SEISMIC AND STRESS ANALYSIS OF LACBWR

MAIN STEAM PIPING SYSTEM

Prepared Under NES Project 5101 for

DAIRYLAND POWER COOPERATIVE

NUCLEAR ENERGY SERVICES, INC.

Danbury, Connecticut 06810

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1. SUMMARY

This report, prepared for Dairyland Power Cooperative, presents the results of seismic and stress analyses of the main steam piping system for the LACBWR Nuclear Power Station. The seismic and stress analyses are performed in accordance with the design requirements for Class 2 piping components of the ASME Boiler and Pressure Vessel Code, Section III, Division 1, "Nuclear Power Plant Components", 1974. By providing adequate seismic restraints (snubbers) at critical locations of the main steam system, the stresses in the piping due to a seismic event have been reduced to acceptable values. It is concluded that the stresses due to seismic, dead weight, pressure and thermal expansion loadings, combined according to the ASME Code rules for Class 2 components, satisfy the design requirements given in the Code.

2. INTRODUCTION

In response to AEC/DL's request to review the effects of an earthquake event on the LaCrosse Boiling Water Reactor, Dairyland Power Cooperative requested Gulf United Nuclear Fuels Corporation to evaluate the adequacy of the major structures and equipment to withstand seismic loadings. The seismic study performed by Gulf United (GU) Nuclear Fuels Corporation (Ref. 1) included an analysis of the main steam line which indicated that high stresses would be generated in the main steam line during a seismic event. It was also evident from these analyses that the LACBWR piping systems, in general, were not designed to accomodate horizontal accelerations, the primary earthquake induced loading condition. Anticipating the possibility of a seismically induced loss of coolant accident, it was, therefore, concluded that analyses of the major Class 1 piping systems should be performed to evaluate their structural integrity.

In order to verify that the seismic stresses are acceptable, it is necessary to show that the combined stresses in the piping system are within ASME Boiler and Pressure Vessel Code allowable values. This requires that the seismic stresses be combined with the stresses due to deadweight, pressure and thermal loadings in accordance with the ASME Code Section IIi rules(Ref. 2).

The rules for a Class 1 (Section III) analysis require that thermal stress and fatigue due to thermal cycling be considered. A review of the available main steam piping system flexibility and stress analyses indicated that only thermal expansion was considered together with the pressure and deadweight loads in the original design. Consequently, it is not possible to perform a Class 1 analysis with the existing analytical data.

The existing analytical data, however, is sufficient to perform a Class 2 (Section III) analysis. Therefore, in the subject analysis, the adequacy of the main steam piping system to withstand an earthquake event is evaluated by combining the stresses due to deadweight, pressure, thermal and seismic loadings in accordance with ASME Code requirements for the design of Class 2 components. It should be noted that the requirements of the ASME Code, Section III, for the design of Class 2 components are much more rigorous than the design requirements given in the Power Piping Code, USAS B31.1.0 (The applicable code for the LACBWR Project).

Section 3.0 of this report describes the scope of the main steam piping system considered in the analysis. The loading criteria, design criteria and analytical methods used in the analyses are given in Sections 4.0, 5.0 and 6.0 respectively. The results of the analysis are discussed in Section 7.0. The conclusions and recommendations are summarized in Section 8.0.

3. PIPING SYSTEM DESCRIPTION

The main steam piping system within the containment shell carries steam from the reactor vessel to either the turbine building or the shutdown condenser. Steam is withdrawn from the reactor vessel through two 8-inch steam lines leading to a single 10-inch line. The steam passes out of the biological shield and through a rotoport steam isolation valve in the 10-inch line before leaving the containment shell for the turbine building. Within the biological shield, the 10-inch steam line branches upward and out of the biological shield to the main steam safety valves. The line then continues upward in the form of a 6-inch line to the shutdown condenser via a redundant system of control valves.

The governing design specification used in the analysis of the main steam piping system is given in Reference 3. The piping arrangement analyzed and piping suspension (hangers, etc.) characteristics have been taken from the drawings listed in Reference 4. Piping properties have been taken from the information given in Reference 5 and from the piping specification (Ref.3). This information is summarized in Table A-1 of Appendix A.
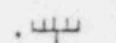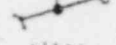
An isometric drawing showing the main steam piping system as analyzed, including the suspension system and recommended seismic snubbers, is given in Figure 3.1.

FIGURE 3.1

MATHEMATICAL MODEL
LACBWR MAIN STEAM PIPING SYSTEM

MAIN STEAM LINE TO
CONDENSER

MAIN STEAM LINE TO
TURBINE
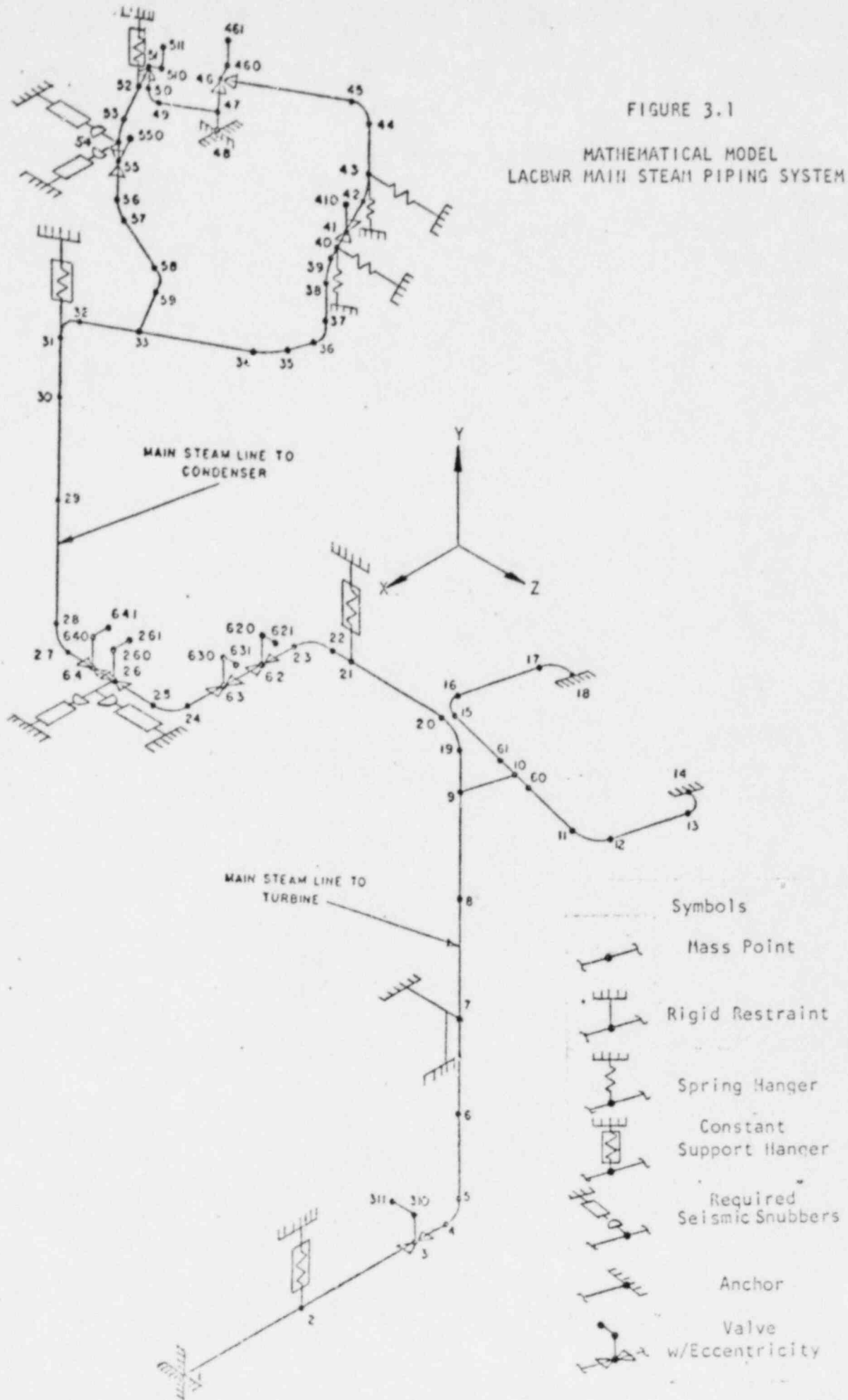
Symbols

Mass Point

Rigid Restraint

Spring Hanger

Constant
Support Hanger

Required
Seismic Snubbers

Anchor

Valve
w/Eccentricity

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4. LOADING CRITERIA

The load cases which must be considered in performing a Class 2 stress analysis include: dead loads and sustained mechanical loads, internal pressure, thermal expansion loading, seismic inertia loads and seismic anchor movement loading. The static and dynamic load cases are summarized in Tables A-III and A-IV of Appendix A.

4.1 Dead Weight and Other Sustained Mechanical Loads (Static Load Case 1)

The dead weight of the piping system is calculated assuming the system to be insulated and filled with water. The weight of valves, valve operators, and branch piping are included in the analysis. Valve weights and dimensions are taken from vendor drawings and specifications supplied by DPC and are given in Table A-II of Appendix A. Sustained loads imposed on the piping system by constant load hangers are also considered in the dead weight analysis. These loads are taken from Ref. 4 drawings.

4.2 Internal Pressure (Static Load Cases 2 and 3)

System normal operating pressure, Load Case 2, and peak pressure, Load Case 3, used in the analysis are taken from Refs. 3 and 6. A value of 1300 psia for operating pressure and 1415 psia for peak pressure are used for most of the piping system. A peak pressure of 1300 psia is used in the section between the containment vessel and the rotoport isolation valve (Nodes 1 through 3).

4.3 Thermal Loading (Static Load Case 4)

The thermal expansion stresses are based on the thermal loading resulting from the normal operating temperature of 577.5°F.

Thermal anchor movements at the nozzle connections to the pressure vessel are calculated based on the thermal expansion of the pressure vessel at the design temperature of 577.5°F.

4.4 Seismic Loading

A dynamic analysis of the piping system is performed using the response spectrum method of analysis (Section 6.4). Two seismic loading events are considered: the safe shutdown earthquake (SSE), and the operating basis earthquake (OBE). The established design criteria (Ref. 7, Reg. Guide 1.48, May 1973) for Class 2 analysis considers the OBE (or 1/2 SSE) to be the normal and upset condition while the SSE is considered the faulted condition.

Seismic inertia loading is imposed on the piping system in the form of seismic acceleration spectra which were derived for the LACBWR plant (Ref. 1). The horizontal acceleration spectrum used for the main steam line is that corresponding to the reactor vessel at an elevation of 664.5 feet. The vertical response spectrum for the SSE loading is taken as 2/3 of the horizontal SSE ground response spectrum assuming no amplification of vertical response in the structure. For the operating basis earthquake the vertical piping response spectrum is taken as 1/2 of the SSE vertical response spectrum. Damping values used are 1 percent for the OBE and 2 percent for the SSE.

The horizontal spectra in either the global X- direction (Dynamic Load Cases 8 and 10) or the global Z- direction (Dynamic Load Cases 9 and 11) are applied simultaneously with the vertical spectra in the global Y- direction. Load Cases 8 and 9 represent the operating bases earthquake while 10 and 11 represent the SSE earthquake. The applicable response spectra used in the analysis for dynamic load cases are shown in Table A-V of Appendix A.

Seismically induced anchor movements (Static Load Cases 6,7,12, and 13) for points 7, 14,18, 40, 42, and 48 were estimated by calculating low frequency displacements from the containment vessel response spectra at the different anchor point elevations.

5. STRESS ACCEPTANCE CRITERIA

The requirements for acceptability of a Class 2 piping system are given in AEC regulatory position 8 of Reference 7 and Section NC-3611 of Reference 2. Calculated stresses resulting from specified load combinations must meet the stress limits of equations 8 through 11 (Section 6.5).

5.1 Normal Operating Conditions

Under normal operating conditions, the combined stresses due to design pressure, weight, and other sustained loads (load Cases 1 and 2) must not exceed the baisc material allowable stress at maximum temperature, S_h, and the requirements of Equation 8, Section 6.5. Additionally, either the stress range due to thermal expansion and seismic anchor movements (Load Cases 4 and 6) as calculated by Equation 10, Section 6.5, must not exceed the allowable expansion stress range S_A (Reference 2), or the combined stresses due to design pressure, weight, other sustained loads and the stress range due to thermal expansion (Load Cases 1, 2, 4 and 6 or 7) must not exceed the sum of S_A and S_h as required by Equation 11, Section 6.5.

5.2 Upset Conditions

The requirements for operation under upset conditions include compliance with the requirements of Equations 8, 10 and 11 as described above as well as Equation 9, Section 6.5. Equation 9 requires that the combined stresses produced by peak pressure (Load Case 3), live and dead loads (Load Case 1), and those produced by occasional loads -- in this analysis defined as the OBE earthquake -- (Load Cases 8 and 9), must not be greater than 1.2 times the allowable stress value S_h.

5.3 Faulted Conditions

During faulted conditions, the requirements of Equation 9 must be met using a stress limit of 1.8 S_h. For the purpose of satisfying this criteria, the faulted conditions are specified as peak pressure loads (Load Case 3), live and dead loads (Load Case 1), the SSE seismic inertia loadings (Load Cases 1 and 11) and the seismic anchor movement loads associated with the SSE (Load Cases 12 and 13).

6. ANALYTICAL METHODS

6.1 Mathematical Model

In order to perform static, dynamic and stress analyses, the continuous piping system is mathematically modeled as an assembly of elastic structural elements interconnected at discrete nodal points(Figure 3.1). Nodal points are located at all points of interest in the piping system such as elbows, valves,anchorages,hangers,tee intersections, load points, all structural and material discontinuities, etc. This three dimensional multidegree-of-freedom model of the piping system is attached to the "ground" (structure) by means of rigid hangers, support springs, hydraulic snubbers and anchors. Stiffness characteristics of structural elements are related to the moment of inertia and the axial and effective shear area of the pipe cross section. The stiffness characteristics of the elbows and tee connections are modified to account for local deformation by using the flexibility factors given in the ASME Code (Ref. 2).

For the seismic analysis the distributed mass of the piping system is lumped at the system nodal points. Masses are lumped so that the lumped mass, multidegree-of-freedom model represents the dynamic characteristics of the piping system. In order to reduce the number of dynamic degrees-of-freedom, only translational degrees-of-freedom are considered at each mass point (the masses associated with the rotational degrees-of-freedom are set to zero). This assumption has been shown to be completely satisfactory for accurate analysis of seismic response. Special items such as valves and actuators are modeled by lumping their masses at an appropriate offset from the center-line of the piping system.

6.2 Static Load Analysis

The static load analysis involves the application of the following loading conditions and their combinations:

- Design Pressure
- Gravity Loading (dead weight) and Sustained Mechanical Loads
- Support Displacement
- Thermal Expansion

For the pressure loadings, the hoop and longitudinal stresses in the affected piping are calculated using the formulae given in the Code (see Section 6.5).

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For the deadweight, support displacement, or thermal expansion loading conditions the following equations of equilibrium written in matrix form are solved:

$$KU = P \qquad (1)$$

where:

K = System stiffness matrix

U = Nodal point displacement vector

P = External forces, dead weight or equivalent thermal load vector.

The system stiffness matrix is obtained from element stiffness matrices using direct stiffness methods. The unknown nodal displacements U are obtained as follows:

$$U = K^{-1}P \qquad (2)$$

The inversion of the stiffness matrix is performed using the Gauss-Siedel technique.

From the nodal displacements U, the member internal forces are determined using the member stiffness matrix. Finally the member internal forces are used in calculating the stresses.

6.3 Eigenvalue Analysis

The eigenvalues (natural frequencies) and the eigenvectors (mode shapes)for each of the natural modes of vibration are calculated by solving the following frequency equation:

$$\left[K - \omega_n^2 M \right] \left\{ \phi_n \right\} = \left\{ 0 \right\} \qquad (3)$$

where:

ω_n = Natural angular frequency for the nth mode

M = System mass matrix

ϕ_n = Mode shape vector for the nth mode

0 = Null vector

The eigenvalue/eigenvector extraction is performed using the Householder-QR technique.

6.4   Dynamic (Seismic) Load Analysis

Considering only translational degrees of freedom and assuming viscous (velocity proportional) form of damping, the equation of motion in matrix form can be expressed as follows:

$$M(\ddot{U}_t + \ddot{U}_{gt}) + C\dot{U}_t + KU_t = 0 \tag{4}$$

where:

$\ddot{U}_t$ = Relative acceleration time history vector

$\ddot{U}_{gt}$ = Ground acceleration time history vector

C = Damping matrix

$\dot{U}_t$ = Velocity time history vector

U_t = Relative displacement time history vector

Rearranging equation (4)

$$M\ddot{U}_t + C\dot{U}_t + KU_t = -M\ddot{U}_{gt} = P_{eff} \tag{5}$$

To uncouple equation (5), assume

$$U = \phi Y_t$$

where:

ϕ = Characteristic free vibration mode shapes matrix.

Y_t = Generalized coordinate displacement time history vector.

Pre-and post-multiplying equation (5) by the transpose of ϕ and by ϕ respectively and using orthogonality conditions, the following uncoupled equations of motion are obtained:

$$\ddot{Y}_{nt} + 2\omega_n \lambda_n \dot{Y}_{nt} + \omega_n^2 Y_{nt} = M_n^{*-1} R_n \ddot{U}_{gt} \tag{6}$$

where:

Y_{nt} = Generalized displacement coordinate time history for n^{th} mode

λ_n = Damping ratio for the nth mode expressed as percent of critical damping

M_n^{*} = Generalized mass for the nth mode

$\quad\quad = \phi_n^T M \phi_n = M_i \phi_{in}^2$

The mode shape ϕ_n is normalized such that $M_n^* = 1$

$\quad R_n \quad =$ Participation factor for the nth mode

$$\quad = \phi_n^T \, MI \quad = \sum M_i \phi_{in}$$

$\quad I \quad =$ Column vector whose elements are generally unity

The solution for the differential equation (6) is given by the Duhamel Integral

$$Y_{nt} = \frac{R_n}{M_n^* \omega_n} \int_0^t \ddot{U}_{gt} \, e^{-\lambda_n \omega_n (t-\tau)} \sin \omega_n (t-\tau) \, d\tau$$

Using the response spectrum method of analysis, the maximum values of the generalized response for each mode is given by:

$$\ddot{Y}_{n\,max} = \frac{R_n \, S_{an}}{M_n^*} \tag{7}$$

where:

$\quad \ddot{Y}_{n\,max} =$ Maximum generalized coordinate acceleration response for the nth mode.

$\quad S_{an} \quad =$ Spectral acceleration value for the nth mode (from the applicable response spectrum curve)

From the maximum generalized coordinate response, the maximum acceleration $(\ddot{U}_{n\,max})$ and maximum inertia forces $(F_{n\,max})$ at each mass point are given by:

$$\ddot{U}_{n\,max} = \ddot{Y}_{n\,max} \, \phi_{in}$$

$$F_{n\,max} = M_n \, \ddot{U}_{n\,max}$$

The inertia forces $(F_{n\,max})$ for each of the system natural modes are applied as external static forces, and the piping system response (displacements, member internal forces and stresses) are calculated using the procedure described in Section 4.2. Total system response is then obtained by combining the individual modal response values by the square-root of the sum of the squares method; lower modes having large contribution to the response (all modes having natural frequency under 30 cycles per second) are considered and higher modes with negligible participation are neglected.

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6.5 Stress Analysis

The design requirements of the ASME Code for Class 2 piping systems are satisfied when the calculated stresses in the piping system due to thermal expansion, weight, and other sustained and occasional loads are combined in accordance with and meet the limitations of, equations 8,9,10,and 11 of Subsection NC-3652 of Reference 8. These requirements are described below:

A.   Sustained Loads

The effects of pressure weight and other sustained mechanical loads must meet the requirements of equation (8).

$$S_{SL} = \frac{PDo}{4t_n} + \frac{0.75iM_A}{Z} \leq 1.0S_h \tag{8}$$

where:

P   =   Internal design pressure, psi

D_o =   Outside diameter of pipe, in.

t_n =   Nominal wall thickness, in.

M_A =   Resultant moment loading on cross section due to weight and other sustained loads, in. (See NC-3652.4, Ref.8)

Z   =   Section modulus of pipe, in.3 (See NC-3652.4, Ref.8)

i   =   Stress intensification factor (NC-3673.2 (b), Ref.8) The product of 0.75i shall never be taken as less than 1.0

S_h =   Basic material allowable stress at design temperature

B.   Occasional Loads

The effects of pressure, weight, other sustained loads and occasional loads including earthquake must meet the requirements of Equation (9).

$$S_{OL} = \frac{P_{max}D_o}{4t_n} + \frac{0.75i (M_A + M_B)}{Z} \leq 1.2S_h \tag{9}$$

where:

P_{max} =   Peak pressure, psi

M_B =   Resultant moment loading on cross section due to occasional loads such as earthquake loads

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C.   Thermal Expansion

The requirements of either Equation (10) or Equation (11) must be met.

1. The effects of thermal expansion must meet the requirements of Equation (10)

$$S_{TE} = \frac{iM_C}{Z} \leq S_A \tag{10}$$

where:

M_C = Range of resultant moments due to thermal expansion. Also include moment effects of anchor displacements due to earthquake if anchor displacement effects were omitted from Equation (9)

S_A = Allowable stress range for expansion stresses (NC-3611.2, Ref.8)

2. The effects of pressure, weight, other sustained loads and thermal expansion shall meet the requirements of Equation (11)

$$S_{TE} = \frac{PD_o}{4t_n} + \frac{0.75i\,M_A}{Z} + \frac{iM_C}{Z} \leq (S_h + S_A) \tag{11}$$

The above mentioned static, dynamic and stress analyses are carried out using the PIPESD computer code. PIPESD was developed by URS/John A. Blume and Associates, Engineers, San Francisco, California and has been extensively used in the seismic and stress analysis of piping system for a number of nuclear power plants. PIPESD is available to Nuclear Energy Services through the Control Data Corporation CYBERNET Service.

7. DISCUSSION OF RESULTS

A preliminary seismic analysis of the main steam piping system with its existing support configuration indicated that the stresses due to the operating basis earthquake would be substantially greater than the allowable stress values at critical locations (particularly in the vicinity of nodes 53 and 54). In addition, this preliminary analysis indicated that, in the relatively long steam line leading to the shutdown condenser, lateral deflections due to the seismic inertia loads would be of the order of 5 to 6 inches. In order to reduce the seismic stresses and deflections to acceptable values four seismic snubbers were located at critical locations in the piping system as shown in Figure 3.1. The results presented in this report represent the response of this modified system configuration.

The natural frequencies for the first 32 modes of vibration of the piping system are summarized in Table 7-1, from which it may be seen that the piping system is a fairly flexible (low frequency) system.

The deflections at each node point due to the various load cases are summarized in Table B-1, pages B-1 through B-10 of Appendix B. The maximum deflection due to the SSE seismic inertia loading (Load Case 10) is 0.58 inches at node point 31. For a flexible piping system this deflection should be acceptable. The maximum deflection due to thermal expansion (Load Case 4) is 1.8 inches at node 29. Table B-11, pages B-11 through B-14 of Appendix B, summarizes the elastic support reaction forces. The seismic restraints and anchors should be designed (sized) using these restraint forces. The maximum reaction force in the seismic restraints is 980 pounds (Load Case 11).

The results of the detailed stress analysis in accordance with the requirements of Subarticle NC 3652 of the ASME Code for the Class 2 piping system are given in Table B-111, pages B-15 through B-41 of Appendix B. Figures 7.1 through 7.9 indicate node points with maximum stresses or stresses exceeding 10.0 ksi for specified Class 2 load conditions. From these stress results summaries, it may be seen that code allowable stress values are not exceeded.

