ENCLOSURE 1

Analytical Evaluation of the Pressurizer Upper Shell to Head Weld Indication

68 pages follow

Structural Integrity Associates, Inc.	CALCULATION PACKAGE	File No.: PBCH-14Q-301 Project No.: PBCH-14Q

PROJECT NAME: Pressurizer Flaw Evaluation

Contract No.: P305817

CLIENT: Nuclear Management Company, LLC	**PLANT: Point Beach Nuclear Plant**

CALCULATION TITLE: Pressurizer Flaw Evaluation

Document Revision	**Affected Pages**	**Revision Description**	**Project Mgr. Approval Signature & Date**	**Preparer(s) & Checker(s) Signatures & Date**
0	1-7 Appendices A,B,C, D	Initial Issue	H. L. Gustin 10/24/05 H L Gustin	H. L. Gustin 10/24/05 H L Gustin S. S. Tang 10/24/05 S. C. Tang

1 INTRODUCTION

An indication was identified during the 2005 inservice inspection of the reactor pressurizer at Point Beach Nuclear Plant Unit 1. The indication did not meet the flaw acceptance standards of ASME B&PV Code Section XI, IWB-3510 [1]. It is therefore necessary to conduct a flaw evaluation per Section XI IWB-3600. This calculation evaluates the identified flaw per the guidelines of Section XI, IWB-3610, which include acceptance criteria based on linear elastic fracture mechanics and consideration of potential flaw growth. This calculation does not apply to other flaws which may be identified, without further evaluation. Conservative assumptions have been used in this evaluation to demonstrate flaw acceptability per IWB-3610. This calculation has been design reviewed in accordance with the requirements of the Structural Integrity Associates Quality Assurance Program.

2 TECHNICAL APPROACH

Fracture mechanics methods consistent with the requirements of ASME Section XI have been applied to this flaw evaluation. The acceptance criterion is that the applied stress intensity factor due to the observed flaw, with consideration of flaw growth over the remaining life of the plant, remains below the material toughness, including applicable margins from Section XI. The flaw acceptance criteria based on applied stress intensity factor was determined based on Paragraph IWB-3612 of ASME Section XI [1]. The material toughness for the carbon steel pressurizer shell material at operating temperature is taken to be 200 ksi-$\sqrt{\text{inch}}$, consistent with Figure A-4200-1 from ASME Section XI Appendix A for K_{Ic}. A safety factor of $\sqrt{10}$ is applied, as required by IWB-3610. This gives an allowable stress intensity factor of $200/\sqrt{10} = 63.25$ ksi-$\sqrt{\text{inch}}$.

3 FLAW CHARACTERIZATION

The indication is a planar indication located in the Upper Shell to Upper Head weld [4]. The indication is located in the weld material on the side of the Upper Head, and running parallel to the weld. It is a subsurface indication with a through wall depth of 0.57 inches, a length of 0.875 inches, and surface separation of 0.72 inches.

The observed flaw is entirely subsurface and not exposed to any fluid chemistry.

4 DESIGN INPUTS

The as-measured wall thickness is 4.41 inches for the Upper Shell to Upper Head weld (from plant UT reports [4]).

The Upper Head material is SA216WCC, and the Upper Shell material is SA302B. Both of these are carbon steels [2]. These components are clad with an austenitic stainless steel material on the inside surface [6]. Such cladding is typically 3/16" thick. However, the thickness of the cladding is not

considered to be load bearing (per applicable design Codes), so no credit is taken in the original design for this material.

From Reference 2, Section 7.0, the combined direct and bending stresses at the affected weld location are shown in the following table. To be conservative, the highest of these values is used, and conservatively treated as an applied membrane stress

Location	Meriodional		Circumferential	
	inside	outside	inside	outside
Upper Head Weld	8663	17844	21922	24676

In addition to the above stresses, a thermal stress at the flaw location was calculated as described in section 6.1 of this calculation.

Welding residual stresses and cladding induced stresses at the flaw location are negligible since the vessel is a thick walled shell that has been stress relieved, and the flaw is not adjacent to the base metal/cladding interface.

The flaw is characterized ([4]) as being 0.875 inch long, 0.57 inch across (in the depth direction), with a separation from the outside surface of 0.72 inch.

5 ASSUMPTIONS

1. To be conservative, the highest of the stress values reported in Section 4.0 is used, and conservatively treated as an applied membrane stress. This is conservative because membrane stresses are more severe than bending stresses at equal magnitude.
2. The service life is assumed to be 60 years.
3. The material toughness K_{Ic} is taken as 200 ksi- $\sqrt{inch}$, from Section XI Appendix A [1].
4. In the thermal stress analysis in Appendix C, the inside surface convection coefficient is conservatively taken as 800 BTU/hour-ft^2-°F, which is much higher than actually expected in the region of interest.

6 CALCULATIONS

6.1 Through wall transient thermal stress calculation

The referenced stress report [2] does not expressly define thermal stresses at the area of interest. Therefore, a thermal stress calculation was performed. The SI thermal analysis program PIPE-TS2 [5] was used. A thermal transient of a cool down at a rate of 200° F per hour from an initial temperature of 680° F to a final temperature of 80° F was assumed. This transient is assumed to bound all thermal transients at

the flaw location [8]. The resulting maximum stress at the depth of the observed flaw was determined to be less than 5 ksi. Output from the analysis is contained in Appendix C.

6.2 Fracture mechanics evaluation

Linear elastic fracture mechanics and fatigue flaw growth evaluations of the indication were performed. The indication was modeled as a subsurface semi-elliptical flaw in an infinite plate subjected to membrane and bending stress as illustrated in Figure 1. This is a common fracture mechanics model applied to subsurface flaws in thick shells. Figure 1 refers to the 1986 Edition of ASME Section XI. This is the Edition to which the SI fracture mechanics program pc-CRACK [3] was developed. However, the flaw definition in that figure remains the same in subsequent Editions of the Code, including the committed Edition and Addenda for Point Beach [1]. For this subsurface flaw model, the flaw depth is defined as 2a. Therefore, the flaw depth, a, is half of the measured flaw depth as reported in the UT reports.

For the indication the flaw parameters were calculated as follows:

Depth [4]	2a = 0.57 inch
Length [4]	l = 0.875 inches
Aspect ratio:	a/l = 0.326
	a/t = .0646=6.46%
Eccentricity ratio:	2e/t = 0.543

The applied stress intensity factors for the indication above were calculated using **pc-CRACK**, [3]. The aspect ratio of 0.1 was conservatively used in the evaluation for the indication. The applied stress intensity factor $K_{applied}$ at the limiting location on the flaw face was compared to an allowable value of $K_{Ic}/\sqrt{10}$, where K_{Ic} is the material toughness (assumed to be 200 ksi-$\sqrt{}$inch for the pressurizer material at the service temperatures, from Section XI, Appendix A, Figure A-4200-1), and the factor of $\sqrt{10}$ represents the factor of safety that is imposed by ASME Section XI, IWB-3610 for Normal and Upset conditions. The allowable K is therefore 63.25 ksi-$\sqrt{}$inch. As long as the applied stress intensity factor remains below the allowable value for the flaw size, the flaw remains acceptable by Section XI criteria. **pc-CRACK** output for the fracture mechanics analysis is contained in Appendix A.

6.3 End of Life Fatigue Flaw Growth Calculation

Since the indications are subsurface and therefore not wetted, the end of life flaw size due to fatigue growth was calculated using the fatigue growth curves for carbon and low alloy ferritic steels exposed to air environments, Figure A-4300-1 of Appendix A of Section XI [1]. The flaw was conservatively assumed to experience cyclic stresses corresponding to a stress range from 0 to 30 ksi. This is conservative because the latter value corresponds to the sum of the highest reported direct plus bending stress, plus the calculated thermal stress, rounded upward. Most actual transients will be much less severe than this bounding transient.

Fatigue growth results are contained in Appendix B.

7 RESULTS OF ANALYSIS

The fracture mechanics analysis presented in Appendix A shows that the current flaw is acceptable per the criteria of ASME Section XI, IWB-3612. The calculated maximum stress intensity factor for the observed flaw is 27.99 ksi-√inch, as compared to the allowable value of 63.25 ksi-√inch, which includes required safety margins as noted in section 2 of this calculation. In fact the flaw could grow to more than twice the current size and remain acceptable.

The fatigue growth calculation demonstrates that over more than 200 cycles from 0 to 30 ksi, the resulting flaw growth is insignificant compared to the current size of the flaw. Therefore, growth of the flaw to an unacceptable size over the remaining life of the plant is not predicted.

8 DEGRADATION MECHANISMS

The observed flaw is a subsurface flaw that is remote from any surface (either the wetted inside surface or the air outside surface). Such a flaw is therefore not a result of chemistry-driven mechanisms such as stress corrosion cracking or corrosion. Furthermore, the original fatigue analysis summarized in [7] notes that at this general location in the pressurizer, the cumulative fatigue usage factor over the life of the plant is less than 1.0, and so flaw initiation by a fatigue mechanism is not plausible. ASME Section III limits fatigue usage over the life of the plant to less than 1.0, to limit fatigue damage such that fatigue cracks will not initiate. These factors lead to the conclusion that the observed flaw is in fact an artifact of original fabrication, and not to an active degradation mechanism. The evaluation of the hypothetical flaw growth by a fatigue mechanism is therefore conservative.

9 CONCLUSIONS AND DISCUSSIONS

Based on the results of the evaluation presented in this calculation package, the indication found during the inservice inspection of the pressurizer welds are acceptable and meet the requirement of ASME Code, Section XI, IWB-3610 [1].

The indication area is about 0.5 in^2. The area of the upper shell to head weld is about 1164 in^2, assuming an inside radius of 42 inches, and a wall thickness of 4.41 inches. The area reduction is less than 0.043% of the original area. This area reduction will have no significant affect on the hoop stress in the weld. Thus, the pressurizer stress analysis based on ASME Boiler and Pressure Vessel Code Section III in Reference 2 is not affected. Therefore, the requirement of IWB-3610 (d) (2) is satisfied.

10 REFERENCES

1. ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition with Addenda through 2000.
2. Westinghouse Electric Corporation, "Wisconsin Electric Power Pressurizer Stress Report", August 1969, SI File: PBCH-14Q-207
3. **pc-CRACK** for Windows, Version 3.1-98348, Structural Integrity Associates, 1998.
4. Point Beach Ultrasonic Examination Reports , SI File: PBCH-14Q-210
5. **PIPE-TS2**, Version 1.01, Structural Integrity Associates, April 1991.
6. Westinghouse Electric Corporation, Equipment Specification 676402, Revision 1, 3/10/1969. SI File: PBCH-14Q-201
7. E-mail from Brian Kemp (NMC) to Hal Gustin (SI) dated 10/18/05. SI File: PBCH-14Q-220
8. E-mail from Brian Kemp (NMC) to Russell Turner (NMC), cc: Hal Gustin (SI), dated 10/14/05 SI File: PBCH-14Q-220

NOTE: References 7 & 8 are attached in Appendix D

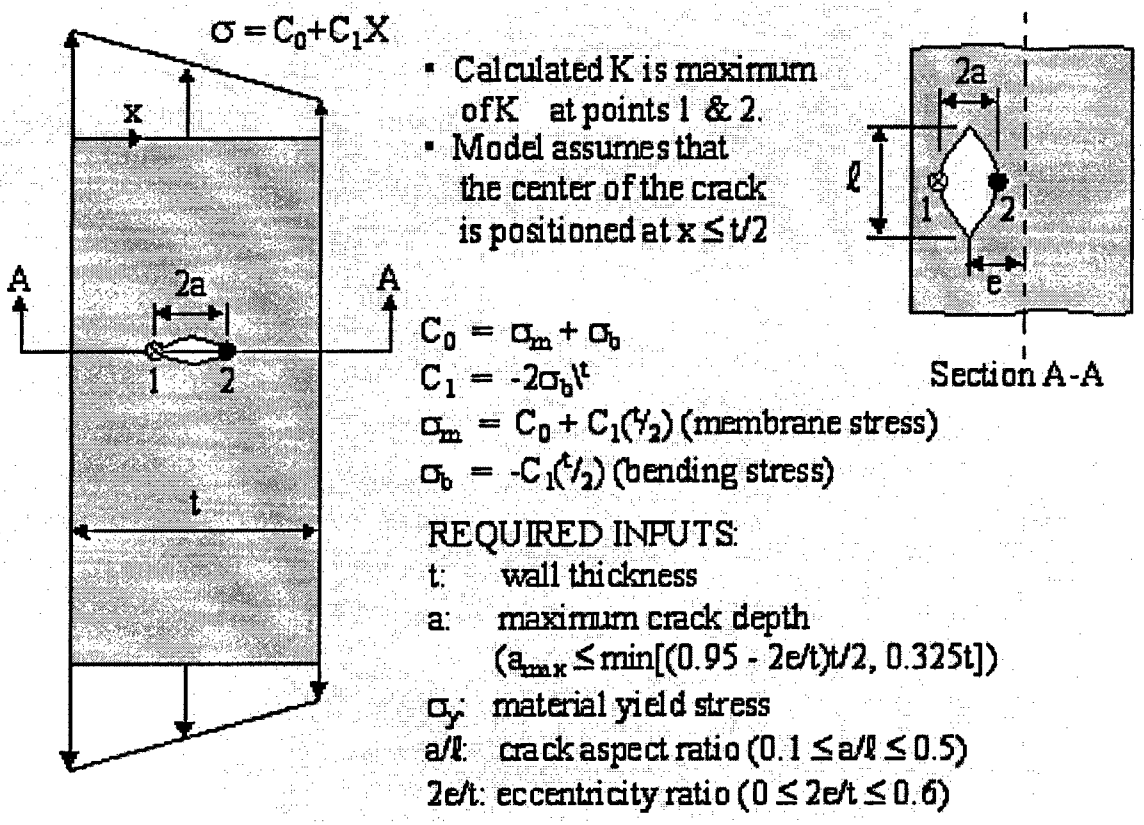

Figure 1: ASME B&PV Code Section XI Subsurface Crack Model

APPENDIX A

pc-CRACK OUTPUT FILES: ALLOWABLE FLAW DETERMINATION

PZRSUB2

tm

pc-CRACK for Windows

Version 3.1-98348

Structural Integrity Associates, Inc.
3315 Almaden Expressway, Suite 24
San Jose, CA 95118-1557
Voice: 408-978-8200
Fax: 408-978-8964
E-mail: pccrack@structint.com

Linear Elastic Fracture Mechanics

Date: Wed Oct 19 15:55:50 2005
Input Data and Results File: PZRSUB2.LFM

Title: POINT BEACH PRESSURIZER

Load Cases:

Case ID	Stress Coefficients C0	C1	C2	C3	Type
Unit	10	0	0	0	Coeff

------Through Wall Stresses for Load Cases With Stress Coeff-------

Wall Depth	Case Unit
0.0000	10
0.0750	10
0.1500	10
0.2250	10
0.3000	10
0.3750	10
0.4500	10
0.5250	10
0.6000	10
0.6750	10
0.7500	10

Crack Model: Elliptical Subsurface Cracked Plate Under Membrane & Bending Stresses

Reference: ASME Boiler and Pressure Vessel Code, Section XI, '86 Ed.
WARNING: The stress intensity factor (K) is the maximum of
K at point 1 and K at point 2 as identified in Section XI.

Crack Parameters:
Wall thickness: 4.4100
Max. crack depth: 0.7500
Crack aspect ratio: 0.1000
Eccentricity ratio: 0.5400
Material yield strength: 38.0000
Co = Sigma(membrane) + Sigma(bending)
C1 = -2*Sigma(bending)/thickness

----------Stress Intensity Factor----------

Crack Size	Case Unit
0.0150	2.07134
0.0300	2.93478
0.0450	3.60104
0.0600	4.16585
0.0750	4.6662
0.0900	5.12103
0.1050	5.54156
0.1200	5.93511
0.1350	6.30672
0.1500	6.66008
0.1650	6.99797
0.1800	7.32252
0.1950	7.63545
0.2100	7.93814
0.2250	8.23171
0.2400	8.51713
0.2550	8.79518
0.2700	9.06656
0.2850	9.33184
0.3000	9.59154
0.3150	9.84611
0.3300	10.0959
0.3450	10.3687
0.3600	10.6401
0.3750	10.9089
0.3900	11.1753
0.4050	11.4395
0.4200	11.7016
0.4350	11.9619
0.4500	12.2205
0.4650	12.4775
0.4800	12.733
0.4950	12.9871
0.5100	13.24
0.5250	13.4917
0.5400	13.7423
0.5550	13.998
0.5700	14.2712
0.5850	14.5442
0.6000	14.817
0.6150	15.0897
0.6300	15.3623
0.6450	15.6348
0.6600	15.9074
0.6750	16.18
0.6900	16.4526
0.7050	16.7254
0.7200	16.9982
0.7350	17.2713
0.7500	17.5445

Material fracture toughness:

Material ID: A216WCC

Depth	K1c
0.0000	200.0000

0.5000	200.0000
2.0000	200.0000
4.4000	200.0000

Load combination for critical crack size:

Load Case	Scale Factor
Unit	2.5000
Unit	0.5000

Crack Size	Total K	K1c
0.015	6.21401	200
0.03	8.80433	200
0.045	10.8031	200
0.06	12.4976	200
0.075	13.9986	200
0.09	15.3631	200
0.105	16.6247	200
0.12	17.8053	200
0.135	18.9202	200
0.15	19.9803	200
0.165	20.9939	200
0.18	21.9676	200
0.195	22.9063	200
0.21	23.8144	200
0.225	24.6951	200
0.24	25.5514	200
0.255	26.3855	200
0.27	27.1997	200
0.285	27.9955	200
0.3	28.7746	200
0.315	29.5383	200
0.33	30.2878	200
0.345	31.1062	200
0.36	31.9204	200
0.375	32.7267	200
0.39	33.5258	200
0.405	34.3184	200
0.42	35.1049	200
0.435	35.8857	200
0.45	36.6615	200
0.465	37.4324	200
0.48	38.1989	200
0.495	38.9613	200
0.51	39.7199	200
0.525	40.4751	200
0.54	41.2269	200
0.555	41.9939	200
0.57	42.8135	200
0.585	43.6325	200
0.6	44.4509	200
0.615	45.269	200
0.63	46.0868	200
0.645	46.9044	200
0.66	47.7221	200
0.675	48.5399	200
0.69	49.3578	200
0.705	50.1761	200
0.72	50.9947	200
0.735	51.8138	200

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0.75 52.6334 200

Critical crack size not found.

