 VALUE 0.2868E+03 0.2056E+03 0.0000E+00 9742. 0.0000E+00 0.0000E+00 0.2869E+03 2872. 0.0000E+00 0.2869E+03 0.2869E+03

PRINT NODAL DISPLACEMENTS

NEDO-10084-4
March 1995

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NUCLEAR PACB MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7948 MAY 1, 1990 CP= 268.970

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
1	0.00000000E+00	-0.78123408E-01
2	0.44221332E-02	-0.77689329E-01
3	0.87014627E-02	-0.76309752E-01
4	0.12792140E-01	-0.74766740E-01
5	0.16632128E-01	-0.72616131E-01
6	0.20232671E-01	-0.70292768E-01
7	0.23786847E-01	-0.68031377E-01
8	0.27435423E-01	-0.66808723E-01
9	0.31740545E-01	-0.65932564E-01
10	0.35721677E-01	-0.64417034E-01
11	0.39242092E-01	-0.62344971E-01
12	0.42334978E-01	-0.60319307E-01
13	0.45712145E-01	-0.58333085E-01
14	0.48738878E-01	-0.56062379E-01
15	0.51660709E-01	-0.53668837E-01
16	0.54301139E-01	-0.51164355E-01
17	0.57247003E-01	-0.48546082E-01
18	0.59923689E-01	-0.45832867E-01
19	0.62331326E-01	-0.43034027E-01
20	0.63039806E-01	-0.40132681E-01
21	0.67444849E-01	-0.37122080E-01
22	0.69736785E-01	-0.33993287E-01
23	0.71864604E-01	-0.30736330E-01
24	0.73824089E-01	-0.27337819E-01
25	0.75612624E-01	-0.23798644E-01
26	0.77214192E-01	-0.20091724E-01
27	0.78519159E-01	-0.16144099E-01
28	0.79343362E-01	-0.12035420E-01
29	0.79843075E-01	-0.79671201E-02
30	0.80040959E-01	-0.39491311E-02
31	0.80093800E-01	0.00000000E+00
32	0.00000000E+00	-0.76312843E-01
33	0.40085317E-02	-0.76113189E-01
34	0.80364826E-02	-0.74966824E-01
35	0.11890834E-01	-0.73260019E-01
36	0.13582374E-01	-0.71176407E-01
37	0.19180747E-01	-0.68860337E-01
38	0.22826630E-01	-0.66673903E-01
40	0.31449304E-01	-0.64354185E-01
41	0.35063921E-01	-0.62961933E-01
42	0.38456270E-01	-0.61130047E-01
43	0.41678602E-01	-0.59149820E-01

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March 1995

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SPACE DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7949 MAY 1, 1990 CP= 269.240

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
44	0.44764918E-01	-0.37024639E-01
45	0.47728777E-01	-0.34774622E-01
46	0.30604215E-01	-0.32414429E-01
47	0.33397379E-01	-0.49950615E-01
48	0.36098767E-01	-0.47363769E-01
49	0.38743005E-01	-0.44482745E-01
50	0.41328153E-01	-0.41895454E-01
51	0.43807751E-01	-0.39045377E-01
52	0.46170815E-01	-0.36090489E-01
53	0.48393354E-01	-0.33023754E-01
54	0.50473875E-01	-0.29842223E-01
55	0.52385469E-01	-0.26327287E-01
56	0.54135837E-01	-0.23071558E-01
57	0.55692012E-01	-0.19475154E-01
58	0.56935169E-01	-0.15731821E-01
59	0.57770316E-01	-0.11786396E-01
60	0.58219758E-01	-0.78215346E-02
61	0.58394775E-01	-0.39048102E-02
62	0.58431629E-01	0.00000000E+00
63	0.00000000E+00	-0.72221693E-01
64	0.15375468E-02	-0.72200357E-01
65	0.31424249E-02	-0.71450731E-01
66	0.89637495E-02	-0.70335467E-01
67	0.12955465E-01	-0.68895101E-01
68	0.17150858E-01	-0.67340707E-01
69	0.21635191E-01	-0.65889816E-01
70	0.26740144E-01	-0.63226246E-01
71	0.00000000E+00	-0.68472833E-01
72	0.16758831E-02	-0.68306192E-01
73	0.28126388E-01	-0.61628010E-01
74	0.31166646E-01	-0.62178623E-01
76	0.00000000E+00	-0.64752573E-01
77	0.16904892E-02	-0.64745329E-01
78	0.28473469E-01	-0.58333247E-01
79	0.31612605E-01	-0.58460683E-01
80	0.35405358E-01	-0.58379586E-01
81	0.39150349E-01	-0.5463107E-01
82	0.00000000E+00	-0.60898440E-01
83	0.17304932E-02	-0.60908717E-01
84	0.28418067E-01	-0.54829721E-01
85	0.31663650E-01	-0.54779458E-01
86	0.35371091E-01	-0.54777456E-01

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SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7949 MAY 1, 1990 CP= 269.460

***** POST1 MODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
87	0.39395635E-01	-0.34720611E-01
88	0.43170699E-01	-0.34377706E-01
89	0.00000000E+00	-0.36974210E-01
90	0.17607238E-02	-0.36987474E-01
91	0.28256455E-01	-0.31142375E-01
92	0.31541544E-01	-0.31014518E-01
93	0.35371225E-01	-0.30923610E-01
94	0.39496632E-01	-0.30850645E-01
95	0.43366032E-01	-0.30772337E-01
96	0.47189326E-01	-0.30695560E-01
97	0.50949440E-01	-0.30579379E-01
98	0.00000000E+00	-0.33006381E-01
99	0.17768244E-02	-0.32981174E-01
100	0.27896316E-01	-0.47357664E-01
101	0.31365677E-01	-0.47161424E-01
102	0.35473795E-01	-0.46951920E-01
103	0.39509053E-01	-0.46833035E-01
104	0.43485806E-01	-0.46834484E-01
105	0.47424150E-01	-0.46834793E-01
106	0.51310266E-01	-0.46827613E-01
107	0.55070329E-01	-0.46791936E-01
108	0.00000000E+00	-0.48940167E-01
109	0.17918862E-02	-0.49005377E-01
110	0.63392594E-02	-0.48811582E-01
111	0.10838027E-01	-0.48009244E-01
112	0.13234034E-01	-0.46896114E-01
113	0.19533169E-01	-0.45639500E-01
114	0.23700053E-01	-0.44482228E-01
115	0.27701297E-01	-0.43564309E-01
116	0.31099438E-01	-0.43146776E-01
117	0.35331529E-01	-0.42801075E-01
118	0.39458037E-01	-0.42680265E-01
119	0.43357142E-01	-0.42733029E-01
120	0.47603069E-01	-0.42827908E-01
121	0.51603545E-01	-0.42899305E-01
122	0.55534514E-01	-0.42954972E-01
123	0.00000000E+00	-0.47361741E-01
124	0.17834472E-02	-0.47390511E-01
125	0.61598633E-02	-0.47124679E-01
126	0.10458476E-01	-0.46335124E-01
127	0.14781146E-01	-0.45219599E-01
128	0.19080735E-01	-0.43977544E-01

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NUCLEAR PACE MAY 1, 1989

SPACKER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7950 MAY 1, 1990 CP- 269.740

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
129	0.23284498E-01	-0.42832422E-01
130	0.27522564E-01	-0.42019420E-01
131	0.29233670E-01	-0.41817363E-01
132	0.00000000E+00	-0.43709038E-01
133	0.18341751E-02	-0.45660302E-01
134	0.39249322E-02	-0.45306700E-01
135	0.10103991E-01	-0.44343686E-01
136	0.14330044E-01	-0.43432305E-01
137	0.18609926E-01	-0.42207586E-01
138	0.22941787E-01	-0.41078254E-01
139	0.27269368E-01	-0.40355502E-01
140	0.29083480E-01	-0.40269966E-01
141	0.30834401E-01	-0.40051012E-01
142	0.35144316E-01	-0.39491594E-01
143	0.39447164E-01	-0.39451406E-01
144	0.43623004E-01	-0.39320634E-01
145	0.47730134E-01	-0.39480190E-01
146	0.51736952E-01	-0.39833504E-01
147	0.55835554E-01	-0.39941797E-01
148	0.57440231E-01	-0.40037530E-01
149	0.61233239E-01	-0.40252004E-01
150	0.00000000E+00	-0.41233324E-01
151	0.19681274E-02	-0.41277791E-01
152	0.27184049E-01	-0.36023241E-01
153	0.29090393E-01	-0.36114429E-01
154	0.30971093E-01	-0.36296904E-01
155	0.36463625E-01	-0.35739899E-01
156	0.38077964E-01	-0.36016214E-01
157	0.61941035E-01	-0.36423217E-01
158	0.00000000E+00	-0.36836722E-01
159	0.19663325E-02	-0.36822786E-01
160	0.27718983E-01	-0.31742584E-01
161	0.29613083E-01	-0.32016836E-01
162	0.31528208E-01	-0.32277387E-01
163	0.37125666E-01	-0.31677539E-01
164	0.38711430E-01	-0.32060454E-01
165	0.62592151E-01	-0.32333757E-01
166	0.66307392E-01	-0.32875070E-01
167	0.00000000E+00	-0.32341982E-01
168	0.19879946E-02	-0.32339939E-01
169	0.28431068E-01	-0.27518127E-01
170	0.30376246E-01	-0.27836545E-01

NEDO-10084-4
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FOR SUPPORT CALL STEVE FOKTER PHONE (206) 474-2233 FAX

SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7951 MAY 1, 1990 CP= 269.960

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING U, V, W DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
171	0.32276060E-01	-0.28129724E-01
172	0.37589964E-01	-0.28006123E-01
173	0.59253143E-01	-0.28198376E-01
174	0.63214237E-01	-0.28637086E-01
175	0.66996089E-01	-0.29011419E-01
176	0.00000000E+00	-0.27800801E-01
177	0.19926009E-02	-0.27833113E-01
178	0.29174224E-01	-0.23373918E-01
179	0.31101770E-01	-0.23582339E-01
180	0.33029121E-01	-0.23891322E-01
181	0.38085814E-01	-0.24131133E-01
182	0.39718289E-01	-0.24291675E-01
183	0.63763310E-01	-0.24746695E-01
184	0.67631456E-01	-0.23114098E-01
185	0.71307673E-01	-0.23420254E-01
186	0.00000000E+00	-0.23321307E-01
187	0.20338541E-02	-0.23259302E-01
188	0.29595450E-01	-0.19219942E-01
189	0.31622473E-01	-0.19427829E-01
190	0.33573445E-01	-0.19437015E-01
191	0.58488037E-01	-0.20149069E-01
192	0.60213791E-01	-0.20414243E-01
193	0.64292679E-01	-0.20799144E-01
194	0.68193973E-01	-0.21176325E-01
195	0.71959199E-01	-0.21494333E-01
196	0.00000000E+00	-0.18669333E-01
197	0.18481377E-02	-0.18733940E-01
198	0.61317582E-02	-0.19557042E-01
199	0.11091032E-01	-0.20212361E-01
200	0.16370933E-01	-0.20016435E-01
201	0.21359141E-01	-0.18735406E-01
202	0.26223755E-01	-0.16832522E-01
203	0.30009163E-01	-0.13141273E-01
204	0.31749606E-01	-0.13019464E-01
205	0.33448516E-01	-0.13073315E-01
206	0.37144380E-01	-0.16284972E-01
207	0.41613761E-01	-0.17789431E-01
208	0.46521382E-01	-0.18639773E-01
209	0.51389616E-01	-0.18384395E-01
210	0.55721687E-01	-0.17331267E-01
211	0.59223224E-01	-0.16334154E-01
212	0.60791533E-01	-0.16332034E-01

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FOR SUPPORT CALL STEVE PORTER PHONE (206) 874-2235 TUE

SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7951 MAY 1, 1990 CP= 270.180

***** POST1 MODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
213	0.64711732E-01	-0.16706027E-01
214	0.68647043E-01	-0.17169855E-01
215	0.72506434E-01	-0.17537500E-01
216	0.00000000E+00	-0.13616679E-01
217	0.47472155E-02	-0.13980488E-01
218	0.93031005E-02	-0.14894117E-01
219	0.14028739E-01	-0.17204874E-01
220	0.17820008E-01	-0.14606598E-01
221	0.22501614E-01	-0.14878904E-01
222	0.26946317E-01	-0.12629445E-01
223	0.31645663E-01	-0.12062903E-01
224	0.36223761E-01	-0.12612646E-01
225	0.40322262E-01	-0.14265365E-01
226	0.44967315E-01	-0.13617448E-01
227	0.48490359E-01	-0.13691323E-01
228	0.52744219E-01	-0.13224251E-01
229	0.56708395E-01	-0.14062947E-01
230	0.60880391E-01	-0.13706123E-01
231	0.64923082E-01	-0.14042290E-01
232	0.68869668E-01	-0.14619520E-01
233	0.72754849E-01	-0.15028701E-01
234	0.00000000E+00	-0.12481124E-01
235	0.50223009E-02	-0.12823971E-01
236	0.96910494E-02	-0.13625769E-01
237	0.13671363E-01	-0.14063930E-01
238	0.13494937E-01	-0.13876017E-01
239	0.17312559E-01	-0.13511760E-01
240	0.21330058E-01	-0.11448638E-01
241	0.26246223E-01	-0.98040253E-02
242	0.31344844E-01	-0.90401107E-02
243	0.36766083E-01	-0.96170555E-02
244	0.41460912E-01	-0.11153439E-01
245	0.45278141E-01	-0.12687288E-01
246	0.48994072E-01	-0.12934774E-01
247	0.48653634E-01	-0.13002798E-01
248	0.32179141E-01	-0.12287513E-01
249	0.36402213E-01	-0.11320681E-01
250	0.60853493E-01	-0.10983172E-01
251	0.63209255E-01	-0.11343607E-01
252	0.69185775E-01	-0.11964820E-01
253	0.72639917E-01	-0.12488139E-01
254	0.12817059E-01	-0.94094224E-02

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NUCLEAR PAC. MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK.

SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

10.7992 MAY 1, 1990 CP= 270.450

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z DISPLACEMENTS ARE IN GLOBAL COORDINATES

NODE	UX	UY
255	0.14921968E-01	-0.91378859E-02
256	0.17012886E-01	-0.90436465E-02
257	0.43320237E-01	-0.84978441E-02
258	0.47334166E-01	-0.85134911E-02
259	0.49267996E-01	-0.87161926E-02
260	0.72598838E-01	-0.83830927E-02
261	0.12323827E-01	-0.46745831E-02
262	0.14378354E-01	-0.46243706E-02
263	0.16622403E-01	-0.44919821E-02
264	0.43371518E-01	-0.42234758E-02
265	0.47333988E-01	-0.43188588E-02
266	0.49429941E-01	-0.43318677E-02
267	0.72316837E-01	-0.42102318E-02
268	0.12404937E-01	0.00000000E+00
269	0.14464621E-01	0.00000000E+00
270	0.16312221E-01	0.00000000E+00
271	0.43631475E-01	0.00000000E+00
272	0.47604928E-01	0.00000000E+00
273	0.49303083E-01	0.00000000E+00
274	0.72472727E-01	0.00000000E+00

MAXIMUMS

NODE 31 1
VALUE 0.80093800E-01 -0.78123608E-01

/SHOW SWITCH PLOTS TO FILE PLOTS - VECTOR MODE

PRODUCE STRESS PLOT, LABEL= TEMP KAVC= 0

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

PRODUCE STRESS PLOT, LABEL= S1 KAVC= 0

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS - VECTOR MODE
DISPLAY TITLE= SPACER DISK THERMAL STRESS ANALYSIS, ACCIDENT CONDITIONS

***** ROUTINE COMPLETED ***** CP = 279.520

/EOF ENCOUNTERED ON FILES

PREF? AWRITE OR SFWRITE WARNING MESSAGES = 1
NUMBER OF SOLUTION PHASE WARNING MESSAGES = 0

***** RUN COMPLETED ***** CP= 279.9000 TIME= 10.7978

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***** ANSYS INPUT DATA LISTING (FILE8) *****
1  /PREP7
2  /TITLE,IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS
3  ET,1,83
4  EL,2,21,...4
5  ET,3,12,...1
6  KAP,0
7  DENS,1,0.00073
8  NUXY,1,0.29
9  KY,1,26.2E4
10 C*** REAL CONSTANTS
11 E,1,2,0
12 E,2,0.01771
13 E,3,0.03542
14 C*** NODE GENERATION
15 CSYS,1
16 N,1,18.633,-90
17 N,31,18.633,0
18 FILL
19 NGEN,2,31,1,31,1,-0.49
20 NDELT,39
21 CSYS,0
22 N,63,0,-17
23 N,64,0.4,-17
24 N,70,6.4,-17
25 FILL
26 N,71,0,-16
27 N,72,.4,-16
28 N,73,6.4,-16
29 N,74,7.2,-16
30 NGEN,2,5,71,74,1,,1.0
31 N,80,8.2,-13
32 N,81,9.2,-13
33 NGEN,2,6,76,81,1,,1.0
34 N,88,10.2,-14
35 NGEN,2,7,82,88,1,,1.0
36 N,96,11.2,-13
37 N,97,12.2,-13
38 NGEN,2,9,89,97,1,,1.0
39 N,107,13.2,-12
40 N,108,0,-11
41 N,109,.4,-11
42 N,115,6.4,-11
43 FILL
44 N,116,7.2,-11
45 N,122,13.2,-11
46 FILL
47 NGEN,2,15,108,115,1,...375
48 N,131,4.8,-10.625
49 NGEN,2,9,123,131,1,...375
50 N,141,7.2,-10.25
51 N,147,13.2,-10.25
52 FILL
53 N,148,13.6,-10.25
54 N,149,14.6,-10.25
55 N,150,0,-9.25
56 N,151,.4,-9.25
57 N,152,6.4,-9.25
58 N,153,8.8,-9.25
59 N,154,7.2,-9.25
60 N,155,13.2,-9.25

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***** AHSYS INPUT DATA LISTING (FILE16) *****

61 R 136,13.6,-9.25
62 R 137,14.6,-9.25
63 NGEN,2,8,136,137,1,,1.0
64 R 146,13.6,-8.25
65 NGEN,2,9,138,146,1,,1.0
66 NGEN,2,9,147,173,1,,1.0
67 R 183,16.6,-4.25
68 NGEN,2,10,174,183,1,,1.0
69 NGEN,2,64,132,148,1,,6.0
70 R 213,16.6,-4.25
71 FILL,212,213
72 R 214,0,-3.625
73 R 219,3,-3.625
74 FILL
75 R 220,3,8,-3.625
76 R 226,9,8,-3.625
77 FILL
78 R 227,10.6,-3.625
79 R 233,16.6,-3.625
80 FILL
81 NGEN,2,18,214,219,1,,0.625
82 R 238,3,4,-3.0
83 R 239,3,8,-3.0
84 R 243,9,8,-3.0
85 FILL
86 R 246,10.2,-3.0
87 R 247,10.6,-3.0
88 R 253,16.6,-3.0
89 FILL
90 NGEN,2,17,237,239,1,,1.0
91 NGEN,2,12,243,247,1,,1.0
92 R 260,16.6,-2
93 NGEN,3,7,254,260,1,,1.0
94 C*** ELEMENT GENERATION
95 E 1,2,33,32
96 EGEN,6,1,-1
97 E 7,8,70,38
98 E 6,9,40,70
99 E 9,10,41,40
100 EGEN,22,1,-1
101 E 32,64,63
102 E 32,33,64
103 E 33,34,63,64
104 EGEN,5,1,-1
105 E 38,70,69
106 E 63,64,72,71
107 E 70,40,74,73
108 E 40,41,74
109 E 71,72,77,76
110 E 73,74,79,78
111 E 74,41,80,79
112 E 41,42,81,80
113 E 42,43,81
114 E 76,77,83,82
115 E 78,79,83,84
116 E 79,80,86,85
117 E 80,81,87,86
118 E 81,43,44
119 E 81,44,88
120 E 81,88,87

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***** ANSYS INPUT DATA LISTING (FILE16) *****

121 E,82,83,90,89
122 E,84,85,92,91
123 EGEN,4,1,-1
124 E,88,43,96,95
125 E,44,43,88
126 E,43,46,96
127 E,46,97,96
128 E,46,47,97
129 E,89,90,99,98
130 E,91,92,101,100
131 EGEN,6,1,-1
132 E,97,47,106
133 E,47,107,106
134 E,47,48,107
135 E,98,99,109,108
136 E,100,101,116,115
137 EGEN,7,1,-1
138 E,48,49,107
139 E,107,49,122
140 E,49,50,122
141 E,108,109,124,123
142 EGEN,7,1,-1
143 E,113,131,130
144 E,113,116,131
145 E,123,124,133,132
146 EGEN,7,1,-1
147 E,130,131,140,139
148 E,131,116,141
149 E,131,141,140
150 E,116,117,142,141
151 EGEN,6,1,-1
152 E,122,148,147
153 E,122,50,148
154 E,148,50,149
155 E,50,51,149
156 E,132,133,131,130
157 E,139,140,133,132
158 E,140,141,154,133
159 E,147,144,156,133
160 E,148,149,137,156
161 E,149,51,137
162 E,51,52,137
163 E,130,131,139,138
164 E,132,133,161,160
165 E,133,134,162,161
166 E,135,156,164,163
167 E,156,137,165,164
168 E,137,52,166,163
169 E,52,53,166
170 E,158,159,168,167
171 E,160,161,170,169
172 E,161,162,171,170
173 E,163,164,173,172
174 E,164,165,174,173
175 E,165,166,175,174
176 E,166,53,54,173
177 E,167,168,177,176
178 E,169,170,179,178
179 E,170,171,180,179
180 E,172,173,182,181

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***** ANSYS INPUT DATA LISTING (FILE18) *****

181 EGEN, 3, 1, -1
182 E, 173, 34, 183, 184
183 E, 34, 35, 183
184 E, 176, 177, 187, 188
185 E, 178, 179, 189, 188
186 E, 179, 180, 190, 189
187 E, 181, 182, 192, 191
188 EGEN, 4, 1, -1
189 E, 55, 56, 183
190 E, 183, 56, 193
191 E, 184, 187, 197, 196
192 E, 188, 189, 204, 203
193 E, 189, 190, 203, 204
194 E, 191, 192, 212, 211
195 EGEN, 4, 1, -1
196 E, 193, 56, 57
197 E, 193, 57, 213
198 E, 213, 57, 58
199 E, 196, 197, 216
200 E, 197, 198, 217, 216
201 EGEN, 3, 1, -1
202 E, 200, 220, 219
203 E, 200, 201, 221, 220
204 EGEN, 3, 1, -1
205 E, 203, 204, 223
206 E, 204, 205, 223
207 E, 203, 206, 224, 223
208 EGEN, 3, 1, -1
209 E, 208, 227, 226
210 E, 208, 209, 228, 227
211 EGEN, 3, 1, -1
212 E, 211, 212, 230
213 E, 212, 213, 231, 230
214 EGEN, 3, 1, -1
215 E, 213, 58, 233
216 E, 216, 217, 235, 234
217 EGEN, 3, 1, -1
218 E, 219, 238, 237
219 E, 219, 220, 238
220 E, 220, 239, 238
221 E, 220, 221, 240, 239
222 EGEN, 6, 1, -1
223 E, 224, 246, 245
224 E, 226, 227, 246
225 E, 227, 247, 246
226 E, 227, 228, 248, 247
227 EGEN, 6, 1, -1
228 E, 233, 59, 59, 253
229 E, 237, 238, 253, 254
230 E, 238, 239, 256, 253
231 E, 243, 244, 258, 257
232 E, 246, 247, 259, 258
233 E, 253, 59, 60, 260
234 E, 254, 255, 262, 261
235 E, 255, 256, 263, 262
236 E, 257, 258, 265, 264
237 E, 259, 259, 266, 265
238 E, 260, 60, 61, 267
239 E, 261, 262, 269, 268
240 E, 262, 263, 270, 269

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***** ANSYS INPUT DATA LISTING (FILE18) *****

```

241 E,264,265,272,271
242 E,265,266,273,272
243 E,267,61,62,274
244 C*** SYNETRIC GENERATION
245 SYNG,1,1000,1,500
246 SYNG,2,2000,1,2000
247 ESYNG,2,1000,1,500
248 ESYNG,2,2000,1,2000
249 MRCGE
250 CSYS,0
251 C*** MASS ELEMENTS
252 TYPE,2
253 REAL,2
254 E,64
255 E,70
256 E,133
257 E,139
258 E,141
259 E,147
260 E,237
261 E,239
262 E,245
263 E,247
264 E,253
265 E,1044
266 E,1070
267 E,1133
268 E,1139
269 E,1141
270 E,1147
271 E,1237
272 E,1239
273 E,1245
274 E,1247
275 E,1253
276 E,3211
277 E,3207
278 E,3203
279 E,3197
280 E,3203
281 E,2197
282 E,2203
283 E,2203
284 E,2211
285 E,3113
286 E,3109
287 E,2109
288 E,2113
289 REAL,3
290 E,63
291 EGEN,3,1,-1
292 E,134
293 EGEN,3,1,-1
294 E,142
295 EGEN,3,1,-1
296 E,234
297 E,233
298 E,236
299 E,240
300 EGEN,3,1,-1

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***** AMETE INPUT DATA LISTING (FILE 8) *****

```

101 E,248
102 EGEN,3,1,-1
103 E,1063
104 EGEN,3,1,-1
105 E,1136
106 EGEN,3,1,-1
107 E,1142
108 EGEN,3,1,-1
109 E,1240
110 EGEN,3,1,-1
111 E,1248
112 EGEN,3,1,-1
113 E,1233
114 E,1238
115 E,2206
116 EGEN,3,1,-1
117 E,2198
118 EGEN,3,1,-1
119 E,3198
120 EGEN,3,1,-1
121 E,3206
122 EGEN,3,1,-1
123 E,2110
124 EGEN,3,1,-1
125 E,3110
126 EGEN,3,1,-1
127 /CHECK,Y
128 C*** BOUNDARY CONDITIONS
129 D,1,ALL,0,0
130 CSTE,1
131 /ROTATE,2,6
132 /ROTATE,2002,2006
133 D,2,UL,0,0,,9,1
134 D,2002,UL,0,0,,2006,1
135 CSTE,0
136 D,93,UL,0,0,,93,1
137 D,102,UL,0,0,,104,1
138 D,117,UL,0,0,,119,1
139 D,1093,UL,0,0,,1095,1
140 D,1102,UL,0,0,,1104,1
141 D,1117,UL,0,0,,1119,1
142 D,2093,UL,0,0,,2095,1
143 D,2102,UL,0,0,,2104,1
144 D,2117,UL,0,0,,2119,1
145 D,3093,UL,0,0,,3095,1
146 D,3102,UL,0,0,,3104,1
147 D,3117,UL,0,0,,3119,1
148 C*** LOADING CONDITIONS
149 /ITER,1,1
150 /ACEL,1,0
151 /AFWRITE
152 /FINISH
153 /EXEC
154 /INPUT,27
155 /FINISH
156 /EXEC
157 /BUCKLE,.....1
158 /ITER,1,1,1
159 /END
160 /FINISH

```

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***** ANSYS INPUT DATA LISTING (FILE 6) *****

361 /EOF

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NUCLEAR PACER MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

IF300 2" SPACER DISK 90 DEG. SIDE DROP ANALYSIS

12.2928 MAY 21, 1990 CP= 7468.060

***** STATIC LOAD MULTIPLIERS FOR BUCKLING *****

1 1585286.3
2 -1932315.3

INTEGER STORAGE REQUIREMENTS FOR FULL SUBSPACE ITERATION CP= 7468.650 TIME= 12.29320
FIXED DATA = 4078 TEMPORARY DATA = 34527 TOTAL= 60605
FIXED AVAIL= 2250000 TEMPORARY AVAIL= 2250000 TOTAL AVAIL= 2250000

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***** ABEYS INPUT DATA LISTING (FILE16) *****

```

1  /PREP7
2  /TITLE,IF300 2" SPACER DISK 0 DEG. SIDE DROP BUCKLING ANALYSIS
3  ET,1,63
4  ET,2,21,...,4
5  KAP,0
6  DENS,1,0.00073
7  MUXX,1,0.29
8  EX,1,26.216
9  C*** REAL CONSTANTS
10 E,1,2,0
11 E,2,0.01771
12 E,3,0.03342
13 C*** NODE GENERATION
14 CSYS,1
15 N,1,18.653,-90
16 N,31,18.653,0
17 FILL
18 MGEN,2,31,1,31,1,-0.49
19 MDELE,39
20 CSYS,0
21 E,63,0,-17
22 E,64,0.4,-17
23 E,70,6.4,-17
24 FILL
25 E,71,0,-16
26 E,72,.4,-16
27 E,73,6.4,-16
28 E,74,7.2,-16
29 MGEN,2,3,71,74,1,,1.0
30 E,80,8.2,-13
31 E,81,9.2,-13
32 MGEN,2,6,76,81,1,,1.0
33 E,88,10.2,-14
34 MGEN,2,7,82,88,1,,1.0
35 E,96,11.2,-13
36 E,97,12.2,-13
37 MGEN,2,9,89,97,1,,1.0
38 E,107,13.2,-12
39 E,108,0,-11
40 E,109,.4,-11
41 E,113,6.4,-11
42 FILL
43 E,116,7.2,-11
44 E,122,13.2,-11
45 FILL
46 MGEN,2,13,108,113,1,...,373
47 E,131,6.6,-10.623
48 MGEN,2,9,123,131,1,...,373
49 E,141,7.2,-10.23
50 E,147,13.2,-10.23
51 FILL
52 E,148,13.6,-10.23
53 E,149,14.6,-10.23
54 E,150,0,-9.23
55 E,151,.4,-9.23
56 E,152,6.4,-9.23
57 E,153,6.8,-9.23
58 E,154,7.2,-9.23
59 E,155,13.2,-9.23
60 E,156,13.6,-9.23

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

```

61  R,157,14.6,-9.25
62  NGEN,2,8,150,157,1,1.0
63  R,166,15.6,-8.25
64  NGEN,2,9,158,166,1,1.0
65  NGEN,2,9,167,173,1,1.0
66  R,183,16.6,-6.25
67  NGEN,2,10,176,183,1,1.0
68  NGEN,2,64,132,148,1,6.0
69  R,213,16.6,-4.25
70  FILL,212,213
71  R,216,0,-3.625
72  R,219,3,-3.625
73  FILL
74  R,220,3,3,-3.625
75  R,226,9,8,-3.625
76  FILL
77  R,227,10.6,-3.625
78  R,233,16.6,-3.625
79  FILL
80  NGEN,2,13,216,219,1,0.625
81  R,238,3,4,-3.0
82  R,239,3,3,-3.0
83  R,245,9,8,-3.0
84  FILL
85  R,246,10.2,-3.0
86  R,247,10.6,-3.0
87  R,253,16.6,-3.0
88  FILL
89  NGEN,2,17,237,239,1,1.0
90  NGEN,2,12,245,247,1,1.0
91  R,260,18.6,-2
92  NGEN,3,7,254,260,1,1.0
93  C*** ELEMENT GENERATION
94  E,1,2,33,32
95  EGEN,6,1,-1
96  E,7,8,70,38
97  E,8,9,40,70
98  E,9,10,41,40
99  EGEN,22,1,-1
100  E,32,64,83
101  E,32,33,64
102  E,33,34,63,64
103  EGEN,3,1,-1
104  E,38,70,69
105  E,63,64,72,71
106  E,70,40,74,73
107  E,40,41,74
108  E,71,72,77,76
109  E,73,74,79,78
110  E,74,41,80,79
111  E,41,42,81,80
112  E,42,43,81
113  E,76,77,83,82
114  E,78,79,85,84
115  E,79,80,86,83
116  E,80,81,87,86
117  E,81,43,44
118  E,81,44,88
119  E,81,88,87
120  E,82,83,90,89

```

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***** ANSYS INPUT DATA LISTING (FILES) *****

121 E,84,85,92,91
122 EGEN,4,1,-1
123 E,88,43,96,95
124 E,44,43,88
125 E,43,46,96
126 E,46,97,96
127 E,46,47,97
128 E,89,90,99,98
129 E,91,92,101,100
130 EGEN,6,1,-1
131 E,97,47,106
132 E,47,107,106
133 E,47,48,107
134 E,98,99,109,108
135 E,100,101,116,115
136 EGEN,7,1,-1
137 E,48,49,107
138 E,107,49,122
139 E,49,50,122
140 E,108,109,124,123
141 EGEN,7,1,-1
142 E,113,132,130
143 E,113,116,131
144 E,123,124,133,132
145 EGEN,7,1,-1
146 E,130,131,140,139
147 E,131,116,141
148 E,131,141,140
149 E,116,117,142,141
150 EGEN,6,1,-1
151 E,122,148,147
152 E,122,50,148
153 E,148,50,148
154 E,50,91,149
155 E,132,133,151,150
156 E,139,140,153,152
157 E,140,141,154,153
158 E,147,148,156,155
159 E,148,149,157,156
160 E,149,51,157
161 E,51,52,157
162 E,150,151,159,158
163 E,152,153,161,160
164 E,153,154,162,161
165 E,155,156,164,163
166 E,156,157,163,164
167 E,157,52,166,165
168 E,52,53,166
169 E,158,159,168,167
170 E,160,161,170,169
171 E,161,162,171,170
172 E,163,164,173,172
173 E,164,165,174,173
174 E,165,166,175,174
175 E,166,53,54,175
176 E,167,168,177,176
177 E,169,170,179,178
178 E,170,171,180,179
179 E,172,173,182,181
180 EGEN,3,1,-1

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

181 E,175,34,185,184
182 E,34,35,185
183 E,176,177,187,186
184 E,178,179,189,188
185 E,179,180,190,189
186 E,181,182,192,191
187 EGEN,4,1,-1
188 E,35,56,185
189 E,183,56,193
190 E,186,187,197,196
191 E,188,189,204,203
192 E,189,190,205,204
193 E,191,192,212,211
194 EGEN,4,1,-1
195 E,193,56,57
196 E,193,57,213
197 E,213,57,58
198 E,196,197,216
199 E,197,198,217,216
200 EGEN,3,1,-1
201 E,200,220,219
202 E,200,201,221,220
203 EGEN,3,1,-1
204 E,203,204,223
205 E,204,205,223
206 E,205,206,224,223
207 EGEN,3,1,-1
208 E,208,227,226
209 E,208,209,228,227
210 EGEN,3,1,-1
211 E,211,212,230
212 E,213,213,231,230
213 EGEN,3,1,-1
214 E,213,58,233
215 E,216,217,233,234
216 EGEN,3,1,-1
217 E,219,238,237
218 E,219,220,238
219 E,220,239,238
220 E,220,221,240,239
221 EGEN,6,1,-1
222 E,228,246,245
223 E,228,227,246
224 E,227,247,246
225 E,227,228,248,247
226 EGEN,6,1,-1
227 E,233,58,59,233
228 E,237,238,235,234
229 E,238,239,256,235
230 E,243,246,258,257
231 E,246,247,259,258
232 E,233,59,60,260
233 E,254,255,262,261
234 E,255,256,263,262
235 E,257,258,265,264
236 E,258,259,266,265
237 E,260,60,61,267
238 E,261,262,269,268
239 E,262,263,270,269
240 E,264,265,272,271

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***** ANSYS INPUT DATA LISTING (FILE8) *****

241 E,263,266,273,272
242 E,267,61,62,274
243 C*** SYMMETRIC GENERATION
244 SYMM,1,1000,1,500
245 SYMM,2,2000,1,2000
246 ESTIM,2,1000,1,500
247 ESTIM,2,2000,1,2000
248 MERGE
249 CSYS,0
250 C*** MASS ELEMENTS
251 TYPE,2
252 REAL,2
253 E,70
254 E,139
255 E,147
256 E,237
257 E,245
258 E,253
259 E,1064
260 E,1133
261 E,1141
262 E,1239
263 E,1247
264 E,3205
265 E,3197
266 E,2203
267 E,2211
268 E,3109
269 E,2113
270 E,1113
271 E,1109
272 E,203
273 E,211
274 E,1197
275 E,1205
276 E,2253
277 E,2245
278 E,2237
279 E,3239
280 E,3247
281 E,2147
282 E,2139
283 E,3123
284 E,3141
285 E,2070
286 E,3064
287 REAL,3
288 E,73
289 E,78
290 E,84
291 E,91
292 E,100
293 E,1072
294 E,1077
295 E,1083
296 E,1090
297 E,1099
298 E,135
299 E,143
300 E,172