TABLE 7-1

NATURAL FREQUENCIES OF VIBRATION

Mode No.	Frequency (CPS)
1	3.0511
2	4.1689
3	4.5762
4	4.8482
5	5.5088
6	6.1582
7	6.5564
8	7.4169
9	8.9696
10	9.6125
11	10.7147
12	11.3881
13	12.4584
14	13.2577
15	14.0559
16	14.3915
17	15.0682
18	16.6528
19	17.3994
20	17.5007
21	19.0081
22	21.1871
23	21.9415
24	22.5624
25	23.5551
26	23.7430
27	26.4039
28	27.1295
29	28.5522
30	29.5071
31	31.1632
32	31.3518

FIGURE 7.2

COMPLIANCE WITH ASME CODE EQUATION 9
Upset Conditions

Applied Loads
Peak Pressure
Dead Weight & Other Sustained Mechanical Loads
X + Y Earthquake ($\frac{1}{2}$ SSE)
Allowable Stress, 1.2 S_h = 18.0   KSI
Maximum Stress at Node 1 = 11.8   KSI

(Stresses Greater Than 10.0 KSI Indicated)

MAIN STEAM LINE TO
CONDENSER

MAIN STEAM LINE TO
TURBINE

-17
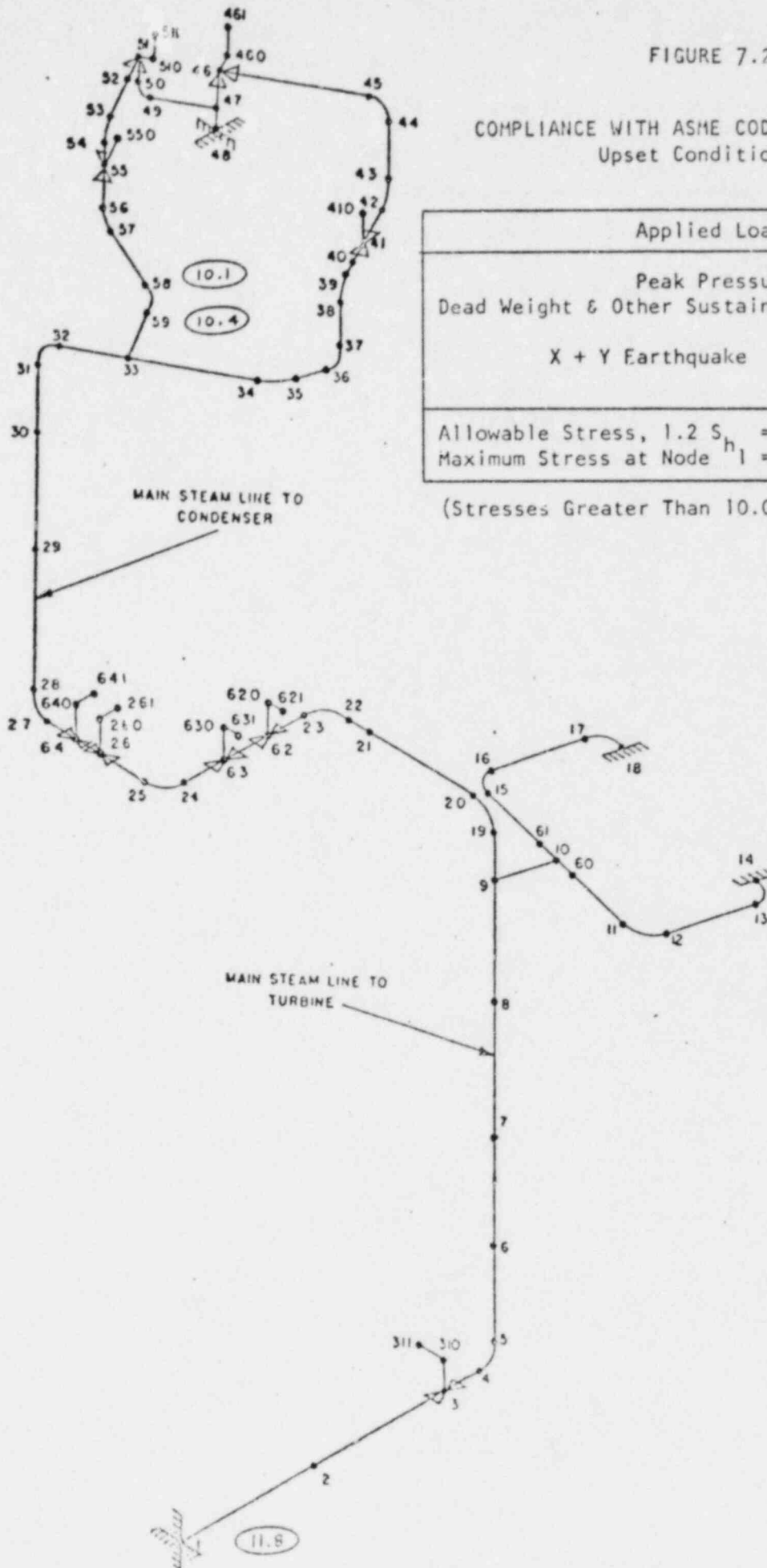
FIGURE 7.3

COMPLIANCE WITH ASME CODE EQUATION 9
Upset Conditions

Applied Loads
Peak Pressure Dead Weight & Other Sustained Mechanical Loads Z + Y Earthquake ($\frac{1}{2}$ SSE)
Allowable Stress, 1.2 S_h = 18.0 KSI Maximum Stress at Node 59 = 10.4 KSI

(Stresses Greater Than 10.0 KSI Indicated)

MAIN STEAM LINE TO
CONDENSER

MAIN STEAM LINE TO
TURBINE
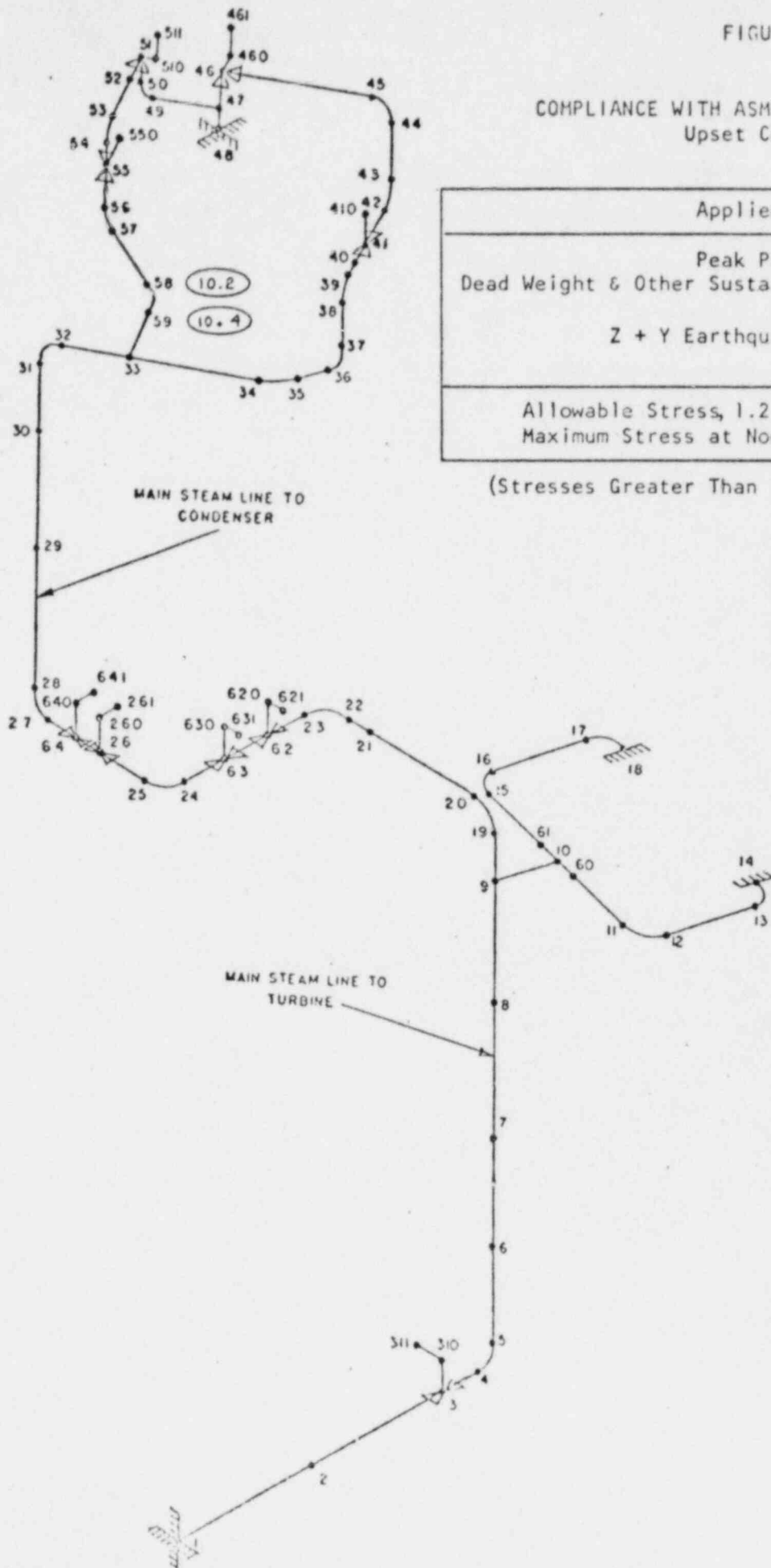
FIGURE 7.4

COMPLIANCE WITH ASME CODE EQUATION 10
Normal Operating and Upset Conditions

Applied Loads
Design Temperature Thermal Anchor Movements Seismic Anchor Movements (X-direction)

Allowable Stress, S_A = 19.1 KSI
Maximum Stress at Node 1 = 16.6 KSI

(Stresses Greater Than 10.0 KSI Indicated)

MAIN STEAM LINE TO
CONDENSER

MAIN STEAM LINE TO
TURBINE
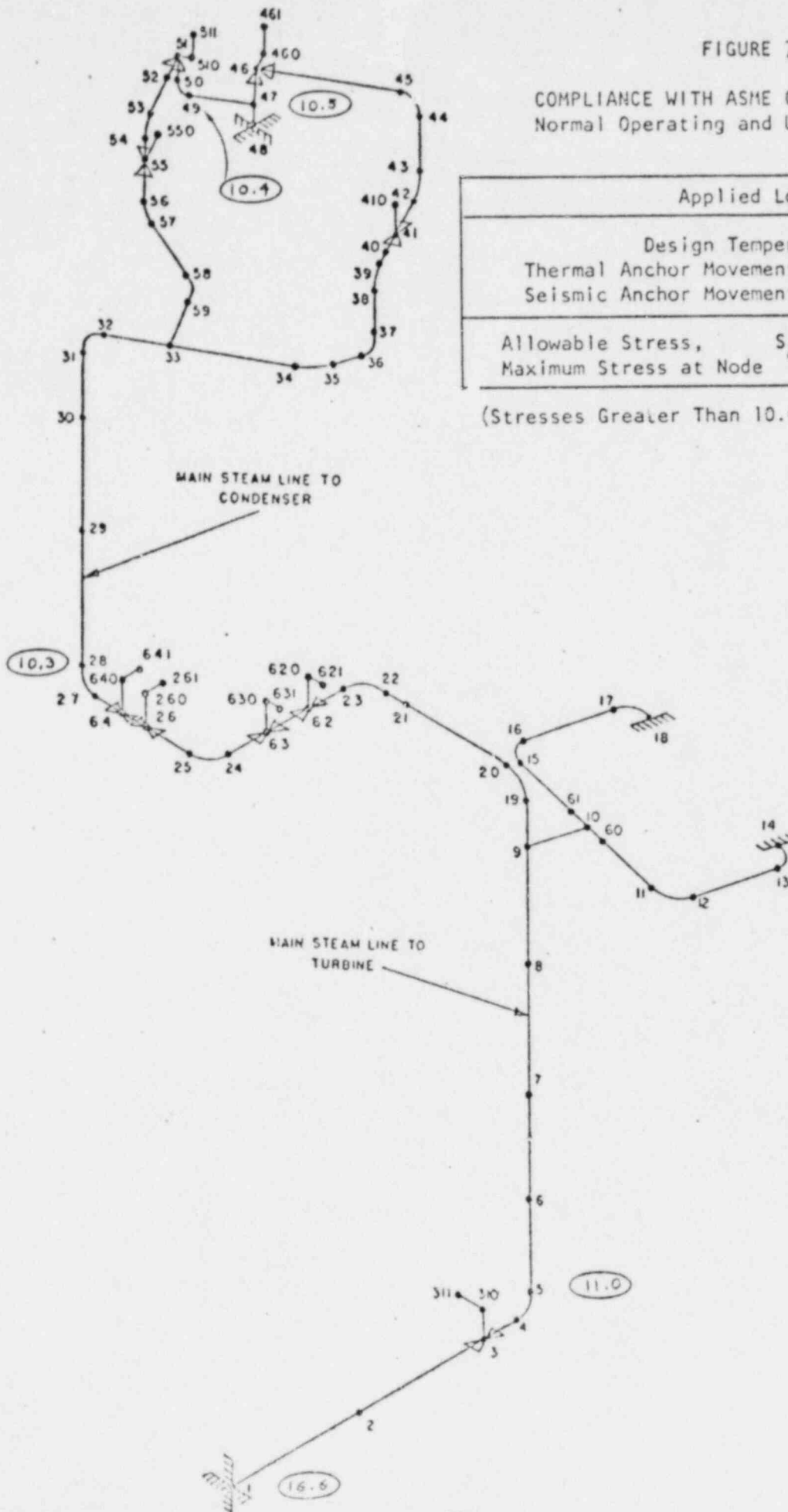
FIGURE 7.5

COMPLIANCE WITH ASME CODE EQUATION 10
Normal Operating and Upset Conditions
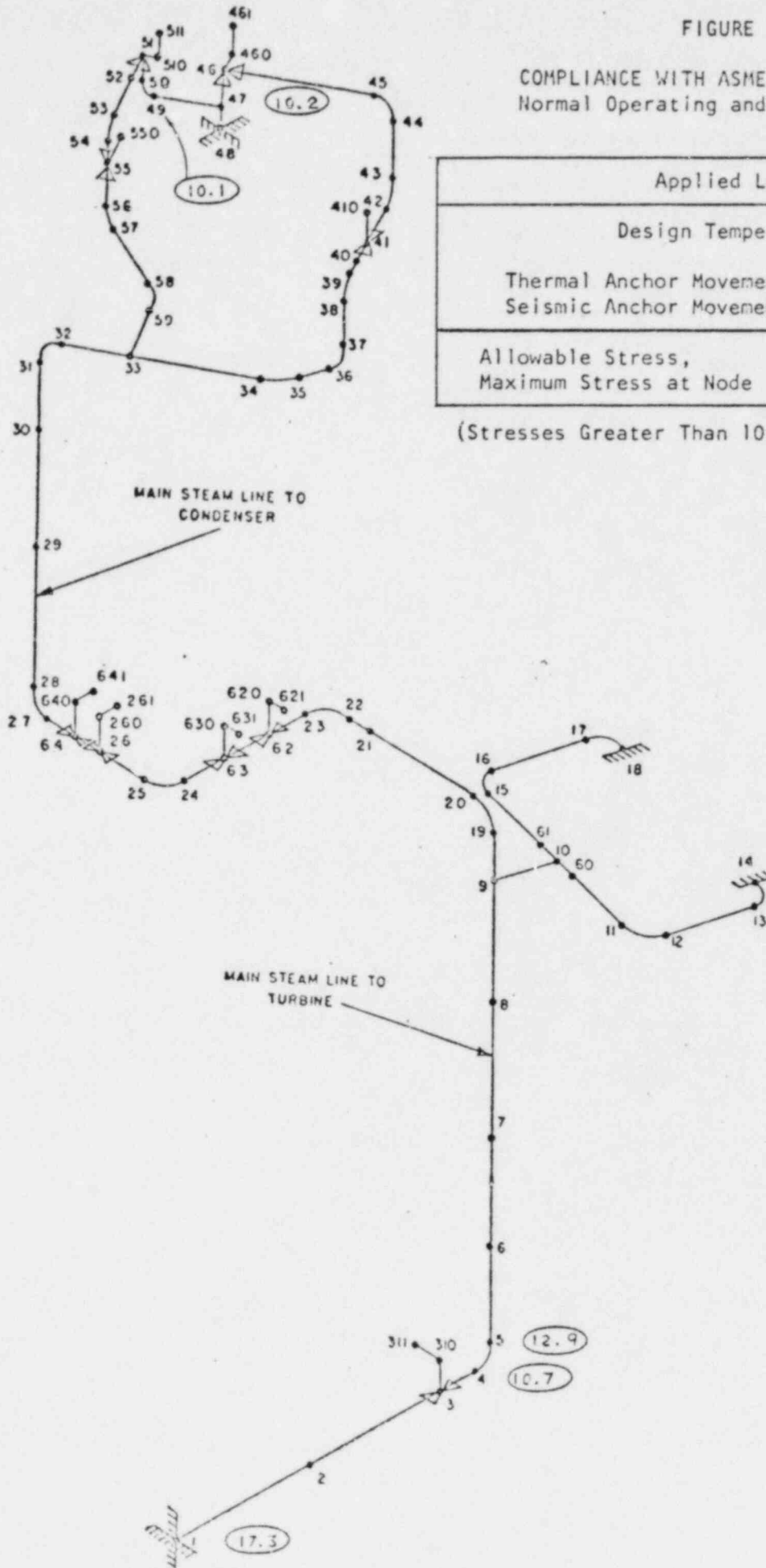
Applied Loads
Design Temperature
Thermal Anchor Movements Seismic Anchor Movements (Z-direction)

Allowable Stress,	S_A =	19.1 KSI
Maximum Stress at Node	1 =	17.3 KSI

(Stresses Greater Than 10.0 KSI Indicated)

MAIN STEAM LINE TO
CONDENSER

MAIN STEAM LINE TO
TURBINE

FIGURE 7.6

COMPLIANCE WITH ASME CODE EQUATION 11
Normal Operating And Upset Conditions

Applied Loads
Design Pressure & Temperature
Dead Weight & Other Sustained Mechanical Loads
Thermal Anchor Movements
Seismic Anchor Movements (X-direction)

Allowable Stress, $S_h + S_A$ = 34.1 KSI
Maximum Stress at Node 1 = 22.3 KSI

(Stresses Greater Than 10.0 KSI Indicated)
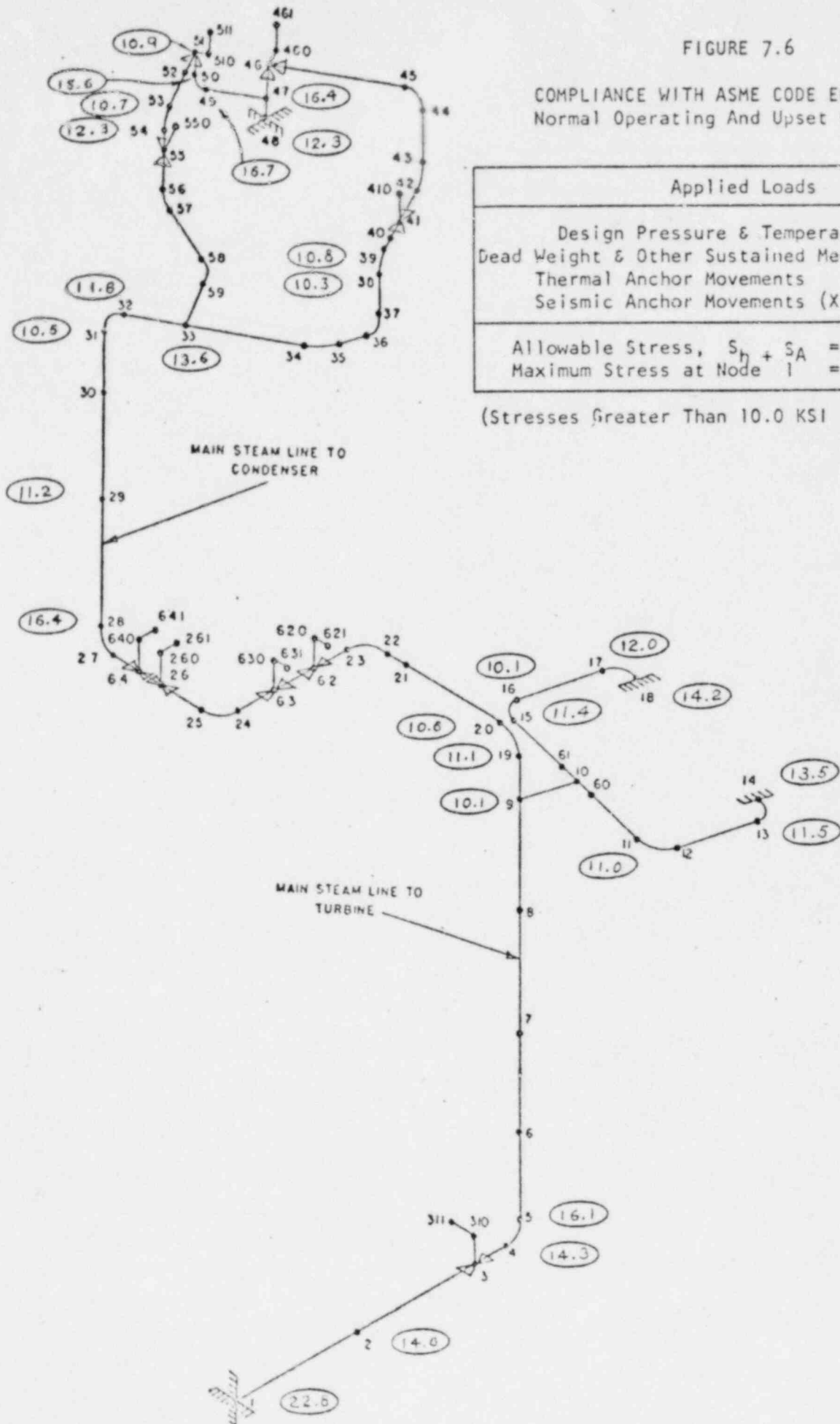
FIGURE 7.7

COMPLIANCE WITH ASME CODE EQUATION 11
Normal Operating and Upset Conditions

Applied Loads
Design Pressure & Temperature Dead Weight & Other Sustained Mechanical Loads Thermal Anchor Movements Seismic Anchor Movements (Z-direction)
Allowable Stress, $S_h + S_A$ = 34.1 KSI Maximum Stress at Node 1 = 23.5 KSI

(Stresses Greater Than 10.0 KSI indicated)

MAIN STEAM LINE TO CONDENSER

MAIN STEAM LINE TO TURBINE
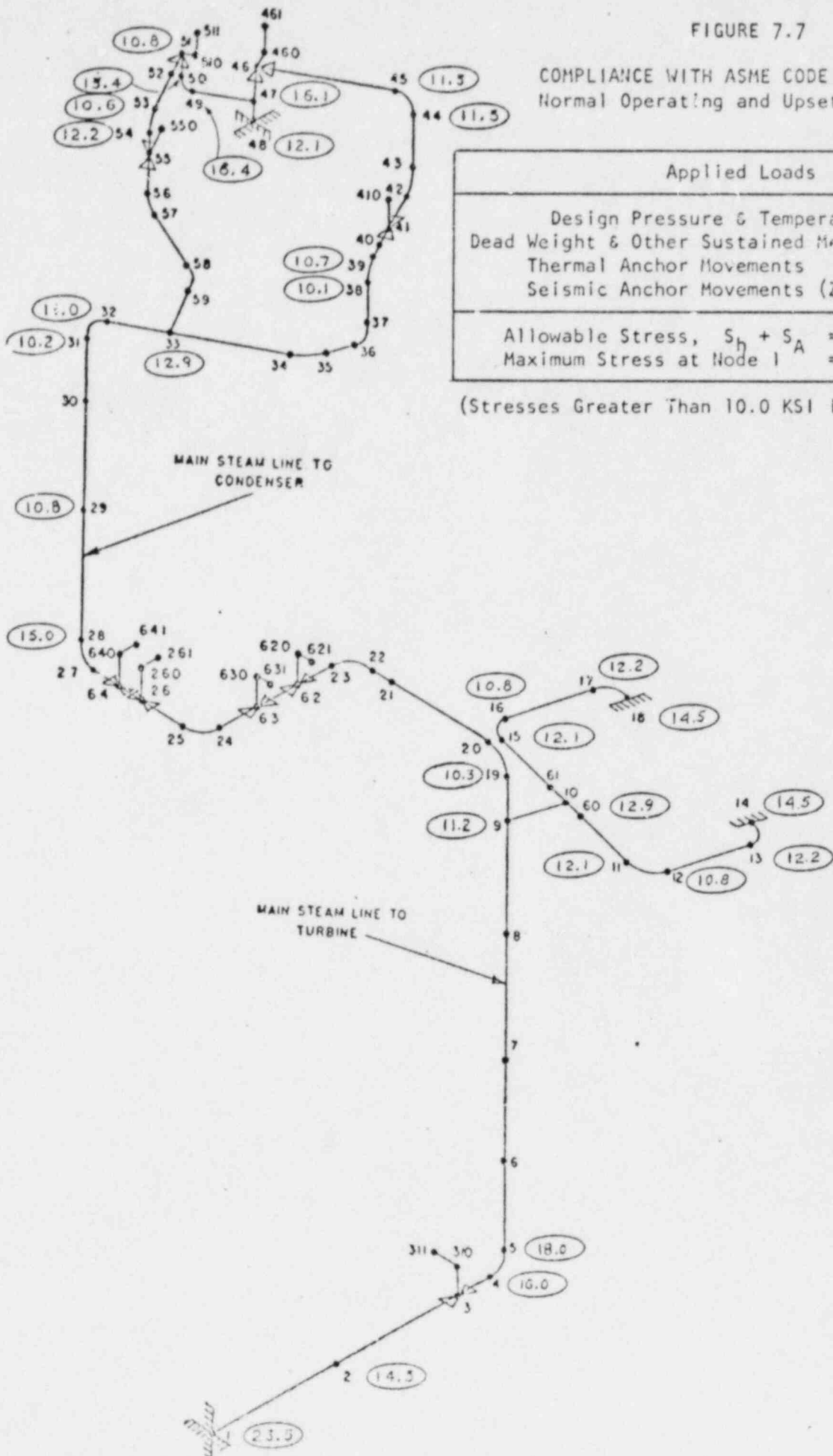
FIGURE 7.8

COMPLIANCE WITH ASME CODE EQUATION 9
Faulted Conditions

Applied Loads
Peak Pressure
Dead Weight & Other Sustained Mechanical Loads
X + Y Earthquake (SSE)
Seismic Anchor Movements (X-direction,SSE)