End of pc-CRACK Output

APPENDIX B

pc-CRACK OUTPUT FILE: FATIGUE CRACK GROWTH

PZRFATG2

tm

pc-CRACK for Windows

Version 3.1-98348

Structural Integrity Associates, Inc.
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Fax: 408-978-8964
E-mail: pccrack@structint.com

Linear Elastic Fracture Mechanics

Date: Wed Oct 19 16:23:54 2005
Input Data and Results File: PZRFATG2.LFM

Title: POINT BEACH PRESSURIZER

Load Cases:

Case ID	Stress Coefficients C0	C1	C2	C3	Type
Unit	10	0	0	0	Coeff

------Through Wall Stresses for Load Cases With Stress Coeff-------

Wall Depth	Case Unit
0.0000	10
0.0750	10
0.1500	10
0.2250	10
0.3000	10
0.3750	10
0.4500	10
0.5250	10
0.6000	10
0.6750	10
0.7500	10

Crack Model: Elliptical Subsurface Cracked Plate Under Membrane & Bending Stresses

Reference: ASME Boiler and Pressure Vessel Code, Section XI, '86 Ed.
WARNING: The stress intensity factor (K) is the maximum of
K at point 1 and K at point 2 as identified in Section XI.

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Max. crack depth: 0.7500
Crack aspect ratio: 0.1000
Eccentricity ratio: 0.5400
Material yield strength: 38.0000
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0.0900	5.12103
0.1050	5.54156
0.1200	5.93511
0.1350	6.30672
0.1500	6.66008
0.1650	6.99797
0.1800	7.32252
0.1950	7.63545
0.2100	7.93814
0.2250	8.23171
0.2400	8.51713
0.2550	8.79518
0.2700	9.06656
0.2850	9.33184
0.3000	9.59154
0.3150	9.84611
0.3300	10.0959
0.3450	10.3687
0.3600	10.6401
0.3750	10.9089
0.3900	11.1753
0.4050	11.4395
0.4200	11.7016
0.4350	11.9619
0.4500	12.2205
0.4650	12.4775
0.4800	12.733
0.4950	12.9871
0.5100	13.24
0.5250	13.4917
0.5400	13.7423
0.5550	13.998
0.5700	14.2712
0.5850	14.5442
0.6000	14.817
0.6150	15.0897
0.6300	15.3623
0.6450	15.6348
0.6600	15.9074
0.6750	16.18
0.6900	16.4526
0.7050	16.7254
0.7200	16.9982
0.7350	17.2713
0.7500	17.5445

Crack Growth Laws:

Law ID: PZR Fatigue
Model: ASME Section XI - ferritic steel in air environment

$$da/dN = C * S * dK^{3.07}$$

where

S = 25.72 * (2.88 - R')^(-3.07)
R = 0 for R < 0
R'= R for R >= 0
dK = Kmax - Kmin
R = Kmin / Kmax

where:
C = 1.9900e-010
is for the currently selected units of:
force: kip
length: inch

Material Fracture Toughness KIc:

Material ID: A216WCC

Depth	KIc
0.0000	200.0000
0.5000	200.0000
2.0000	200.0000
4.4000	200.0000

Initial crack size= 0.2850
Max. crack size= 0.7500

Number of blocks= 1
Print increment of block= 1

Subblock	Cycles /Time	Calc. incre.	Print incre.	Crk. Grw. Law	Mat. K1c
PZR	1000	50	50	PZR Fatigue	A216WCC

Subblock	Kmax Case ID	Kmax Scale Factor	Kmin Case ID	Kmin Scale Factor
PZR	Unit	3.0000	Unit	0.0000

Crack growth results:

Total Cycles /Time	Subblock Cycles /Time	Kmax	Kmin	DeltaK	R	DaDn /DaDt	Da	a	a/thk
Block: 1									
50	50	2.80e+001	0.00e+000	2.80e+001	0.00	5.51e-006	2.76e-004	0.2853	0.06
100	100	2.80e+001	0.00e+000	2.80e+001	0.00	5.52e-006	2.76e-004	0.2856	0.06
150	150	2.80e+001	0.00e+000	2.80e+001	0.00	5.53e-006	2.76e-004	0.2858	0.06
200	200	2.80e+001	0.00e+000	2.80e+001	0.00	5.54e-006	2.77e-004	0.2861	0.06
250	250	2.81e+001	0.00e+000	2.81e+001	0.00	5.55e-006	2.77e-004	0.2864	0.06
300	300	2.81e+001	0.00e+000	2.81e+001	0.00	5.56e-006	2.78e-004	0.2867	0.07
350	350	2.81e+001	0.00e+000	2.81e+001	0.00	5.56e-006	2.78e-004	0.2869	0.07
400	400	2.81e+001	0.00e+000	2.81e+001	0.00	5.57e-006	2.79e-004	0.2872	0.07
450	450	2.81e+001	0.00e+000	2.81e+001	0.00	5.58e-006	2.79e-004	0.2875	0.07

PZRFATG2

500	500	2.81e+001	0.00e+000	2.81e+001	0.00	5.59e-006	2.80e-004	0.2878	0.07
550	550	2.81e+001	0.00e+000	2.81e+001	0.00	5.60e-006	2.80e-004	0.2881	0.07
600	600	2.82e+001	0.00e+000	2.82e+001	0.00	5.61e-006	2.80e-004	0.2883	0.07
650	650	2.82e+001	0.00e+000	2.82e+001	0.00	5.62e-006	2.81e-004	0.2886	0.07
700	700	2.82e+001	0.00e+000	2.82e+001	0.00	5.63e-006	2.81e-004	0.2889	0.07
750	750	2.82e+001	0.00e+000	2.82e+001	0.00	5.64e-006	2.82e-004	0.2892	0.07
800	800	2.82e+001	0.00e+000	2.82e+001	0.00	5.64e-006	2.82e-004	0.2895	0.07
850	850	2.82e+001	0.00e+000	2.82e+001	0.00	5.65e-006	2.83e-004	0.2897	0.07
900	900	2.82e+001	0.00e+000	2.82e+001	0.00	5.66e-006	2.83e-004	0.29	0.07
950	950	2.83e+001	0.00e+000	2.83e+001	0.00	5.67e-006	2.84e-004	0.2903	0.07
1000	1000	2.83e+001	0.00e+000	2.83e+001	0.00	5.68e-006	2.84e-004	0.2906	0.07