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***** ANSYS INPUT DATA LISTING (FILE18) *****

301 E,181
302 E,191
303 E,152
304 E,160
305 E,169
306 E,178
307 E,188
308 E,1151
309 E,1159
310 E,1168
311 E,1177
312 E,1187
313 E,1154
314 E,1162
315 E,1171
316 E,1180
317 E,1190
318 E,260
319 E,267
320 E,276
321 E,2267
322 E,2260
323 E,257
324 E,264
325 E,271
326 E,2264
327 E,2257
328 E,254
329 E,261
330 E,268
331 E,2261
332 E,2254
333 E,2259
334 E,2266
335 E,2273
336 E,3264
337 E,3259
338 E,1256
339 E,1263
340 E,1270
341 E,3263
342 E,3256
343 E,2191
344 E,2181
345 E,2172
346 E,2163
347 E,2155
348 E,2188
349 E,2178
350 E,2169
351 E,2160
352 E,2152
353 E,3190
354 E,3180
355 E,3171
356 E,3162
357 E,3154
358 E,3187
359 E,3177
360 E,3168

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***** ANSYS INPUT DATA LISTING (FILE16) *****

```

361 E, 3139
362 E, 3131
363 E, 2100
364 E, 2091
365 E, 2084
366 E, 2078
367 E, 2073
368 E, 3099
369 E, 3090
370 E, 3083
371 E, 3077
372 E, 3072
373 MESH, Y
374 C*** BOUNDARY CONDITIONS
375 D, 31, ALL, 0, 0
376 CSYS, 1
377 ROTATE, 25, 30
378 ROTATE, 2025, 2030
379 D, 25, UZ, 0, 0, 30, 1
380 D, 2025, UZ, 0, 0, 2030, 1
381 CSYS, 0
382 D, 93, UZ, 0, 0, 93, 1
383 D, 104, UZ, 0, 0, 104, 1
384 D, 117, UZ, 0, 0, 117, 1
385 D, 1093, UZ, 0, 0, 1093, 1
386 D, 1102, UZ, 0, 0, 1102, 1
387 D, 1117, UZ, 0, 0, 1117, 1
388 D, 2093, UZ, 0, 0, 2093, 1
389 D, 2102, UZ, 0, 0, 2102, 1
390 D, 2117, UZ, 0, 0, 2117, 1
391 D, 3093, UZ, 0, 0, 3093, 1
392 D, 3102, UZ, 0, 0, 3102, 1
393 D, 3117, UZ, 0, 0, 3117, 1
394 C*** LOADING CONDITIONS
395 ITEL, 1, 0, 1
396 ACEL, -1, 0
397 AFWRITE
398 FINISH
399 /EXEC
400 /INPUT, 27
401 FINISH
402 /EXEC
403 /BUCKET, .....1
404 ITEL, 1, 1, 1
405 END
406 FINISH
407 /EOF

```

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FOR SUPPORT CALL STEVE FORSTER PHONE (206) 874-2235 TME

NUCLEAR PACL MAY 1, 1989

SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

IP300 2" SPACER DISK 8 DEL. SIDE DROP BUCKLING ANALYSIS

16.4700 MAY 21, 1990 CP= 2497.290

***** STATIC LOAD MULTIPLIERS FOR BUCKLING *****

1 1238159.3
2 3421776.1

INTEGER STORAGE REQUIREMENTS FOR FULL SUBSPACE ITERATION CP= 2498.940 TIME= 16.47050
FIXED DATA = 6068 TEMPORARY DATA = 34523 TOTAL= 60591
FIXED AVAIL= 2250000 TEMPORARY AVAIL= 2250000 TOTAL AVAIL= 2250000

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***** ANSYS INPUT DATA LISTING (FILE:8) *****

```

1 /PREP7
2 /TITLE,IF300 3/4" SPACER DISK 0 DEG. 1' SIDE DROP ANALYSIS
3 ET,1,42...3
4 ET,2,21...4
5 ET,3,12...1
6 KAX,4
7 KAY,5,2
8 GAMMA,0.02,20
9 DENS,1,0.00073
10 MUZY,1,0.29
11 EL,1,26,2E4
12 C*** REAL CONSTANTS
13 R,1,0.73
14 R,2,0.1639
15 R,3,0.01092
16 R,4,0.01492
17 R,5,0.01271
18 R,104,8.93,1.0E11,-0.080,3.0
19 R,105,11.94,1.0E11,-0.073,3.0
20 R,106,14.92,1.0E11,-0.070,3.0
21 R,107,17.92,1.0E11,-0.063,3.0
22 R,108,20.90,1.0E11,-0.061,3.0
23 R,109,23.88,1.0E11,-0.056,3.0
24 R,110,26.87,1.0E11,-0.052,3.0
25 R,111,29.85,1.0E11,-0.047,3.0
26 R,112,32.84,1.0E11,-0.043,3.0
27 R,113,35.83,1.0E11,-0.039,3.0
28 R,114,38.82,1.0E11,-0.035,3.0
29 R,115,41.81,1.0E11,-0.031,3.0
30 R,116,44.79,1.0E11,-0.028,3.0
31 R,117,47.78,1.0E11,-0.024,3.0
32 R,118,50.77,1.0E11,-0.021,3.0
33 R,119,53.77,1.0E11,-0.018,3.0
34 R,120,56.76,1.0E11,-0.015,3.0
35 R,121,59.76,1.0E11,-0.013,3.0
36 R,122,62.74,1.0E11,-0.010,3.0
37 R,123,65.73,1.0E11,-0.008,3.0
38 R,124,68.73,1.0E11,-0.006,3.0
39 R,125,71.72,1.0E11,-0.005,3.0
40 R,126,74.71,1.0E11,-0.003,3.0
41 R,127,77.72,1.0E11,-0.002,3.0
42 R,128,80.71,1.0E11,-0.001,3.0
43 C*** NODE GENERATION
44 CSYS,1
45 N,1,18.633,-90
46 N,31,18.633,0
47 FILL
48 MGEN,2,31,1,31,1,-0.49
49 MDKLE,39
50 CSYS,0
51 N,63,0,-17
52 N,64,0,4,-17
53 N,70,6,4,-17
54 FILL
55 N,71,0,-16
56 N,72,4,-16
57 N,73,6,4,-16
58 N,74,7,2,-16
59 MGEN,2,5,71,74,1,,1.0
60 N,80,8,2,-13

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***** ARMS INPUT DATA LISTING (FILES) *****

```

61  R 81.9.2,-13
62  NGEN 2,6,76,81,1,1.0
63  R 88,10.2,-14
64  NGEN 2,7,82,88,1,1.0
65  R 96,11.2,-13
66  R 97,12.2,-13
67  NGEN 2,9,89,97,1,1.0
68  R 107,13.2,-12
69  R 108,0,-11
70  R 109,-4,-11
71  R 113,6.4,-11
72  FILL
73  R 116,7.2,-11
74  R 122,13.2,-11
75  FILL
76  NGEN 2,15,108,113,1,...375
77  R 131,6.8,-10.625
78  NGEN 2,9,123,131,1,...375
79  R 141,7.2,-10.25
80  R 147,13.2,-10.25
81  FILL
82  R 148,13.6,-10.25
83  R 149,14.6,-10.25
84  R 150,0,-9.25
85  R 151,-4,-9.25
86  R 152,6.4,-9.25
87  R 153,6.8,-9.25
88  R 154,7.2,-9.25
89  R 155,13.2,-9.25
90  R 156,13.4,-9.25
91  R 157,14.4,-9.25
92  NGEN 2,8,150,157,1,1.0
93  R 166,13.4,-8.25
94  NGEN 2,9,158,166,1,1.0
95  NGEN 2,9,167,173,1,1.0
96  R 183,16.4,-4.25
97  NGEN 2,10,174,183,1,1.0
98  NGEN 2,64,132,148,1,6.0
99  R 213,16.4,-4.25
100  FILL 212,213
101  R 216,0,-3.625
102  R 219,3,-3.625
103  FILL
104  R 220,3.8,-3.625
105  R 226,9.8,-3.625
106  FILL
107  R 227,10.4,-3.625
108  R 233,16.4,-3.625
109  FILL
110  NGEN 2,18,216,219,1,0.625
111  R 238,3.4,-3.0
112  R 239,3.8,-3.0
113  R 243,9.8,-3.0
114  FILL
115  R 246,10.2,-3.0
116  R 247,10.6,-3.0
117  R 253,16.6,-3.0
118  FILL
119  NGEN 2,17,237,239,1,1.0
120  NGEN 2,12,243,247,1,1.0

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

121 K,260,16.6,-2
122 MGEN,3,7,254,260,1,,1.0
123 C*** ELEMENT GENERATION
124 E,1,2,33,32
125 EGEN,6,1,-1
126 E,7,8,70,38
127 E,8,9,40,70
128 E,9,10,41,40
129 EGEN,22,1,-1
130 E,32,64,63
131 E,32,33,64
132 E,33,34,63,64
133 EGEN,5,1,-1
134 E,38,70,63
135 E,63,64,72,71
136 E,70,40,74,73
137 E,40,41,74
138 E,71,72,77,76
139 E,72,74,78,78
140 E,74,41,80,79
141 E,41,42,81,80
142 E,42,43,81
143 E,76,77,83,82
144 E,76,79,83,84
145 E,79,80,85,83
146 E,80,81,87,86
147 E,81,43,44
148 E,81,44,88
149 E,81,88,87
150 E,82,83,90,89
151 E,84,83,92,91
152 EGEN,4,1,-1
153 E,88,43,94,93
154 E,44,43,88
155 E,43,46,96
156 E,46,97,96
157 E,46,47,97
158 E,89,90,99,98
159 E,91,92,101,100
160 EGEN,6,1,-1
161 E,97,47,106
162 E,47,107,106
163 E,47,48,107
164 E,98,99,109,108
165 E,100,101,116,115
166 EGEN,7,1,-1
167 E,48,49,107
168 E,107,49,122
169 E,49,30,122
170 E,108,109,124,123
171 EGEN,7,1,-1
172 E,115,131,130
173 E,115,116,131
174 E,123,124,133,132
175 EGEN,7,1,-1
176 E,130,131,140,139
177 E,131,116,141
178 E,131,141,140
179 E,116,117,142,141
180 EGEN,6,1,-1

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***** ANSYS INPUT DATA LISTING (FILE16) *****

181 E,122,148,147
182 E,122,50,148
183 E,148,50,149
184 E,50,31,149
185 E,122,133,131,130
186 E,139,140,133,132
187 E,140,141,134,133
188 E,147,148,136,135
189 E,148,149,137,136
190 E,149,31,137
191 E,31,32,137
192 E,130,131,139,138
193 E,132,133,141,140
194 E,133,134,142,141
195 E,135,136,144,143
196 E,136,137,145,144
197 E,137,32,146,145
198 E,32,33,146
199 E,138,139,148,147
200 E,140,141,170,169
201 E,141,142,171,170
202 E,143,144,173,172
203 E,144,145,174,173
204 E,145,146,175,174
205 E,146,33,34,175
206 E,147,148,177,176
207 E,149,178,179,178
208 E,170,171,180,179
209 E,172,173,182,181
210 EGEN,3,1,-1
211 E,173,34,183,184
212 E,34,35,183
213 E,176,177,187,186
214 E,178,179,189,188
215 E,179,180,190,189
216 E,181,182,192,191
217 EGEN,4,1,-1
218 E,35,36,183
219 E,183,36,193
220 E,184,187,197,196
221 E,188,189,204,203
222 E,189,190,203,204
223 E,191,192,212,211
224 EGEN,4,1,-1
225 E,193,36,37
226 E,193,37,213
227 E,213,37,38
228 E,194,197,216
229 E,197,198,217,216
230 EGEN,3,1,-1
231 E,200,220,219
232 E,200,201,221,220
233 EGEN,3,1,-1
234 E,203,204,223
235 E,204,203,223
236 E,203,206,224,223
237 EGEN,3,1,-1
238 E,208,227,226
239 E,208,209,228,227
240 EGEN,3,1,-1

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

```

241 E, 211, 212, 230
242 E, 212, 213, 231, 230
243 EGEN, 3, 1, -1
244 E, 212, 38, 233
245 E, 216, 217, 233, 234
246 EGEN, 3, 1, -1
247 E, 219, 238, 237
248 E, 219, 220, 238
249 E, 220, 239, 238
250 E, 220, 221, 240, 239
251 EGEN, 6, 1, -1
252 E, 226, 246, 243
253 E, 226, 227, 246
254 E, 227, 247, 246
255 E, 227, 228, 246, 247
256 EGEN, 6, 1, -1
257 E, 233, 38, 39, 233
258 E, 237, 238, 233, 234
259 E, 238, 239, 234, 233
260 E, 243, 246, 238, 237
261 E, 246, 247, 239, 238
262 E, 233, 39, 40, 260
263 E, 234, 233, 262, 261
264 E, 233, 236, 263, 262
265 E, 237, 238, 263, 264
266 E, 238, 239, 266, 263
267 E, 260, 60, 61, 267
268 E, 261, 262, 269, 268
269 E, 262, 263, 270, 269
270 E, 264, 263, 272, 271
271 E, 263, 266, 273, 272
272 E, 267, 61, 62, 274
273 C*** SYMMETRIC GENERATION
274 SYMM, 1, 1000, 1, 500
275 ESTIM, 2, 1000, 1, 500
276 MERGE
277 C*** BOUNDARY MODES
278 NGEN, 2, 2000, 4, 26, 1
279 CSYS, 0
280 C*** MASS ELEMENTS
281 TYPE, 2
282 REAL, 2
283 E, 183
284 E, 193
285 E, 215
286 E, 233
287 E, 253
288 E, 267
289 E, 274
290 E, 1183
291 E, 1193
292 E, 1213
293 E, 1233
294 E, 1233
295 E, 1267
296 E, 1274
297 REAL, 3
298 E, 63
299 EGEN, 8, 1, -1
300 E, 1064

```

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***** ANSYS INPUT DATA LISTING (FILE16) *****

301 ECEM,7,1,-1
302 REAL,6
303 E,40
304 ECEM,5,1,-1
305 E,1040
306 ECEM,5,1,-1
307 REAL,3
308 E,43
309 ECEM,11,1,-1
310 E,1043
311 ECEM,11,1,-1
312 C*** GAP ELEMENTS
313 TYPE,3
314 REAL,104
315 E,2004,4
316 REAL,103
317 E,2003,3
318 REAL,106
319 E,2004,6
320 REAL,107
321 E,2007,7
322 REAL,108
323 E,2008,8
324 REAL,109
325 E,2009,9
326 REAL,110
327 E,2010,10
328 REAL,111
329 E,2011,11
330 REAL,112
331 E,2012,12
332 REAL,113
333 E,2013,13
334 REAL,114
335 E,2014,14
336 REAL,115
337 E,2013,15
338 REAL,116
339 E,2016,16
340 REAL,117
341 E,2017,17
342 REAL,118
343 E,2018,18
344 REAL,119
345 E,2019,19
346 REAL,120
347 E,2020,20
348 REAL,121
349 E,2021,21
350 REAL,122
351 E,2022,22
352 REAL,123
353 E,2023,23
354 REAL,124
355 E,2024,24
356 REAL,125
357 E,2023,25
358 REAL,126
359 E,2026,26
360 REAL,127

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***** ANSYS INPUT DATA LISTING (FILE16) *****

```

361 E,2027,27
362 REAL,128
363 E,2028,28
364 USORT,1
365 C**** BOUNDARY CONDITIONS
366 SYMBC,0,2,0
367 D,31,ALL,0,0
368 CSYS,1
369 ROTATE,29,30
370 D,29,UY,0,0
371 D,30,UX,0,0
372 CSYS,0
373 D,93,UZ,0,0
374 D,94,UZ,0,0
375 D,95,UZ,0,0
376 D,102,UZ,0,0
377 D,103,UZ,0,0
378 D,104,UZ,0,0
379 D,117,UZ,0,0
380 D,118,UZ,0,0
381 D,119,UZ,0,0
382 D,1093,UZ,0,0
383 D,1094,UZ,0,0
384 D,1095,UZ,0,0
385 D,1102,UZ,0,0
386 D,1103,UZ,0,0
387 D,1104,UZ,0,0
388 D,1117,UZ,0,0
389 D,1118,UZ,0,0
390 D,1119,UZ,0,0
391 D,2004,ALL,0,0,2028,1
392 C**** LOADING CONDITIONS
393 TIME,0.25E-3
394 ITER,12,,1
395 ACTL,-81144
396 LWRITE
397 TIME,.5E-3
398 ITER,12,,1
399 ACTL,0,0
400 LWRITE
401 TIME,0.02
402 ITER,30,,1
403 LWRITE
404 AFWRITE
405 FINISH
406 /EXEC
407 /INPUT,27
408 FINISH
409 /POST26
410 HSMVAL,15
411 TIME,0,0,03
412 DISP,2,273,UY
413 DISP,3,171,UY
414 ESTL,4,219,40,SI
415 ESTL,5,178,43,SI
416 ESTL,6,177,43,SI
417 ESTL,7,176,43,SI
418 ESTL,8,177,30,SI
419 ESTL,9,177,33,SI
420 ESTL,10,200,43,SI

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```
***** AHSYS INPUT DATA LISTING (FILE16) *****  
421 ESTE,11,201,45,SI  
422 ESTE,12,201,40,SI  
423 ESTE,13,130,40,SI  
424 ESTE,14,100,45,SI  
425 /SHOW PLOTS,,1  
426 PLVAR,2,3  
427 PLVAR,5,6,7  
428 PLVAR,4,8,9,10  
429 PLVAR,11,12,13,14  
430 EXTEND,2,9,1  
431 FINISH  
432 /EOF
```

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ANALYSIS - ENGINEERING ANALYSIS SYSTEM REVISION 4.4 NUCLEAR PACK MAY 1, 1989
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IF300 3/4" SPACKER DISK 0 DEG. 1' SIDE DROP ANALYSIS

16.4350 MAY 22, 1990 CP- 3461.630

***** GENERAL GRAPH POSTPROCESSOR (POST26) *****

ALL POST26 SPECIFICATIONS ARE RESET TO INITIAL DEFAULTS

MAXIMUM NUMBER OF VARIABLES= 13

MINIMUM TIME= 0.00000E+00 MAXIMUM TIME= 0.30000E-01

*** NOTE ***
REDEFINITION OF TIME RANGE ERASES ALL PREVIOUSLY STORED OR CALCULATED DATA

VARIABLE 2 IS 273 UT

VARIABLE 3 IS 171 UT

VARIABLE 4 IS ELEMENT 219 ITEM 40 NAME= 219 SI

VARIABLE 5 IS ELEMENT 178 ITEM 45 NAME= 178 SI

VARIABLE 6 IS ELEMENT 177 ITEM 45 NAME= 177 SI

VARIABLE 7 IS ELEMENT 176 ITEM 45 NAME= 176 SI

VARIABLE 8 IS ELEMENT 177 ITEM 30 NAME= 177 SI

VARIABLE 9 IS ELEMENT 177 ITEM 35 NAME= 177 SI

VARIABLE 10 IS ELEMENT 200 ITEM 45 NAME= 200 SI

VARIABLE 11 IS ELEMENT 201 ITEM 45 NAME= 201 SI

VARIABLE 12 IS ELEMENT 201 ITEM 40 NAME= 201 SI

VARIABLE 13 IS ELEMENT 130 ITEM 40 NAME= 130 SI

VARIABLE 14 IS ELEMENT 100 ITEM 45 NAME= 100 SI

/SHOW SWITCH PLOTS TO FILE PLOTS - VECTOR MODE.

STORAGE COMPLETE FOR 74 DATA POINTS

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	273	UT	273	UT	0.0000E+00	0.2000E-01	0.0000E+00	0.2000E-01
3	DISP	171	UT	171	UT	-0.3882E-02	0.1670E-02	0.4213E-02	0.2840E-02
4	ESTR	219	40	219	SI	0.1867E-04	0.2083E-04	0.1294E+05	0.6740E-02
5	ESTR	178	45	178	SI	0.1301E-02	0.2083E-04	0.1754E+05	0.1280E-02
6	ESTR	177	45	177	SI	0.7742E-03	0.2083E-04	0.2415E+05	0.1670E-02
7	ESTR	176	45	176	SI	0.4391E-03	0.2083E-04	0.2073E+05	0.1670E-02
8	ESTR	177	30	177	SI	0.7262E-03	0.2083E-04	0.3022E+05	0.1670E-02
9	ESTR	177	35	177	SI	0.7454E-03	0.2083E-04	0.3005E+05	0.1670E-02
10	ESTR	200	45	200	SI	0.5370E-03	0.2083E-04	0.2123E+05	0.6350E-02
11	ESTR	201	45	201	SI	0.8641E-03	0.2083E-04	0.2764E+05	0.6350E-02
12	ESTR	201	40	201	SI	0.1284E-02	0.2083E-04	0.2748E+05	0.6350E-02
13	ESTR	130	40	130	SI	0.3874E-04	0.2083E-04	3471.	0.2450E-02
14	ESTR	100	45	100	SI	0.2020E-03	0.2083E-04	0.2158E+05	0.1670E-02

PLOT DEFINITION
CURVE VARIABLE NAME
1 2 273 UT
2 3 171 UT

CUMULATIVE DISPLAY NUMBER 1 WRITTEN TO FILE PLOTS - VECTOR MODE.
DISPLAY TITLE- IF300 3/4" SPACKER DISK 0 DEG. 1' SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 5 178 SI
2 6 177 SI
3 7 176 SI

CUMULATIVE DISPLAY NUMBER 2 WRITTEN TO FILE PLOTS - VECTOR MODE.
DISPLAY TITLE- IF300 3/4" SPACKER DISK 0 DEG. 1' SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 4 219 SI
2 8 177 SI
3 9 177 SI
4 10 200 SI

CUMULATIVE DISPLAY NUMBER 3 WRITTEN TO FILE PLOTS - VECTOR MODE.
DISPLAY TITLE- IF300 3/4" SPACKER DISK 0 DEG. 1' SIDE DROP ANALYSIS

PLOT DEFINITION
CURVE VARIABLE NAME
1 11 201 SI
2 12 201 SI
3 13 130 SI
4 14 100 SI

CUMULATIVE DISPLAY NUMBER 4 WRITTEN TO FILE PLOTS - VECTOR MODE.
DISPLAY TITLE- IF300 3/4" SPACKER DISK 0 DEG. 1' SIDE DROP ANALYSIS

POST26 SUMMARY OF VARIABLE EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2	DISP	273	UT	273	UT	0.0000E+00	0.2000E-01	0.0000E+00	0.2000E-01
3	DISP	171	UT	171	UT	-0.3882E-02	0.1670E-02	0.4213E-02	0.2840E-02

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4	ESTE	219	40	219	SI	0.1867E-04	0.2083E-04	0.1296E+03	0.6740E-02
5	ESTE	178	45	178	SI	0.1301E-02	0.2083E-04	0.1754E+03	0.1280E-02
6	ESTE	177	45	177	SI	0.7742E-03	0.2083E-04	0.2415E+03	0.1670E-02
7	ESTE	176	45	176	SI	0.4391E-03	0.2083E-04	0.2073E+03	0.1670E-02
8	ESTE	177	30	177	SI	0.7262E-03	0.2083E-04	0.3022E+03	0.1670E-02
9	ESTE	177	35	177	SI	0.7454E-03	0.2083E-04	0.3005E+03	0.1670E-02

***** ROUTINE COMPLETED ***** CP = 3377.630

/EOF ENCOUNTERED ON FILE 8

PREP7 AFWRITE OR SFWRITE WARNING MESSAGES = 1
NUMBER OF SOLUTION PHASE WARNING MESSAGES = 1

***** RUN COMPLETED ***** CP= 3378.1200 TIME= 16.4673

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```

***** ANSYS INPUT DATA LISTING (FILE:8) *****
1  /PREP7
2  /TITLE,POISON SHEET END DROP BUCKLING ANALYSIS
3  KAN,0
4  ET,1,3
5  EX,1,25.826
6  NUXY,1,0.29
7  DENS,1,0.00073
8  C*** REAL CONSTANTS
9  R,1,0.25,0.0013,0.25
10 C*** NODES
11 N,1,0,0
12 N,2,2,0.067
13 N,3,4,0.126
14 N,4,6,0.173
15 N,5,8,0.203
16 N,6,10,0.214
17 N,7,12,0.203
18 N,8,14,0.173
19 N,9,16,0.126
20 N,10,18,0.067
21 N,11,20,0,0
22 FILL
23 C*** ELEMENTS
24 E,1,2
25 EGEN,10,1,-1
26 ITEL,1,0,1
27 C*** BOUNDARY CONDITIONS
28 D,1,UY,0,0
29 D,1,UX,0,0
30 D,11,UY,0,0
31 C*** LOAD CONDITIONS
32 ACFL,386.6
33 AFWRITE
34 FINISH
35 /INPUT,27
36 FINISH
37 /EXEC
38 /BUCKLE,.....1
39 ITEL,1,1,1
40 END
41 FINISH
42 /EOF

```

*** CONSERVATIVE HEIGHT

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POISON SHEET END DROP BUCKLING ANALYSIS

9.9894 MAY 24, 1990 CP= 23.230

***** STATIC LOAD MULTIPLIERS FOR BUCKLING *****

1 1103.3143
2 3131.3987

INTEGER STORAGE REQUIREMENTS FOR FULL SUBSPACE ITERATION CP= 23.340 TIME= 9.98942
FIXED DATA = 646 TEMPORARY DATA = 469 TOTAL= 1135
FIXED AVAIL= 2250000 TEMPORARY AVAIL= 2250000 TOTAL AVAIL= 2250000

***** EXPANDED BUCKLING MODE 1 ***** LOAD FACTOR= 1103.31

NODE	UX	UY	NOTE
1	0.000000E+00	0.000000E+00	0.404752
2	-0.264734E-01	0.790217	0.373991
3	-0.463567E-01	1.47097	0.297972
4	-0.380814E-01	1.94133	0.188894
5	-0.619441E-01	2.21883	0.681873E-01
6	-0.620476E-01	2.23762	-0.473580E-01
7	-0.631294E-01	2.04090	-0.143792
8	-0.686883E-01	1.67027	-0.220627
9	-0.803209E-01	1.17523	-0.270292
10	-0.971365E-01	0.604496	-0.296914
11	-0.117406	0.000000E+00	-0.304916

MAXIMUMS
NODE 11 6 1
VALUE -0.117406 2.23762 0.404752

INTEGER STORAGE REQUIREMENTS FOR BACK SUBSTITUTION CP= 23.400 TIME= 9.98943
FIXED DATA = 646 TEMPORARY DATA = 74 TOTAL= 740
FIXED AVAIL= 2250000 TEMPORARY AVAIL= 2250000 TOTAL AVAIL= 2250000

*** STORAGE REQUIREMENT SUMMARY
MAXIMUM FIXED MEMORY USED = 646
MAXIMUM TEMPORARY MEMORY USED= 469
MAXIMUM TOTAL MEMORY USED = 1135
MAXIMUM TEMPORARY AVAILABLE = 2249332

*** PROBLEM STATISTICS
NO. OF ACTIVE DEGREES OF FREEDOM = 30
R.M.S. WAVEFRONT SIZE = 4.8
NUMBER OF MASTER DEGREES OF FREEDOM = 2

*** ANSYS BINARY FILE STATISTICS
BUFFER SIZE USED= 2048
POST DATA WRITTEN ON FILE 2

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```

***** ANSYS INPUT DATA LISTING (FILE16) *****
1  /PLOT7
2  /TITLE,IP300 2" SPACER DISK 0 DEG. DEAD WEIGHT ANALYSIS
3  ET,1,42,...3
4  ET,2,21,...4
5  ET,3,12,...1
6  KAP,0
7  DEMP,1,0.00073
8  NUXTY,1,0.29
9  KX,1,26.2E4
10 C*** REAL CONSTANTS
11 R,1,2,0
12 R,2,0.01771
13 R,3,0.03541
14 R,104,4.93,1.0E11,-0.080,3.0
15 R,105,11.94,1.0E11,-0.075,3.0
16 R,106,14.92,1.0E11,-0.070,3.0
17 R,107,17.92,1.0E11,-0.065,3.0
18 R,108,20.90,1.0E11,-0.061,3.0
19 R,109,23.88,1.0E11,-0.056,3.0
20 R,110,26.87,1.0E11,-0.052,3.0
21 R,111,29.85,1.0E11,-0.047,3.0
22 R,112,32.84,1.0E11,-0.043,3.0
23 R,113,35.83,1.0E11,-0.039,3.0
24 R,114,38.82,1.0E11,-0.035,3.0
25 R,115,41.81,1.0E11,-0.031,3.0
26 R,116,44.79,1.0E11,-0.028,3.0
27 R,117,47.78,1.0E11,-0.024,3.0
28 R,118,50.77,1.0E11,-0.021,3.0
29 R,119,53.77,1.0E11,-0.018,3.0
30 R,120,56.76,1.0E11,-0.015,3.0
31 R,121,59.76,1.0E11,-0.013,3.0
32 R,122,62.74,1.0E11,-0.010,3.0
33 R,123,65.73,1.0E11,-0.008,3.0
34 R,124,68.73,1.0E11,-0.006,3.0
35 R,125,71.72,1.0E11,-0.005,3.0
36 R,126,74.71,1.0E11,-0.003,3.0
37 R,127,77.72,1.0E11,-0.002,3.0
38 R,128,80.71,1.0E11,-0.001,3.0
39 C*** NODE GENERATION
40 CSET,1
41 N,1,18.655,-90
42 N,31,18.655,0
43 FILL
44 MGEN,2,31,1,31,1,-0.49
45 MDELE,39
46 CSET,0
47 N,63,0,-17
48 N,64,0.4,-17
49 N,70,6.4,-17
50 FILL
51 N,71,0,-16
52 N,72,.4,-16
53 N,73,6.4,-16
54 N,74,7.2,-16
55 MGEN,2,5,71,74,1,,1.0
56 N,80,8.2,-15
57 N,81,9.2,-15
58 MGEN,2,6,76,81,1,,1.0
59 N,88,10.2,-14
60 MGEN,2,7,82,88,1,,1.0

```

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***** ARMS INPUT DATA LISTING (FILES) *****

```

61  R 96,11.2,-13
62  R 97,12.2,-13
63  NGEN,2,9,89,97,1,,1.0
64  R 107,13.2,-12
65  R 108,0,-11
66  R 109,-4,-11
67  R 115,6.4,-11
68  FILL
69  R 116,7.2,-11
70  R 122,13.2,-11
71  FILL
72  NGEN,2,15,108,115,1,,.375
73  R 131,8.8,-10.625
74  NGEN,2,9,123,131,1,,.375
75  R 141,7.2,-10.25
76  R 147,13.2,-10.25
77  FILL
78  R 148,13.8,-10.25
79  R 149,14.8,-10.25
80  R 150,0,-9.25
81  R 151,-4,-9.25
82  R 152,6.4,-9.25
83  R 153,8.8,-9.25
84  R 154,7.2,-9.25
85  R 155,13.2,-9.25
86  R 156,13.8,-9.25
87  R 157,14.8,-9.25
88  NGEN,2,8,150,157,1,,1.0
89  R 166,15.4,-8.25
90  NGEN,2,9,158,166,1,,1.0
91  NGEN,2,9,167,175,1,,1.0
92  R 185,16.4,-6.25
93  NGEN,2,10,176,185,1,,1.0
94  NGEN,2,44,132,148,1,,6.0
95  R 215,16.4,-4.25
96  FILL,212,215
97  R 216,0,-3.625
98  R 219,3,-3.625
99  FILL
100  R 220,3.8,-3.625
101  R 226,9.8,-3.625
102  FILL
103  R 227,10.6,-3.625
104  R 233,16.4,-3.625
105  FILL
106  NGEN,2,18,216,219,1,,0.625
107  R 238,3.4,-3.0
108  R 239,3.8,-3.0
109  R 245,9.8,-3.0
110  FILL
111  R 246,10.2,-3.0
112  R 247,10.6,-3.0
113  R 253,16.4,-3.0
114  FILL
115  NGEN,2,17,237,239,1,,1.0
116  NGEN,2,12,245,247,1,,1.0
117  R 260,16.4,-2
118  NGEN,3,7,254,260,1,,1.0
119  C= ELEMENT GENERATION
120  E,1,2,33,32

```

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***** ARMY INPUT DATA LISTING (FILE 8) *****

121 EGEN 6,1,-1
122 E 7,8,70,38
123 E 8,9,40,70
124 E 9,10,41,40
125 EGEN 22,1,-1
126 E 32,64,63
127 E 33,33,64
128 E 33,34,63,64
129 EGEN 5,1,-1
130 E 38,70,69
131 E 63,64,72,71
132 E 70,40,74,73
133 E 40,41,74
134 E 71,72,77,76
135 E 73,74,79,78
136 E 74,41,80,79
137 E 41,42,81,80
138 E 42,43,81
139 E 76,77,83,82
140 E 78,79,83,84
141 E 79,80,86,83
142 E 40,81,87,86
143 E 81,43,44
144 E 81,44,88
145 E 81,88,87
146 E 82,83,90,89
147 E 84,83,92,91
148 EGEN 4,1,-1
149 E 88,43,96,93
150 E 44,43,88
151 E 43,46,96
152 E 46,97,96
153 E 46,47,97
154 E 89,90,99,98
155 E 91,92,101,100
156 EGEN 6,1,-1
157 E 97,47,106
158 E 47,107,106
159 E 47,48,107
160 E 98,99,109,108
161 E 100,101,116,115
162 EGEN 7,1,-1
163 E 48,49,107
164 E 107,49,122
165 E 49,50,122
166 E 108,109,124,123
167 EGEN 7,1,-1
168 E 113,131,130
169 E 113,116,131
170 E 123,124,133,132
171 EGEN 7,1,-1
172 E 130,131,140,139
173 E 131,116,141
174 E 131,141,140
175 E 116,117,142,141
176 EGEN 6,1,-1
177 E 122,148,147
178 E 122,50,148
179 E 148,50,149
180 E 50,51,149

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***** ANSYS INPUT DATA LISTING (FILE 8) *****

181 E,132,133,151,150
182 E,139,140,153,152
183 E,140,141,154,153
184 E,147,148,156,153
185 E,148,149,157,154
186 E,149,151,157
187 E,51,52,157
188 E,150,151,159,158
189 E,152,153,161,160
190 E,153,154,162,161
191 E,155,156,164,163
192 E,156,157,165,164
193 E,157,158,166,165
194 E,52,53,166
195 E,158,159,168,167
196 E,160,161,170,169
197 E,161,162,171,170
198 E,163,164,173,172
199 E,164,165,174,173
200 E,165,166,175,174
201 E,166,53,54,175
202 E,167,168,177,176
203 E,169,170,179,178
204 E,170,171,180,179
205 E,172,173,182,181
206 EGEN,3,1,-1
207 E,173,54,183,184
208 E,54,55,183
209 E,174,177,187,186
210 E,176,179,189,188
211 E,179,180,190,189
212 E,181,182,192,191
213 EGEN,4,1,-1
214 E,55,56,183
215 E,183,56,193
216 E,184,187,197,196
217 E,188,189,204,203
218 E,189,190,205,204
219 E,191,192,212,211
220 EGEN,4,1,-1
221 E,193,56,57
222 E,195,57,215
223 E,213,57,58
224 E,196,197,216
225 E,197,198,217,216
226 EGEN,3,1,-1
227 E,200,220,219
228 E,200,201,221,220
229 EGEN,3,1,-1
230 E,203,204,223
231 E,204,205,223
232 E,205,206,224,223
233 EGEN,3,1,-1
234 E,208,227,226
235 E,208,209,228,227
236 EGEN,3,1,-1
237 E,211,212,230
238 E,212,213,231,230
239 EGEN,3,1,-1
240 E,215,58,233

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***** ANSYS INPUT DATA LISTING (FILE:8) *****