Allowable Stress, 1.0 S_h =	27.0 KSI
Maximum Stress at Node 1 =	12.3 KSI

(Stresses Greater Than 10.0 KSI Indicated)

MAIN STEAM LINE TO
CONDENSER

MAIN STEAM LINE TO
TURBINE
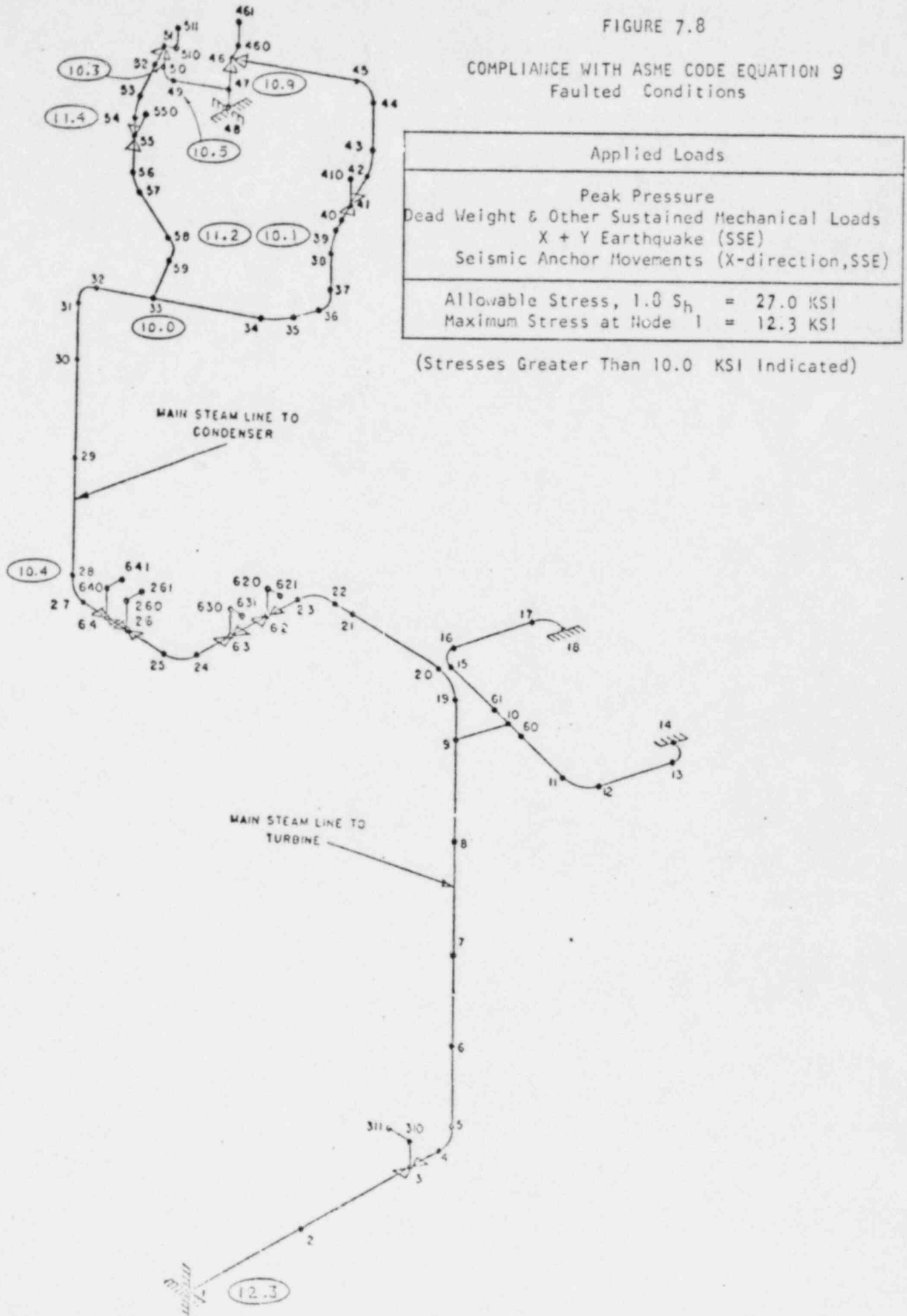
FIGURE 7.9

COMPLIANCE WITH ASME CODE EQUATION 9
Faulted Conditions
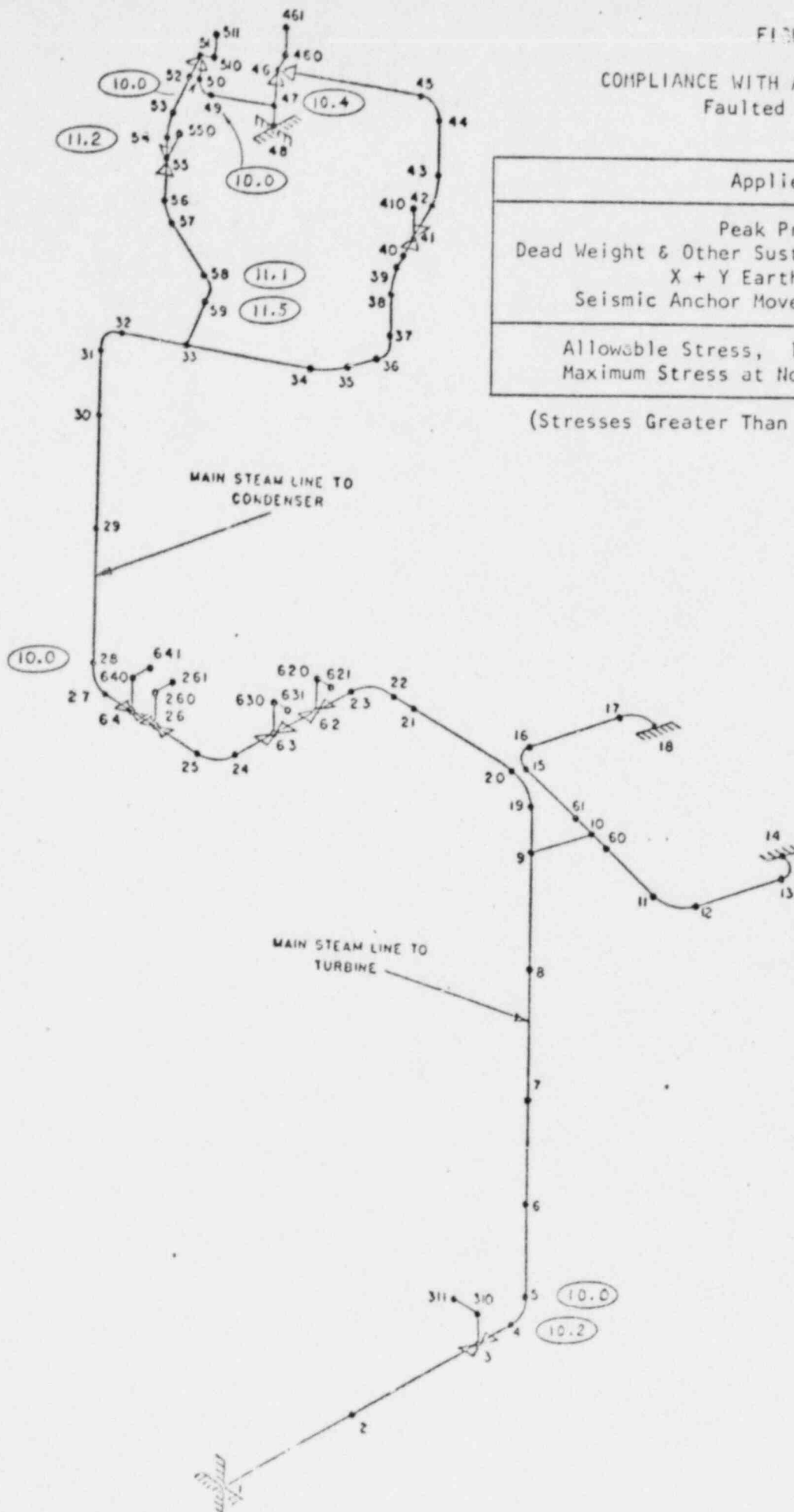
Applied Loads
Peak Pressure Dead Weight & Other Sustained Mechanical Load X + Y Earthquake (SSE) Seismic Anchor Movements (X-direction, SSE)
Allowable Stress, $1.8 S_h$ = 23.6 KSI Maximum Stress at Node 1 = 11.6 KSI

(Stresses Greater Than 10.0 KSI Indicated)

10.0   10.4   11.2   11.1   11.5   10.0   10.0   10.0   10.2

MAIN STEAM LINE TO CONDENSER

MAIN STEAM LINE TO TURBINE

8. CONCLUSION AND RECOMMENDATIONS

1. The existing support system of the LACBWR main steam piping system is not adequate to withstand the specified seismic events.

2. The results of the subject analysis, which includes the effects of four additional seismic restraints, indicate that the deflections of the main steam piping system, due to dead weight, thermal expansion and seismic loading are nominal. In addition, the stresses resulting from these loadings, as calculated and combined in accordance with the rules given in Subarticle NC-3652 of Section III of the ASME Code (Ref. 2), satisfy the design requirements of Class 2 piping systems.

3. It is therefore recommended that the main steam piping system be provided with four seismic restraints at the locations indicated in Figure 3.1. The seismic restraints and their attachments should be oriented as shown in Figure 3.1 and designed using the support reaction forces and node displacements given in Appendix B of this report.

9. REFERENCES

1. Gulf United Services Report No.SS-1162 "Seismic Evaluation of the LaCrosse Boiling Water Reactor", dated January 11, 1974.

2. ASME Boiler and Pressure Vessel Code, Section III, Division I, 1974 Edition, Nuclear Power Plant Components.

3. Sargent and Lundy Engineers "Specification for Piping System-LaCrosse Boiling Water Reactor" LACBWR No.256.

4. Sargent and Lundy Engineers "LACBWR" Project Drawing Nos.41-503374, 503375, 503376.

5. United Nuclear Corporation "Review of LACBWR Feedwater Nozzle and Recirculation Piping Stress Analysis" Report, dated October 1970.

6. Allis-Chalmers, "LaCrosse Boiling Water Reactor Safeguards Report Volume I and II; LACBWR No.283, dated August 1967.

7. U.S. Atomic Energy Commission - Regulatory Guide 1.48, May 1973.

APPENDIX A

LACBWR FEEDWATER PIPING ANALYSIS

ANALYTICAL INPUT DATA

APPENDIX B

LACBWR FEEDWATER PIPING ANALYSIS

TABULATED RESULTS

TABLE A-1 - Pipe Data

Run No.	From Point	To Point	O.D. (in.)	Wall Thick. (in.)	Matl. ASTM	Fluid	Wt.of Pipe and Fluid (lb./in.)	Wt.of Insul. (lb./in.)	Design Temp. (°F)	Design Press. (psia)	Elastic Modulus (psi) X10⁻⁶
1	3	21	10.750	0.843	A376		9.76	1.00	577.5	1300	25.1
1	9	60/61	10.750	0.843	A376		9.76	1.00	577.5	1300	25.1
1	60/61	14/18	8.625	0.593 *	A376		5.81	0.85	577.5	1300	25.1
2	21	28	10.750	0.718	A335		8.87	1.00	577.5	1300	27.0
2	28	47	6.625	0.432	A335		3.32	0.71	577.5	1300	27.0
3	1	3	10.750	0.593	A335		7.95	1.00	577.5	1300	27.4

(The "Fluid" column contains an arrow labeled WATER pointing from top to bottom of the column.)

* .718 was used in the analysis; see Table B-III.

TABLE A-II MAIN STEAM VALVE WEIGHTS

Valve	Total Weight, Lbs.	Nodes	Node Wts, Lbs.	Eccentricity, in.	
				Horizontal	Vertical
Rotoport Isolation Valve	2350	3	784	0	0
		310	784	0	30
		311	784	28	30
Safety Valve	440	62	0	0	0
		620	315	0	30
		621	125	18	30
Safety Valve	440	63	0	0	0
		620	315	0	30
		621	125	18	30
Safety Valve	440	26	0	0	0
		260	315	0	30
		261	125	14	30
Safety Valve	440	64	0	0	0
		640	315	0	30
		641	125	18	30
Gate Valve	425	41	212.5	0	0
		410	212.5	0	13
Gate Valve	425	55	212.5	0	0
		550	212.5	13	0
Pneumatic Control Valve	850	46	284	0	0
		460	283	7.5	0
		461	283	7.5	36
Pneumatic Control Valve	850	51	284	0	0
		510	283	7.5	0
		511	283	7.5	36

A) 1. STATIC LOAD CASE : 1
   LOAD CASE TITLE : DEAD LOAD PLUS SUSTAINED MECHANICAL LOADS

   SINGLE JOINT FORCE AND MOMENT LOADING

JOINT ID	LOAD TYPE	LOAD DIRECTION	LOAD MAGNITUDE
2	FORCE	Y	2600.0000
21	FORCE	Y	1500.0000
31	FORCE	Y	1930.0000
52	FORCE	Y	2145.0000

B) 2. STATIC LOAD CASE : 2
   LOAD CASE TITLE : NORMAL OPERATING PRESSURE

   THERMAL AND PRESSURE LOADINGS FOR ALL PIPE RUNS

RUN ID	DESIGN PRESSURE PSI	TEMPERATURE CHANGE DEG.	LINEAR TEMPERATURE GRADIENT DEG.	NONLINEAR TEMPERATURE GRADIENT DEG.	LONG. PRESSURE STRESS
1	1285.00	.00	.000	.000	NO
2	1285.00	.00	.000	.000	NO
3	1285.00	.00	.000	.000	NO

C) 3. STATIC LOAD CASE : 3
   LOAD CASE TITLE : MAXIMUM PRESSURE

   THERMAL AND PRESSURE LOADINGS FOR ALL PIPE RUNS

RUN ID	DESIGN PRESSURE PSI	TEMPERATURE CHANGE DEG.	LINEAR TEMPERATURE GRADIENT DEG.	NONLINEAR TEMPERATURE GRADIENT DEG.	LONG. PRESSURE STRESS
1	1400.00	.00	.000	.000	NO
2	1400.00	.00	.000	.000	NO
3	1285.00	.00	.000	.000	NO

D) 4. STATIC LOAD CASE : 4
   LOAD CASE TITLE : NORMAL OPERATING TEMPERATURE INCL. THERMAL ANCHOR MOVEMENTS

   SUPPORT DISPLACEMENTS

JOINT ID	LOAD TYPE	DISPLACEMENT DIRECTION	DISPLACEMENT MAGNITUDE
14	TRANS.	X	.1810
14	TRANS.	Y	1.2800
14	TRANS.	Z	.0440
18	TRANS.	X	-.1810
18	TRANS.	Y	1.2800
18	TRANS.	Z	-.0440

   THERMAL AND PRESSURE LOADINGS FOR ALL PIPE RUNS

RUN ID	DESIGN PRESSURE PSI	TEMPERATURE CHANGE DEG.	LINEAR TEMPERATURE GRADIENT DEG.	NONLINEAR TEMPERATURE GRADIENT DEG.	LONG. PRESSURE STRESS
1	.00	507.50	-.000	-.000	NO
2	.00	507.50	-.000	-.000	NO
3	.00	507.50	-.000	-.000	NO

E) 5. STATIC LOAD CASE : 6
LOAD CASE TITLE : SEISMIC ANCHOR MOVEMENTS X - DIRECTION (1/2 SSE)

SUPPORT DISPLACEMENTS

JOINT ID	LOAD TYPE	DISPLACEMENT DIRECTION	DISPLACEMENT MAGNITUDE
14	TRANS.	X	.8200
18	TRANS.	X	.8200
40	TRANS.	X	1.3100
43	TRANS.	X	1.3100
48	TRANS.	X	1.3100

F) 6. STATIC LOAD CASE : 7
LOAD CASE TITLE : SEISMIC ANCHOR MOVEMENTS Z - DIRECTION (1/2 SSE)

SUPPORT DISPLACEMENTS

JOINT ID	LOAD TYPE	DISPLACEMENT DIRECTION	DISPLACEMENT MAGNITUDE
14	TRANS.	7	.8200
18	TRANS.	7	.8200
40	TRANS.	7	1.3100
43	TRANS.	7	1.3100
48	TRANS.	7	1.3100

G) 8. STATIC LOAD CASE : 13
LOAD CASE TITLE : SEISMIC ANCHOR MOVEMENTS Z - DIRECTION (SSE)

SUPPORT DISPLACEMENTS

JOINT ID	LOAD TYPE	DISPLACEMENT DIRECTION	DISPLACEMENT MAGNITUDE
14	TRANS.	7	1.5700
18	TRANS.	7	1.5700
40	TRANS.	7	2.3800
43	TRANS.	7	2.3800
48	TRANS.	7	2.3800

H) 7. STATIC LOAD CASE : 12
LOAD CASE TITLE : SEISMIC ANCHOR MOVEMENTS X - DIRECTION (SSE)

SUPPORT DISPLACEMENTS

JOINT ID	LOAD TYPE	DISPLACEMENT DIRECTION	DISPLACEMENT MAGNITUDE
7	TRANS.	X	.4400
14	TRANS.	X	1.5700
18	TRANS.	Y	1.5700
40	TRANS.	X	2.3800
43	TRANS.	X	2.3800
48	TRANS.	X	2.3800

TABLE A-IV - DYNAMIC LOAD CASES

Load Case No.	Load Description	Spectrum IDS			Spectrum Multipliers		
		X	Y	Z	X	Y	Z
8	x + y Earthquake (½ SSE)	1	3	0	386.4	128.8	0
9	z + y Earthquake (½ SSE)	0	3	1	0	128.8	386.4
10	x + y Earthquake (SSE)	2	3	0	386.4	257.6	0
11	z + y Earthquake (SSE)	0	3	2	0	257.6	386.4

SEISMIC RESPONSE SPECTRA

	SPECTRUM ID	FREQUENCY CPS	PERIOD SEC.	ACCELERATION G's
A)	1	40.000	.025	.16000
		20.000	.050	.16000
		10.000	.100	.16000
		8.000	.125	.16000
		6.000	.167	.27000
		5.200	.192	.48000
		4.200	.238	1.22000
		3.800	.263	1.46000
		3.350	.299	.51000
		2.950	.339	.26000
		2.400	.417	.51000
		2.250	.444	.46000
		2.100	.476	.83000
		2.000	.500	.65000
		1.620	.617	2.17000
		1.600	.625	1.65000
		1.580	.633	1.77000
		1.380	.725	.62000
		1.300	.769	.69000
		1.000	1.000	.35000
		.830	1.205	.21500
		.630	1.587	.10800
		.500	2.000	.10800
B)	2	40.000	.025	.28000
		20.000	.050	.28000
		10.000	.100	.28000
		6.600	.152	.33000
		5.400	.185	.60000
		4.700	.213	.67000
		4.200	.238	1.28000
		4.100	.244	1.15000
		4.000	.250	1.21000
		3.600	.278	.97500
		3.400	.294	.75000
		2.950	.339	.45000
		2.500	.400	.82500
		2.300	.435	.75000
		2.100	.476	1.30000
		2.000	.500	1.05000
		1.750	.571	2.40000
		1.700	.588	2.38000
		1.600	.625	2.55000
		1.350	.741	1.13000
		1.320	.758	1.13000
		1.050	.952	.52000
		.920	1.087	.37500
		.840	1.190	.39000
		.720	1.389	.23000
		.500	2.000	.17500
C)	3	40.000	.025	.12000
		33.000	.030	.12000
		20.000	.050	.23000
		15.000	.067	.32000
		10.000	.100	.52000
		9.000	.111	.60000
		5.000	.200	.65000
		3.000	.333	.70000
		2.500	.400	.72000
		2.200	.455	.63000
		2.000	.500	.59000
		1.500	.667	.44000
		1.000	1.000	.31000
		.900	1.250	.24300
		.600	1.667	.19000
		.400	2.500	.13000
		.200	5.000	.05400

JOINT DISPLACEMENTS (LOAD CASE 1)

DEAD LOAD PLUS SUSTAINED MECHANICAL LOADS

JOINT (GID)	X	Y	Z		JOINT	X	Y	Z
1	.0000000	-.0000000	.0000000		43	.0125768	-.0003042	-.0084104
2	.0031649	-.0067586	.0000030		44	.0036192	-.0003543	.0013240
3	.0100328	-.0203547	.0000058		45	.0018672	-.0018050	.0017063
4	.0170536	-.0070788	.0000077		46	.0013283	-.0001679	.0007390
5	.0174357	-.0009702	.0060028		47	.0002449	-.0000626	.0003371
6	.0169928	-.0003688	.0408575		48	-.0000000	-.0000000	-.0000000
7	.0228730	-.0000000	.0571975		49	.0000223	-.0001261	-.0000220
8	.0236598	-.0010790	.0466081		50	.0047276	.0003152	.0061503
9	.0000021	-.0017021	-.0002408		51	.0131982	.0003178	.0169760
10	-.0004654	-.0146631	-.0003563		52	.0136499	-.0362450	.0167183
11	-.0004944	-.0050188	-.0002388		53	.0119729	-.1195423	.0176899
12	-.0004163	-.0054079	-.0001016		54	.0009923	-.1407334	.0006241
13	-.0000201	-.0009934	.0000010		55	-.0103766	-.1407803	-.0210960
14	.0000000	-.0000000	-.0000000		56	-.0300337	-.1408353	-.0789561
15	-.0005272	-.0317490	-.0001042		57	-.0486398	-.1400177	-.0998255
16	-.0004588	-.0306904	-.0001340		58	-.0673705	-.1343391	-.1486168
17	-.0000321	-.0032431	-.0000292		59	-.0752951	-.1459688	-.1551450
18	-.0000000	-.0000000	.0000000		60	-.0004417	-.0116433	-.0004509
19	-.0144312	-.0017538	-.0194415		61	-.0004014	-.0179904	-.0002513
20	-.0249866	-.0142174	-.0289013		62	-.0181712	-.1123784	-.0183687
21	-.0249781	-.1314585	-.0213495		63	-.0132877	-.0709082	-.0183686
22	-.0249773	-.1441637	-.0203630		64	-.0039897	-.1507280	-.0059408
23	-.0227599	-.1487899	-.0183689		260	-.0701070	-.1048078	-.0603852
24	-.0066576	-.0092266	-.0183684		261	-.0729652	-.1355910	-.0603852
25	-.0039954	-.0123237	-.0157877		310	.0021380	-.0203939	.0004872
26	-.0039916	-.1047968	-.0091197		311	.0021380	-.0280957	-.0027463
27	-.0039888	-.1700189	-.0046441		410	-.0229761	.0005013	.0123530
28	-.0336989	-.2006456	-.0271420		460	.0012185	-.0001301	.0000009
29	-.1673393	-.2602860	-.1760405		461	.0034174	-.0001386	-.0001344
30	-.1445959	-.1996168	-.2009494		510	.0130432	-.0010792	.0167010
31	-.1221263	-.1993180	-.1823349		511	.0309799	-.0010877	.0511456
32	-.1142402	-.1994811	-.1702186		550	-.0074654	-.1148573	-.0227694
33	-.0079524	-.1888488	-.1420467		620	-.0675874	-.1123894	-.0618015
34	-.0614121	-.1111452	-.0787447		621	-.0653369	-.0730453	-.0640519
35	-.0417613	-.0643761	-.0637029		630	-.0656751	-.0709192	-.0669044
36	-.0240545	-.0257952	-.0589785		631	-.0632475	-.0221517	-.0692319
37	-.0190683	-.0074336	-.0400523		640	-.0686983	-.1507390	-.0565889
38	-.0306182	-.0072485	.0082121		641	-.0713537	-.1811398	-.0565889
39	-.0276141	-.0021389	.0142606					
40	-.0256724	-.0013595	.0130944					
41	-.0152733	-.0005036	.0071730					
42	.0114137	-.0003928	-.0083533					