End of pc-CRACK Output

APPENDIX C

PIPE-TS2 OUTPUT: THERMAL STRESS CALCULATION

```
 Date: 10-19-2005          Time: 13:59:47                          PAGE   1
********** ********** ********** ********** ********** ********** ********
        * * * * *  PIPE-TS2 VERSION 1.01  (4/17/91 1930)  * * * * *

========== ========= START OF INPUT ====== ========== =========

INPUT IS FROM THE SCREEN
THIS FILE IS => PZR4.OUT

CASE INFORMATION.....................................
CASE DESCRIPTION:
  THROUGHWALL THERMAL STRESS CALCULATION FOR POINT BEACH PZR


MODEL INFORMATION.....................................
  INSIDE RADIUS(INCHES) =  42
  OUTSIDE RADIUS(INCHES) =  46.4
  MATERIAL INTERFACE RADIUS(IN.) = 42.2

  NUMBER OF NODES IN PIPE MODEL 20
  NUMBER OF NODES FOR INNER MATERIAL  2


 Date: 10-19-2005          Time: 14:01:31                          PAGE   2
********** ********** ********** ********** ********** ********** ********
        * * * * *  PIPE-TS2 VERSION 1.01  (4/17/91 1930)  * * * * *

TEMPERATURE INFORMATION.....................................
  INITIAL PIPE WALL TEMPERATURE (F) =  680

  INSIDE FLUID TEMPERATURE HISTORY:  TIME(SEC)/TEMPERATURE(F) =
  TIME (SEC) =          0.00    T (F)   =  +680.0
  TIME (SEC) =       3600.00    T (F)   =  +480.0
  TIME (SEC) =       7200.00    T (F)   =  +280.0
  TIME (SEC) =      10800.00    T (F)   =   +80.0
  TIME (SEC) =     100000.00    T (F)   =   +80.0

  INSIDE FLUID HT TRANSFER COEFFICIENT HISTORY BTU/HR-FT2-F
  TIME (SEC) =          0.00    H (BTU/HR-FT2-F) = +8.0000E+02
  TIME (SEC) =     100000.00    H (BTU/HR-FT2-F) = +8.0000E+02

  OUTSIDE FLUID TEMPERATURE HISTORY: TIME(SEC)/TEMPERATURE(F) =
  TIME (SEC) =          0.00    T (F)   =  +100.0
  TIME (SEC) =     100000.00    T (F)   =  +100.0

  OUTSIDE HT TRANSFER COEFFICIENT HISTORY BTU/HR-FT2-F
        TIME/HEAT TRANSFER COEFFICIENT =
  TIME (SEC) =          0.00    H (BTU/HR-FT2-F) = +2.0000E-01
  TIME (SEC) =     100000.00    H (BTU/HR-FT2-F) = +2.0000E-01


 Date: 10-19-2005          Time: 14:03:50                          PAGE   3
********** ********** ********** ********** ********** ********** ********
        * * * * *  PIPE-TS2 VERSION 1.01  (4/17/91 1930)  * * * * *

MATERIAL PROPERTIES (INNER MATERIAL) ..............

  CONDUCTIVITY(BTU/HR-FT-F) = 10
  DENSITY (LB/FT3)  X SPECIFIC HEAT  (BTU/LB-F)
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    RHOCP(BTU/FT3-F) = 53.68
  E - MODULUS OF ELASTICITY(KSI) = 27000
  ALPHA - COEFFICIENT OF THERMAL EXPANSION(IN/IN-F) = .00001
  NU - POISSONS RATIO = .3

MATERIAL PROPERTIES (OUTER MATERIAL).....................

  CONDUCTIVITY(BTU/HR-FT-F) = 26
  DENSITY (LB/FT3) x SPECIFIC HEAT (BTU/LB-F)
    RHOCP(BTU/FT3-F) = 55.031
  E - MODULUS OF ELASTICITY(KSI) = 28500
  ALPHA - COEFFICIENT OF THERMAL EXPANSION (IN/IN-F) = .0000068
  NU - POISSONS RATIO = .3

  STRESS-FREE TEMPERATURE FOR BIMETALLIC CYLINDER (F)
    May be any value for single material      T =  70

TIME CONTROL INFORMATION.....................

  MAXIMUM STABLE TIME STEP IS APPROXIMATELY  0.64  SECONDS

  NUMBER OF TIME STEP CONTROL INTERVALS =  7

  FOR INTERVAL  1
    END OF INTERVAL TIME (SEC) = 300     TIME STEP(SEC) = .5
    PRINT/EVALUATION INTERVAL(SEC) = 50

  FOR INTERVAL  2
    END OF INTERVAL TIME (SEC) = 900     TIME STEP(SEC) = .5
    PRINT/EVALUATION INTERVAL(SEC) = 100

  FOR INTERVAL  3
    END OF INTERVAL TIME (SEC) = 3600     TIME STEP(SEC) = .5
    PRINT/EVALUATION INTERVAL(SEC) = 200

  FOR INTERVAL  4
    END OF INTERVAL TIME (SEC) = 7200     TIME STEP(SEC) = .5
    PRINT/EVALUATION INTERVAL(SEC) = 600

  FOR INTERVAL  5
    END OF INTERVAL TIME (SEC) = 10800     TIME STEP(SEC) = .5
    PRINT/EVALUATION INTERVAL(SEC) = 600

  FOR INTERVAL  6
    END OF INTERVAL TIME (SEC) = 20000     TIME STEP(SEC) = .637549
      WARNING:  Time step set to stable time step =  .6374549
    PRINT/EVALUATION INTERVAL(SEC) = 1000

  FOR INTERVAL  7
    END OF INTERVAL TIME (SEC) = 100000     TIME STEP(SEC) = .5
    PRINT/EVALUATION INTERVAL(SEC) = 5000



==========END OF INPUT========== ============== =========

DATE = 10-19-2005     TIME = 14:10:59
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.....OUTPUT FOR TIME= 0.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	680.0	
1	42.0000	42.0500	-72.22	-72.20	+0.00	680.0	680.0
2	42.1000	42.1500	-72.05	-72.20	-0.17	680.0	680.0
3	42.2000	42.3167	Interface	(below)	-0.34	680.0	680.0
4	42.4333	42.5500	+3.59	+3.27	-0.32	680.0	680.0
5	42.6667	42.7833	+3.57	+3.27	-0.30	680.0	680.0
6	42.9000	43.0167	+3.55	+3.27	-0.28	680.0	680.0
7	43.1333	43.2500	+3.53	+3.27	-0.26	680.0	680.0
8	43.3667	43.4833	+3.50	+3.27	-0.24	680.0	680.0
9	43.6000	43.7167	+3.48	+3.27	-0.22	680.0	680.0
10	43.8333	43.9500	+3.47	+3.27	-0.20	680.0	680.0
11	44.0667	44.1833	+3.45	+3.27	-0.18	680.0	680.0
12	44.3000	44.4167	+3.43	+3.27	-0.16	680.0	680.0
13	44.5333	44.6500	+3.41	+3.27	-0.14	680.0	680.0
14	44.7667	44.8833	+3.39	+3.27	-0.12	680.0	680.0
15	45.0000	45.1167	+3.37	+3.27	-0.10	680.0	680.0
16	45.2333	45.3500	+3.35	+3.27	-0.09	680.0	680.0
17	45.4667	45.5833	+3.34	+3.27	-0.07	680.0	680.0
18	45.7000	45.8167	+3.32	+3.27	-0.05	680.0	680.0
19	45.9333	46.0500	+3.30	+3.27	-0.03	680.0	680.0
20	46.1667	46.2833	+3.28	+3.27	-0.02	680.0	680.0
21	46.4000	46.5167	+3.27	+3.27	-0.00	680.0	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-71.88	-72.20	-0.34
FOR OUTER MATERIAL	+3.61	+3.27	-0.34

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	-0.00	-0.16
HOOP MEMBRANE	N/A	-0.00
AVERAGE RADIAL	N/A	-0.16
AXIAL BENDING	+9.53	+9.82
INSIDE BENDING	-9.69	-9.99
OUTSIDE BENDING	+9.37	+9.66
HOOP BENDING	N/A	+9.67
INSIDE BENDING	N/A	-9.67
OUTSIDE BENDING	N/A	+9.67

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	680.0	680.0
DELTA T1 (Total Section Delta T)	-0.0	+0.0
LINEAR INSIDE TEMPERATURE	680.0	680.0
LINEAR OUTSIDE TEMPERATURE	680.0	680.0
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 50.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	677.2	
1	42.0000	42.0500	-71.52	-71.51	+0.00	678.0	678.2
2	42.1000	42.1500	-71.53	-71.69	-0.17	678.4	678.6
3	42.2000	42.3167	Interface	(below)	-0.34	678.8	679.0
4	42.4333	42.5500	+3.72	+3.40	-0.32	679.2	679.3
5	42.6667	42.7833	+3.63	+3.34	-0.29	679.4	679.5

6	42.9000	43.0167	+3.56	+3.29	-0.27	679.6	679.7
7	43.1333	43.2500	+3.51	+3.25	-0.25	679.7	679.8
8	43.3667	43.4833	+3.46	+3.23	-0.23	679.8	679.8
9	43.6000	43.7167	+3.42	+3.21	-0.21	679.9	679.9
10	43.8333	43.9500	+3.39	+3.20	-0.19	679.9	679.9
11	44.0667	44.1833	+3.37	+3.19	-0.17	679.9	679.9
12	44.3000	44.4167	+3.35	+3.19	-0.16	679.9	679.9
13	44.5333	44.6500	+3.33	+3.19	-0.14	679.9	679.9
14	44.7667	44.8833	+3.31	+3.19	-0.12	679.9	679.9
15	45.0000	45.1167	+3.30	+3.20	-0.10	679.9	679.9
16	45.2333	45.3500	+3.29	+3.21	-0.08	679.9	679.9
17	45.4667	45.5833	+3.28	+3.22	-0.07	679.8	679.8
18	45.7000	45.8167	+3.28	+3.23	-0.05	679.8	679.8
19	45.9333	46.0500	+3.28	+3.24	-0.03	679.7	679.7
20	46.1667	46.2833	+3.28	+3.26	-0.02	679.7	679.6
21	46.4000	46.5167	+3.29	+3.29	-0.00	679.6	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-71.53	-71.85	-0.34
FOR OUTER MATERIAL	+3.83	+3.49	-0.34

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.16
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.16
AXIAL BENDING	+9.40	+9.70
INSIDE BENDING	-9.56	-9.86
OUTSIDE BENDING	+9.25	+9.54
HOOP BENDING	N/A	+9.54
INSIDE BENDING	N/A	-9.54
OUTSIDE BENDING	N/A	+9.55

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	679.7	679.7
DELTA T1 (Total Section Delta T)	+0.7	+0.8
LINEAR INSIDE TEMPERATURE	679.3	679.3
LINEAR OUTSIDE TEMPERATURE	680.0	680.1
DELTA T2 (Absolute of Maximum)	1.4	1.3

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.................OUTPUT FOR TIME = 100.00 SECONDS....................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		674.4
1	42.0000	42.0500	-70.79	-70.78	+0.00	675.6	676.0
2	42.1000	42.1500	-70.92	-71.07	-0.17	676.4	676.8
3	42.2000	42.3167	Interface	(below)	-0.34	677.1	677.4
4	42.4333	42.5500	+3.95	+3.64	-0.31	677.7	677.9
5	42.6667	42.7833	+3.80	+3.51	-0.29	678.1	678.4
6	42.9000	43.0167	+3.67	+3.40	-0.27	678.5	678.7
7	43.1333	43.2500	+3.56	+3.32	-0.25	678.8	679.0
8	43.3667	43.4833	+3.48	+3.25	-0.23	679.1	679.2
9	43.6000	43.7167	+3.40	+3.20	-0.21	679.3	679.4
10	43.8333	43.9500	+3.34	+3.16	-0.19	679.4	679.5
11	44.0667	44.1833	+3.29	+3.13	-0.17	679.5	679.6
12	44.3000	44.4167	+3.26	+3.10	-0.15	679.6	679.6
13	44.5333	44.6500	+3.22	+3.09	-0.13	679.7	679.7
14	44.7667	44.8833	+3.20	+3.08	-0.12	679.7	679.7

15	45.0000	45.1167	+3.18	+3.08	-0.10	679.7	679.7
16	45.2333	45.3500	+3.17	+3.09	-0.08	679.7	679.7
17	45.4667	45.5833	+3.16	+3.09	-0.06	679.6	679.6
18	45.7000	45.8167	+3.16	+3.11	-0.05	679.6	679.6
19	45.9333	46.0500	+3.16	+3.12	-0.03	679.5	679.5
20	46.1667	46.2833	+3.16	+3.14	-0.02	679.5	679.4
21	46.4000	46.5167	+3.16	+3.16	-0.00	679.4	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-71.03	-71.35	-0.34
FOR OUTER MATERIAL	+4.13	+3.79	-0.34

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.16
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.16
AXIAL BENDING	+9.15	+9.44
INSIDE BENDING	-9.30	-9.60
OUTSIDE BENDING	+9.00	+9.29
HOOP BENDING	N/A	+9.29
INSIDE BENDING	N/A	-9.29
OUTSIDE BENDING	N/A	+9.29

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	679.1	679.1
DELTA T1 (Total Section Delta T)	+2.3	+2.4
LINEAR INSIDE TEMPERATURE	677.9	677.9
LINEAR OUTSIDE TEMPERATURE	680.2	680.2
DELTA T2 (Absolute of Maximum)	2.3	2.2

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 150.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	671.7	
1	42.0000	42.0500	-70.09	-70.07	+0.00	673.2	673.7
2	42.1000	42.1500	-70.31	-70.46	-0.17	674.2	674.7
3	42.2000	42.3167	Interface (below)		-0.33	675.2	675.6
4	42.4333	42.5500	+4.19	+3.88	-0.31	675.9	676.3
5	42.6667	42.7833	+3.98	+3.70	-0.28	676.6	676.9
6	42.9000	43.0167	+3.81	+3.54	-0.26	677.2	677.4
7	43.1333	43.2500	+3.65	+3.41	-0.24	677.6	677.9
8	43.3667	43.4833	+3.52	+3.30	-0.22	678.0	678.2
9	43.6000	43.7167	+3.41	+3.21	-0.20	678.4	678.5
10	43.8333	43.9500	+3.32	+3.14	-0.18	678.6	678.7
11	44.0667	44.1833	+3.24	+3.08	-0.16	678.8	678.9
12	44.3000	44.4167	+3.18	+3.03	-0.14	679.0	679.1
13	44.5333	44.6500	+3.12	+3.00	-0.13	679.1	679.2
14	44.7667	44.8833	+3.08	+2.97	-0.11	679.2	679.3
15	45.0000	45.1167	+3.05	+2.96	-0.09	679.3	679.3
16	45.2333	45.3500	+3.03	+2.95	-0.08	679.3	679.3
17	45.4667	45.5833	+3.01	+2.95	-0.06	679.3	679.3
18	45.7000	45.8167	+3.00	+2.95	-0.05	679.3	679.3
19	45.9333	46.0500	+2.99	+2.96	-0.03	679.3	679.2
20	46.1667	46.2833	+2.99	+2.98	-0.02	679.2	679.2
21	46.4000	46.5167	+3.00	+3.00	-0.00	679.1	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-70.51	-70.82	-0.33
FOR OUTER MATERIAL	+4.43	+4.10	-0.33

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.15
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.15
AXIAL BENDING	+8.87	+9.15
INSIDE BENDING	-9.01	-9.30
OUTSIDE BENDING	+8.72	+9.00
HOOP BENDING	N/A	+9.01
INSIDE BENDING	N/A	-9.00
OUTSIDE BENDING	N/A	+9.01

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	678.3	678.2
DELTA T1 (Total Section Delta T)	+4.1	+4.2
LINEAR INSIDE TEMPERATURE	676.2	676.1
LINEAR OUTSIDE TEMPERATURE	680.3	680.3
DELTA T2 (Absolute of Maximum)	2.9	2.9

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 200.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	668.9	
1	42.0000	42.0500	-69.40	-69.39	+0.00	670.7	671.4
2	42.1000	42.1500	-69.71	-69.85	-0.17	672.0	672.5
3	42.2000	42.3167	Interface (below)		-0.33	673.1	673.6
4	42.4333	42.5500	+4.42	+4.12	-0.30	674.1	674.5
5	42.6667	42.7833	+4.17	+3.89	-0.28	674.9	675.3
6	42.9000	43.0167	+3.94	+3.69	-0.25	675.6	676.0
7	43.1333	43.2500	+3.75	+3.51	-0.23	676.2	676.5
8	43.3667	43.4833	+3.58	+3.36	-0.21	676.8	677.0
9	43.6000	43.7167	+3.43	+3.24	-0.19	677.2	677.5
10	43.8333	43.9500	+3.30	+3.13	-0.17	677.6	677.8
11	44.0667	44.1833	+3.20	+3.04	-0.15	677.9	678.1
12	44.3000	44.4167	+3.11	+2.97	-0.14	678.2	678.3
13	44.5333	44.6500	+3.03	+2.91	-0.12	678.4	678.5
14	44.7667	44.8833	+2.97	+2.86	-0.10	678.6	678.7
15	45.0000	45.1167	+2.92	+2.83	-0.09	678.7	678.8
16	45.2333	45.3500	+2.88	+2.81	-0.07	678.8	678.8
17	45.4667	45.5833	+2.85	+2.79	-0.06	678.8	678.9
18	45.7000	45.8167	+2.83	+2.79	-0.04	678.9	678.9
19	45.9333	46.0500	+2.82	+2.79	-0.03	678.8	678.8
20	46.1667	46.2833	+2.82	+2.81	-0.01	678.8	678.8
21	46.4000	46.5167	+2.83	+2.83	-0.00	678.7	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-69.99	-70.30	-0.33
FOR OUTER MATERIAL	+4.71	+4.38	-0.33

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.15
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.15

PZR4

AXIAL BENDING	+8.58	+8.86
INSIDE BENDING	-8.72	-9.01
OUTSIDE BENDING	+8.44	+8.72
HOOP BENDING	N/A	+8.72
INSIDE BENDING	N/A	-8.71
OUTSIDE BENDING	N/A	+8.72

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	677.3	677.2
DELTA T1 (Total Section Delta T)	+6.0	+6.1
LINEAR INSIDE TEMPERATURE	674.2	674.2
LINEAR OUTSIDE TEMPERATURE	680.2	680.3
DELTA T2 (Absolute of Maximum)	3.5	3.4

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 250.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	666.1	
1	42.0000	42.0500	-68.75	-68.73	+0.00	668.2	669.0
2	42.1000	42.1500	-69.12	-69.27	-0.16	669.6	670.3
3	42.2000	42.3167	Interface (below)		-0.33	671.0	671.6
4	42.4333	42.5500	+4.64	+4.34	-0.30	672.1	672.6
5	42.6667	42.7833	+4.34	+4.06	-0.27	673.1	673.5
6	42.9000	43.0167	+4.07	+3.82	-0.25	673.9	674.3
7	43.1333	43.2500	+3.84	+3.61	-0.23	674.7	675.1
8	43.3667	43.4833	+3.63	+3.43	-0.20	675.4	675.7
9	43.6000	43.7167	+3.45	+3.26	-0.18	676.0	676.2
10	43.8333	43.9500	+3.29	+3.13	-0.17	676.5	676.7
11	44.0667	44.1833	+3.16	+3.01	-0.15	676.9	677.1
12	44.3000	44.4167	+3.04	+2.91	-0.13	677.2	677.4
13	44.5333	44.6500	+2.94	+2.83	-0.11	677.5	677.7
14	44.7667	44.8833	+2.86	+2.76	-0.10	677.8	677.9
15	45.0000	45.1167	+2.79	+2.71	-0.08	678.0	678.0
16	45.2333	45.3500	+2.74	+2.67	-0.07	678.1	678.2
17	45.4667	45.5833	+2.70	+2.65	-0.05	678.2	678.2
18	45.7000	45.8167	+2.67	+2.63	-0.04	678.2	678.3
19	45.9333	46.0500	+2.66	+2.63	-0.03	678.3	678.2
20	46.1667	46.2833	+2.65	+2.64	-0.01	678.2	678.2
21	46.4000	46.5167	+2.66	+2.66	-0.00	678.2	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-69.47	-69.79	-0.33
FOR OUTER MATERIAL	+4.97	+4.64	-0.33

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.14
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.14
AXIAL BENDING	+8.30	+8.58
INSIDE BENDING	-8.44	-8.72
OUTSIDE BENDING	+8.17	+8.44
HOOP BENDING	N/A	+8.44
INSIDE BENDING	N/A	-8.44
OUTSIDE BENDING	N/A	+8.44

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	676.1	676.1

DELTA T1 (Total Section Delta T)	+7.7	+7.8
LINEAR INSIDE TEMPERATURE	672.2	672.2
LINEAR OUTSIDE TEMPERATURE	679.9	680.0
DELTA T2 (Absolute of Maximum)	4.0	3.9