241 E, 216, 217, 233, 234
242 EGER, 3, 1, -1
243 E, 219, 238, 237
244 E, 219, 220, 238
245 E, 220, 239, 238
246 E, 220, 221, 240, 239
247 EGER, 6, 1, -1
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252 EGER, 6, 1, -1
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266 E, 264, 263, 271, 271
267 E, 265, 266, 271, 272
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270 SYMM, 1, 1000, 1, 500
271 EXSYM, 2, 1000, 1, 500
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274 EGER, 2, 2000, 4, 28, 1
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283 E, 245
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285 E, 70
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288 E, 203
289 E, 237
290 E, 248
291 E, 1247
292 E, 1273
293 E, 1239
294 E, 1270
295 E, 1141
296 E, 1205
297 E, 1064
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305 E, 264
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309 E, 153
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335 E, 1171
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341 E, 1256
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361 E.2012.12
362 REAL.113
363 E.2013.13
364 REAL.114
365 E.2014.14
366 REAL.115
367 E.2015.15
368 REAL.116
369 E.2016.16
370 REAL.117
371 E.2017.17
372 REAL.118
373 E.2018.18
374 REAL.119
375 E.2019.19
376 REAL.120
377 E.2020.20
378 REAL.121
379 E.2021.21
380 REAL.122
381 E.2022.22
382 REAL.123
383 E.2023.23
384 REAL.124
385 E.2024.24
386 REAL.125
387 E.2025.25
388 REAL.126
389 E.2026.26
390 REAL.127
391 E.2027.27
392 REAL.128
393 E.2028.28
394 WROTE.1
395 C*** BOUNDARY CONDITIONS
396 SYM.C. 0.2.0
397 D.31. ALL. 0.0
398 CYS.1
399 WROTE.29.30
400 D.29. UZ. 0.0
401 D.30. UZ. 0.0
402 CYS.0
403 D.93. UZ. 0.0
404 D.94. UZ. 0.0
405 D.95. UZ. 0.0
406 D.102. UZ. 0.0
407 D.103. UZ. 0.0
408 D.104. UZ. 0.0
409 D.117. UZ. 0.0
410 D.118. UZ. 0.0
411 D.119. UZ. 0.0
412 D.1093. UZ. 0.0
413 D.1094. UZ. 0.0
414 D.1095. UZ. 0.0
415 D.1102. UZ. 0.0
416 D.1103. UZ. 0.0
417 D.1104. UZ. 0.0
418 D.1117. UZ. 0.0
419 D.1118. UZ. 0.0
420 D.1119. UZ. 0.0

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IF300 2" SPACER DISK 8 DEG. DEAD WEIGHT ANALYSIS

9.6882 JUN 11, 1990 CP- 113.090

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.0000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SE	SY	SZ	SEY	SEZ	SEZ	SIG1	SIG2	SIG3	SI	SIGE
1	-33.33	0.3812	0.0000E+00	-6.134	0.0000E+00	0.0000E+00	2.772	-1.050	-34.69	37.47	35.82
2	-10.38	-0.433	0.0000E+00	-2.497	0.0000E+00	0.0000E+00	0.0000E+00	-1.933	-13.08	13.08	12.24
3	-14.16	0.8130	0.0000E+00	2.036	0.0000E+00	0.0000E+00	1.232	-0.9301E-01	-14.46	15.71	15.28
4	-22.86	-0.3327	0.0000E+00	3.321	0.0000E+00	0.0000E+00	0.2629	-0.2033	-23.43	23.71	23.48
5	-22.14	-0.3901	0.0000E+00	3.793	0.0000E+00	0.0000E+00	0.4300	-0.1823	-22.79	23.24	22.94
6	-28.01	2.255	0.0000E+00	1.621	0.0000E+00	0.0000E+00	2.347	0.0000E+00	-28.12	30.49	29.41
7	-31.60	-3.341	0.0000E+00	-1.337	0.0000E+00	0.0000E+00	0.0000E+00	-3.121	-32.02	32.02	49.73
8	-60.26	2.024	0.0000E+00	-19.48	0.0000E+00	0.0000E+00	9.317	-1.033	-66.73	76.24	71.84
9	-44.01	-10.49	0.0000E+00	-15.48	0.0000E+00	0.0000E+00	0.4292E-01	-4.322	-30.22	30.22	48.31
10	-25.83	-6.437	0.0000E+00	-7.321	0.0000E+00	0.0000E+00	0.0000E+00	-3.983	-28.30	28.30	26.33
11	-16.32	-6.612	0.0000E+00	-3.307	0.0000E+00	0.0000E+00	0.0000E+00	-1.733	-17.40	17.40	15.88
12	-9.221	-2.742	0.0000E+00	0.7584	0.0000E+00	0.0000E+00	0.1822	-2.313	-9.631	10.01	9.116
13	-2.032	0.2291E-01	0.0000E+00	5.740	0.0000E+00	0.0000E+00	1.003	-0.9487E-01	-6.917	11.92	10.94
14	5.320	4.302	0.0000E+00	11.44	0.0000E+00	0.0000E+00	16.39	0.0000E+00	-6.763	23.33	21.02
15	15.00	11.23	0.0000E+00	19.73	0.0000E+00	0.0000E+00	32.94	0.0000E+00	-6.712	39.63	36.92
16	37.48	23.61	0.0000E+00	32.39	0.0000E+00	0.0000E+00	54.22	0.0000E+00	-7.128	63.33	62.23
17	30.43	39.35	0.0000E+00	47.84	0.0000E+00	0.0000E+00	83.40	0.0000E+00	-13.20	96.60	90.78
18	37.34	63.14	0.0000E+00	53.30	0.0000E+00	0.0000E+00	107.1	0.0000E+00	-6.582	113.6	110.3
19	17.60	66.87	0.0000E+00	54.28	0.0000E+00	0.0000E+00	104.2	0.0000E+00	-19.69	125.9	117.3
20	6.196	58.68	0.0000E+00	29.37	0.0000E+00	0.0000E+00	72.01	0.0000E+00	-7.137	79.14	76.06
21	-2.963	32.91	0.0000E+00	13.18	0.0000E+00	0.0000E+00	38.34	0.0000E+00	-6.393	47.14	43.72
22	-4.460	17.44	0.0000E+00	6.881	0.0000E+00	0.0000E+00	19.41	0.0000E+00	-6.632	26.04	23.34
23	-2.432	15.78	0.0000E+00	7.027	0.0000E+00	0.0000E+00	16.31	0.0000E+00	-3.158	21.67	19.63
24	1.003	22.43	0.0000E+00	12.21	0.0000E+00	0.0000E+00	27.96	0.0000E+00	-4.524	32.49	30.61
25	0.1089	43.72	0.0000E+00	20.07	0.0000E+00	0.0000E+00	31.62	0.0000E+00	-7.791	59.41	56.06
26	6.433	73.67	0.0000E+00	21.71	0.0000E+00	0.0000E+00	80.29	0.3792	-0.3597	80.83	80.39
27	-32.68	82.18	0.0000E+00	16.43	0.0000E+00	0.0000E+00	83.84	0.0000E+00	-36.34	122.2	108.8
28	35.13	-79.17	0.0000E+00	-64.38	0.0000E+00	0.0000E+00	80.24	31.38	-137.9	236.1	218.7
29	-36.84	-331.1	0.0000E+00	-24.48	0.0000E+00	0.0000E+00	0.0000E+00	-239.8	-440.3	440.3	389.0
30	31.28	-309.7	0.0000E+00	10.39	0.0000E+00	0.0000E+00	31.83	0.0000E+00	-310.3	362.2	340.0
31	72.37	-203.8	0.0000E+00	-2.099	0.0000E+00	0.0000E+00	72.38	0.0000E+00	-203.8	278.4	250.1
32	-25.31	1.899	0.0000E+00	-12.08	0.0000E+00	0.0000E+00	13.03	-3.638	-30.78	43.81	39.07
33	-25.38	-10.21	0.0000E+00	-0.6981	0.0000E+00	0.0000E+00	0.0000E+00	-8.403	-27.18	27.18	24.96
34	-27.68	1.439	0.0000E+00	1.361	0.0000E+00	0.0000E+00	1.632	-0.9263E-01	-27.38	29.21	28.40
35	-31.19	-0.9442	0.0000E+00	2.400	0.0000E+00	0.0000E+00	0.0000E+00	-0.7480	-31.39	31.39	31.02
36	-33.73	-0.1360	0.0000E+00	1.410	0.0000E+00	0.0000E+00	0.3293	-0.4216	-33.79	34.12	33.76
37	-37.37	1.022	0.0000E+00	0.4760	0.0000E+00	0.0000E+00	1.079	-0.2734E-02	-37.63	38.70	38.19
38	-37.67	-2.353	0.0000E+00	3.010	0.0000E+00	0.0000E+00	0.2267	-2.099	-37.93	38.18	37.14
39	-19.19	-6.267	0.0000E+00	-3.071	0.0000E+00	0.0000E+00	0.4092	-3.814	-22.07	22.48	21.02
40	-16.48	-8.018	0.0000E+00	-3.273	0.0000E+00	0.0000E+00	0.0000E+00	-4.974	-19.32	19.32	17.68
41	-13.14	-3.898	0.0000E+00	-3.379	0.0000E+00	0.0000E+00	0.0000E+00	-4.019	-15.01	15.01	13.34
42	-4.731	-0.387	0.0000E+00	0.2304	0.0000E+00	0.0000E+00	0.0000E+00	-2.894	-8.224	8.224	7.313
44	-1.881	-0.149	0.0000E+00	2.463	0.0000E+00	0.0000E+00	2.416	-1.379	-7.067	9.482	8.420

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IF300 2" SPACER DISK 0 DEEL DEAD WEIGHT ANALYSIS

9.6884 JUN 11, 1990 CP= 113.480

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	ST	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	ST	SIGX
43	3.684	-2.741	0.0000E+00	3.382	0.0000E+00	0.0000E+00	8.144	0.0000E+00	-7.202	13.33	13.72
46	9.313	0.6343	0.0000E+00	12.07	0.0000E+00	0.0000E+00	18.32	0.0000E+00	-9.172	26.49	23.63
47	18.37	-4.047	0.0000E+00	19.00	0.0000E+00	0.0000E+00	29.12	0.0000E+00	-16.60	43.71	40.67
48	17.62	12.29	0.0000E+00	31.97	0.0000E+00	0.0000E+00	49.80	0.0000E+00	-19.89	69.69	63.42
49	6.080	17.61	0.0000E+00	27.89	0.0000E+00	0.0000E+00	44.33	0.0000E+00	-20.66	63.00	59.63
50	-23.24	20.33	0.0000E+00	14.48	0.0000E+00	0.0000E+00	38.32	-3.694	-37.31	73.64	66.16
51	-17.08	19.83	0.0000E+00	11.33	0.0000E+00	0.0000E+00	42.93	0.0000E+00	-20.20	63.14	56.32
52	-16.01	24.24	0.0000E+00	0.3994	0.0000E+00	0.0000E+00	26.12	0.0000E+00	-17.89	44.01	38.77
53	-9.722	16.32	0.0000E+00	2.293	0.0000E+00	0.0000E+00	17.03	0.0000E+00	-18.23	27.29	24.02
54	-1.333	4.929	0.0000E+00	3.133	0.0000E+00	0.0000E+00	9.119	0.1275	-3.632	14.77	13.27
55	0.6640	8.877	0.0000E+00	10.32	0.0000E+00	0.0000E+00	18.77	0.0000E+00	-7.230	24.00	21.56
56	-1.343	10.48	0.0000E+00	14.03	0.0000E+00	0.0000E+00	22.26	0.0000E+00	-13.20	33.46	31.67
57	-9.893	8.057	0.0000E+00	6.942	0.0000E+00	0.0000E+00	17.41	-0.1078	-19.14	36.33	33.93
58	-49.54	-7.326	0.0000E+00	-17.93	0.0000E+00	0.0000E+00	14.63	-10.27	-61.23	73.90	68.60
59	-43.33	-33.26	0.0000E+00	-91.47	0.0000E+00	0.0000E+00	63.37	0.0000E+00	-142.2	207.7	189.4
60	-230.1	-118.6	0.0000E+00	-33.43	0.0000E+00	0.0000E+00	12.83	-89.20	-250.1	302.8	276.1
61	27.30	-184.8	0.0000E+00	18.48	0.0000E+00	0.0000E+00	30.71	-1.168	-184.8	217.3	204.4
62	62.62	-197.9	0.0000E+00	10.09	0.0000E+00	0.0000E+00	63.56	0.0000E+00	-198.9	262.4	237.3
63	-14.44	4.833	0.0000E+00	-1.333	0.0000E+00	0.0000E+00	24.20	0.0000E+00	-33.79	37.99	31.44
64	-37.17	-42.36	0.0000E+00	0.2394	0.0000E+00	0.0000E+00	2.001	-13.56	-69.63	73.34	68.30
65	-39.19	1.988	0.0000E+00	0.2843	0.0000E+00	0.0000E+00	2.001	0.0000E+00	-59.19	61.19	60.22
66	-34.58	-1.248	0.0000E+00	0.9647	0.0000E+00	0.0000E+00	0.0000E+00	-1.231	-54.59	34.59	33.99
67	-31.02	0.4330	0.0000E+00	-0.3204	0.0000E+00	0.0000E+00	0.4332	0.0000E+00	-51.02	31.48	31.26
68	-48.00	0.2043	0.0000E+00	0.5779	0.0000E+00	0.0000E+00	0.4066	-0.1839	-48.02	48.42	48.13
69	-38.92	-0.1241	0.0000E+00	1.323	0.0000E+00	0.0000E+00	0.3932	-0.4461	-38.99	39.38	38.97
70	-23.84	9.891	0.0000E+00	-2.913	0.0000E+00	0.0000E+00	11.71	-0.7897	-24.72	34.67	32.98
71	-0.733	6.038	0.0000E+00	20.40	0.0000E+00	0.0000E+00	24.98	0.0000E+00	-19.72	44.71	39.96
72	10.44	-64.44	0.0000E+00	20.40	0.0000E+00	0.0000E+00	18.39	0.0000E+00	-72.58	90.99	90.07
73	-3.882	25.49	0.0000E+00	0.5772	0.0000E+00	0.0000E+00	23.80	0.0000E+00	-3.990	31.78	29.29
74	-9.321	-3.443	0.0000E+00	-1.334	0.0000E+00	0.0000E+00	0.7748	-1.724	-12.21	12.99	12.02
76	-3.993	6.360	0.0000E+00	11.77	0.0000E+00	0.0000E+00	14.68	0.0000E+00	-12.31	26.99	23.59
77	-6.992	33.39	0.0000E+00	11.73	0.0000E+00	0.0000E+00	39.39	0.0000E+00	-11.19	70.78	67.79
78	-6.436	20.27	0.0000E+00	0.9330	0.0000E+00	0.0000E+00	20.33	0.0000E+00	-6.523	26.87	24.29
79	-3.221	4.097	0.0000E+00	-0.8099	0.0000E+00	0.0000E+00	4.693	0.0000E+00	-3.819	10.31	9.332
80	-4.686	-6.343	0.0000E+00	-3.273	0.0000E+00	0.0000E+00	0.0000E+00	-2.113	-8.913	8.913	8.120
81	-3.313	-8.360	0.0000E+00	-2.126	0.0000E+00	0.0000E+00	0.2910E-02	-2.244	-9.632	9.633	8.839
82	-3.231	6.323	0.0000E+00	2.948	0.0000E+00	0.0000E+00	8.601	0.0000E+00	-3.309	13.91	12.28
83	-1.990	110.7	0.0000E+00	2.970	0.0000E+00	0.0000E+00	111.0	0.0000E+00	-2.274	113.3	112.2
84	-3.580	18.96	0.0000E+00	-1.343	0.0000E+00	0.0000E+00	19.06	0.0000E+00	-3.683	24.73	22.46
85	-4.961	8.633	0.0000E+00	-2.431	0.0000E+00	0.0000E+00	9.203	0.0000E+00	-3.529	14.73	12.91
86	-2.983	-9.893	0.0000E+00	-4.013	0.0000E+00	0.0000E+00	0.9250	-0.4983	-8.103	9.028	8.394
87	-1.350	-4.893	0.0000E+00	-3.949	0.0000E+00	0.0000E+00	0.2252	0.0000E+00	-11.47	11.69	11.58
88	0.7972E-01	-9.304	0.0000E+00	-1.117	0.0000E+00	0.0000E+00	1.339	-0.6050	-10.16	11.70	11.09

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IF300 2" SPACER DISK 8 DEG. DEAD WEIGHT ANALYSIS

9.6885 JUN 11, 1990 CP- 113.920

***** POSTI MOAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	STX	STY	STZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGX
89	-3.950	6.443	0.0000E+00	-3.676	0.0000E+00	0.0000E+00	9.840	0.0000E+00	-7.347	17.19	13.04
90	-3.189	99.63	0.0000E+00	-3.688	0.0000E+00	0.0000E+00	100.3	0.0000E+00	-3.793	106.1	103.4
91	-7.292	27.21	0.0000E+00	-3.389	0.0000E+00	0.0000E+00	27.55	0.0000E+00	-7.630	35.16	32.11
92	-6.116	9.417	0.0000E+00	-3.902	0.0000E+00	0.0000E+00	10.41	0.0000E+00	-7.113	17.53	13.29
93	-3.737	-4.774	0.0000E+00	-4.141	0.0000E+00	0.0000E+00	0.6259E-01	-1.137	-9.437	9.499	9.033
94	-6.386	-9.972	0.0000E+00	-4.173	0.0000E+00	0.0000E+00	0.0000E+00	-3.774	-12.78	12.78	11.41
95	-3.968	-11.09	0.0000E+00	-4.728	0.0000E+00	0.0000E+00	1.010	-2.217	-13.83	14.66	13.38
96	3.987	-8.624	0.0000E+00	-0.4234	0.0000E+00	0.0000E+00	0.911	-0.1714	-11.38	16.29	16.66
97	10.79	-9.103	0.0000E+00	6.389	0.0000E+00	0.0000E+00	13.58	0.0000E+00	-13.89	29.48	26.07
98	-1.190	3.913	0.0000E+00	-14.70	0.0000E+00	0.0000E+00	18.18	0.0000E+00	-13.43	31.63	28.13
99	3.096	23.42	0.0000E+00	-14.62	0.0000E+00	0.0000E+00	42.04	4.817	-20.37	62.43	59.07
100	-1.683	37.93	0.0000E+00	-1.822	0.0000E+00	0.0000E+00	38.23	0.0000E+00	-2.164	40.40	39.36
101	-7.678	7.191	0.0000E+00	-1.328	0.0000E+00	0.0000E+00	7.843	0.0000E+00	-7.730	13.57	13.82
102	-13.28	-3.739	0.0000E+00	-0.3328	0.0000E+00	0.0000E+00	0.0000E+00	-4.668	-16.13	16.13	14.39
103	-20.90	-7.293	0.0000E+00	-2.032	0.0000E+00	0.0000E+00	0.0000E+00	-4.693	-21.70	21.70	19.38
104	-23.93	-7.932	0.0000E+00	-6.374	0.0000E+00	0.0000E+00	0.0000E+00	-3.264	-26.34	26.34	24.44
105	-17.18	-9.629	0.0000E+00	-11.62	0.0000E+00	0.0000E+00	3.316	-3.632	-26.37	26.69	26.98
106	3.038	-13.63	0.0000E+00	-3.370	0.0000E+00	0.0000E+00	11.24	-1.293	-22.33	33.79	30.49
107	12.32	-14.67	0.0000E+00	20.03	0.0000E+00	0.0000E+00	31.71	0.0000E+00	-34.06	63.77	39.43
108	-11.91	7.007	0.0000E+00	-14.09	0.0000E+00	0.0000E+00	14.61	0.0000E+00	-19.81	34.72	30.21
109	-26.86	-32.33	0.0000E+00	-11.12	0.0000E+00	0.0000E+00	0.0000E+00	-13.39	-43.60	43.60	40.23
110	-48.16	6.467	0.0000E+00	0.2267	0.0000E+00	0.0000E+00	6.823	0.0000E+00	-48.32	53.34	52.27
111	-36.38	-0.3334E-01	0.0000E+00	2.318	0.0000E+00	0.0000E+00	0.6732	-0.4927	-36.61	37.29	36.71
112	-72.23	-1.034	0.0000E+00	1.168	0.0000E+00	0.0000E+00	0.0000E+00	-1.016	-72.27	72.27	71.77
113	-82.61	1.683	0.0000E+00	1.633	0.0000E+00	0.0000E+00	1.724	0.0000E+00	-82.63	84.37	83.53
114	-97.98	-4.158	0.0000E+00	1.803	0.0000E+00	0.0000E+00	0.0000E+00	-4.118	-98.02	98.02	96.03
115	-39.42	24.11	0.0000E+00	1.935	0.0000E+00	0.0000E+00	24.16	0.0000E+00	-39.48	83.64	73.38
116	-37.37	7.263	0.0000E+00	2.400	0.0000E+00	0.0000E+00	7.482	0.0000E+00	-37.99	43.69	42.32
117	-34.12	-4.640	0.0000E+00	3.957	0.0000E+00	0.0000E+00	0.0000E+00	-3.949	-38.81	38.81	37.06
118	-44.09	-3.299	0.0000E+00	0.3192	0.0000E+00	0.0000E+00	0.0000E+00	-3.134	-44.23	44.23	42.77
119	-47.87	-3.331	0.0000E+00	-4.391	0.0000E+00	0.0000E+00	0.0000E+00	-2.709	-48.31	48.31	47.24
120	-38.61	-4.747	0.0000E+00	-10.89	0.0000E+00	0.0000E+00	0.7434E-01	-2.293	-61.14	61.21	60.09
121	-31.29	-11.64	0.0000E+00	-22.35	0.0000E+00	0.0000E+00	7.339	-6.293	-63.98	71.32	63.71
122	-34.34	-38.23	0.0000E+00	1.548	0.0000E+00	0.0000E+00	11.84	-19.94	-64.68	76.52	68.57
123	-22.11	6.719	0.0000E+00	-4.393	0.0000E+00	0.0000E+00	9.973	0.0000E+00	-23.37	33.34	29.77
124	-32.52	-35.29	0.0000E+00	-1.417	0.0000E+00	0.0000E+00	0.0000E+00	-27.78	-40.04	40.04	35.94
125	-47.44	7.438	0.0000E+00	1.542	0.0000E+00	0.0000E+00	7.913	0.0000E+00	-47.92	53.83	52.36
126	-32.03	-0.3040	0.0000E+00	1.542	0.0000E+00	0.0000E+00	0.4327	-0.3861	-32.18	32.62	32.12
127	-49.09	-1.048	0.0000E+00	1.542	0.0000E+00	0.0000E+00	0.0000E+00	-0.9434	-49.18	49.18	46.71
128	-31.63	1.908	0.0000E+00	1.542	0.0000E+00	0.0000E+00	1.961	0.0000E+00	-31.68	33.64	32.70
129	-49.08	-5.043	0.0000E+00	1.542	0.0000E+00	0.0000E+00	0.0000E+00	-4.970	-49.13	49.13	46.87
130	-46.27	17.83	0.0000E+00	0.6263	0.0000E+00	0.0000E+00	17.94	0.0000E+00	-46.36	66.30	59.44
131	-43.62	16.69	0.0000E+00	-0.3932	0.0000E+00	0.0000E+00	16.78	0.0000E+00	-43.71	60.49	54.19

NEDO-10084-4
March 1995

ANETS - ENGINEERING ANALYSIS SYSTEM REVISION 4.4 NUCLEAR PACE, MAY 1, 1989
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FOR SUPPORT CALL STEVE PORTER PHONE (206) 874-2233 TME

IF300 2" SPACER DISK 0 DEG. DEAD WEIGHT ANALYSIS

9.4886 JUN 11, 1990 CP= 114.300

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGX
132	-11.95	6.887	0.0000E+00	10.37	0.0000E+00	0.0000E+00	13.85	0.0000E+00	-18.91	32.76	28.71
133	-38.13	-44.31	0.0000E+00	9.702	0.0000E+00	0.0000E+00	-22.46	0.0000E+00	-37.98	37.98	31.63
134	-58.05	8.410	0.0000E+00	2.857	0.0000E+00	0.0000E+00	3.768	0.0000E+00	-56.48	63.16	61.31
135	-39.78	-0.3524	0.0000E+00	0.7636	0.0000E+00	0.0000E+00	0.2640	-0.6695	-39.92	40.19	39.73
136	-30.93	-1.042	0.0000E+00	1.915	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-31.06	31.06	30.62
137	-16.60	2.131	0.0000E+00	1.450	0.0000E+00	0.0000E+00	2.308	0.0000E+00	-16.77	19.07	18.09
138	-7.469	-3.928	0.0000E+00	1.279	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-4.743	6.653	7.546
139	-12.78	11.82	0.0000E+00	4.681	0.0000E+00	0.0000E+00	13.24	0.0000E+00	-16.20	31.43	28.13
140	-27.18	16.94	0.0000E+00	7.102	0.0000E+00	0.0000E+00	20.15	0.0000E+00	-30.39	30.54	44.33
141	-49.72	15.49	0.0000E+00	5.768	0.0000E+00	0.0000E+00	16.94	0.0000E+00	-50.97	67.91	62.65
142	-72.82	-2.885	0.0000E+00	3.565	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-73.31	73.31	72.14
143	-57.31	-1.612	0.0000E+00	0.9235	0.0000E+00	0.0000E+00	-1.539	0.0000E+00	-37.58	37.58	56.83
144	-59.01	-1.043	0.0000E+00	-2.405	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-39.14	39.14	58.69
145	-71.79	-3.352	0.0000E+00	-6.257	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-72.40	72.40	71.00
146	-138.9	-0.8353	0.0000E+00	-25.45	0.0000E+00	0.0000E+00	4.078	0.0000E+00	-143.8	147.9	146.0
147	-131.2	-107.8	0.0000E+00	-26.20	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-170.4	170.4	150.4
148	-68.04	-49.35	0.0000E+00	-15.44	0.0000E+00	0.0000E+00	7.227	-34.41	-88.21	95.44	83.43
149	-40.41	35.18	0.0000E+00	-5.551	0.0000E+00	0.0000E+00	40.11	0.0000E+00	-43.36	85.48	75.05
150	-1.238	5.797	0.0000E+00	16.04	0.0000E+00	0.0000E+00	19.55	0.0000E+00	-14.99	34.55	30.77
151	4.768	0.5302	0.0000E+00	13.94	0.0000E+00	0.0000E+00	32.36	5.447	-32.51	64.86	61.85
152	-3.116	-48.33	0.0000E+00	13.00	0.0000E+00	0.0000E+00	9.529	-4.641	-56.34	65.87	61.48
153	2.547	16.33	0.0000E+00	12.89	0.0000E+00	0.0000E+00	24.66	2.210	-7.990	32.65	29.03
154	8.211	86.81	0.0000E+00	12.79	0.0000E+00	0.0000E+00	28.64	7.396	-3.019	91.68	86.92
155	8.986	-126.5	0.0000E+00	-20.39	0.0000E+00	0.0000E+00	12.93	0.0000E+00	-130.5	143.5	138.2
156	-6.434	-78.01	0.0000E+00	-24.98	0.0000E+00	0.0000E+00	8.673	-4.432	-86.68	95.35	89.68
157	-21.07	17.10	0.0000E+00	-13.92	0.0000E+00	0.0000E+00	25.74	0.0000E+00	-29.72	55.46	49.37
158	-3.881	6.096	0.0000E+00	7.217	0.0000E+00	0.0000E+00	10.47	0.0000E+00	-8.255	18.72	16.37
159	-5.584	86.49	0.0000E+00	7.376	0.0000E+00	0.0000E+00	87.86	0.0000E+00	-6.552	94.41	91.50
160	-3.023	-112.1	0.0000E+00	4.056	0.0000E+00	0.0000E+00	0.1030E-01	-2.603	-112.5	112.5	111.3
161	-4.675	17.00	0.0000E+00	4.069	0.0000E+00	0.0000E+00	18.55	0.0000E+00	-6.221	24.77	22.37
162	-6.326	147.2	0.0000E+00	4.082	0.0000E+00	0.0000E+00	147.4	0.0000E+00	-6.546	154.0	150.8
163	-11.22	-49.80	0.0000E+00	-3.523	0.0000E+00	0.0000E+00	0.0000E+00	-10.67	-50.33	50.33	46.05
164	-9.070	-51.05	0.0000E+00	-12.31	0.0000E+00	0.0000E+00	0.7843	-3.182	-55.72	56.51	53.98
165	-9.955	-10.50	0.0000E+00	-18.27	0.0000E+00	0.0000E+00	8.323	0.0000E+00	-28.98	37.50	34.40
166	-12.89	9.830	0.0000E+00	-9.055	0.0000E+00	0.0000E+00	15.07	-0.2455	-17.89	32.95	29.39
167	-3.121	6.567	0.0000E+00	-1.607	0.0000E+00	0.0000E+00	8.365	0.0000E+00	-4.919	13.28	11.70
168	-1.772	107.7	0.0000E+00	-1.730	0.0000E+00	0.0000E+00	107.9	0.0000E+00	-2.023	110.0	109.0
169	-4.335	-110.6	0.0000E+00	-4.626	0.0000E+00	0.0000E+00	0.0000E+00	-3.962	-111.0	111.0	109.1
170	-2.849	17.87	0.0000E+00	-4.755	0.0000E+00	0.0000E+00	19.58	0.3069	-4.847	24.40	22.35
171	-1.565	144.0	0.0000E+00	-4.864	0.0000E+00	0.0000E+00	144.4	0.6161	-2.369	146.8	145.3
172	-5.324	-26.34	0.0000E+00	-6.542	0.0000E+00	0.0000E+00	1.547	-4.326	-29.08	30.63	28.16
173	-3.417	-20.95	0.0000E+00	-12.38	0.0000E+00	0.0000E+00	4.171	-1.991	-28.54	32.72	30.33
174	-3.622	-17.39	0.0000E+00	-18.44	0.0000E+00	0.0000E+00	9.214	0.0000E+00	-30.23	39.44	35.78

ANSYS - ENGINEERING ANALYSIS SYSTEM REVISION 4.4 NUCLEAR PACE MAY 1, 1989
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17300 2" SPACER DISK 0 DEG. DEAD WEIGHT ANALYSIS

9.6887 JUN 11, 1990 CP= 114.690

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SE	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGX
175	-2.366	-9.406	0.0000E+00	-11.32	0.0000E+00	0.0000E+00	8.367	-1.323	-18.82	27.18	24.13
176	-5.193	5.933	0.0000E+00	-10.43	0.0000E+00	0.0000E+00	13.01	0.0000E+00	-12.27	23.29	22.06
177	-8.153	62.83	0.0000E+00	-10.23	0.0000E+00	0.0000E+00	65.29	0.0000E+00	-10.39	73.88	72.16
178	-2.725	-40.30	0.0000E+00	-13.84	0.0000E+00	0.0000E+00	14.27	-4.618	-32.88	67.13	62.90
179	-8.276	16.89	0.0000E+00	-13.58	0.0000E+00	0.0000E+00	24.04	0.0000E+00	-13.43	37.47	33.13
180	-9.827	75.84	0.0000E+00	-13.32	0.0000E+00	0.0000E+00	79.03	0.0000E+00	-13.01	92.06	87.70
181	-6.142	9.714	0.0000E+00	-4.933	0.0000E+00	0.0000E+00	14.02	-1.034	-9.396	23.42	22.29
182	-4.111	6.522	0.0000E+00	-16.35	0.0000E+00	0.0000E+00	22.73	-1.201	-17.12	39.83	36.01
183	-2.714	-23.07	0.0000E+00	-23.44	0.0000E+00	0.0000E+00	16.76	0.0000E+00	-37.11	53.87	47.89
184	8.235	-29.54	0.0000E+00	-11.93	0.0000E+00	0.0000E+00	13.17	0.0000E+00	-34.48	47.66	42.90
185	5.048	-5.174	0.0000E+00	8.143	0.0000E+00	0.0000E+00	14.10	0.0000E+00	-14.22	28.32	25.23
186	5.234	5.160	0.0000E+00	-19.26	0.0000E+00	0.0000E+00	26.00	0.0000E+00	-13.60	41.60	37.49
187	16.19	-44.70	0.0000E+00	-19.36	0.0000E+00	0.0000E+00	25.04	5.993	-61.34	86.62	81.97
188	-2.919	94.72	0.0000E+00	-22.34	0.0000E+00	0.0000E+00	101.3	2.881	-12.62	114.2	109.6
189	10.23	13.39	0.0000E+00	-22.40	0.0000E+00	0.0000E+00	37.11	1.849	-13.34	30.44	45.34
190	23.37	-34.37	0.0000E+00	-22.46	0.0000E+00	0.0000E+00	32.23	6.949	-72.18	104.4	98.09
191	-4.393	92.36	0.0000E+00	-18.22	0.0000E+00	0.0000E+00	93.87	0.2233	-7.932	103.8	101.0
192	-0.8224E-01	30.05	0.0000E+00	-22.78	0.0000E+00	0.0000E+00	43.66	0.0000E+00	-13.69	37.33	32.00
193	3.326	-33.03	0.0000E+00	-23.33	0.0000E+00	0.0000E+00	13.33	0.0000E+00	-44.84	60.17	54.31
194	1.720	-44.11	0.0000E+00	-12.73	0.0000E+00	0.0000E+00	3.765	-0.1316E-03	-50.16	53.92	53.44
195	-2.079	-18.38	0.0000E+00	7.447	0.0000E+00	0.0000E+00	8.834	-0.3393	-29.13	37.98	35.34
196	-38.99	5.347	0.0000E+00	2.366	0.0000E+00	0.0000E+00	17.97	0.0000E+00	-51.41	69.38	62.84
197	-91.91	-49.73	0.0000E+00	3.993	0.0000E+00	0.0000E+00	6.014	-29.33	-118.3	124.4	111.7
198	-153.1	-2.327	0.0000E+00	-3.123	0.0000E+00	0.0000E+00	3.678	-5.978	-153.4	157.0	152.5
199	-149.1	-1.351	0.0000E+00	2.803	0.0000E+00	0.0000E+00	1.278	-2.749	-149.2	150.4	148.5
200	-101.4	2.110	0.0000E+00	-16.30	0.0000E+00	0.0000E+00	7.166	-2.070	-104.4	111.5	107.2
201	-49.11	-1.278	0.0000E+00	-3.232	0.0000E+00	0.0000E+00	2.738	-3.734	-49.37	52.11	49.31
202	-22.63	0.8970	0.0000E+00	-8.422	0.0000E+00	0.0000E+00	9.562	-5.228	-26.27	35.83	31.37
203	-24.62	81.99	0.0000E+00	6.716	0.0000E+00	0.0000E+00	88.33	0.4272	-31.80	120.3	112.1
204	-59.36	14.17	0.0000E+00	5.742	0.0000E+00	0.0000E+00	27.00	0.0000E+00	-72.19	99.19	89.32
205	-134.2	-33.11	0.0000E+00	8.844	0.0000E+00	0.0000E+00	9.772	-37.37	-161.3	171.3	155.4
206	-247.6	-3.770	0.0000E+00	3.803	0.0000E+00	0.0000E+00	4.344	-7.931	-248.0	252.3	246.4
207	-272.3	-2.621	0.0000E+00	10.28	0.0000E+00	0.0000E+00	1.290	-3.681	-272.8	274.1	271.6
208	-197.4	9.770	0.0000E+00	-20.65	0.0000E+00	0.0000E+00	12.31	0.0000E+00	-200.0	212.3	204.3
209	-125.6	-3.682	0.0000E+00	-23.03	0.0000E+00	0.0000E+00	3.130	-1.732	-130.7	133.8	131.3
210	-10.32	0.9134	0.0000E+00	-29.04	0.0000E+00	0.0000E+00	36.04	-1.740	-43.71	79.73	76.63
211	20.20	87.12	0.0000E+00	-9.682	0.0000E+00	0.0000E+00	92.46	19.95	-5.086	97.33	93.69
212	-17.55	30.47	0.0000E+00	-6.301	0.0000E+00	0.0000E+00	39.21	0.0000E+00	-26.29	65.50	58.07
213	-50.27	-29.87	0.0000E+00	-7.739	0.0000E+00	0.0000E+00	0.0000E+00	-16.43	-63.69	63.69	57.98
214	-64.31	-49.30	0.0000E+00	-18.62	0.0000E+00	0.0000E+00	0.0000E+00	-36.42	-77.38	77.38	68.78
215	-43.63	-31.68	0.0000E+00	-8.334	0.0000E+00	0.0000E+00	3.828	-20.61	-58.36	62.39	56.43
216	-61.60	3.939	0.0000E+00	16.63	0.0000E+00	0.0000E+00	13.34	-5.747	-67.66	83.20	73.73
217	-73.84	-7.828	0.0000E+00	1.333	0.0000E+00	0.0000E+00	1.842	-7.749	-77.76	79.60	73.31

NEDO-10084-4

March 1995

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IF300 2" SPACER DISK 0 DEGR. DEAD WEIGHT ANALYSIS