JOINT DISPLACEMENTS   (LOAD CASE 4)

NORMAL OPERATING TEMPERATURE INCL. THERMAL ANCHOR MOVEMENTS

JOINT (GID)	X	Y	Z	JOINT (GID)	X	Y	Z
1	.000000	-.000000	.000000				
2	.006168	-.226493	-.253025				
3	.019546	-.679030	-.488844				
4	.033213	-1.083852	-.765848				
5	.038939	-1.106392	-.882551				
6	.054139	-.534774	-.904670				
7	.052336	-.000000	-.574025		X	Y	Z
8	-.011997	.758347	.135924				
9	-.157632	1.404862	.635384	53	-.119493	.660459	.174092
10	-.122246	1.477206	.484032	54	-.105252	.690298	.271932
11	.237645	1.446077	.546064	55	-.110585	.645733	.351945
12	.295318	1.418622	.482074	56	-.139237	.520157	.562434
13	.239928	1.290394	.112324	57	-.145513	.455874	.633219
14	.181000	1.280000	.044000	58	-.146529	.236542	.790288
15	-.469841	1.392723	.372367	59	-.118612	.231881	.850416
16	-.490257	1.368166	.288632	60	-.063799	1.482021	.497854
17	-.265350	1.285910	-.011433	61	-.180611	1.469368	.469879
18	-.181000	1.280000	-.044000	62	-.882366	.654512	1.030227
19	-.224963	1.576333	.733501	63	-.846862	.461022	1.130661
20	-.346748	1.596686	.791015	64	-1.069150	-.382674	1.414625
21	-.842582	1.079840	.853449	260	-1.172570	-.257257	1.578334
22	-.876056	1.027419	.860760	261	-1.193904	-.144174	1.578334
23	-.915709	.840370	.931133	310	.022530	-.679030	-.716753
24	-.798560	.201654	1.264572	311	.022530	-.675249	-.723439
25	-.934832	.002120	1.339403	410	.234962	-.012978	.085780
26	-.991044	-.257257	1.390061	460	-.014680	.112036	-.012139
27	-1.102624	-.435119	1.425201	461	-.047926	.112036	-.018431
28	-1.234347	-.459985	1.527585	510	-.169851	.157771	-.055754
29	-1.204288	.030451	1.809616	511	-.214940	.157771	-.312079
30	-.438973	.520888	1.400901	550	-.110942	.575650	.352150
31	-.156647	.688082	1.154510	620	-1.071371	.654512	1.242671
32	-.086769	.652899	1.067289	621	-1.055016	.644574	1.226316
33	-.001744	.395434	.924683	630	-1.037046	.461022	1.346709
34	.143110	.053652	.622699	631	-1.020152	.450072	1.329775
35	.151852	-.053254	.520843	640	-1.245134	-.382674	1.596393
36	.134573	-.133371	.450054	641	-1.266319	-.273613	1.596393
37	.146814	-.141016	.376359				
38	.215023	-.018202	.245579				
39	.221286	.002432	.185202				
40	.217070	-.000163	.174970				
41	.197672	-.012974	.117632				
42	.151443	-.033763	-.071906				
43	.168815	-.001011	-.120647				
44	.283834	.166209	-.183771				
45	.264359	.205473	-.174481				
46	-.014973	.116697	-.011974				
47	-.001589	.039494	-.003427				
48	-.000000	.000000	.000000				
49	-.122637	.078529	.054433				
50	-.160202	.131277	.017055				
51	-.174317	.175703	-.064364				
52	-.155530	.368429	.034113				

JOINT DISPLACEMENTS (LOAD CASE 6)

SEISMIC ANCHOR MOVEMENTS X - DIRECTION (1/2 SSE)

JOINT (GID)	X	Y	Z		JOINT (GID)	X	Y	Z
1	.000000	.000000	-.000000					
2	.009488	.000196	-.000002					
3	.030244	.000379	-.000003					
4	.051710	.000203	-.000005					
5	.077262	-.000004	-.000286					
6	.259305	-.000002	-.003903					
7	.444438	-.000000	-.007222			X	Y	Z
8	.683990	-.000020	-.007866					
9	.815242	-.000037	-.000839		53	1.304481	.029098	-.006754
10	.815956	-.001704	-.000662		54	1.303414	.031727	-.003637
11	.816021	-.020523	-.000883		55	1.301952	.031732	-.000667
12	.816270	-.019300	-.000669		56	1.296614	.031746	.006053
13	.819574	-.001710	.000139		57	1.294068	.030957	.008183
14	.820000	-.000000	.000000		58	1.285848	.026107	.013010
15	.816041	.018526	-.000965		59	1.283619	.024718	.014193
16	.816453	.017637	-.001115		60	.815932	-.006321	-.000558
17	.819709	.001574	-.000296		61	.815987	.002940	-.000781
18	.820000	.000000	-.000000		62	.840017	.035550	.010804
19	.835752	-.000045	.003115		63	.851269	.020748	.010804
20	.843640	.007326	.005805		64	.857415	.037332	.018471
21	.843648	.047263	.009132		260	.875300	.024552	.030561
22	.843649	.050766	.009645		261	.873609	.032972	.030561
23	.845011	.049583	.010805		310	.056322	.000379	.000001
24	.855686	.000740	.010803		311	.056322	.024684	-.010435
25	.857409	.000511	.012441		410	1.303835	.000240	.009401
26	.857413	.026552	.016529		460	1.310283	-.000257	-.001267
27	.857416	.042977	.019291		461	1.310067	-.000257	-.002688
28	.868037	.053113	.026867		510	1.309099	.003584	-.008644
29	1.024368	.053096	.047240		511	1.308137	.003584	-.022811
30	1.219516	.053080	.026158		550	1.302340	.029952	-.000890
31	1.274684	.053074	.015565		620	.860803	.035550	.026958
32	1.293397	.045522	.014096		621	.862291	.023280	.025470
33	1.283501	.023233	.014256		630	.864930	.020749	.027401
34	1.283634	.002716	.014456		631	.866383	.007960	.025849
35	1.284398	.000357	.014970		640	.876066	.037332	.031964
36	1.285406	-.000023	.015257		641	.974418	.045428	.031964
37	1.288333	-.000541	.015262					
38	1.296242	-.000531	.013116					
39	1.299284	-.000168	.011848					
40	1.299635	-.000070	.011636					
41	1.301573	.000240	.010511					
42	1.307673	.000124	.007031					
43	1.309482	-.000010	.005820					
44	1.312192	-.000014	.003230					
45	1.312088	.000217	.002325					
46	1.310001	.000007	-.001154					
47	1.310043	.000005	-.000250					
48	1.310000	.000000	-.000000					
49	1.309293	.003447	-.001438					
50	1.309030	.004467	-.003485					
51	1.308224	.006472	-.006220					
52	1.306853	.014815	-.008116					

J O I N T   D I S P L A C E M E N T S   (LOAD CASE 7)

SEISMIC ANCHOR MOVEMENTS Z - DIRECTION (1/2 SSE)

JOINT (GID)	X	Y	Z	JOINT (GID)	X	Y	Z
1	-.000000	-.000000	.000000				
2	-.000900	-.009018	.000035				
3	-.002968	-.015459	.000068				
4	-.005253	-.008291	.000090				
5	-.006428	.000164	.011619				
6	-.010713	.000079	.172631				
7	-.013535	-.000000	.371187				
8	-.011615	-.000114	.652091				
9	-.000681	-.000211	.817043	53	-.001370	.012873	1.306923
10	-.001904	.019728	.816749	54	-.000565	.013656	1.306929
11	-.002388	.001565	.818690	55	.000262	.013659	1.306096
12	-.001951	.000201	.819505	56	.002126	.013669	1.301874
13	-.000070	-.000039	.819995	57	.002697	.014109	1.299483
14	.000000	.000000	.820000	58	.003447	.016652	1.291616
15	-.002475	.021231	.819074	59	.002822	.014782	1.289970
16	-.002456	.016850	.819191	60	-.001951	.017169	.816538
17	-.000235	.001619	.819754	61	-.001985	.021852	.817080
18	-.000000	.000000	.820000	62	.018417	.029577	.880086
19	.004718	-.000202	.843711	63	.025373	.018549	.880088
20	.008283	.003909	.856532	64	.039542	.001433	.905560
21	.008281	.039486	.874729	260	.040445	.001010	.915883
22	.008280	.042739	.876668	261	.034440	.011425	.915883
23	.011803	.040855	.880083	310	-.003634	-.015459	-.000130
24	.035116	.003706	.880091	311	-.003634	-.016079	.000944
25	.039544	-.001224	.884700	410	.004831	.000242	1.303439
26	.039543	.001010	.898524	450	.000045	-.000134	1.309410
27	.039542	.001516	.908579	451	.000153	-.000134	1.308606
28	.039259	.001380	.923619	510	-.001182	.001884	1.306896
29	.021467	.001320	1.065469	511	-.003990	.001884	1.301483
30	-.000027	.001260	1.235688	550	-.000229	.014198	1.306105
31	-.001929	.001239	1.280067	620	.026831	.029577	.892528
32	-.000807	.003227	1.288394	621	.030047	.020734	.889312
33	.000921	.004643	1.291122	630	.032547	.018549	.892326
34	.003782	-.001193	1.294281	631	.035993	.010318	.888981
35	.004620	-.001852	1.296985	640	.039931	.001433	.923906
36	.005027	-.001004	1.297097	641	.033999	.012441	.923906
37	.005928	-.000441	1.297984				
38	.007185	-.000447	1.301275				
39	.006568	-.000035	1.302257				
40	.006431	.000024	1.302389				
41	.005200	.000242	1.303103				
42	.001104	.000895	1.305439				
43	.000110	.000014	1.305939				
44	-.001298	.000014	1.306465				
45	-.001264	-.000145	1.306629				
46	.000136	.000003	1.309359				
47	.000033	.000003	1.302463				
48	.000000	.000000	1.310000				
49	-.000024	.001914	1.302770				
50	-.000276	.001026	1.308601				
51	-.001216	.001172	1.307038				
52	-.001333	.006643	1.306905				

JOINT DISPLACEMENTS (LOAD CASE 8)

X + Y EARTHQUAKE (1/2 SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SQSS SUMMATION

JOINT GID	X	Y	Z	JOINT	X	Y	Z
1	.0000000	.0000000	.0000000				
2	.1016139	.0030028	.0000518				
3	.3044946	.0053251	.0001001	42	.0425143	.0005623	.1458183
4	.4928507	.0025834	.0001211	43	.0323223	.0003889	.1271615
5	.5141111	.0000698	.0036395	44	.0543489	.0004349	.0976950
6	.2412720	.0000338	.0446351	45	.0507060	.0038934	.0808928
7	.0000000	.0000000	.0693995	46	.0045680	.0000589	.0031688
8	.0971371	.0000686	.0524927	47	.0012906	.0000355	.0007485
9	.0464719	.0001269	.0142384	48	.0000000	.0000000	.0000000
10	.0410442	.0063383	.0129895	49	.0051477	.0312201	.0059159
11	.0413957	.0155925	.0105630	50	.0198468	.0472264	.0103181
12	.0383057	.0150242	.0071085	51	.0434408	.0472524	.0325778
13	.0041290	.0013529	.0013041	52	.0416279	.0742326	.0312714
14	.0000000	.0000000	.0000000	53	.0352117	.1305236	.0284515
15	.0413060	.0206815	.0108422	54	.0000000	.1450849	.0000000
16	.0375443	.0192892	.0119158	55	.0493404	.1450984	.0380698
17	.0031660	.0017035	.0032515	56	.1949476	.1451172	.1464032
18	.0000000	.0000000	.0000000	57	.2509354	.1346483	.1895196
19	.0411801	.0001403	.0171093	58	.3772554	.0968553	.2978397
20	.0436062	.0116137	.0239193	59	.4039302	.1079881	.3160575
21	.0436124	.1144665	.0339526	60	.0412247	.0045289	.0122995
22	.0436130	.1250448	.0344183	61	.0408460	.0096418	.0135683
23	.0408748	.1263712	.0349281	62	.0327951	.0925849	.0340306
24	.0075498	.0124191	.0340195	63	.0329904	.0562253	.0340286
25	.0000187	.0035225	.0260309	64	.0000095	.1264922	.0135197
26	.0000000	.0847431	.0000000	260	.0594326	.0847435	.0496651
27	.0000136	.1443505	.0193556	261	.0617336	.1105570	.0496651
28	.0290873	.1735097	.0394141	310	.2774135	.0053251	.0005501
29	.2806802	.1736718	.2880079	311	.2774135	.0225821	.0961373
30	.4525297	.1737709	.3714634	410	.1428720	.0022543	.2067161
31	.4712204	.1737902	.3476111	460	.0070536	.0007377	.0043341
32	.4668391	.1723451	.3329447	461	.0099902	.0007378	.0067935
33	.4408882	.1539339	.3103242	510	.0435372	.0277009	.0321855
34	.3928342	.0861873	.3081708	511	.1172395	.0277015	.1065336
35	.3632201	.0511604	.3199634	550	.0426300	.1248066	.0368730
36	.3328748	.0215820	.3257799	620	.0644037	.0025852	.0582771
37	.3046280	.0058096	.3196102	621	.0607530	.0603710	.0617943
38	.2523724	.0057963	.2718476	630	.0591681	.0562255	.0602347
39	.2139372	.0011650	.2475100	631	.0553726	.0268430	.0643093
40	.2061919	.0004829	.2429298	640	.0506560	.1264928	.0521348
41	.1641820	.0022543	.2191687	641	.0615518	.1524160	.0521348

J O I N T   D I S P L A C E M E N T S   (LOAD CASE 9)

Z + Y EARTHQUAKE (1/2 SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SDSS SUMMATION

JOINT GID	/-----DISPLACEMENTS (IN.)-----/			JOINT	X	Y	Z
	X	Y	Z				
1	.0000000	.0000000	.0000000				
2	.0282985	.0148099	.0001915		X	Y	Z
3	.0847146	.0279660	.0003700				
4	.1370822	.0143213	.0004916	43	.0217860	.0003783	.1258787
5	.1429125	.0002378	.0199244	44	.0523095	.0004254	.0956052
6	.0667866	.0001150	.2416978	45	.0492288	.0038726	.0788814
7	.0000000	.0000000	.3659043	46	.0043671	.0000589	.0031054
8	.0288387	.0001832	.2458536	47	.0012587	.0000358	.0007303
9	.0265951	.0003392	.0189485	48	.0000000	.0000000	.0000000
10	.0248520	.0335459	.0187512	49	.0054769	.0310386	.0064555
11	.0235110	.0093548	.0061522	50	.0197788	.0469241	.0104148
12	.0221701	.0090888	.0039710	51	.0430047	.0464502	.0319677
13	.0026783	.0002391	.0009094	52	.0412310	.0731706	.0307365
14	.0000000	.0000000	.0000000	53	.0349246	.1256919	.0279684
15	.0235658	.0405862	.0060688	54	.0000000	.1387388	.0000000
16	.0206413	.0363697	.0064229	55	.0489591	.1387532	.0375733
17	.0016950	.0031542	.0017537	56	.1034426	.1387751	.1449695
18	.0000000	.0000000	.0000000	57	.2490151	.1280179	.1879606
19	.0303018	.0003300	.0331481	58	.3744752	.0898992	.2961876
20	.0491434	.0125237	.0523068	59	.6007553	.0949257	.3144039
21	.0491806	.1276398	.0482806	60	.0248365	.0286990	.0182544
22	.0491843	.1390408	.0476497	61	.0247715	.0378231	.0184198
23	.0459285	.1379101	.0456595	62	.0373705	.1001738	.0456585
24	.0094336	.0127121	.0456346	63	.0267646	.0608072	.0456517
25	.0000164	.0032549	.0351693	64	.0000094	.1153944	.0183147
26	.0000000	.0774016	.0000000	260	.0541631	.0774019	.0490303
27	.0000135	.1316286	.0262242	261	.0575974	.1022832	.0490303
28	.0263937	.1580197	.6414554	310	.0770061	.0279674	.0006388
29	.2673754	.1591636	.2753707	311	.0770061	.0315586	.0266136
30	.4442728	.1582496	.3649207	410	.1412230	.0020940	.2062087
31	.4644258	.1582657	.3443479	460	.0066482	.0006711	.0041880
32	.4605459	.1568300	.3308042	461	.0090958	.0006711	.0064944
33	.4360522	.1395564	.3095681	510	.0430939	.0276160	.0316097
34	.3903536	.0783426	.3084717	511	.1160125	.0276165	.1045569
35	.3615335	.0465463	.3200727	550	.0423180	.1257686	.0361501
36	.3316435	.0200123	.3258328	620	.0707091	.1001742	.0808234
37	.3035542	.0053200	.3198416	621	.0664557	.0663110	.0852234
38	.2513416	.0053218	.2718063	630	.0617192	.060-074	.0812651
39	.2127569	.0010623	.2473896	631	.0571706	.0298071	.0865698
40	.2050923	.0004517	.2428545	640	.0542566	.1153950	.0471121
41	.1628479	.0020940	.2189599	641	.0571608	.1400817	.0471121
42	.0348158	.0005390	.1449959				

TABLE B-1 (g)

JOINT DISPLACEMENTS   (LOAD CASE 10)

X+ Y DRE EARTHQUAKE (SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SQSS SUMMATION

JOINT GID	X	Y	Z	JOINT GID	X	Y	Z
1	.0000000	.0000000	.0000000				
2	.0887294	.0044622	.0000602				
3	.2658581	.0078875	.0001142				
4	.4303111	.0037016	.0001463	43	.0512444	.0005083	.1394091
5	.4488768	.0001006	.0051033	44	.0612953	.0005497	.1096220
6	.2107589	.0000487	.0618442	45	.0563581	.0042453	.0923790
7	.0000000	.0000000	.0950627	46	.0062900	.0000657	.0046820
8	.0886200	.0001139	.0702694	47	.0015986	.0000432	.0010099
9	.0535147	.0002108	.0193349	48	.0000000	.0000000	.0000000
10	.0489152	.0101580	.0182596	49	.0075285	.0347218	.0093909
11	.0496681	.0183294	.0133767	50	.0228675	.0515406	.0143491
12	.0457274	.0177524	.0086172	51	.0483511	.0515742	.0396535
13	.0047275	.0016049	.0014899	52	.0466850	.0905203	.0380364
14	.0000000	.0000000	.0000000	53	.0393664	.1823822	.0362053
15	.0496941	.0265272	.0132109	54	.0000000	.2087627	.0000000
16	.0452722	.0246271	.0143727	55	.0549484	.2087739	.0530713
17	.0038304	.0021769	.0039332	56	.2172439	.2087796	.2108311
18	.0000000	.0000000	.0000000	57	.2704227	.2008844	.2744886
19	.0580107	.0002296	.0280174	58	.4184919	.1713671	.4331198
20	.0663239	.0174232	.0393235	59	.4514419	.1932357	.4541832
21	.0663410	.1814815	.0543630	60	.0490423	.0073885	.0177015
22	.0663426	.1990156	.0554016	61	.0488144	.0141262	.0185380
23	.0622028	.2018788	.0552076	62	.0500684	.1462292	.0552118
24	.0118258	.0173756	.0551914	63	.0351705	.0862988	.0552080
25	.0000297	.0058029	.0424904	64	.0000110	.2254016	.0222391
26	.0000000	.1507412	.0000000	260	.1061883	.1507418	.0785583
27	.0000155	.2575699	.0318569	261	.1096321	.1936378	.0785583
28	.0524181	.3103350	.0627344	310	.2422303	.0078897	.0008243
29	.4244193	.3105910	.4441435	311	.2422303	.0212170	.0839425
30	.5742594	.3107364	.5731867	410	.1539530	.0039449	.2170977
31	.5748672	.3107607	.5342434	460	.0082524	.0013206	.0054055
32	.5619708	.3078824	.5016694	461	.0137766	.0013207	.0101148
33	.5137680	.2755024	.4243465	510	.0483783	.0321976	.0389871
34	.4209176	.1525077	.3376395	511	.1294658	.0321984	.1272034
35	.3872298	.0889443	.3389802	550	.0467620	.1723324	.0543213
36	.3483531	.0361422	.3423836	620	.1078898	.1462297	.0986060
37	.3171131	.0101929	.3321320	621	.1021924	.0904379	.1040934
38	.2556367	.0101536	.2813125	630	.1009295	.0862991	.1016505
39	.2258208	.0020208	.2573918	631	.0951222	.0356518	.1082440
40	.2176253	.0007205	.2527526	640	.1069109	.2254925	.0814325
41	.1732716	.0039440	.2286722	641	.1096510	.2688644	.0814325
42	.0586650	.0011437	.1572729				

JOINT DISPLACEMENTS   (LOAD CASE 11)

Z + Y DBE EARTHQUAKE(SSE) + Z - ANCHOR MOVE.(SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SOSS SUMMATION

JOINT GID	X	Y	Z
1	.0000000	.0000000	.0000000
2	.0250695	.0136415	.0001737
3	.0750060	.0255940	.0003356
4	.1214195	.0129921	.0004459
5	.1266260	.0002305	.0180465
6	.0594908	.0001115	.2188042
7	.0000000	.0000000	.3312665
8	.0311171	.0001960	.2234834
9	.0387434	.0003444	.0222721
10	.0362045	.0308194	.0218163
11	.0362808	.0145163	.0102327
12	.0334843	.0141169	.0062972
13	.0036172	.0012676	.0011550
14	.0000000	.0000000	.0000000
15	.0363515	.0405414	.0099586
16	.0329625	.0365302	.0104596
17	.0028109	.0031848	.0029070
18	.0000000	.0000000	.0000000
19	.0560113	.0003447	.0377783
20	.0689784	.0176565	.0569615
21	.0690146	.1819253	.0615466
22	.0690182	.1990701	.0616675
23	.0649224	.2003037	.0600557
24	.0128513	.0178171	.0600331
25	.0000252	.0054175	.0460539
26	.0000000	.1402895	.0000000
27	.0000150	.2396723	.0341718
28	.0437490	.2887228	.0591864
29	.4006552	.2889629	.4166839
30	.5541992	.2890991	.5459030
31	.5578476	.2891218	.5098835
32	.5463161	.2865102	.4797160
33	.5017922	.2563098	.4092529
34	.4236943	.1417439	.3327073
35	.3930402	.0827390	.3351021
36	.3452247	.0337090	.3387561
37	.3142304	.0094202	.3292398
38	.2626725	.0093860	.2787389
39	.2227567	.0018635	.2545126
40	.2145414	.0006785	.2498691
41	.1498132	.0036724	.2255613
42	.0 56189	.0009750	.1525819

JOINT GID	X	Y	Z
43	.0363472	.0004851	.1340802
44	.0564264	.0005279	.1035666
45	.0526063	.0041077	.0863741
46	.0056828	.0000651	.0045171
47	.0014942	.0000427	.0009717
48	.0000000	.0000000	.0000000
49	.0075242	.0340194	.0093626
50	.0224308	.0505949	.0137633
51	.0471905	.0506279	.0383923
52	.0456641	.0885400	.0368901
53	.0386449	.1749853	.0349710
54	.0000000	.1992917	.0000000
55	.0540027	.1993040	.0509005
56	.2135225	.1993130	.2019205
57	.2746746	.1911726	.2629249
58	.4115163	.1614510	.4152372
59	.4435888	.1809509	.4359138
60	.0362399	.0261281	.0212898
61	.0361531	.0352280	.0215706
62	.0526523	.1449974	.0600583
63	.0374229	.0861567	.0600525
64	.0000107	.2098341	.0239731
260	.0098099	.1402901	.0752818
261	.1020762	.1803266	.0752818
310	.0683172	.0255960	.0009769
311	.0683172	.0293146	.0235882
410	.1499851	.0036724	.2134127
460	.0073584	.0012285	.0051619
461	.0118209	.0012286	.0096292
510	.0471959	.0314436	.0377024
511	.1263613	.0314492	.1240186
550	.0459949	.1671023	.0517777
620	.1072493	.1449979	.1080244
621	.1013244	.0918890	.1142988
630	.0977901	.0861569	.1101490
631	.0016743	.0380414	.1176504
640	.0994669	.2098350	.0745601
641	.1019741	.2501155	.0745601

JOINT DISPLACEMENTS   (LOAD CASE 12)

SEISMIC ANCHOR MOVEMENTS X - DIRECTION (SSE)