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 300.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	663.3	
1	42.0000	42.0500	-68.12	-68.10	+0.00	665.7	666.5
2	42.1000	42.1500	-68.56	-68.71	-0.16	667.3	668.0
3	42.2000	42.3167	Interface	(below)	-0.32	668.8	669.4
4	42.4333	42.5500	+4.84	+4.54	-0.30	670.0	670.6
5	42.6667	42.7833	+4.50	+4.23	-0.27	671.1	671.7
6	42.9000	43.0167	+4.19	+3.95	-0.24	672.2	672.6
7	43.1333	43.2500	+3.92	+3.70	-0.22	673.0	673.5
8	43.3667	43.4833	+3.68	+3.48	-0.20	673.8	674.2
9	43.6000	43.7167	+3.47	+3.29	-0.18	674.5	674.9
10	43.8333	43.9500	+3.28	+3.12	-0.16	675.1	675.4
11	44.0667	44.1833	+3.12	+2.98	-0.14	675.7	675.9
12	44.3000	44.4167	+2.98	+2.85	-0.12	676.1	676.3
13	44.5333	44.6500	+2.86	+2.75	-0.11	676.5	676.7
14	44.7667	44.8833	+2.76	+2.66	-0.09	676.8	676.9
15	45.0000	45.1167	+2.67	+2.59	-0.08	677.1	677.2
16	45.2333	45.3500	+2.61	+2.54	-0.07	677.2	677.3
17	45.4667	45.5833	+2.56	+2.50	-0.05	677.4	677.4
18	45.7000	45.8167	+2.52	+2.48	-0.04	677.5	677.5
19	45.9333	46.0500	+2.50	+2.47	-0.03	677.5	677.5
20	46.1667	46.2833	+2.49	+2.48	-0.01	677.5	677.5
21	46.4000	46.5167	+2.50	+2.49	-0.00	677.4	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-68.98	-69.28	-0.32
FOR OUTER MATERIAL	+5.21	+4.89	-0.32

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.14
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.14
AXIAL BENDING	+8.04	+8.32
INSIDE BENDING	-8.17	-8.45
OUTSIDE BENDING	+7.91	+8.18
HOOP BENDING	N/A	+8.18
INSIDE BENDING	N/A	-8.17
OUTSIDE BENDING	N/A	+8.18

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	674.9	674.8
DELTA T1 (Total Section Delta T)	+9.4	+9.5
LINEAR INSIDE TEMPERATURE	670.1	670.0
LINEAR OUTSIDE TEMPERATURE	679.5	679.5
DELTA T2 (Absolute of Maximum)	4.4	4.3

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

PZR4

................OUTPUT FOR TIME = 400.00 SECONDS..................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		657.8
1	42.0000	42.0500	-66.93	-66.92	+0.00	660.6	661.5
2	42.1000	42.1500	-67.49	-67.63	-0.16	662.4	663.4
3	42.2000	42.3167	Interface	(below)	-0.32	664.2	665.0
4	42.4333	42.5500	+5.19	+4.90	-0.29	665.7	666.4
5	42.6667	42.7833	+4.78	+4.52	-0.26	667.1	667.7
6	42.9000	43.0167	+4.41	+4.17	-0.23	668.3	668.9
7	43.1333	43.2500	+4.07	+3.86	-0.21	669.5	670.0
8	43.3667	43.4833	+3.77	+3.59	-0.19	670.5	670.9
9	43.6000	43.7167	+3.50	+3.34	-0.17	671.4	671.8
10	43.8333	43.9500	+3.27	+3.12	-0.15	672.2	672.5
11	44.0667	44.1833	+3.05	+2.92	-0.13	672.9	673.2
12	44.3000	44.4167	+2.87	+2.76	-0.11	673.5	673.7
13	44.5333	44.6500	+2.71	+2.61	-0.10	674.0	674.2
14	44.7667	44.8833	+2.57	+2.49	-0.08	674.4	674.6
15	45.0000	45.1167	+2.46	+2.39	-0.07	674.8	674.9
16	45.2333	45.3500	+2.37	+2.31	-0.06	675.1	675.2
17	45.4667	45.5833	+2.30	+2.25	-0.05	675.3	675.4
18	45.7000	45.8167	+2.25	+2.21	-0.03	675.4	675.5
19	45.9333	46.0500	+2.21	+2.19	-0.02	675.5	675.5
20	46.1667	46.2833	+2.20	+2.19	-0.01	675.5	675.5
21	46.4000	46.5167	+2.20	+2.20	-0.00	675.5	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-68.02	-68.32	-0.32
FOR OUTER MATERIAL	+5.63	+5.31	-0.32

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.13
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.13
AXIAL BENDING	+7.57	+7.84
INSIDE BENDING	-7.69	-7.97
OUTSIDE BENDING	+7.44	+7.71
HOOP BENDING	N/A	+7.70
INSIDE BENDING	N/A	-7.70
OUTSIDE BENDING	N/A	+7.70

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	671.9	671.8
DELTA T1 (Total Section Delta T)	+12.3	+12.4
LINEAR INSIDE TEMPERATURE	665.7	665.6
LINEAR OUTSIDE TEMPERATURE	678.0	678.0
DELTA T2 (Absolute of Maximum)	5.1	5.0

................OUTPUT FOR TIME = 500.00 SECONDS..................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		652.2
1	42.0000	42.0500	-65.83	-65.82	+0.00	655.4	656.5
2	42.1000	42.1500	-66.48	-66.62	-0.16	657.5	658.5
3	42.2000	42.3167	Interface	(below)	-0.32	659.5	660.4
4	42.4333	42.5500	+5.47	+5.19	-0.28	661.2	662.1
5	42.6667	42.7833	+5.01	+4.76	-0.25	662.8	663.6

6	42.9000	43.0167	+4.58	+4.36	-0.22	664.2	664.9
7	43.1333	43.2500	+4.20	+4.00	-0.20	665.5	666.2
8	43.3667	43.4833	+3.85	+3.67	-0.18	666.7	667.3
9	43.6000	43.7167	+3.53	+3.37	-0.16	667.8	668.3
10	43.8333	43.9500	+3.25	+3.11	-0.14	668.8	669.2
11	44.0667	44.1833	+2.99	+2.87	-0.12	669.6	670.0
12	44.3000	44.4167	+2.77	+2.67	-0.10	670.3	670.7
13	44.5333	44.6500	+2.58	+2.49	-0.09	671.0	671.3
14	44.7667	44.8833	+2.41	+2.34	-0.08	671.5	671.8
15	45.0000	45.1167	+2.28	+2.21	-0.06	672.0	672.2
16	45.2333	45.3500	+2.16	+2.11	-0.05	672.4	672.5
17	45.4667	45.5833	+2.07	+2.03	-0.04	672.6	672.8
18	45.7000	45.8167	+2.01	+1.98	-0.03	672.8	672.9
19	45.9333	46.0500	+1.97	+1.95	-0.02	673.0	673.0
20	46.1667	46.2833	+1.95	+1.94	-0.01	673.0	673.0
21	46.4000	46.5167	+1.95	+1.95	-0.00	672.9	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-67.10	-67.40	-0.32
FOR OUTER MATERIAL	+5.98	+5.67	-0.32

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.12
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.12
AXIAL BENDING	+7.15	+7.42
INSIDE BENDING	-7.27	-7.54
OUTSIDE BENDING	+7.04	+7.30
HOOP BENDING	N/A	+7.28
INSIDE BENDING	N/A	-7.28
OUTSIDE BENDING	N/A	+7.28

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	668.6	668.5
DELTA T1 (Total Section Delta T)	+14.8	+14.9
LINEAR INSIDE TEMPERATURE	661.1	661.0
LINEAR OUTSIDE TEMPERATURE	675.8	675.9
DELTA T2 (Absolute of Maximum)	5.7	5.6

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

................OUTPUT FOR TIME = 600.00 SECONDS....................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi hoop	axial	------ radial	Temperature, F Grid	Node
					(Inside fluid)		646.7
1	42.0000	42.0500	-64.80	-64.78	+0.00	650.2	651.3
2	42.1000	42.1500	-65.53	-65.67	-0.15	652.4	653.6
3	42.2000	42.3167	Interface	(below)	-0.31	654.7	655.7
4	42.4333	42.5500	+5.71	+5.44	-0.28	656.6	657.5
5	42.6667	42.7833	+5.20	+4.95	-0.24	658.3	659.1
6	42.9000	43.0167	+4.73	+4.51	-0.22	659.9	660.7
7	43.1333	43.2500	+4.29	+4.10	-0.19	661.4	662.1
8	43.3667	43.4833	+3.90	+3.73	-0.17	662.7	663.4
9	43.6000	43.7167	+3.55	+3.40	-0.15	663.9	664.5
10	43.8333	43.9500	+3.23	+3.10	-0.13	665.0	665.5
11	44.0667	44.1833	+2.94	+2.83	-0.11	666.0	666.4
12	44.3000	44.4167	+2.69	+2.59	-0.10	666.8	667.2
13	44.5333	44.6500	+2.47	+2.38	-0.08	667.6	667.9
14	44.7667	44.8833	+2.28	+2.21	-0.07	668.2	668.5

15	45.0000	45.1167	+2.11	+2.06	-0.06	668.8	669.0
16	45.2333	45.3500	+1.98	+1.94	-0.05	669.2	669.4
17	45.4667	45.5833	+1.88	+1.84	-0.04	669.6	669.7
18	45.7000	45.8167	+1.80	+1.77	-0.03	669.8	669.9
19	45.9333	46.0500	+1.75	+1.73	-0.02	669.9	670.0
20	46.1667	46.2833	+1.73	+1.72	-0.01	670.0	670.0
21	46.4000	46.5167	+1.73	+1.73	-0.00	670.0	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-66.23	-66.53	-0.31
FOR OUTER MATERIAL	+6.27	+5.96	-0.31

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.11
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.12
AXIAL BENDING	+6.79	+7.05
INSIDE BENDING	-6.90	-7.16
OUTSIDE BENDING	+6.68	+6.94
HOOP BENDING	N/A	+6.91
INSIDE BENDING	N/A	-6.91
OUTSIDE BENDING	N/A	+6.92

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	664.9	664.8
DELTA T1 (Total Section Delta T)	+16.8	+17.0
LINEAR INSIDE TEMPERATURE	656.3	656.3
LINEAR OUTSIDE TEMPERATURE	673.2	673.3
DELTA T2 (Absolute of Maximum)	6.2	6.1

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

................OUTPUT FOR TIME = 700.00 SECONDS...................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		641.1
1	42.0000	42.0500	-63.82	-63.81	+0.00	644.9	646.1
2	42.1000	42.1500	-64.62	-64.76	-0.15	647.3	648.5
3	42.2000	42.3167	Interface	(below)	-0.31	649.7	650.8
4	42.4333	42.5500	+5.91	+5.64	-0.27	651.8	652.7
5	42.6667	42.7833	+5.35	+5.12	-0.24	653.6	654.6
6	42.9000	43.0167	+4.84	+4.63	-0.21	655.4	656.2
7	43.1333	43.2500	+4.37	+4.19	-0.18	657.0	657.8
8	43.3667	43.4833	+3.94	+3.78	-0.16	658.5	659.2
9	43.6000	43.7167	+3.55	+3.41	-0.14	659.8	660.4
10	43.8333	43.9500	+3.20	+3.08	-0.12	661.0	661.6
11	44.0667	44.1833	+2.89	+2.78	-0.10	662.1	662.6
12	44.3000	44.4167	+2.61	+2.52	-0.09	663.0	663.5
13	44.5333	44.6500	+2.36	+2.29	-0.08	663.9	664.2
14	44.7667	44.8833	+2.15	+2.09	-0.06	664.6	664.9
15	45.0000	45.1167	+1.97	+1.92	-0.05	665.2	665.5
16	45.2333	45.3500	+1.83	+1.78	-0.04	665.7	665.9
17	45.4667	45.5833	+1.71	+1.68	-0.03	666.1	666.2
18	45.7000	45.8167	+1.62	+1.60	-0.02	666.3	666.5
19	45.9333	46.0500	+1.57	+1.55	-0.02	666.5	666.6
20	46.1667	46.2833	+1.54	+1.53	-0.01	666.6	666.6
21	46.4000	46.5167	+1.54	+1.54	-0.00	666.6	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

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FOR INNER MATERIAL	-65.39	-65.68	-0.31
FOR OUTER MATERIAL	+6.51	+6.20	-0.31

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.11
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.11
AXIAL BENDING	+6.47	+6.73
INSIDE BENDING	-6.57	-6.83
OUTSIDE BENDING	+6.36	+6.62
HOOP BENDING	N/A	+6.59
INSIDE BENDING	N/A	-6.59
OUTSIDE BENDING	N/A	+6.60

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	660.9	660.8
DELTA T1 (Total Section Delta T)	+18.6	+18.8
LINEAR INSIDE TEMPERATURE	651.5	651.4
LINEAR OUTSIDE TEMPERATURE	670.1	670.1
DELTA T2 (Absolute of Maximum)	6.6	6.5

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	635.6	
1	42.0000	42.0500	-62.90	-62.88	+0.00	639.5	640.8
2	42.1000	42.1500	-63.76	-63.89	-0.15	642.1	643.4
3	42.2000	42.3167	Interface	(below)	-0.30	644.7	645.8
4	42.4333	42.5500	+6.07	+5.80	-0.27	646.8	647.9
5	42.6667	42.7833	+5.48	+5.25	-0.23	648.8	649.8
6	42.9000	43.0167	+4.93	+4.73	-0.20	650.7	651.6
7	43.1333	43.2500	+4.43	+4.26	-0.18	652.4	653.2
8	43.3667	43.4833	+3.97	+3.82	-0.15	654.0	654.7
9	43.6000	43.7167	+3.56	+3.42	-0.13	655.4	656.1
10	43.8333	43.9500	+3.18	+3.06	-0.11	656.7	657.3
11	44.0667	44.1833	+2.84	+2.74	-0.10	657.9	658.4
12	44.3000	44.4167	+2.54	+2.46	-0.08	658.9	659.4
13	44.5333	44.6500	+2.27	+2.20	-0.07	659.8	660.3
14	44.7667	44.8833	+2.04	+1.99	-0.06	660.6	661.0
15	45.0000	45.1167	+1.85	+1.80	-0.05	661.3	661.6
16	45.2333	45.3500	+1.69	+1.65	-0.04	661.8	662.1
17	45.4667	45.5833	+1.56	+1.53	-0.03	662.3	662.4
18	45.7000	45.8167	+1.47	+1.45	-0.02	662.6	662.7
19	45.9333	46.0500	+1.41	+1.39	-0.01	662.8	662.8
20	46.1667	46.2833	+1.38	+1.37	-0.01	662.9	662.9
21	46.4000	46.5167	+1.38	+1.38	-0.00	662.8	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-64.58	-64.87	-0.30
FOR OUTER MATERIAL	+6.71	+6.40	-0.30

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.10
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.11

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AXIAL BENDING	+6.18	+6.44
INSIDE BENDING	-6.28	-6.54
OUTSIDE BENDING	+6.08	+6.34
HOOP BENDING	N/A	+6.31
INSIDE BENDING	N/A	-6.30
OUTSIDE BENDING	N/A	+6.31

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	656.7	656.5
DELTA T1 (Total Section Delta T)	+20.1	+20.2
LINEAR INSIDE TEMPERATURE	646.5	646.4
LINEAR OUTSIDE TEMPERATURE	666.6	666.7
DELTA T2 (Absolute of Maximum)	7.0	6.9

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 900.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial (Inside fluid)	Temperature, F Grid	Node 630.0
1	42.0000	42.0500	-62.02	-62.00	+0.00	634.1	635.5
2	42.1000	42.1500	-62.92	-63.05	-0.15	636.9	638.2
3	42.2000	42.3167	Interface (below)		-0.30	639.5	640.7
4	42.4333	42.5500	+6.20	+5.94	-0.26	641.8	642.9
5	42.6667	42.7833	+5.58	+5.35	-0.23	643.9	644.9
6	42.9000	43.0167	+5.01	+4.81	-0.20	645.9	646.8
7	43.1333	43.2500	+4.48	+4.31	-0.17	647.7	648.6
8	43.3667	43.4833	+4.00	+3.85	-0.15	649.4	650.2
9	43.6000	43.7167	+3.55	+3.43	-0.13	650.9	651.6
10	43.8333	43.9500	+3.15	+3.05	-0.11	652.3	652.9
11	44.0667	44.1833	+2.79	+2.70	-0.09	653.5	654.1
12	44.3000	44.4167	+2.47	+2.40	-0.08	654.6	655.1
13	44.5333	44.6500	+2.19	+2.13	-0.06	655.6	656.0
14	44.7667	44.8833	+1.95	+1.89	-0.05	656.4	656.8
15	45.0000	45.1167	+1.74	+1.70	-0.04	657.1	657.5
16	45.2333	45.3500	+1.57	+1.54	-0.03	657.7	658.0
17	45.4667	45.5833	+1.43	+1.41	-0.03	658.2	658.4
18	45.7000	45.8167	+1.33	+1.31	-0.02	658.5	658.7
19	45.9333	46.0500	+1.27	+1.25	-0.01	658.7	658.8
20	46.1667	46.2833	+1.23	+1.23	-0.01	658.8	658.8
21	46.4000	46.5167	+1.24	+1.23	-0.00	658.8	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-63.80	-64.08	-0.30
FOR OUTER MATERIAL	+6.87	+6.57	-0.30

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.10
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.10
AXIAL BENDING	+5.93	+6.18
INSIDE BENDING	-6.02	-6.28
OUTSIDE BENDING	+5.83	+6.08
HOOP BENDING	N/A	+6.05
INSIDE BENDING	N/A	-6.05
OUTSIDE BENDING	N/A	+6.06

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	652.3	652.1

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DELTA T1 (Total Section Delta T)	+21.3	+21.5
LINEAR INSIDE TEMPERATURE	641.4	641.3
LINEAR OUTSIDE TEMPERATURE	662.7	662.8
DELTA T2 (Absolute of Maximum)	7.3	7.2

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 1100.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	618.9	
1	42.0000	42.0500	-60.35	-60.34	+0.00	623.3	624.8
2	42.1000	42.1500	-61.33	-61.46	-0.14	626.2	627.7
3	42.2000	42.3167	Interface (below)		-0.29	629.1	630.3
4	42.4333	42.5500	+6.39	+6.14	-0.25	631.5	632.7
5	42.6667	42.7833	+5.72	+5.51	-0.22	633.8	634.9
6	42.9000	43.0167	+5.11	+4.92	-0.19	635.9	636.9
7	43.1333	43.2500	+4.54	+4.38	-0.16	637.9	638.8
8	43.3667	43.4833	+4.01	+3.88	-0.14	639.7	640.6
9	43.6000	43.7167	+3.54	+3.42	-0.12	641.3	642.1
10	43.8333	43.9500	+3.10	+3.00	-0.10	642.8	643.6
11	44.0667	44.1833	+2.71	+2.63	-0.08	644.2	644.8
12	44.3000	44.4167	+2.36	+2.29	-0.07	645.4	646.0
13	44.5333	44.6500	+2.05	+2.00	-0.06	646.5	647.0
14	44.7667	44.8833	+1.79	+1.74	-0.05	647.4	647.8
15	45.0000	45.1167	+1.56	+1.52	-0.04	648.2	648.6
16	45.2333	45.3500	+1.37	+1.34	-0.03	648.8	649.1
17	45.4667	45.5833	+1.22	+1.20	-0.02	649.4	649.6
18	45.7000	45.8167	+1.11	+1.09	-0.02	649.7	649.9
19	45.9333	46.0500	+1.04	+1.03	-0.01	650.0	650.1
20	46.1667	46.2833	+1.00	+0.99	-0.01	650.1	650.1
21	46.4000	46.5167	+1.00	+1.00	-0.00	650.1	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-62.29	-62.56	-0.29
FOR OUTER MATERIAL	+7.10	+6.81	-0.29

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.09
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.10
AXIAL BENDING	+5.50	+5.74
INSIDE BENDING	-5.58	-5.83
OUTSIDE BENDING	+5.41	+5.65
HOOP BENDING	N/A	+5.62
INSIDE BENDING	N/A	-5.61
OUTSIDE BENDING	N/A	+5.62

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	642.9	642.7
DELTA T1 (Total Section Delta T)	+23.3	+23.5
LINEAR INSIDE TEMPERATURE	631.1	631.0
LINEAR OUTSIDE TEMPERATURE	654.3	654.4
DELTA T2 (Absolute of Maximum)	7.7	7.6

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 1300.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	607.8	
1	42.0000	42.0500	-58.79	-58.77	+0.00	612.4	614.0
2	42.1000	42.1500	-59.82	-59.95	-0.14	615.5	617.0
3	42.2000	42.3167	Interface	(below)	-0.28	618.5	619.8