9.6868 JUN 11, 1990 CP= 115.130

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
 TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	SXZ	SXZ	SIG1	SIG2	SIG3	SI	SIGZ
218	-92.96	-0.7539E-01	0.0000E+00	1.243	0.0000E+00	0.0000E+00	0.0000E+00	1.475	-1.374	-93.13	94.61	93.23
219	-80.53	15.36	0.0000E+00	-13.83	0.0000E+00	0.0000E+00	0.0000E+00	18.70	0.0000E+00	-83.87	102.6	93.32
220	-84.92	-8.351	0.0000E+00	-13.76	0.0000E+00	0.0000E+00	0.0000E+00	3.170	-8.228	-90.42	93.59	89.00
221	-94.73	-1.591	0.0000E+00	-3.679	0.0000E+00	0.0000E+00	0.0000E+00	1.337	-2.485	-95.18	96.51	94.69
222	-113.7	7.432	0.0000E+00	-2.983	0.0000E+00	0.0000E+00	0.0000E+00	11.18	-2.661	-114.8	126.0	119.7
223	-92.23	9.466	0.0000E+00	23.93	0.0000E+00	0.0000E+00	0.0000E+00	22.63	-3.738	-99.64	122.3	111.7
224	-110.6	-9.831	0.0000E+00	8.997	0.0000E+00	0.0000E+00	0.0000E+00	2.267	-9.580	-113.1	115.4	110.0
225	-133.6	-0.8338	0.0000E+00	8.693	0.0000E+00	0.0000E+00	0.0000E+00	2.048	-2.130	-134.3	136.4	134.4
226	-112.2	23.21	0.0000E+00	-13.31	0.0000E+00	0.0000E+00	0.0000E+00	28.38	0.0000E+00	-113.6	144.2	133.7
227	-119.4	6.150	0.0000E+00	-21.08	0.0000E+00	0.0000E+00	0.0000E+00	13.02	-2.882	-123.4	136.4	129.6
228	-132.4	-3.249	0.0000E+00	-23.87	0.0000E+00	0.0000E+00	0.0000E+00	2.784	-3.432	-137.8	139.8	136.8
229	-149.8	8.300	0.0000E+00	-22.40	0.0000E+00	0.0000E+00	0.0000E+00	14.13	-1.666	-133.9	168.1	161.0
230	-128.8	28.49	0.0000E+00	8.193	0.0000E+00	0.0000E+00	0.0000E+00	29.61	0.0000E+00	-129.9	159.3	149.6
231	-166.1	-17.37	0.0000E+00	8.239	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-13.30	-168.0	168.0	160.9
232	-158.9	-23.10	0.0000E+00	-23.33	0.0000E+00	0.0000E+00	0.0000E+00	3.330	-19.89	-167.6	171.1	161.3
233	-100.4	-37.90	0.0000E+00	-44.02	0.0000E+00	0.0000E+00	0.0000E+00	6.739	-33.12	-129.9	136.7	123.5
234	-88.63	3.166	0.0000E+00	14.82	0.0000E+00	0.0000E+00	0.0000E+00	6.743	-0.9004	-91.31	98.05	94.71
235	-37.14	-13.13	0.0000E+00	6.233	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-7.993	-42.28	42.28	39.26
236	-13.67	1.400	0.0000E+00	-0.3171	0.0000E+00	0.0000E+00	0.0000E+00	2.609	0.0000E+00	-16.87	19.47	18.32
237	-32.80	47.27	0.0000E+00	-0.1960	0.0000E+00	0.0000E+00	0.0000E+00	31.56	0.0000E+00	-37.09	88.64	77.96
238	-58.69	6.245	0.0000E+00	-3.683	0.0000E+00	0.0000E+00	0.0000E+00	13.67	-0.3143	-63.80	79.47	74.22
239	-98.33	-37.73	0.0000E+00	1.113	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-26.34	-109.8	109.8	100.9
240	-183.3	-1.903	0.0000E+00	-4.126	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-1.366	-183.7	183.7	182.9
241	-179.4	13.97	0.0000E+00	2.436	0.0000E+00	0.0000E+00	0.0000E+00	14.96	0.0000E+00	-186.4	193.3	188.3
242	-123.4	6.804	0.0000E+00	21.62	0.0000E+00	0.0000E+00	0.0000E+00	11.46	-0.3164	-127.7	139.2	134.3
243	-37.13	-13.93	0.0000E+00	14.19	0.0000E+00	0.0000E+00	0.0000E+00	3.830	-4.301	-32.43	56.28	52.92
244	23.90	1.133	0.0000E+00	7.102	0.0000E+00	0.0000E+00	0.0000E+00	26.09	0.0000E+00	-1.034	27.12	26.66
245	-1.178	58.72	0.0000E+00	4.734	0.0000E+00	0.0000E+00	0.0000E+00	69.79	7.156	-19.41	89.20	80.23
246	-33.34	28.70	0.0000E+00	-4.011	0.0000E+00	0.0000E+00	0.0000E+00	35.44	0.0000E+00	-60.08	93.53	85.09
247	-79.61	3.930	0.0000E+00	-7.860	0.0000E+00	0.0000E+00	0.0000E+00	13.74	-4.882	-84.54	98.29	90.89
248	-212.2	-6.816	0.0000E+00	-24.69	0.0000E+00	0.0000E+00	0.0000E+00	1.844	-3.730	-215.1	216.9	213.3
249	-301.6	13.68	0.0000E+00	-13.76	0.0000E+00	0.0000E+00	0.0000E+00	17.23	0.0000E+00	-303.2	320.4	312.3
250	-310.8	11.23	0.0000E+00	9.161	0.0000E+00	0.0000E+00	0.0000E+00	11.83	0.0000E+00	-311.4	323.3	317.6
251	-260.6	-11.94	0.0000E+00	11.74	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-11.23	-261.3	261.3	235.9
252	-299.8	-3.814	0.0000E+00	-26.42	0.0000E+00	0.0000E+00	0.0000E+00	2.132	-1.326	-304.2	304.6	304.5
253	-210.0	-26.11	0.0000E+00	-83.20	0.0000E+00	0.0000E+00	0.0000E+00	39.13	-26.54	-248.7	287.8	263.8
254	0.9891	24.05	0.0000E+00	17.87	0.0000E+00	0.0000E+00	0.0000E+00	48.17	0.8157	-23.93	72.12	70.00
255	8.744	3.993	0.0000E+00	17.63	0.0000E+00	0.0000E+00	0.0000E+00	25.29	0.2725	-12.83	38.12	34.22
256	16.30	-6.935	0.0000E+00	17.43	0.0000E+00	0.0000E+00	0.0000E+00	36.93	10.93	-38.31	73.26	68.69
257	-1.310	33.28	0.0000E+00	19.09	0.0000E+00	0.0000E+00	0.0000E+00	58.08	-2.954	-23.27	81.27	79.24
258	6.018	42.37	0.0000E+00	17.63	0.0000E+00	0.0000E+00	0.0000E+00	50.80	4.318	-6.726	57.52	52.98
259	13.35	72.31	0.0000E+00	16.21	0.0000E+00	0.0000E+00	0.0000E+00	79.41	10.58	-3.934	83.33	77.14
260	-126.3	138.2	0.0000E+00	-32.74	0.0000E+00	0.0000E+00	0.0000E+00	169.9	0.0000E+00	-157.9	327.7	287.1

NEDO-10084-4
March 1995

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NUCLEAR PACK. MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK.

1P300 2" SPACER DISK 0 DEL. DEAD WEIGHT ANALYSIS

9.6889 JUN 11, 1990 CP= 115.310

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGE
261	-4.082	-76.70	0.0000E+00	8.901	0.0000E+00	0.0000E+00	2.434	-4.357	-78.86	81.30	78.12
262	-4.202	6.178	0.0000E+00	8.826	0.0000E+00	0.0000E+00	11.30	0.0000E+00	-11.32	23.02	20.06
263	-8.323	89.45	0.0000E+00	8.750	0.0000E+00	0.0000E+00	90.61	0.0000E+00	-9.488	100.1	96.03
264	-5.092	-72.68	0.0000E+00	8.364	0.0000E+00	0.0000E+00	1.268	-4.780	-74.28	73.37	72.74
265	-7.146	49.74	0.0000E+00	8.826	0.0000E+00	0.0000E+00	31.32	0.0000E+00	-6.719	60.03	56.33
266	-9.201	163.7	0.0000E+00	9.287	0.0000E+00	0.0000E+00	164.3	0.0000E+00	-10.02	174.6	169.9
267	-1.013	217.2	0.0000E+00	23.51	0.0000E+00	0.0000E+00	219.7	0.6717	-4.221	224.0	221.6
268	-3.714	-110.6	0.0000E+00	3.670	0.0000E+00	0.0000E+00	0.6000E+00	-3.388	-110.7	110.7	109.0
269	-2.472	6.745	0.0000E+00	4.413	0.0000E+00	0.0000E+00	8.364	0.0000E+00	-4.291	12.63	11.36
270	-1.230	122.2	0.0000E+00	3.137	0.0000E+00	0.0000E+00	122.4	0.0000E+00	-1.443	123.9	123.2
271	-2.260	-102.6	0.0000E+00	3.250	0.0000E+00	0.0000E+00	0.6000E+00	-1.884	-102.8	102.8	101.8
272	-1.052	46.28	0.0000E+00	4.413	0.0000E+00	0.0000E+00	46.70	0.0000E+00	-1.472	48.17	47.47
273	0.1564	200.3	0.0000E+00	3.377	0.0000E+00	0.0000E+00	200.4	0.9261E-01	0.0000E+00	200.6	200.3
274	51.12	209.3	0.0000E+00	27.19	0.0000E+00	0.0000E+00	214.1	46.38	0.0000E+00	214.1	195.0
1002	-34.42	4.840	0.0000E+00	0.6372	0.0000E+00	0.0000E+00	3.423	0.0000E+00	-34.99	60.41	57.92
1003	-53.28	-0.4903	0.0000E+00	7.694	0.0000E+00	0.0000E+00	0.8674	-0.2316	-36.41	57.27	56.73
1004	-43.35	-2.029	0.0000E+00	8.791	0.0000E+00	0.0000E+00	0.2831	-0.3812	-47.08	47.37	46.94
1005	-34.41	-0.1773	0.0000E+00	9.423	0.0000E+00	0.0000E+00	2.322	0.0000E+00	-36.91	39.23	38.14
1006	-23.64	-6.622	0.0000E+00	6.823	0.0000E+00	0.0000E+00	0.6000E+00	-4.213	-26.03	26.03	24.22
1007	2.424	4.720	0.0000E+00	3.167	0.0000E+00	0.0000E+00	18.77	0.0000E+00	-11.62	30.39	27.43
1008	-0.1284	-3.639	0.0000E+00	-4.080	0.0000E+00	0.0000E+00	14.73	0.0000E+00	-18.50	33.23	29.19
1009	-24.61	-0.1751	0.0000E+00	10.30	0.0000E+00	0.0000E+00	3.128	0.0000E+00	-29.91	35.04	32.97
1010	-24.67	-9.332	0.0000E+00	14.64	0.0000E+00	0.0000E+00	0.6000E+00	-0.9830	-35.02	35.02	34.34
1011	-19.91	-6.797	0.0000E+00	12.47	0.0000E+00	0.0000E+00	0.7603	0.0000E+00	-27.47	28.23	27.86
1012	-18.18	-7.967	0.0000E+00	11.33	0.0000E+00	0.0000E+00	0.6000E+00	-0.4388	-25.69	25.69	23.46
1013	-18.48	-8.562	0.0000E+00	12.84	0.0000E+00	0.0000E+00	0.3384	-0.6610E-01	-27.29	27.63	27.42
1014	-19.60	-11.22	0.0000E+00	13.12	0.0000E+00	0.0000E+00	0.3839	-0.6134E-01	-31.12	31.51	31.28
1015	-21.93	-14.96	0.0000E+00	18.09	0.0000E+00	0.0000E+00	0.4518	-0.4483	-36.67	37.32	36.87
1016	-24.82	-20.53	0.0000E+00	22.83	0.0000E+00	0.0000E+00	0.7092	-0.4007	-45.66	46.37	45.83
1017	-23.46	-27.24	0.0000E+00	27.60	0.0000E+00	0.0000E+00	2.452	0.0000E+00	-33.16	53.61	54.43
1018	-22.79	-34.99	0.0000E+00	27.65	0.0000E+00	0.0000E+00	0.1577	-0.5071	-37.43	57.59	57.26
1019	-13.55	-34.68	0.0000E+00	23.43	0.0000E+00	0.0000E+00	3.737	0.0000E+00	-51.97	53.71	53.93
1020	-8.044	-28.83	0.0000E+00	14.44	0.0000E+00	0.0000E+00	0.7344	-1.370	-36.24	36.97	35.97
1021	-3.537	-18.42	0.0000E+00	8.410	0.0000E+00	0.0000E+00	0.7377	-0.4647	-22.23	22.97	22.40
1022	-1.433	-11.35	0.0000E+00	4.070	0.0000E+00	0.0000E+00	0.5186	-0.4861	-12.82	13.34	12.87
1023	-0.4569	-6.335	0.0000E+00	1.642	0.0000E+00	0.0000E+00	0.3101	-0.3291	-6.773	7.083	6.788
1024	-0.3963E-01	-2.712	0.0000E+00	0.3087	0.0000E+00	0.0000E+00	0.2023	-0.1979	-2.736	2.958	2.786
1025	-0.7838E-01	-0.4331	0.0000E+00	-0.3931	0.0000E+00	0.0000E+00	0.5243	-0.1250	-0.7541	1.279	1.197
1026	1.476	3.593	0.0000E+00	-1.921	0.0000E+00	0.0000E+00	4.770	0.3405	-0.4132E-01	4.811	4.632
1027	1.129	11.16	0.0000E+00	-4.218	0.0000E+00	0.0000E+00	12.76	0.3248	-0.7943	13.36	13.05
1028	-0.2368	17.92	0.0000E+00	-4.045	0.0000E+00	0.0000E+00	18.87	0.0000E+00	-1.191	20.06	19.51
1029	-0.6736	20.40	0.0000E+00	-1.937	0.0000E+00	0.0000E+00	20.64	0.0000E+00	-0.9131	21.55	21.11
1030	0.2727	19.22	0.0000E+00	-0.3716	0.0000E+00	0.0000E+00	19.24	0.2342	0.0000E+00	19.24	19.11

NEDO-10084-4
March 1995

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IF300 2" SPACER DISK 0 DEG. DEAD WEIGHT ANALYSIS

9.6896 JUN 11, 1990 CP= 115.890

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGX
1031	-0.3661	17.80	0.0000E+00	-0.3858	0.0000E+00	0.0000E+00	17.81	0.0000E+00	-0.3743	18.18	18.00
1033	-32.89	11.83	0.0000E+00	2.692	0.0000E+00	0.0000E+00	12.89	0.0000E+00	-33.95	46.84	42.42
1034	-33.41	-1.469	0.0000E+00	3.031	0.0000E+00	0.0000E+00	0.4371	-1.119	-34.22	34.67	33.92
1035	-29.08	-0.8192	0.0000E+00	6.198	0.0000E+00	0.0000E+00	0.7743	-0.2845	-30.39	31.16	30.63
1036	-27.69	-0.3824	0.0000E+00	6.968	0.0000E+00	0.0000E+00	1.368	-0.1332E-01	-29.42	30.78	30.13
1037	-28.87	-3.579	0.0000E+00	7.689	0.0000E+00	0.0000E+00	0.8363	-2.202	-31.11	31.96	30.60
1038	-26.72	-0.3488	0.0000E+00	14.20	0.0000E+00	0.0000E+00	3.879	-1.658	-41.29	67.16	64.13
1040	-27.54	-0.2835	0.0000E+00	13.27	0.0000E+00	0.0000E+00	3.648	0.0000E+00	-33.45	39.10	36.62
1041	-13.79	-4.824	0.0000E+00	9.086	0.0000E+00	0.0000E+00	1.158	-0.8088	-20.96	22.12	21.26
1042	-17.17	-3.219	0.0000E+00	10.78	0.0000E+00	0.0000E+00	1.224	-0.5388E-01	-23.55	24.77	24.18
1043	-13.66	-6.375	0.0000E+00	10.43	0.0000E+00	0.0000E+00	0.8343	-0.4074	-22.46	23.30	22.72
1044	-13.54	-8.218	0.0000E+00	10.03	0.0000E+00	0.0000E+00	0.6302	-0.3034	-22.08	22.71	22.27
1045	-18.03	-7.087	0.0000E+00	10.71	0.0000E+00	0.0000E+00	0.3778	-0.1645	-23.33	23.71	23.45
1046	-18.81	-9.243	0.0000E+00	13.31	0.0000E+00	0.0000E+00	1.420	-0.5001	-26.97	28.59	27.64
1047	-17.60	-7.686	0.0000E+00	16.13	0.0000E+00	0.0000E+00	4.470	-0.1339	-29.82	34.49	32.59
1048	-18.26	-13.24	0.0000E+00	20.09	0.0000E+00	0.0000E+00	3.514	-0.1462	-36.87	42.39	40.21
1049	-9.093	-17.99	0.0000E+00	16.91	0.0000E+00	0.0000E+00	3.547	-0.3272	-32.30	37.85	35.84
1050	3.733	-18.43	0.0000E+00	9.738	0.0000E+00	0.0000E+00	9.329	-0.4147	-24.44	33.77	30.92
1051	0.9158	-23.29	0.0000E+00	3.002	0.0000E+00	0.0000E+00	4.179	-0.5912	-23.97	30.14	28.22
1052	1.333	-13.97	0.0000E+00	2.324	0.0000E+00	0.0000E+00	2.913	-0.1633	-17.18	20.10	18.82
1053	0.4112	-11.59	0.0000E+00	0.1067	0.0000E+00	0.0000E+00	1.523	-0.2413	-12.24	13.78	13.01
1054	0.4486	-6.390	0.0000E+00	0.1735E-01	0.0000E+00	0.0000E+00	0.7989	-0.1283	-6.811	7.610	7.227
1055	0.2396	-3.355	0.0000E+00	-0.8023	0.0000E+00	0.0000E+00	0.4293	-0.1068	-3.738	4.168	3.938
1056	0.5279	-1.828	0.0000E+00	-1.487	0.0000E+00	0.0000E+00	0.9438	-0.7302E-01	-2.169	3.113	2.814
1057	1.368	-1.351	0.0000E+00	-2.339	0.0000E+00	0.0000E+00	2.270	0.0000E+00	-2.053	4.323	3.861
1058	1.202	-0.1090E-02	0.0000E+00	-1.434	0.0000E+00	0.0000E+00	3.993	0.3306E-01	-2.823	6.818	6.343
1059	-2.893	7.306	0.0000E+00	-1.434	0.0000E+00	0.0000E+00	7.898	0.0000E+00	-3.586	11.48	10.36
1060	-0.1924	8.350	0.0000E+00	-0.3343	0.0000E+00	0.0000E+00	8.421	0.2123	-0.4760	8.897	8.580
1061	-0.2372E-01	7.153	0.0000E+00	0.3490E-01	0.0000E+00	0.0000E+00	7.156	0.1175	-0.1447	7.301	7.174
1062	-0.3749	7.280	0.0000E+00	-0.4551E-01	0.0000E+00	0.0000E+00	7.281	0.0000E+00	-0.3758	7.637	7.476
1064	0.3724	49.02	0.0000E+00	1.472	0.0000E+00	0.0000E+00	66.43	3.737	-14.79	73.24	69.97
1065	20.52	-2.484	0.0000E+00	2.050	0.0000E+00	0.0000E+00	20.71	0.0000E+00	-2.673	23.39	22.19
1066	8.767	0.2492	0.0000E+00	3.264	0.0000E+00	0.0000E+00	10.47	0.4587E-02	-1.462	11.94	11.46
1067	-4.717	-0.7041	0.0000E+00	3.539	0.0000E+00	0.0000E+00	3.084	0.0000E+00	-8.303	11.39	11.20
1068	-25.83	0.1329	0.0000E+00	7.142	0.0000E+00	0.0000E+00	2.059	0.0000E+00	-27.75	29.81	28.97
1069	-70.51	0.1450	0.0000E+00	7.420	0.0000E+00	0.0000E+00	4.112	-3.123	-71.35	73.46	72.14
1070	-61.51	-5.771	0.0000E+00	15.07	0.0000E+00	0.0000E+00	4.161	-4.688	-66.75	70.91	67.05
1072	-11.99	78.27	0.0000E+00	20.60	0.0000E+00	0.0000E+00	84.20	0.0000E+00	-17.92	102.1	98.97
1073	1.029	6.433	0.0000E+00	3.362	0.0000E+00	0.0000E+00	12.25	2.832	-7.621	19.87	17.72
1074	-4.683	0.3602	0.0000E+00	6.520	0.0000E+00	0.0000E+00	6.156	0.1953	-10.67	16.83	15.59
1077	-0.9944	-42.41	0.0000E+00	11.82	0.0000E+00	0.0000E+00	10.20	-3.350	-50.26	60.46	56.80
1078	-2.334	16.76	0.0000E+00	-0.5434	0.0000E+00	0.0000E+00	16.82	0.0000E+00	-2.410	19.23	18.15
1079	-2.497	1.957	0.0000E+00	1.059	0.0000E+00	0.0000E+00	3.498	0.0000E+00	-4.039	7.537	6.675

NEDO-10084-4
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FOR SUPPORT CALL STEVE PORTER PHONE (206) 874-2235 TLE

IF300 2" SPACER DISK 0 DEG. DEAD WEIGHT ANALYSIS

9.6891 JUN 11, 1990 CP- 116.330

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.0000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGC
1080	-6.119	-3.612	0.0000E+00	3.994	0.0000E+00	0.0000E+00	0.3918	-0.3108	-9.613	10.20	9.732
1081	-11.97	-3.661	0.0000E+00	7.497	0.0000E+00	0.0000E+00	1.283	-0.3384	-16.78	18.07	17.33
1083	-4.472	-98.08	0.0000E+00	2.926	0.0000E+00	0.0000E+00	0.0000E+00	-4.139	-98.39	98.39	96.39
1084	-0.3628E-01	11.42	0.0000E+00	-1.843	0.0000E+00	0.0000E+00	11.78	0.1633	-0.3761	12.35	12.01
1085	-0.9359	4.283	0.0000E+00	-2.106	0.0000E+00	0.0000E+00	3.134	0.1331E-01	-1.617	6.932	6.303
1086	-3.322	0.8437E-01	0.0000E+00	-0.7267	0.0000E+00	0.0000E+00	1.679	-0.3609	-4.354	6.235	5.410
1087	-7.460	-1.247	0.0000E+00	2.876	0.0000E+00	0.0000E+00	0.7320	-0.1934	-9.266	10.02	9.397
1088	-13.05	-2.843	0.0000E+00	6.768	0.0000E+00	0.0000E+00	0.9623	-0.1313	-16.73	17.68	17.17
1090	-2.710	-88.84	0.0000E+00	-3.865	0.0000E+00	0.0000E+00	1.042	-2.134	-87.43	88.70	86.78
1091	0.1776	2.990	0.0000E+00	-2.847	0.0000E+00	0.0000E+00	3.421	0.1499	-2.403	7.823	7.363
1092	-0.4084	3.749	0.0000E+00	-3.433	0.0000E+00	0.0000E+00	3.768	0.0000E+00	-2.348	8.074	7.249
1093	-1.400	3.907	0.0000E+00	-2.761	0.0000E+00	0.0000E+00	3.236	0.0000E+00	-2.730	7.944	7.065
1094	-2.623	1.786	0.0000E+00	-0.2680	0.0000E+00	0.0000E+00	2.316	0.0000E+00	-3.153	5.471	4.834
1095	-3.681	0.1168	0.0000E+00	1.989	0.0000E+00	0.0000E+00	1.261	0.0000E+00	-6.823	8.086	7.534
1096	-12.04	-3.294	0.0000E+00	6.264	0.0000E+00	0.0000E+00	0.9712	-0.3133	-14.00	16.97	16.38
1097	-13.31	-4.704	0.0000E+00	10.30	0.0000E+00	0.0000E+00	2.499	-0.3916	-22.12	24.42	23.33
1099	-3.477	-9.344	0.0000E+00	-14.78	0.0000E+00	0.0000E+00	26.49	-5.738	-33.73	62.34	58.67
1100	-2.777	-10.43	0.0000E+00	-3.641	0.0000E+00	0.0000E+00	0.6488	-1.301	-12.60	13.36	12.40
1101	-0.6489	6.317	0.0000E+00	-2.844	0.0000E+00	0.0000E+00	8.011	0.4808	-2.634	10.43	9.513
1102	2.992	6.449	0.0000E+00	-1.164	0.0000E+00	0.0000E+00	7.530	2.325	-0.4149	7.945	7.061
1103	3.881	2.033	0.0000E+00	-0.6428	0.0000E+00	0.0000E+00	4.408	1.504	0.0000E+00	6.408	5.850
1104	6.313	0.8496	0.0000E+00	-1.193	0.0000E+00	0.0000E+00	4.745	0.5820	-0.8313E-01	6.831	6.550
1105	1.643	0.7893	0.0000E+00	-0.8911	0.0000E+00	0.0000E+00	4.405	0.4338	-2.584	7.191	6.479
1106	-9.160	-0.6231	0.0000E+00	4.350	0.0000E+00	0.0000E+00	3.327	0.8000E+00	-13.11	14.44	15.47
1107	-12.71	-3.130	0.0000E+00	13.18	0.0000E+00	0.0000E+00	8.737	-0.1169	-26.48	33.24	32.29
1109	-6.867	40.34	0.0000E+00	-9.834	0.0000E+00	0.0000E+00	43.03	0.0000E+00	-9.340	52.39	48.56
1110	-2.096	-8.329	0.0000E+00	0.3310	0.0000E+00	0.0000E+00	0.0000E+00	-0.8335	-9.592	9.592	9.212
1111	7.070	1.201	0.0000E+00	1.919	0.0000E+00	0.0000E+00	9.890	0.9980	-2.618	12.31	11.61
1112	19.33	0.1144	0.0000E+00	0.9333	0.0000E+00	0.0000E+00	19.40	0.4143	-0.3534	19.94	19.58
1113	29.96	-0.4833	0.0000E+00	1.634	0.0000E+00	0.0000E+00	30.05	0.1134	-0.6879	30.74	30.35
1114	40.92	2.300	0.0000E+00	1.032	0.0000E+00	0.0000E+00	40.97	2.253	0.0000E+00	40.97	39.90
1115	19.26	-11.31	0.0000E+00	-3.598	0.0000E+00	0.0000E+00	20.11	0.8934E-01	-12.25	32.34	29.22
1116	9.619	13.07	0.0000E+00	0.2440	0.0000E+00	0.0000E+00	16.89	4.798	0.0000E+00	16.89	15.59
1117	14.94	3.215	0.0000E+00	2.883	0.0000E+00	0.0000E+00	16.32	3.370	-1.943	18.47	16.78
1118	20.48	1.204	0.0000E+00	-0.2676	0.0000E+00	0.0000E+00	20.33	1.137	0.0000E+00	20.33	20.01
1119	20.71	0.3303	0.0000E+00	-1.748	0.0000E+00	0.0000E+00	20.88	0.4814	-0.1309	21.00	20.71
1120	22.98	0.7511	0.0000E+00	-2.875	0.0000E+00	0.0000E+00	23.37	0.4358	-0.9782E-01	23.47	23.20
1121	16.20	2.480	0.0000E+00	-4.498	0.0000E+00	0.0000E+00	20.25	1.974	-1.544	21.80	20.32
1122	9.039	2.888	0.0000E+00	6.104	0.0000E+00	0.0000E+00	16.15	3.126	-9.331	27.48	24.81
1124	-10.24	39.99	0.0000E+00	-1.341	0.0000E+00	0.0000E+00	40.45	0.0000E+00	-10.70	51.14	46.97
1125	2.013	-9.254	0.0000E+00	1.329	0.0000E+00	0.0000E+00	4.432	-1.235	-10.44	14.91	13.24
1126	3.961	1.414	0.0000E+00	1.329	0.0000E+00	0.0000E+00	5.734	0.3640	-0.9427	6.697	6.131
1127	2.691	0.2013	0.0000E+00	1.329	0.0000E+00	0.0000E+00	3.804	0.6819E-01	-0.9795	4.783	4.437

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NUCLEAR PACE MAY 1, 1989
SWANSON ANALYSIS SYSTEMS, INC. AS UNPUBLISHED WORK

IF300 2" SPACER DISK 0 DEL. DEAD WEIGHT ANALYSIS

9.6893 JUN 11, 1990 CP= 116.720

***** POST1 NODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGZ
1128	3.324	-1.039	0.0000E+00	1.329	0.0000E+00	0.0000E+00	4.093	0.0000E+00	-1.608	3.702	3.184
1129	3.363	4.401	0.0000E+00	1.329	0.0000E+00	0.0000E+00	6.319	1.833	-0.1878	6.508	3.828
1130	8.416	-17.93	0.0000E+00	-2.926	0.0000E+00	0.0000E+00	9.356	0.0000E+00	-18.87	28.22	25.04
1131	11.26	3.343	0.0000E+00	-3.056	0.0000E+00	0.0000E+00	13.38	2.889	-3.658	19.03	17.24
1133	2.729	52.33	0.0000E+00	8.209	0.0000E+00	0.0000E+00	34.36	6.359	-3.666	60.03	55.32
1134	8.416	-10.18	0.0000E+00	2.127	0.0000E+00	0.0000E+00	10.44	-1.377	-10.64	21.08	18.71
1135	-3.322	1.628	0.0000E+00	0.7392	0.0000E+00	0.0000E+00	2.134	0.0000E+00	-3.828	5.962	3.259
1136	-12.13	0.2882	0.0000E+00	1.723	0.0000E+00	0.0000E+00	0.9334	-0.1871	-12.61	13.54	13.11
1137	-13.08	-1.595	0.0000E+00	1.002	0.0000E+00	0.0000E+00	0.0000E+00	-1.544	-23.13	23.13	22.61
1138	-13.00	6.502	0.0000E+00	1.626	0.0000E+00	0.0000E+00	4.377	0.0000E+00	-33.07	39.63	36.83
1139	-13.93	-21.04	0.0000E+00	4.752	0.0000E+00	0.0000E+00	3.959	-8.383	-30.56	34.32	31.22
1140	8.583	6.944	0.0000E+00	7.231	0.0000E+00	0.0000E+00	28.82	1.837	-7.143	27.95	24.96
1141	23.20	22.34	0.0000E+00	3.397	0.0000E+00	0.0000E+00	33.81	9.937	0.0000E+00	33.81	32.28
1142	18.12	-0.7856	0.0000E+00	3.001	0.0000E+00	0.0000E+00	39.04	0.0000E+00	-1.782	48.74	39.92
1143	26.67	1.234	0.0000E+00	-0.3679	0.0000E+00	0.0000E+00	28.69	1.213	0.0000E+00	28.69	28.11
1144	30.14	0.1883E-01	0.0000E+00	-1.288	0.0000E+00	0.0000E+00	30.19	0.1973	-0.2356	30.43	30.21
1145	36.46	0.7909	0.0000E+00	-2.183	0.0000E+00	0.0000E+00	36.59	0.6799	-0.2632E-01	36.62	36.27
1146	37.19	0.5362	0.0000E+00	-8.869	0.0000E+00	0.0000E+00	38.10	0.2498	-0.6248	38.73	38.30
1147	43.74	23.70	0.0000E+00	-3.413	0.0000E+00	0.0000E+00	34.89	16.33	0.0000E+00	34.89	49.41
1148	20.20	3.662	0.0000E+00	-1.938	0.0000E+00	0.0000E+00	24.76	3.661	-4.533	29.31	28.27
1149	9.807	-22.78	0.0000E+00	1.538	0.0000E+00	0.0000E+00	11.54	-0.884E-01	-24.42	33.96	32.24
1151	-7.244	12.78	0.0000E+00	16.14	0.0000E+00	0.0000E+00	39.29	-8.033	-27.61	46.80	63.44
1152	0.3323	34.83	0.0000E+00	14.81	0.0000E+00	0.0000E+00	47.87	3.330	-16.21	64.08	61.18
1153	-6.166	8.446	0.0000E+00	13.08	0.0000E+00	0.0000E+00	18.78	0.0000E+00	-16.50	33.27	31.33
1154	-12.46	-18.87	0.0000E+00	13.37	0.0000E+00	0.0000E+00	24.33	-9.400	-44.49	69.04	62.87
1155	-3.437	30.18	0.0000E+00	-8.032	0.0000E+00	0.0000E+00	31.46	0.0000E+00	-6.927	38.38	36.09
1156	-0.7073	14.64	0.0000E+00	-7.032	0.0000E+00	0.0000E+00	19.32	0.2391	-6.648	22.97	21.19
1157	3.378	-13.44	0.0000E+00	-2.123	0.0000E+00	0.0000E+00	3.144	-0.7108E-01	-17.13	22.27	20.38
1159	-2.177	-74.18	0.0000E+00	7.158	0.0000E+00	0.0000E+00	2.211	-3.006	-73.56	77.77	73.30
1160	-4.943	113.6	0.0000E+00	6.454	0.0000E+00	0.0000E+00	114.3	0.0000E+00	-3.614	119.9	117.3
1161	-3.101	9.136	0.0000E+00	6.263	0.0000E+00	0.0000E+00	12.33	0.0000E+00	-8.296	18.63	16.33
1162	-1.256	-97.03	0.0000E+00	6.076	0.0000E+00	0.0000E+00	1.696	-2.297	-97.69	99.38	97.43
1163	1.617	8.129	0.0000E+00	-0.7621	0.0000E+00	0.0000E+00	8.293	1.431	0.0000E+00	8.293	7.721
1164	1.161	8.146	0.0000E+00	-3.044	0.0000E+00	0.0000E+00	9.772	0.5994	-1.063	10.84	10.13
1165	1.704	-3.823	0.0000E+00	-4.207	0.0000E+00	0.0000E+00	3.750	0.0000E+00	-7.872	11.62	10.34
1166	2.410	-11.74	0.0000E+00	-1.088	0.0000E+00	0.0000E+00	2.900	0.0000E+00	-12.23	13.13	13.96
1168	-4.470	-93.91	0.0000E+00	-1.483	0.0000E+00	0.0000E+00	0.0000E+00	-4.268	-96.11	96.11	94.03
1169	-1.784	128.3	0.0000E+00	-2.656	0.0000E+00	0.0000E+00	128.7	0.0000E+00	-1.984	130.6	129.7
1170	-3.197	8.441	0.0000E+00	-2.560	0.0000E+00	0.0000E+00	10.16	0.0000E+00	-4.920	13.08	13.44
1171	-4.609	-110.3	0.0000E+00	-2.463	0.0000E+00	0.0000E+00	0.0000E+00	-4.332	-110.7	110.7	108.6
1172	0.1946	3.271	0.0000E+00	-1.354	0.0000E+00	0.0000E+00	4.139	0.3370	-1.066	3.263	3.049
1173	0.5439	1.677	0.0000E+00	-2.164	0.0000E+00	0.0000E+00	3.373	0.1832E-01	-1.172	4.348	4.138
1174	1.337	-4.043	0.0000E+00	-3.376	0.0000E+00	0.0000E+00	2.991	0.0000E+00	-3.699	8.690	7.670

NEDO-10084-4

March 1995

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IP300 2" SPACER DISK 8 DEL. DEAD WEIGHT ANALYSIS

