APPLICANT'S EXHIBIT 39

GE Nuclear Energy

990-2174

DEC 1 4 ...

December 11, 1992

To: Dr. Stephen Tumminelli
     Manager, Engineering Mechanics
     GPU Nuclear Corporation
     1 Upper Pond Road
     Parsippany, NJ 07054

Subject: Sandbed Local Thinning and Raising the Fixity Height Analyses (Line
            Items 1 and 2 in Contract # PC-0391407)

Dear Dr. Tumminelli:

The attached letter report documents the results of subject analyses. The original purchase order called for the analyses to be conducted on a spherical panel model rather than on the full pie slice model. However, the results are more useful when conducted on the full pie slice model since in that case no interpretation is required regarding the relationship between the spherical panel results and the pie slice model results. The pie slice model we have used in these studies has the refined mesh in the sandbed region.

A 3.5" PC Disk containing three ANSYS input files (0.636" case, 0.536" case and 1 foot wall case) is also enclosed with this letter. The detailed calculations have been filed in Chapter 10 of our Design Record File No. 00664.

This transmittal completes the scope of work identified in the subject PO. If you have any questions on the above item, please give me a call.

Sincerely,

H.S. Mehta, Principal Engineer
Materials Monitoring & Structural Analysis Services
Mail Code 747; Phone (408) 925-5029

Attachment: Letter Report

cc: D.K. Henrie (w/o Attach.)
      J.M. Miller (w/o Attach.)
      S. Ranganath (w/o Attach.)

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990-2174

LETTER REPORT ON ADDITIONAL SANDBED REGION ANALYSES

1.0 SCOPE AND BACKGROUND

Structural Analyses of the Oyster Creek drywell assuming a degraded thickness of 0.736 inch in the sandbed region (and sand removed) were documented in GENE Report Numbers 9-3 and 9-4. A separate purchase order was issued (Contract # PC-0391407) to perform additional analyses. The PO listed the additional analyses under two categories: Line Item 001 and Line Item 002. This letter report documents the results of these analyses.

The additional analyses are the following:

(1)   Investigate the effect on the buckling behavior of drywell from postulated local thinning in the sandbed region beyond the uniform projected thickness of 0.736" used in the above mentioned reports (Line Item 001).

(2)   Determine the change in the drywell buckling margins when the fixity point at the bottom of the sandbed is moved upwards by ≈ 1 foot to simulate placement of concrete (Line Item 002).

The original PO called for the Line Item 001 analyses to be conducted on a spherical panel. The relative changes in the buckling load factors were to be assumed to be the same for the global pie slice model. However, the mesh refinement activity on the global pie slice model and the availability of work station, has given us the capability to conduct the same analyses on the global pie slice model itself, thus eliminating the uncertainties regarding the correlation between the panel model and the pie slice model.

All of the results reported in this report are based on the pie slice model with a refined mesh in the sandbed region.

2.0 LINE ITEM 001

Figure 1a shows the local thickness reductions modeled in the pie slice model. A locally thinned region of ≈ 6"x12" is modeled. The thickness of this region is 0.636" in one

case and 0.536" in the other case. The transition to the sandbed projected thickness of 0.736" occurs over a distance of 12" (4 elements).

The various thicknesses indicated in Figure 1a were incorporated in the pie slice model by defining new real constants for the elements involved. The buckling analyses conducted as a result of mesh refinement indicated that the refueling loading condition is the governing case from the point of view of ASME Code margins. Therefore, the stress and buckling analyses were conducted using the refueling condition loadings. The center of the thinned area was located close to the calculated maximum displacement point in the refueling condition buckling analyses with uniform thickness of 0.736 inch. Figure 1b shows the location of the thinned area in the pie slice model.

2.1 0.536 Inch Thickness Case

Figures 2 through 5 show the membrane meridional and circumferential stress distributions from the refueling condition loads. As expected, the tensile circumferential stress (Sx in element coordinate system) and the compressive meridional stress (Sy in element coordinate system) magnitudes in the thinned region are larger than those at the other edge of the model where the thickness is 0.736 inch. However, this is a local effect and the average meridional stress and the average circumferential stress is not expected to change significantly.

Figures 6 and 7 show the first buckling mode with the symmetric boundary conditions at both the edges of the model (sym-sym). This mode is clearly associated with the thinned region. The load factor value is 5.562. The second mode with the same boundary conditions is also associated with the thinned region. Figure 8 shows the buckled shape. The load factor value is 5.872.

Next, buckling analyses were conducted with the symmetric boundary conditions specified at the thinned edge and the asymmetric boundary conditions at the other edge (sym-asym). The load factor of the first mode for this case was 5.58. Figure 9 shows the buckling mode shape. It is clearly associated with the thinned region. Figure 10 shows the buckled mode shape with asymmetric boundary conditions at the both edges (asym-asym). As expected, the load factor for this case is considerably higher (7.037).

-2-

Thus, the load factor value of 5.562 is the lowest value obtained. The load factor for the same loading case (refueling condition) with a uniform thickness of 0.736" was 6.141. Thus, the load factor is predicted to change from 6.141 to 5.562 with the postulated thinning to 0.536".

2.2 0.636 Inch Thickness Case

Figures 11 through 14 show the membrane meridional and circumferential stress distributions from the refueling condition loads. As expected, the tensile circumferential stress (Sx in element coordinate system) and the compressive meridional stress (Sy in element coordinate system) magnitudes in the thinned region are larger than those at the other edge of the model where the thickness is 0.736 inch. However, this is a local effect and the average meridional stress and the average circumferential stress is not expected to change significantly.

Figures 15 and 16 show the first buckling mode with the symmetric boundary conditions at both the edges of the model (sym-sym). This mode is clearly associated with the thinned region. The load factor value is 5.91.

Next, buckling analysis was conducted with the symmetric boundary conditions specified at the thinned edge and the asymmetric boundary conditions at the other edge. The load factor of the first mode for this case was 5.945. Figure 17 shows the buckling mode shape. It is clearly associated with the thinned region. Based on the results of 0.536" case, the load factor for asym-asym case is expected to be considerably higher.

Thus, the load factor value of 5.91 is the lowest value obtained. The load factor for the same loading case (refueling condition) with a uniform thickness of 0.736" was 6.141. Thus, the load factor is predicted to change from 6.141 to 5.91 with the postulated thinning to 0.636".

2.3 Summary

The load factors for the postulated 0.536" and 0.636" thinning cases are 5.562 and 5.91, respectively. These values can be compared to 6.141 obtained for the case with a uniform sandbed thickness of 0.736 inch.

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3.0 LINE ITEM 002

The objective of this task was to determine the change in the drywell buckling margins when the fixity point at the bottom of the sandbed is moved upwards by ≈ 1 foot to simulate placement of concrete. The elements in the sandbed region are approximately 3-inch square. Thus the nodes associated with the bottom four row of elements (nodes 1027 through 1271, Figure 18) were fixed in all directions.

The buckling analyses conducted as a result of mesh refinement indicated that the refueling loading condition is the governing case from the point of view of ASME Code margins. Therefore, the stress and buckling analyses were conducted using the refueling condition loadings. Figure 19 through 22 show the membrane meridional and circumferential stress distributions from the refueling condition loads. Figure 23 shows the calculated average values of meridional and circumferential stresses that are used in the buckling margin evaluation.

Figure 24 shows the first buckling mode with sym-sym boundary conditions. The load factor for this mode is 6.739. The load factor with asym-sym boundary conditions is 6.887 and the mode shape shown in Figure 25. It is clear that the sym-sym boundary condition gives the least load factor. Figure 26 shows the buckling margin calculation. It is seen that the buckling margin is 5.3% compared to 0% margin in the base case calculation.

To summarize, the load factor changes to 6.739 for the refueling condition when the fixity point at the bottom of the sandbed is moved upwards by ≈ 1 foot. This results in an excess margin of 5.3% above that required by the Code.

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GPU Nuclear

Calculation Sheet

Subject		Calc No.		Rev. No.	Sheet No.
Oyster Creek Drywell					of
Originator	Date	Reviewed by			Date
M. Yekta	11/23/92				

Proposed Local Thining in the Refined Global Pie Slice

CASE (2)	CASE (1)
0.836°	0.736°
0.686°	0.711°
0.636°	0.686°
0.586°	0.661°
0.536°	0.636°
0.536°	0.636°
0.586°	0.661°
0.636°	0.686°
0.686°	0.711°
0.736°	0.736°

B.C. Line

FIGURE 1a

980-2174
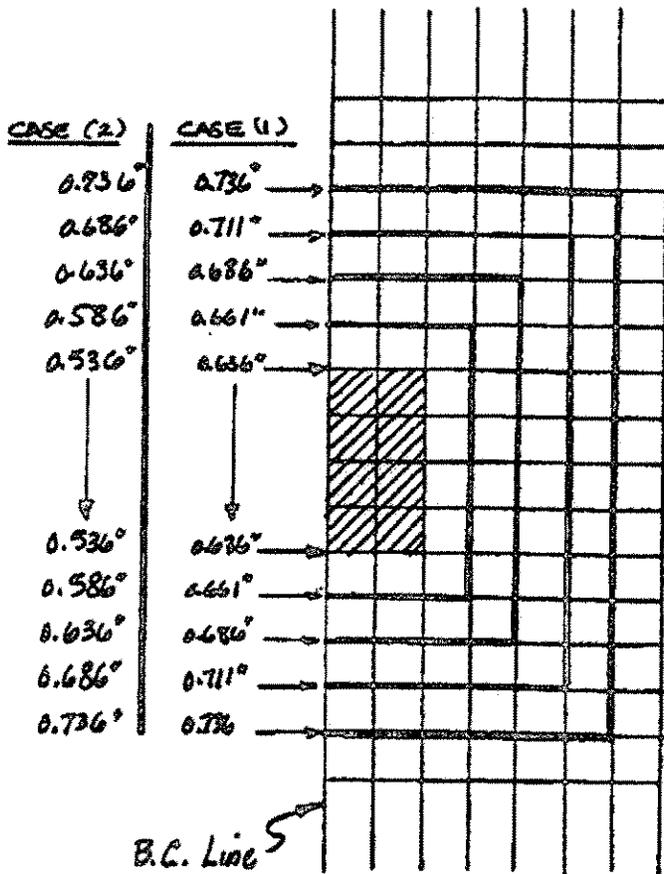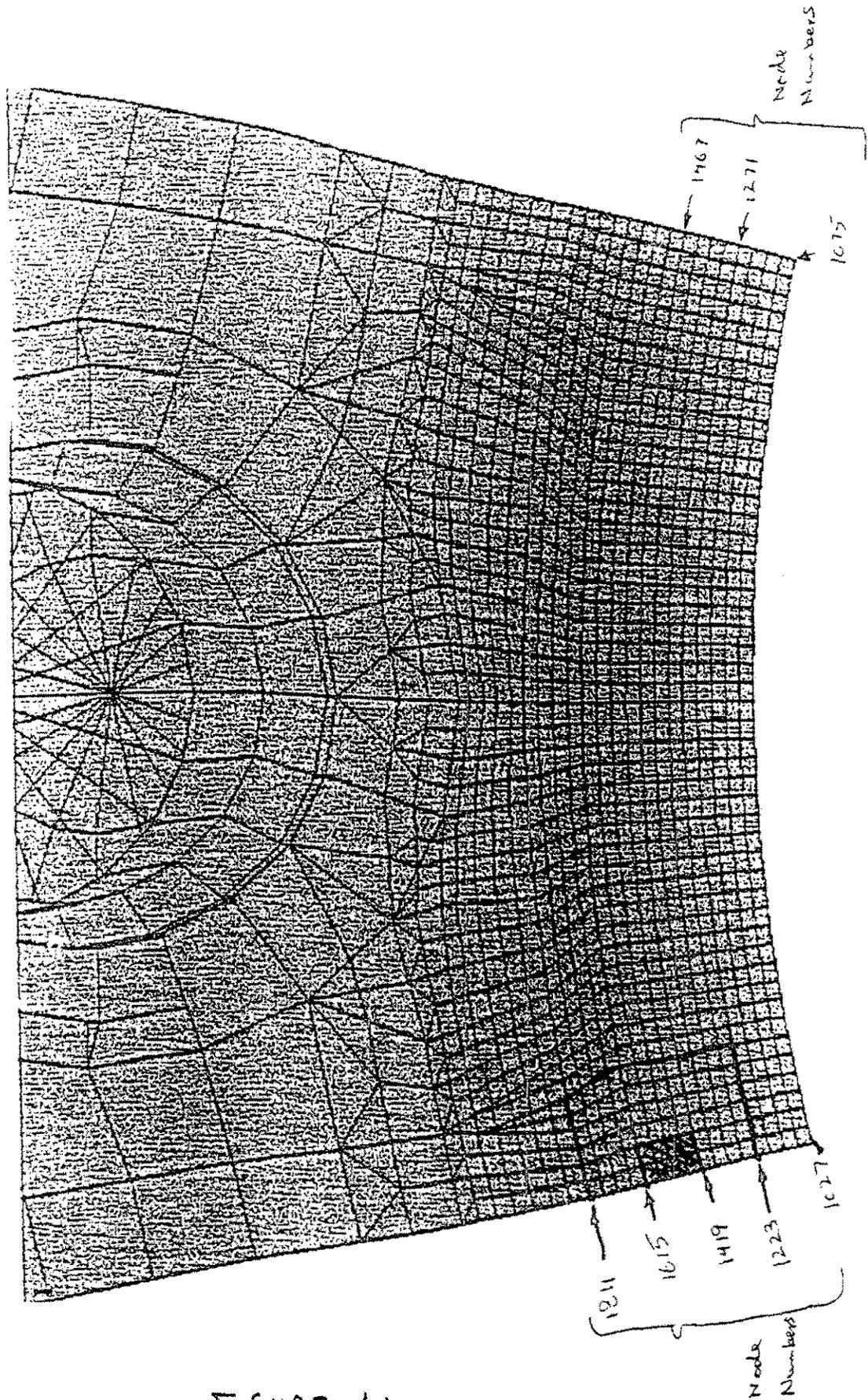
FIGURE 1b