4	42.4333	42.5500	+6.50	+6.26	-0.24	621.0	622.2
5	42.6667	42.7833	+5.81	+5.60	-0.21	623.4	624.6
6	42.9000	43.0167	+5.16	+4.98	-0.18	625.6	626.7
7	43.1333	43.2500	+4.56	+4.41	-0.15	627.7	628.7
8	43.3667	43.4833	+4.01	+3.88	-0.13	629.6	630.5
9	43.6000	43.7167	+3.50	+3.40	-0.11	631.3	632.2
10	43.8333	43.9500	+3.04	+2.96	-0.09	632.9	633.7
11	44.0667	44.1833	+2.63	+2.56	-0.07	634.4	635.1
12	44.3000	44.4167	+2.26	+2.20	-0.06	635.7	636.3
13	44.5333	44.6500	+1.94	+1.89	-0.05	636.8	637.3
14	44.7667	44.8833	+1.65	+1.61	-0.04	637.8	638.2
15	45.0000	45.1167	+1.41	+1.38	-0.03	638.6	639.0
16	45.2333	45.3500	+1.21	+1.19	-0.02	639.3	639.6
17	45.4667	45.5833	+1.05	+1.03	-0.02	639.9	640.1
18	45.7000	45.8167	+0.93	+0.92	-0.01	640.3	640.5
19	45.9333	46.0500	+0.85	+0.84	-0.01	640.6	640.7
20	46.1667	46.2833	+0.81	+0.81	-0.00	640.7	640.7
21	46.4000	46.5167	+0.81	+0.81	-0.00	640.7	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-60.83	-61.10	-0.28
FOR OUTER MATERIAL	+7.25	+6.97	-0.28

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.08
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.09
AXIAL BENDING	+5.14	+5.38
INSIDE BENDING	-5.22	-5.46
OUTSIDE BENDING	+5.06	+5.29
HOOP BENDING	N/A	+5.25
INSIDE BENDING	N/A	-5.25
OUTSIDE BENDING	N/A	+5.26

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	633.0	632.8
DELTA T1 (Total Section Delta T)	+24.7	+24.8
LINEAR INSIDE TEMPERATURE	620.5	620.4
LINEAR OUTSIDE TEMPERATURE	645.1	645.2
DELTA T2 (Absolute of Maximum)	8.1	8.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 1500.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	596.7	
1	42.0000	42.0500	-57.29	-57.28	+0.00	601.4	603.0
2	42.1000	42.1500	-58.37	-58.49	-0.14	604.6	606.2
3	42.2000	42.3167	Interface	(below)	-0.28	607.7	609.0
4	42.4333	42.5500	+6.57	+6.33	-0.24	610.3	611.6
5	42.6667	42.7833	+5.85	+5.64	-0.20	612.8	614.0

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6	42.9000	43.0167	+5.18	+5.01	-0.17	615.1	616.2
7	43.1333	43.2500	+4.56	+4.41	-0.14	617.2	618.3
8	43.3667	43.4833	+3.99	+3.87	-0.12	619.2	620.2
9	43.6000	43.7167	+3.46	+3.36	-0.10	621.0	621.9
10	43.8333	43.9500	+2.99	+2.91	-0.08	622.7	623.5
11	44.0667	44.1833	+2.56	+2.49	-0.07	624.2	624.9
12	44.3000	44.4167	+2.17	+2.12	-0.05	625.5	626.2
13	44.5333	44.6500	+1.83	+1.79	-0.04	626.7	627.3
14	44.7667	44.8833	+1.54	+1.50	-0.03	627.7	628.2
15	45.0000	45.1167	+1.29	+1.26	-0.03	628.6	629.0
16	45.2333	45.3500	+1.08	+1.06	-0.02	629.4	629.7
17	45.4667	45.5833	+0.91	+0.90	-0.02	629.9	630.2
18	45.7000	45.8167	+0.79	+0.78	-0.01	630.4	630.6
19	45.9333	46.0500	+0.71	+0.70	-0.01	630.7	630.8
20	46.1667	46.2833	+0.66	+0.66	-0.00	630.8	630.8
21	46.4000	46.5167	+0.66	+0.66	-0.00	630.8	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-59.42	-59.68	-0.28
FOR OUTER MATERIAL	+7.34	+7.06	-0.28

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.08
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.08
AXIAL BENDING	+4.83	+5.06
INSIDE BENDING	-4.91	-5.14
OUTSIDE BENDING	+4.76	+4.99
HOOP BENDING	N/A	+4.95
INSIDE BENDING	N/A	-4.94
OUTSIDE BENDING	N/A	+4.95

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	622.8	622.6
DELTA T1 (Total Section Delta T)	+25.7	+25.8
LINEAR INSIDE TEMPERATURE	609.8	609.7
LINEAR OUTSIDE TEMPERATURE	635.4	635.5
DELTA T2 (Absolute of Maximum)	8.3	8.2

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 1700.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	585.6	
1	42.0000	42.0500	-55.85	-55.84	+0.00	590.4	592.1
2	42.1000	42.1500	-56.96	-57.08	-0.13	593.7	595.3
3	42.2000	42.3167	Interface	(below)	-0.27	596.8	598.2
4	42.4333	42.5500	+6.59	+6.36	-0.23	599.5	600.8
5	42.6667	42.7833	+5.86	+5.66	-0.19	602.0	603.3
6	42.9000	43.0167	+5.17	+5.01	-0.16	604.4	605.5
7	43.1333	43.2500	+4.54	+4.40	-0.14	606.6	607.6
8	43.3667	43.4833	+3.95	+3.84	-0.11	608.6	609.6
9	43.6000	43.7167	+3.42	+3.32	-0.09	610.5	611.4
10	43.8333	43.9500	+2.93	+2.85	-0.08	612.2	613.0
11	44.0667	44.1833	+2.49	+2.43	-0.06	613.7	614.5
12	44.3000	44.4167	+2.09	+2.04	-0.05	615.1	615.8
13	44.5333	44.6500	+1.74	+1.70	-0.04	616.3	616.9
14	44.7667	44.8833	+1.44	+1.41	-0.03	617.4	617.9

15	45.0000	45.1167	+1.18	+1.16	-0.02	618.3	618.7
16	45.2333	45.3500	+0.97	+0.95	-0.02	619.1	619.4
17	45.4667	45.5833	+0.80	+0.78	-0.01	619.7	619.9
18	45.7000	45.8167	+0.67	+0.66	-0.01	620.1	620.3
19	45.9333	46.0500	+0.58	+0.58	-0.01	620.4	620.5
20	46.1667	46.2833	+0.54	+0.54	-0.00	620.6	620.6
21	46.4000	46.5167	+0.54	+0.54	-0.00	620.6	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-58.04	-58.29	-0.27
FOR OUTER MATERIAL	+7.38	+7.11	-0.27

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.07
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.08
AXIAL BENDING	+4.56	+4.79
INSIDE BENDING	-4.63	-4.86
OUTSIDE BENDING	+4.49	+4.72
HOOP BENDING	N/A	+4.67
INSIDE BENDING	N/A	-4.67
OUTSIDE BENDING	N/A	+4.68

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	612.3	612.1
DELTA T1 (Total Section Delta T)	+26.4	+26.6
LINEAR INSIDE TEMPERATURE	598.9	598.8
LINEAR OUTSIDE TEMPERATURE	625.3	625.4
DELTA T2 (Absolute of Maximum)	8.5	8.4

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 1900.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial (Inside fluid)	Temperature, F Grid	Node 574.4
1	42.0000	42.0500	-54.44	-54.43	+0.00	579.4	581.1
2	42.1000	42.1500	-55.57	-55.69	-0.13	582.7	584.3
3	42.2000	42.3167	Interface	(below)	-0.26	585.9	587.3
4	42.4333	42.5500	+6.60	+6.37	-0.22	588.6	589.9
5	42.6667	42.7833	+5.85	+5.66	-0.19	591.2	592.4
6	42.9000	43.0167	+5.15	+4.99	-0.16	593.6	594.7
7	43.1333	43.2500	+4.51	+4.38	-0.13	595.8	596.9
8	43.3667	43.4833	+3.91	+3.80	-0.11	597.9	598.9
9	43.6000	43.7167	+3.37	+3.28	-0.09	599.8	600.7
10	43.8333	43.9500	+2.87	+2.80	-0.07	601.5	602.3
11	44.0667	44.1833	+2.42	+2.36	-0.06	603.1	603.8
12	44.3000	44.4167	+2.02	+1.97	-0.04	604.5	605.2
13	44.5333	44.6500	+1.66	+1.63	-0.03	605.7	606.3
14	44.7667	44.8833	+1.35	+1.33	-0.03	606.8	607.3
15	45.0000	45.1167	+1.09	+1.07	-0.02	607.8	608.2
16	45.2333	45.3500	+0.87	+0.85	-0.01	608.5	608.9
17	45.4667	45.5833	+0.69	+0.68	-0.01	609.2	609.4
18	45.7000	45.8167	+0.56	+0.56	-0.01	609.6	609.8
19	45.9333	46.0500	+0.48	+0.47	-0.00	609.9	610.0
20	46.1667	46.2833	+0.43	+0.43	-0.00	610.1	610.1
21	46.4000	46.5167	+0.43	+0.43	-0.00	610.1	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-56.67	-56.92	-0.26
FOR OUTER MATERIAL	+7.40	+7.13	-0.26

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.07
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.08
AXIAL BENDING	+4.32	+4.54
INSIDE BENDING	-4.39	-4.61
OUTSIDE BENDING	+4.25	+4.47
HOOP BENDING	N/A	+4.43
INSIDE BENDING	N/A	-4.42
OUTSIDE BENDING	N/A	+4.43

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	601.7	601.4
DELTA T1 (Total Section Delta T)	+26.9	+27.1
LINEAR INSIDE TEMPERATURE	588.0	587.9
LINEAR OUTSIDE TEMPERATURE	614.9	615.0
DELTA T2 (Absolute of Maximum)	8.6	8.5

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 2100.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	563.3	
1	42.0000	42.0500	-53.06	-53.05	+0.00	568.3	570.0
2	42.1000	42.1500	-54.21	-54.32	-0.13	571.6	573.3
3	42.2000	42.3167	Interface	(below)	-0.26	574.9	576.3
4	42.4333	42.5500	+6.58	+6.36	-0.22	577.7	579.0
5	42.6667	42.7833	+5.82	+5.64	-0.18	580.3	581.5
6	42.9000	43.0167	+5.12	+4.97	-0.15	582.7	583.9
7	43.1333	43.2500	+4.47	+4.34	-0.12	585.0	586.0
8	43.3667	43.4833	+3.86	+3.76	-0.10	587.0	588.0
9	43.6000	43.7167	+3.31	+3.23	-0.08	589.0	589.9
10	43.8333	43.9500	+2.81	+2.74	-0.07	590.7	591.6
11	44.0667	44.1833	+2.35	+2.30	-0.05	592.3	593.1
12	44.3000	44.4167	+1.94	+1.90	-0.04	593.8	594.4
13	44.5333	44.6500	+1.58	+1.55	-0.03	595.0	595.6
14	44.7667	44.8833	+1.27	+1.25	-0.02	596.1	596.6
15	45.0000	45.1167	+1.00	+0.99	-0.02	597.1	597.5
16	45.2333	45.3500	+0.78	+0.77	-0.01	597.9	598.2
17	45.4667	45.5833	+0.60	+0.60	-0.01	598.5	598.8
18	45.7000	45.8167	+0.47	+0.47	-0.01	599.0	599.1
19	45.9333	46.0500	+0.38	+0.38	-0.00	599.3	599.4
20	46.1667	46.2833	+0.34	+0.33	-0.00	599.4	599.5
21	46.4000	46.5167	+0.33	+0.33	-0.00	599.4	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-55.32	-55.57	-0.26
FOR OUTER MATERIAL	+7.39	+7.13	-0.26

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.07
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.07

PZR4

AXIAL BENDING	+4.10	+4.31
INSIDE BENDING	-4.16	-4.38
OUTSIDE BENDING	+4.03	+4.25
HOOP BENDING	N/A	+4.20
INSIDE BENDING	N/A	-4.20
OUTSIDE BENDING	N/A	+4.21

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	590.9	590.7
DELTA T1 (Total Section Delta T)	+27.2	+27.5
LINEAR INSIDE TEMPERATURE	577.0	576.9
LINEAR OUTSIDE TEMPERATURE	604.3	604.4
DELTA T2 (Absolute of Maximum)	8.7	8.6

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 2300.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	552.2	
1	42.0000	42.0500	-51.70	-51.68	+0.00	557.3	559.0
2	42.1000	42.1500	-52.86	-52.97	-0.12	560.6	562.3
3	42.2000	42.3167	Interface	(below)	-0.25	563.9	565.3
4	42.4333	42.5500	+6.55	+6.34	-0.21	566.7	568.0
5	42.6667	42.7833	+5.79	+5.61	-0.18	569.3	570.5
6	42.9000	43.0167	+5.08	+4.93	-0.15	571.7	572.9
7	43.1333	43.2500	+4.42	+4.30	-0.12	574.0	575.1
8	43.3667	43.4833	+3.81	+3.71	-0.10	576.1	577.1
9	43.6000	43.7167	+3.25	+3.18	-0.08	578.1	579.0
10	43.8333	43.9500	+2.75	+2.69	-0.06	579.8	580.7
11	44.0667	44.1833	+2.29	+2.24	-0.05	581.5	582.2
12	44.3000	44.4167	+1.88	+1.84	-0.04	582.9	583.6
13	44.5333	44.6500	+1.51	+1.48	-0.03	584.2	584.8
14	44.7667	44.8833	+1.20	+1.18	-0.02	585.3	585.8
15	45.0000	45.1167	+0.93	+0.91	-0.01	586.3	586.7
16	45.2333	45.3500	+0.70	+0.69	-0.01	587.1	587.4
17	45.4667	45.5833	+0.52	+0.51	-0.01	587.7	588.0
18	45.7000	45.8167	+0.39	+0.38	-0.00	588.2	588.4
19	45.9333	46.0500	+0.30	+0.29	-0.00	588.5	588.6
20	46.1667	46.2833	+0.25	+0.25	-0.00	588.6	588.7
21	46.4000	46.5167	+0.25	+0.25	-0.00	588.6	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-53.99	-54.22	-0.25
FOR OUTER MATERIAL	+7.36	+7.11	-0.25

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.06
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.07
AXIAL BENDING	+3.89	+4.10
INSIDE BENDING	-3.95	-4.16
OUTSIDE BENDING	+3.83	+4.03
HOOP BENDING	N/A	+3.99
INSIDE BENDING	N/A	-3.98
OUTSIDE BENDING	N/A	+4.00

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	580.0	579.8

PZR4

DELTA T1 (Total Section Delta T)	+27.5	+27.7
LINEAR INSIDE TEMPERATURE	566.0	565.9
LINEAR OUTSIDE TEMPERATURE	593.5	593.7
DELTA T2 (Absolute of Maximum)	8.8	8.6

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 2500.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial (Inside fluid)	Temperature, F Grid	Node 541.1
1	42.0000	42.0500	-50.34	-50.33	+0.00	546.2	547.9
2	42.1000	42.1500	-51.52	-51.62	-0.12	549.5	551.2
3	42.2000	42.3167	Interface	(below)	-0.24	552.8	554.3
4	42.4333	42.5500	+6.51	+6.30	-0.20	555.6	557.0
5	42.6667	42.7833	+5.74	+5.57	-0.17	558.3	559.5
6	42.9000	43.0167	+5.03	+4.89	-0.14	560.7	561.9
7	43.1333	43.2500	+4.37	+4.25	-0.11	563.0	564.1
8	43.3667	43.4833	+3.76	+3.66	-0.09	565.2	566.2
9	43.6000	43.7167	+3.20	+3.12	-0.07	567.1	568.1
10	43.8333	43.9500	+2.68	+2.63	-0.06	568.9	569.8
11	44.0667	44.1833	+2.22	+2.18	-0.04	570.5	571.3
12	44.3000	44.4167	+1.81	+1.78	-0.03	572.0	572.7
13	44.5333	44.6500	+1.44	+1.42	-0.02	573.3	573.9
14	44.7667	44.8833	+1.12	+1.11	-0.02	574.4	574.9
15	45.0000	45.1167	+0.85	+0.84	-0.01	575.4	575.8
16	45.2333	45.3500	+0.63	+0.62	-0.01	576.2	576.5
17	45.4667	45.5833	+0.44	+0.44	-0.01	576.8	577.1
18	45.7000	45.8167	+0.31	+0.31	-0.00	577.3	577.5
19	45.9333	46.0500	+0.22	+0.22	-0.00	577.6	577.7
20	46.1667	46.2833	+0.17	+0.17	-0.00	577.8	577.8
21	46.4000	46.5167	+0.17	+0.17	-0.00	577.8	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-52.66	-52.89	-0.24
FOR OUTER MATERIAL	+7.33	+7.08	-0.24

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.06
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.06
AXIAL BENDING	+3.69	+3.89
INSIDE BENDING	-3.74	-3.95
OUTSIDE BENDING	+3.63	+3.83
HOOP BENDING	N/A	+3.79
INSIDE BENDING	N/A	-3.78
OUTSIDE BENDING	N/A	+3.79

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	569.1	568.8
DELTA T1 (Total Section Delta T)	+27.7	+27.9
LINEAR INSIDE TEMPERATURE	555.0	554.9
LINEAR OUTSIDE TEMPERATURE	582.7	582.8
DELTA T2 (Absolute of Maximum)	8.8	8.7

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 2700.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ----- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	530.0	
1	42.0000	42.0500	-49.00	-48.99	+0.00	535.1	536.8
2	42.1000	42.1500	-50.18	-50.29	-0.12	538.5	540.1
3	42.2000	42.3167	Interface	(below)	-0.24	541.8	543.2
4	42.4333	42.5500	+6.46	+6.26	-0.20	544.6	545.9
5	42.6667	42.7833	+5.69	+5.53	-0.16	547.2	548.5
6	42.9000	43.0167	+4.98	+4.84	-0.13	549.7	550.9
7	43.1333	43.2500	+4.31	+4.20	-0.11	552.0	553.1
8	43.3667	43.4833	+3.70	+3.61	-0.09	554.2	555.2
9	43.6000	43.7167	+3.14	+3.07	-0.07	556.1	557.1
10	43.8333	43.9500	+2.62	+2.57	-0.05	557.9	558.8
11	44.0667	44.1833	+2.16	+2.12	-0.04	559.6	560.3
12	44.3000	44.4167	+1.74	+1.71	-0.03	561.0	561.7
13	44.5333	44.6500	+1.37	+1.35	-0.02	562.3	562.9
14	44.7667	44.8833	+1.05	+1.04	-0.01	563.5	564.0
15	45.0000	45.1167	+0.78	+0.77	-0.01	564.4	564.9
16	45.2333	45.3500	+0.55	+0.55	-0.01	565.2	565.6
17	45.4667	45.5833	+0.37	+0.37	-0.00	565.9	566.2
18	45.7000	45.8167	+0.24	+0.23	-0.00	566.4	566.6
19	45.9333	46.0500	+0.14	+0.14	-0.00	566.7	566.8
20	46.1667	46.2833	+0.10	+0.10	-0.00	566.9	566.9
21	46.4000	46.5167	+0.09	+0.09	-0.00	566.9	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-51.33	-51.56	-0.24
FOR OUTER MATERIAL	+7.29	+7.05	-0.24

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.06
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.06
AXIAL BENDING	+3.49	+3.69
INSIDE BENDING	-3.54	-3.75
OUTSIDE BENDING	+3.44	+3.64
HOOP BENDING	N/A	+3.59
INSIDE BENDING	N/A	-3.58
OUTSIDE BENDING	N/A	+3.59

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	558.1	557.9
DELTA T1 (Total Section Delta T)	+27.9	+28.1
LINEAR INSIDE TEMPERATURE	543.9	543.8
LINEAR OUTSIDE TEMPERATURE	571.8	571.9
DELTA T2 (Absolute of Maximum)	8.8	8.7

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 2900.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ----- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	518.9	
1	42.0000	42.0500	-47.67	-47.65	+0.00	524.0	525.7
2	42.1000	42.1500	-48.85	-48.96	-0.11	527.4	529.0
3	42.2000	42.3167	Interface	(below)	-0.23	530.7	532.1
4	42.4333	42.5500	+6.41	+6.22	-0.19	533.5	534.9
5	42.6667	42.7833	+5.64	+5.48	-0.16	536.2	537.5

6	42.9000	43.0167	+4.92	+4.79	-0.13	538.7	539.9
7	43.1333	43.2500	+4.26	+4.15	-0.10	541.0	542.1
8	43.3667	43.4833	+3.64	+3.56	-0.08	543.1	544.2
9	43.6000	43.7167	+3.08	+3.01	-0.06	545.1	546.0
10	43.8333	43.9500	+2.56	+2.51	-0.05	546.9	547.8
11	44.0667	44.1833	+2.09	+2.06	-0.04	548.5	549.3
12	44.3000	44.4167	+1.68	+1.65	-0.03	550.0	550.7
13	44.5333	44.6500	+1.31	+1.29	-0.02	551.3	551.9