9.6894 JUN 11, 1990 CP- 117.100

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
 TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	ST	SIGK
1175	1.630	-7.306	0.0000E+00	-2.463	0.0000E+00	0.0000E+00	2.463	0.0000E+00	-8.281	10.69	9.733
1177	-2.233	-49.81	0.0000E+00	-10.64	0.0000E+00	0.0000E+00	7.123	-3.748	-33.42	62.35	38.39
1178	-7.106	75.31	0.0000E+00	-11.36	0.0000E+00	0.0000E+00	78.00	0.0000E+00	-9.794	87.79	84.20
1179	-4.037	8.980	0.0000E+00	-11.38	0.0000E+00	0.0000E+00	16.20	0.0000E+00	-11.23	27.43	24.10
1180	-0.9473	-38.39	0.0000E+00	-11.41	0.0000E+00	0.0000E+00	6.833	-3.284	-62.93	69.79	63.91
1181	-0.9431	1.713	0.0000E+00	0.2311	0.0000E+00	0.0000E+00	2.632	0.0000E+00	-1.682	4.314	4.166
1182	0.1362	-1.620	0.0000E+00	-1.627	0.0000E+00	0.0000E+00	1.674	-0.1816	-3.377	7.251	6.713
1183	0.7999	-3.940	0.0000E+00	-3.378	0.0000E+00	0.0000E+00	2.813	0.0000E+00	-3.953	6.770	7.771
1184	0.2129	-4.723	0.0000E+00	-2.618	0.0000E+00	0.0000E+00	1.398	0.0000E+00	-3.910	7.308	6.730
1185	0.4004	-4.320	0.0000E+00	-1.070	0.0000E+00	0.0000E+00	0.6819	0.0000E+00	-4.602	5.284	4.988
1187	-3.720	61.28	0.0000E+00	-19.13	0.0000E+00	0.0000E+00	69.43	0.3339	-14.43	83.88	82.78
1188	9.873	-41.20	0.0000E+00	-20.11	0.0000E+00	0.0000E+00	23.63	4.937	-39.92	83.37	80.67
1189	-1.446	8.066	0.0000E+00	-20.21	0.0000E+00	0.0000E+00	23.33	0.0000E+00	-18.91	44.43	39.60
1190	-12.77	59.93	0.0000E+00	-20.31	0.0000E+00	0.0000E+00	69.72	-1.624	-20.92	90.64	88.44
1191	3.338	-14.17	0.0000E+00	-4.937	0.0000E+00	0.0000E+00	7.337	2.813	-18.20	23.76	23.79
1192	1.212	-7.034	0.0000E+00	-3.144	0.0000E+00	0.0000E+00	3.373	-0.2700	-10.94	16.32	14.38
1193	-4.003	-0.6603	0.0000E+00	-3.376	0.0000E+00	0.0000E+00	2.391	-0.1371	-6.917	9.308	8.431
1194	-2.842	-2.944	0.0000E+00	-0.6612	0.0000E+00	0.0000E+00	0.7133E-01	-0.9836	-4.672	4.944	4.619
1195	0.3422	-4.002	0.0000E+00	-0.8308	0.0000E+00	0.0000E+00	0.9723	-0.1319	-4.480	3.433	3.063
1197	-8.644	39.86	0.0000E+00	3.643	0.0000E+00	0.0000E+00	66.08	3.893	-20.76	84.84	79.91
1198	-2.396	1.284	0.0000E+00	-7.112	0.0000E+00	0.0000E+00	10.38	-3.336	-8.336	18.92	17.33
1199	-27.23	-0.6677	0.0000E+00	-3.021	0.0000E+00	0.0000E+00	2.464	-2.792	-27.37	30.04	28.11
1200	-72.15	2.333	0.0000E+00	-15.13	0.0000E+00	0.0000E+00	7.883	-1.690	-75.99	83.88	79.53
1201	-116.7	-1.350	0.0000E+00	4.760	0.0000E+00	0.0000E+00	1.610	-2.721	-116.9	116.6	116.3
1202	-116.0	-2.038	0.0000E+00	-0.2802	0.0000E+00	0.0000E+00	3.787	-3.637	-110.2	114.0	109.6
1203	-36.88	-49.03	0.0000E+00	3.988	0.0000E+00	0.0000E+00	8.476	-20.66	-93.73	102.2	91.33
1204	-10.91	3.628	0.0000E+00	2.863	0.0000E+00	0.0000E+00	27.16	0.0000E+00	-32.44	39.60	32.88
1205	33.76	61.13	0.0000E+00	3.361	0.0000E+00	0.0000E+00	66.73	17.26	-9.092	93.82	87.61
1206	67.74	2.236	0.0000E+00	-6.433	0.0000E+00	0.0000E+00	68.81	3.329	-4.134	72.98	68.71
1207	43.68	-0.2900	0.0000E+00	-1.776	0.0000E+00	0.0000E+00	46.01	2.172	-2.789	48.80	46.33
1208	-12.82	0.4281E-01	0.0000E+00	-16.92	0.0000E+00	0.0000E+00	19.93	0.0000E+00	-32.70	32.63	46.86
1209	-43.21	-0.7629	0.0000E+00	-2.976	0.0000E+00	0.0000E+00	1.132	-1.707	-63.42	66.37	63.20
1210	-69.89	-2.491	0.0000E+00	-4.362	0.0000E+00	0.0000E+00	1.242	-3.427	-90.20	91.44	89.21
1211	-37.37	-18.09	0.0000E+00	-3.940	0.0000E+00	0.0000E+00	0.0000E+00	-14.47	-60.79	60.79	33.68
1212	-28.59	-4.799	0.0000E+00	-2.301	0.0000E+00	0.0000E+00	0.1722	-3.069	-30.49	30.66	29.24
1213	-14.20	3.689	0.0000E+00	1.333	0.0000E+00	0.0000E+00	4.937	0.0000E+00	-15.43	20.38	18.71
1214	-2.808	-2.377	0.0000E+00	3.127	0.0000E+00	0.0000E+00	1.648	-0.7307	-6.103	7.732	6.960
1215	1.214	-6.016	0.0000E+00	0.5033E-01	0.0000E+00	0.0000E+00	2.033	0.0000E+00	-6.837	8.910	8.239
1217	-73.68	6.358	0.0000E+00	-2.827	0.0000E+00	0.0000E+00	9.379	-1.978	-76.72	86.10	81.03
1218	-39.77	-0.7199	0.0000E+00	-3.432	0.0000E+00	0.0000E+00	1.331	-1.373	-60.26	61.62	60.24
1219	-34.27	-8.617	0.0000E+00	-13.47	0.0000E+00	0.0000E+00	3.809	-7.083	-39.62	63.43	39.31
1220	-48.29	16.13	0.0000E+00	-12.23	0.0000E+00	0.0000E+00	20.48	0.0000E+00	-32.63	73.11	66.33
1221	-36.39	-0.3936	0.0000E+00	3.677	0.0000E+00	0.0000E+00	1.436	-1.322	-36.92	36.37	36.96

NEDO-10084-4
March 1995

ANALYSIS - ENGINEERING ANALYSIS SYSTEM REVISION 4.4 NUCLEAR PACS MAY 1, 1989
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FOR SUPPORT CALL STEVE PORTER PHONE (208) 874-2233 TUE

IF300 2" SPACER DISK 0 DEEL DEAD WEIGHT ANALYSIS

9.6893 JUN 11, 1990 CP= 117.540

***** POSTI MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= 0.00000E+00 LOAD CASE= 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIGZ
1222	-39.63	-6.936	0.0000E+00	3.904	0.0000E+00	0.0000E+00	2.039	-3.043	-43.60	43.66	42.81
1223	-30.77	3.194	0.0000E+00	18.54	0.0000E+00	0.0000E+00	19.14	-4.343	-42.37	61.31	54.79
1224	-40.34	7.849	0.0000E+00	-1.629	0.0000E+00	0.0000E+00	11.74	-2.037	-42.18	33.93	48.69
1225	-21.54	-1.036	0.0000E+00	-2.428	0.0000E+00	0.0000E+00	1.643	-1.492	-22.73	24.37	23.09
1226	-22.48	-11.08	0.0000E+00	-13.92	0.0000E+00	0.0000E+00	4.701	-4.807	-33.46	38.16	33.33
1227	-16.68	11.63	0.0000E+00	-14.52	0.0000E+00	0.0000E+00	19.46	0.0000E+00	-24.48	43.94	38.66
1228	-17.71	-1.262	0.0000E+00	-3.213	0.0000E+00	0.0000E+00	1.120	-1.493	-18.60	19.72	18.56
1229	-4.313	-4.137	0.0000E+00	-2.669	0.0000E+00	0.0000E+00	3.263	-0.8107	-13.13	16.39	14.86
1230	-7.333	-4.679	0.0000E+00	3.601	0.0000E+00	0.0000E+00	3.239	-1.341	-13.71	16.94	13.44
1231	-2.480	3.687	0.0000E+00	3.293	0.0000E+00	0.0000E+00	6.777	0.0000E+00	-3.370	12.33	10.79
1232	-1.374	0.6712	0.0000E+00	4.752	0.0000E+00	0.0000E+00	4.861	0.0000E+00	-3.763	10.43	9.348
1233	0.4987	-14.67	0.0000E+00	2.132	0.0000E+00	0.0000E+00	1.300	0.0000E+00	-13.67	17.17	16.49
1235	-126.7	11.43	0.0000E+00	1.438	0.0000E+00	0.0000E+00	12.31	0.0000E+00	-127.6	139.9	134.2
1236	-127.3	-0.7722	0.0000E+00	-3.882	0.0000E+00	0.0000E+00	0.2883	-0.7291	-127.9	128.2	127.7
1237	-62.78	-37.33	0.0000E+00	0.1372	0.0000E+00	0.0000E+00	0.6396	-19.00	-81.99	82.63	73.23
1238	-31.32	6.891	0.0000E+00	-3.221	0.0000E+00	0.0000E+00	17.33	0.0000E+00	-41.97	59.12	34.01
1239	-0.2496	31.28	0.0000E+00	1.806	0.0000E+00	0.0000E+00	29.11	7.028	-13.10	74.21	67.35
1240	23.63	0.1583	0.0000E+00	2.594	0.0000E+00	0.0000E+00	24.77	0.0000E+00	-0.9622	25.74	23.27
1241	-8.939	-11.81	0.0000E+00	8.088	0.0000E+00	0.0000E+00	9.233	-1.303	-18.30	37.74	35.25
1242	-68.38	1.368	0.0000E+00	16.98	0.0000E+00	0.0000E+00	7.481	-1.348	-72.94	80.63	76.89
1243	-117.1	13.46	0.0000E+00	3.214	0.0000E+00	0.0000E+00	14.73	0.0000E+00	-118.4	133.2	126.3
1244	-123.3	-1.781	0.0000E+00	-3.079	0.0000E+00	0.0000E+00	0.0000E+00	-1.443	-123.9	123.9	123.2
1245	-38.40	-37.39	0.0000E+00	0.9407	0.0000E+00	0.0000E+00	0.8836	-18.37	-80.29	81.18	74.30
1246	-18.64	0.4327	0.0000E+00	-3.144	0.0000E+00	0.0000E+00	14.18	0.0000E+00	-32.39	46.37	42.30
1247	10.14	33.90	0.0000E+00	-0.8382	0.0000E+00	0.0000E+00	49.21	8.397	-11.76	60.97	34.75
1248	34.47	-1.762	0.0000E+00	-3.449	0.0000E+00	0.0000E+00	34.82	0.0000E+00	-2.110	56.93	33.92
1249	39.92	-3.824	0.0000E+00	-0.7379	0.0000E+00	0.0000E+00	60.44	0.0000E+00	-6.349	66.79	63.86
1250	44.03	-0.6132	0.0000E+00	6.183	0.0000E+00	0.0000E+00	43.02	0.6110	-2.208	47.22	45.93
1251	19.27	1.714	0.0000E+00	4.824	0.0000E+00	0.0000E+00	29.31	0.7773	-0.3054	20.82	20.30
1252	-2.430	3.741	0.0000E+00	4.252	0.0000E+00	0.0000E+00	6.884	1.872	-7.464	14.35	12.83
1253	-8.443	-23.84	0.0000E+00	3.228	0.0000E+00	0.0000E+00	0.0000E+00	-7.275	-27.01	27.01	24.44
1254	10.19	-7.377	0.0000E+00	17.32	0.0000E+00	0.0000E+00	33.01	7.754	-18.16	71.17	66.64
1255	2.489	8.410	0.0000E+00	17.63	0.0000E+00	0.0000E+00	24.43	0.4017	-14.13	38.39	34.32
1256	-3.209	31.28	0.0000E+00	17.98	0.0000E+00	0.0000E+00	32.08	-4.317	-21.89	73.77	71.81
1257	7.634	-1.937	0.0000E+00	17.77	0.0000E+00	0.0000E+00	36.24	7.089	-37.62	73.67	69.73
1258	0.1788	-1.934	0.0000E+00	17.63	0.0000E+00	0.0000E+00	17.89	0.0000E+00	-19.63	37.34	35.36
1259	-7.297	-1.207	0.0000E+00	17.33	0.0000E+00	0.0000E+00	34.93	-6.678	-34.73	71.48	67.86
1260	0.1932	-34.22	0.0000E+00	2.289	0.0000E+00	0.0000E+00	0.3636	0.0000E+00	-34.19	34.76	34.38
	-7.148	88.94	0.0000E+00	8.880	0.0000E+00	0.0000E+00	90.18	0.0000E+00	-8.487	98.77	95.13
	-3.044	10.47	0.0000E+00	8.824	0.0000E+00	0.0000E+00	13.03	0.0000E+00	-9.608	24.64	21.63
	-2.940	-49.35	0.0000E+00	8.771	0.0000E+00	0.0000E+00	2.981	-3.733	-71.32	74.50	71.39
1264	-6.037	96.81	0.0000E+00	8.730	0.0000E+00	0.0000E+00	97.94	0.0000E+00	-7.181	105.1	102.0
1265	-4.018	-2.091	0.0000E+00	8.826	0.0000E+00	0.0000E+00	6.268	0.0000E+00	-12.38	18.63	16.43

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March 1995

ANYSYS - ENGINEERING ANALYSIS SYSTEM REVISION 4.4 NUCLEAR PAC, MAY 1, 1989
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FOR SUPPORT CALL STEVE PORTER PHONE (206) 874-2233 FAX

IP300 2" SPACER DISK 6 DEG. DEAD WEIGHT ANALYSIS

9.6896 JUN 11, 1990 CP- 117.930

***** POST1 MODAL STRESS LISTING *****

LOAD STEP 1 ITERATION- 1 SECTION- 1
TIME- 0.00000E+00 LOAD CASE- 1

THE FOLLOWING X, Y, Z STRESSES ARE IN GLOBAL COORDINATES

NODE	SX	SY	SZ	STX	STY	STZ	SIG1	SIG2	SIG3	SI	SIG6
1266	-1.979	-99.64	0.0000E+00	8.922	0.0000E+00	0.0000E+00	2.742	-3.309	-101.1	103.8	100.9
1267	-0.3116	-30.77	0.0000E+00	0.9404	0.0000E+00	0.0000E+00	0.0000E+00	-0.2766	-30.80	30.80	30.67
1268	-1.440	122.7	0.0000E+00	4.527	0.0000E+00	0.0000E+00	122.9	0.0000E+00	-1.604	124.3	123.7
1269	-2.673	18.06	0.0000E+00	4.413	0.0000E+00	0.0000E+00	11.44	0.0000E+00	-4.059	13.30	13.96
1270	-3.906	-102.3	0.0000E+00	4.300	0.0000E+00	0.0000E+00	0.0000E+00	-3.719	-102.3	102.3	100.7
1271	-2.169	129.4	0.0000E+00	4.833	0.0000E+00	0.0000E+00	129.6	0.0000E+00	-2.346	131.9	130.8
1272	-3.370	-1.372	0.0000E+00	4.413	0.0000E+00	0.0000E+00	2.172	0.0000E+00	-6.914	9.086	8.281
1273	-4.570	-133.7	0.0000E+00	3.994	0.0000E+00	0.0000E+00	0.0000E+00	-4.447	-133.8	133.8	131.7
1274	-0.3721	-30.03	0.0000E+00	0.4993	0.0000E+00	0.0000E+00	0.0000E+00	-0.3637	-30.06	30.06	29.68

MINIMUMS

NODE	29	29	1	39	1	1	2	29	29	1023	1023
VALUE	-368.4	-331.1	0.0000E+00	-91.47	0.0000E+00	0.0000E+00	0.0000E+00	-239.0	-440.3	1.279	1.197

MAXIMUMS

NODE	31	267	1	19	1	1	267	274	273	29	29
VALUE	72.37	217.2	0.0000E+00	56.28	0.0000E+00	0.0000E+00	219.7	46.38	0.0000E+00	440.3	389.0

***** ROUTINE COMPLETED ***** CP - 118.200

/EOF ENCOUNTERED ON FILE16

PREP7 AFWRITE OR SFWRITE WARNING MESSAGES - 1
NUMBER OF SOLUTION PHASE WARNING MESSAGES - 0

***** RUN COMPLETED ***** CP- 118.7000 TIME- 9.6898

NEDO-10084-4
March 1995

***** ANSYS INPUT DATA LISTING (FILE18) *****

```
/OUTPUT,PS25X17.RES
/PREP7
/TITLE,POISON SHEET 30' DROP ANALYSIS 1/4" X 17 3/16" 90 DEG.
KAN,2
KAY,3.1
ET,1,3
ET,2,21,...,4
EX,1,25.8E6
NUXY,1,0.29
DENS,1,0.000725
GAMMA,0,02.20
C*** REAL CONSTANTS
R,1,0.25,0.0013,0.25
C*** NODES
N,1,0,0
N,11,17.1875,0
FILL
C*** ELEMENTS
E,1,2
EGEN,10,1,-1
ITER,1,1,1
C*** BOUNDARY CONDITIONS
D,1,UY,0,0
D,1,UX,0,0
D,11,UY,0,0
ITER,1,1,1
M,6,UY
M,11,UX
TOTAL,5
AFWRITE
FINISH
/INPUT,27
FINISH
/PREP7
RESUME
KAN,5
KAY,3
C*** INITIAL CONDITIONS AT REST
TIME,0
ACEL,,0
LWRITE
TIME,0.3E-3
C*** LOADING STEP 1
ACEL,,54096
ITER,20,0,1
LWRITE
C*** LOADING STEP 2
TIME,0.48E-3
ITER,20,0,1
ACEL,,23995
LWRITE
C*** LOADING STEP 3
TIME,15.8E-3
ACEL,,23995
ITER,100,0,1
LWRITE
C*** LOADING STEP 4
TIME,30.3E-3
ITER,25,0,1
ACEL,,0,0
LWRITE
C*** LOADING STEP 5
TIME,0.05
ITER,200,0,1
LWRITE
SLOAD,1
AFWRITE
FINISH
/LNFREQ,5
/INPUT,27
FINISH
/POST26
FILE,10
```

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DISP.2.6.UY
DISP.3.11.UX
/GRAPH.LABX.SEC.
/GRAPH.LABY.IN.
/TITLE.1/4" X 17 3/16" POISON SHEET 30' 90 DEG. SIDE DROP DISPLACEMENT
/SHOW.PLOT1..1
PLVAR.2
/SHOW.PLOT2..1
PLVAR.3
FINISH
/STRESS..5
TIME.50E-3
NSTRES.100
END
FINISH
/POST26
ESTR.4.5.11.SB
RFORCE.5.1.FY
RFORCE.6.11.FY
/TITLE.1/4" X 17 3/16" POISON SHEET 30' SIDE DROP BENDING STRESS
/GRAPH.LABY.PSI
/SHOW.PLOT3..1
PLVAR.4
/SHOW.PLOT4..1
/TITLE.1/4" X 17 3/16" POISON SHEET 30' SIDE DROP END REACTIONS
/GRAPH.LABY.#/IN
PLVAR.5.6
FINISH
/OUTPUT
/EOF

NEDO-10084-4
March 1995

***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 7.420 ***
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= POISON SHEET 30' DROP ANALYSIS 1/4" X 17 3/16" 90 DEG.

VARIABLE 2 IS 6 UY

VARIABLE 3 IS 11 UX

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES							
VARI	TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
2	DISP	6 UY	6 UY	-0.2857	0.6875E-02	0.1413	0.4113E-01
3	DISP	11 UX	11 UX	-0.7488E-19	0.7106E-03	0.2441E-19	0.3153E-01

VARIABLE 4 IS ELEMENT 5 ITEM 11 NAME= 5 SB

VARIABLE 5 IS REACTION FORCE 1 FY

VARIABLE 6 IS REACTION FORCE 11 FY

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES							
VARI	TYPE	IDENTIFIERS	NAME	MINIMUM	AT TIME	MAXIMUM	AT TIME
4	ESTR	5 11	5 SB	-0.1626E+05	0.4100E-01	0.3192E+05	0.7007E-02
5	RFOR	1 FY	1 FY	-33.60	0.4150E-01	71.01	0.6495E-02
6	RFOR	11 FY	11 FY	-26.37	0.4150E-01	54.79	0.6495E-02

***** ROUTINE COMPLETED ***** CP = 103.040

***** ANSYS INPUT DATA LISTING (FILE18) *****

/OUTPUT,PS516X19.RES
/PREP7
/TITLE,POISON SHEET 30' DROP ANALYSIS 5/16" X 19 1/16" 90 DEG.
KAN,2
KAY,3,1
ET,1,3
ET,2,21,...,4
EX,1,25,8E6
NUXY,1,0,29
DENS,1,0,000725
GAMMA,0,02,20
C*** REAL CONSTANTS
R,1,0,3125,0,002543,0,3125
C*** NODES
N,1,0,0
N,11,19,0625,0
FILL
C*** ELEMENTS
E,1,2
EGEN,10,1,-1
ITER,1,1,1
C*** BOUNDARY CONDITIONS
D,1,UY,0,0
D,1,UX,0,0
D,11,UY,0,0
ITER,1,1,1
M,6,UY
M,11,UX
TOTAL,5
AFWRITE
FINISH
/INPUT,27
FINISH
/PREP7
RESUME
KAN,5
KAY,3
C*** INITIAL CONDITIONS AT REST
TIME,0
ACEL,,0
LWRITE
TIME,0,3E-3
C*** LOADING STEP 1
ACEL,,54096
ITER,20,0,1
LWRITE
C*** LOADING STEP 2
TIME,0,48E-3
ITER,20,0,1
ACEL,,23995
LWRITE
C*** LOADING STEP 3
TIME,15,8E-3
ACEL,,23995
ITER,100,0,1
LWRITE
C*** LOADING STEP 4
TIME,30,3E-3
ITER,25,0,1
ACEL,,0,0
LWRITE
C*** LOADING STEP 5
TIME,0,05
ITER,200,0,1
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SLOAD,1
AFWRITE
FINISH
/LNRFREQ,5
/INPUT,27
FINISH
/POST26
FILE,10

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DISP.3.11.UX.UX
EXTREM.3
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/SHOW.PLOT2..1
PLVAR.3
FINISH
/STRESS..5
TIME.50E-3
NSTRES.100
END
FINISH
/POST26
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RFORCE.5.1.FY
RFORCE.6.11.FY
/SHOW.PLOT3..1
/GRAPH.LABY.PSI
/TITLE.5/16" X 19 1/16" POISON SHEET 30' 90 DEG. SIDE DROP BENDING STRESS
PLVAR.4
/GRAPH.LABY.#/IN
/TITLE.5/16" X 19 1/16" POISON SHEET 30' 90 DEG. SIDE DROP END REACTION
/SHOW.PLOT4..1
PLVAR.5.6
FINISH
/OUTPUT
/EOF

NEDO-10084-4

March 1995

***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 12.090 ***
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= POISON SHEET 30' DROP ANALYSIS 5/16" X 19 1/16" 90 DEG.

VARIABLE 2 IS 6 UY

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME
2 DISP 6 UY 6 UY -0.2763 0.6763E-02 0.1373 0.4043E-01
VARIABLE 3 IS 11 UX

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME
3 DISP 11 UX 11 UX -0.1158E-18 0.7331E-03 0.4873E-19 0.3382E-01
VARIABLE 4 IS ELEMENT 5 ITEM 11 NAME= 5 SB

VARIABLE 5 IS REACTION FORCE 1 FY

VARIABLE 6 IS REACTION FORCE 11 FY

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME
4 ESTR 5 11 5 SB -0.1578E+05 0.3999E-01 0.3168E+05 0.7002E-02
5 RFOR 1 FY 1 FY -45.22 0.4100E-01 95.48 0.6507E-02
6 RFOR 11 FY 11 FY -36.32 0.4100E-01 75.99 0.6507E-02

***** ROUTINE COMPLETED ***** CP = 105.950

NEDO-10084-4
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***** ANSYS INPUT DATA LISTING (FILE18) *****

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KAY.3.1
ET.1.3
ET.2.21...4
EX.1.25.8E6
NUXY.1.0.29
DENS.1.0.000725
GAMMA.0.02.20
C*** REAL CONSTANTS
R.1.0.375.0.0044.0.375
C*** NODES
N.1.0.0
N.11.17.1875.0
FILL
C*** ELEMENTS
E.1.2
EGEN.10.1.-1
ITER.1.1.1
C*** BOUNDARY CONDITIONS
D.1.UY.0.0
D.1.UX.0.0
D.11.UY.0.0
ITER.1.1.1
M.6.UY
M.11.UX
TOTAL.5
AFWRITE
FINISH
/INPUT.27
FINISH
/PREP7
RESUME
KAN.5
KAY.3
C*** INITIAL CONDITIONS AT REST
TIME.0
ACEL..0
LWRITE
TIME.0.6E-3
C*** LOADING STEP 1
ACEL..82690
ITER.20.0.1
LWRITE
C*** LOADING STEP 2
TIME.0.95E-3
ITER.20.0.1
ACEL..37094
LWRITE
C*** LOADING STEP 3
TIME.10.0E-3
ACEL..37094
ITER.100.0.1
LWRITE
C*** LOADING STEP 4
TIME.19.4E-3
ITER.25.0.1
ACEL..0.0
LWRITE
C*** LOADING STEP 5
TIME.0.05
ITER.200.0.1
LWRITE
SLOAD.1
AFWRITE
FINISH
/LNFREQ.5
/INPUT.27
FINISH
/POST26
FILE.10
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DISP.2.6.UY
DISP.3.11.UX
/GRAPH.LABX.SEC.
/GRAPH.LABY.IN.
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/SHOW.PLOT1..1
PLVAR.2
EXTREM.2
/SHOW.PLOT2..1
PLVAR.3
EXTREM.3
FINISH
/STRESS..5
TIME.50E-3
NSTRES.100
END
FINISH
/POST26
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RFORCE.5.1.FY
RFORCE.6.11.FY
/TITLE.3/8" X 17 3/16" POISON SHEET 30' 0 DEG. SIDE DROP MEMBRANE + BENDING STRESS
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/GRAPH.LABY.PSI
PLVAR.4
/SHOW.PLOT4..1
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/OUTPUT
/EOF

NEDO-10084-4
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***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 9.940 ****
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= POISON SHEET 30' DROP ANALYSIS 3/8" X 17 3/16" 0 DEG.

VARIABLE 2 IS 6 UY

VARIABLE 3 IS 11 UX

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2 DISP	6 UY	6 UY	-0.2061	0.4313E-02	0.1076	0.2742E-01
3 DISP	11 UX	11 UX	-0.2193E-17	0.3950E-02	0.1139E-17	0.2752E-01

VARIABLE 4 IS ELEMENT 5 ITEM 11 NAME= 5 SB

VARIABLE 5 IS REACTION FORCE 1 FY

VARIABLE 6 IS REACTION FORCE 11 FY

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

4 ESTR	5 11	5 SB	-0.1885E+05	0.2750E-01	0.3408E+05	0.3999E-02
5 RFOR	1 FY	1 FY	-92.23	0.3651E-01	163.6	0.3503E-02
6 RFOR	11 FY	11 FY	-66.70	0.2700E-01	135.6	0.4495E-02

***** ROUTINE COMPLETED ***** CP = 103.150

NEDO-10084-4
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***** ANSYS INPUT DATA LISTING (FILE18) *****

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KAY.3.1
ET.1.3
ET.2.21...4
EX.1.25.8E6
NUXY.1.0.29
DENS.1.0.000725
GAMMA.0.02.20
C*** REAL CONSTANTS
R.1.0.44.0.0071.0.44
C*** NODES
N.1.0.0
N.11.19.0625.0
FILL
C*** ELEMENTS
E.1.2
EGEN.10.1.-1
ITER.1.1.1
C*** BOUNDARY CONDITIONS
D.1.UY.0.0
D.1.UX.0.0
D.11.UY.0.0
ITER.1.1.1
M.6.UY
M.11.UX
TOTAL.5
AFWRITE
FINISH
/INPUT.27
FINISH
/PREP7
RESUME
KAN.5
KAY.3
C*** INITIAL CONDITIONS AT REST
TIME.0
ACEL..0
LWRITE
TIME.0.3E-3
C*** LOADING STEP 1
ACEL..82690
ITER.20.0.1
LWRITE
C*** LOADING STEP 2
TIME.0.48E-3
ITER.20.0.1
ACEL..37094
LWRITE
C*** LOADING STEP 3
TIME.15.8E-3
ACEL..37094
ITER.100.0.1
LWRITE
C*** LOADING STEP 4
TIME.30.3E-3
ITER.25.0.1
ACEL..0.0
LWRITE
C*** LOADING STEP 5
TIME.0.05
ITER.200.0.1
LWRITE
SLOAD.1
AFWRITE
FINISH
/LNFREQ.5
/INPUT.27
FINISH
/POST26
FILE.10
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DISP.2.6.UY.UY
DISP.3.11.UX.UX
/GRAPH.LABX.SEC.
/GRAPH.LABY.IN.
/TITLE.7/16" X 19 1/16" POISON SHEET 30' 0 DEG. SIDE DROP DISPLACEMENT
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PLVAR.2
EXTREM.2
/SHOW.PLOT2..1
PLVAR.3
EXTREM.3
FINISH
/STRESS..5
TIME.50E-3
NSTRES.100
END
FINISH
/POST26
ESTR.4.5.11.SB
RFORCE.5.1.FY
RFORCE.6.11.FY
/SHOW.PLOT3..1
/TITLE.7/16" X 19 1/16" POISON SHEET 30' 0 DEG. SIDE DROP BENDING STRESS
/GRAPH.LABY.PSI
PLVAR.4
EXTREM.4
/SHOW.PLOT4..1
/TITLE.7/16" X 19 1/16" POISON SHEET 30' 0 DEG. SIDE DROP END REACTIONS
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EXTREM.5.6.1
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/OUTPUT
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NEDO-10084-4
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***** ANSYS OUTPUT DATA LISTING *****

*** ANSYS REV 4.4 38122-PC/LIN-4.4 CP= 7.740 ****
FOR SUPPORT CALL ROBERT QUINN PHONE (408) 281-6151 TWX

NEW TITLE= POISON SHEET 30' DROP ANALYSIS 7/16" X 19 1/16" 0 DEG.

VARIABLE 2 IS 6 UY

VARIABLE 3 IS 11 UX

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

2 DISP	6 UY	6 UY	-0.2170	0.1426E-01	0.9285E-01	0.3867E-01
3 DISP	11 UX	11 UX	-0.1774E-17	0.3121E-01	0.1578E-16	0.3299E-03

VARIABLE 4 IS ELEMENT 5 ITEM 11 NAME= 5 SB

VARIABLE 5 IS REACTION FORCE 1 FY

VARIABLE 6 IS REACTION FORCE 11 FY

SUMMARY OF VARIABLES STORED THIS STEP AND EXTREME VALUES
VARI TYPE IDENTIFIERS NAME MINIMUM AT TIME MAXIMUM AT TIME

4 ESTR	5 11	5 SB	-0.1528E+05	0.3851E-01	0.3482E+05	0.5004E-02
5 RFOR	1 FY	1 FY	-92.48	0.2900E-01	208.0	0.1450E-01
6 RFOR	11 FY	11 FY	-70.96	0.3900E-01	167.7	0.4509E-02

***** ROUTINE COMPLETED ***** CP = 96.230

A-2.10.4 Oblique Drop Evaluation

The drop orientations for which the IF-300 Channelled BWR Fuel Basket have been analyzed are consistent with those employed in the IF-300 18-Cell BWR Fuel Basket design analysis documented in the Volumes 1 and 2 of this report [A-2.10.1-2]. Specifically, the Channelled BWR Fuel Basket is analyzed for the 0°, 45°, and 90° orientation side drops, and the top and bottom end drops. The hypothetical drop accident conditions specified in 10CFR71 [A-2.10.1-1] §71.73(b)(1) requires evaluation of the drop be performed for the orientation for which maximum damage is expected. This has been interpreted to mean that the evaluation of the basket must include consideration of oblique drop orientations and subsequent slap-down. The purpose of this appendix section is to demonstrate that the drop orientations considered in the analysis of the IF-300 Channelled BWR Fuel Basket are more severe than the oblique drop orientations.

1. Evaluation Approach

The IF-300 cask drop decelerations are evaluated for side drops, corner drops, and oblique drops with subsequent slap-down. The drop deceleration values are developed using the program SCANS [A-2.10.1-18], which uses the cask geometry, weight, and impact limiter stiffness to develop decelerations for the cask under a variety of impact angles for a 30 foot drop.

The cask is analyzed for two side drop orientations, 0° and 180°. The 0° orientation is chosen since the 0° orientation side drop analysis resulted in the highest spacer disk stresses of the three side drop cases evaluated in Section A-2.7. The 180° orientation is also considered since the geometry of the basket for the 180° orientation is identical to the geometry for 0° orientation.

The cask is also analyzed for a variety of oblique drops. For the 180° orientation, an evaluation is performed for angles of 15°, 30°, 45°, 60°, and 75° from horizontal. The 15° through 60° orientations include initial impact and subsequent slap-down; the 75° case is the cask corner drop (i.e. cask center of gravity over corner), and no subsequent slap-down is evaluated.

For the 0° orientation, an oblique drop evaluation is performed for an angle of 15° with subsequent slap-down. This impact and slap-down occurs on the valve box fins on the top side of the IF-300 cask body. At angles of 30° or more, the initial cask

impact will be on the cask end fins. The rotation following the initial impact will result in the valve box fins closest to the initial impact end impacting, followed by continuing cask rotation and impact of the other set of valve box fins. This slap-down sequence results in the rotational energy being removed in two impacts instead of one, and therefore it is expected that the resulting decelerations will be less severe than those for the 180° orientation slap-down. Therefore oblique drops for the 0° cask orientation are not evaluated for angles from 30° to 75°.

2. Development of Impact Limiter Stiffness

The force/displacement data for the impact limiters used in the SCANS program is derived based on the energy absorption capability of the IF-300 impact limiter fins. Due to the unsymmetrical nature of the IF-300 cask impact limiter fins, the derivation of the force/displacement data is required for each cask orientation considered.

Since the depleted uranium shield blocks are located at the top end of the basket assembly, the oblique drop is assumed to occur with initial impact on the bottom of the cask with slap-down on the top end. For the 180° orientation, force-deflection curves are developed for the 0°, 15°, 30°, 45°, 60°, and 75° angles of impact with respect to horizontal for the cask bottom impact fins, and for 0° and 15° for the top impact fins. For the 0° orientation, force-deflection curves are developed for the 0° and 15° angles.

The methodology used to derive the force/displacement relationships is the same as that used in Volumes 1 and 2 of this report [A-2.10.1-2]. A summary of the methodology and the application of the methodology to the development of the force-deflection curves for the IF-300 impact limiter fins are provided in the following sections.

1. Force-Deflection Curve Development Methodology

The force-deflection relationships for the various cask orientations are derived from stress-time relationships developed in the Volumes 1 and 2 of this report [A-2.10.1-2]. Fins inclined less than or equal to 10° from the impact surface ($\gamma \leq 10^\circ$) will form a double hinge. All others will form a single hinge ([A-2.10.1-2], p. 5-29). Fins experiencing single hinge bending are assumed

to absorb half the energy of fins in double hinge bending [A-2.10.1-19] and do not experience the peak stresses developed in buckling. The stress in impact limiters experiencing double hinge bending builds to a peak stress of 90 ksi, at which time buckling occurs [A-2.10.1-2]. Following buckling, the impact limiter stress is "governed by the static yield stress" ([A-2.10.1-2], p. V1-15). The static yield stresses for the impact limiter materials are taken as:

$$304SS: S_y = 40 \text{ ksi} \\ ([A-2.10.1-2], \text{ Figure 5})$$

$$216SS: S_y = 50 \text{ ksi} \\ ([A-2.10.1-20], \\ \text{Type XM-17})$$

The force time history provided in [A-2.10.1-2] is converted to a force-deflection curve by multiplying the time at which the stress occurs by the impact velocity. For the 30 foot drop case considered in this analysis, the relative deflection is calculated as:

$$\delta = (V)(t) \\ = (44 \times 12)(t) = 528t \text{ inches}$$

Using this information, the resulting stress-displacement curves for the 304SS and 216SS impact limiter materials are shown in Figures A-2.10.4-1 and A-2.10.4-2, respectively. The forces corresponding to the stresses in Figures A-2.10.4-1 and A-2.10.4-2 are calculated as:

$$F = A\sigma$$

where:

$$A = (L_{eff})(t) \\ L_{eff} = \text{Effective fin width} \\ = (L_i + 2L_o)/3 \quad \text{double hinge bending} \\ \quad \quad \quad ([A-2.10.1-2], \\ \quad \quad \quad \text{p. 5-29}) \\ = L_i \quad \quad \quad \text{single hinge bending} \\ \quad \quad \quad ([A-2.10.1-2], \\ \quad \quad \quad \text{p. 5-39}) \\ L_o = \text{Outer hinge width} \\ L_i = \text{Inner hinge width} \\ t = \text{fin thickness}$$

σ = stress of the fin material corresponding to deflections (Figures A-2.10.4-1 and A-2.10.4-2).