JOINT (GID)	X	Y	Z
1	.000000	.000000	-.000000
2	.018235	.000362	-.000003
3	.058140	.000698	-.000006
4	.099430	.000374	-.000008
5	.148442	-.000007	-.000526
6	.495200	-.000004	-.007194
7	.851600	-.000000	-.013323
8	1.309867	-.000034	-.014559
9	1.560216	-.000064	-.001698
10	1.561762	-.003383	-.001316
11	1.561898	-.038499	-.001779
12	1.562398	-.036667	-.001359
13	1.569127	-.003248	.000285
14	1.570000	-.000000	.000000
15	1.561043	.035040	-.001970
16	1.562778	.033368	-.002273
17	1.560407	.002979	-.000605
18	1.570000	.000000	-.000000
19	1.599065	-.000077	.005548
20	1.613934	.013784	.010193
21	1.613947	.087780	.013707
22	1.613948	.094169	.014356
23	1.615838	.091839	.015924
24	1.631157	.002270	.015920
25	1.633601	.000936	.018220
26	1.633607	.042056	.023822
27	1.633611	.073431	.027567
28	1.651576	.090612	.041000
29	1.911276	.090583	.081545
30	2.232800	.090554	.047020
31	2.323608	.090544	.029252
32	2.337903	.077988	.026028
33	2.337765	.040673	.025757
34	2.337331	.005658	.024954
35	2.338275	.001250	.025558
36	2.339800	.000224	.025958
37	2.344403	-.000825	.025754
38	2.357577	-.000809	.021474
39	2.362567	-.000265	.019517
40	2.363125	-.000113	.019178
41	2.366220	.000369	.017382
42	2.376053	.000202	.011777
43	2.379039	-.000019	.009772
44	2.383628	-.000026	.005361
45	2.383465	.000366	.003049
46	2.380127	.000012	-.001038
47	2.380070	.000000	-.000434
48	2.380000	.000000	-.000000
49	2.378969	.005757	-.002223
50	2.379032	.000134	-.007756
51	2.377071	.004142	-.015411
52	2.374991	.024990	-.013641

JOINT (GID)	X	Y	Z
53	2.371146	.049325	-.011492
54	2.369501	.053377	-.006154
55	2.367179	.053886	-.000937
56	2.358630	.053909	.011079
57	2.354511	.052579	.014954
58	2.341081	.044376	.023824
59	2.337518	.042282	.025909
60	1.561707	-.012135	-.001086
61	1.561929	.005442	-.001576
62	1.620133	.066111	.015923
63	1.624807	.038971	.015921
64	1.633610	.063831	.026458
260	1.664120	.042056	.049836
261	1.661818	.057664	.049836
310	.108093	.000698	.000003
311	.108093	.047254	-.020066
410	2.370042	.000369	.015481
460	2.380461	-.000434	-.002126
461	2.380085	-.000434	-.004346
510	2.378494	.005985	-.014483
511	2.376777	.005985	-.038406
550	2.367733	.050599	-.001255
620	1.642718	.066111	.045538
621	1.644952	.043978	.043404
630	1.648552	.038971	.046358
631	1.650786	.015999	.044125
640	1.665351	.063831	.051509
641	1.663119	.078861	.051509

JOINT (GID)	X	Y	Z
1	-.000000	-.000000	.000000
2	-.001611	-.015362	.000068
3	-.005293	-.029617	.000130
4	-.009334	-.015884	.000173
5	-.011450	.000314	.022261
6	-.019418	.000152	.330726
7	-.024725	-.000000	.711040
8	-.021416	-.000223	1.250523
9	-.001551	-.000413	1.564067
10	-.003489	.037666	1.563604
11	-.004470	.003337	1.567536
12	-.003647	.000715	1.569077
13	-.000130	-.000045	1.569091
14	-.000000	.000000	1.570000
15	-.004609	.040278	1.568164
16	-.004649	.035656	1.568447
17	-.000459	.003061	1.569514
18	-.000000	.000000	1.570000
19	.008288	-.000397	1.614846
20	.014783	.007091	1.638563
21	.014779	.072092	1.667041
22	.014778	.078073	1.670082
23	.020299	.074469	1.675436
24	.056871	.006076	1.675449
25	.063848	-.002137	1.682725
26	.063846	.003994	1.704616
27	.063845	.006480	1.720558
28	.064131	.007031	1.745927
29	.038265	.006920	1.983837
30	.002749	.006827	2.263007
31	-.000352	.006792	2.336324
32	.001249	.009886	2.347931
33	.003500	.011282	2.351846
34	.007482	-.000221	2.358789
35	.008424	-.002077	2.359611
36	.008715	-.001282	2.359693
37	.009909	-.000634	2.360852
38	.012332	-.000644	2.365529
39	.011396	-.000040	2.367062
40	.011006	.000045	2.367299
41	.008915	.000362	2.368571
42	.001660	.000131	2.372650
43	.000024	.000012	2.373470
44	-.002168	.000019	2.374156
45	-.002077	-.000229	2.374902
46	.000216	.000005	2.373942
47	.000054	.000005	2.373761
48	.000000	.000000	2.383000
49	.000009	.002631	2.379486
50	-.000579	.003362	2.377615
51	-.002025	.003361	2.374440
52	-.002075	.011459	2.374465
53	-.001858	.023339	2.374335
54	-.000349	.024952	2.374622
55	.001149	.024958	2.373679
56	.004594	.024974	2.368026
57	.005650	.025658	2.364676
58	.007044	.029571	2.352835
59	.006175	.026770	2.350308
60	-.003410	.032864	1.563288
61	-.003625	.041639	1.564160
62	.030464	.053536	1.675440
63	.041570	.033193	1.675464
64	.063945	.005855	1.715770
260	.067023	.003994	1.735151
261	.057507	.022315	1.735151
310	-.006534	-.029617	-.000250
311	-.006534	-.030774	.001657
410	.008329	.000362	2.369030
450	.000065	-.000237	2.378966
461	.000216	-.000237	2.377565
510	-.001992	.003242	2.374499
511	-.006941	.003242	2.364680
550	-.000951	.025350	2.373792
620	.046646	.053536	1.698466
621	.051687	.036996	1.693426
630	.055434	.033193	1.697928
631	.060693	.017781	1.692680
640	.066125	.005855	1.747879
641	.056560	.025120	1.747079

(LOAD CASE 1)

DEAD LOAD PLUS SUSTAINED MECHANICAL LOADS

SUPPORT	/--------FORCE (LB.)---------/			/-------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	-60.04	74.83	-22.68	17670.52	10181.15	-9974.75
7	.00	9578.81	.00	.00	.00	.00
14	-4.54	574.50	25.53	-11479.03	17.18	776.06
18	8.54	913.53	-6.14	-29139.86	278.15	-17252.12
25	.00	2797.49	.00	.00	.00	.00
40	62.13	1481.90	-31.66	-406.40	397.34	-376.86
43	-30.44	331.57	20.35	-158.00	224.92	-181.44
48	24.35	1397.53	14.60	-6939.87	-89.01	5060.44

B) (LOAD CASE 4)

NORMAL OPERATING TEMPERATURE INCL. THERMAL ANCHOR MOVEMENTS

SUPPORT	/--------FORCE (LB.)---------/			/-------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	-117.2	5610.7	-1139.7	756253.8	19846.1	3849.6
7	.0	561.0	.0	.0	.0	.0
14	-2133.3	-2668.5	195.0	134604.2	-118404.8	41797.0
18	1859.7	-1990.6	1080.2	99777.1	119644.3	3810.7
25	.0	-481.2	.0	.0	.0	.0
40	-525.3	183.3	-423.4	1836.2	312.7	1897.1
43	-408.5	1101.9	292.0	1075.3	405.8	1933.2
48	1324.6	-2317.4	-4.0	70344.5	15409.6	-32785.2

C) (LOAD CASE 6)

SEISMIC ANCHOR MOVEMENTS X - DIRECTION (1/2 SSE)

SUPPORT	/--------FORCE (LB.)---------/			/-------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	-174.35	-11.96	13.21	-805.35	30403.00	33649.35
7	.00	99.63	.00	.00	.00	.00
14	81.37	276.17	-68.16	-17358.66	3681.06	153.07
18	39.07	-212.12	71.93	13036.21	3307.54	8075.46
25	.00	-116.05	.00	.00	.00	.00
40	25.08	76.69	-28.16	56.25	72.01	132.60
43	1.25	10.52	-14.09	44.79	54.44	53.01
48	27.58	-115.89	25.27	5272.20	1772.71	917.69

ELASTIC SUPPORT REACTIONS

(LOAD CASE 7)

SEISMIC ANCHOR MOVEMENTS Z - DIRECTION (1/2 SSE)

SUPPORT	/-------FORCE (LB.)--------/			/-------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	13.20	488.09	-264.54	32863.67	-2814.02	-858.73
7	.00	6.60	.00	.00	.00	.00
14	-34.25	-209.68	131.06	3660.62	-189.20	5362.95
18	38.03	-459.58	82.23	20028.81	2825.93	5224.19
25	.00	277.86	.00	.00	.00	.00
40	-15.56	-26.61	18.42	-24.50	-44.73	-14.75
43	-.27	-15.16	9.83	-8.58	-41.17	-22.69
48	-1.15	-61.51	23.01	2784.26	-83.30	676.13

E

(LOAD CASE 12)

SEISMIC ANCHOR MOVEMENTS X - DIRECTION (SSE)

SUPPORT	/-------FORCE (LB.)--------/			/-------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	-334.62	-22.04	24.28	-1483.91	58422.02	64455.14
7	.00	170.93	.00	.00	.00	.00
14	167.07	526.25	-143.95	-33004.47	7562.16	250.88
18	78.98	-412.84	149.41	24617.40	6764.44	15303.03
25	.00	-212.47	.00	.00	.00	.00
40	40.84	122.92	-46.41	97.73	114.69	223.32
43	2.33	20.64	-23.65	75.96	88.11	89.94
48	44.61	-193.39	40.12	8850.81	2873.10	1503.23

F

(LOAD CASE 13)

SEISMIC ANCHOR MOVEMENTS Z - DIRECTION (SSE)

SUPPORT	/-------FORCE (LB.)--------/			/-------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	24.27	935.13	-507.32	62964.62	-5050.09	-1601.17
7	.00	32.63	.00	.00	.00	.00
14	-64.23	-404.87	240.68	7283.25	-335.03	10229.40
18	69.71	-873.10	183.25	37986.93	5665.48	9827.18
25	.00	485.20	.00	.00	.00	.00
40	-26.64	-48.99	30.74	-33.60	-80.22	-18.03
43	-.05	-20.49	15.80	-11.39	-70.93	-34.14
48	-3.06	-105.55	36.84	4857.96	-209.27	1109.55

ELASTIC SUPPORT REACTIONS

(LOAD CASE 8)

X + Y EARTHQUAKE (1/2 SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SOSS SUMMATION

SUPPORT	/--------FORCE (LB.)--------/			/--------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	2549.	202.	389.	12710.	339944.	35355.
7	1705.	391.	.	.	.	.
14	718.	174.	478.	12707.	34457.	2088.
18	432.	313.	893.	16149.	36655.	7896.
25	.	800.	.	.	.	.
26	359.	.	418.	.	.	.
40	499.	526.	588.	820.	1604.	1261.
43	78.	424.	308.	528.	1298.	809.
48	267.	781.	475.	15944.	10259.	26176.
54	885.	.	509.	.	.	.

(LOAD CASE 9)

Z + Y EARTHQUAKE (1/2 SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SOSS SUMMATION

SUPPORT	/--------FORCE (LB.)--------/			/--------MOMENT (IN.-LB.)--------/		
JOINT	X	Y	Z	X	Y	Z
1	714.	927.	1439.	61227.	94698.	10560.
7	523.	1472.	.	.	.	.
14	615.	347.	756.	8927.	24158.	9195.
18	245.	835.	819.	37065.	20165.	11229.
25	.	739.	.	.	.	.
26	329.	.	457.	.	.	.
40	496.	452.	588.	810.	1595.	1256.
43	53.	412.	305.	528.	1298.	803.
48	216.	780.	469.	15598.	11006.	25559.
54	880.	.	575.	.	.	.

ELASTIC SUPPORT REACTIONS

J)   (LOAD CASE 10)

X + Y DRE EARTHQUAKE (SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SOSS SUMMATION

SUPPORT JOINT	FORCE (LB.)			MOMENT (IN.-LB.)		
	X	Y	Z	X	Y	Z
1	2229.	305.	452.	18956.	296878.	31114.
7	1515.	642.	.	.	.	.
1A	797.	205.	472.	14853.	39317.	3166.
1P	535.	421.	1097.	21162.	44344.	9822.
25	.	1317.	.	.	.	.
26	555.	.	644.	.	.	.
46	527.	735.	612.	975.	1761.	1350.
43	124.	554.	337.	578.	1363.	873.
4P	383.	950.	563.	21336.	17355.	32390.
54	998.	.	862.	.	.	.

K)   (LOAD CASE 11)

Z + Y DRE EARTHQUAKE(SSE) + Z - ANCHOR MOVE.(SSE)

TOTAL RESPONSE EQUALS MODE 1 THROUGH 34 BY SOSS SUMMATION

SUPPORT JOINT	FORCE (LB.)			MOMENT (IN.-LB.)		
	X	Y	Z	X	Y	Z
1	645.	862.	1305.	56565.	84038.	10444.
7	496.	1410.	.	.	.	.
1	609.	336.	714.	12440.	30551.	8509.
1P	394.	801.	1047.	36180.	33159.	12017.
25	.	1230.	.	.	.	.
26	490.	.	675.	.	.	.
46	519.	740.	605.	950.	1737.	1336.
43	88.	529.	324.	570.	1354.	852.
4	384.	940.	540.	20594.	16736.	30358.
54	980.	.	854.	.	.	.

TABLE B-III

COMPLIANCE WITH ASME CODE EQUATIONS 8, 9, 10 and 11

Pages B-15 through B-32

NOTE: Stresses for members between node points 10 - 14 and 10 - 18
should be increased by a factor of 1.21 to account for the in-
consistency between pipe wall thickness used in the analysis
and the actual wall thickness of the pipe. In view of the
low stresses and low masses of these members, the effect of
this inconsistency on the overall analysis is small. Stresses
for these members, a shown on Figure 7.6 and 7.7, have al-
ready been increased by this factor of 1.21.

LAGRWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

D.1 CLASS 2 STRESSES FOR ANALYSIS SET NUMBER 1

ASSIGNED LOAD COMBINATION IDENTIFIERS
WA = 1 WB = 7 WC = 3 P = 1 PMAX = 2

D.1.1 SATISFACTION OF EQUATION 8   (ANALYSIS SET 1)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (WA)	OCCASIONAL LOAD STRESS (WB)	THERMAL EXPANSION STRESS (WC)	TOTAL STRESS (TB)	MODIFIED ALLOWABLE STRESS (SAH)	DESIGN STRESS RATIO TB/(1.0*SH)	MODIFIED STRESS RATIO
1S	3	4096.604	.000	1006.063	.000	.000	5102.667	32531.483	.32092	
	4	4096.604	.000	242.821	.000	.000	4339.425	33180.239	.27242	
2S	5	4096.604	.000	176.305	.000	.000	4272.909	33235.777	.26674	
	6	4096.604	.000	151.332	.000	.000	4247.937	33258.604	.26717	
3S	6	4096.604	.000	151.332	.000	.000	4247.937	33258.604	.26717	
	7	4096.604	.000	174.108	.000	.000	4270.712	33238.844	.26660	
4S	7	4096.604	.000	174.108	.000	.000	4270.712	33238.844	.26660	
	8	4096.604	.000	256.524	.000	.000	4353.128	33168.591	.27378	
5S	8	4096.604	.000	256.524	.000	.000	4353.128	33168.591	.27378	
	9	4096.604	.000	349.780	.000	.000	4446.385	33039.323	.27965	
6S	9	4096.604	.000	396.202	.000	.000	4497.876	33049.865	.27257	
	10	4096.604	.000	542.903	.000	.000	4639.508	32925.168	.30179	
7S	9	4096.604	.000	697.028	.000	.000	4793.633	32704.182	.30149	
	10	4096.604	.000	710.318	.000	.000	4806.922	32742.866	.30232	
8S	10	4096.604	.000	400.609	.000	.000	4497.714	33046.118	.27284	
	60	4096.604	.000	313.305	.000	.000	4409.909	33126.327	.27735	
9S	10	4096.604	.000	252.152	.000	.000	4348.757	33172.347	.27351	
	61	4096.604	.000	252.917	.000	.000	4349.522	33171.656	.27355	
10S	12	3859.027	.000	253.913	.000	.000	4117.940	33372.751	.25668	
	13	3859.027	.000	126.102	.000	.000	3985.128	33481.391	.25064	
11S	14	3859.027	.000	383.940	.000	.000	4242.967	33242.228	.26665	
	17	3859.027	.000	511.604	.000	.000	4370.631	33153.714	.27488	
12S	20	4096.604	.000	605.566	.000	.000	4702.171	32871.905	.29573	
	71	4096.604	.000	580.033	.000	.000	4676.638	32893.608	.29413	
13S	60	3859.027	.000	579.934	.000	.000	4438.961	33095.633	.27915	
	11	3859.027	.000	242.053	.000	.000	4101.080	33382.632	.25703	
14S	61	3859.027	.000	468.156	.000	.000	4327.183	33190.644	.27215	
	15	3859.027	.000	464.470	.000	.000	4323.497	33193.778	.27192	

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (WA)	OCCASIONAL LOAD STRESS (WB)	THERMAL EXPANSION STRESS (WC)	TOTAL STRESS (TB)	MODIFIED ALLOWABLE STRESS (SAH)	DESIGN STRESS RATIO TB/(1.0*SH)	MODIFIED STRESS RATIO
1C	4	4800.802	.000	435.990	.000	.000	5245.791	27416.078	.34972	
	5	4800.802	.000	318.559	.000	.000	5128.350	27517.594	.34174	
2C	11	3859.027	.000	324.035	.000	.000	4183.062	33313.148	.24369	
	12	3859.027	.000	339.912	.000	.000	4198.939	33299.852	.26409	
3C	13	3859.027	.000	168.811	.000	.000	4027.838	33445.847	.25332	
	14	3859.027	.000	354.474	.000	.000	4213.501	33287.274	.24502	
4C	15	3859.027	.000	621.783	.000	.000	4446.810	33040.042	.24141	
	16	3859.027	.000	513.978	.000	.000	4373.005	33151.696	.23574	
5C	17	3859.027	.000	644.881	.000	.000	4543.908	33004.428	.28574	
	18	3859.027	.000	1043.377	.000	.000	4902.404	32701.707	.30933	
6C	19	4096.604	.000	994.563	.000	.000	5091.168	32541.258	.32022	
	20	4096.604	.000	847.893	.000	.000	4944.498	32665.927	.31097	

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (WA)	OCCASIONAL LOAD STRESS (WB)	THERMAL EXPANSION STRESS (WC)	TOTAL STRESS (TB)	MODIFIED ALLOWABLE STRESS (SAH)	DESIGN STRESS RATIO TB/(1.0*SH)	MODIFIED STRESS RATIO
1S	71	4800.802	.000	657.256	.000	.000	5467.057	27224.001	.36447	
	72	4800.802	.000	554.182	.000	.000	5354.983	27313.914	.35773	
2S	23	4800.802	.000	636.783	.000	.000	5374.584	27256.803	.25031	
	42	4800.802	.000	744.067	.000	.000	5533.860	27154.228	.37623	
3S	25	4800.802	.000	555.443	.000	.000	5358.245	27266.492	.35994	
	26	4800.802	.000	173.070	.000	.000	4983.821	27539.562	.33719	
4S	26	4800.802	.000	190.767	.000	.000	4995.819	27629.243	.33350	
	44	4800.802	.000	336.374	.000	.000	5136.175	27560.751	.34241	
5S	28	4096.604	.000	1117.967	.000	.000	6104.671	26905.197	.45566	
	29	4096.604	.000	779.948	.000	.000	5714.423	27074.201	.35560	
6S	29	4096.604	.000	740.046	.000	.000	5704.823	27034.701	.34045	
	30	4096.604	.000	443.532	.000	.000	5426.109	27207.057	.35134	
7S	30	4096.604	.000	425.512	.000	.000	5425.109	27207.357	.34134	
	31	4096.604	.000	447.137	.000	.000	5344.714	27204.243	.35023	
8S	32	4096.604	.000	567.235	.000	.000	5443.812	27204.248	.36025	
	33	4096.604	.000	1174.229	.000	.000	6019.802	26720.119	.40333	
9S	33	4096.604	.000	1353.415	.000	.000	6751.912	26525.607	.45580	
	34	4096.604	.000	451.152	.000	.000	5407.934	27259.015	.34043	
10S	35	4096.604	.000	425.231	.000	.000	5336.109	27137.234	.32747	
	60	4096.604	.000	379.787	.000	.000	5206.348	27306.547	.27376	
11S	36	4096.604	.000	66.536	.000	.000	4987.113	27607.094	.33247	
	74	4096.604	.000	464.055	.000	.000	5395.607	27209.185	.35147	
12S	37	4096.604	.000	732.350	.000	.000	5653.704	27003.094	.37374	
	38	4096.604	.000	737.403	.000	.000	5853.049	27044.159	.35643	
13S	39	4096.604	.000	1088.114	.000	.000	6014.071	26717.013	.40033	
	40	4096.604	.000	1011.752	.000	.000	6139.336	26517.628	.40022	

28S	40	4926.577	.000	1189.914	.000	.000	6116.491	26675.903	.40727
29S	41	4926.577	.000	550.256	.000	.000	5474.833	27219.692	.36512
	41	4926.577	.000	550.256	.000	.000	5474.833	27219.692	.36512
	42	4926.577	.000	376.592	.000	.000	5303.169	27307.306	.35354
30S	43	4926.577	.000	354.626	.000	.000	5283.203	27394.277	.35221
31S	45	4926.577	.000	281.734	.000	.000	5208.042	27454.964	.34667
	44	4926.577	.000	217.467	.000	.000	5208.311	27447.936	.34727
32S	44	4926.577	.000	294.547	.000	.000	5144.484	27502.108	.34297
	47	4926.577	.000	361.371	.000	.000	5221.124	27437.044	.34807
33S	47	4926.577	.000	436.277	.000	.000	5287.947	27388.249	.35253
	48	4926.577	.000	527.022	.000	.000	5562.854	27186.574	.37049
34S	47	4926.577	.000	949.843	.000	.000	5453.599	27239.441	.36357
	49	4926.577	.000	912.441	.000	.000	5875.670	26893.723	.39171
35S	50	4926.577	.000	799.017	.000	.000	5733.612	26950.835	.38240
	51	4926.577	.000	773.225	.000	.000	5725.594	27000.245	.38171
36S	51	4926.577	.000	786.540	.000	.000	5709.802	27025.068	.38039
	52	4926.577	.000	2332.794	.000	.000	5713.117	27018.851	.38087
37S	52	4926.577	.000	2332.794	.000	.000	7259.371	25704.535	.48296
	53	4926.577	.000	272.019	.000	.000	7259.371	25704.535	.48345
38S	54	4926.577	.000	613.431	.000	.000	5198.596	27466.103	.34657
	55	4926.577	.000	593.385	.000	.000	5540.008	27165.943	.34933
39S	55	4926.577	.000	447.584	.000	.000	5519.961	27183.033	.38200
	56	4926.577	.000	395.780	.000	.000	5374.161	27308.044	.35828
40S	57	4926.577	.000	388.974	.000	.000	5322.357	27350.997	.35482
	58	4926.577	.000	367.046	.000	.000	5307.551	27363.582	.35384
41S	62	4809.802	.000	773.385	.000	.000	5293.623	27375.420	.35291
	63	4809.802	.000	715.091	.000	.000	5583.187	27129.291	.37221
42S	63	4809.802	.000	745.013	.000	.000	5524.872	27178.841	.36833
	24	4809.802	.000	387.750	.000	.000	5554.815	27153.408	.37032
43S	46	4809.802	.000	335.999	.000	.000	5197.051	27457.507	.34647
	27	4809.802	.000	327.127	.000	.000	5136.928	27508.611	.34246

CURVED MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (TR)	MODIFIED ALLOWABLE STRESS (SAH)	DESIGN STRESS RATIO TB/(1.0*SH)	MODIFIED STRESS RATIO
7C	22	4809.802	.000	881.303	.000	.000	5691.105	27037.561	.37941	
	23	4809.802	.000	894.932	.000	.000	5704.734	27025.976	.38032	
8C	24	4809.802	.000	613.620	.000	.000	5423.422	27265.041	.36155	
	25	4809.802	.000	932.424	.000	.000	5742.226	26994.108	.38292	
9C	27	4809.802	.000	518.352	.000	.000	5328.151	27348.670	.35521	
	28	4809.802	.000	424.576	.000	.000	5234.377	27432.374	.34893	
10C	31	4926.577	.000	759.201	.000	.000	5685.774	27042.089	.37905	
	32	4926.577	.000	931.858	.000	.000	5858.435	26895.330	.39054	
11C	34	4926.577	.000	481.352	.000	.000	5407.929	27214.249	.36051	
	35	4926.577	.000	45.535	.000	.000	4967.113	27614.954	.33247	
12C	36	4926.577	.000	763.664	.000	.000	5849.241	27033.195	.37899	
	37	4926.577	.000	1202.780	.000	.000	6124.357	26645.268	.41042	
13C	38	4926.577	.000	1194.998	.000	.000	6121.475	26671.651	.40811	
	39	4926.577	.000	1787.560	.000	.000	6714.137	26167.983	.44761	