990-2174

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SMN =-3561
SMX =7614

XV =1
YV =-0.8
DIST=718.786
XF =303.031
ZF =639.498
ANGZ=-90
CENTROID HIDDEN
  -3561
  -2319
  -1078
  163.887
  1406
  2647
  3889
  5131
  6372
  7614

OYSTER CREEK DW ANALYSIS - OCRFTH1 (NO SAND, REFUELING)

FIGURE 2

980-2174
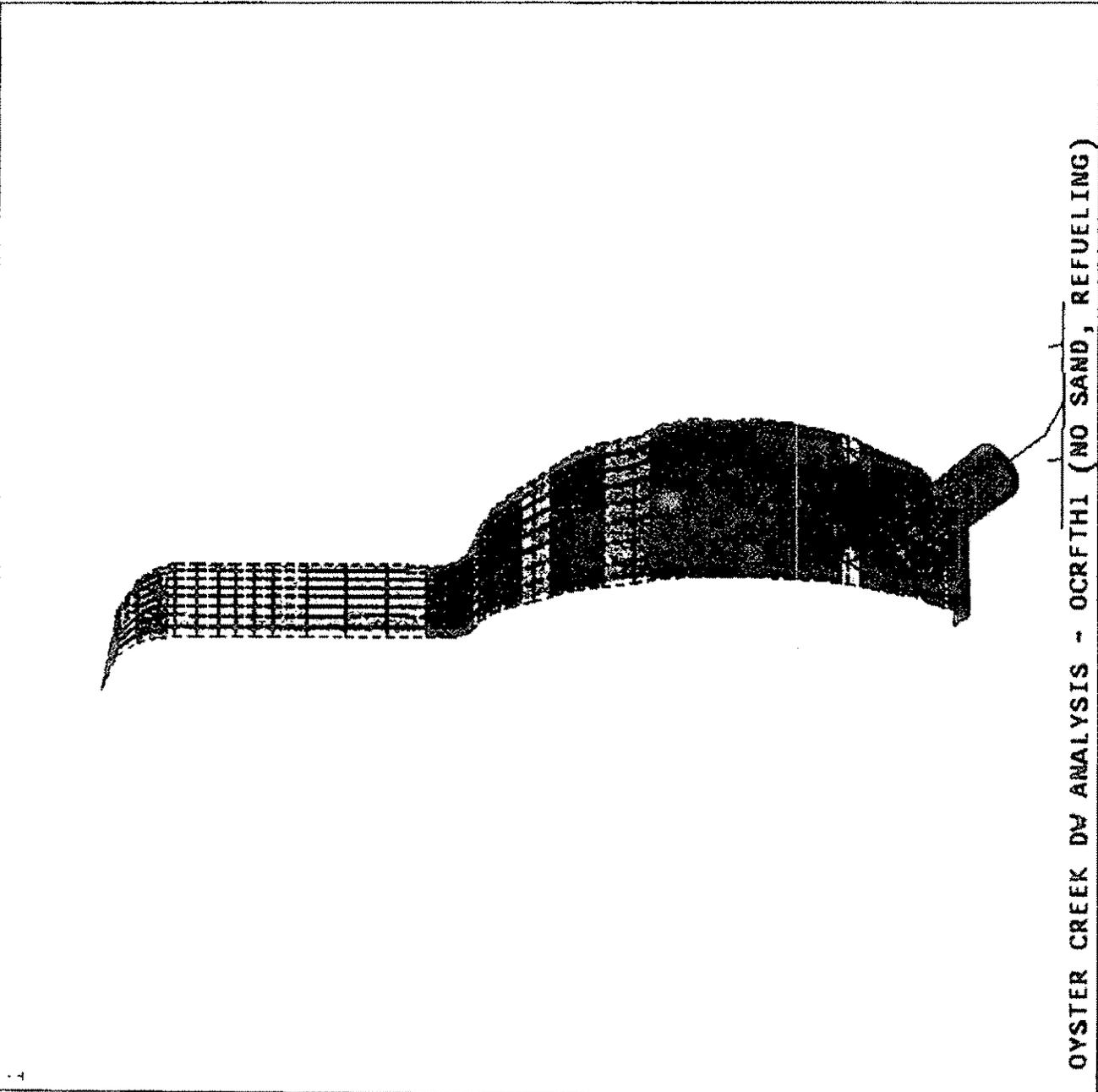
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SMX =7614

XV =1
ZV =-1
*DIST=121.539
*XF =46.39
*YF =-1.382
*ZF =382.857
ANGZ=-90
CENTROID HIDDEN

-3561
-2319
-1078
163.887
1406
2647
3889
5131
6372
7614

OYSTER CREEK DW ANALYSIS - OCRFTH1 (NO SAND, REFUELING)

FIGURE 3

990·2174
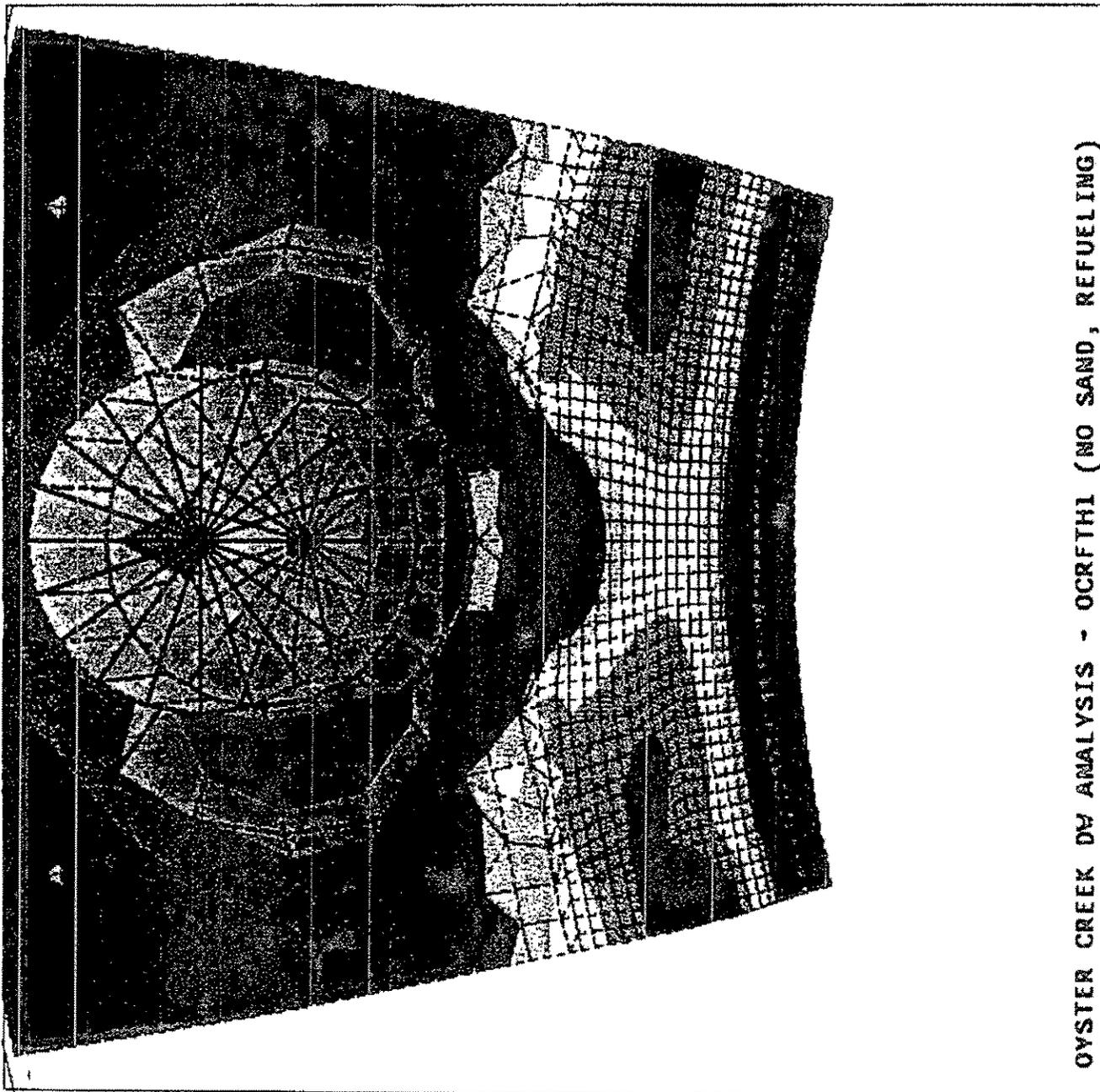
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SMX =701.049

XV =1
YV =-0.8
DIST=718.786
XF =303.031
ZF =639.498
ANGZ=-90
CENTROID HIDDEN

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-7577
-6395
-5212
-4030
-2847
-1664
-481.591
701.049
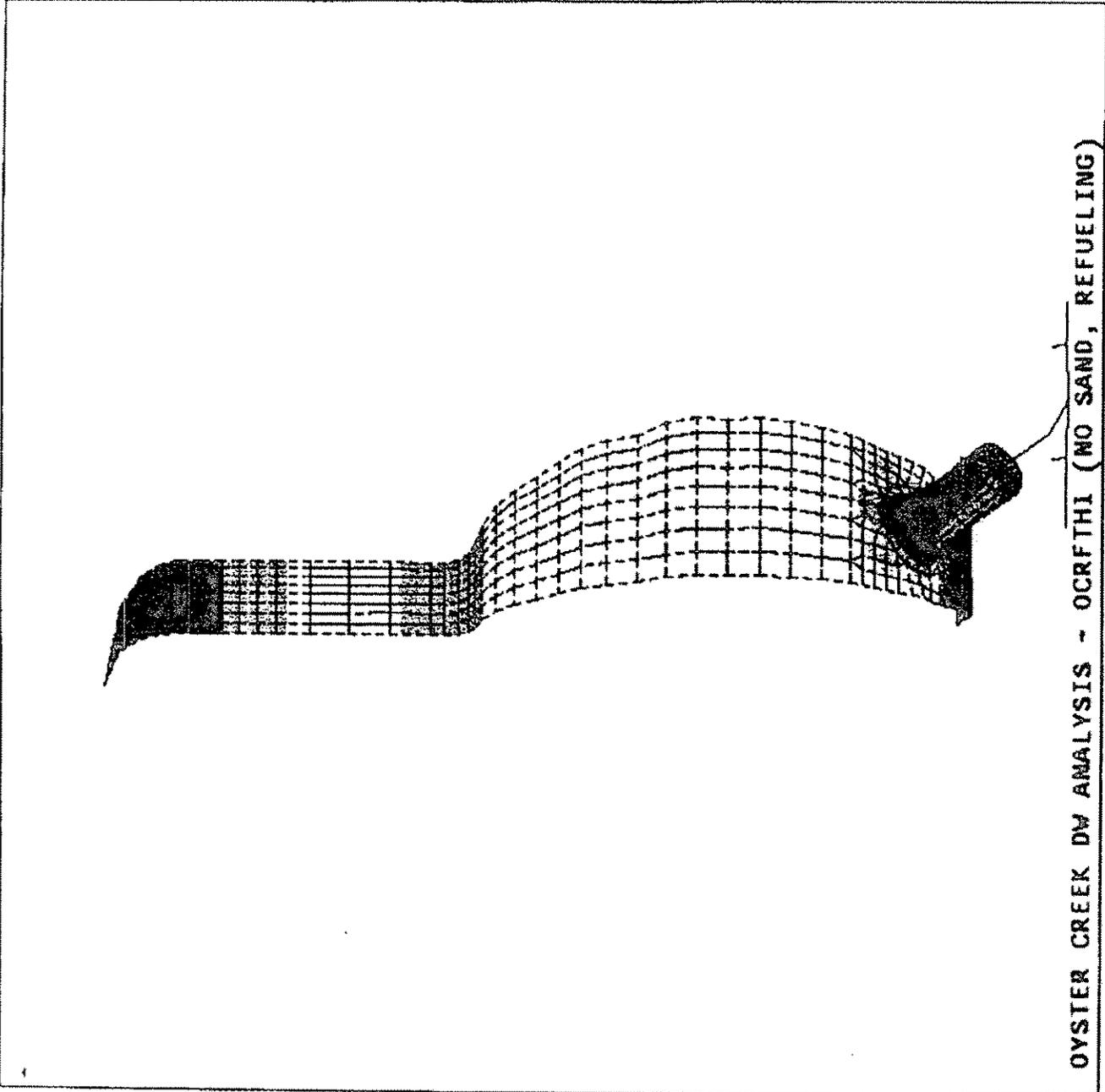
OYSTER CREEK DW ANALYSIS - OCRFTH1 (NO SAND, REFUELING)

FIGURE 4

990-2174

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ITER=1
SY (AVG)
MIDDLE
ELEM CS
DMX =0.222715
SMN =-9943
SMX =701.049

XV =1
ZV =-1
°DIST=121.539
⊕XF =46.39
⊕YF =-1.382
⊕ZF =382.857
ANGZ =-90
CENTROID HIDDEN

-9943
-8760
-7577
-6395
-5212
-4030
-2847
-1664
-481.591
701.049

OYSTER CREEK DW ANALYSIS - OCRFTH1 (NO SAND, REFUELING)