14	44.7667	44.8833	+0.99	+0.97	-0.01	552.5	553.0
15	45.0000	45.1167	+0.71	+0.70	-0.01	553.4	553.9
16	45.2333	45.3500	+0.48	+0.48	-0.00	554.2	554.6
17	45.4667	45.5833	+0.30	+0.30	-0.00	554.9	555.2
18	45.7000	45.8167	+0.17	+0.16	-0.00	555.4	555.6
19	45.9333	46.0500	+0.07	+0.07	-0.00	555.7	555.8
20	46.1667	46.2833	+0.03	+0.03	-0.00	555.9	555.9
21	46.4000	46.5167	+0.02	+0.02	-0.00	555.9	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-50.01	-50.23	-0.23
FOR OUTER MATERIAL	+7.24	+7.01	-0.23

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.05
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.06
AXIAL BENDING	+3.30	+3.50
INSIDE BENDING	-3.35	-3.55
OUTSIDE BENDING	+3.25	+3.44
HOOP BENDING	N/A	+3.40
INSIDE BENDING	N/A	-3.39
OUTSIDE BENDING	N/A	+3.40

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	547.1	546.9
DELTA T1 (Total Section Delta T)	+28.0	+28.2
LINEAR INSIDE TEMPERATURE	532.9	532.7
LINEAR OUTSIDE TEMPERATURE	560.9	561.0
DELTA T2 (Absolute of Maximum)	8.9	8.7

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

................OUTPUT FOR TIME= 3100.00 SECONDS...................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi hoop	axial	------ radial	Temperature, F Grid	Node
					(Inside fluid)		507.8
1	42.0000	42.0500	-46.34	-46.32	+0.00	512.9	514.6
2	42.1000	42.1500	-47.53	-47.63	-0.11	516.3	518.0
3	42.2000	42.3167	Interface	(below)	-0.23	519.6	521.1
4	42.4333	42.5500	+6.36	+6.17	-0.19	522.4	523.8
5	42.6667	42.7833	+5.59	+5.43	-0.15	525.1	526.4
6	42.9000	43.0167	+4.87	+4.74	-0.12	527.6	528.8
7	43.1333	43.2500	+4.20	+4.10	-0.10	529.9	531.0
8	43.3667	43.4833	+3.58	+3.50	-0.08	532.1	533.1
9	43.6000	43.7167	+3.02	+2.96	-0.06	534.1	535.0
10	43.8333	43.9500	+2.50	+2.45	-0.04	535.9	536.7
11	44.0667	44.1833	+2.03	+2.00	-0.03	537.5	538.3
12	44.3000	44.4167	+1.61	+1.59	-0.02	539.0	539.7
13	44.5333	44.6500	+1.24	+1.23	-0.01	540.3	540.9
14	44.7667	44.8833	+0.92	+0.91	-0.01	541.4	542.0

15	45.0000	45.1167	+0.65	+0.64	-0.01	542.4	542.9
16	45.2333	45.3500	+0.42	+0.41	-0.00	543.2	543.6
17	45.4667	45.5833	+0.23	+0.23	-0.00	543.9	544.2
18	45.7000	45.8167	+0.10	+0.10	+0.00	544.4	544.6
19	45.9333	46.0500	+0.00	+0.00	+0.00	544.7	544.8
20	46.1667	46.2833	-0.04	-0.04	+0.00	544.9	544.9
21	46.4000	46.5167	-0.05	-0.05	+0.00	544.9	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-48.69	-48.90	-0.23
FOR OUTER MATERIAL	+7.19	+6.96	-0.23

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.05
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.06
AXIAL BENDING	+3.12	+3.30
INSIDE BENDING	-3.16	-3.35
OUTSIDE BENDING	+3.07	+3.25
HOOP BENDING	N/A	+3.21
INSIDE BENDING	N/A	-3.20
OUTSIDE BENDING	N/A	+3.21

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	536.1	535.8
DELTA T1 (Total Section Delta T)	+28.1	+28.3
LINEAR INSIDE TEMPERATURE	521.8	521.7
LINEAR OUTSIDE TEMPERATURE	549.9	550.0
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 3300.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	496.7	
1	42.0000	42.0500	-45.01	-45.00	+0.00	501.8	503.5
2	42.1000	42.1500	-46.21	-46.30	-0.11	505.2	506.9
3	42.2000	42.3167	Interface	(below)	-0.22	508.5	510.0
4	42.4333	42.5500	+6.30	+6.12	-0.18	511.4	512.7
5	42.6667	42.7833	+5.53	+5.38	-0.15	514.0	515.3
6	42.9000	43.0167	+4.81	+4.69	-0.12	516.5	517.7
7	43.1333	43.2500	+4.14	+4.05	-0.09	518.9	520.0
8	43.3667	43.4833	+3.52	+3.45	-0.07	521.0	522.0
9	43.6000	43.7167	+2.95	+2.90	-0.06	523.0	523.9
10	43.8333	43.9500	+2.44	+2.40	-0.04	524.8	525.7
11	44.0667	44.1833	+1.97	+1.94	-0.03	526.5	527.2
12	44.3000	44.4167	+1.55	+1.53	-0.02	527.9	528.6
13	44.5333	44.6500	+1.18	+1.17	-0.01	529.3	529.9
14	44.7667	44.8833	+0.86	+0.85	-0.01	530.4	530.9
15	45.0000	45.1167	+0.58	+0.58	-0.00	531.4	531.8
16	45.2333	45.3500	+0.35	+0.35	-0.00	532.2	532.6
17	45.4667	45.5833	+0.17	+0.17	+0.00	532.9	533.2
18	45.7000	45.8167	+0.03	+0.03	+0.00	533.4	533.6
19	45.9333	46.0500	-0.06	-0.06	+0.00	533.7	533.8
20	46.1667	46.2833	-0.11	-0.11	+0.00	533.9	533.9
21	46.4000	46.5167	-0.11	-0.11	+0.00	533.9	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

PZR4

FOR INNER MATERIAL	-47.37	-47.58	-0.22
FOR OUTER MATERIAL	+7.13	+6.91	-0.22

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.05
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.05
AXIAL BENDING	+2.93	+3.11
INSIDE BENDING	-2.98	-3.16
OUTSIDE BENDING	+2.89	+3.07
HOOP BENDING	N/A	+3.02
INSIDE BENDING	N/A	-3.02
OUTSIDE BENDING	N/A	+3.03

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	525.0	524.8
DELTA T1 (Total Section Delta T)	+28.2	+28.4
LINEAR INSIDE TEMPERATURE	510.7	510.6
LINEAR OUTSIDE TEMPERATURE	538.9	539.0
DELTA T2 (Absolute of Maximum)	8.9	8.8

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 3500.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	485.6	
1	42.0000	42.0500	-43.68	-43.67	+0.00	490.7	492.4
2	42.1000	42.1500	-44.89	-44.98	-0.11	494.1	495.8
3	42.2000	42.3167	Interface (below)		-0.21	497.4	498.9
4	42.4333	42.5500	+6.25	+6.07	-0.17	500.3	501.6
5	42.6667	42.7833	+5.47	+5.33	-0.14	502.9	504.2
6	42.9000	43.0167	+4.75	+4.64	-0.11	505.4	506.7
7	43.1333	43.2500	+4.08	+3.99	-0.09	507.8	508.9
8	43.3667	43.4833	+3.46	+3.39	-0.07	509.9	511.0
9	43.6000	43.7167	+2.89	+2.84	-0.05	511.9	512.9
10	43.8333	43.9500	+2.37	+2.34	-0.04	513.8	514.6
11	44.0667	44.1833	+1.91	+1.88	-0.03	515.4	516.2
12	44.3000	44.4167	+1.49	+1.47	-0.02	516.9	517.6
13	44.5333	44.6500	+1.11	+1.10	-0.01	518.2	518.8
14	44.7667	44.8833	+0.79	+0.79	-0.00	519.4	519.9
15	45.0000	45.1167	+0.51	+0.51	-0.00	520.3	520.8
16	45.2333	45.3500	+0.28	+0.29	+0.00	521.2	521.5
17	45.4667	45.5833	+0.10	+0.10	+0.00	521.8	522.1
18	45.7000	45.8167	-0.04	-0.04	+0.00	522.3	522.5
19	45.9333	46.0500	-0.13	-0.13	+0.00	522.7	522.8
20	46.1667	46.2833	-0.18	-0.18	+0.00	522.8	522.9
21	46.4000	46.5167	-0.18	-0.18	+0.00	522.8	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-46.06	-46.26	-0.21
FOR OUTER MATERIAL	+7.07	+6.86	-0.21

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.04
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.05

PZR4

AXIAL BENDING	+2.75	+2.93
INSIDE BENDING	-2.79	-2.97
OUTSIDE BENDING	+2.71	+2.88
HOOP BENDING	N/A	+2.84
INSIDE BENDING	N/A	-2.83
OUTSIDE BENDING	N/A	+2.84

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	513.9	513.7
DELTA T1 (Total Section Delta T)	+28.2	+28.5
LINEAR INSIDE TEMPERATURE	499.6	499.5
LINEAR OUTSIDE TEMPERATURE	527.8	527.9
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 3600.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	480.0	
1	42.0000	42.0500	-43.02	-43.01	+0.00	485.1	486.9
2	42.1000	42.1500	-44.23	-44.32	-0.10	488.5	490.2
3	42.2000	42.3167	Interface	(below)	-0.21	491.9	493.3
4	42.4333	42.5500	+6.22	+6.04	-0.17	494.7	496.1
5	42.6667	42.7833	+5.44	+5.30	-0.14	497.4	498.7
6	42.9000	43.0167	+4.72	+4.61	-0.11	499.9	501.1
7	43.1333	43.2500	+4.05	+3.96	-0.09	502.2	503.4
8	43.3667	43.4833	+3.43	+3.36	-0.07	504.4	505.4
9	43.6000	43.7167	+2.86	+2.81	-0.05	506.4	507.3
10	43.8333	43.9500	+2.34	+2.31	-0.03	508.2	509.1
11	44.0667	44.1833	+1.87	+1.85	-0.02	509.9	510.7
12	44.3000	44.4167	+1.45	+1.44	-0.01	511.4	512.1
13	44.5333	44.6500	+1.08	+1.07	-0.01	512.7	513.3
14	44.7667	44.8833	+0.76	+0.76	-0.00	513.8	514.4
15	45.0000	45.1167	+0.48	+0.48	+0.00	514.8	515.3
16	45.2333	45.3500	+0.25	+0.25	+0.00	515.6	516.0
17	45.4667	45.5833	+0.07	+0.07	+0.00	516.3	516.6
18	45.7000	45.8167	-0.07	-0.07	+0.00	516.8	517.0
19	45.9333	46.0500	-0.16	-0.16	+0.00	517.1	517.3
20	46.1667	46.2833	-0.21	-0.21	+0.00	517.3	517.4
21	46.4000	46.5167	-0.21	-0.21	+0.00	517.3	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-45.40	-45.60	-0.21
FOR OUTER MATERIAL	+7.05	+6.84	-0.21

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.04
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.05
AXIAL BENDING	+2.66	+2.83
INSIDE BENDING	-2.70	-2.88
OUTSIDE BENDING	+2.62	+2.79
HOOP BENDING	N/A	+2.75
INSIDE BENDING	N/A	-2.74
OUTSIDE BENDING	N/A	+2.75

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	508.4	508.2

PZR4

DELTA T1 (Total Section Delta T)	+28.3	+28.5
LINEAR INSIDE TEMPERATURE	494.0	493.9
LINEAR OUTSIDE TEMPERATURE	522.3	522.4
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 4200.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial (Inside fluid)	Temperature, F Grid	Node
						446.7	
1	42.0000	42.0500	-39.05	-39.04	+0.00	451.8	453.5
2	42.1000	42.1500	-40.27	-40.36	-0.09	455.2	456.9
3	42.2000	42.3167	Interface	(below)	-0.19	458.6	460.0
4	42.4333	42.5500	+6.04	+5.88	-0.15	461.4	462.8
5	42.6667	42.7833	+5.26	+5.14	-0.12	464.1	465.4
6	42.9000	43.0167	+4.54	+4.44	-0.10	466.6	467.8
7	43.1333	43.2500	+3.87	+3.79	-0.07	469.0	470.1
8	43.3667	43.4833	+3.25	+3.19	-0.05	471.1	472.2
9	43.6000	43.7167	+2.68	+2.64	-0.04	473.1	474.1
10	43.8333	43.9500	+2.16	+2.13	-0.02	475.0	475.8
11	44.0667	44.1833	+1.69	+1.67	-0.01	476.6	477.4
12	44.3000	44.4167	+1.27	+1.26	-0.01	478.1	478.8
13	44.5333	44.6500	+0.89	+0.89	+0.00	479.5	480.1
14	44.7667	44.8833	+0.57	+0.57	+0.00	480.6	481.2
15	45.0000	45.1167	+0.29	+0.30	+0.01	481.6	482.1
16	45.2333	45.3500	+0.06	+0.07	+0.01	482.4	482.8
17	45.4667	45.5833	-0.12	-0.12	+0.01	483.1	483.4
18	45.7000	45.8167	-0.26	-0.26	+0.01	483.6	483.8
19	45.9333	46.0500	-0.36	-0.35	+0.00	484.0	484.1
20	46.1667	46.2833	-0.41	-0.40	+0.00	484.1	484.2
21	46.4000	46.5167	-0.41	-0.41	+0.00	484.2	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-41.46	-41.64	-0.19
FOR OUTER MATERIAL	+6.87	+6.68	-0.19

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.03
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.04
AXIAL BENDING	+2.12	+2.28
INSIDE BENDING	-2.15	-2.31
OUTSIDE BENDING	+2.09	+2.25
HOOP BENDING	N/A	+2.20
INSIDE BENDING	N/A	-2.19
OUTSIDE BENDING	N/A	+2.20

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	475.2	474.9
DELTA T1 (Total Section Delta T)	+28.4	+28.6
LINEAR INSIDE TEMPERATURE	460.7	460.6
LINEAR OUTSIDE TEMPERATURE	489.2	489.3
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.................OUTPUT FOR TIME= 4800.00 SECONDS...................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		413.3
1	42.0000	42.0500	-35.09	-35.08	+0.00	418.5	420.2
2	42.1000	42.1500	-36.32	-36.40	-0.08	421.9	423.6
3	42.2000	42.3167	Interface	(below)	-0.17	425.3	426.7
4	42.4333	42.5500	+5.85	+5.72	-0.14	428.1	429.5
5	42.6667	42.7833	+5.08	+4.97	-0.11	430.8	432.1
6	42.9000	43.0167	+4.35	+4.27	-0.08	433.3	434.6
7	43.1333	43.2500	+3.68	+3.62	-0.06	435.7	436.8
8	43.3667	43.4833	+3.06	+3.02	-0.04	437.9	438.9
9	43.6000	43.7167	+2.49	+2.46	-0.02	439.9	440.8
10	43.8333	43.9500	+1.97	+1.96	-0.01	441.7	442.6
11	44.0667	44.1833	+1.50	+1.49	-0.00	443.4	444.2
12	44.3000	44.4167	+1.08	+1.08	+0.00	444.9	445.6
13	44.5333	44.6500	+0.70	+0.71	+0.01	446.2	446.8
14	44.7667	44.8833	+0.38	+0.39	+0.01	447.4	447.9
15	45.0000	45.1167	+0.10	+0.11	+0.01	448.4	448.8
16	45.2333	45.3500	-0.13	-0.12	+0.01	449.2	449.6
17	45.4667	45.5833	-0.32	-0.31	+0.01	449.9	450.2
18	45.7000	45.8167	-0.46	-0.45	+0.01	450.4	450.6
19	45.9333	46.0500	-0.55	-0.54	+0.01	450.7	450.9
20	46.1667	46.2833	-0.60	-0.60	+0.00	450.9	451.0
21	46.4000	46.5167	-0.60	-0.60	+0.00	451.0	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

	hoop	axial	radial
FOR INNER MATERIAL	-37.52	-37.68	-0.17
FOR OUTER MATERIAL	+6.68	+6.51	-0.17

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.02
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.03
AXIAL BENDING	+1.58	+1.73
INSIDE BENDING	-1.60	-1.75
OUTSIDE BENDING	+1.56	+1.70
HOOP BENDING	N/A	+1.65
INSIDE BENDING	N/A	-1.65
OUTSIDE BENDING	N/A	+1.66

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	441.9	441.7
DELTA T1 (Total Section Delta T)	+28.5	+28.7
LINEAR INSIDE TEMPERATURE	427.4	427.3
LINEAR OUTSIDE TEMPERATURE	456.0	456.1
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.................OUTPUT FOR TIME= 5400.00 SECONDS...................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		380.0
1	42.0000	42.0500	-31.13	-31.12	+0.00	385.2	386.9
2	42.1000	42.1500	-32.37	-32.44	-0.08	388.6	390.3
3	42.2000	42.3167	Interface	(below)	-0.15	391.9	393.4
4	42.4333	42.5500	+5.67	+5.55	-0.12	394.8	396.2
5	42.6667	42.7833	+4.89	+4.80	-0.09	397.5	398.8

6	42.9000	43.0167	+4.17	+4.10	-0.06	400.1	401.3
7	43.1333	43.2500	+3.50	+3.45	-0.04	402.4	403.5
8	43.3667	43.4833	+2.87	+2.85	-0.03	404.6	405.6
9	43.6000	43.7167	+2.30	+2.29	-0.01	406.6	407.6
10	43.8333	43.9500	+1.78	+1.78	-0.00	408.4	409.3
11	44.0667	44.1833	+1.31	+1.32	+0.01	410.1	410.9
12	44.3000	44.4167	+0.89	+0.90	+0.01	411.6	412.3
13	44.5333	44.6500	+0.51	+0.53	+0.02	413.0	413.6
14	44.7667	44.8833	+0.19	+0.21	+0.02	414.1	414.7
15	45.0000	45.1167	-0.09	-0.07	+0.02	415.1	415.6
16	45.2333	45.3500	-0.32	-0.30	+0.02	416.0	416.4
17	45.4667	45.5833	-0.51	-0.49	+0.01	416.7	417.0
18	45.7000	45.8167	-0.65	-0.64	+0.01	417.2	417.4
19	45.9333	46.0500	-0.74	-0.73	+0.01	417.5	417.7
20	46.1667	46.2833	-0.79	-0.79	+0.00	417.7	417.8
21	46.4000	46.5167	-0.79	-0.79	+0.00	417.7	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-33.58	-33.73	-0.15
FOR OUTER MATERIAL	+6.50	+6.35	-0.15

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.01
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.02
AXIAL BENDING	+1.05	+1.17
INSIDE BENDING	-1.06	-1.19
OUTSIDE BENDING	+1.04	+1.16
HOOP BENDING	N/A	+1.11
INSIDE BENDING	N/A	-1.11
OUTSIDE BENDING	N/A	+1.12

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	408.7	408.4
DELTA T1 (Total Section Delta T)	+28.6	+28.8
LINEAR INSIDE TEMPERATURE	394.1	394.0
LINEAR OUTSIDE TEMPERATURE	422.7	422.8
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.................OUTPUT FOR TIME= 6000.00 SECONDS.....................

	-- Radii, inches -		---- Grid Stress, ksi	------		Temperature, F	
N	Grid	Node	hoop	axial	radial	Grid	Node
					(Inside fluid)	346.7	
1	42.0000	42.0500	-27.16	-27.16	+0.00	351.9	353.6
2	42.1000	42.1500	-28.42	-28.48	-0.07	355.3	357.0
3	42.2000	42.3167	Interface	(below)	-0.13	358.6	360.1
4	42.4333	42.5500	+5.49	+5.38	-0.10	361.5	362.9
5	42.6667	42.7833	+4.71	+4.63	-0.07	364.2	365.5
6	42.9000	43.0167	+3.98	+3.93	-0.05	366.8	368.0
7	43.1333	43.2500	+3.31	+3.28	-0.03	369.1	370.3
8	43.3667	43.4833	+2.69	+2.67	-0.01	371.3	372.4
9	43.6000	43.7167	+2.12	+2.12	-0.00	373.3	374.3
10	43.8333	43.9500	+1.59	+1.60	+0.01	375.2	376.1
11	44.0667	44.1833	+1.12	+1.14	+0.02	376.9	377.6
12	44.3000	44.4167	+0.70	+0.72	+0.02	378.4	379.1
13	44.5333	44.6500	+0.33	+0.35	+0.02	379.7	380.3
14	44.7667	44.8833	-0.00	+0.02	+0.02	380.9	381.4

15	45.0000	45.1167	-0.28	-0.26	+0.02	381.9	382.4
16	45.2333	45.3500	-0.51	-0.49	+0.02	382.7	383.1
17	45.4667	45.5833	-0.70	-0.68	+0.02	383.4	383.7
18	45.7000	45.8167	-0.84	-0.82	+0.01	383.9	384.2
19	45.9333	46.0500	-0.93	-0.92	+0.01	384.3	384.4
20	46.1667	46.2833	-0.98	-0.98	+0.00	384.5	384.6
21	46.4000	46.5167	-0.99	-0.99	+0.00	384.5	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-29.64	-29.77	-0.13