14C	42	4926.577	.000	618.668	.000	.000	5545.245	27161.542	.36968
	43	4926.577	.000	616.275	.000	.000	5542.852	27163.576	.36952
15C	44	4926.577	.000	449.250	.000	.000	5375.827	27305.547	.35839
	45	4926.577	.000	442.834	.000	.000	5369.411	27294.001	.35829
16C	49	4926.577	.000	1334.683	.000	.000	6261.260	26552.929	.41742
	50	4926.577	.000	1312.631	.000	.000	6239.208	26571.674	.41595
17C	53	4926.577	.000	446.875	.000	.000	5373.452	27307.566	.35823
	54	4926.577	.000	1007.749	.000	.000	5934.326	26830.823	.39552
18C	56	4926.577	.000	395.780	.000	.000	5322.357	27350.997	.35482
	57	4926.577	.000	380.974	.000	.000	5307.551	27363.582	.35384
19C	58	4926.577	.000	602.986	.000	.000	5529.563	27174.871	.36864
	59	4926.577	.000	623.924	.000	.000	5550.501	27157.074	.37003

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (TR)	MODIFIED ALLOWABLE STRESS (SAH)	DESIGN STRESS RATIO TB/(1.0*SH)	MODIFIED STRESS RATIO
44S	1	5823.672	.000	373.789	.000	.000	6197.461	26557.159	.41315	
	2	5823.672	.000	588.802	.000	.000	6412.474	26424.369	.42751	
45S	2	5823.672	.000	588.802	.000	.000	6412.474	26424.369	.42751	
	3	5823.672	.000	1327.840	.000	.000	7151.512	25796.215	.47677	

LACRUR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

D.1.2 S A T I S F A C T I O N O F E Q U A T I O N 9   (ANALYSIS SET 1)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1S	3	.000	4463.227	1066.063	780.726	.000	6258.015	32531.483	.32749	.21866
2S	4	.000	4463.227	242.821	865.771	.000	5571.819	33180.239	.29282	.18668
2S	5	.000	4463.227	176.305	990.415	.000	5630.146	33236.777	.29503	.18672
3S	6	.000	4463.227	151.332	454.415	.000	5068.974	33253.004	.26567	.17711
3S	7	.000	4463.227	151.332	454.415	.000	5068.974	33254.004	.26567	.17711
4S	7	.000	4463.227	174.108	1743.495	.000	6380.829	33239.644	.33443	.22205
4S	8	.000	4463.227	174.108	1743.495	.000	6380.829	33238.644	.33443	.22205
5S	8	.000	4463.227	256.524	934.501	.000	5654.251	33168.591	.29665	.19770
5S	9	.000	4463.227	256.524	934.501	.000	5654.251	33168.591	.29665	.19770
6S	9	.000	4463.227	349.780	424.537	.000	5237.544	33099.323	.27450	.18300
6S	18	.000	4463.227	395.202	630.881	.000	5498.509	33049.865	.28816	.19212
7S	9	.000	4463.227	697.028	153.146	.000	5313.400	32925.168	.30086	.20591
7S	18	.000	4463.227	710.318	645.736	.000	5819.281	32782.866	.30459	.20333
8S	18	.000	4463.227	406.609	63.990	.000	4927.826	33046.118	.25027	.17219
8S	10	.000	4463.227	313.365	305.620	.000	5082.152	33120.327	.26635	.17757
9S	10	.000	4463.227	252.152	145.909	.000	4861.288	33172.307	.25478	.16988
9S	11	.000	4463.227	252.917	436.650	.000	5155.794	33171.656	.26098	.17997
10S	12	.000	4204.387	253.913	478.070	.000	4936.370	33372.751	.25872	.17243
11S	14	.000	4204.387	126.102	524.337	.000	4854.826	33481.341	.25445	.16963
	17	.000	4204.387	383.940	565.502	.000	5153.830	33242.220	.27012	.18008
12S	20	.000	4463.227	605.566	605.439	.000	5278.344	33153.714	.27664	.18443
	21	.000	4463.227	530.033	590.472	.000	5633.732	32943.608	.29527	.19635
13S	18	.000	4204.387	579.934	565.710	.000	5350.032	33095.633	.28040	.18697
	11	.000	4204.387	242.053	485.205	.000	4931.445	33382.632	.25847	.17231
14S	61	.000	4204.387	468.156	804.547	.000	5477.090	33130.644	.28766	.19137
	15	.000	4204.387	464.470	572.956	.000	5241.814	33143.778	.27473	.18315

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1C	4	.000	5248.251	435.990	1554.509	.000	7236.749	27416.078	.46171	.26743
	5	.000	5248.251	316.559	1773.667	.000	7335.477	27517.554	.40753	.27168
2C	11	.000	4204.387	324.035	649.541	.000	5177.963	33313.148	.27138	.18092
	12	.000	4204.387	339.912	639.989	.000	5184.288	33299.652	.27171	.18114
3C	13	.000	4204.387	168.811	701.927	.000	5075.126	33445.087	.26599	.17733
	14	.000	4204.387	354.474	1133.316	.000	5692.177	33287.274	.29833	.19885

4C	15	.000	4204.387	621.793	767.013	.000	5593.183	33060.062	.29314	.19543
	16	.000	4204.387	513.978	757.034	.000	5475.399	33151.696	.28697	.19131
5C	17	.000	4204.387	686.881	752.818	.000	5642.076	33006.428	.29571	.19714
	18	.000	4204.387	1043.377	1257.819	.000	6505.543	32701.767	.34096	.22731
6C	19	.000	4463.227	994.563	904.134	.000	6361.928	32541.258	.33343	.22229
	20	.000	4463.227	847.893	847.715	.000	6158.835	32665.927	.32279	.21519

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
15S	21	.000	5248.251	657.256	660.094	.000	6564.576	27228.001	.34481	.24321
	22	.000	5248.251	554.182	685.416	.000	6461.848	27313.914	.36010	.24007
16S	23	.000	5248.251	564.783	708.750	.000	6513.364	27306.603	.36185	.24124
	62	.000	5248.251	744.047	702.878	.000	6687.177	27154.228	.37151	.24767
17S	25	.000	5248.251	588.443	644.882	.000	6471.576	27286.462	.35964	.23976
18S	24	.000	5248.251	173.020	502.361	.000	5915.632	27639.662	.32865	.21910
	64	.000	5248.251	185.267	495.263	.000	5929.771	27629.242	.32993	.21929
19S	28	.000	5248.251	325.374	514.517	.000	6083.141	27509.251	.33799	.22533
	29	.000	5367.477	1177.897	2312.604	.000	8657.803	26886.197	.49211	.30887
20S	30	.000	5367.477	700.346	1395.355	.000	7541.478	27024.201	.41906	.27939
21S	31	.000	5367.477	691.532	1409.005	.000	7543.478	27024.201	.41906	.27939
	32	.000	5367.477	493.532	1409.005	.000	7270.014	27267.957	.40399	.26936
22S	33	.000	5367.477	462.138	886.434	.000	6714.048	27254.543	.37300	.24967
		.000	5367.477	562.239	823.960	.000	6754.662	27205.260	.37549	.25033
23S	33	.000	5367.477	1176.225	562.263	.000	7061.765	26733.118	.39232	.26155
	34	.000	5367.477	1347.415	326.116	.000	7025.008	26533.607	.39021	.26019
24S	33	.000	5367.477	481.358	1089.585	.000	6938.414	27278.260	.38547	.25609
	64	.000	5367.477	424.651	3002.903	.000	8700.811	27322.508	.48348	.29502
25S	35	.000	5367.477	68.536	1529.445	.000	8414.642	27304.197	.46760	.31145
	36	.000	5367.477	463.505	1754.169	.000	6955.489	27635.154	.39647	.25765
26S	37	.000	5367.477	732.750	1625.369	.000	7152.151	27259.180	.40179	.25119
	38	.000	5367.477	727.413	1086.635	.000	7174.726	27069.169	.42337	.28211
27S	39	.000	5367.477	1089.114	1075.501	.000	7536.154	26762.513	.35867	.24592
	40	.000	5367.477	1711.753	1094.747	.000	7635.977	26667.420	.41117	.27749
28S	40	.000	5367.477	1349.914	1021.384	.000	7574.677	26676.803	.42422	.28291
	41	.000	5367.477	565.256	830.551	.000	6745.684	27219.602	.37510	.25040
29S	41	.000	5367.477	374.542	798.423	.000	6737.729	27219.802	.37452	.24994
30S	43	.000	5367.477	394.626	657.475	.000	6634.878	27304.777	.36840	.24494
31S	45	.000	5367.477	723.485	1181.064	.000	7400.978	27404.195	.35240	.24432
	46	.000	5367.477	391.334	1123.826	.000	6763.217	27367.838	.37737	.25064
32S	46	.000	5367.477	717.907	1240.274	.000	6987.668	27205.169	.37687	.25171
	47	.000	5367.477	794.747	1233.524	.000	6908.958	27437.844	.39332	.25709
33S	47	.000	5367.477	636.277	1257.748	.000	6993.578	27380.634	.39467	.26333
	48	.000	5367.477	542.572	1093.108	.000	6734.503	27168.574	.37567	.25513
34S	47	.000	5367.477	909.043	1326.685	.000	7473.545	27230.441	.40563	.27151
	49	.000	5367.477	612.441	1662.835	.000	7041.951	26996.815	.43566	.27048

3F5	50	.000	5367.477	799.017	1521.526	.000	7690.070	27008.245	.42722	.28483
	51	.000	5367.477	779.225	1627.494	.000	7774.146	27025.068	.43190	.28791
3F5	51	.000	5367.477	786.540	1591.646	.000	7747.682	27018.851	.43043	.28695
	52	.000	5367.477	2332.794	1399.702	.000	9000.973	25704.535	.50059	.33367
375	52	.000	5367.477	2332.794	1399.702	.000	9000.973	25704.535	.50053	.33367
	53	.000	5367.477	272.019	1577.359	.000	7216.856	27456.193	.40094	.26730
3F5	54	.000	5367.477	613.431	1871.665	.000	7852.573	27165.983	.43535	.29084
	55	.000	5367.477	593.385	1399.576	.000	7351.439	27143.033	.40841	.27224
395	55	.000	5367.477	447.566	1365.573	.000	7130.636	27306.866	.39592	.26599
	56	.000	5367.477	395.780	974.836	.000	6738.093	27350.997	.37434	.24956
405	57	.000	5367.477	386.974	1351.358	.000	7101.709	27363.582	.39454	.26303
	58	.000	5367.477	367.045	2537.831	.000	8272.354	27375.620	.45954	.30659
415	62	.000	5240.251	773.385	691.010	.000	6704.646	27129.291	.37248	.24832
	63	.000	5240.251	715.091	667.857	.000	6623.134	27178.841	.36796	.24530
425	63	.000	5240.251	745.013	656.837	.000	6642.101	27153.608	.36901	.24600
	26	.000	5240.251	387.250	643.169	.000	6270.669	27457.507	.34837	.23225
435	66	.000	5240.251	335.999	512.740	.000	6088.490	27501.069	.33825	.22550
	27	.000	5240.251	327.127	540.092	.000	6107.470	27508.611	.33930	.22620

CURVED MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
7C	22	.000	5240.251	881.303	1086.082	.000	7207.637	27037.561	.40042	.26695
	23	.000	5240.251	874.932	1122.423	.000	7257.606	27025.976	.40325	.26883
8C	26	.000	5240.251	613.620	1019.140	.000	6873.011	27265.091	.38183	.25454
	25	.000	5240.251	937.424	1021.854	.000	7194.579	26994.108	.39973	.26666
6C	27	.000	5240.251	518.352	856.809	.000	6614.411	27346.070	.36747	.24494
	24	.000	5240.251	428.576	841.408	.000	6510.235	27422.379	.36168	.24112
10C	31	.000	5367.477	759.201	1452.954	.000	7579.632	27042.089	.42107	.28073
	32	.000	5367.477	931.858	1353.590	.000	7652.925	26895.330	.42516	.28344
11C	34	.000	5367.477	481.352	1083.585	.000	6934.414	27278.260	.38547	.25693
	35	.000	5367.477	60.535	1520.455	.000	6956.469	27635.954	.34547	.25765
12C	36	.000	5367.477	749.664	2865.946	.000	9022.186	27033.195	.50123	.33418
	37	.000	5367.477	1202.780	2670.133	.000	9240.390	26665.046	.51335	.34224
13C	38	.000	5367.477	1104.996	1782.176	.000	8344.652	26671.661	.46359	.30904
	39	.000	5367.477	1797.560	1771.920	.000	8926.958	26167.983	.49594	.33063
14C	42	.000	5367.477	618.668	1297.937	.000	7284.082	27161.542	.40467	.24978
	41	.000	5367.477	616.275	1600.303	.000	7593.054	27163.576	.42184	.24122
15C	44	.000	5367.477	449.250	1909.882	.000	7725.609	27305.547	.42925	.29613
	45	.000	5367.477	662.934	1832.886	.000	7676.297	27244.001	.42613	.28408
16C	49	.000	5367.477	1334.883	2730.402	.000	9432.502	26552.929	.52423	.34935
	50	.000	5367.477	1312.631	2502.858	.000	9182.965	26571.674	.51016	.34011
17C	51	.000	5367.477	446.875	2591.797	.000	8406.648	27307.566	.46693	.31132
	54	.000	5367.477	1007.749	3074.784	.000	9450.010	26833.023	.52505	.35000
18C	54	.000	5367.477	395.780	974.836	.000	6738.093	27350.997	.37434	.24956
	57	.000	5367.477	386.974	1351.358	.000	7101.709	27363.582	.39454	.26303
19C	58	.000	5367.477	602.986	4169.166	.000	10139.629	27174.871	.56331	.37554
	59	.000	5367.477	623.924	4381.979	.000	10373.380	27157.074	.57633	.38420

1ACRWD MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
445	1	.000	5823.672	373.789	5631.157	.000	11828.618	26607.159	.65715	.43816
	2	.000	5823.672	588.812	2766.423	.000	9176.907	26424.389	.50983	.33989
455	2	.000	5823.672	588.812	2766.423	.000	9176.907	26424.389	.50983	.33989
	3	.000	5823.672	1327.840	643.879	.000	7795.390	25796.215	.43308	.28672

EACRVP MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

0.1.3 S A T I S F A C T I O N   O F   E Q U A T I O N   10   (ANALYSIS SET 1)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO T10/(1.0*SAM)
1S	3	.000	.000	.000	.000	666.982	666.982	32531.483	.02856	.02058
	4	.000	.000	.000	.000	5023.207	5023.207	33180.239	.21509	.15133
2S	5	.000	.000	.000	.000	6122.644	6122.644	33236.777	.24217	.18421
	6	.000	.000	.000	.000	3964.169	3964.169	33258.004	.16474	.11919
3S	6	.000	.000	.000	.000	3964.169	3964.169	33258.004	.16474	.11919
	7	.000	.000	.000	.000	2037.442	2037.442	33238.644	.08724	.06130
4S	7	.000	.000	.000	.000	2037.442	2037.442	33238.644	.08724	.06130
	8	.000	.000	.000	.000	1532.497	1532.497	33168.591	.06562	.04628
5S	8	.000	.000	.000	.000	1532.497	1532.497	33168.591	.06562	.04628
	9	.000	.000	.000	.000	3835.610	3835.610	33009.323	.16474	.11592
6S	9	.000	.000	.000	.000	5627.281	5627.281	33040.845	.24096	.17027
	10	.000	.000	.000	.000	3231.915	3231.915	32905.168	.13939	.09816
7S	9	.000	.000	.000	.000	4097.612	4097.612	32734.162	.17546	.12445
	19	.000	.000	.000	.000	4305.970	4305.970	32702.866	.18435	.13135
8S	10	.000	.000	.000	.000	3201.976	3201.976	33064.118	.13711	.09689
	60	.000	.000	.000	.000	2787.492	2787.892	33120.327	.11933	.08417
9S	10	.000	.000	.000	.000	2930.696	2930.696	33172.307	.12549	.08835
	61	.000	.000	.000	.000	2556.571	2556.571	33171.656	.15981	.07731
10S	12	.000	.000	.000	.000	2946.141	2946.141	33272.751	.12615	.08824
	13	.000	.000	.000	.000	4090.786	4090.786	33481.391	.17517	.12218
11S	14	.000	.000	.000	.000	2981.103	2981.103	33262.226	.12765	.08942
	17	.000	.000	.000	.000	4021.501	4021.501	33153.714	.17220	.12130
12S	20	.000	.000	.000	.000	4069.692	4069.692	32871.905	.17426	.12380
	21	.000	.000	.000	.000	2345.376	2345.376	32893.608	.10043	.07130
13S	60	.000	.000	.000	.000	5160.453	5160.453	33095.633	.22007	.15593
	11	.000	.000	.000	.000	3686.545	3686.545	33302.832	.15786	.11043
14S	61	.000	.000	.000	.000	4747.080	4747.080	33190.644	.20327	.14302
	15	.000	.000	.000	.000	3686.787	3686.787	33193.778	.15787	.11107

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO T10/(1.0*SAM)
1C	4	.000	.000	.000	.000	9019.265	9019.265	27416.078	.47163	.32898
	5	.000	.000	.000	.000	10993.329	10993.329	27517.594	.57481	.39950
2C	11	.000	.000	.000	.000	4935.153	4935.153	33313.148	.21132	.14814
	12	.000	.000	.000	.000	3943.979	3943.979	33249.652	.14888	.11844
3C	13	.000	.000	.000	.000	5476.307	5476.307	33445.087	.23449	.16374
	14	.000	.000	.000	.000	6955.449	6955.449	33287.274	.29783	.20895

4C	15	.000	.000	.000	.000	4935.477	4935.477	33060.062	.21134	.14929
	16	.000	.000	.000	.000	3990.782	3990.782	33151.696	.17088	.12038
5C	17	.000	.000	.000	.000	5393.556	5393.556	33356.424	.23052	.16311
	18	.000	.000	.000	.000	6872.149	6872.149	32701.707	.29426	.21015
6C	19	.000	.000	.000	.000	6029.003	6029.003	32541.258	.25816	.18527
	20	.000	.000	.000	.000	5698.245	5698.245	32665.927	.24400	.17444

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO T10/(1.0*SAM)
15S	21	.000	.000	.000	.000	2657.625	2657.625	27228.001	.12898	.09741
	22	.000	.000	.000	.000	2592.879	2592.879	27313.914	.13556	.09491
16S	23	.000	.000	.000	.000	2167.863	2167.863	27306.603	.12812	.07573
	62	.000	.000	.000	.000	1210.252	1210.252	27154.228	.06328	.04457
17S	26	.000	.000	.000	.000	1365.196	1365.196	27246.492	.07135	.05013
	24	.000	.000	.000	.000	1790.357	1790.357	27639.602	.09561	.06473
18S	25	.000	.000	.000	.000	1790.357	1790.357	27629.242	.09261	.06486
	64	.000	.000	.000	.000	2153.670	2153.670	27509.251	.12084	.07636
19S	28	.000	.000	.000	.000	10356.889	10356.889	26668.197	.53892	.38822
	26	.000	.000	.000	.000	5470.339	5470.339	27024.201	.26003	.20243
20S	24	.000	.000	.000	.000	5470.339	5470.339	27074.231	.26003	.20243
	30	.000	.000	.000	.000	2271.810	2271.810	27047.007	.11479	.08321
21S	30	.000	.000	.000	.000	2271.810	2271.810	27067.407	.11879	.08321
	31	.000	.000	.000	.000	2915.475	2915.475	27244.543	.15244	.10692
22S	32	.000	.000	.000	.000	3629.376	3629.376	27265.260	.18977	.13341
	33	.000	.000	.000	.000	7545.637	7545.637	26730.118	.3045	.20203
23S	33	.000	.000	.000	.000	5174.053	5174.053	26553.607	.27054	.19503
	34	.000	.000	.000	.000	1837.591	1837.591	27358.260	.09566	.06734
24S	33	.000	.000	.000	.000	5203.196	5203.196	27372.358	.27208	.19044
	69	.000	.000	.000	.000	2130.986	2130.986	27304.567	.11142	.07797
25S	34	.000	.000	.000	.000	1775.145	1775.145	27435.064	.09297	.06456
	36	.000	.000	.000	.000	1832.493	1832.493	27749.180	.09582	.06715
26S	37	.000	.000	.000	.000	1943.744	1943.744	27263.667	.10369	.07324
	38	.000	.000	.000	.000	2573.334	2573.334	27849.119	.13500	.09533
27S	39	.000	.000	.000	.000	2497.014	2497.014	26762.513	.13043	.09371
	40	.000	.000	.000	.000	2397.768	2397.768	21807.420	.12400	.07967
28S	41	.000	.000	.000	.000	1790.678	1790.678	26576.943	.17314	.06557
	42	.000	.000	.000	.000	1714.478	1714.478	25113.642	.09337	.06557
29S	43	.000	.000	.000	.000	772.508	772.508	27317.326	.03946	.02733
	45	.000	.000	.000	.000	733.708	733.708	23343.277	.04046	.05171
30S	45	.000	.000	.000	.000	2917.723	3887.073	27049.564	.40220	.14845
	46	.000	.000	.000	.000	3992.124	3992.124	27047.509	.21013	.13153
31S	46	.000	.000	.000	.000	2901.146	2901.146	27035.704	.15100	.10500
	47	.000	.000	.000	.000	2915.143	2915.143	27133.517	.14213	.10774
32S	47	.000	.000	.000	.000	3600.193	3600.193	27144.074	.20943	.13745
	48	.000	.000	.000	.000	10355.767	10555.767	21342.673	.05140	.15376
33S	49	.000	.000	.000	.000	6349.965	6349.965	26938.603	.33002	.23572

ACRWP MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

6.1.3 S A T I S F A C T I O N   O F   E Q U A T I O N 10   (ANALYSIS SET 1)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO T10/(1.0*SAM)
15	3	.000	.000	.000	.000	666.902	666.902	32531.483	.08856	.07050
25	4	.000	.000	.000	.000	5023.207	5023.207	33180.239	.21502	.15139
	5	.000	.000	.000	.000	6122.644	6122.644	33236.777	.26717	.18421
35	6	.000	.000	.000	.000	3964.169	3964.169	33258.004	.16974	.11719
	7	.000	.000	.000	.000	2037.442	2037.442	33238.644	.08724	.06136
45	7	.000	.000	.000	.000	2037.442	2037.442	33238.644	.08724	.06136
	8	.000	.000	.000	.000	1532.497	1532.497	33168.591	.06562	.04626
55	8	.000	.000	.000	.000	1532.497	1532.497	33168.591	.06562	.04626
	9	.000	.000	.000	.000	3835.610	3835.610	33089.323	.16424	.11597
65	9	.000	.000	.000	.000	5627.281	5627.281	33049.845	.24096	.17027
	10	.000	.000	.000	.000	3231.915	3231.915	32925.168	.13939	.09716
75	9	.000	.000	.000	.000	4097.612	4097.612	32794.162	.17566	.12446
	10	.000	.000	.000	.000	4355.920	4355.920	32782.566	.18633	.13135
85	10	.000	.000	.000	.000	3201.970	3201.970	33646.118	.13711	.09849
	60	.000	.000	.000	.000	2787.892	2787.892	33120.327	.11935	.08417
95	16	.000	.000	.000	.000	2930.656	2930.656	33172.307	.12549	.08835
	61	.000	.000	.000	.000	2564.571	2564.571	33171.656	.10981	.07731
105	12	.000	.000	.000	.000	2946.141	2946.141	33372.751	.12615	.08828
	13	.000	.000	.000	.000	4090.786	4090.786	33491.391	.17517	.12218
115	16	.000	.000	.000	.000	2981.103	2981.103	33242.228	.12765	.08949
	17	.000	.000	.000	.000	4021.501	4021.501	33153.714	.17220	.12130
125	20	.000	.000	.000	.000	4069.692	4069.692	32871.905	.17426	.12368
	21	.000	.000	.000	.000	2345.376	2345.376	32893.863	.10043	.07136
135	80	.000	.000	.000	.000	5160.453	5160.453	33095.633	.22092	.15593
	11	.000	.000	.000	.000	3685.545	3685.545	33202.432	.15786	.11043
145	81	.000	.000	.000	.000	4747.080	4747.080	33190.646	.20327	.14302
	15	.000	.000	.000	.000	3686.787	3686.787	33193.778	.15787	.11107