FIGURE 5

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OYSTER CREEK DRYWELL ANALYSIS - OCRF05BSS (NO SAND, REFUELING)

FIGURE 6

990·2174
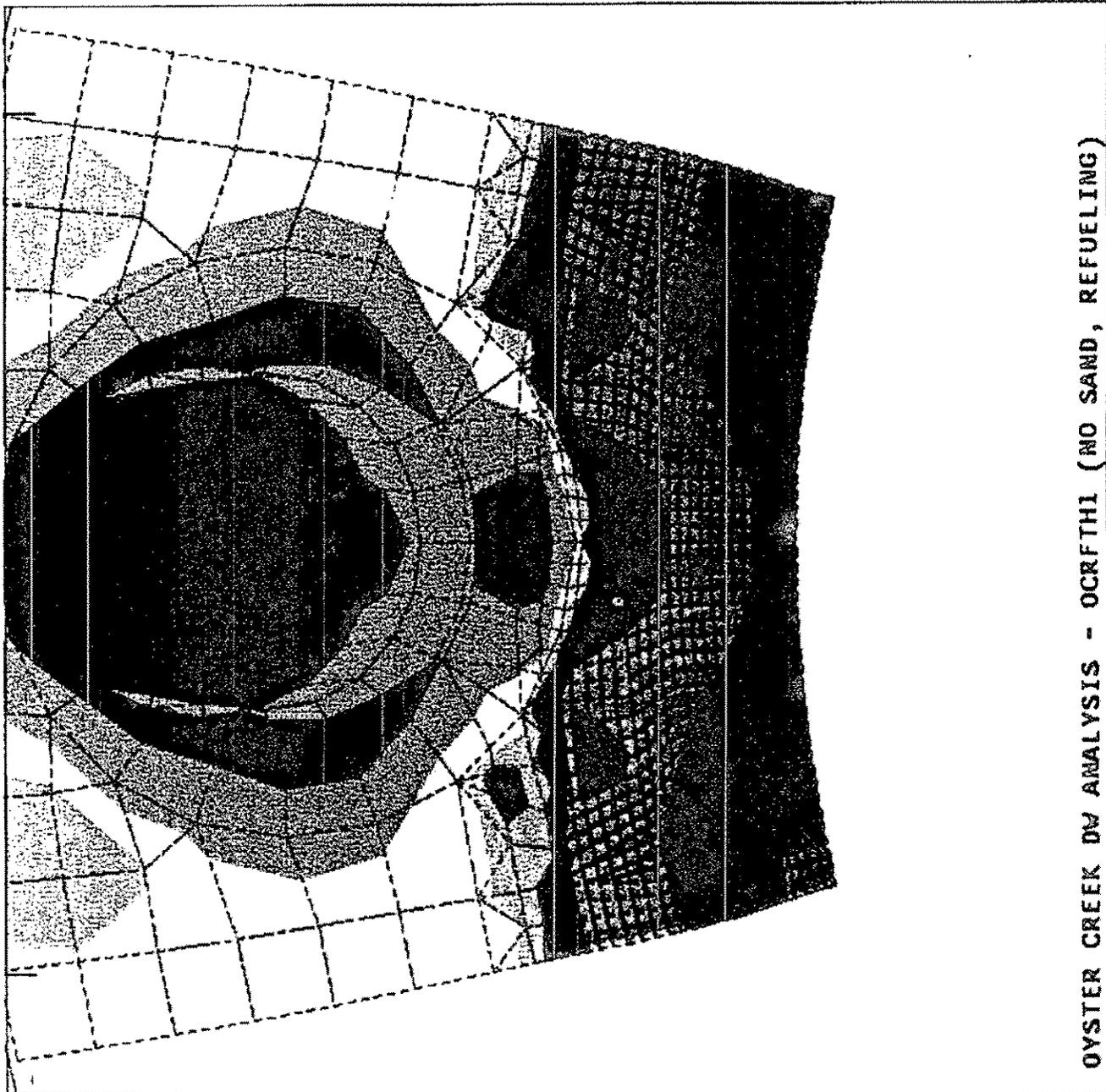
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6:57:10
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D NODAL
DMX =0.006073
SMN =-0.006072
SMX =0.00345
XV =1
ZV =-1
DIST=110.004
XF =29.455
YF =0.460954
ZF =365.922
ANGZ=-90
CENTROID HIDDEN
-0.006072
-0.005014
-0.003956
-0.002898
-0.00184
-0.782E-03
0.276E-03
0.001334
0.002392
0.00345
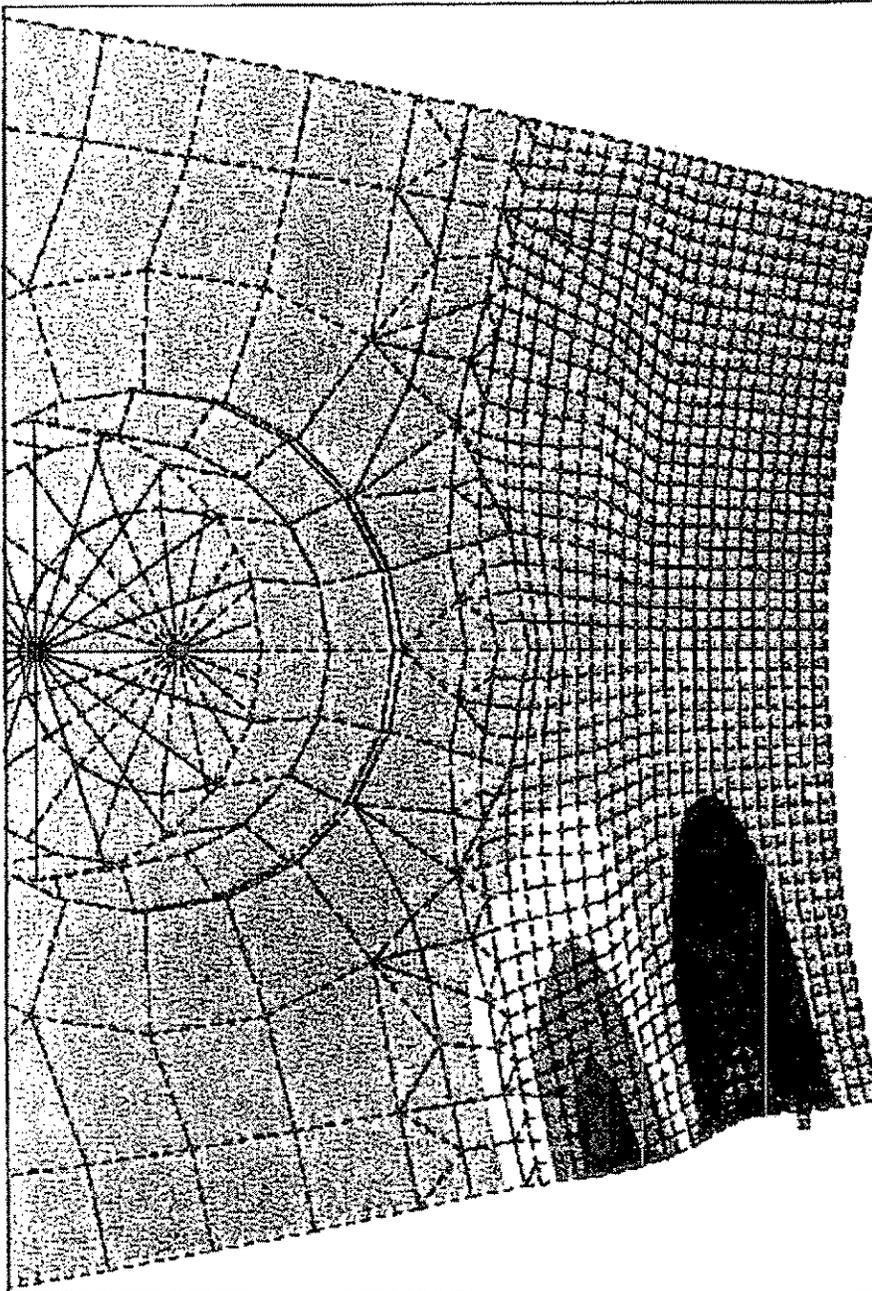
OYSTER CREEK DRYWELL ANALYSIS - OCRF05BSS (NO SAND, REFUELING)

FIGURE 7

990-2174
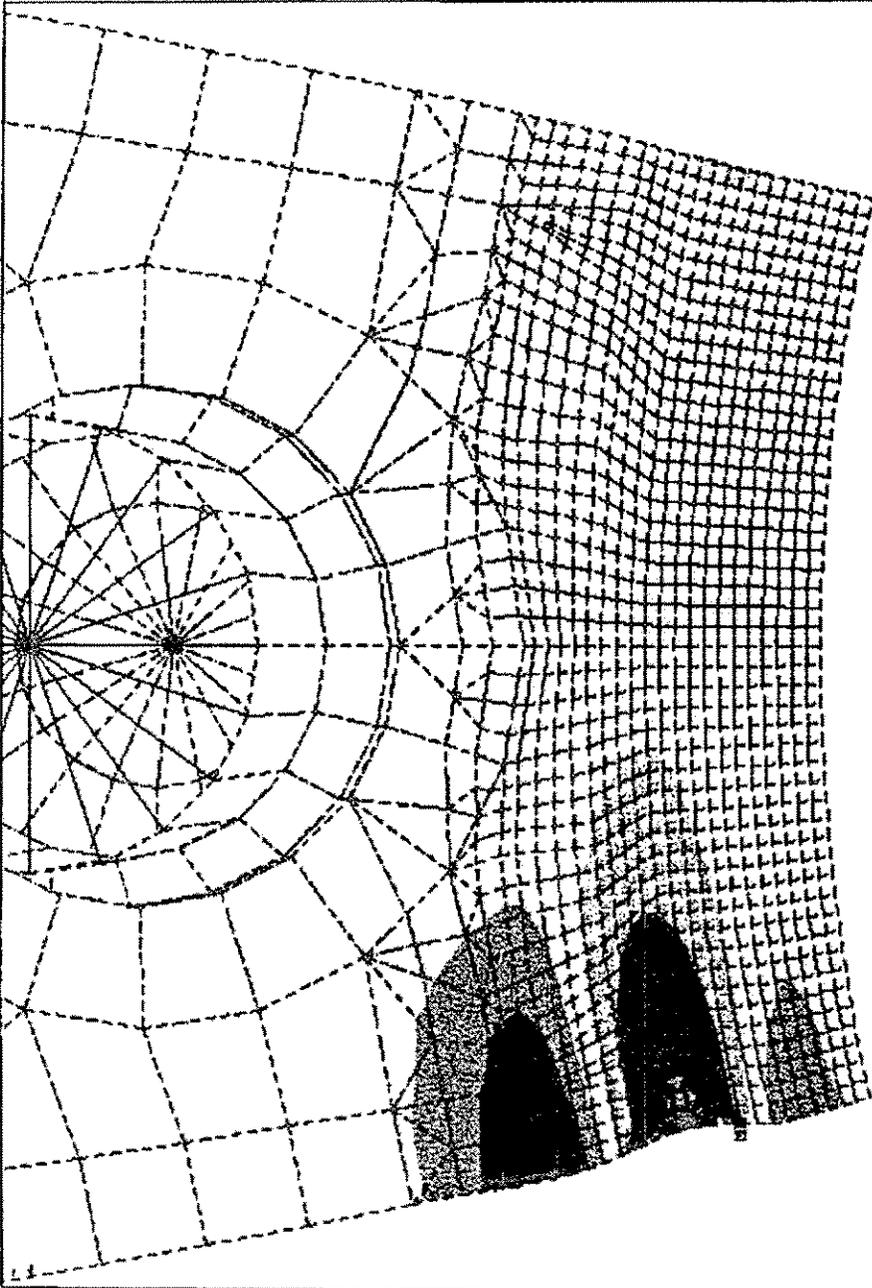
OYSTER CREEK DRYWELL ANALYSIS - CRF05 BSS (NO SAND, REFUELING)

FIGURE 8

980-2174

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7:29:08
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D NODAL
DMX =0.005974
SMN =-0.005972
SMX =0.003682