The hinge lengths, L_o , L_i and L_{eff} , are determined based on the cask orientation and fin geometry associated with each drop case, as described in further detail in the following sections.

2. 180° Cask Orientation (Bottom), Oblique Drops

The oblique drop angles considered in the analysis range from 15° to 75°, in increments of 15°. The cask orientation and end impact limiter geometry are shown in Figures A-2.10.4-3 through A-2.10.4-5. The impact limiter angle with respect to horizontal (i.e. the impact angle) is defined by:

$$\tau = \gamma(\phi/90^\circ)$$

where:

γ = Cask angle with respect to vertical
 ϕ = Fin orientation angle, from 0° (impact limiter #1)
 τ = Fin impact angle with respect to vertical

The hinge lengths, and consequently, the energy absorption, depend upon the cask orientation and the fin geometry. Based on the impact limiter geometry, the crush deflection, δ_o , assuming a maximum deflection of $d - 2t$, can be calculated by:

$$\delta_o = (d)\cos(\phi) - 24.75(1-\cos\phi)\sin\gamma$$

The force deflection data for the bottom and top end impact limiters impacting at oblique angles is derived by summing the forces developed by the individual fins at the respective deflections, at which the fins impact.

3. 180° Cask Orientation, 0° Impact

Since the outer radius of the structural rings extends 1" beyond that of the end impact limiters, the four structural rings and the partial structural ring will impact initially,

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and consequently, the first crush increment ($\delta = 0"$ to $1.0"$) will involve only the structural rings. The structural rings are made of 216SS, for which the force-deflection data is derived using the stress-deflection relationship shown in Figure A-2.10.4-2.

For the 0° side drop case, the four structural rings and the partial ring will impact at the same time. Assuming that the load will be distributed equally between all 5 rings, equivalent force-deflection relationships for each end of the cask are calculated assuming the stiffness of the partial ring is distributed equally to each end of the cask. Consequently, the total number of fins per side is assumed to be $2 \frac{1}{2}$.

The effective hinge length, L_{eff} , of the structural rings, shown in Figure A-2.10.4-6, for the 0° orientation is:

$$L_0 = 2(31.75")\sin(\theta_0/2)$$

$$\begin{aligned}\theta_0/2 &= \cos^{-1}[(31.75 - (0.35)(7))/31.75] \\ &= 45.3^\circ\end{aligned}$$

$$L_0 = 24.46"$$

$$L_1 = 2(31.75")\sin(\theta_1/2)$$

$$\begin{aligned}\theta_1/2 &= \cos^{-1}[(31.75 - 7 + 2(1.25))/31.75] \\ &= 61.75^\circ\end{aligned}$$

$$L_1 = 32.59"$$

$$L_{eff} = [2(24.46) + 32.59]/3 = 27.17"$$

The total effective cross-sectional area of the structural fins acting at each end is:

$$A = 2.5(27.17)(1.25) = 85.0 \text{ in}^2$$

The force-deflection data for the 0° cask orientation 0° side drop cases are derived using the stress-deflection relationships shown in Figures A-2.10.4-1 and A-2.10.4-2 for the respective fin material types. All crush increments following the initial crush increment include bending of the cask end impact limiters. Therefore the total energy absorbed in bending is the sum of the energy absorbed by the cask end impact limiters, as

described in Section A-2.10.4.1 previously, and the energy absorbed by the structural rings.

In several cases, a 0° secondary impact angle is used in the SCANS analysis. The SCANS analysis results show that, at shallow angles, the cask tends to pivot about a center of rotation near the bottom of the cask. Consequently, all the structural rings will contribute to the energy absorption associated with the secondary impact. The velocity of the secondary impact consists of translational and rotational components. The effective stiffness provided by each fin is assumed to be proportional to its corresponding impact velocity. Assuming the rotational velocity is dominant, the stiffness associated with each structural ring is assumed to be proportional to the moment arm from the point of rotation. Assuming the point of rotation to be located at the bottom end impact limiter, and that the two structural rings near the top of the cask are fully effective, stiffness contributions, K_n , provided by each ring are:

$$K_n = d/L$$

where:

d = distance from cask top to structural ring n
 L = distance from cask bottom (rotation point) to center of top end valve box span

K_1	=	26.375/174.1875	=	0.151
K_2	=	42.5/174.1875	=	0.244
K_3	=	104.1875/174.1875	=	0.598
K_4	=	166.125/174.1875	=	0.954
K_5	=	182.25/174.1875	=	<u>1.046</u>
ΣK			=	2.993
			=	3.0

The results show that the equivalent stiffness, and consequently the resisting force, of approximately three structural rings is provided for the initial crush increment of the secondary impact. Consequently, the force-deflection data for the secondary impact at the cask top end is derived as described previously, assuming the equivalent of three structural rings exist at the cask top end.

If all of the energy is not absorbed in the initial primary and secondary impacts, the bottom end will impact for a second time. Since an equivalent stiffness of three structural rings is used for the secondary impact at the top end, an equivalent stiffness equal to the balance (i.e. 2 structural rings) will be used to develop the force-deflection data for a secondary impact at the cask bottom end.

4. 0° Cask Orientation Impacts

Since the slap-down effects at shallow angles relative to horizontal vary little from larger angles, as shown for the 180° orientation results, and since at angles larger than 15° the end impact limiters will impact initially, only angles of 0° and 15° from horizontal are considered for the geometry associated with the valve box impact limiters for the 0° cask orientation slap-down analysis. At shallow angles ($\gamma \leq 15^\circ$), only the impact limiters surrounding the valve boxes are assumed to contact the impact surface. Since the top and bottom valve box impact limiter geometry is identical, the same force-deflection data applies to both ends. To simplify the analysis, the energy absorption data for the valve box impact limiters is applied at the location of the cask end impact limiters. This approach will yield conservative results since the moment arm used in the analysis is larger than the actual moment arms, resulting in conservatively large rotational components of the secondary impact velocity.

The impact limiters surrounding the valve boxes consist of two 1½" thick structural fins and several smaller fins attached to the valve boxes (Figure A-2.10.4-6). The outer and inner hinge lengths, and consequently the effective hinge length of the structural fins, remain constant for all angles, γ , considered in this analysis. Therefore, the structural fin hinge lengths are:

$$L_1 = 31.4" + 2(0.35(16")) = 58.0"$$

$$L_o = 31.4" + 2(16" - 2(1.25")) = 42.6"$$

$$L_{eff} = [2(42.6) + 58.0]/3 = 47.7"$$

The hinge lengths of the valve box impact limiters for the angles being considered are given by the equations:

$$L_i = \frac{14.625''}{\sin \gamma}$$

$$L_o = \frac{0.35d}{\sin(90-\gamma)}$$

The maximum possible crush deflection, $\delta_{\max}$, of the valve box impact limiter fins, as shown in Figure 2.10.4-7, is:

$$\delta_{\max} = X_1 + (7.0'' - 2(0.5625''))\sin(\gamma)$$

where:

$$X_1 = Y_1 \sin(90-\gamma) = 3.6'' \sin(90-\gamma)$$

$$Y_1 = 24.7 \tan 5^\circ + \frac{3}{16} + \frac{1.25}{\cos 5^\circ} = 3.60''$$

The valve box impact limiter fins will impact when the outer structural ring has crushed a distance X_1 . The inner structural ring will impact if the crush distance reaches a distance X_2 (Figure A-2.10.4-7) given by the equation:

$$X_2 = Y_2 \sin(90-\gamma) = (3.6 + 14.625 + 3/16 + 24.7 \tan 5^\circ) \sin(90-\gamma)$$

The angle of the valve box impact limiter fins with respect to the impact surface, τ , is given by:

$$\tau = \phi(\gamma/90)$$

The angle of the inner and outer structural rings, τ_{SRI} and τ_{SRO} , with respect to the impact surface are:

$$\tau_{SRI} = |85^\circ - \gamma|$$

$$\tau_{SRO} = |95^\circ - \gamma|$$

Those fins for which the angle τ is less than 10° , are assumed to experience double hinge bending. Those fins for which τ is greater than 10° are assumed to experience single hinge bending.

The valve box impact limiters and structural rings are made of 216SS. Therefore, the force-deflection data are derived using the stress-deflection relationship given in Figure A-2.10.4-2. The resulting force-deflection data used in the SCANS [A-2.10.1-18] program for the 0° cask orientation 0° and 15° impact angles are shown in Figures A-2.10.4-8 and A-2.10.4-9.

3. Oblique Drop Evaluation Results

The resulting maximum decelerations for the side and oblique drops evaluated, accounting for slap-down effects, are reported in Table A-2.10.4-1. The results show that the 0° cask orientation side impact (0° angle with respect to the horizontal) load case imparts the highest deceleration loading to the IF-300 basket assembly, consistent with the basis for the analysis in Section A-2.7. The maximum slap-down decelerations are significantly less than those for the straight side drop. Therefore it is concluded that the side drop decelerations represent a bounding loading condition for the oblique drop slap-down loads, and therefore the basket need not be evaluated for slap-down loads.

Table A-2.10.4-1

Maximum Deceleration Loading

CASK ORIENTATION	IMPACT ANGLE WITH RESPECT TO HORIZONTAL	MAXIMUM DECELERATIONS (in/sec ²)	
		BOTTOM END (PRIMARY IMPACT)	TOP END (SECONDARY IMPACT)
180° (BOTTOM IMPACT)	0°	114.8	114.8
	15°	50.0	67.1
	30°	26.9	67.4
	45°	33.0	67.4
	60°	46.4	32.8
	75°	81.6	N/A
0° (TOP IMPACT)	0°	211.5	211.5
	15°	124.4	124.4

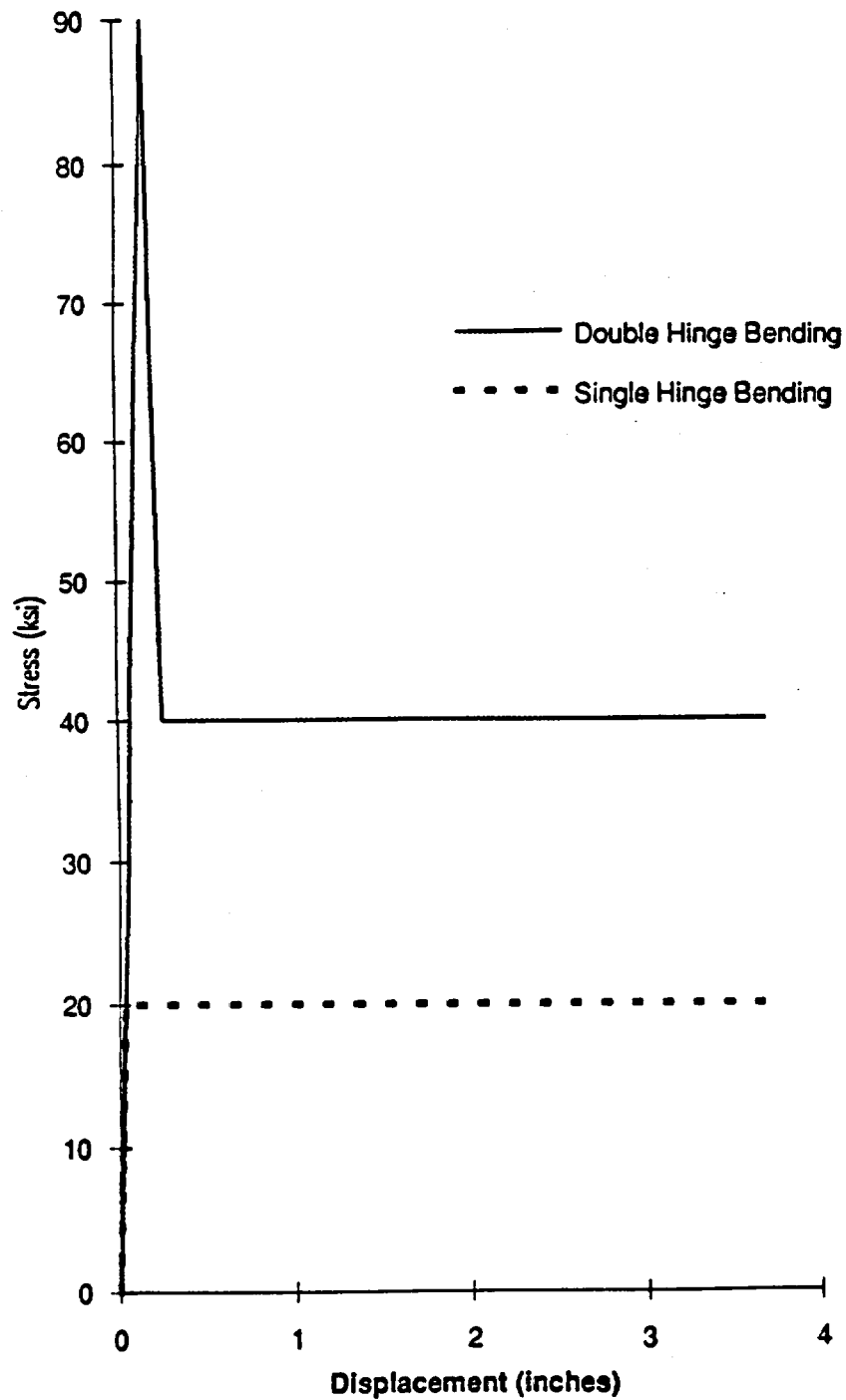


Figure A-2.10.4-1

Stress-Deflection Relationship for 304SS Impact Limiters

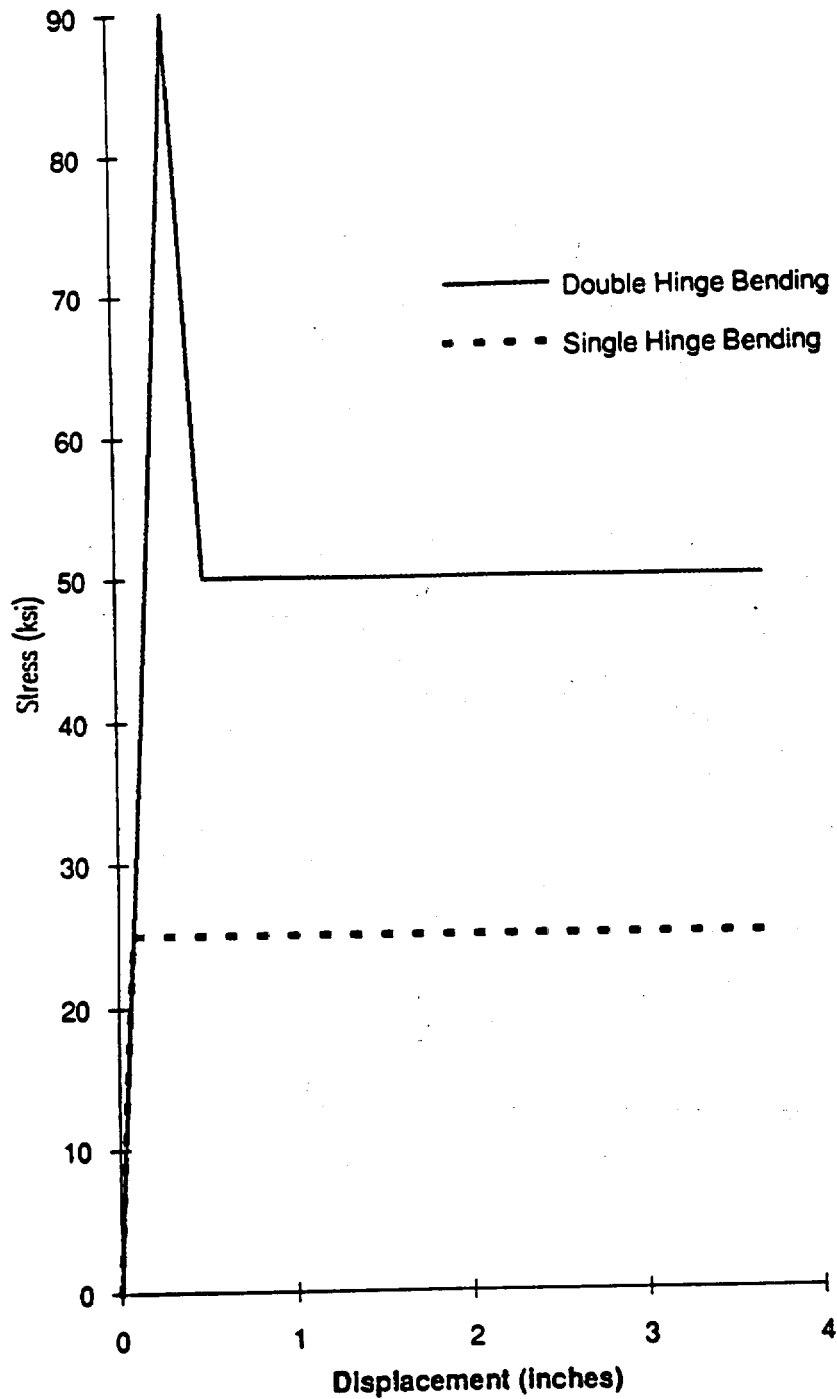


Figure A-2.10.4-2

Stress-Deflection Relationship for 216SS Impact Limiters

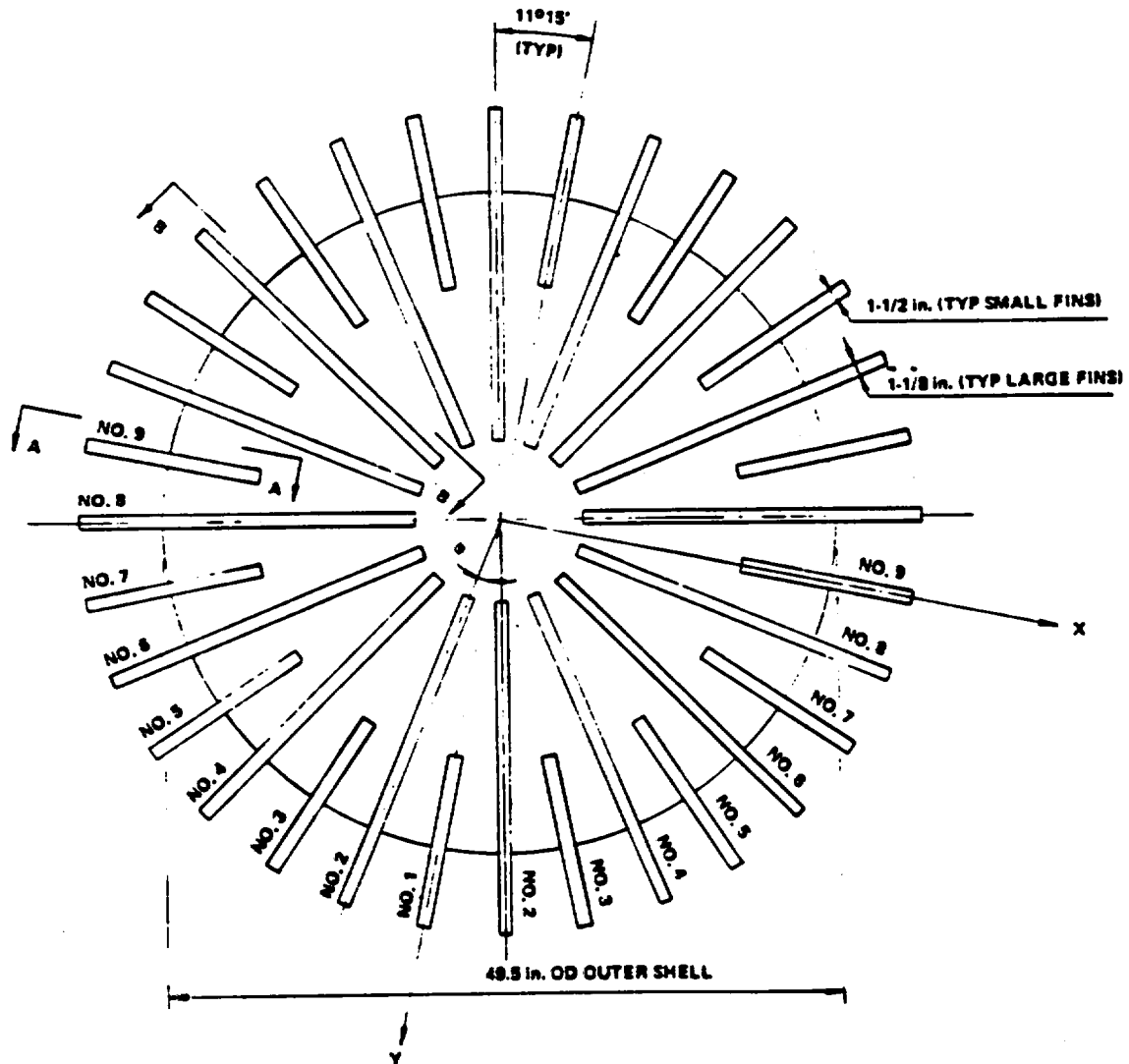


Figure V4-2.10.4-3
End Impact Limiter Orientations

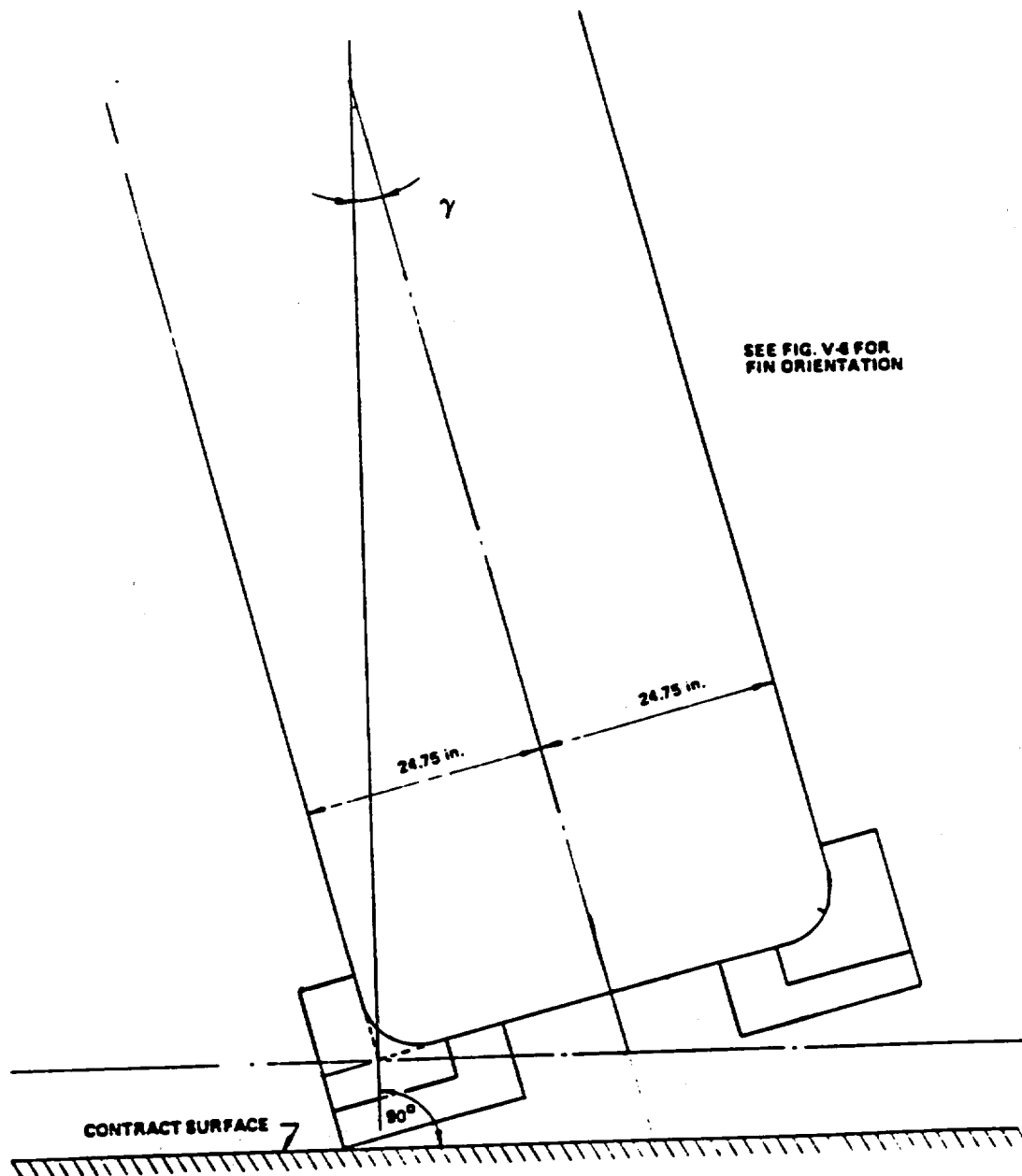


Figure A-2.10.4-4
Cask Orientation for Oblique Drops

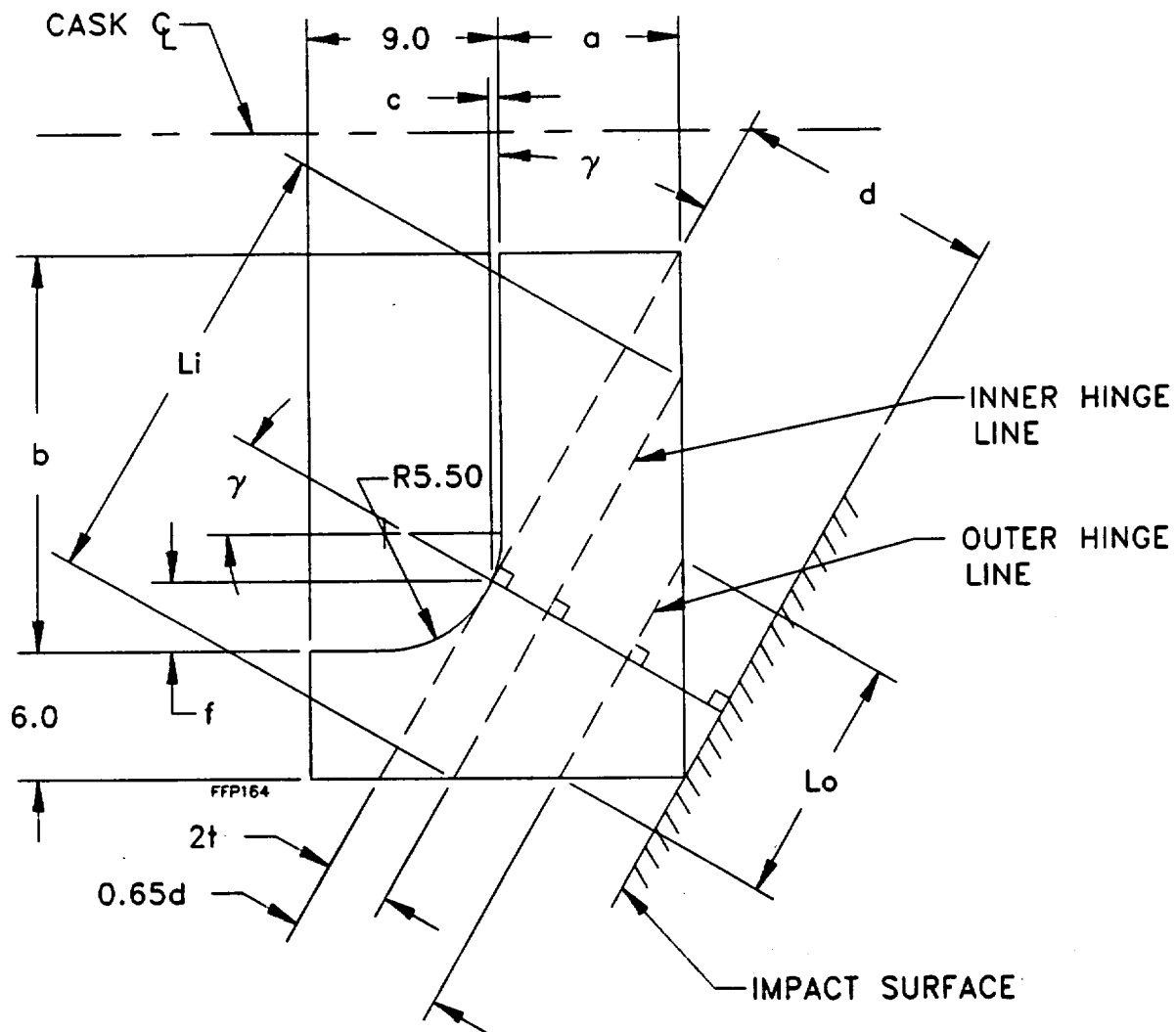


Figure A-2.10.4-5
End Impact Limiter Geometry

FIGURE WITHHELD UNDER 10 CFR 2.390

Figure A-2.10.4-6

Valve Box Impact Limiter Geometry

A-2-335

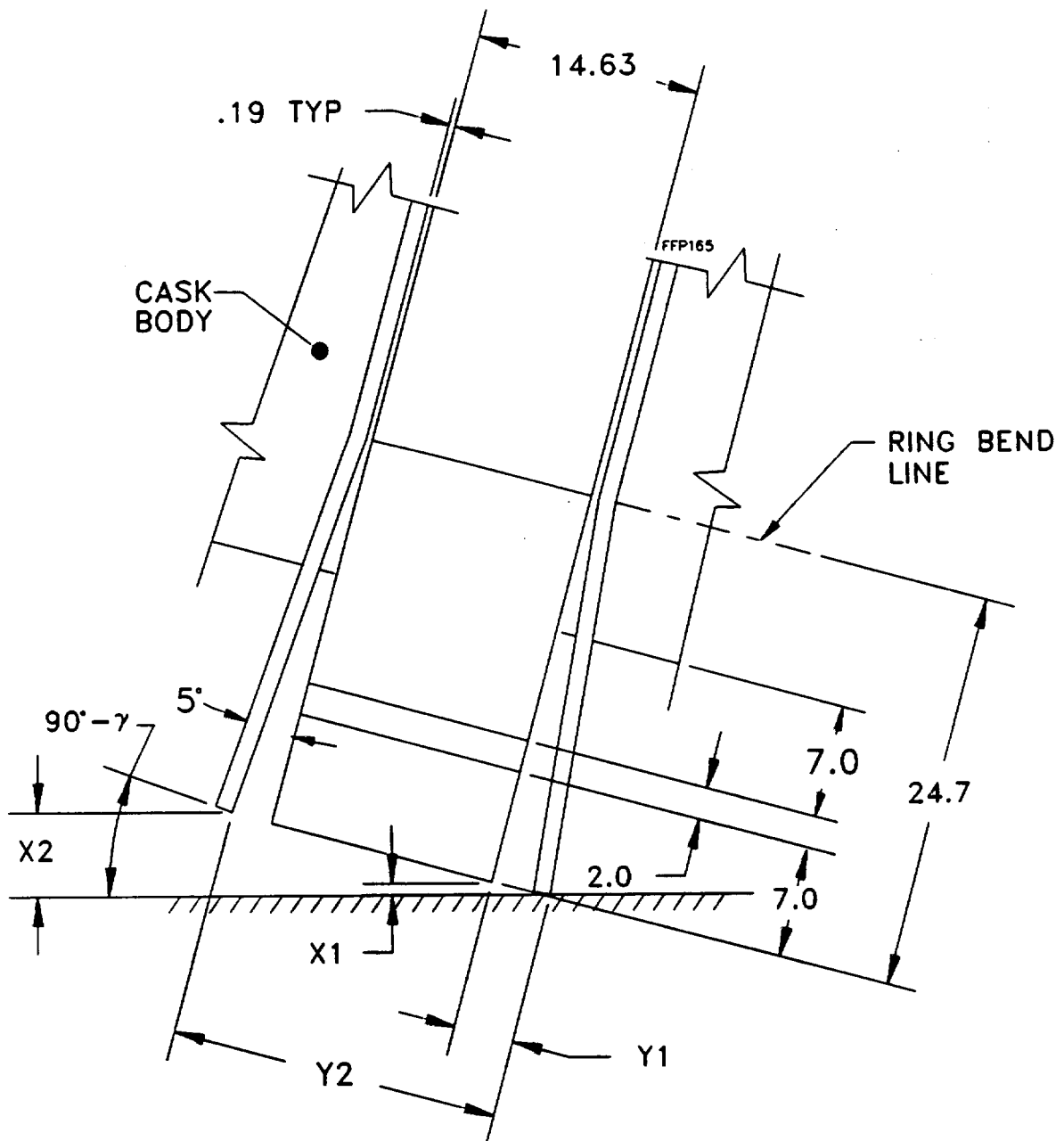


Figure A-2.10.4-7

Valve Box Orientation for Oblique Drop

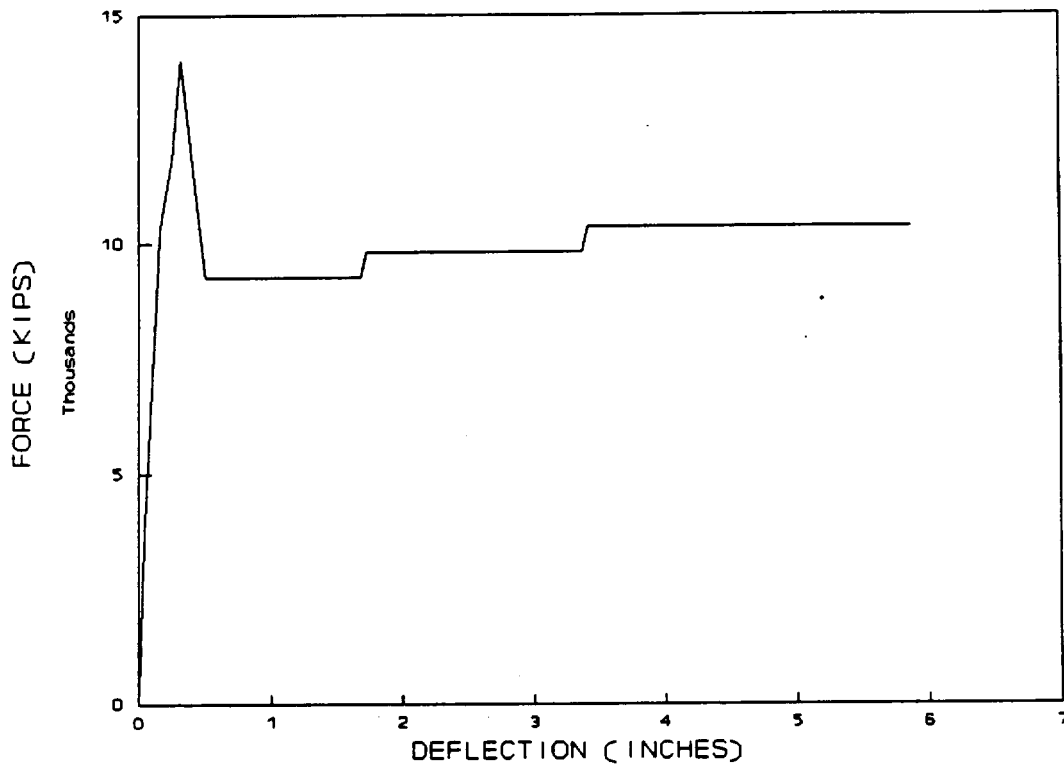


Figure A-2.10.4-8

Force-Deflection Data, Top and Bottom Impact Limiters
0° Cask Angle wrt Horizontal, 0° Cask Orientation

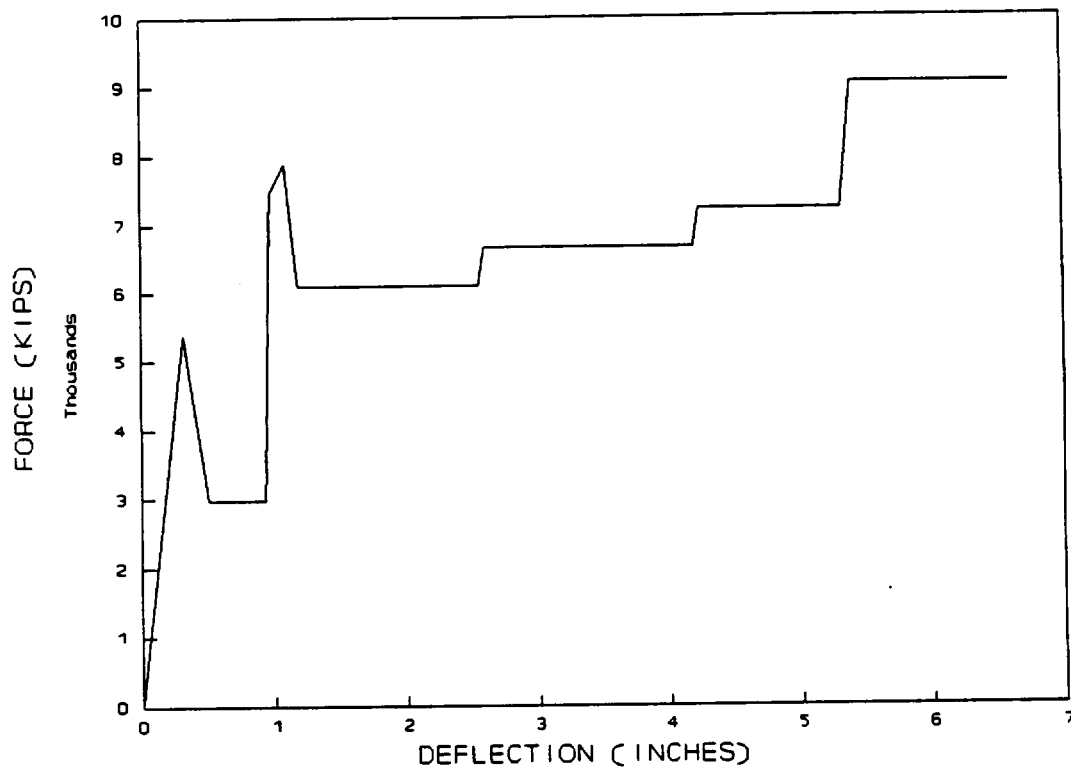


Figure A-2.10.4-9

Force-Deflection Data, Top and Bottom Impact Limiters
15° Cask Angle wrt Horizontal, 0° Cask Orientation

A-3.0

THERMAL EVALUATION

The thermal analyses of the IF-300 shipping cask with the Channelled BWR Fuel Basket is described in this chapter. The Channelled BWR Fuel Basket contains 17 BWR fuel assemblies. The design basis fuel assemblies have a maximum burnup of 35,000 MWD/MTIHM and a total design basis heat load of 40,000 Btu/hr [A-3.6.1-1]. This corresponds to a maximum decay heat rate of 2,353 Btu/hr per fuel assembly.