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO T10/(1.0*SAM)
10	4	.000	.000	.000	.000	9019.365	9019.365	27416.078	.47160	.32898
	5	.000	.000	.000	.000	10993.329	10993.329	27517.594	.57681	.39950
20	11	.000	.000	.000	.000	4935.153	4935.153	2.313.148	.21132	.14814
	12	.000	.000	.000	.000	3943.979	3943.979	33297.852	.16888	.11844
30	13	.000	.000	.000	.000	5476.307	5476.307	33445.887	.23469	.16374
	14	.000	.000	.000	.000	6955.449	6955.449	33287.274	.29783	.20895

40	15	.000	.000	.000	.000	4935.477	4935.477	33060.062	.21134	.14920
	16	.000	.000	.000	.000	3990.782	3990.782	33151.895	.17083	.12034
50	17	.000	.000	.000	.000	5393.556	5393.556	33306.424	.23052	.16311
	18	.000	.000	.000	.000	6872.149	6872.149	32701.707	.24426	.21035
60	19	.000	.000	.000	.000	6029.003	6029.003	32541.258	.25816	.18527
	20	.000	.000	.000	.000	5698.245	5698.245	32665.927	.24400	.17444

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO T10/(1.0*SAM)
145	21	.000	.000	.000	.000	2657.625	2657.625	27224.001	.13898	.09761
145	22	.000	.000	.000	.000	2592.879	2592.879	27313.914	.13559	.09491
	23	.000	.000	.000	.000	2657.863	2657.863	27356.603	.10812	.07571
175	25	.000	.000	.000	.000	1210.252	1210.252	27154.228	.06328	.04457
	26	.000	.000	.000	.000	1368.198	1368.198	27226.492	.07134	.05003
185	26	.000	.000	.000	.000	1798.357	1798.357	27659.662	.09368	.06474
	86	.000	.000	.000	.000	1798.357	1798.357	27629.242	.09361	.06468
105	28	.000	.000	.000	.000	2100.633	2100.633	27509.251	.10946	.07636
	24	.000	.000	.000	.000	10326.869	10326.869	26676.197	.53842	.34622
205	29	.000	.000	.000	.000	5470.339	5470.339	27024.201	.20603	.25268
	30	.000	.000	.000	.000	5470.339	5470.339	27094.201	.29609	.24269
215	30	.000	.000	.000	.000	2271.010	2271.010	27207.027	.11862	.08351
	31	.000	.000	.000	.000	2271.010	2271.010	27267.097	.11872	.08131
235	32	.000	.000	.000	.000	2915.475	2915.475	27294.793	.15244	.10693
	33	.000	.000	.000	.000	3628.376	3628.376	27265.760	.18977	.13341
275	33	.000	.000	.000	.000	7545.637	7545.637	26730.119	.39404	.28239
	34	.000	.000	.000	.000	5176.053	5176.053	26533.557	.27204	.19508
265	33	.000	.000	.000	.000	1837.591	1837.591	27217.245	.05900	.06736
	49	.000	.000	.000	.000	5063.179	5063.179	27320.398	.27229	.19344
285	35	.000	.000	.000	.000	2130.900	2130.900	27336.597	.11142	.07747
	36	.000	.000	.000	.000	1774.145	1774.145	27435.954	.09747	.06636
745	37	.000	.000	.000	.000	1832.491	1832.491	27264.190	.09562	.06713
	38	.000	.000	.000	.000	1033.866	1033.866	27063.852	.15364	.17328
275	33	.000	.000	.000	.000	2673.334	2673.334	22545.709	.11764	.09653
	43	.000	.000	.000	.000	2694.714	2694.714	26775.913	.12543	.08373
295	41	.000	.000	.000	.000	2335.968	2335.968	26737.749	.12579	.08559
	41	.000	.000	.000	.000	2331.978	2331.978	26733.593	.12714	.08554
295	41	.000	.000	.000	.000	1794.678	1794.678	27215.692	.09333	.06599
	42	.000	.000	.000	.000	1794.678	1794.678	27213.592	.06933	.06447
315	43	.000	.000	.000	.000	747.670	747.670	27517.305	.03909	.02779
	44	.000	.000	.000	.000	897.780	897.780	27554.623	.04604	.03271
315	45	.000	.000	.000	.000	3862.273	3862.273	27675.394	.20208	.14955
	46	.000	.000	.000	.000	3342.576	3342.576	27463.694	.17499	.13799
330	46	.000	.000	.000	.000	2951.560	2951.560	27107.105	.15393	.11075
	47	.000	.000	.000	.000	2905.364	2905.364	27598.749	.15172	.10781
335	47	.000	.000	.000	.000	837.357	837.357	27514.544	.24411	.11444
	48	.000	.000	.000	.000	7730.553	7730.553	27364.543	.28011	.28011
365	47	.000	.000	.000	.000	2033.593	2033.593	27711.143	.13513	.09641
	48	.000	.000	.000	.000	10355.039	10355.039	26478.490	.33209	.27721

MEMBER NO.	ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0+SA)	MODIFIED STRESS RATIO T10/(1.0+SAM)
395	50	.000	.000	.000	.000	5711.136	5711.136	27008.245	.24442	.21146
	51	.000	.000	.000	.000	5233.407	5233.407	27025.046	.27344	.17345
365	51	.000	.000	.000	.000	5233.407	5233.407	27018.951	.27344	.16349
	52	.000	.000	.000	.000	2319.040	2319.040	25764.535	.12124	.09022
375	52	.000	.000	.000	.000	2319.040	2319.040	25764.535	.12124	.09022
	53	.000	.000	.000	.000	3257.807	3257.807	27456.193	.17034	.11846
385	54	.000	.000	.000	.000	3884.305	3884.305	27145.993	.20331	.14317
	55	.000	.000	.000	.000	3376.245	3376.245	27143.333	.17644	.12426
365	55	.000	.000	.000	.000	3376.245	3376.245	27306.944	.17654	.19344
	56	.000	.000	.000	.000	2156.590	2156.590	27300.907	.11267	.07692
405	57	.000	.000	.000	.000	1699.493	1699.493	27361.842	.08944	.06211
	58	.000	.000	.000	.000	2003.768	2003.768	27375.420	.10494	.07612
415	62	.000	.000	.000	.000	1210.252	1210.252	27129.251	.06334	.04461
	63	.000	.000	.000	.000	349.152	349.152	27178.041	.01826	.01248
425	63	.000	.000	.000	.000	349.152	349.152	27151.408	.01826	.01246
	24	.000	.000	.000	.000	831.101	831.101	27457.567	.04346	.03027
435	66	.000	.000	.000	.000	2100.630	2100.630	27501.069	.10944	.07639
	27	.000	.000	.000	.000	2244.889	2244.889	27506.611	.11736	.08161

CURVED MEMBERS FOR RUN 2

MEMBER NO.	ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0+SA)	MODIFIED STRESS RATIO T10/(1.0+SAM)
70	22	.000	.000	.000	.000	4108.573	4108.573	27037.561	.21483	.15196
	23	.000	.000	.000	.000	3276.653	3276.653	27025.976	.17133	.12124
80	24	.000	.000	.000	.000	1316.929	1316.929	27245.091	.06846	.04830
	25	.000	.000	.000	.000	2163.236	2163.236	26994.108	.11311	.08014
90	27	.000	.000	.000	.000	3557.162	3557.162	27345.070	.18600	.13094
	28	.000	.000	.000	.000	3750.134	3750.134	27422.379	.19609	.13874
100	31	.000	.000	.000	.000	4783.563	4783.563	27042.069	.25043	.17712
	32	.000	.000	.000	.000	5962.353	5962.353	26995.330	.31176	.22159
110	34	.000	.000	.000	.000	1837.591	1837.591	27278.260	.09608	.06736
	35	.000	.000	.000	.000	1778.145	1778.145	27635.954	.05297	.06434
120	36	.000	.000	.000	.000	3510.429	3510.429	27033.195	.15741	.11176
	37	.000	.000	.000	.000	3257.462	3257.462	26645.046	.17032	.12216
130	38	.000	.000	.000	.000	4225.848	4225.848	26671.661	.22096	.15444
	39	.000	.000	.000	.000	4098.004	4098.004	26167.583	.21427	.15650
140	42	.000	.000	.000	.000	1245.214	1245.214	27161.542	.06516	.04568
	43	.000	.000	.000	.000	1693.737	1693.737	27163.576	.08856	.06233
150	44	.000	.000	.000	.000	6352.771	6352.771	27215.547	.33217	.23265
	45	.000	.000	.000	.000	6312.549	6312.549	27244.001	.33007	.23129
160	49	.000	.000	.000	.000	10431.765	10431.765	26552.629	.54545	.39247
	50	.000	.000	.000	.000	9382.292	9382.292	26571.674	.49358	.35339
170	53	.000	.000	.000	.000	5351.947	5351.947	27317.566	.27984	.19599
	54	.000	.000	.000	.000	6387.733	6387.733	26830.823	.33400	.23807
180	56	.000	.000	.000	.000	2156.590	2156.590	27350.997	.11287	.07692
	57	.000	.000	.000	.000	1699.493	1699.493	27363.562	.08886	.06211
190	58	.000	.000	.000	.000	3423.240	3423.240	27174.871	.17899	.12597
	59	.000	.000	.000	.000	3500.657	3500.657	27157.074	.18304	.12890

LACRWD MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0+SA)	MODIFIED STRESS RATIO T10/(1.0+SAM)
445	1	.000	.000	.000	.000	16641.350	16641.350	26657.159	.87014	.62545
	2	.000	.000	.000	.000	8172.094	8172.094	26424.389	.42735	.30926
445	2	.000	.000	.000	.000	8172.094	8172.094	26434.389	.42733	.30926
	3	.000	.000	.000	.000	883.121	883.121	25796.215	.04618	.03423

LACBWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

D.1.4 S A T I S F A C T I O N O F E Q U A T I O N 11   (ANALYSIS SET 1)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO T11/(SH+SAM)
1S	3	4096.604	.000	1004.063	.000	846.002	5769.569	32511.483	.14899	.11913
2S	4	4096.604	.000	242.821	.000	5923.287	9352.633	33160.239	.23852	.14074
	5	4096.604	.000	174.305	.000	6172.646	10395.556	33236.777	.24483	.21156
2S	6	4096.604	.000	151.332	.000	3966.169	8212.106	33258.004	.20921	.16706
	6	4096.604	.000	151.332	.000	3966.169	8212.106	33258.604	.20921	.16706
	7	4096.604	.000	174.109	.000	2037.442	6308.154	33238.444	.16070	.19537
4S	7	4096.604	.000	174.108	.000	2037.442	6308.154	33238.444	.16070	.17937
	8	4096.604	.000	256.524	.000	1532.497	5805.676	33169.591	.14994	.11995
5S	8	4096.604	.000	256.524	.000	1532.497	5805.676	33169.591	.14994	.11995
	9	4096.604	.000	344.780	.000	3835.610	8251.904	33009.323	.21099	.16906
6S	9	4096.604	.000	396.202	.000	5427.281	10120.087	33049.865	.25781	.21674
	10	4096.604	.000	547.903	.000	3231.915	7871.473	32925.168	.20053	.16122
7S	9	4096.604	.000	697.028	.000	4697.612	8891.246	32794.142	.27551	.19259
	10	4096.604	.000	710.318	.000	4305.420	9112.443	32742.866	.23215	.18719
8S	10	4096.604	.000	400.409	.000	3201.970	7690.194	33046.118	.19614	.15730
	60	4096.604	.000	313.305	.000	2787.892	7197.801	33126.327	.18337	.14693
9S	10	4096.604	.000	252.152	.000	2930.696	7279.453	33172.357	.18545	.14934
	11	3850.027	.000	252.917	.000	2564.571	6914.092	33171.658	.17618	.14008
10S	12	3850.027	.000	253.913	.000	2946.141	7059.041	33172.751	.17983	.14327
	13	3850.027	.000	176.102	.000	4050.786	6276.915	33481.391	.20574	.14354
11S	16	3850.027	.000	383.940	.000	2981.103	7224.076	33242.228	.18404	.14694
	17	3850.027	.000	511.604	.000	4671.501	8392.132	33153.714	.21379	.17168
12S	20	4096.604	.000	635.566	.000	4069.692	8771.863	32871.905	.22357	.17995
	21	4096.604	.000	584.033	.000	2345.376	7089.014	32893.608	.17849	.14391
13S	66	3850.027	.000	579.934	.000	5160.453	9590.414	33095.833	.24455	.19549
	11	3850.027	.000	242.053	.000	3686.545	7787.625	33382.837	.19839	.15819
14S	61	3850.027	.000	468.156	.000	4747.080	9074.263	33190.644	.23117	.18488
	15	3850.027	.000	464.479	.000	3686.787	8010.284	33193.778	.20406	.16316

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO T11/(SH+SAM)
1C	4	4809.802	.000	435.990	.000	9019.265	14265.056	27416.078	.41802	.33031
	5	4809.802	.000	316.559	.000	10993.329	15119.689	27517.596	.47217	.37917
2C	11	3850.027	.000	324.035	.000	4935.153	9118.215	33313.148	.23229	.18524
	12	3850.027	.000	339.912	.000	3943.979	8142.918	33299.652	.20744	.16551
3C	13	3850.027	.000	168.811	.000	5476.307	9504.146	33445.087	.24212	.19261
	14	3850.027	.000	354.474	.000	6955.449	11168.950	33287.274	.28453	.22707

MEMBER NO.	MEMBER ENDS									
4C	15	3850.027	.000	621.783	.000	4935.477	9415.287	33060.062	.23988	.19233
	16	3850.027	.000	513.978	.000	3995.782	8363.787	33151.696	.21307	.17051
5C	17	3850.027	.000	604.881	.000	5363.556	9927.464	33006.428	.25290	.20299
	18	3850.027	.000	1043.377	.000	6872.149	11774.853	32701.707	.29996	.24227
6C	19	4096.604	.000	994.563	.000	6099.003	11120.171	32541.258	.28329	.22956
	20	4096.604	.000	847.893	.000	5698.245	10642.742	32665.927	.27113	.21914

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO T11/(SH+SAM)
15S	21	4800.802	.000	657.256	.000	2657.625	8124.683	27228.001	.23809	.19240
	22	4800.802	.000	554.102	.000	2592.439	7958.842	27313.914	.23323	.18809
16S	23	4800.802	.000	566.783	.000	2067.953	7442.447	27306.603	.21809	.17552
	62	4800.802	.000	744.547	.000	1216.252	6764.101	27194.224	.19892	.16046
17S	25	4800.802	.000	598.443	.000	1365.196	6301.441	27216.492	.19592	.15994
	26	4800.802	.000	373.600	.000	1799.307	6723.178	27637.682	.19848	.16406
18S	26	4800.802	.000	184.827	.000	1703.547	6785.316	27629.742	.19584	.15917
	64	4924.577	.000	324.374	.000	2100.630	7234.805	27559.251	.21207	.17024
19S	28	4924.577	.000	133.827	.000	10326.449	16411.343	26688.197	.46092	.34360
	29	4924.577	.000	788.246	.000	5473.339	11177.149	27029.701	.32764	.24547
20S	29	4924.577	.000	783.246	.000	5473.339	11177.162	27074.701	.32754	.24547
	30	4924.577	.000	447.532	.000	2671.713	7691.910	27247.847	.22560	.18198
21S	31	4924.577	.000	447.532	.000	2671.713	7691.910	27247.847	.22560	.18198
	32	4924.577	.000	442.137	.000	2911.475	8306.149	27244.542	.24335	.18654
22S	33	4924.577	.000	547.835	.000	3628.376	9122.138	27205.260	.26735	.21814
	33	4924.577	.000	1120.025	.000	7045.637	13936.439	26338.118	.38869	.32547
23S	34	4924.577	.000	1357.415	.000	5174.653	11005.446	26833.697	.33077	.27547
	35	4924.577	.000	481.362	.000	1937.591	7245.526	27218.260	.21232	.17114
24S	37	4924.577	.000	459.591	.000	5203.195	10555.259	27203.524	.33943	.24505
	50	4924.577	.000	373.742	.000	7122.900	7437.309	27344.547	.21704	.17555
25S	36	4924.577	.000	461.138	.000	1775.145	6765.208	27635.554	.19895	.15867
	37	4924.577	.000	468.565	.000	1937.591	7227.574	27233.180	.21168	.17091
26S	38	4924.577	.000	710.150	.000	1947.654	7065.807	27060.387	.20393	.17144
	39	4924.577	.000	737.413	.000	2575.334	622.574	27069.109	.22100	.17944
27S	40	4924.577	.000	1084.334	.000	2434.514	8530.205	26767.513	.24535	.20259
	45	4924.577	.000	1733.793	.000	2147.345	6325.694	26515.420	.24963	.20443
28S	41	4924.577	.000	570.266	.000	733.149	5592.569	27229.903	.26363	.19273
	42	4924.577	.000	320.092	.000	1734.470	7016.372	27259.472	.21230	.17109
30S	43	4924.577	.000	365.676	.000	767.128	6041.514	27367.300	.21274	.17109
	44	4924.577	.000	275.553	.000	861.308	6171.551	27344.233	.17743	.16476
31S	45	4924.577	.000	201.734	.000	3361.723	5067.205	27456.964	.18107	.14178
	46	4924.577	.000	217.552	.000	3421.544	6467.634	27467.638	.14527	.13713
32S	46	4924.577	.000	364.373	.000	2523.206	5464.693	27457.199	.16937	.13413
	47	4924.577	.000	631.577	.000	3104.107	6772.609	27330.854	.17333	.14219
33S	47	4924.577	.000	631.577	.000	3704.453	7055.947	27330.854	.19570	.16074
	48	4924.577	.000	539.022	.000	10544.157	14433.513	26009.574	.37991	.32152
34S	47	4924.577	.000	563.661	.000	10344.955	14293.543	26008.513	.47923	.32144
	49	4924.577	.000	532.641	.000	9345.605	14039.363	26009.593	.37920	.31755

3FS	50	4926.577	.000	799.817	.000	8711.136	11434.738	27088.245	.33514	.27299
	51	4926.577	.000	774.225	.000	8233.407	10939.209	27075.068	.32058	.26030
36S	51	4926.577	.000	746.540	.000	8233.407	10944.574	27018.851	.32078	.26051
	52	4926.577	.000	2332.794	.000	7319.040	9557.411	25744.535	.28067	.23522
37S	52	4926.577	.000	2332.794	.000	7319.040	9574.411	25744.535	.26169	.23532
	53	4926.577	.000	279.819	.000	3267.807	8454.403	27466.103	.26741	.19919
38S	54	4926.577	.000	613.431	.000	3684.254	9474.313	27145.993	.27429	.23244
	55	4926.577	.000	593.385	.000	3376.245	8846.206	27143.333	.24049	.21090
39S	55	4926.577	.000	467.584	.000	3376.245	8752.405	27306.564	.21642	.20043
	56	4926.577	.000	399.780	.000	2854.593	7488.946	27350.907	.21972	.17846
40S	57	4926.577	.000	380.574	.000	1640.493	7007.044	27263.562	.20533	.16540
41S	58	4800.802	.000	367.046	.000	2083.784	7377.411	27375.420	.21619	.17430
	62	4800.802	.000	773.385	.000	1210.252	6793.459	27120.901	.15908	.16125
42S	63	4800.802	.000	715.091	.000	349.152	5874.044	27174.041	.17213	.15927
	74	4805.802	.000	745.013	.000	349.152	5903.517	27153.405	.17341	.16006
43S	46	4809.882	.000	387.750	.000	831.101	6024.152	27457.507	.17665	.16198
	27	4809.802	.000	327.127	.000	2244.889	7381.817	27598.611	.21235	.17050
									.21932	.17365

CURVED MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO T11/(SH+SAM)
7C	22	4800.802	.000	881.303	.000	4108.573	9799.678	27037.561	.28717	.23312
	23	4800.802	.000	844.932	.000	3276.653	8981.307	27075.976	.26319	.21371
8C	24	4800.802	.000	613.620	.000	1316.929	6740.351	27245.091	.19752	.16968
	25	4800.802	.000	932.424	.000	2167.236	7905.441	26094.108	.27166	.18625
9C	27	4800.802	.000	518.302	.000	3557.162	8655.315	27344.070	.26039	.22993
	28	4800.802	.000	424.576	.000	3750.174	8588.515	27422.379	.25340	.21108
10C	31	4926.577	.000	759.701	.000	4789.563	10475.361	27042.689	.30697	.25916
	32	4926.577	.000	931.858	.000	5562.363	11826.798	26095.330	.36649	.29215
11C	34	4926.577	.000	481.352	.000	1837.591	7245.520	27278.068	.21232	.17138
	35	4926.577	.000	60.536	.000	1778.145	6755.254	27639.954	.19525	.19367
12C	36	4926.577	.000	769.564	.000	3610.429	8704.869	27022.195	.25514	.20714
	37	4926.577	.000	1202.770	.000	3957.462	9386.819	26645.046	.27567	.22529
13C	38	4926.577	.000	1194.908	.000	4225.848	10347.473	26671.651	.30392	.24631
	39	4926.577	.000	1787.560	.000	4800.004	10812.142	26387.903	.31694	.26263
14C	42	4926.577	.000	618.668	.000	1246.714	6791.459	27261.562	.15952	.16158
	43	4926.577	.000	616.275	.000	1693.737	7236.598	27163.576	.21206	.17143
15C	44	4926.577	.000	469.250	.000	6352.771	11728.598	27305.547	.34376	.27774
	45	4926.577	.000	467.034	.000	6317.549	11701.951	27244.001	.34241	.27666
16C	49	4926.577	.000	1334.683	.000	16431.765	18693.025	26552.929	.44917	.44173
17C	50	4926.577	.000	1312.631	.000	9382.292	15621.499	26571.674	.45777	.37577
	53	4926.577	.000	448.975	.000	5351.947	11725.349	27307.566	.31430	.25351
18C	56	6926.577	.000	1027.749	.000	6387.733	12377.059	26636.823	.34169	.29457
	57	4926.577	.000	395.980	.000	2158.590	7480.947	27305.997	.21922	.17864
19C	58	4926.577	.000	385.974	.000	1640.493	7007.044	27363.562	.20533	.16540
	59	4926.577	.000	602.986	.000	3423.260	8953.823	27174.871	.26235	.21228
				623.924	.000	3500.657	9051.158	27157.074	.26524	.21470

1 ACPWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO T11/(SH+SAM)
44S	1	5821.672	.000	373.789	.000	16641.350	22838.611	26607.159	.66927	.54809
45S	2	5821.672	.000	588.812	.000	8172.094	14584.578	26424.369	.42733	.35268
	3	5821.672	.000	588.812	.000	8172.094	14584.578	26424.369	.42733	.35208
	3	5821.672	.000	1327.840	.000	883.121	8034.633	25796.215	.23545	.19855

LACRWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

P.2 CLASS 2 STRESSES FOR ANALYSIS SET NUMBER 2

ASSIGNED LOAD COMBINATION IDENTIFIERS
WR = 1 PR = R MC = A P = 1 PMAX = 2

D.2.1 SATISFACTION OF EQUATION 9   (ANALYSIS SET 2)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
15	3	.010	4463.227	1656.063	792.739	.000	6262.078	.000	.32820	.21886
25	4	.000	4463.227	242.021	1258.461	.000	5954.548	.000	.31219	.27713
25	5	.000	4463.227	176.305	1128.190	.000	5759.022	.000	.35184	.20176
35	6	.000	4463.227	151.332	909.920	.000	5524.479	.000	.28958	.19303
35	6	.000	4463.227	151.332	905.920	.000	5520.479	.000	.28956	.19303
45	7	.000	4463.227	174.108	1904.466	.000	6541.800	.000	.34288	.22557
45	7	.000	4463.227	174.108	1904.468	.000	6541.700	.000	.34288	.22447
55	8	.000	4463.227	256.524	927.946	.000	5647.717	.000	.29600	.19733
55	8	.000	4463.227	256.524	927.946	.000	5647.717	.000	.29500	.19733
65	9	.000	4463.227	349.708	118.490	.000	4931.457	.000	.25047	.17172
75	9	.000	4463.227	395.202	1363.769	.000	6203.197	.000	.32512	.21676
75	10	.000	4463.227	542.953	1030.404	.000	6036.734	.000	.31639	.21093
85	9	.000	4463.227	437.028	116.420	.000	5270.675	.000	.27655	.18197
85	10	.000	4463.227	710.318	704.793	.000	5877.837	.000	.30806	.20538
95	16	.000	4463.227	403.689	395.397	.000	5169.223	.000	.27042	.18042
85	18	.000	4463.227	313.343	595.396	.000	5371.877	.000	.29154	.18769
95	18	.000	4463.227	252.152	607.438	.000	5204.617	.000	.27279	.18186
61		.000	4463.227	252.417	905.749	.000	5625.493	.000	.29470	.19447
165	12	.000	4204.387	263.513	721.567	.000	5180.257	.000	.27155	.18108
115	12	.000	4204.387	124.152	404.560	.000	4737.029	.000	.24827	.16551
115	16	.000	4204.387	333.945	798.321	.000	5286.649	.000	.28232	.18371
175	17	.000	4204.387	511.404	737.904	.000	5451.855	.000	.28584	.19056
175	20	.000	4463.227	605.566	617.668	.000	5685.801	.000	.29800	.19867
135	21	.000	4463.227	590.033	587.968	.000	5611.224	.000	.29459	.19868
135	60	.000	4204.387	579.024	1101.067	.000	5486.229	.000	.30850	.20567
145	11	.000	4204.387	242.553	695.047	.000	5141.447	.000	.24647	.17569
145	61	.000	4204.387	468.156	1678.434	.000	6350.958	.000	.33286	.22191
	15	.000	4204.387	464.470	944.666	.000	5613.526	.000	.29421	.19514