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ZV =-1
DIST=110.004
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YF =0.460954
ZF =365.922
ANGZ=-90
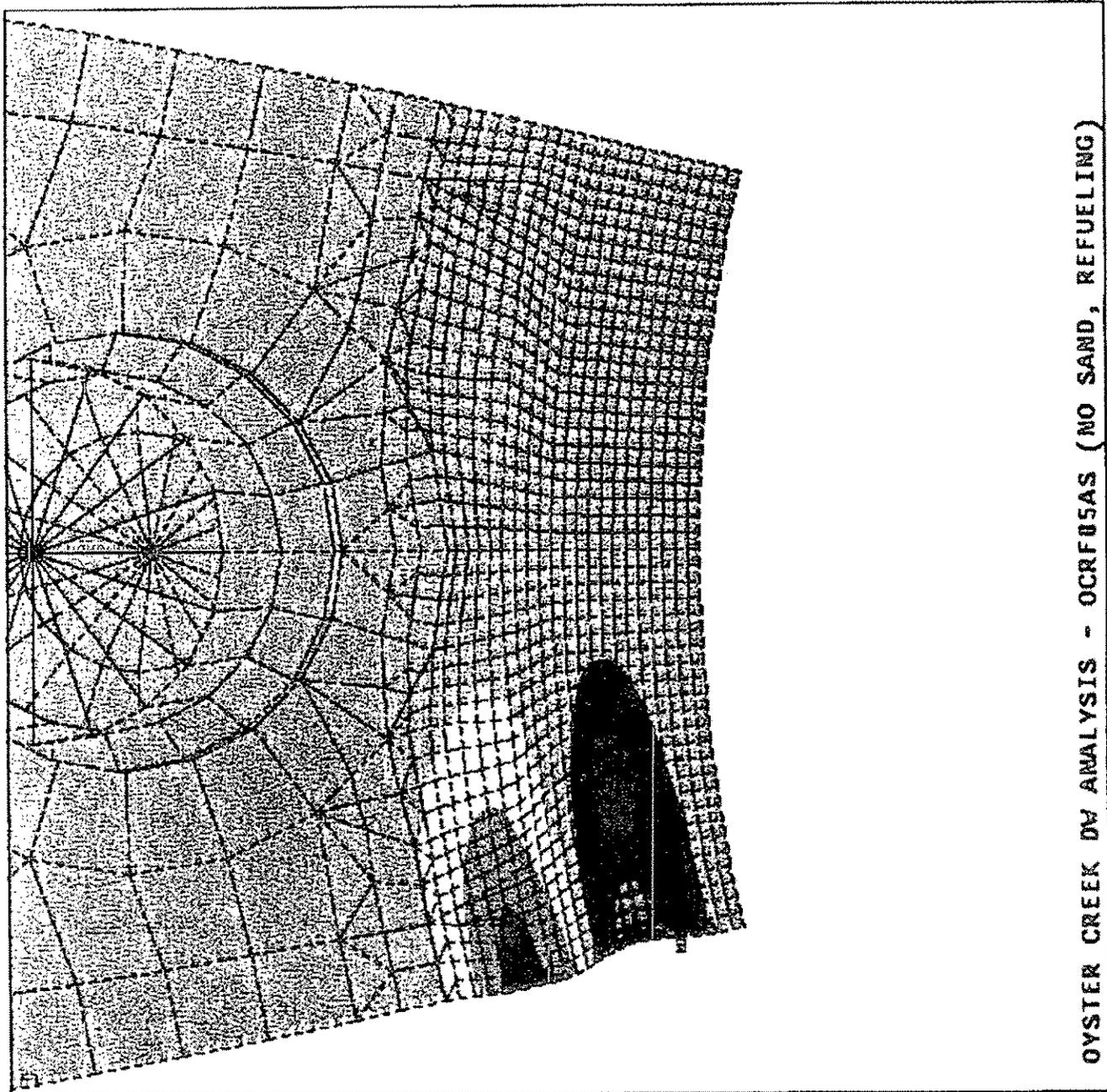CENTROID HIDDEN
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-0.003827
-0.002754
-0.001681
-0.609E-03
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0.001537
0.00261
0.003682

OYSTER CREEK DW ANALYSIS - OCRFB5AS (NO SAND, REFUELING)

FIGURE 9

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950-2174

FIGURE 10

990-2174
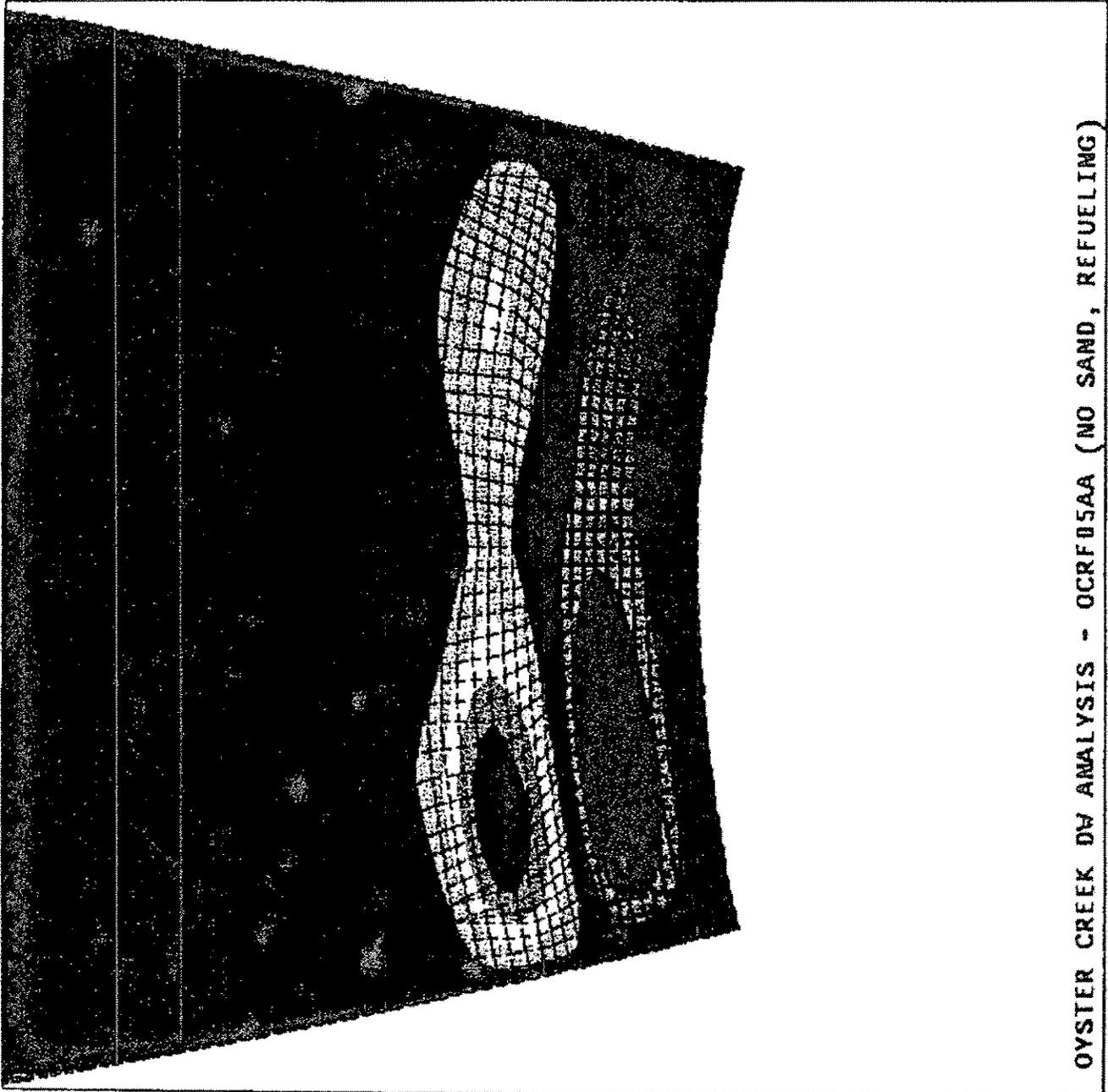
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SMN =-3554
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YV =-0.8
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XF =303.031
ZF =639.498
ANGZ=-90
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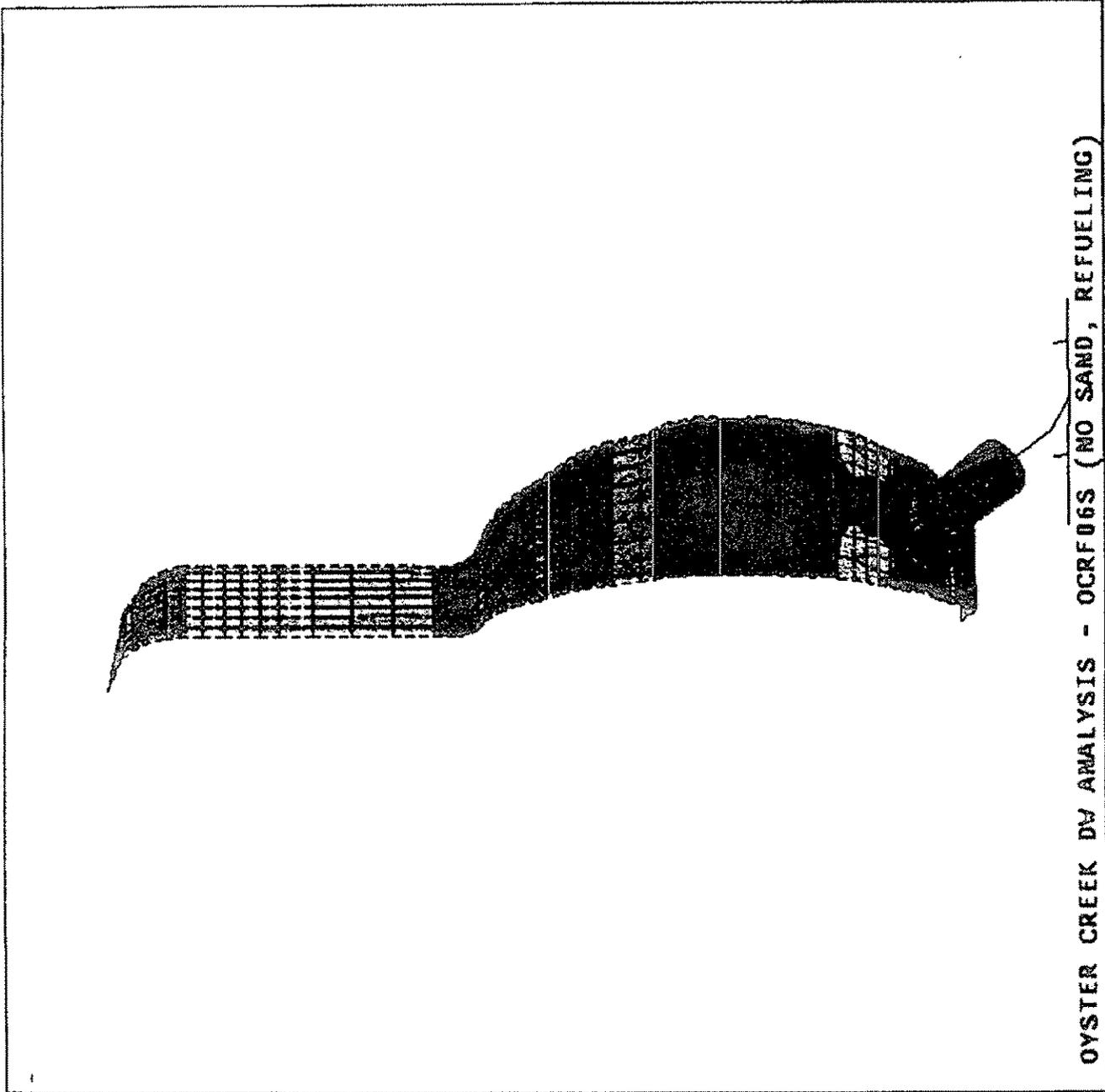
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-1220
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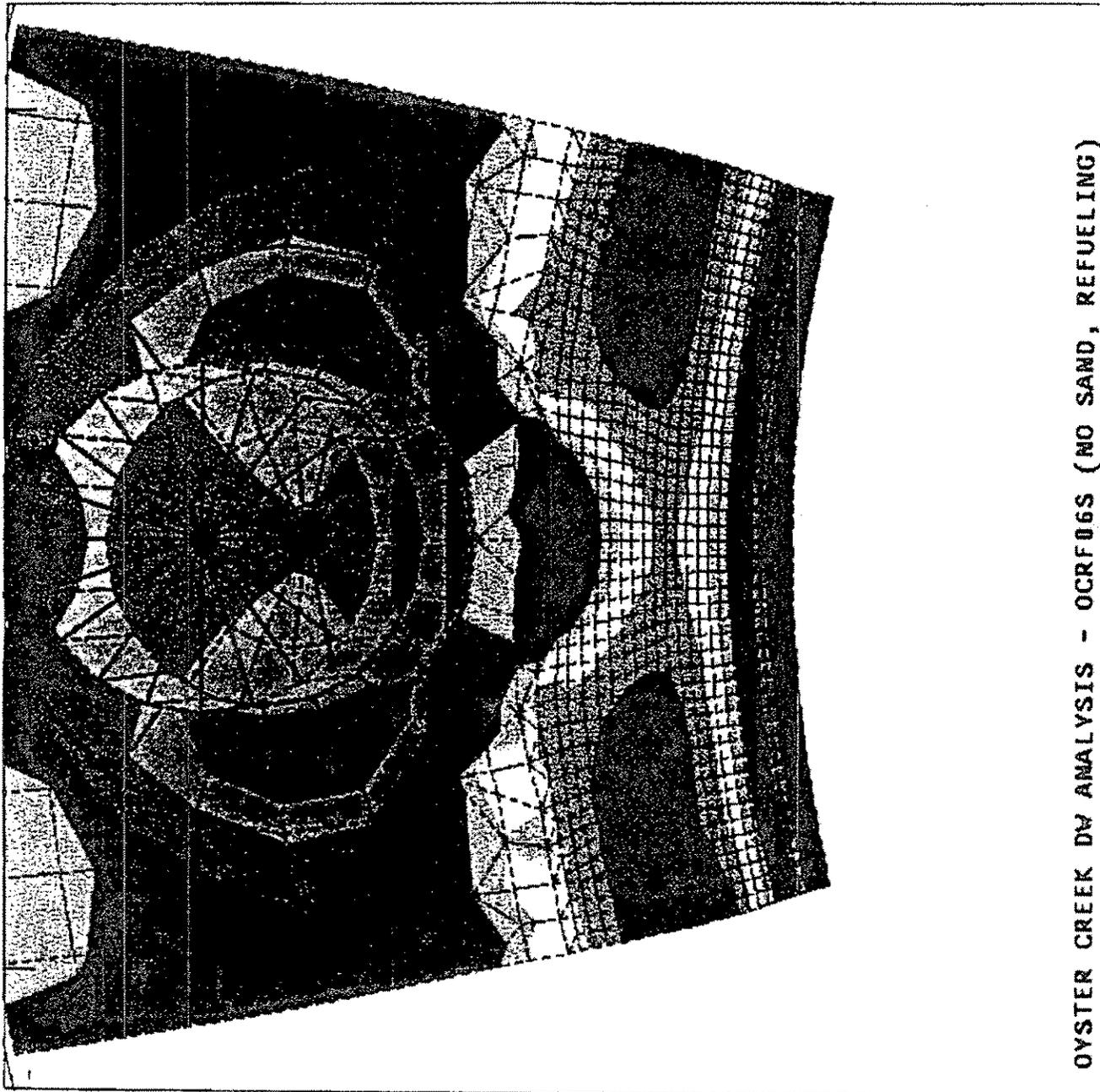1114
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3448
4615
5783
6950