The controlling thermal analyses presented in this report assume that the IF-300 Cask is used in the "dry" shipping mode [A-3.6.1-1]. The thermal analyses are not based on specific fuels but rather on an enveloping "design basis" configuration that results in an analyzed upper limit on the cask thermal capacity. The cask is intended as a general purpose packaging and, as long as the design basis conditions are not exceeded, will function adequately and safely for any BWR fuel that may be placed in the cavity fuel baskets. As discussed in Chapter A-1.0, the IF-300 Cask body is unaffected by the use of the Channelled BWR Fuel Basket. The purpose of the thermal analyses presented herein is to demonstrate that the IF-300 Cask with the Channelled BWR Fuel Basket provides suitable heat dissipation to maintain the heat removal capacity of the loaded IF-300 Cask.

A-3.1

Discussion

The principal design features and operating characteristics of the IF-300 Cask with the Channelled BWR Fuel Basket are the same as with the 18-Cell BWR Fuel Basket [A-3.6.1-2]. The operations of all the subsystems (i.e., expansion tanks for liquid neutron shield and others) are not affected by the Channelled BWR Fuel Basket.

A-3.1.1

Thermal Design Criteria

The maximum fuel cladding temperature criteria for the design basis BWR fuel is 1200°F which provides sufficient margin to ensure that cladding failure by creep rupture will not occur for all design basis conditions. This 1200°F temperature limit is based on the data presented in Figure A-3.1-1 [A-3.6.1-2]. The minimum cask cavity relief pressure is 350 psig and the design pressure of the IF-300 Cask is 400 psig [A-3.6.1-2]. In addition, the IF-300 Cask neutron shielding cavity is provided with a 200 psig pressure relief valve to provide overpressure protection [A-3.6.1-2]. A minimum cooling time of 3 years is assumed with 35,000 MWD/MTIHM burnup in the analysis to determine the bounding radiological and thermal source strengths in the cask cavity. A maximum

design basis heat load of 40,000 Btu/hr is conservatively used in the thermal analyses. The resulting maximum decay heat rate for the BWR fuel is 2,353 Btu/hr per fuel assembly. To prevent freezing of the neutron shielding water, an antifreeze solution of ethylene glycol, or equivalent, is added to form a 50/50 volume percent mixture for cask operations as low as -40°F ambient. Hence, there is no requirement for minimum heat load in the cask cavity.

A-3.1.2 Design Basis Conditions

Four enveloping conditions of operation are evaluated. The characteristic features of each of these conditions are summarized in Table A-3.1-1. All of the analyses presented are for a total decay heat load of 40,000 Btu/hr and dry shipments with an inert cover gas.

A-3.1.3 Results of Design Basis Thermal Analyses

The analytical results obtained from evaluating the design basis conditions are summarized in Table A-3.1-2. They are based on the use of the thermal analysis modules HTAS1 [A-3.6.1-3] and HEATING6 [A-3.6.1-4] in the SCALE computer program system [A-3.6.1-5] to obtain cask and fuel rod cladding temperature distributions.

Table A-3.1-1

Enveloping Design Basis Thermal Conditions
Operating Condition

<u>Parameter</u>	<u>NOC⁽¹⁾</u>	<u>30-Minute Fire</u>	<u>3-Hour Post Fire</u>	<u>PFE⁽²⁾</u>
Neutron Shielding Cavity Contents	Water	Air	Air	Air
Solar Heat Load	No(3)	No(4)	Yes	Yes
Ambient Temp., °F	130	1,475	130	130

Notes:

1. Normal operating condition.
2. Post fire equilibrium.
3. Cask enclosure in place.
4. Not significant during fire transient.

Table A-3.1-2

Design Basis Thermal Analysis Results

<u>Parameter</u>	<u>NOC</u>	<u>30-Minute Fire</u>	<u>3-Hour Post Fire</u>	<u>PFE</u>
Ambient Temp., °F	130	1,475	130	130
Cavity Heat Load, Btu/hr	40,000	40,000	40,000	40,000
Max. Barrel Centerline Temp., °F	194	1,281	249	215
Max. Outer Shell Centerline Temp., °F	199	497	397	319
Max. Inner Cavity Centerline Surface Temp., °F	207	340	407	327
Max. Cladding Temp., °F	685	<769	769	<769
Maximum Inner Cavity Pressure, psig	30.4	<242	242	<242
Maximum Inner Cavity Pressure with All Fuel Rods Rupture, psig	76	295	295	295

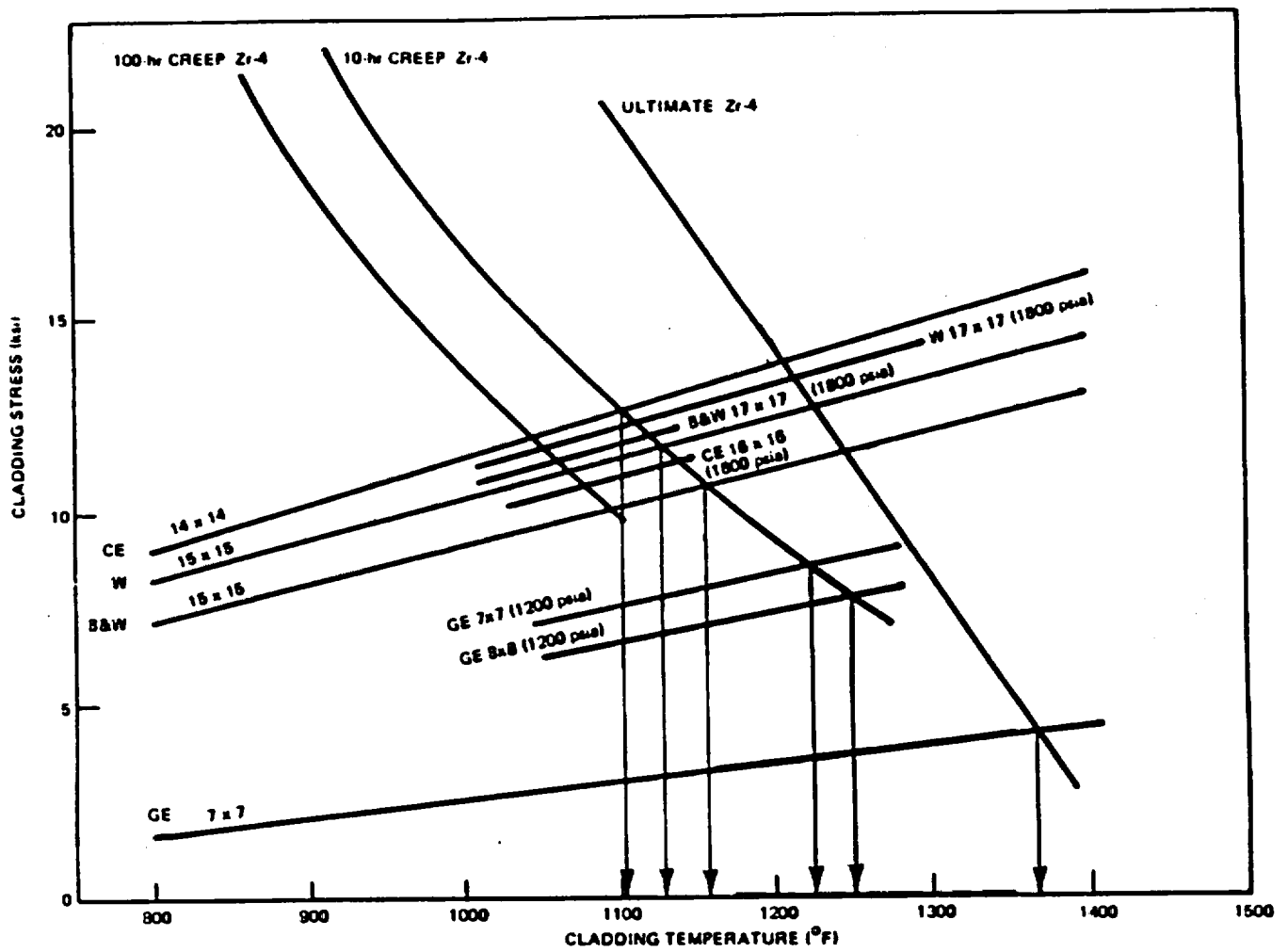


Figure A-3.1-1
Zircaloy Cladding Perforation Temperatures
[A-3.6.1-2]

A-3.2 Summary of Thermal Properties of Materials

The thermal properties of the IF-300 Cask materials used in the HTAS1/HEATING6 modules of the SCALE computer program system are summarized herein. HTAS1 has a built-in library of material properties for various cask materials. The material properties of IF-300 Cask materials are given in Volumes 1 and 2 [A-3.6.1-2]. The material properties given in Volumes 1 and 2 and HTAS1 are compared and in all significant cases bounding values are used in the thermal analyses. Of primary importance to thermal analyses are the four material and surface properties:

K	=	thermal conductivity (Btu/hr-ft-°F)
ρ	=	density (lbm/ft ³)
C	=	specific heat (Btu/lbm-°F)
ϵ	=	surface emissivity

Values of the cask material properties K, ρ , and C are given in Table A-3.2-1 and the values of surface emissivity are given in Table A-3.2-2.

Table A-3.2-1

Material Property Summary

<u>Material Name</u>	<u>Density (lb/ft³)</u>	<u>Trans. Temp. (°F)</u>	<u>Conductivity</u>		<u>Specific Heat</u>		<u>Refs. ⁽ⁿ⁾</u>
			<u>Temp (°F)</u>	<u>(Btu/hr-ft°F)</u>	<u>Temp (°F)</u>	<u>(Btu/lb°F)</u>	
DURANIUM ⁽¹⁾	1190	2070	100	14.3	32	0.0275	2,3
			300	15.9	662	0.035	
			500	17.4	1225	0.048	
			800	19.6			
			1200	22.5			
SST304	491	2552	32	8.1	32	0.12	3
			212	8.7	752	0.135	
			392	8.7			
			572	9.4			
			752	10.0			
			1112	11.0			
XM-19	(4)	2552	100	8.7	(4)	(4)	6
			200	9.3			
			300	9.8			
			400	10.4			
			500	10.9			
			600	11.3			
			700	11.8			
			800	12.2			
H2OCONV ⁽²⁾	60	(6)	150	14.75	32	1.0072	3
			200	17.33	68	0.9986	
			250	19.15	104	0.9978	
			300	20.83	140	0.9992	
			400	23.35	176	1.0021	
					212	1.0068	
					248	1.0149	
					284	1.0228	
					320	1.0369	
					356	1.0548	
					392	1.0758	
					428	1.1009	
					464	1.1357	
					500	1.1818	
					537	1.2437	
					572	1.3678	

Table A-3.2-1

Material Property Summary
(Concluded)

<u>Material Name</u>	<u>Density (lb/ft³)</u>	<u>Trans. Temp. (°F)</u>	<u>Conductivity Temp (°F)</u>	<u>(Btu/hr-ft°F)</u>	<u>Specific Heat Temp (°F)</u>	<u>(Btu/lb°F)</u>	<u>Refs. ⁽⁷⁾</u>
AIRCONV ⁽³⁾	0.059	(6)	(5)	0.1	-6.67	0.24007	3
					83.33	0.24016	
					173.33	0.24095	
					263.33	0.24214	
					353.33	0.24374	
					443.33	0.24584	
					533.33	0.24816	
					623.33	0.25196	
					713.33	0.25396	
					803.33	0.25676	
					893.33	0.25924	
					983.33	0.26215	
					1073.33	0.26495	
					1163.33	0.26774	
					1253.33	0.27035	
					1343.33	0.27264	
					1523.33	0.27701	
ZIRCALOY	(4)	3350	100	6.82	(4)	(4)	7, 13
			200	6.89			
			400	7.11			
			600	7.37			
			800	7.64			
ARGON	(4)	(6)	100	0.0105	(4)	(4)	8
			200	0.0120			
			300	0.0134			
			400	0.0148			
			500	0.0160			
			1,000	0.0215			

FUEL See Section A-3.4.1.2.2

Notes:

1. Depleted Uranium.
2. Water with effective thermal conductivity simulating natural convection.
3. Air with effective thermal conductivity simulating natural convection.
4. Not needed for steady state analysis.
5. Assumed constant.
6. Not applicable.
7. References are A-3.6.1-X, where X = number in this column.

Table A-3.2-2
Emissivity Parameters
Emitter

<u>Condition</u>	<u>Linkage</u>	<u>Emissivity</u> ⁽¹⁾	<u>Ref.</u>	<u>Geometric View Factor</u>	<u>Receptor Absorptivity</u>
Normal (Pre-Fire)	End-to-Ambient	0.84	2	1.0	1.0
	Side-to-Skid/ Ducts	0.83	2	0.55	0.25
	Side-to-Ambient	0.83	2	0.45	1.0
Fire	Ambient-to-All	0.90 (1,475°F)	9	1.0	0.83
Post-Fire and Final	End-to-Ambient	0.83	2	1.0	1.0
	Side-to-Ambient	0.83	2	1.0	1.0
All	Stainless Steel- to-Zircaloy	0.312	10,11	1.0	1.0
	Stainless Steel- to-Ambient	0.587	10	1.0	1.0
	Stainless Steel- to-Stainless Steel	0.415	10	1.0	1.0
	Zircaloy-to- Zircaloy	0.25	11	1.0	1.0
	Zircaloy-to- Ambient	0.40	11	1.0	1.0

Note:

1. Real or effective emissivity.

A-3.3 Technical Specifications of Components

Channelled BWR Fuel Basket contains Type 304, and XM-19 stainless steel, and ASTM A-887 borated stainless steel with transition temperature of 2552°F [A-3.6.1-3]. The Channelled BWR Fuel Basket also contains depleted uranium with transition temperature of 2070°F. The maximum fuel rod temperature criteria for the General Electric BWR fuel is 1200°F [A-3.6.1-2]. The temperatures resulting from 10CFR71 [A-3.6.1-9] normal and accident conditions fall well within the above temperature limits.

The technical specifications of the IF-300 Cask components [A-3.6.1-1 & 2] are not affected by the Channelled BWR Fuel Basket.

A-3.4 Thermal Evaluation for Normal Conditions of Transport

This section presents the thermal analyses of the IF-300 Cask with Channelled BWR Fuel Basket for the enveloping normal conditions of transport. The thermal conditions considered are those specified in 10CFR71, Section 71 [A-3.6.1-9], except that a conservative value of 130°F ambient temperature is used instead of the required value of 100°F. The cask is mounted on the skid in its normal position (horizontal orientation) with natural convection heat transfer on the cask surface. When transported on its skid, the IF-300 Cask is shielded from direct solar heat gain by its retractable enclosure [A-3.6.1-2]. Therefore, the solar insolation during normal conditions of transport need not be included in the analysis.

The inner cask cavity is gas-filled and the neutron shielding cavity is water filled. Heat dissipation is by convection and radiation from the fuel to the cavity walls, conduction through the cask body, convection across the neutron shielding containment, and a combination of natural convection and radiation from the cask exterior to the environment and the skid. The analytical models used in thermal evaluation during normal conditions of transport are described in Section A-3.4.1.

A-3.4.1 Thermal Models

Two thermal models are utilized to perform the thermal analyses of the IF-300 Cask with Channelled BWR Fuel Basket. The first model uses control module Heat Transfer Analysis Sequence Number One (HTAS1) [A-3.6.1-3] and functional module Heat Engineering and Transfer in Nine Geometries (HEATING6) [A-3.6.1-4] in the Standardized Computer Analyses for Licensing Evaluation (SCALE) computer program system [A-3.6.1-5] to calculate the temperature distribution in the IF-300 Cask body

layers for the operating conditions listed in Table A-3.1-1. The second model uses module HEATING6 and the results of the first model as boundary conditions to calculate the detailed temperature distribution in the Channelled BWR Fuel Basket components and the maximum fuel rod cladding temperature.

1. Cask Analytical Model Using HTAS1

The HTAS1 control module was developed for the United States Nuclear Regulatory Commission to perform standardized thermal analyses on a class of nuclear fuel shipping containers which can be modelled by a combination of homogenous, right circular cylinders. HTAS1, a control module in the SCALE package, uses the HEATING6 functional module to perform the prescribed thermal analysis. The nuclear fuel shipping container must be composed of acceptable combinations of zones consisting of cask inner cavity, an inner shell, gamma shielding, an outer shell, a neutron shield, a water jacket, and impact limiters. Thermal properties for the materials in each zone may be extracted from a material property library supplied with the code or may be supplied by the user. The desired thermal analysis of the nuclear fuel shipping container is defined by an analytical sequence composed of one or more of the following calculations chosen in an acceptable order: an initial steady state; a prefire steady state; a fire transient; a post-fire transient; and a final steady state. Each calculation in an analytical sequence specifies the type (steady state or transient), the ambient temperature, the duration of any transient, and the heat transfer mechanisms at the surface of the model. Selected portions of the model (e.g., impact limiters, water in neutron shield during accident) may be deleted at certain points in an analytical sequence to simulate changes in the nuclear fuel shipping container during an analysis. The model and analytical sequence are described to HTAS1 using free-form, keyword-oriented data making extensive use of defaults. The default values are chosen to match those specified by 10CFR71. HTAS1 generates the HEATING6 input data necessary to model each calculation in an analytical sequence and transfers control to the SCALE driver which accesses the HEATING6 functional module to perform the desired analysis. It uses the final temperature distribution from the previous HEATING6 thermal analysis as an initial temperature distribution for the current thermal analysis.

The keywords for the zones of the HTAS1 analytical model of the IF-300 Cask with the Channelled BWR Fuel Basket are shown in Table A-3.4-1. The HTAS1 model of the IF-300 Cask during normal conditions of transport is shown in Figure A-3.4-1. The cask dimensions used in this analysis are the same as those specified in the existing IF-300 Cask Certificate of Compliance [A-3.6.1-1]. The analytical model consists of zones designated as CAVITY, INNER SHELL, SHIELDING, OUTER SHELL, NEUTRON SHIELD, and WATER JACKET as the cask zones.

The CAVITY zone in the model is the cask inner cavity with a heat load of 40,000 Btu/hr under the "DRY" shipping condition [A-3.6.1-1]. The INNER SHELL zone in the model is the cask inner shell modelled as Type 304 stainless steel. The SHIELDING zone is the gamma shielding of IF-300 Cask modelled as depleted uranium. The OUTER SHELL zone in the model is the cask outer shell modelled as Type 304 stainless steel. The NEUTRON SHIELD zone is the neutron shield modelled as water. The WATER JACKET zone is the corrugated metal jacket enclosing the neutron shield modelled as Type 304 stainless steel.

As discussed in the preceding paragraph, the cask inner and outer shell are modelled as Type 304 stainless steel. The cask inner and outer shell are actually fabricated of Types 317 and 216 stainless steel. The difference in thermal properties of the modelled material and the actual material are minimal (less than 2%). Therefore use of the Type 304 stainless steel to model the inner and outer shell is adequate.

The IF-300 cask neutron shield is filled either with water or a 50/50 mix of water and ethylene glycol. The analytical model uses the properties of water for the neutron shield. As discussed in the CSAR [A-3.6.1-2], the difference in thermal distributions between water and a 50/50 water/ethylene glycol mixture is negligible under the dry shipping condition. Therefore the use of the properties of water for the neutron shield is appropriate.

The analytical sequence utilized in HTAS1 for the thermal evaluation for the normal conditions of transport is the PREFIRE case. The thermal analysis of the IF-300 Cask is performed for the design basis normal operating condition described in Section A-3.4, which is the same as PREFIRE case in HTAS1.

The thermal properties of materials utilized in the HTAS1 analytical model zones are taken from Tables A-3.2-1 and A-3.2-2. To account for natural convection from the corrugated surface of the water jacket to the ambient during the PREFIRE case, the following approach is used:

Convection from the corrugated surface of the water jacket cannot be adequately modelled as a fin due to the lack of a radial temperature gradient across the corrugated surface. Therefore the natural convection heat flow as modelled by HTAS1 is given by the correlation:

$$Q_n = h_n (T_s - T_a)^{h_e} A (T_s - T_a)$$

where h_n and h_e are the natural convection coefficient and exponent respectively, A is the surface area, and T_s and T_a are the surface and ambient temperatures. The surface area of the corrugated water jacket is much larger than that of a similar cylinder ($2\pi rL$). The actual surface area of the corrugated water jacket is equal to a constant times that of a cylinder of similar dimensions.

The constant by which h_n is multiplied to account for a corrugated surface is equal to the ratio of the actual length of one period of the corrugation to the axial length. The cask dimensions utilized are taken from Volumes 1 and 2 [A-3.6.1-2]. The axial length of one period is 2.50 inches. The length of one corrugation is equal to twice the straight length plus 360 degrees of the curved portion. The inside radius of the bend is 0.56 inches, and the jacket is .125 inches thick. The average radius is then $.56 + .125/2$ or .6225 inches. The length of the straight portion is .5625 inches. The overall length is then $2\pi(.6225) + 2(.5625) = 5.036$ inches. The value of h_n used in HTAS1 is 0.18. The resulting value of h_n used in the analysis to account for convection from corrugated surface is then:

$$0.18(5.036/2.5) = 0.363 \text{ Btu/hr-ft}^2\text{-}^\circ\text{F.}$$

The geometric view factor from the side of the cask to the skid is 0.55 and the view factor to ambient is 0.45 (Table A-3.2-2). The receptor absorptivity for the skid is 0.25 and for the ambient is 1.0 (Table A-3.2-2). The side emissivity including the corrugated surface is 0.83 (Table A-3.2-2). The

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resulting emissivity from the water jacket during the PREFIRE case (when the cask is on the skid) is then:

$$\epsilon = 0.83 [(0.55)(0.25) + 0.45] = 0.488$$

The IF-300 Cask has fins on the top and bottom cask surfaces. These axial fins are modelled as follows:

The fin geometries on the top and bottom axial surfaces of the IF-300 Cask do not correspond exactly to that of the HTAS1 fin library. The surface area of the fins was calculated in Table A-3.4-2 and an equivalent area was used for a similar fin geometry from the HTAS1 fin library. The fin type used is the straight rectangular cross section fin. The total surface area of the top and bottom fins is 29,694 sq. inches. Therefore, the surface area of the fins used in the analytical model is 14,847 sq. inches at each end.

The fins in HTAS1 are assumed to run the length of the outer shell surface at the end of the cask. The average length of a fin is $2(4\pi r/3)$ or 21.01 inches. The thickness of the fins used in the analytical model is 1.125 inches. The center-to-center spacing of the fins is assumed to be 1.5 inches. The equivalent height of the fin required for the surface area of 14,847 in² is then 9.63 inches.

The following assumptions are used in the cask thermal analysis:

- A. Material thermal conductivities are varied linearly with temperature per Table A-3.2-1.
- B. Surface emittance and absorptance values are held constant per Table A-3.2-2.
- C. The cask is assumed to be horizontal during all analytical sequences.
- D. Thermal radiation between adjacent parallel cask surfaces characterized as infinite parallel surfaces according to the following correlation [A-3.6.1-8]:

$$\epsilon_{\text{effective}} = \frac{1}{[(1/\epsilon_1) + (1/\epsilon_2) - 1]}$$

The input file prepared for the HTAS1 model of the PREFIRE case is listed in Section A-3.6.3. A steady state temperature distribution for the cask was achieved after 12 iterations. The HTAS1 results of this final iteration is also included in Section A-3.6.3.

2. Basket Analytical Model Using HEATING6

The purpose of this analytical model is to perform the thermal analysis of the IF-300 Cask with the Channelled BWR Fuel Basket. The parameters calculated include the peak fuel rod cladding temperature, the spacer disk temperature distribution and the average cask cavity cover gas temperature. These parameters are calculated for the normal conditions of transport described in Section A-3.4.1.

The computer code HEATING6 [A-3.6.1-4] is used to discretely model the IF-300 Channelled BWR Fuel Basket. HEATING6 solves steady-state and/or transient heat conduction problems in one, two, or three dimensional Cartesian or cylindrical coordinates; and is a functional module within the SCALE computer program system [A-3.6.1-5] for performing thermal analyses on problems arising in licensing evaluations of spent fuel shipping casks. The thermal conductivity, density, and specific heat may be both spatially and temperature dependent. The heat generation rates may be dependent on time and position. Boundary conditions which may be applied along surfaces of an analytical model include specified temperatures or any combination of prescribed heat flux, forced convection, natural convection, and thermal radiation. Models are also available to simulate the thermal fin efficiency of certain finned surfaces. In addition, the user may specify radiative heat transfer across gaps or regions which may be embedded in the model. The boundary condition parameters may be time- and/or temperature-dependent. The mesh spacing may be variable along each axis. The input/output features of HEATING6 were designed to be compatible with that of the other functional modules within the SCALE computer program system. HEATING6 may also be used as a stand-alone, heat transfer analysis code. The cask temperatures used as input (applied as constant temperature boundary condition) in this analysis were obtained using the control module HTAS1 within the SCALE computer program system as documented in Section A-3.4.1.1.

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The cask is assumed to be in the horizontal position, with the channelled fuel assemblies resting on the fuel cell openings in the basket spacer disks. To determine the peak fuel rod clad temperature for each case, the HEATING6 code is run with an argon fill gas in the cask, and effective thermal conductivity of the fuel as described in Section A-3.4.1.2.2. Helium, nitrogen, and argon are allowed by the IF-300 Cask Certificate of Compliance [A-3.6.1-1]. Argon has the lowest thermal conductivity as compared to helium and nitrogen. The maximum fuel rod cladding temperatures and temperature distribution in the basket components calculated using argon as the cask cavity cover gas is bounding for helium and nitrogen as the fill gases. The average cask cavity cover gas temperature is calculated by area weighted averaging of the gas temperatures given in the HEATING6 output.

The heat generated in the fuel region was assumed to be transferred to the fuel assembly channel walls by conduction, convection and radiation using the effective fuel thermal conductivity. Heat is transferred through the channels by conduction and radiation only. Any convection heat transfer due to cover gas between the fuel assembly channels and the cask inner cavity is conservatively neglected.

The spacer disk temperature distribution, which is used to determine thermal stresses in the spacer disks and basket, is calculated by replacing the cover gas regions in the analytical model with stainless steel. The key parameter in calculating the thermal stresses is the temperature gradient across the spacer disk. Due to the higher thermal conductivity of steel, the gradients in the cask for the cover gas regions replaced with steel case are smaller than that of the cover gas filled cask. Because the spacer disks are actually bounded by the cover gas on both sides, the actual gradients are greater than that calculated by replacing the cover gas with stainless steel. Therefore, to determine the temperature distribution in the spacer disks, the results of the argon filled and cover gas replaced by steel cases are averaged. This method provides a conservative temperature gradient across spacer disks for the purpose of calculating enveloping thermal stresses.

2. Description of HEATING6 Model of Basket

The input parameters utilized in the HEATING6 analytical model of the Channelled BWR Fuel

Basket are discussed herein. Input listings of the initial runs for the argon filled and argon replaced by steel during loss of mechanical cooling (LOMC) conditions are given in Section A-3.6.2. LOMC case is the same as the normal conditions of transport case described in Section A-3.4. The terminology LOMC is a carryover from earlier work [A-3.6.1-1 & 2], and is used for consistency with the CSAR [A-3.6.1-2] terminology.

The HEATING6 model of the IF-300 Channelled BWR Fuel Basket is shown in Figure A-3.4-2. Because of symmetry, the basket is modelled as a half cylinder. Regions 1 through 11 represent the fuel assemblies, assumed to be homogenized over the insides of the channels using appropriate heat transfer correlations as discussed in Section A-3.4.1.2.2. Regions 14 and 15 represent the neutron poison panels. The edges of the neutron poison panels have been shortened slightly to coincide with the fuel channels to reduce the computer core required by the HEATING6 code while producing conservative results. In addition, the narrow (6.25 and 6.5 inch wide) neutron poison panels are not included in the HEATING6 model of the Channelled BWR Fuel Basket, and are replaced in the model by the cavity cover gas regions. This methodology is conservative for calculating the temperature distribution in the basket components and the maximum fuel rod cladding temperature. The argon cover gas has substantially lower thermal conductivity as compared to the poison panels, resulting in higher resistance to the heat flow out of the fuel regions and increasing the temperature of fuel regions. Regions 16 through 54 represent the Zircaloy channels around the homogenized fuel regions. Regions 101 through 112 represent the outer cavity cover gas regions. Regions 201 through 223 represent the inner cavity cover gas regions, and Regions 301 through 311 represent the cask inner liner.

The outside radius of the cask inner liner is 19.25 inches [A-3.6.1-2], which corresponds to a perimeter of 60.476 inches for the half cylinder. The outside perimeter of the shell regions in the model is:

$$\begin{aligned} P &= 2(2.719 + 6.725 + 5.278 + 3.382 + \\ &\quad 5.358) + 14.888 \\ &= 61.81 \text{ inches} \end{aligned}$$

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which is close to the actual shell perimeter. The thickness of shell regions 303 through 305 and 307 through 309 has been reduced from the 0.5 inch shell thickness to 0.08 inches to reduce the HEATING6 core required. Because temperature gradients across the stainless steel inner shell are very small due to its high thermal conductivity, this change has no impact on the temperature distribution in the basket. The channels are assumed to be centered on and in contact with the bottom edge of the basket spacer disk fuel cell openings, with the fuel assemblies smeared along the inner edge of the channels. The basket is assumed to be centered in the IF-300 Cask. During transport, the basket spacer disks will be resting on the cask inner shell. This assumption results in slight effects on the temperature of regions 101 and 112 and has a negligible impact on the overall results.

2. Fuel Region Thermal Conductivity

The effective thermal conductivity of the fuel assembly inside the channels was determined to account for the different fuel assembly materials (UO_2 , zircaloy and argon), and to include the combined effects of radiation, conduction, and convection. The effective thermal conductivity of the fuel used in the initial run is taken from Reference 11, which gives temperature dependent effective thermal conductivity values within a modelled fuel assembly. These initial values are:

Temperature (°F)	Thermal Conductivity (Btu/min·in·°F)
400	2.222E-03
500	3.056E-03
600	3.611E-03
700	4.444E-03
800	5.278E-03
900	6.389E-03
1000	7.639E-03

The effective thermal conductivities of the fuel assemblies are iterated for each case using the average channel wall temperature, T_w , and the maximum assembly temperature, T_o . The fuel assembly is modelled as a finite heat generating slab of thickness $2a$, surrounded by the channel walls as shown in Figure A-3.4-4.

The temperature difference between the fuel center and the inside of the channel wall is obtained from the correlation [A-3.6.1-12]:

$$T_o - T_s = \frac{q'''a^2}{2k_f}$$

where k_f is the effective fuel thermal conductivity, q''' is the volumetric heat generation rate (9.776E-03 Btu/min·in³ from Section A-3.4.1.2.3), and a is the half-width of the assembly (2.639 inches from Section A-1.3.2). Rearranging, the effective thermal conductivity is given by:

$$k_f = \frac{q'''a^2}{2(T_o - T_s)}$$

The average channel wall temperature is conservatively calculated by averaging the temperatures at the edges of the assembly along the same vertical and horizontal grid lines on which the maximum temperature is determined. The calculation of the effective fuel conductivities for the normal conditions of transport is shown in Section A-3.6.2. The iterated conductivities are then inserted into the HEATING6 input file as a tabular function for the fuel conductivity. Iterations are made until either the peak fuel region temperature converges, or until the peak fuel region temperature decreases with further iterations (producing a conservative result). The resulting converged values of the effective thermal conductivity of the fuel assemblies for the Channelled BWR Fuel Basket arrangement inside the IF-300 Cask cavity are given below, with the associated average channel wall temperature.

EFFECTIVE FUEL THERMAL CONDUCTIVITIES

T_s (°F)	K (Btu/min-in-°F)
473.63	0.002150
473.63	0.002151
542.80	0.001814
542.89	0.001813
552.04	0.002484
552.66	0.002498
629.19	0.004269

629.21	0.004271
655.17	0.005624
655.32	0.005643
683.85	0.012907

3. Decay Heat Generation

The design basis decay heat load in the IF-300 Cask cavity during dry shipment is 40,000 Btu/hr [A-3.6.1-1]. The Channelled BWR Fuel Basket design allows for 17 BWR fuel assemblies, each assumed to have the same decay heat. The active fuel length is conservatively assumed to be 144 inches, and the fuel assembly is assumed to be smeared on the inside of the channel. The channel area from Section 1.3.2 is $(5.278 \text{ in})^2 = 27.857 \text{ in}^2$. The heat generation rate per unit volume per assembly is then:

$$q = \frac{40,000/17}{(144)(27.857)(60)} = 9.776E-03 \text{ Btu/min} \cdot \text{in}^3$$

This is the value used in the HEATING6 Channelled BWR Fuel Basket analytical model for each fuel assembly.

4. Boundary Conditions

The following boundary conditions are used in the analytical model:

- 1) A constant temperature on the outside of the cask inner liner is assumed. The temperature was determined in Section A-3.4.1.1 using HTAS1 with the 40,000 Btu/hr heat load applied as a heat flux in the cask cavity.
- 2) An insulated surface is used on the axis of symmetry and on edges of the cask shell regions which only exist in the model due to the use of rectangular elements in the analytical model to approximate cylindrical geometries.
- 3) A radiation linkage between two parallel zircaloy surfaces is used to model radiation heat transfer between parallel fuel assembly channel surfaces.
- 4) A radiation linkage between a zircaloy and a parallel steel surface is used to

model radiation heat transfer between fuel assembly channels and either poison plate or cask inner shell parallel surfaces.

- 5) A radiation linkage from stainless steel to a gas surface is used to model radiation heat transfer from the poison plates to the surrounding gas regions.
- 6) A radiation linkage between two parallel stainless steel surfaces is used to model radiation heat transfer between poison plates and/or the cask inner shell.
- 7) A radiation linkage from zircaloy to a gas surface is used to model radiation heat transfer from the fuel assembly channels to the surrounding gas regions.