FOR OUTER MATERIAL	+6.32	+6.18	-0.13

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	-0.00
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.01
AXIAL BENDING	+0.51	+0.62
INSIDE BENDING	-0.52	-0.63
OUTSIDE BENDING	+0.51	+0.62
HOOP BENDING	N/A	+0.57
INSIDE BENDING	N/A	-0.56
OUTSIDE BENDING	N/A	+0.57

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	375.4	375.2
DELTA T1 (Total Section Delta T)	+28.7	+29.0
LINEAR INSIDE TEMPERATURE	360.8	360.7
LINEAR OUTSIDE TEMPERATURE	389.5	389.6
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

................OUTPUT FOR TIME= 6600.00 SECONDS...................

	-- Radii, inches -		---- Grid Stress, ksi ------			Temperature, F	
N	Grid	Node	hoop	axial	radial	Grid	Node
					(Inside fluid)		313.3
1	42.0000	42.0500	-23.20	-23.20	+0.00	318.5	320.3
2	42.1000	42.1500	-24.47	-24.52	-0.06	322.0	323.7
3	42.2000	42.3167	Interface	(below)	-0.12	325.3	326.8
4	42.4333	42.5500	+5.30	+5.22	-0.08	328.2	329.6
5	42.6667	42.7833	+4.52	+4.47	-0.06	330.9	332.2
6	42.9000	43.0167	+3.80	+3.76	-0.03	333.5	334.7
7	43.1333	43.2500	+3.12	+3.11	-0.01	335.8	337.0
8	43.3667	43.4833	+2.50	+2.50	+0.00	338.0	339.1
9	43.6000	43.7167	+1.93	+1.94	+0.01	340.0	341.0
10	43.8333	43.9500	+1.41	+1.43	+0.02	341.9	342.8
11	44.0667	44.1833	+0.94	+0.96	+0.03	343.6	344.4
12	44.3000	44.4167	+0.51	+0.54	+0.03	345.1	345.8
13	44.5333	44.6500	+0.14	+0.17	+0.03	346.4	347.1
14	44.7667	44.8833	-0.19	-0.16	+0.03	347.6	348.2
15	45.0000	45.1167	-0.47	-0.44	+0.03	348.6	349.1
16	45.2333	45.3500	-0.70	-0.67	+0.03	349.5	349.9
17	45.4667	45.5833	-0.89	-0.86	+0.02	350.2	350.5
18	45.7000	45.8167	-1.03	-1.01	+0.02	350.7	350.9
19	45.9333	46.0500	-1.12	-1.11	+0.01	351.1	351.2
20	46.1667	46.2833	-1.17	-1.17	+0.01	351.3	351.3
21	46.4000	46.5167	-1.18	-1.18	+0.00	351.3	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-25.71	-25.82	-0.12
FOR OUTER MATERIAL	+6.13	+6.02	-0.12

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.00
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	-0.02	+0.07
INSIDE BENDING	+0.03	-0.07
OUTSIDE BENDING	-0.01	+0.08
HOOP BENDING	N/A	+0.03
INSIDE BENDING	N/A	-0.02
OUTSIDE BENDING	N/A	+0.03

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	342.1	341.9
DELTA T1 (Total Section Delta T)	+28.8	+29.0
LINEAR INSIDE TEMPERATURE	327.5	327.4
LINEAR OUTSIDE TEMPERATURE	356.3	356.4
DELTA T2 (Absolute of Maximum)	8.9	8.8

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.................OUTPUT FOR TIME= 7200.00 SECONDS...................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		280.0
1	42.0000	42.0500	-19.24	-19.24	+0.00	285.2	286.9
2	42.1000	42.1500	-20.52	-20.56	-0.05	288.7	290.4
3	42.2000	42.3167	Interface	(below)	-0.10	292.0	293.5
4	42.4333	42.5500	+5.12	+5.05	-0.07	294.9	296.3
5	42.6667	42.7833	+4.34	+4.30	-0.04	297.6	298.9
6	42.9000	43.0167	+3.61	+3.59	-0.02	300.2	301.4
7	43.1333	43.2500	+2.94	+2.94	-0.00	302.5	303.7
8	43.3667	43.4833	+2.31	+2.33	+0.01	304.7	305.8
9	43.6000	43.7167	+1.74	+1.77	+0.02	306.8	307.7
10	43.8333	43.9500	+1.22	+1.25	+0.03	308.6	309.5
11	44.0667	44.1833	+0.75	+0.78	+0.04	310.3	311.1
12	44.3000	44.4167	+0.32	+0.36	+0.04	311.8	312.6
13	44.5333	44.6500	-0.05	-0.01	+0.04	313.2	313.8
14	44.7667	44.8833	-0.38	-0.34	+0.04	314.4	314.9
15	45.0000	45.1167	-0.66	-0.62	+0.04	315.4	315.9
16	45.2333	45.3500	-0.89	-0.86	+0.03	316.3	316.6
17	45.4667	45.5833	-1.08	-1.05	+0.03	316.9	317.3
18	45.7000	45.8167	-1.22	-1.20	+0.02	317.5	317.7
19	45.9333	46.0500	-1.31	-1.30	+0.01	317.8	318.0
20	46.1667	46.2833	-1.36	-1.36	+0.01	318.1	318.1
21	46.4000	46.5167	-1.37	-1.37	+0.00	318.1	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-21.77	-21.86	-0.10
FOR OUTER MATERIAL	+5.95	+5.85	-0.10

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.01
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	+0.01

PZR4

AXIAL BENDING	-0.55	-0.48
INSIDE BENDING	+0.57	+0.49
OUTSIDE BENDING	-0.54	-0.46
HOOP BENDING	N/A	-0.51
INSIDE BENDING	N/A	+0.52
OUTSIDE BENDING	N/A	-0.51

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	308.9	308.6
DELTA T1 (Total Section Delta T)	+28.9	+29.1
LINEAR INSIDE TEMPERATURE	294.2	294.1
LINEAR OUTSIDE TEMPERATURE	323.1	323.2
DELTA T2 (Absolute of Maximum)	9.0	8.8

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 7800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	246.7	
1	42.0000	42.0500	-15.28	-15.28	+0.00	251.9	253.6
2	42.1000	42.1500	-16.57	-16.61	-0.04	255.3	257.0
3	42.2000	42.3167	Interface	(below)	-0.08	258.7	260.2
4	42.4333	42.5500	+4.93	+4.88	-0.05	261.6	263.0
5	42.6667	42.7833	+4.15	+4.13	-0.02	264.3	265.6
6	42.9000	43.0167	+3.43	+3.42	-0.00	266.9	268.1
7	43.1333	43.2500	+2.75	+2.76	+0.01	269.3	270.4
8	43.3667	43.4833	+2.13	+2.15	+0.03	271.5	272.5
9	43.6000	43.7167	+1.56	+1.59	+0.04	273.5	274.5
10	43.8333	43.9500	+1.03	+1.08	+0.04	275.4	276.2
11	44.0667	44.1833	+0.56	+0.61	+0.05	277.0	277.9
12	44.3000	44.4167	+0.14	+0.18	+0.05	278.6	279.3
13	44.5333	44.6500	-0.24	-0.19	+0.05	279.9	280.6
14	44.7667	44.8833	-0.57	-0.52	+0.05	281.1	281.7
15	45.0000	45.1167	-0.85	-0.81	+0.04	282.1	282.6
16	45.2333	45.3500	-1.08	-1.04	+0.04	283.0	283.4
17	45.4667	45.5833	-1.27	-1.24	+0.03	283.7	284.0
18	45.7000	45.8167	-1.41	-1.39	+0.02	284.2	284.5
19	45.9333	46.0500	-1.50	-1.49	+0.02	284.6	284.8
20	46.1667	46.2833	-1.56	-1.55	+0.01	284.8	284.9
21	46.4000	46.5167	-1.56	-1.56	+0.00	284.9	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-17.83	-17.91	-0.08
FOR OUTER MATERIAL	+5.76	+5.69	-0.08

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.02
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	+0.02
AXIAL BENDING	-1.09	-1.03
INSIDE BENDING	+1.11	+1.05
OUTSIDE BENDING	-1.06	-1.00
HOOP BENDING	N/A	-1.06
INSIDE BENDING	N/A	+1.06
OUTSIDE BENDING	N/A	-1.05

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	275.6	275.4

PZR4

DELTA T1 (Total Section Delta T)	+29.0	+29.2
LINEAR INSIDE TEMPERATURE	260.9	260.7
LINEAR OUTSIDE TEMPERATURE	289.9	290.0
DELTA T2 (Absolute of Maximum)	9.0	8.9

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 8400.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial (Inside fluid)	Temperature, F Grid	Node 213.3
1	42.0000	42.0500	-11.32	-11.32	+0.00	218.6	220.3
2	42.1000	42.1500	-12.62	-12.65	-0.03	222.0	223.7
3	42.2000	42.3167	Interface	(below)	-0.06	225.4	226.9
4	42.4333	42.5500	+4.75	+4.72	-0.03	228.3	229.7
5	42.6667	42.7833	+3.97	+3.96	-0.01	231.0	232.3
6	42.9000	43.0167	+3.24	+3.25	+0.01	233.6	234.8
7	43.1333	43.2500	+2.57	+2.59	+0.03	236.0	237.1
8	43.3667	43.4833	+1.94	+1.98	+0.04	238.2	239.2
9	43.6000	43.7167	+1.37	+1.42	+0.05	240.2	241.2
10	43.8333	43.9500	+0.85	+0.90	+0.05	242.1	243.0
11	44.0667	44.1833	+0.37	+0.43	+0.06	243.8	244.6
12	44.3000	44.4167	-0.05	+0.01	+0.06	245.3	246.0
13	44.5333	44.6500	-0.43	-0.37	+0.06	246.7	247.3
14	44.7667	44.8833	-0.76	-0.70	+0.05	247.9	248.4
15	45.0000	45.1167	-1.04	-0.99	+0.05	248.9	249.4
16	45.2333	45.3500	-1.27	-1.23	+0.04	249.8	250.2
17	45.4667	45.5833	-1.46	-1.42	+0.03	250.5	250.8
18	45.7000	45.8167	-1.60	-1.57	+0.03	251.0	251.2
19	45.9333	46.0500	-1.70	-1.68	+0.02	251.4	251.5
20	46.1667	46.2833	-1.75	-1.74	+0.01	251.6	251.7
21	46.4000	46.5167	-1.75	-1.75	+0.00	251.7	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-13.89	-13.95	-0.06
FOR OUTER MATERIAL	+5.58	+5.52	-0.06

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.03
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	+0.03
AXIAL BENDING	-1.62	-1.58
INSIDE BENDING	+1.65	+1.61
OUTSIDE BENDING	-1.59	-1.54
HOOP BENDING	N/A	-1.60
INSIDE BENDING	N/A	+1.60
OUTSIDE BENDING	N/A	-1.59

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	242.3	242.1
DELTA T1 (Total Section Delta T)	+29.1	+29.3
LINEAR INSIDE TEMPERATURE	227.5	227.4
LINEAR OUTSIDE TEMPERATURE	256.7	256.8
DELTA T2 (Absolute of Maximum)	9.0	8.9

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 9000.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	180.0	
1	42.0000	42.0500	-7.36	-7.36	+0.00	185.2	187.0
2	42.1000	42.1500	-8.68	-8.69	-0.02	188.7	190.4
3	42.2000	42.3167	Interface	(below)	-0.04	192.1	193.6
4	42.4333	42.5500	+4.56	+4.55	-0.01	195.0	196.4
5	42.6667	42.7833	+3.78	+3.79	+0.01	197.7	199.0
6	42.9000	43.0167	+3.05	+3.08	+0.03	200.3	201.5
7	43.1333	43.2500	+2.38	+2.42	+0.04	202.7	203.8
8	43.3667	43.4833	+1.76	+1.81	+0.05	204.9	206.0
9	43.6000	43.7167	+1.18	+1.24	+0.06	206.9	207.9
10	43.8333	43.9500	+0.66	+0.72	+0.07	208.8	209.7
11	44.0667	44.1833	+0.18	+0.25	+0.07	210.5	211.3
12	44.3000	44.4167	-0.24	-0.17	+0.07	212.0	212.8
13	44.5333	44.6500	-0.62	-0.55	+0.06	213.4	214.1
14	44.7667	44.8833	-0.94	-0.88	+0.06	214.6	215.2
15	45.0000	45.1167	-1.23	-1.17	+0.05	215.7	216.1
16	45.2333	45.3500	-1.46	-1.41	+0.05	216.5	216.9
17	45.4667	45.5833	-1.65	-1.61	+0.04	217.2	217.5
18	45.7000	45.8167	-1.79	-1.76	+0.03	217.8	218.0
19	45.9333	46.0500	-1.89	-1.87	+0.02	218.2	218.3
20	46.1667	46.2833	-1.94	-1.93	+0.01	218.4	218.5
21	46.4000	46.5167	-1.95	-1.95	+0.00	218.4	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-9.96	-10.00	-0.04
FOR OUTER MATERIAL	+5.40	+5.35	-0.04

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.04
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	+0.04
AXIAL BENDING	-2.16	-2.13
INSIDE BENDING	+2.20	+2.17
OUTSIDE BENDING	-2.11	-2.09
HOOP BENDING	N/A	-2.14
INSIDE BENDING	N/A	+2.15
OUTSIDE BENDING	N/A	-2.13

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	209.1	208.8
DELTA T1 (Total Section Delta T)	+29.2	+29.4
LINEAR INSIDE TEMPERATURE	194.2	194.1
LINEAR OUTSIDE TEMPERATURE	223.4	223.6
DELTA T2 (Absolute of Maximum)	9.0	8.9

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= 9600.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	146.7	
1	42.0000	42.0500	-3.40	-3.40	+0.00	151.9	153.7
2	42.1000	42.1500	-4.73	-4.73	-0.01	155.4	157.1
3	42.2000	42.3167	Interface	(below)	-0.02	158.8	160.3
4	42.4333	42.5500	+4.38	+4.38	+0.00	161.7	163.1
5	42.6667	42.7833	+3.60	+3.62	+0.03	164.4	165.7

6	42.9000	43.0167	+2.87	+2.91	+0.04	167.0	168.2
7	43.1333	43.2500	+2.19	+2.25	+0.06	169.4	170.5
8	43.3667	43.4833	+1.57	+1.63	+0.07	171.6	172.7
9	43.6000	43.7167	+0.99	+1.07	+0.07	173.7	174.6
10	43.8333	43.9500	+0.47	+0.55	+0.08	175.5	176.4
11	44.0667	44.1833	-0.00	+0.07	+0.08	177.2	178.1
12	44.3000	44.4167	-0.43	-0.35	+0.08	178.8	179.5
13	44.5333	44.6500	-0.80	-0.73	+0.07	180.2	180.8
14	44.7667	44.8833	-1.13	-1.07	+0.07	181.4	181.9
15	45.0000	45.1167	-1.41	-1.36	+0.06	182.4	182.9
16	45.2333	45.3500	-1.65	-1.60	+0.05	183.3	183.7
17	45.4667	45.5833	-1.84	-1.80	+0.04	184.0	184.3
18	45.7000	45.8167	-1.98	-1.95	+0.03	184.5	184.8
19	45.9333	46.0500	-2.08	-2.06	+0.02	184.9	185.1
20	46.1667	46.2833	-2.13	-2.12	+0.01	185.2	185.2
21	46.4000	46.5167	-2.14	-2.14	+0.00	185.2	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-6.02	-6.04	-0.02
FOR OUTER MATERIAL	+5.21	+5.19	-0.02

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.05
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	+0.04
AXIAL BENDING	-2.69	-2.68
INSIDE BENDING	+2.74	+2.73
OUTSIDE BENDING	-2.64	-2.63
HOOP BENDING	N/A	-2.68
INSIDE BENDING	N/A	+2.69
OUTSIDE BENDING	N/A	-2.68

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	175.8	175.6
DELTA T1 (Total Section Delta T)	+29.3	+29.5
LINEAR INSIDE TEMPERATURE	160.9	160.8
LINEAR OUTSIDE TEMPERATURE	190.2	190.3
DELTA T2 (Absolute of Maximum)	9.0	8.9

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= %10200.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	113.3	
1	42.0000	42.0500	+0.56	+0.56	-0.00	118.6	120.3
2	42.1000	42.1500	-0.78	-0.78	-0.00	122.1	123.8
3	42.2000	42.3167	Interface (below)		-0.00	125.5	127.0
4	42.4333	42.5500	+4.19	+4.21	+0.02	128.4	129.8
5	42.6667	42.7833	+3.41	+3.45	+0.04	131.1	132.4
6	42.9000	43.0167	+2.68	+2.74	+0.06	133.7	134.9
7	43.1333	43.2500	+2.01	+2.08	+0.07	136.1	137.2
8	43.3667	43.4833	+1.38	+1.46	+0.08	138.3	139.4
9	43.6000	43.7167	+0.81	+0.89	+0.09	140.4	141.4
10	43.8333	43.9500	+0.28	+0.37	+0.09	142.3	143.2
11	44.0667	44.1833	-0.19	-0.10	+0.09	144.0	144.8
12	44.3000	44.4167	-0.62	-0.53	+0.08	145.5	146.2
13	44.5333	44.6500	-0.99	-0.91	+0.08	146.9	147.5
14	44.7667	44.8833	-1.32	-1.25	+0.07	148.1	148.7

15	45.0000	45.1167	-1.60	-1.54	+0.07	149.2	149.6
16	45.2333	45.3500	-1.84	-1.78	+0.06	150.0	150.4
17	45.4667	45.5833	-2.03	-1.98	+0.05	150.8	151.1
18	45.7000	45.8167	-2.17	-2.14	+0.03	151.3	151.5
19	45.9333	46.0500	-2.27	-2.24	+0.02	151.7	151.9
20	46.1667	46.2833	-2.32	-2.31	+0.01	151.9	152.0
21	46.4000	46.5167	-2.33	-2.33	+0.00	152.0	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-2.08	-2.09	-0.00
FOR OUTER MATERIAL	+5.03	+5.02	-0.00

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.06
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	+0.05
AXIAL BENDING	-3.22	-3.23
INSIDE BENDING	+3.28	+3.29
OUTSIDE BENDING	-3.17	-3.17
HOOP BENDING	N/A	-3.22
INSIDE BENDING	N/A	+3.23
OUTSIDE BENDING	N/A	-3.22

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	142.5	142.3
DELTA T1 (Total Section Delta T)	+29.4	+29.6
LINEAR INSIDE TEMPERATURE	127.6	127.5
LINEAR OUTSIDE TEMPERATURE	157.0	157.1
DELTA T2 (Absolute of Maximum)	9.0	8.9

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

................OUTPUT FOR TIME= %10800.00 SECONDS.....................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi hoop	axial	------ radial	Temperature, F Grid	Node
					(Inside fluid)		80.0
1	42.0000	42.0500	+4.52	+4.52	-0.00	85.3	87.0
2	42.1000	42.1500	+3.17	+3.18	+0.01	88.7	90.5
3	42.2000	42.3167	Interface	(below)	+0.02	92.1	93.6
4	42.4333	42.5500	+4.01	+4.05	+0.04	95.1	96.5
5	42.6667	42.7833	+3.23	+3.29	+0.06	97.8	99.2
6	42.9000	43.0167	+2.50	+2.57	+0.07	100.4	101.6
7	43.1333	43.2500	+1.82	+1.91	+0.09	102.8	104.0
8	43.3667	43.4833	+1.20	+1.29	+0.09	105.0	106.1
9	43.6000	43.7167	+0.62	+0.72	+0.10	107.1	108.1
10	43.8333	43.9500	+0.10	+0.20	+0.10	109.0	109.9
11	44.0667	44.1833	-0.38	-0.28	+0.10	110.7	111.5
12	44.3000	44.4167	-0.80	-0.71	+0.09	112.3	113.0
13	44.5333	44.6500	-1.18	-1.09	+0.09	113.6	114.3
14	44.7667	44.8833	-1.51	-1.43	+0.08	114.9	115.4
15	45.0000	45.1167	-1.79	-1.72	+0.07	115.9	116.4
16	45.2333	45.3500	-2.03	-1.97	+0.06	116.8	117.2
17	45.4667	45.5833	-2.22	-2.17	+0.05	117.5	117.8
18	45.7000	45.8167	-2.36	-2.32	+0.04	118.1	118.3
19	45.9333	46.0500	-2.46	-2.43	+0.03	118.5	118.6
20	46.1667	46.2833	-2.51	-2.50	+0.01	118.7	118.8
21	46.4000	46.5167	-2.52	-2.52	+0.00	118.8	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

PZR4

FOR INNER MATERIAL	+1.85	+1.87	+0.02
FOR OUTER MATERIAL	+4.84	+4.86	+0.02

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.01	+0.07
HOOP MEMBRANE	N/A	+0.01
AVERAGE RADIAL	N/A	+0.06
AXIAL BENDING	-3.76	-3.78
INSIDE BENDING	+3.83	+3.85
OUTSIDE BENDING	-3.69	-3.71
HOOP BENDING	N/A	-3.77
INSIDE BENDING	N/A	+3.77
OUTSIDE BENDING	N/A	-3.76