OYSTER CREEK DW ANALYSIS - OCRF06S (NO SAND, REFUELING)

FIGURE 11

996-2174

ANSYS 4.4A1
DEC 10 1992
8:21:15
POST1 STRESS
STEP=1
ITER=1
SX (AVG)
MIDDLE
ELEM CS
DMX =0.222456
SMN =-3554
SMX =6950

XV =1
ZV =-1
#DIST=121.539
#XF =46.39
#YF =-1.382
#ZF =382.857
ANGZ=-90
CENTROID HIDDEN

-3554
-2387
-1220
-52.809
1114
2281
3448
4615
5783
6950

OYSTER CREEK DW ANALYSIS - OCRF86S (NO SAND, REFUELING)

FIGURE 12

03/20/06 16:25:06

990-2174

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DEC 10 1992
8:18:45
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SY (AVG)
MIDDLE
ELEM CS
DMX =0.222456
SMN =-8767
SMX =694.653

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YV =-0.8
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XF =303.031
ZF =639.498
ANGZ=-90
CENTROID HIDDEN

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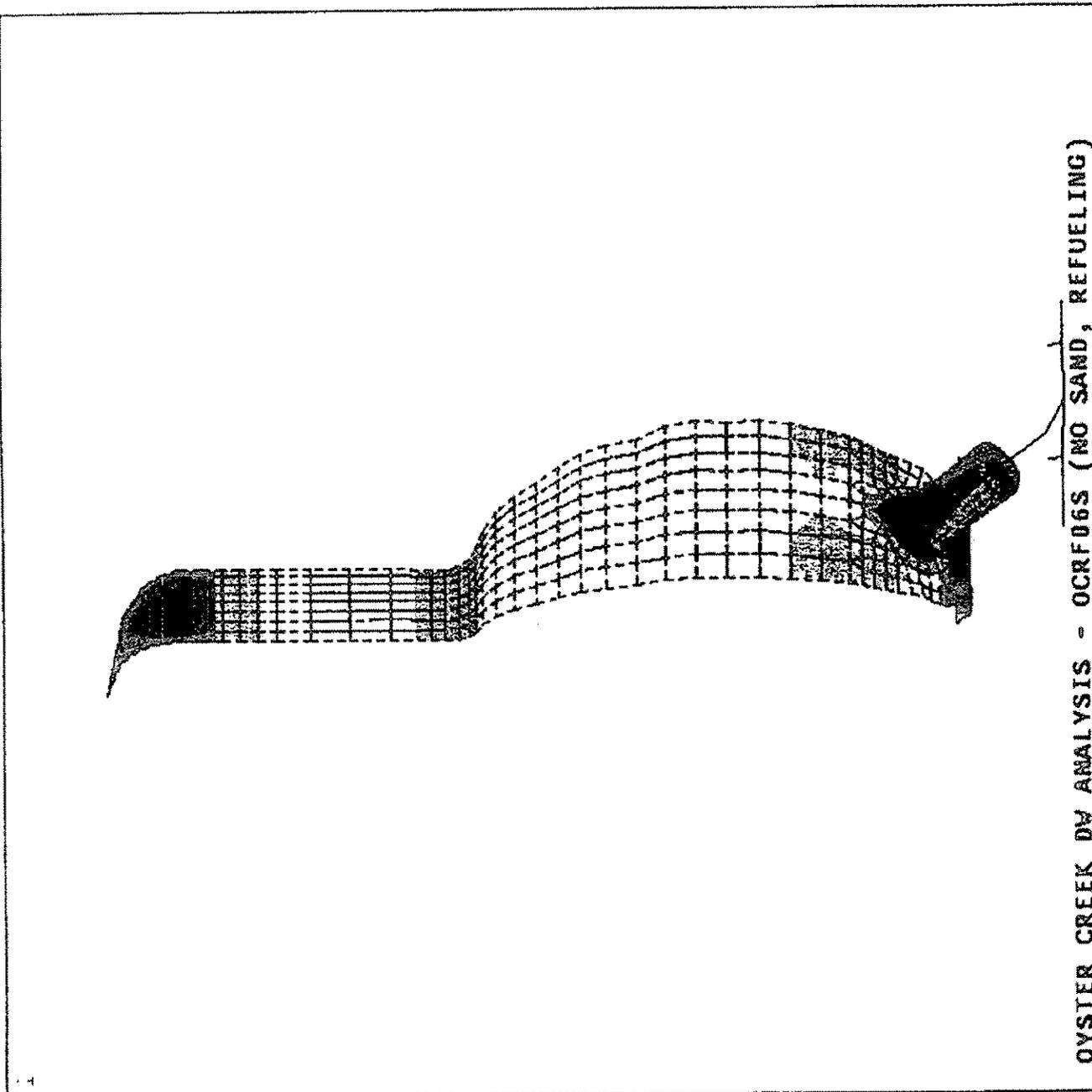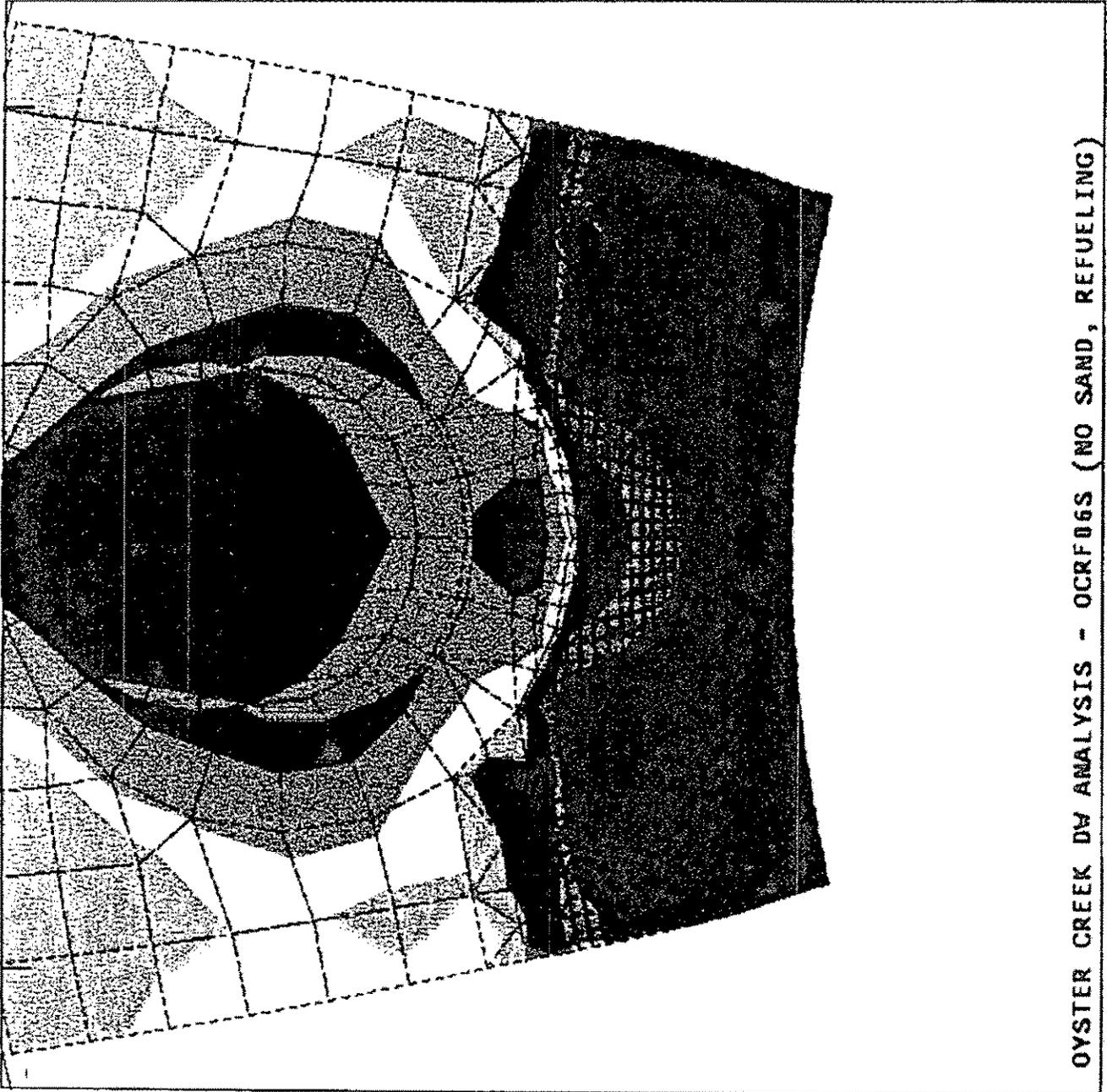-7716
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-5613
-4562
-3511
-2459
-1408
-356.637
694.653

OYSTER CREEK DW ANALYSIS - OCRF06S (NO SAND, REFUELING)

FIGURE 13

990-217Y

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DEC 10 1992
8:21:30
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ITER=1
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MIDDLE
ELEM CS
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SMN =-8767
SMX =694.653

XV =1
ZV =-1
*DIST=121.539
*XF =46.39
*YF =-1.382
*ZF =382.857
ANGZ=-90
CENTROID HIDDEN

-8767
-7716
-6664
-5613
-4562
-3511
-2459
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-356.637
694.653

OYSTER CREEK DW ANALYSIS - OCRF06S (NO SAND, REFUELING)
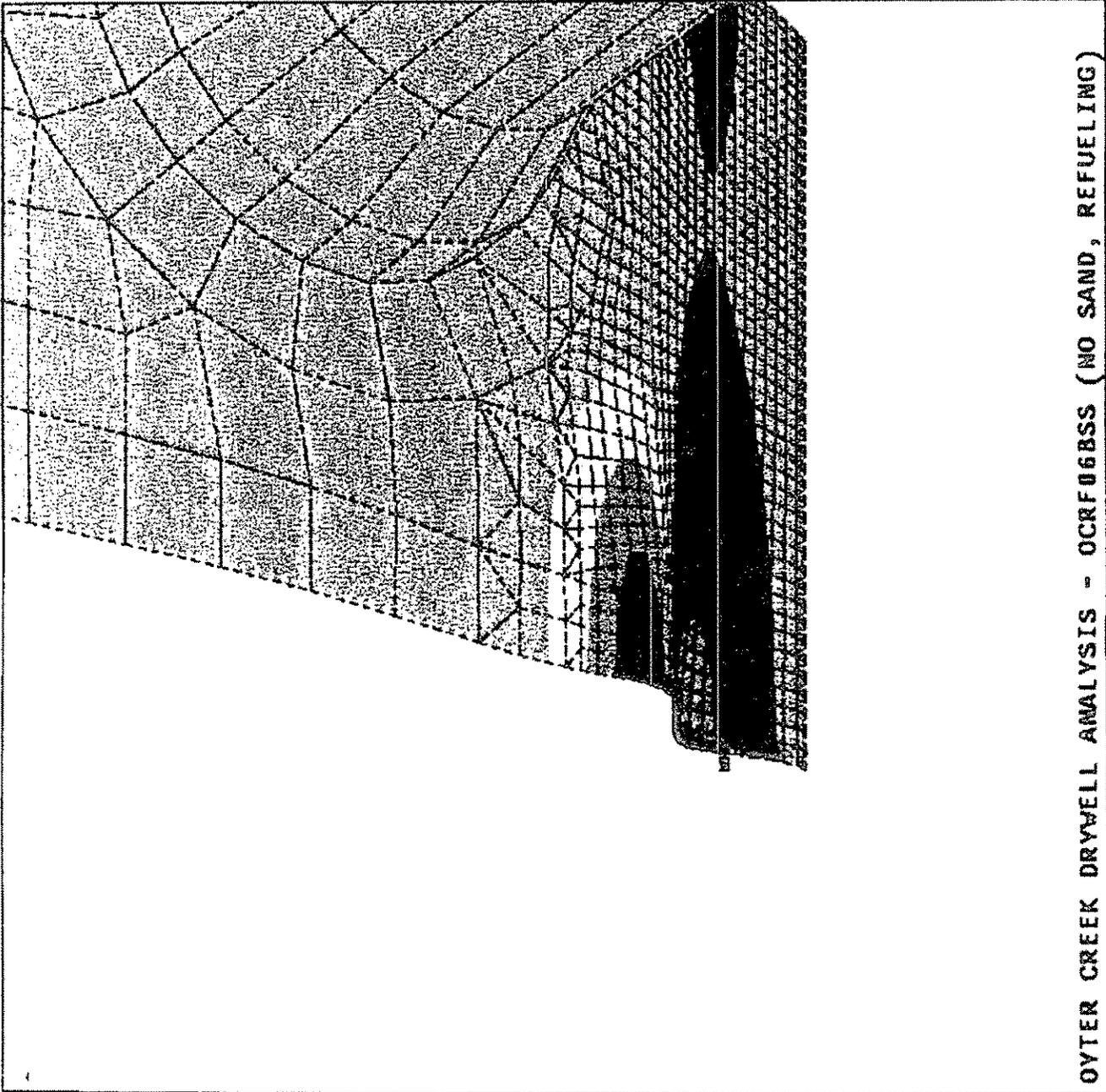
FIGURE 14