The values of the heat transfer coefficients h_r for the zirconium to zirconium, zirconium to steel, steel to gas and zirconium to gas radiation boundary condition used in the HEATING6 model is calculated as follows:

h_r is equal to the Stephan-Boltzman constant (σ) multiplied by the effective emissivity of the surface [A-3.6.1-4]. The value of σ is equal to $0.173\text{E-}08 \text{ Btu/hr-ft}^2\text{-}^\circ\text{R}^4$ ($2.002\text{E-}13 \text{ Btu/min-in}^2\text{-}^\circ\text{R}^4$) [A-3.6.1-4]. The effective emissivity, ϵ_{eff} between two parallel surfaces is given by,

$$\epsilon_{\text{eff}} = \frac{1}{\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1}$$

where ϵ_1 is the emissivity of one surface and ϵ_2 is the emissivity of the opposing surface.

The emissivity of stainless steel is 0.587 [A-3.6.1-10], and the emissivity of zirconium is 0.4 [A-3.6.1-11]. The gas medium is treated as transparent and its presence in the path of radiation as a participating medium is ignored.

The effective emissivity ϵ_{eff} and the h_r for the zirconium to zirconium radiation boundary condition are then calculated as:

$$\epsilon_{\text{eff}} = 1/((1/0.4) + (1/0.4) - 1) = 0.25$$

and $h_r = \sigma * \epsilon_{\text{eff}} = 2.002\text{E-}13 * 0.25$

$$= 5.005\text{E-}14 \text{ Btu/min-in}^2\text{-}^\circ\text{R}^4$$

The effective emissivity ϵ_{eff} and the h_r for the zirconium to steel radiation boundary condition are then calculated as:

$$\epsilon_{\text{eff}} = 1/((1/0.4) + (1/0.587) - 1) = 0.312$$

and $h_r = \sigma * \epsilon_{\text{eff}} = 2.002\text{E-}13 * 0.312$

$$= 6.246\text{E-}14 \text{ Btu/min-in}^2\text{-}^\circ\text{R}^4$$

The effective emissivity ϵ_{eff} and the h_r for the zirconium to gas radiation boundary condition are then calculated as:

$$\epsilon_{\text{eff}} = 1/((1/0.4) + (1/1.0) - 1) = 0.4$$

and $h_r = \sigma * \epsilon_{\text{eff}} = 2.002\text{E-}13 * 0.4$

$$= 8.008\text{E-}14 \text{ Btu/min-in}^2\text{-}^\circ\text{R}^4$$

The effective emissivity ϵ_{eff} and the h_r for the steel to gas radiation boundary condition are then calculated as:

$$\epsilon_{\text{eff}} = 1/((1/0.587) + (1/1.0) - 1) = 0.587$$

and $h_r = \sigma * \epsilon_{\text{eff}} = 2.002\text{E-}13 * 0.587$

$$= 1.175\text{E-}13 \text{ Btu/min-in}^2\text{-}^\circ\text{R}^4$$

These values of effective emissivities are documented in Table A-3.2-2.

The maximum inner cavity centerline temperature predicted by the HTAS1 model in Section A-3.4.1.1 during normal conditions of transport is 207°F. However, a conservative value of 229°F for the inner shell region is used in this analysis.

Two consecutive analyses were performed for each of the cask cavity filled with argon gas cases before convergence of the maximum fuel temperature was achieved. For the case with the cask cavity cover gas replaced by steel to calculate the spacer disk temperature distribution, the temperature decreased

significantly from the initial to the subsequent analysis. Additional iterations would have resulted in lower fuel temperatures and therefore were not made.

The spacer disk temperature distribution was determined by averaging the temperature distribution obtained using the argon cover gas and the argon replaced by steel cases. The final steady state temperature distribution for these cases is shown in Section A-3.6.3.

The average argon temperature for the normal conditions of transport case is calculated by area weighted averaging of the argon filled cask temperature distribution. This calculation is shown in Section A-3.6.3. The results show that average argon (cover gas) temperature in the cask cavity during normal conditions of transport is 430°F.

3. Test Model

No test model of the IF-300 Channelled BWR Fuel Basket is utilized.

A-3.4.2 Maximum Temperatures

The maximum steady state temperature distribution for the IF-300 Cask body for normal conditions of transport is included in Section A-3.6.3. The maximum centerline inner cavity temperature predicted by the HTAS1 analytical model is 207°F, however a conservative value of 229°F is used in Section A-3.4.1.2 to calculate the maximum fuel rod cladding temperature. The maximum fuel rod cladding temperature for normal conditions of transport is 685°F based on the maximum inner cavity surface temperature of 229°F.

The maximum centerline temperatures for all cask body layers and maximum fuel rod cladding temperature is shown in Table A-3.4-3.

A-3.4.3 Minimum Temperatures

The enveloping analysis performed for the normal conditions of transport is based on a 130°F ambient temperature and a design basis heat load of 40,000 Btu/hr [A-3.6.1-2]. As stated in Volumes 1 and 2 [A-3.6.1-2], the operation of the IF-300 Cask at -40°F would result in fuel cladding temperatures which are significantly reduced (approximately 25%) from those occurring at

130°F. Therefore no further analysis for the fuel cladding is required.

The minimum temperature distribution for the IF-300 Cask with the Channelled BWR Fuel Basket occurs with no decay heat load in the cask cavity (empty basket) and an ambient temperature of -40°F. Since the steady state analysis of these conditions represents a trivial case, no calculations are performed. Instead it is assumed that all cask components would reach -40°F under steady state condition.

Currently, there is no requirement for minimum heat load in the IF-300 Cask cavity for the shipment of an empty IF-300 Cask [A-3.6.1-1]. These requirements are not affected by the Channelled BWR Fuel Basket.

A-3.4.4 Maximum Internal Pressures

Maximum cask internal cavity pressure for the normal conditions of transport is the sum of the cover gas pressure and residual water vapor pressure from water that may remain in the cask after draining operations. The cover gas (argon) pressure is assumed to follow the ideal gas relationship. The average argon temperature is 430°F as calculated in Section A-3.4.1.2. Then the cover gas pressure is given by:

$$P_{gu} = \frac{P_i T_{gu}}{T_i} = \frac{14.7 \times (430+460)}{(460+70)}$$

$$\therefore P_{gu} = 24.7 \text{ psia}$$

The contribution to the cask inner cavity pressure due to residual water vapor pressure is determined using the cask cavity wall temperature. For this evaluation, it is conservatively assumed that the residual water temperature is at the maximum cavity temperature of 229°F. The residual water vapor pressure is [A-3.6.1-13]:

$$P_{vapor} = 20.4 \text{ psia}$$

The total pressure in the cask inner cavity is the sum of the partial pressures, i.e.,

$$\begin{aligned} P_{total} &= P_{gu} + P_{vapor} \\ &= 24.7 + 20.4 = 45.1 \text{ psia} \end{aligned}$$

$$\therefore P_{total} = 30.4 \text{ psig}$$

For the normal conditions of transport, the maximum cask cavity pressure of 30.4 psig is quite low in comparison to the minimum cask cavity relief pressure of 350 psig [A-3.6.1-2].

The maximum cask internal cavity pressure during normal conditions of transport with all the fuel rods ruptured is given in Section A-3.5.4.

A-3.4.5 Maximum Thermal Stresses

Maximum thermal stresses in the Channelled BWR Fuel Basket for normal conditions are provided in Section A-2.6.1.3 of this SAR.

A-3.4.6 Evaluation of Package Performance for Normal Conditions of Transport

The component temperatures and pressures for the IF-300 Cask with Channelled BWR Fuel Basket for normal conditions of transport show that they are all within allowable limits for the respective materials. As an input to Chapter A-2.0, the temperature for any component is a minimum of -40°F with the basket empty (-20°F when combined with other load cases), and a maximum of 229°F for cask inner cavity surface, 199°F for the cask outer shell, and 194°F for the neutron shield water jacket (barrel). The temperature distribution of the spacer disks is presented in Section A-3.4.1.2. The maximum fuel rod cladding temperature is 685°F.

Stresses in the Channelled BWR Fuel Basket are all within allowable limits for normal transport conditions. Details of the stress and fatigue evaluations are provided in Section A-2.6.1.3 of this SAR.

The maximum pressure in the cask cavity is 30.4 psig and the average cover gas temperature in the cask cavity is 430°F.

Table A-3.4-1

Keywords for Zones in HTAS1 Model

<u>Zone Keyword</u>	<u>Material Name</u>	<u>Material Description</u>
CAVITY	N/A	Void
INNER SHELL	SST304	Stainless Steel 304
SHIELDING	DURANIUM	Depleted Uranium
OUTER SHELL	SST304	Stainless Steel 304
NEUTRON SHIELD	H2OCON	Water, effective conductivity simulating natural convection during normal conditions of transport
WATER JACKET	SST304	Stainless Steel 304

Table A-3.4-2

Fin Area Calculations

Top Head Cover Total Fin Area: 15858.25 sq. in.

LARGER FINS

SMALLER FINS

Dimensions, inches

Dimensions, inches

Thick 1.125
Radial (total) 24.625
Radial (leg) 6
Axial (total) 18.5
Axial (leg) 9.5

Thick 1.5
Radial (total) 14.875
Radial (leg) 6
Axial (total) 15
Axial (leg) 6

Areas, sq. in.

Areas, sq. in.

Top 27.70312
Bottom 6.75
Outside 20.8125
Inside 10.6875
Face 287.9375
Face 287.9375

Top 22.3125
Bottom 9
Outside 22.5
Inside 9
Face 143.25
Face 143.25

Total Area: 641.8281 sq. in. Total Area: 349.3125 sq. in.

Bottom Head Total Fin Area: 13836.25 sq. in.

LARGER FINS

SMALLER FINS

Dimensions, inches

Dimensions, inches

Thick 1.125
Radial (total) 24.625⁽²⁾
Radial (leg) 6⁽²⁾
Axial (total) 17
Axial (leg) 8

Thick 1.5
Radial (total) 14.875⁽²⁾
Radial (leg) 6⁽²⁾
Axial (total) 13.5⁽¹⁾
Axial (leg) 4.5⁽¹⁾

Areas, sq. in.

Areas, sq. in.

Top 27.70312
Bottom 6.75
Outside 19.125
Inside 9
Face 251
Face 251

Top 22.3125
Bottom 9
Outside 20.25
Inside 6.75
Face 120.9375
Face 120.9375

Total Area: 564.5781 sq. in. Total Area: 300.1875 sq. in.

Notes:

1. Estimated value based on upper head.
2. Assumed same as upper head.

Table A-3.4-3

Cask Temperatures and Pressures
Normal Conditions of Transport

<u>Value</u>	<u>Parameter, Units</u>
Ambient Air Temperature, °F	130
Maximum Cask Cavity Heat Load, Btu/hr	40,000
Maximum Centerline Water Jacket Surface Temp., °F	194
Maximum Centerline Outer Shell Temperature, °F	199
Maximum Centerline Inner Cavity Surface Temp., °F	207
Maximum Fuel Rod Cladding Temperature, °F	685
Maximum Inner Cavity Pressure, psig	30.4

FIGURE WITHHELD UNDER 10 CFR 2.390

Figure A-3.4-1

HTAS1 Model of IF-300 Cask During
Normal Condition of Transport

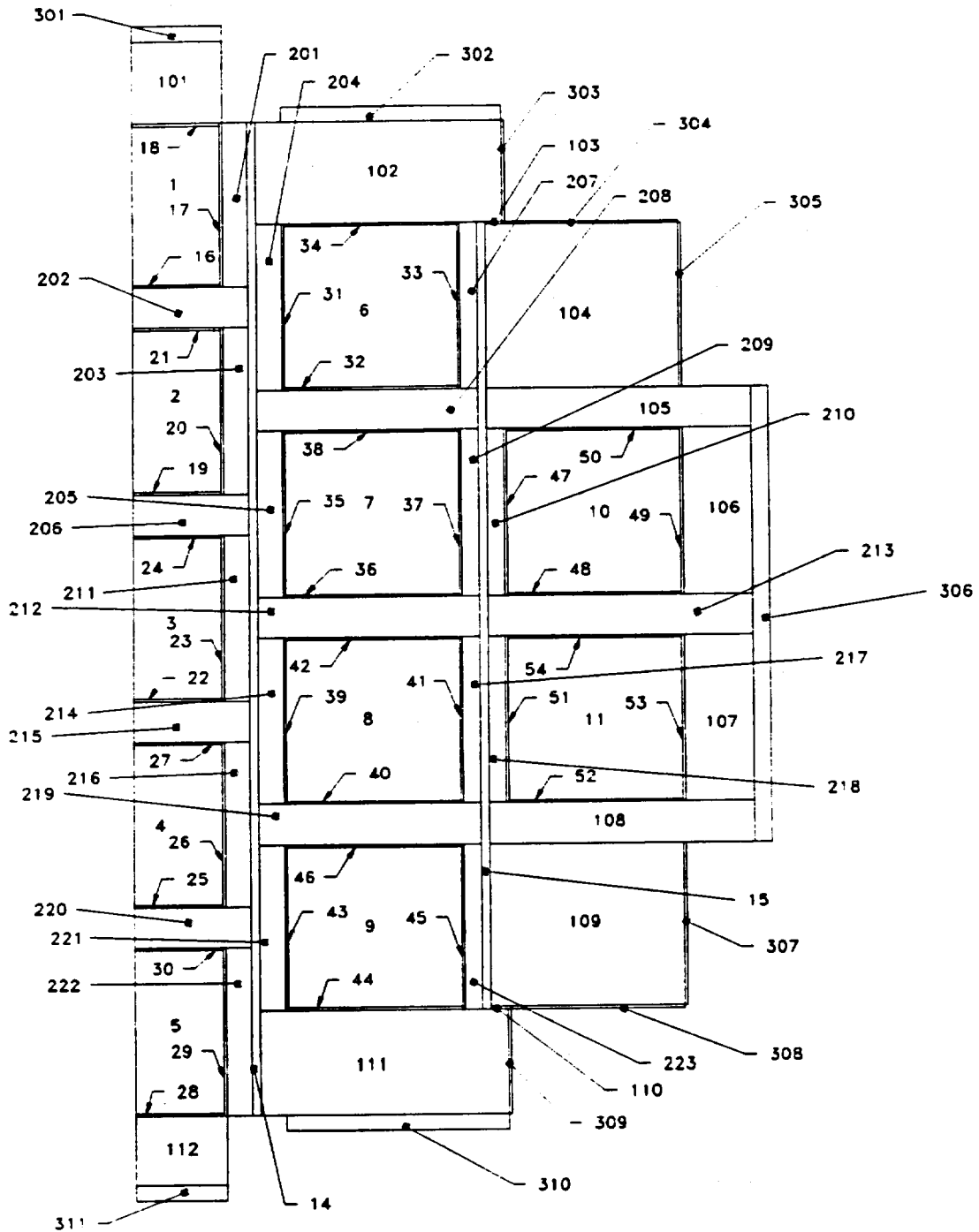


Figure A-3.4-2

HEATING6 Model Regions of IF-300 Channelled BWR Fuel Basket

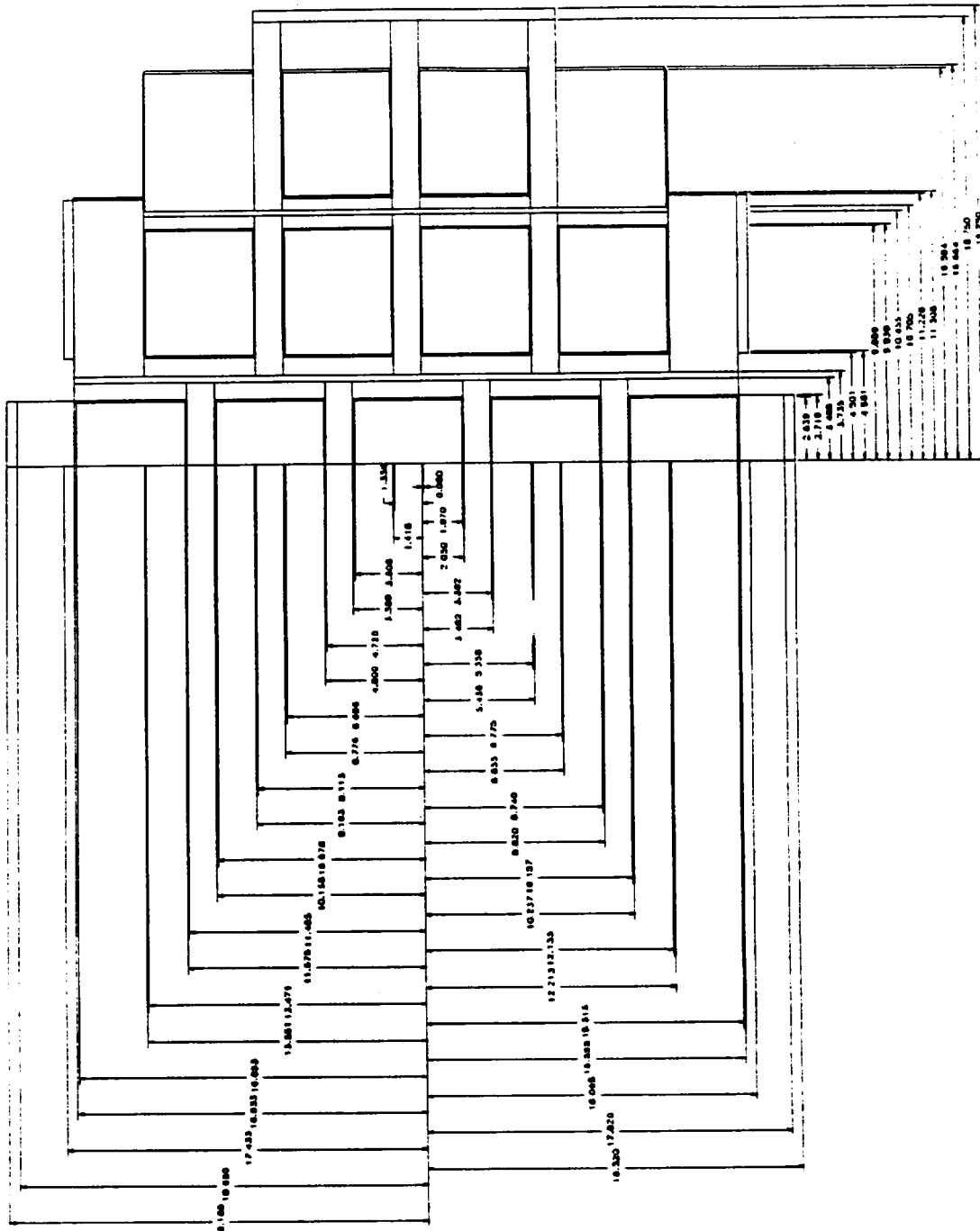


Figure A-3.4-3

HEATING6 Analytical Model Dimensions of
IF-300 Channelled BWR Fuel Basket

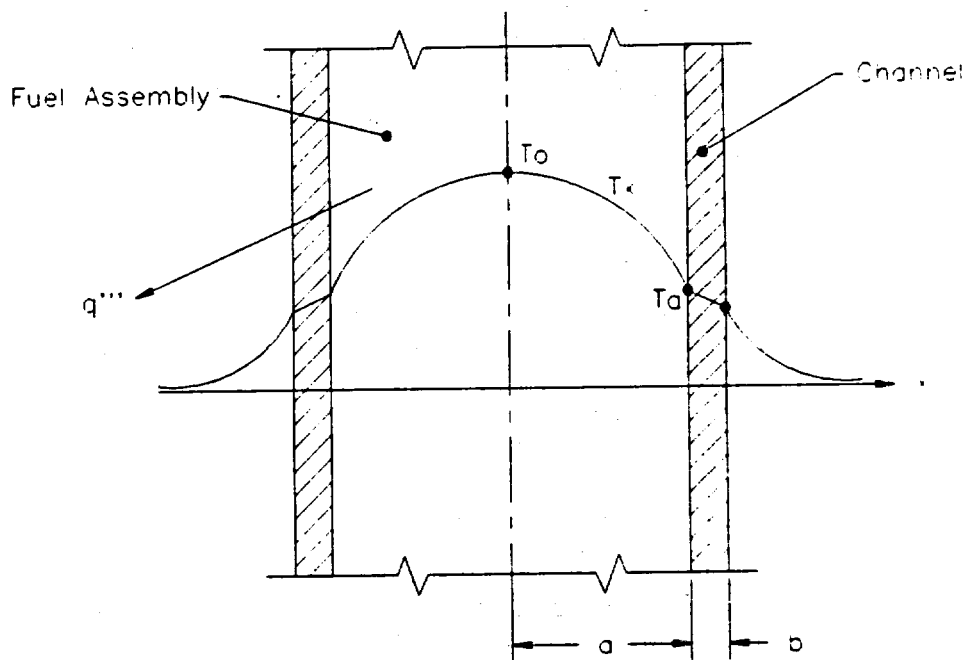


Figure A-3.4-4

Temperature Distribution in a
Heat Generating Slab for Fuel Region

A-3.5 Hypothetical Accident Thermal Evaluation

This section presents the thermal analysis of the IF-300 Cask with Channelled BWR Fuel Basket for the hypothetical accident thermal conditions defined in 10CFR71.73(c) [A-3.6.1-9]. The accident sequence considered is the free drop and puncture tests followed by a 30 minute exposure to a 1475°F fire thermal radiation environment having an emissivity of 0.9, assuming that the cask has an absorption coefficient of 0.83.

The cask is assumed to be separated from the skid. The corrugated barrel surrounding the neutron shielding cavity is assumed to be in place but ruptured due to a drop accident. The cask cavity remains sealed due to the integrity of the closure, valves, and rupture disk [A-3.6.1-2]. It is assumed that the initial temperature distribution within the cask at the start of the fire is the final steady state temperature distribution from the normal conditions of transport case described in Section A-3.4.

After the 30 minute exposure to fire, the cask is then subjected to an ambient temperature of 130°F with a solar heat load of 123 Btu/hr-ft² on the cask surfaces for a period of three hours [A-3.6.1-3 & 9]. This condition, termed the post-fire case, uses the temperature distribution within the cask at the end of the 30-minute fire as the initial temperature distribution.

The cask is allowed to reach the steady state after the three hour postfire case to obtain the final steady state thermal conditions following the accident and exposure to fire. The analytical models used in thermal evaluations during hypothetical accident conditions described above are given in Section A-3.5.1.

A-3.5.1 Thermal Models

Two analytical models similar to those used for the normal conditions of transport described in Section A-3.4.1 were developed to perform the thermal analysis of the IF-300 Cask with Channelled BWR Fuel Basket. The first analytical model uses modules HTAS1/HEATING6 [A-3.6.1-3 & 4] in the SCALE computer program system [A-3.6.1-5] to calculate the temperature distribution in the IF-300 Cask layers for the accident conditions described in Section A-3.5. The second analytical model uses module HEATING6 and the results of the first model as the constant temperature boundary conditions to calculate the detailed temperature distribution within the Channelled BWR Fuel Basket components and the maximum fuel rod cladding temperatures.

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1. Cask Analytical Model Using HTAS1

The HTAS1 analytical model of the IF-300 Cask for the accident sequence is shown in Figure A-3.5-1. The model is exactly the same as that used for the normal conditions of transport (Figure A-3.4-1) except the NEUTRON SHIELD zone is modelled as air (material AIRCONV in Table A-3.2-1). The neutron shield is deleted from the model and replaced with air after the PREFIRE case in HTAS1. To account for radiation linkage between the newly exposed outer shell surface and the corrugated water jacket inside surface, emissivity values of 0.6 and 0.83 respectively are assumed for these surfaces [A-3.6.1-2]. The analytical sequences in HTAS1 applicable for the accident sequence is FIRE, POSTFIRE, and FINAL.

The solar heat load is not applied to the surface of the package during the FIRE transient. A value of 123 Btu/hr-ft² is applied to the cask surface during POSTFIRE and FINAL accident sequences [A-3.6.1-9].

The input file prepared for the HTAS1 model of the accident sequence described above is included in Section A-3.6.2. The HTAS1 results at the end of the 30-minute FIRE transient are also included in Section A-3.6.3 and summarized in Table A-3.5-1. The average values for cask surfaces tabulated are the averages along the length of the cask surface. The results show that the air filled neutron shield water jacket (barrel) acts as a thermal radiation barrier, thus limiting the heat input to the cask body from the fire.

The maximum centerline temperature at the end of the 30-minute FIRE transient is 340°F. The average cavity surface temperature over the entire cavity length and over the active fuel length portion of the fuel assembly is 386°F and 366°F, respectively.

The most limiting thermal conditions experienced by the cask internals are in the period following the 30-minute fire. The limiting nature of this analysis is due to the corrugated barrel of the empty neutron shield water jacket. This structure, which acts as a barrier to external thermal radiation during the fire, acts as an insulator to internal heat dissipation after the fire.

The HTAS1 results for the POSTFIRE sequence are summarized in Table A-3.5-2. The results show that the maximum cavity surface temperature of 656°F

occurs in the corner of the cavity at 50 minutes into the FIRE transient (20 minutes into the POSTFIRE sequence). The maximum centerline temperature for the cask inner cavity surface at that time is 405°F and the average cavity surface temperature is 464°F. The average cavity surface temperature over the active fuel length portion of the fuel assembly is 437°F. To calculate the maximum fuel rod cladding temperature during the POSTFIRE conditions, a conservative value of 454°F is used. The maximum centerline temperature of 407°F for the cask inner cavity surface occurs at 60 minutes into the FIRE transient (30 minutes into the POSTFIRE sequence). The average cavity surface temperature over the entire cavity length and over the active fuel length portion of the fuel assembly at this time is 463°F and 436°F, respectively.

The centerline cavity surface temperature at the end of the 3 hours and 30 minutes FIRE transient (3 hours after the fire) is 393°F. The maximum cavity surface temperature is 412°F. The average cavity surface temperature over the entire cavity length and over the active fuel length portion of the fuel assembly is 400°F and 401°F, respectively. The HTAS1 results at 50 minutes, 60 minutes, and 3 hours 30 minutes into the FIRE transient (20 minutes, 30 minutes, and 3 hours into the POSTFIRE sequence) are shown in Section A-3.6.3.

The temperature distribution at the end of the 3 hour POSTFIRE transient is used as an input to calculate the final steady state thermal conditions following the accident and exposure to fire (FINAL sequence in HTAS1).

The HTAS1 results for the FINAL sequence are summarized in Table A-3.5-3. The results show that the post-accident final steady state is reached after 11 iterations. The results of the final steady state temperature distribution for the post-accident conditions are included in Section A-3.6.3. The results show that the centerline cavity surface temperature is 327°F which is also the maximum cask cavity surface temperature. The centerline shell temperature is 319°F which is also the maximum shell temperature and the centerline neutron shield water jacket (barrel) surface temperature is 215°F which is also the maximum surface temperature.

2. Basket Analytical Model Using HEATING6

The purpose of this analytical model is to perform the thermal analyses of the IF-300 Cask with Channelled BWR Fuel Basket for the accident conditions described in Section A-3.5. The parameters calculated include the peak fuel rod cladding temperature, the spacer disk temperature distribution, and the average cavity cover gas temperature.

The computer code HEATING6 [A-3.6.1-4] is used to model the BWR basket. The HEATING6 model is exactly the same as that used for the evaluation of normal conditions of transport shown in Figures A-3.4-2 and A-3.4-3. All the modeling assumptions, methods for calculating effective fuel thermal conductivity, spacer disk temperature distribution and average cavity cover gas (argon) temperatures are exactly the same as the normal conditions of transport described in Section A-3.4.1.2. The only difference is the use of 453.7°F as the constant temperature boundary conditions on the cask inner cavity surface instead of the 229°F used during normal conditions of transport. The results of Section A-3.5.1.1 using the HTAS1 control module during FIRE, POSTFIRE, and FINAL accident sequences show that the maximum average cavity surface temperature over the active fuel length portion of the fuel assembly is 437°F occurring at 20 minutes into the 3 hour POSTFIRE analytical sequence (50 minutes into the FIRE transient). In the HEATING6 model, a conservative value of 453.7°F is used.

The HEATING6 results obtained using this temperature for the cask inner cavity surface will give bounding results for the FIRE and FINAL steady state accident sequence.

The HEATING6 input file using argon as the cask cavity cover gas during accident conditions is included in Section A-3.6.3. The results of the analysis show that the maximum fuel rod cladding temperature is 769°F and the average argon cover gas temperature is 580°F. Also, the steady state temperature distribution convergence is obtained after the 8th iteration. The steady state temperature distribution is included in Section A-3.6.3.

3. Test Model

No test model of the IF-300 Channelled BWR Fuel Basket is utilized.

A-3.5.2 Package Conditions and Environment

The limiting accident sequence considered for the cask thermal evaluation is the free drop and puncture tests followed by a 30 minute 1,475°F fire with a 3 hour post fire transient followed by a final post accident steady state condition.

The IF-300 Cask with the Channelled BWR Fuel Basket is assumed to be separated from the skid. The corrugated water jacket surrounding the neutron shielding cavity is assumed to be in place but ruptured due to the cask drop accident. The cask inner cavity remains sealed due to the integrity of the closure, valves, and rupture disk. The liquid neutron shield (water) is assumed to be lost and air is assumed to be present in the neutron shield cavity. The results of the analysis show that the IF-300 Cask internals experience the most limiting thermal conditions during the 3-hour post-fire transient as shown in Section A-3.5.1.

A-3.5.3 Package Temperatures

The results of Section A-3.5.1 show that the maximum inner cavity surface temperature is 656°F and occurs during the 3 hour period following the fire transient. The maximum shell temperature is 1,096°F and occurs at the end of the 30 minute fire transient. The maximum water jacket temperature is 1,315°F and occurs at the end of the 30 minute fire transient. The maximum fuel rod cladding temperature during any of the accident conditions is 769°F and occurs during the 3 hour post-fire period. These results are shown in Tables A-3.5-1, A-3.5-2, and A-3.5-3.

A-3.5.4 Maximum Internal Pressures

The maximum cask internal pressure for the accident conditions is calculated by the same methods used for the normal conditions of transport documented in Section A-3.4.4, except it is conservatively assumed that 100% of fuel rods release their fission and fill gases into the cask cavity. The total internal cavity pressure is then the sum of cover gas (argon) pressure, residual water vapor pressure and the fuel rod residual fission and fill gas pressure.

The cover gas pressure is assumed to follow the ideal gas relationship. The maximum average argon temperature

during the accident conditions as calculated in Section A-3.5.1.2 is 580°F. The cover gas pressure is given by:

$$P_{\text{gas}} = \frac{P_1 T_{\text{gas}}}{T_1} = \frac{14.7 \times (580+460)}{(460+70)}$$

$$= 28.8 \text{ psia}$$

The contribution to the cask inner cavity pressure due to residual water vapor pressure is determined using the centerline cavity temperature at the end of the 3 hour post fire transient of 393°F (Section A-3.5.1.1). The residual water vapor pressure is 228 psia [A-3.6.1-13].

The fuel rod residual gas pressure is calculated by first determining the free volume in the cask internal cavity as follows:

For the worst case accident, it is assumed that all of the fuel rods rupture and that all of the residual gases in the fuel rods are released into the free volume of the cask cavity. The residual gases are assumed to include the helium fill gas and gaseous fission products. The volume occupied by the gases is equal to the cask cavity volume minus the volume of the basket with fuel assemblies. The volume of the cask internal cavity is 115.2 ft³. The volume of 17 fuel assemblies with channels is 24.0 ft³. The volume of spacer disks, support rods and poison plates is 10.9 ft³. The volume of depleted uranium shield blocks and lifting lug assemblies is 0.6 ft³. The volume occupied by gases (free volume in cask cavity) is then 115.2-24.0-10.9-0.6 = 79.7 ft³.

The fuel rod helium fill gas is assumed to fill the annulus between the fuel and the cladding, and the plenum at 5 atmospheres at 60 °F. The I.D. of the cladding is 0.451 inches, the O.D. of the fuel pellet is 0.410 inches, and the length of the plenum is 9.48 inches [A-3.6.1-14]. The volume of helium in each fuel rod is then:

$$V = 150 \left(\frac{\pi}{4} \right) (0.451^2 - 0.410^2) + 9.48 \left(\frac{\pi}{4} \right) 0.451^2 = 5.67 \text{ in}^3$$

The number of moles of helium in each rod is then:

$$n = \frac{PV}{RT} = \frac{5 \times 14.7 \times 5.67}{10.73 (460+60) 12^3} = 4.323 \text{E-5 moles}$$

The volumes of the fission products in each fuel assembly at STP (32°F and 1 atm), interpolated for a maximum burnup of 35 GWD/MTU, neglecting tritium, are 19.3 liters (.682 ft³) of krypton-85 and 180.5 liters (6.374 ft³) of xenon-131 [A-3.6.1-15]. The number of moles of fission products in each fuel assembly is therefore:

$$n = \frac{PV}{RT} = \frac{14.7 \cdot (.682 + 6.374)}{10.73(32 + 460)} = .0196 \text{ moles}$$

The total number of moles of gas in the fuel assemblies is then equal to:

$$n = 17[(.0196) + 62(4.323E-5)] = 0.379 \text{ moles}$$

The average temperature of argon in the cask cavity is 580°F from Section 3.5.1.2. The cask pressure increase due to the rupture of the fuel rods is then equal to:

$$P = \frac{nRT}{V} = \frac{.379 \cdot 10.73(460 + T)}{79.7} \text{ psia}$$

$$P = \frac{.379 \cdot 10.73(460 + 580)}{79.7}$$

Pressure due to fuel rod gas $P = 53.1$ psi.

The maximum cask internal pressure for accident conditions is then:

$$28.8 + 228 + 53.1 = 309.9 \text{ psia} = 295.2 \text{ psig}$$

For the accident conditions, the maximum cask cavity pressure at 295.2 psig is less than the minimum cask cavity relief pressure at 350 psig [A-3.6.1-2].

For the normal conditions of transport, the pressure in the cask cavity is 45.1 psia (Section A-3.4.4). If it is assumed that all of the fuel rods rupture during the normal conditions of transport and the residual gases in the fuel rods are released in the free volume of the cask cavity, then the maximum cavity pressure will increase. Using the same methodology as the accident case described above, the cavity pressure increase due to the release of the residual gases is calculated as follows:

The average temperature of the argon cover gas in the cask cavity during the normal conditions of transport is calculated in Section A-3.4.1.2 to be 431°F. Using this temperature, the pressure increase due to the fuel rod residual gas release in the cask cavity is 45.5 psi. This will result in

total pressure of 90.6 psia (45.1 + 45.5) in the cask cavity during normal conditions of transport for the rupture of all fuel rods accident.

A-3.5.5 Maximum Thermal Stresses

Maximum thermal stresses in the Channelled BWR Fuel Basket for accident conditions are provided in Section A-2.7.3.3 of this CSAR.

A-3.5.6 Evaluation of Package Performance for Hypothetical Accident Thermal Conditions

The results of the thermal evaluation of the IF-300 Cask with Channelled BWR Fuel Basket show that none of the temperatures in the accident sequence exceed temperature limitations of the cask and basket materials. The liquid neutron shield is assumed to be lost during the accident but the cask inner cavity remains intact. The maximum fuel rod cladding temperature is also well below the temperature limit at which cladding failure by creep rupture would be predicted. The maximum internal pressures in the cask cavity also are below the set points of rupture disks and relief valves. Therefore, the cask cavity will not release its contents to the environment or lose containment function for the postulated accident sequence.

Table A-3.5-1

Cask Body Temperatures and Pressures -
End of 30 Minute Fire Transient

<u>Cask Layer</u>	<u>Maximum Centerline Temperature (°F)</u>	<u>Maximum Temperature (°F)</u>	<u>Average Temperature Over the Entire Surface (°F)</u>	<u>Average Temperature Over the Active Fuel Lgth. (°F)</u>
Inner Cavity Surface	340	535	386	366
Outer Shell	497	1,096	773	N/A
Barrel	1,281	1,315	1,287	N/A

<u>Parameter, units</u>	<u>Value</u>
Ambient Air Temperature, °F	1,475
Maximum Cask Cavity Heat Load, Btu/hr	40,000
Maximum Inner Cavity Pressure Due to Argon and Residual Water, psig	< 242
Maximum Pressure Rise From All the Fuel Rods Rupture, psi	< 53
Maximum Total Accident Pressure in the Cask Cavity, psig	< 295
Maximum Fuel Rod Cladding Temperature, °F	< 769