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	109.3	109.0
DELTA T1 (Total Section Delta T)	+29.5	+29.7
LINEAR INSIDE TEMPERATURE	94.3	94.2
LINEAR OUTSIDE TEMPERATURE	123.8	123.9
DELTA T2 (Absolute of Maximum)	9.0	8.9

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

..................OUTPUT FOR TIME= %11800.00 SECONDS....................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)		80.0
1	42.0000	42.0500	-0.13	-0.13	+0.00	80.9	81.1
2	42.1000	42.1500	-0.35	-0.35	-0.00	81.4	81.7
3	42.2000	42.3167	Interface	(below)	-0.00	82.0	82.2
4	42.4333	42.5500	+0.82	+0.82	+0.00	82.5	82.7
5	42.6667	42.7833	+0.68	+0.69	+0.01	83.0	83.2
6	42.9000	43.0167	+0.55	+0.56	+0.01	83.4	83.7
7	43.1333	43.2500	+0.42	+0.44	+0.01	83.9	84.1
8	43.3667	43.4833	+0.30	+0.32	+0.02	84.3	84.5
9	43.6000	43.7167	+0.19	+0.21	+0.02	84.7	84.9
10	43.8333	43.9500	+0.09	+0.10	+0.02	85.1	85.3
11	44.0667	44.1833	-0.01	+0.01	+0.02	85.4	85.6
12	44.3000	44.4167	-0.10	-0.08	+0.02	85.7	85.9
13	44.5333	44.6500	-0.18	-0.16	+0.02	86.0	86.2
14	44.7667	44.8833	-0.25	-0.23	+0.01	86.3	86.4
15	45.0000	45.1167	-0.31	-0.30	+0.01	86.5	86.6
16	45.2333	45.3500	-0.36	-0.35	+0.01	86.7	86.8
17	45.4667	45.5833	-0.40	-0.39	+0.01	86.9	86.9
18	45.7000	45.8167	-0.44	-0.43	+0.01	87.0	87.1
19	45.9333	46.0500	-0.46	-0.45	+0.00	87.1	87.1
20	46.1667	46.2833	-0.47	-0.47	+0.00	87.1	87.2
21	46.4000	46.5167	-0.47	-0.47	+0.00	87.2	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-0.57	-0.57	-0.00
FOR OUTER MATERIAL	+0.96	+0.96	-0.00

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	+0.01
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	+0.01

PZR4

AXIAL BENDING	-0.62	-0.62
INSIDE BENDING	+0.63	+0.63
OUTSIDE BENDING	-0.61	-0.61
HOOP BENDING	N/A	-0.62
INSIDE BENDING	N/A	+0.62
OUTSIDE BENDING	N/A	-0.62

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	85.2	85.2
DELTA T1 (Total Section Delta T)	+5.8	+5.9
LINEAR INSIDE TEMPERATURE	82.3	82.2
LINEAR OUTSIDE TEMPERATURE	88.1	88.1
DELTA T2 (Absolute of Maximum)	1.4	1.4

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME = %12800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-0.99	-0.99	+0.00	80.2	80.2
2	42.1000	42.1500	-1.03	-1.03	-0.00	80.3	80.3
3	42.2000	42.3167	Interface (below)		-0.00	80.4	80.4
4	42.4333	42.5500	+0.20	+0.20	-0.00	80.5	80.5
5	42.6667	42.7833	+0.17	+0.17	-0.00	80.5	80.6
6	42.9000	43.0167	+0.15	+0.15	-0.00	80.6	80.7
7	43.1333	43.2500	+0.13	+0.13	-0.00	80.7	80.8
8	43.3667	43.4833	+0.10	+0.10	-0.00	80.8	80.8
9	43.6000	43.7167	+0.08	+0.08	+0.00	80.9	80.9
10	43.8333	43.9500	+0.06	+0.06	+0.00	80.9	81.0
11	44.0667	44.1833	+0.04	+0.05	+0.00	81.0	81.0
12	44.3000	44.4167	+0.03	+0.03	+0.00	81.1	81.1
13	44.5333	44.6500	+0.01	+0.01	+0.00	81.1	81.1
14	44.7667	44.8833	-0.00	+0.00	+0.00	81.2	81.2
15	45.0000	45.1167	-0.01	-0.01	+0.00	81.2	81.2
16	45.2333	45.3500	-0.02	-0.02	+0.00	81.2	81.3
17	45.4667	45.5833	-0.03	-0.03	+0.00	81.3	81.3
18	45.7000	45.8167	-0.04	-0.04	+0.00	81.3	81.3
19	45.9333	46.0500	-0.04	-0.04	+0.00	81.3	81.3
20	46.1667	46.2833	-0.05	-0.05	+0.00	81.3	81.3
21	46.4000	46.5167	-0.05	-0.05	+0.00	81.3	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-1.06	-1.07	-0.00
FOR OUTER MATERIAL	+0.23	+0.22	-0.00

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.01	+0.01
INSIDE BENDING	-0.01	-0.01
OUTSIDE BENDING	+0.01	+0.01
HOOP BENDING	N/A	+0.01
INSIDE BENDING	N/A	-0.01
OUTSIDE BENDING	N/A	+0.01

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	81.0	81.0

PZR4

DELTA T1 (Total Section Delta T)	+1.1	+1.1
LINEAR INSIDE TEMPERATURE	80.4	80.4
LINEAR OUTSIDE TEMPERATURE	81.5	81.5
DELTA T2 (Absolute of Maximum)	0.3	0.3

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= %13800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-1.14	-1.14	+0.00	80.0	80.0
2	42.1000	42.1500	-1.15	-1.15	-0.00	80.1	80.1
3	42.2000	42.3167	Interface	(below)	-0.01	80.1	80.1
4	42.4333	42.5500	+0.09	+0.08	-0.00	80.1	80.1
5	42.6667	42.7833	+0.08	+0.08	-0.00	80.1	80.1
6	42.9000	43.0167	+0.08	+0.07	-0.00	80.1	80.1
7	43.1333	43.2500	+0.07	+0.07	-0.00	80.1	80.2
8	43.3667	43.4833	+0.07	+0.07	-0.00	80.2	80.2
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.2	80.2
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.2	80.2
11	44.0667	44.1833	+0.05	+0.05	-0.00	80.2	80.2
12	44.3000	44.4167	+0.05	+0.05	-0.00	80.2	80.2
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.2	80.2
14	44.7667	44.8833	+0.04	+0.04	-0.00	80.2	80.3
15	45.0000	45.1167	+0.04	+0.04	-0.00	80.3	80.3
16	45.2333	45.3500	+0.04	+0.04	-0.00	80.3	80.3
17	45.4667	45.5833	+0.04	+0.03	-0.00	80.3	80.3
18	45.7000	45.8167	+0.03	+0.03	-0.00	80.3	80.3
19	45.9333	46.0500	+0.03	+0.03	-0.00	80.3	80.3
20	46.1667	46.2833	+0.03	+0.03	-0.00	80.3	80.3
21	46.4000	46.5167	+0.03	+0.03	-0.00	80.3	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-1.15	-1.16	-0.01
FOR OUTER MATERIAL	+0.10	+0.09	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.12	+0.13
INSIDE BENDING	-0.13	-0.13
OUTSIDE BENDING	+0.12	+0.13
HOOP BENDING	N/A	+0.13
INSIDE BENDING	N/A	-0.13
OUTSIDE BENDING	N/A	+0.13

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.2	80.2
DELTA T1 (Total Section Delta T)	+0.2	+0.2
LINEAR INSIDE TEMPERATURE	80.1	80.1
LINEAR OUTSIDE TEMPERATURE	80.3	80.3
DELTA T2 (Absolute of Maximum)	0.1	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME = %14800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.17	-0.00	80.0	80.0
3	42.2000	42.3167	Interface	(below)	-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.07	+0.06	-0.00	80.0	80.0
6	42.9000	43.0167	+0.07	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.1
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.1	80.1
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.1	80.1
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.1	80.1
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.1	80.1
12	44.3000	44.4167	+0.05	+0.05	-0.00	80.1	80.1
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.1	80.1
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.04	+0.04	-0.00	80.1	80.1
20	46.1667	46.2833	+0.04	+0.04	-0.00	80.1	80.1
21	46.4000	46.5167	+0.04	+0.04	-0.00	80.1	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-1.17	-1.17	-0.01
FOR OUTER MATERIAL	+0.07	+0.07	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.14	+0.15
INSIDE BENDING	-0.15	-0.15
OUTSIDE BENDING	+0.14	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.1	80.1
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME = %15800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface	(below)	-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0

6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.1	80.1
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.15
OUTSIDE BENDING	+0.14	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.................OUTPUT FOR TIME= %16800.00 SECONDS....................

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi hoop	axial	------ radial	Temperature, F Grid	Node
					(Inside fluid)		80.0
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface	(below)	-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0
6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.0	80.0
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1

15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.16
OUTSIDE BENDING	+0.15	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

...............OUTPUT FOR TIME= %17800.00 SECONDS...................

	-- Radii, inches -		---- Grid Stress, ksi		------	Temperature, F	
N	Grid	Node	hoop	axial	radial	Grid	Node
					(Inside fluid)		80.0
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface	(below)	-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0
6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.0	80.0
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

PZR4

FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.16
OUTSIDE BENDING	+0.15	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME = %18800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface (below)		-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0
6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.0	80.0
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00

PZR4

AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.16
OUTSIDE BENDING	+0.15	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= %19800.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ------ hoop	axial	radial (Inside fluid)	Temperature, F Grid	Node
						80.0	
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface (below)		-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0
6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.0	80.0
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.16
OUTSIDE BENDING	+0.15	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0

PZR4

DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= %20000.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi ---- hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface	(below)	-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0
6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.0	80.0
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3			
FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.16
OUTSIDE BENDING	+0.15	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME = %25000.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface (below)		-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0
6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.0	80.0
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0
					(Above node is outside fluid)		

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.16
OUTSIDE BENDING	+0.15	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME = %30000.00 SECONDS.....

N	-- Radii, inches - Grid	Node	---- Grid Stress, ksi hoop	axial	radial	Temperature, F Grid	Node
					(Inside fluid)	80.0	
1	42.0000	42.0500	-1.17	-1.17	+0.00	80.0	80.0
2	42.1000	42.1500	-1.17	-1.18	-0.00	80.0	80.0
3	42.2000	42.3167	Interface (below)		-0.01	80.0	80.0
4	42.4333	42.5500	+0.07	+0.06	-0.01	80.0	80.0
5	42.6667	42.7833	+0.06	+0.06	-0.00	80.0	80.0

PZR4

6	42.9000	43.0167	+0.06	+0.06	-0.00	80.0	80.0
7	43.1333	43.2500	+0.06	+0.06	-0.00	80.0	80.0
8	43.3667	43.4833	+0.06	+0.06	-0.00	80.0	80.0
9	43.6000	43.7167	+0.06	+0.06	-0.00	80.0	80.0
10	43.8333	43.9500	+0.06	+0.06	-0.00	80.0	80.0
11	44.0667	44.1833	+0.06	+0.05	-0.00	80.0	80.0
12	44.3000	44.4167	+0.06	+0.05	-0.00	80.0	80.0
13	44.5333	44.6500	+0.05	+0.05	-0.00	80.0	80.0
14	44.7667	44.8833	+0.05	+0.05	-0.00	80.1	80.1
15	45.0000	45.1167	+0.05	+0.05	-0.00	80.1	80.1
16	45.2333	45.3500	+0.05	+0.05	-0.00	80.1	80.1
17	45.4667	45.5833	+0.05	+0.05	-0.00	80.1	80.1
18	45.7000	45.8167	+0.05	+0.05	-0.00	80.1	80.1
19	45.9333	46.0500	+0.05	+0.05	-0.00	80.1	80.1
20	46.1667	46.2833	+0.05	+0.05	-0.00	80.1	80.1
21	46.4000	46.5167	+0.05	+0.05	-0.00	80.1	100.0

(Above node is outside fluid)

INDIVIDUAL MATERIAL STRESSES AT INTERFACE GRID 3

FOR INNER MATERIAL	-1.17	-1.18	-0.01
FOR OUTER MATERIAL	+0.07	+0.06	-0.01

INSIDE/OUTSIDE HT TX COEF. (BTU/HR-FT2-F): +8.000D+02 +2.000D-01

STRESSES (KSI) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AXIAL MEMBRANE	+0.00	-0.00
HOOP MEMBRANE	N/A	+0.00
AVERAGE RADIAL	N/A	-0.00
AXIAL BENDING	+0.15	+0.15
INSIDE BENDING	-0.15	-0.16
OUTSIDE BENDING	+0.15	+0.15
HOOP BENDING	N/A	+0.15
INSIDE BENDING	N/A	-0.15
OUTSIDE BENDING	N/A	+0.15

TEMPERATURES (F) BASED ON:	AREA WEIGHTED AVERAGING	LINEAR AVERAGING
AVERAGE TEMPERATURE	80.0	80.0
DELTA T1 (Total Section Delta T)	+0.1	+0.1
LINEAR INSIDE TEMPERATURE	80.0	80.0
LINEAR OUTSIDE TEMPERATURE	80.1	80.1
DELTA T2 (Absolute of Maximum)	0.0	0.0

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* * * * * PIPE-TS2 VERSION 1.01 (4/17/91 1930) * * * * *

.....OUTPUT FOR TIME= %35000.00 SECONDS.....

N	Grid	Node	-- Radii, inches -	---- Grid Stress, ksi ------ hoop	axial	radial	Temperature, F Grid	Node
						(Inside fluid)		80.0

APPENDIX D
DESIGN INPUT MEMOS (REFERENCES 7 & 8)

Hal L. Gustin

From: Kemp, Brian [Brian.Kemp@nmcco.com]
Sent: Wednesday, October 19, 2005 9:30 AM
To: Hal L. Gustin
Subject: PBNP design input

Attachments: design paramters.doc; load cycles.doc; Pzr Fatigue Usage.doc; SG Design Information.doc; Transition Cone Region Figure.doc; Transition Cone Region Figure - Thicknesses.doc


design aramters.doc (70 KE


load cycles.doc (68 KB)


Pzr Fatigue Usage.doc (43 KB)


SG Design ıformation.doc (37 .


Transition Cone Region Figure....


Transition Cone Region Figure ...

Hal,

The attached information should be used as design inputs for the U1R29 SG & PZR structural evaluations that SIA is performing.

This information is non-proprietary exerpts from the Westinghouse Report titled "PBNP Power Uprate Project

NSSS Engineering Report Volume 1."

Please call with questions.

Brian Kemp

PBNP Pressurizer Fatigue Usage	
Component	**Calculated Fatigue Usage**
Surge Nozzle	[< 0.62][b,c]
Spray Nozzle	[< 0.92][b,c]
Safety and Relief Nozzle	[< 0.15][b,c]
Lower Head, Heater Well Lower Head, Preformation	[< 0.01][b,c] [< 0.09][b,c]
Upper Head and Shell	[< 0.78][b,c]
Support Skirt/Flange	[< 0.01][b,c]
Manway Pad Manway Cover Manway Bolts	[0.0][b,c] [0.0][b,c] [0.0][b,c]
Support Lug	[< 0.05][b,c]
Instrument Nozzle	[< 0.11][b,c]
Immersion Heater	[< 0.01][b,c]
Valve Support Bracket	[0.01][b,c]

Bracketed [ ][b,c] information designates data that is Westinghouse Proprietary, as discussed in Section 1.5 of this report.

Hal L. Gustin

From: Kemp, Brian [Brian.Kemp@nmcco.com]
Sent: Friday, October 14, 2005 7:58 AM
To: Turner, Russell
Cc: Hal L. Gustin
Subject: RE: Transients

Russell,

I believe that 200F/hour is a very conservative cycle range for plant startup and shutdown cycles. I would suspect that the plant would see no more than 100-200 of these during the plant lifetime (the FSAR has assumed cycles). Operating temperature cycles at that location would be very small in temperature and probably can be neglected. As I mentioned yesterday, Dave Gerber's team at SIA have the numbers. I understand he may be on vacation. At PBNP, the owner of the fatigue program and the FatiguePro software is Jason Hawman & someone else (forgot his name) in Hawki's group. They can validate assumptions also.

Brian K.

From: Turner, Russell
Sent: Friday, October 14, 2005 5:11 AM
To: Kemp, Brian
Subject: FW: Transients

Brian, can you answer this, or is it something I have to dig for?

From: Hal L. Gustin [mailto:Hgustin@Structint.com]
Sent: Thursday, October 13, 2005 5:35 PM
To: Turner, Russell
Subject: Transients

Russell:

Is a thermal transient of 200 F / hour representative of the pressurizer upper shell region, or did I miss something. I'll need to ask the same question for the SGs also, when we get to it.

Thanks,

Hal