990 2074

ANSYS 4.4A1
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FACT=5.91
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SMN =-0.005174
SMX =0.00326

XV =1
YV =-0.8
°DIST=89.401
°XF =262.142
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ANGZ=-90
CENTROID HIDDEN
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-0.004237
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-0.002362
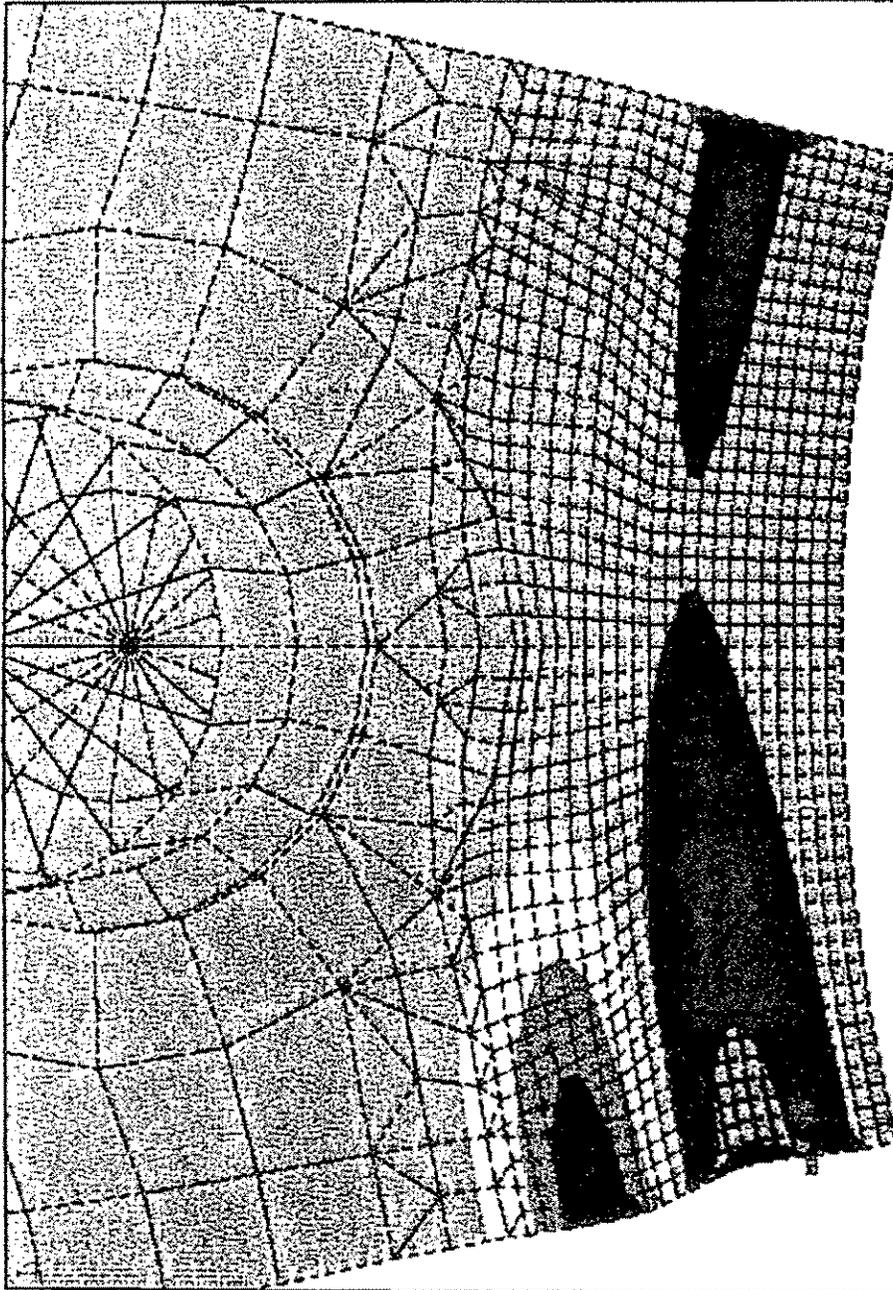-0.001425
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OYTER CREEK DRYWELL ANALYSIS - OCRF06BSS (NO SAND, REFUELING)

FIGURE 15

ANSYS 4.4A1
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SMN =-0.005174
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XV =1
ZV =-1
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*XF =29.455
*YF =0.460954
*ZF =365.922
ANGZ=-90
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-0.004237
-0.0033
-0.002362
-0.001425
-0.488E-03
0.449E-03
0.001386
0.002323
0.00326

OYTER CREEK DRYWELL ANALYSIS - OCRF06BSS (NO SAND, REFUELING)

FIGURE 16

980-2174

ANSYS 4.4A1
DEC 10 1992
16:48:07
POST1 STRESS
STEP=1
ITER=1
FACT=5.945
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D NODAL
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SMN =-0.005177
SMX =0.003584

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ZV =-1
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*YF =0.460954
*ZF =365.922
ANGZ=-90
CENTROID HIDDEN
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-0.004203
-0.00323
-0.002256
-0.001283
-0.310E-03
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0.001637
0.002611
0.003584
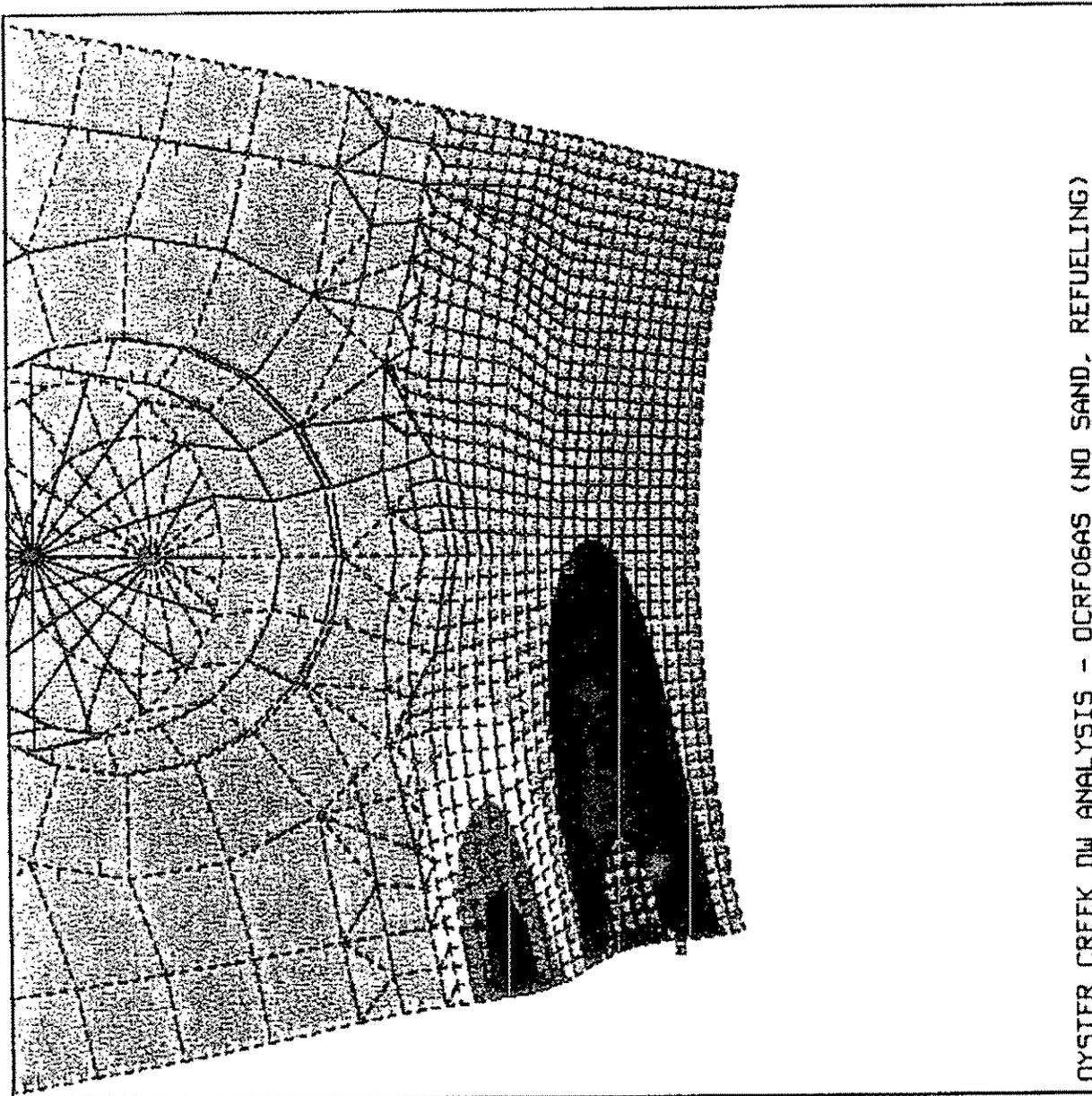
OYSTER CREEK DW ANALYSIS - OCRFO6AS (NO SAND, REFUELING)

FIGURE 17

FIGURE 18

996-2174

ANSYS 4.4A1
DEC 7 1992
12:44:31
POST1 STRESS
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ITER=1
SX (AVG)
MIDDLE
ELEM CS
DMX =0.211959
SMN =-3547
SMX =6041

XV =1
YV =-0.8
DIST=718.786
XF =303.031
ZF =639.498
ANGZ=-90
CENTROID HIDDEN

-3547
-2482
-1416
-350.884
714.437
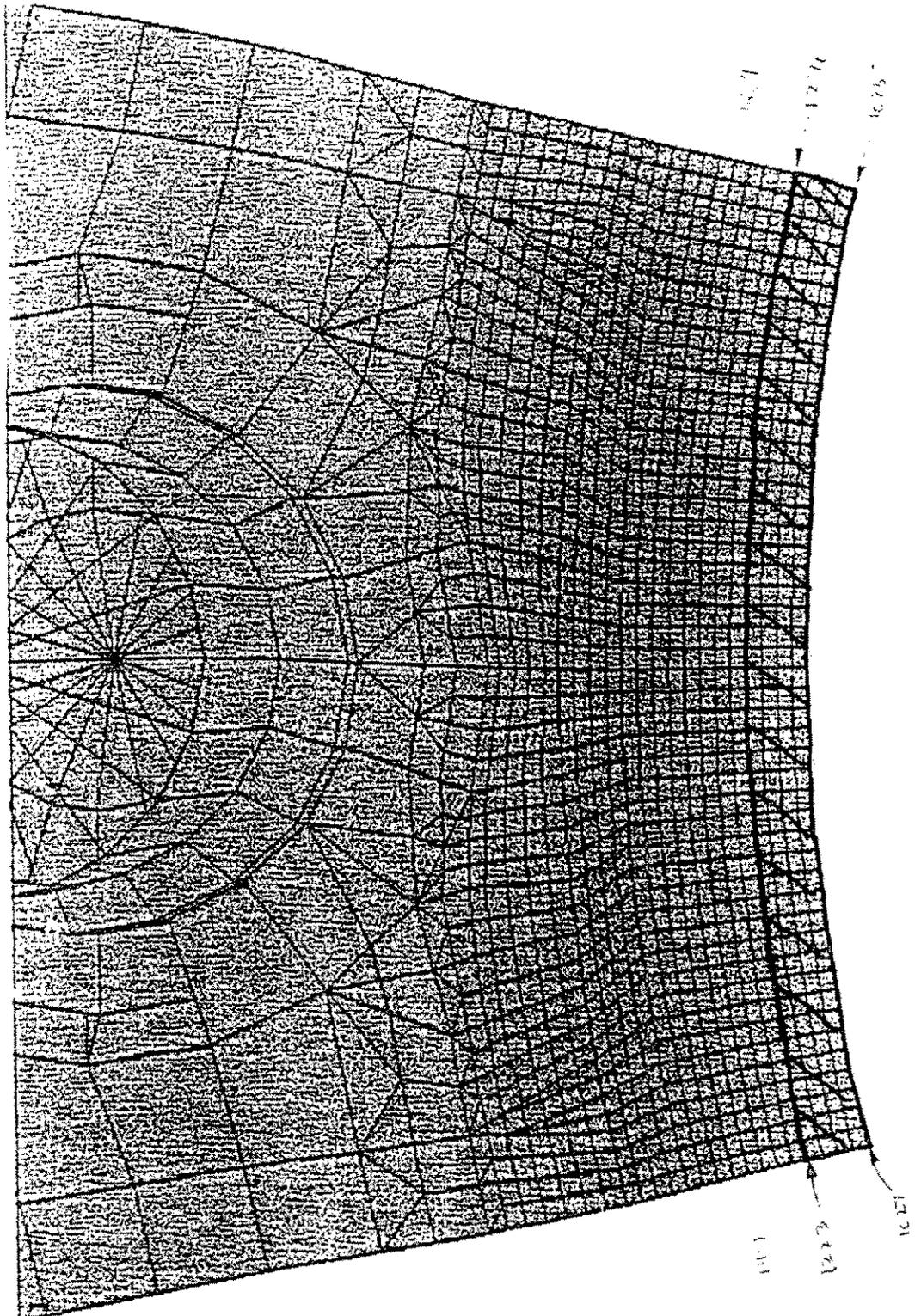1780
2845
3910
4976
6041

OYSTER CREEK DRYWELL ANALYSIS - OYCRIS (NO SAND, REFUELING)

FIGURE 19

9 80 - 2174

ANSYS 4.4A1
DEC 7 1992
12:33:33
POSTI STRESS
STEP=1
ITER=1
SX (AVG)
MIDDLE
ELEM CS
DMX =0.211959
SMN =-3547
SMX =6041

XV =1
ZV =-1
*DIST=121.539
*XF =46.39
*YF =-1.382
*ZF =382.857
ANGZ=-90
CENTROID HIDDEN

-3547
-2482
-1416
-350.884
714.437
1780
2845
3910
4976
6041

OYSTER CREEK DRYWELL ANALYSIS - OYCRIS (NO SAND, REFUELING)
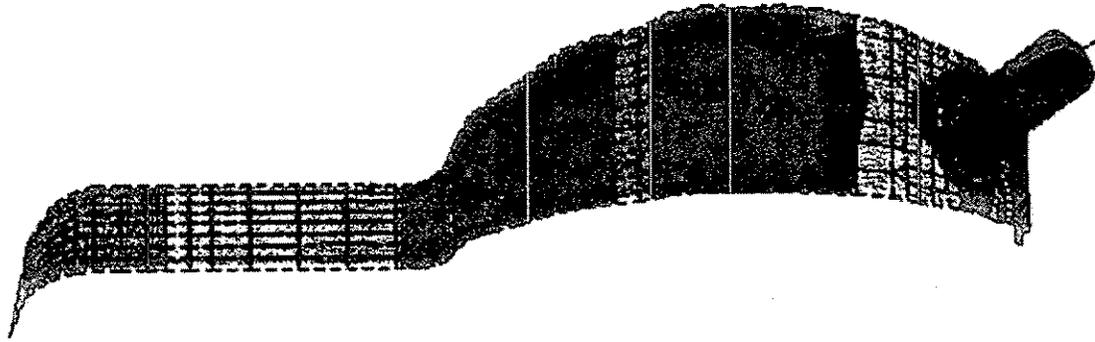
FIGURE 20

03/20/06 16:25:06

990.-2174

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DEC 7 1992
12:44:44
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MIDDLE
ELEM CS
DMX =0.211959
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SMX =766.953

XV =1
YV =-0.8
DIST=718.786
XF =303.031
ZF =639.498
AMGZ=-90
CENTROID HIDDEN

-7956
-6987
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-4079
-3110
-2141
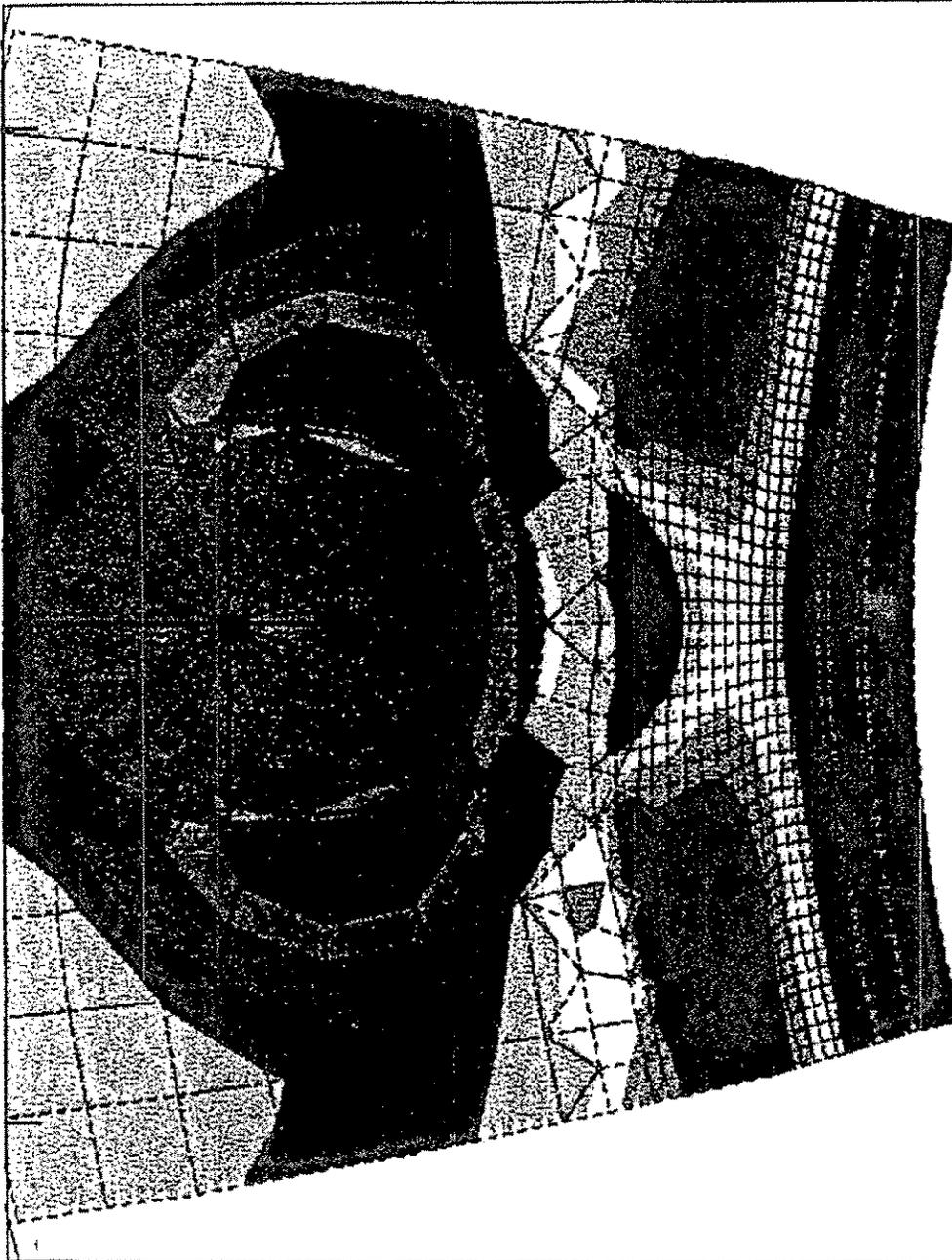-1172
-202.301
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OYSTER CREEK DRYWELL ANALYSIS - OYCRIS (NO SAND, REFUELING)

FIGURE 21

990-2174

```
ANSYS  4.4A1
DEC  7 1992
12:34:18
POST1 STRESS
STEP=1
ITER=1
SY   (AVG)
MIDDLE
ELEM CS
DMX =0.211959
SMN =-7956
SMX =766.953

XV  =1
ZV  =-1
*DIST=121.539
*XF =46.39
*YF =-1.382
*ZF =382.857
ANGZ=-90
CENTROID HIDDEN
      -7956
      -6987
      -6018
      -5049
      -4079
      -3110
      -2141
      -1172
      -202.301
      766.953
```
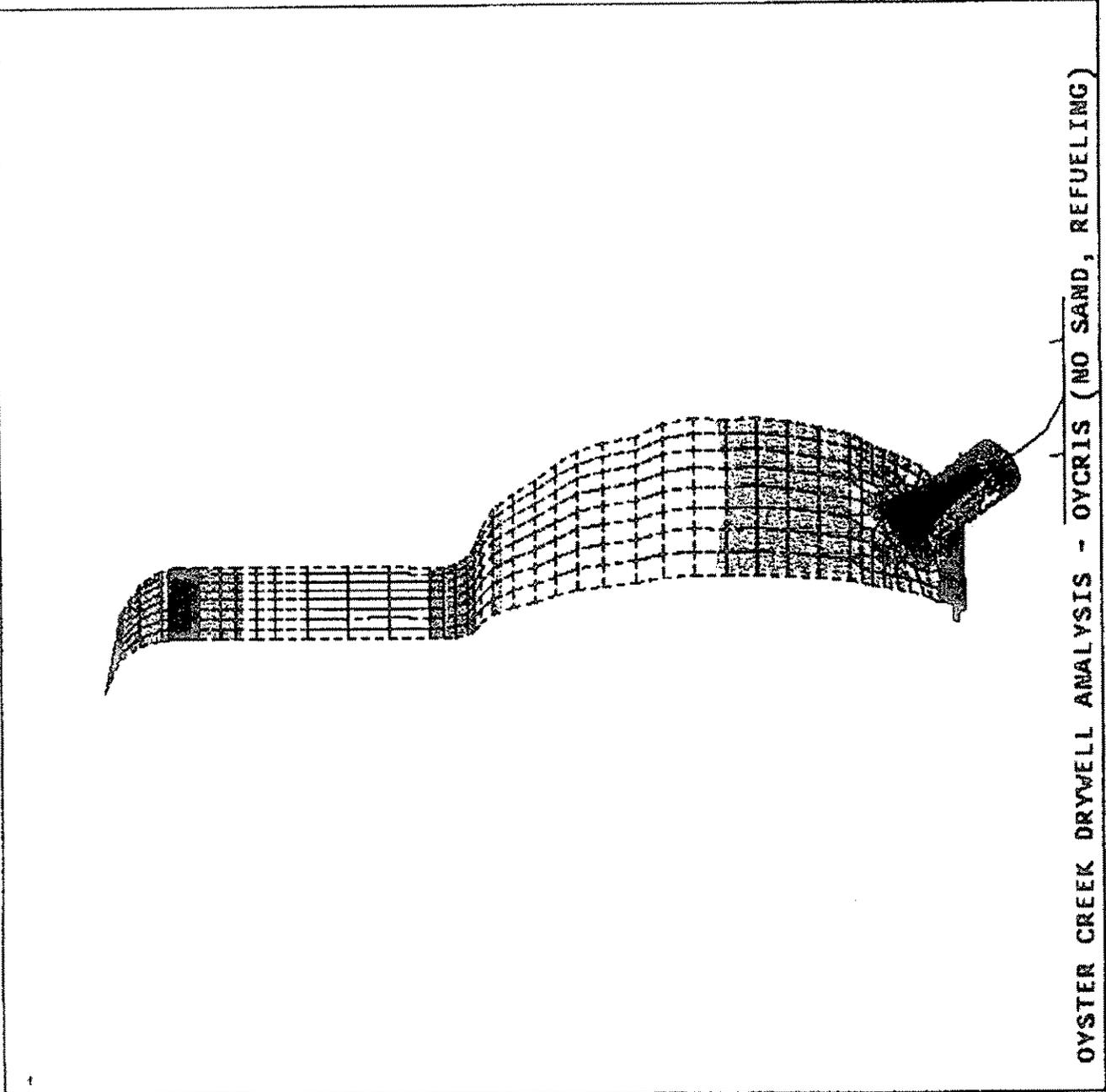
OYSTER CREEK DRYWELL ANALYSIS - OYCRIS (NO SAND, REFUELING)
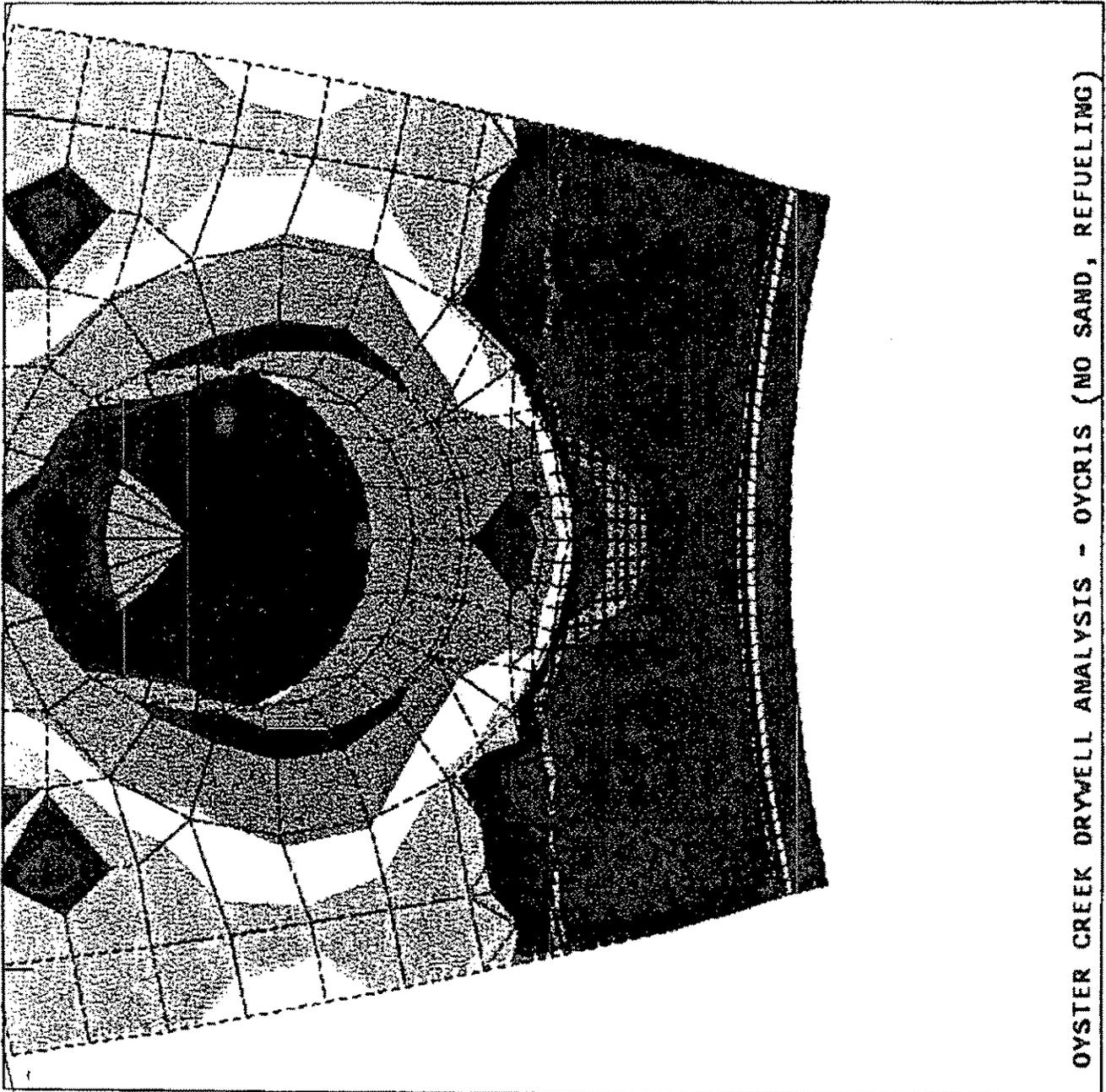
FIGURE 22

APPLIED MERIDIONAL AND CIRCUMFERENTIAL STRESSES - REFUELING CONDITION
ONE FOOT INCREASE IN FIXITY CASE; STRESS RUN: OCRFRLSB.OUT

AVERAGE APPLIED MERIDIONAL STRESS:

The average meridional stress is defined as the average stress across
the elevation including nodes 1419 through 1467. Stresses at nodes 1419 and
1467 are weighted only one half as much as the other nodes because they
lie on the edge of the modeled 1/10th section of the drywell and thus
represent only 1/2 of the area represented by the other nodes.

Nodes	# of Nodes	Meridional Stress (ksi)	# of Nodes x Meridional Stress (ksi)
1419-1467	1	-7.726	-7.726
1423-1463	2	-7.738	-15.476
1427-1459	2	-7.760	-15.520
1431-1455	2	-7.682	-15.364
1435-1451	2	-7.394	-14.788
1439-1447	2	-7.014	-14.028
1443	1	-6.834	-6.834
Total:	12		-89.736
			12
Average Meridional Stress:			-7.478 (ksi)

AVERAGE APPLIED CIRCUMFERENTIAL STRESS:

The circumferential stress is averaged along the vertical line from
node 1223 to node 2058.

Nodes	# of Nodes	Circumferential Stress (ksi)	# of Nodes x Circumferential Stress (ksi)
1223	0	-1.175	0.000
1419	1	0.505	0.505
1615	1	4.165	4.165
1811	1	5.846	5.846
2058	1	5.024	5.024
Total:	4		15.54
			4
Average Circumferential Stress:			3.885 (ksi)

OCRFST06.WK1

FIGURE 23

940-2174

```
ANSYS  4.4A1
DEC  8 1992
  6:15:38
POST1 STRESS
STEP=1
ITER=1
FACT=6.739
UX
D NODAL
DMX =0.003681
SMN =-0.00368
SMX =0.001848

XV  =1
ZV  =-1
*DIST=110.004
*XF  =29.455
*YF  =0.460954
*ZF  =365.922
ANGZ=-90
CENTROID HIDDEN
      -0.00368
      -0.003065
      -0.002451
      -0.001837
      -0.001223
      -0.609E-03
       0.567E-05
       0.620E-03
       0.001234
       0.001848
```
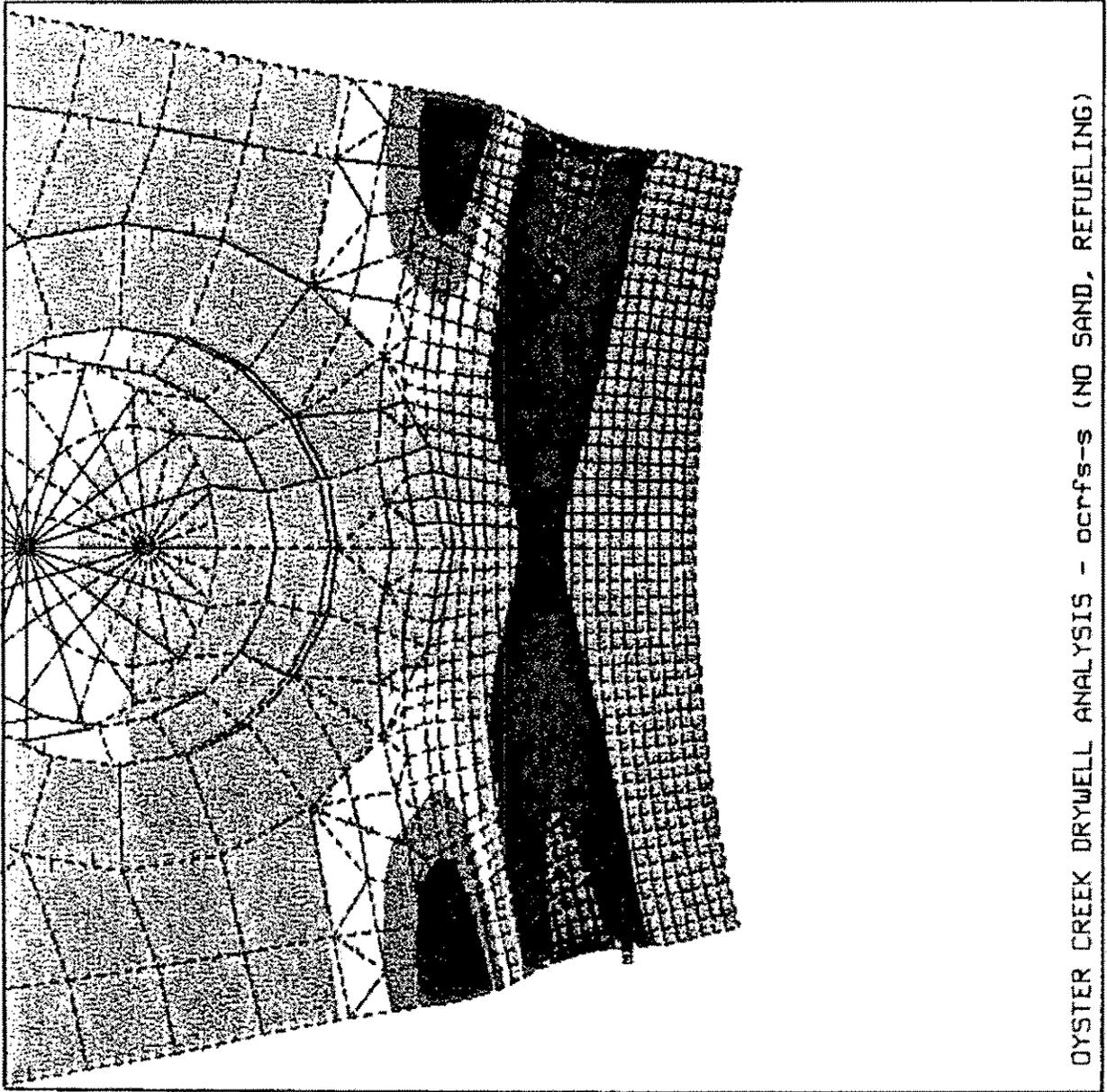
OYSTER CREEK DRYWELL ANALYSIS - ocrfs-s (NO SAND, REFUELING)

FIGURE 24

990-2174

ANSYS 4.4A1
DEC 9 1992
11:35:17
POST1 STRESS
STEP=1
ITER=1
FACT=6.887
UX
D NODAL
DMX =0.005136
SMN =-0.005134
SMX =-0.003244

XV =1
ZV =-1
*DIST=110.004
*XF =29.455
*YF =0.460954
*ZF =365.922
ANGZ=-90
CENTROID HIDDEN
-0.005134
-0.004203
-0.003273
-0.002342
-0.001411
-0.001411
-0.480E-03
0.451E-03
0.001382
0.002313
0.003244
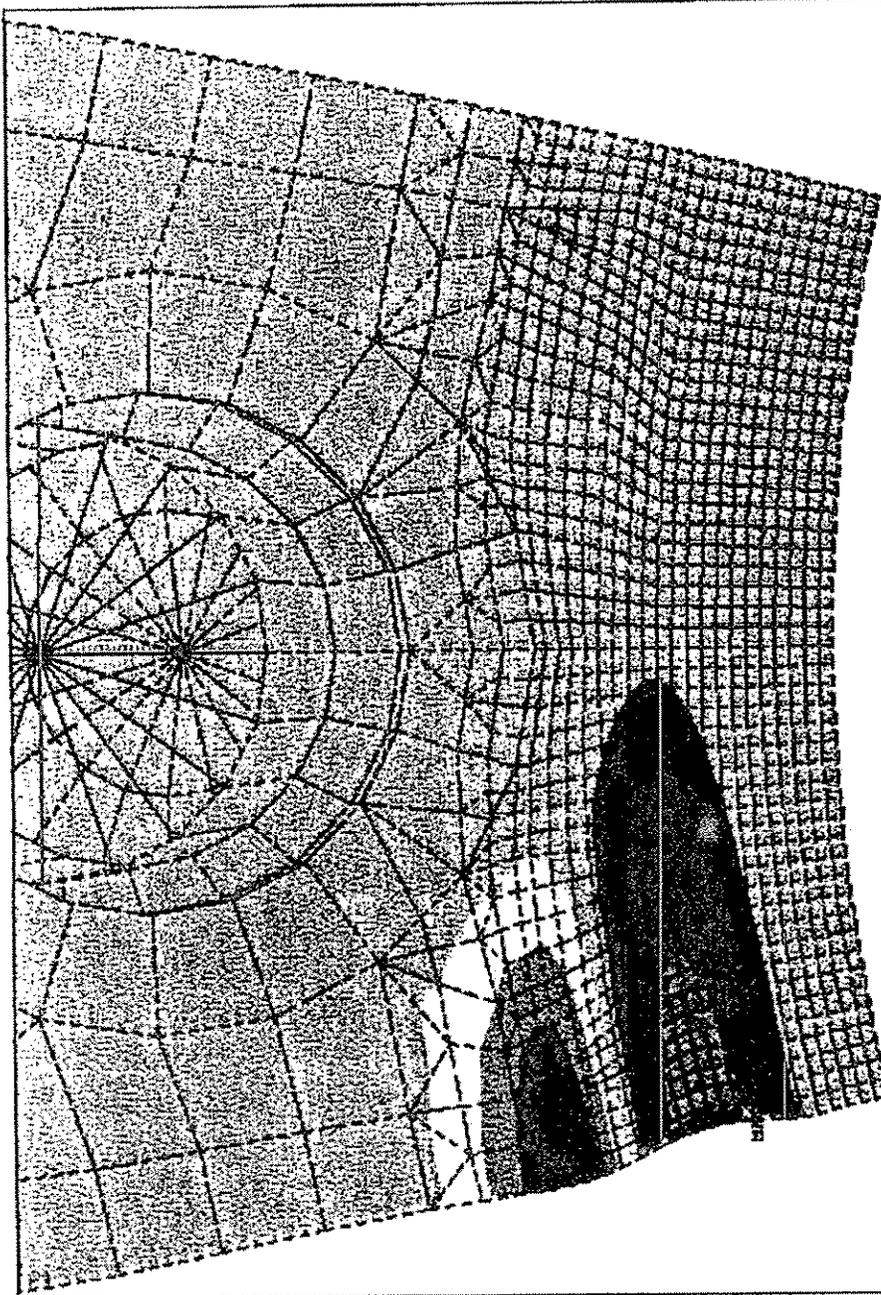
OYSTER CREEK DRYWELL ANALYSIS (ASYM-SYMM) - (NO SAND, REFUELING)

FIGURE 25

9 96-2174

CALCULATION OF ALLOWABLE BUCKLING STRESSES - REFUELING CASE, NO SAND
ONE FOOT INCREASE IN FIXITY CASE; STRESS RUN OCRFRLSB.OUT,
BUCKLING RUN OYCRSBBK.OUT

ITEM	PARAMETER	UNITS	VALUE	LOAD FACTOR
	*** DRYWELL GEOMETRY AND MATERIALS			
1	Sphere Radius, R	(in.)	420	
2	Sphere Thickness, t	(in.)	0.736	
3	Material Yield Strength, Sy	(ksi)	38	
4	Material Modulus of Elasticity, E	(ksi)	29600	
5	Factor of Safety, FS	-	2	
	*** BUCKLING ANALYSIS RESULTS			
6	Theoretical Elastic Instability Stress, Ste	(ksi)	50.394	6.739
	*** STRESS ANALYSIS RESULTS			
7	Applied Meridional Compressive Stress, Sm	(ksi)	7.478	
8	Applied Circumferential Tensile Stress, Sc	(ksi)	3.885	
	*** CAPACITY REDUCTION FACTOR CALCULATION			
9	Capacity Reduction Factor, ALPHAi	-	0.207	
10	Circumferential Stress Equivalent Pressure, Peq	(psi)	13.616	
11	'X' Parameter, X= (Peq/4E) (d/t)^2	-	0.075	
12	Delta C (From Figure -)	-	0.064	
13	Modified Capacity Reduction Factor, ALPHA,i,mod	-	0.313	
14	Reduced Elastic Instability Stress, Se	(ksi)	15.753	2.107
	*** PLASTICITY REDUCTION FACTOR CALCULATION			
15	Yield Stress Ratio, DELTA=Se/Sy	-	0.415	
16	Plasticity Reduction Factor, NUi	-	1.000	
17	Inelastic Instability Stress, Si = NUi x Se	(ksi)	15.753	2.107
	*** ALLOWABLE COMPRESSIVE STRESS CALCULATION			
18	Allowable Compressive Stress, Sall = Si/FS	(ksi)	7.877	1.053
19	Compressive Stress Margin, M=(Sall/Sm -1) x 100%	(%)	5.3	

REFNSND2.WK1

FIGURE 26

Final