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (PA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1C	4	.000	5240.251	435.990	3245.473	.000	7921.718	.000	.44010	.22340
2C	5	.000	5240.251	316.559	2011.682	.000	7568.491	.000	.42247	.29021
2C	11	.000	4204.387	324.035	930.455	.000	5458.877	.000	.29610	.19077
2C	12	.000	4204.387	339.912	961.692	.000	5510.791	.000	.28883	.19255
3C	13	.000	4204.387	148.911	544.233	.000	4917.531	.000	.25773	.17142
3C	14	.000	4204.387	354.474	842.551	.000	5401.413	.000	.28369	.18874
4C	15	.000	4204.387	621.733	1266.619	.000	6096.739	.000	.31922	.21282
4C	16	.000	4204.387	513.978	1065.707	.000	5787.073	.000	.30702	.20525
5C	17	.000	4204.387	844.881	987.927	.000	5877.095	.000	.30702	.20525
5C	18	.000	4204.387	1043.377	1345.768	.000	6593.033	.000	.34555	.23035
6C	19	.000	4463.227	990.563	568.127	.000	6443.917	.000	.33773	.22515
	20	.000	4463.227	847.893	851.514	.000	6175.033	.000	.32364	.21576

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
135	21	.000	5240.251	657.296	643.544	.000	6641.590	.000	.36399	.24234
	22	.000	5240.251	554.192	667.448	.000	6463.931	.000	.35911	.23968
145	23	.000	5265.351	566.793	695.949	.000	6503.372	.000	.36139	.24594
	62	.000	5240.351	743.047	707.722	.000	6661.570	.000	.37175	.24751
175	25	.000	5240.251	535.663	635.768	.000	6735.472	.000	.34766	.24174
	24	.000	5240.251	171.370	562.333	.000	5953.473	.000	.33376	.22368
185	24	.000	5240.251	165.707	531.341	.000	5963.418	.000	.33131	.22037
	64	.000	5240.251	334.174	553.052	.000	6114.714	.000	.35393	.23017
195	26	.000	6477.477	1171.867	2401.361	.000	8446.714	.000	.44407	.33153
	29	.000	5347.477	790.746	1245.743	.000	7354.348	.000	.44007	.33134
205	29	.000	5347.477	743.966	1345.743	.000	7374.958	.000	.41004	.27319
	30	.000	5347.477	651.372	134.512	.000	7249.591	.000	.41004	.27319
215	30	.000	5347.477	447.932	1397.712	.000	7244.021	.000	.40273	.26851
	31	.000	5347.477	446.137	513.437	.000	6664.051	.000	.37217	.24731
225	32	.000	6347.477	315.225	572.740	.000	6637.513	.000	.37111	.24737
	33	.000	6347.477	330.435	277.394	.000	7034.592	.000	.31276	.22549
235	33	.000	6347.477	403.172	364.114	.000	7037.623	.000	.35046	.23468
	34	.000	6347.477	445.143	383.163	.000	6733.323	.000	.37153	.23913
245	35	.000	6347.477	375.712	363.138	.000	6443.102	.000	.34244	.23171
	60	.000	6347.477	445.109	173.518	.000	6613.079	.000	.42314	.20103
255	37	.000	6347.477	350.312	151.137	.000	7712.811	.000	.41111	.21114
	34	.000	6347.477	737.413	135.742	.000	7730.911	.000	.41111	.21114
265	35	.000	6347.477	1350.114	1417.174	.000	7349.716	.000	.41173	.27713
	65	.000	6347.477	1611.763	991.231	.000	7075.641	.000	.40119	.29114

MEMBER NO.	ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
295	40	.000	5367.477	1189.914	961.365	.000	7520.746	.000	.41742	.27855
295	41	.000	5367.477	550.256	791.681	.000	6709.714	.000	.37273	.24869
205	41	.000	5367.477	550.256	780.157	.000	6697.890	.003	.37211	.24827
305	43	.000	5367.477	376.592	761.046	.000	6505.815	.000	.36144	.24096
315	44	.000	5367.477	273.465	1146.174	.000	6587.811	.000	.36599	.24399
315	45	.000	5367.477	281.734	1107.735	.000	6787.816	.000	.37719	.25140
375	46	.000	5367.477	217.907	1139.139	.000	6756.946	.000	.37539	.25024
375	46	.000	5367.477	294.567	1194.671	.000	6781.503	.000	.37675	.25117
335	47	.000	5367.477	361.371	1212.563	.000	6941.227	.000	.38562	.25708
335	47	.000	5367.477	634.277	790.609	.000	6794.163	.000	.37740	.25164
345	48	.000	5367.477	527.022	1959.346	.000	7091.854	.000	.43921	.26041
345	47	.000	5367.477	649.043	3279.915	.000	9526.435	.000	.55314	.35543
305	49	.000	5367.477	794.017	1838.915	.000	785.533	.000	.63426	.28526
305	50	.000	5367.477	794.017	1517.693	.000	7670.107	.000	.42562	.29961
345	51	.000	5367.477	779.225	1817.169	.000	7763.051	.000	.43113	.28255
345	51	.000	5367.477	786.560	1581.176	.000	7735.197	.000	.42993	.28649
375	52	.000	5367.477	2332.794	1229.095	.000	8906.346	.000	.49924	.33283
375	52	.000	5367.477	2332.794	1284.005	.000	8586.366	.000	.49924	.33263
305	53	.000	5367.477	272.619	1600.716	.000	7245.712	.000	.49994	.33293
305	54	.000	5367.477	613.431	1938.141	.000	7911.670	.000	.43256	.26416
305	55	.000	5367.477	593.385	1435.556	.000	7395.917	.000	.39553	.29315
395	55	.000	5367.477	447.564	1405.125	.000	7224.147	.000	.41095	.27549
405	56	.000	5367.477	395.780	951.569	.000	6722.826	.000	.40134	.26754
405	57	.000	5367.477	380.974	1334.581	.000	7083.431	.000	.37349	.24989
415	58	.000	5367.477	347.046	2555.789	.000	8295.012	.000	.39352	.31216
415	62	.000	5240.251	773.385	735.765	.000	6723.401	.000	.46073	.36714
625	63	.000	5240.251	715.091	701.167	.000	6663.528	.000	.37362	.24901
625	63	.000	5240.251	745.013	716.343	.000	6695.647	.000	.37020	.24862
635	74	.000	5240.251	387.250	714.603	.000	6342.496	.000	.37194	.24760
635	64	.000	5240.251	335.999	550.161	.000	6124.411	.000	.35234	.23461
	77	.000	5240.251	327.127	572.720	.000	6139.597	.000	.34169	.22739

CURVED MEMBERS FOR RUN 2

MEMBER NO.	ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
7C	22	.000	5240.251	881.303	1057.475	.000	7179.229	.000	.39885	.26597
7C	23	.000	5240.251	896.932	1134.489	.000	7241.663	.000	.40231	.24421
8C	24	.000	5240.251	617.629	1137.550	.000	6986.871	.000	.53819	.25933
8C	25	.000	5240.251	932.424	1107.372	.000	7270.946	.000	.40444	.26953
9C	27	.000	5240.251	518.352	905.717	.000	6665.350	.000	.37035	.24644
9C	28	.000	5240.251	428.576	871.367	.000	6563.194	.000	.26344	.24431
10C	31	.000	5367.477	759.701	1370.819	.000	7497.498	.000	.41663	.27769
11C	32	.000	5367.477	931.658	1244.545	.000	7564.520	.000	.41913	.27942
11C	34	.000	5367.477	481.352	1089.716	.000	6937.045	.000	.38539	.25643
12C	35	.000	5367.477	60.536	1535.716	.000	6961.629	.000	.25676	.25742
12C	36	.000	5367.477	789.664	2827.182	.000	922.323	.000	.50159	.35423
13C	37	.000	5367.477	1202.780	2660.887	.000	9236.344	.000	.51242	.34184
13C	38	.000	5367.477	1194.998	1741.276	.000	8303.751	.000	.46137	.30755
	39	.000	5367.477	1787.560	1387.367	.000	8842.404	.000	.49124	.32755

MEMBER NO.	ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
14C	42	.000	5367.477	618.668	1251.568	.000	7237.711	.000	.40210	.26806
14C	43	.000	5367.477	616.275	1569.788	.000	7551.639	.000	.41925	.27574
15C	44	.000	5367.477	449.750	1864.532	.000	7708.619	.000	.42742	.29522
15C	45	.000	5367.477	442.834	1919.745	.000	7650.105	.000	.42501	.27324
16C	49	.000	5367.477	1334.683	2691.528	.000	9394.087	.000	.52189	.34793
16C	50	.000	5367.477	1312.631	2485.563	.000	9165.170	.000	.50914	.33945
17C	53	.000	5367.477	446.675	2633.703	.000	8453.055	.000	.44961	.31310
18C	54	.000	5367.477	1007.749	3170.382	.000	9546.108	.000	.53034	.38354
18C	56	.000	5367.477	395.780	958.569	.000	6722.826	.000	.37349	.24903
19C	57	.500	5367.477	380.974	1334.981	.000	7083.431	.000	.39352	.24235
19C	58	.000	5367.477	602.986	4204.617	.000	10174.840	.000	.56527	.37644
	59	.000	5367.477	623.924	4425.741	.000	10420.142	.000	.57893	.38543

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
445	1	.000	5823.672	373.789	1864.806	.000	8062.266	.000	.44780	.31581
455	2	.000	5823.672	773.139	773.139	.000	7165.623	.000	.39020	.26613
455	2	.000	5823.672	598.812	773.139	.000	7165.623	.000	.39920	.26613
	3	.000	5823.672	1327.840	1020.443	.000	8171.954	.000	.45400	.30266

LACPWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

N.P.2 S A T I S F A C T I O N   O F   E Q U A T I O N   10   (ANALYSIS SET 2)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO
15	3	.000	.000	.000	.000	482.776	482.776	.000	.01725	
25	4	.000	.000	.000	.000	5409.042	5989.842	.000	.25868	
	5	.000	.000	.000	.000	7157.255	7157.255	.000	.30647	
35	6	.000	.000	.000	.000	4493.587	4490.587	.000	.19267	
	7	.000	.000	.000	.000	4493.597	4493.597	.000	.19267	
45	7	.000	.000	.000	.000	2038.898	2034.898	.000	.09730	
	8	.000	.000	.000	.000	2034.698	2035.698	.000	.09730	
55	8	.000	.000	.000	.000	1647.426	1647.426	.000	.07054	
	9	.000	.000	.000	.000	1647.426	1647.426	.000	.07054	
45	9	.000	.000	.000	.000	4673.972	4673.972	.000	.20014	
	10	.000	.000	.000	.000	6706.198	6706.198	.000	.28716	
75	9	.000	.000	.000	.000	3951.685	3951.685	.000	.16927	
	19	.000	.000	.000	.000	3565.155	3565.155	.000	.15266	
85	19	.000	.000	.000	.000	3726.953	3726.953	.000	.15959	
	89	.000	.000	.000	.000	3895.172	3895.172	.000	.16679	
95	10	.000	.000	.000	.000	3383.085	3383.085	.000	.14486	
	81	.000	.000	.000	.000	3260.981	3260.981	.000	.13963	
105	12	.000	.000	.000	.000	3493.500	3493.500	.000	.12742	
	11	.000	.000	.000	.000	4512.198	4512.198	.000	.14466	
115	14	.000	.000	.000	.000	3383.207	3383.207	.000	.19321	
	17	.000	.000	.000	.000	3383.207	3383.207	.000	.14487	
125	20	.000	.000	.000	.000	4151.079	4151.079	.000	.17775	
	21	.000	.000	.000	.000	3531.202	3531.202	.000	.15120	
175	40	.000	.000	.000	.000	2030.482	2030.482	.000	.08494	
	11	.000	.000	.000	.000	6262.169	6262.169	.000	.26816	
145	81	.000	.000	.000	.000	4329.773	4329.773	.000	.18540	
	81	.000	.000	.000	.000	5292.220	5292.220	.000	.221.51	
	15	.000	.000	.000	.000	4114.778	4114.778	.000	.176.9	

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO
1C	4	.000	.000	.000	.000	10754.876	10754.876	.000	.56235	
	5	.000	.000	.000	.000	12850.989	12850.989	.000	.67195	
2C	11	.000	.000	.000	.000	5796.238	5796.238	.000	.24819	
	12	.000	.000	.000	.000	4672.708	4672.708	.000	.20008	
3C	13	.000	.000	.000	.000	6040.449	6040.449	.000	.25865	
	14	.000	.000	.000	.000	7729.733	7729.733	.000	.33098	

4C	15	.000	.000	.000	.000	5508.425	5508.425	.000	.23547	
	16	.000	.000	.000	.000	4529.276	4529.076	.000	.19303	
5C	17	.000	.000	.000	.000	5557.021	5557.021	.000	.23705	
	18	.000	.000	.000	.000	7047.786	7047.786	.000	.30178	
6C	19	.000	.000	.000	.000	5218.353	5218.353	.000	.22345	
	25	.000	.000	.000	.000	4944.269	4944.269	.000	.21171	

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO
135	21	.000	.000	.000	.000	2300.809	2300.809	.000	.17030	
	22	.000	.000	.000	.000	2821.910	2821.910	.000	.11810	
145	23	.000	.000	.000	.000	1753.896	1753.896	.000	.09168	
	63	.000	.000	.000	.000	1081.906	1081.808	.000	.05567	
175	24	.000	.000	.000	.000	1529.715	1529.715	.000	.06345	
	74	.000	.000	.000	.000	1379.794	1379.794	.000	.07215	
165	74	.000	.000	.000	.000	1379.794	1379.794	.000	.07215	
	64	.000	.000	.000	.000	1714.271	1714.271	.000	.00964	
185	24	.000	.000	.000	.000	8904.074	8904.074	.000	.46557	
	29	.000	.000	.000	.000	5666.727	5666.727	.000	.25407	
205	29	.000	.000	.000	.000	5666.727	5666.727	.000	.26487	
	50	.000	.000	.000	.000	2506.974	2506.974	.000	.13118	
215	30	.000	.000	.000	.000	2506.974	2506.974	.000	.13104	
	31	.000	.000	.000	.000	2759.644	2759.644	.000	.14325	
225	32	.000	.000	.000	.000	3153.166	3153.166	.000	.16508	
	33	.000	.000	.000	.000	6869.101	6869.101	.000	.35567	
235	34	.000	.000	.000	.000	4339.206	4339.206	.000	.22664	
	33	.000	.000	.000	.000	1588.805	1588.805	.000	.08307	
245	40	.000	.000	.000	.000	5133.609	5133.609	.000	.26762	
	36	.000	.000	.000	.000	2061.704	2061.704	.000	.10741	
255	36	.000	.000	.000	.000	1558.129	1558.129	.000	.08356	
	37	.000	.000	.000	.000	1694.063	1694.063	.000	.08843	
265	38	.000	.000	.000	.000	1594.509	1594.509	.000	.07750	
	39	.000	.000	.000	.000	2497.229	2497.229	.000	.12671	
275	40	.000	.000	.000	.000	2417.931	2417.931	.000	.17917	
	41	.000	.000	.000	.000	3335.819	3335.819	.000	.12913	
285	41	.000	.000	.000	.000	2704.609	2704.609	.000	.11949	
	42	.000	.000	.000	.000	1756.609	1756.609	.000	.09168	
305	43	.000	.000	.000	.000	705.858	705.858	.000	.03681	
	44	.000	.000	.000	.000	802.317	802.317	.000	.04182	
315	45	.000	.000	.000	.000	3744.198	3744.198	.000	.16001	
	46	.000	.000	.000	.000	3731.574	3731.574	.000	.17151	
325	47	.000	.000	.000	.000	785.787	785.787	.000	.04497	
	47	.000	.000	.000	.000	2771.637	2771.637	.000	.14598	
335	48	.000	.000	.000	.000	861.672	861.772	.000	.04487	
	48	.000	.000	.000	.000	751.141	751.141	.000	.04 7	
345	47	.000	.000	.000	.000	1653.162	1653.162	.000	.7.764	
	48	.000	.000	.000	.000	1922.637	1922.637	.000	.0970	
					.000	6166.675	6166.675	.000	.3.240	

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO
32S	50	.000	.000	.000	.000	5556.539	5556.539	.000	.29649	
	51	.000	.000	.000	.000	5065.872	5065.872	.000	.26593	
34S	51	.000	.000	.000	.000	5065.872	5065.872	.000	.26593	
	52	.000	.000	.000	.000	2209.804	2209.804	.000	.11555	
37S	52	.000	.000	.000	.000	2209.804	2209.804	.000	.11555	
	53	.000	.000	.000	.000	3156.660	3156.660	.000	.16569	
38S	54	.000	.000	.000	.000	3707.165	3707.165	.000	.19402	
	55	.000	.000	.000	.000	3292.665	3292.665	.000	.17217	
39S	55	.000	.000	.000	.000	3292.665	3292.665	.000	.17217	
	56	.000	.000	.000	.000	2110.435	2110.435	.000	.11035	
40S	57	.000	.000	.000	.000	1649.308	1649.308	.000	.08624	
	58	.000	.000	.000	.000	1990.334	1990.334	.000	.10407	
41S	62	.000	.000	.000	.000	1081.808	1081.808	.000	.05657	
	63	.000	.000	.000	.000	478.804	478.804	.000	.02504	
42S	63	.000	.000	.000	.000	478.804	478.804	.000	.02504	
	26	.000	.000	.000	.000	722.156	722.156	.000	.03774	
43S	64	.000	.000	.000	.000	1714.271	1714.271	.000	.08964	
	27	.000	.000	.000	.000	1872.381	1872.381	.000	.09790	

CURVED MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO
7C	22	.000	.000	.000	.000	3520.750	3520.750	.000	.18469	
	23	.000	.000	.000	.000	2777.476	2777.476	.000	.14525	
8C	24	.000	.000	.000	.000	1144.300	1144.300	.000	.05943	
	25	.000	.000	.000	.000	1619.763	1619.763	.000	.08449	
9C	27	.000	.000	.000	.000	2966.001	2966.001	.000	.15513	
	28	.000	.000	.000	.000	3234.715	3234.715	.000	.16940	
10C	31	.000	.000	.000	.000	4500.705	4500.705	.000	.23533	
	32	.000	.000	.000	.000	5185.613	5185.613	.000	.27120	
11C	34	.000	.000	.000	.000	1588.405	1588.405	.000	.08307	
	35	.000	.000	.000	.000	1598.129	1598.129	.000	.08356	
12C	36	.000	.000	.000	.000	2784.562	2784.562	.000	.14560	
	37	.000	.000	.000	.000	3063.165	3063.165	.000	.16017	
13C	38	.000	.000	.000	.000	3987.461	3987.461	.000	.20849	
	39	.000	.000	.000	.000	3963.933	3963.933	.000	.20727	
14C	42	.000	.000	.000	.000	1159.654	1159.654	.000	.06064	
	43	.000	.000	.000	.000	1514.342	1514.342	.000	.07918	
15C	44	.000	.000	.000	.000	6154.262	6154.262	.000	.32179	
	45	.000	.000	.000	.000	6133.146	6133.146	.000	.32069	
16C	49	.000	.000	.000	.000	10133.671	10133.671	.000	.52971	
	50	.000	.000	.000	.000	9126.676	9126.676	.000	.47721	
17C	53	.000	.000	.000	.000	5185.743	5185.743	.000	.27115	
	54	.000	.000	.000	.000	6221.560	6221.570	.000	.32531	
18C	56	.000	.000	.000	.000	2110.435	2110.435	.000	.11035	
	57	.000	.000	.000	.000	1649.308	1649.308	.000	.08624	
19C	58	.000	.000	.000	.000	3269.734	3269.734	.000	.17097	
	59	.000	.000	.000	.000	3387.133	3387.133	.000	.17710	

LACRWP MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T10)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T10/(1.0*SA)	MODIFIED STRESS RATIO
44S	1	.000	.000	.000	.000	17327.623	17327.623	.000	.90602	
	2	.000	.000	.000	.000	8088.426	8088.426	.000	.42292	
45S	2	.000	.000	.000	.000	8088.426	8088.426	.000	.42292	
	3	.000	.000	.000	.000	533.375	533.375	.000	.02784	

LACRWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

D.2.3 S A T I S F A C T I O N O F E Q U A T I O N 11 (ANALYSIS SET 2)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO
15	3	4096.604	.000	1006.563	.000	402.786	5505.453	.000	.14025	
15	4	4096.604	.000	242.921	.000	5989.852	10329.247	.000	.24314	
15	5	4096.604	.000	174.305	.000	7157.255	11436.164	.000	.29119	
35	6	4096.604	.000	151.332	.000	4499.587	8747.523	.000	.22295	
35	7	4096.604	.000	151.332	.000	4499.587	8747.523	.000	.22292	
45	7	4096.604	.000	174.108	.000	2039.898	6309.611	.000	.16074	
45	8	4096.604	.000	174.108	.000	2039.898	6309.611	.000	.16074	
55	8	4096.604	.000	255.524	.000	1647.426	6000.554	.000	.15287	
55	9	4096.604	.000	255.524	.000	1647.426	6000.554	.000	.15287	
65	9	4096.604	.000	340.750	.000	4673.972	9120.357	.000	.23234	
65	10	4096.604	.000	394.202	.000	6706.198	11199.804	.000	.28530	
75	9	4096.604	.000	542.903	.000	3953.085	8592.543	.000	.21890	
75	10	4096.604	.000	697.028	.000	3565.155	8355.798	.000	.21294	
85	10	4096.604	.000	710.318	.000	3726.953	8531.876	.000	.21743	
85	60	4096.604	.000	313.305	.000	3383.085	7793.994	.000	.21388	
95	10	4096.604	.000	252.152	.000	3260.981	7609.738	.000	.19853	
95	61	4096.604	.000	252.917	.000	2859.078	7208.600	.000	.18364	
105	12	3859.027	.000	293.913	.000	3490.500	7603.440	.000	.19370	
105	13	3859.027	.000	126.192	.000	4512.198	8497.327	.000	.21647	
115	16	3859.027	.000	383.940	.000	3383.207	7626.174	.000	.19428	
115	17	3859.027	.000	511.604	.000	4151.079	8521.710	.000	.21759	
125	20	4096.604	.000	605.566	.000	3531.702	8233.372	.000	.20975	
125	21	4096.604	.000	543.833	.000	2033.682	6707.120	.000	.17067	
135	60	3859.027	.000	579.934	.000	6262.169	10701.130	.000	.27261	
135	11	3859.027	.000	242.053	.000	4329.773	8430.853	.000	.21478	
145	61	3859.027	.000	468.156	.000	5292.220	9619.403	.000	.24505	
145	15	3859.027	.000	464.470	.000	4114.778	8438.275	.000	.21497	

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO
1C	4	4809.802	.000	435.990	.000	10754.876	16000.657	.000	.46548	
1C	5	4809.802	.000	316.559	.000	12850.989	17977.349	.000	.52L	
2C	11	3859.027	.000	324.035	.000	5796.238	9979.299	.000	.25423	
2C	12	3859.027	.000	339.912	.000	4672.708	8871.647	.000	.22601	
3C	13	3859.027	.000	168.811	.000	6040.449	10068.287	.000	.25649	
3C	14	3859.027	.000	354.474	.000	7729.733	11943.234	.000	.30426	

4C	15	3859.027	.000	821.783	.000	5508.425	9989.235	.000	.25443	
4C	16	3859.027	.000	513.978	.000	4529.076	8903.081	.000	.27674	
5C	17	3859.027	.000	684.881	.000	5557.021	10100.929	.000	.25732	
5C	18	3859.027	.000	1043.377	.000	7047.786	11950.190	.000	.30443	
6C	19	4096.604	.000	994.563	.000	5218.353	10309.521	.000	.26264	
6C	20	4096.604	.000	847.893	.000	4944.269	9888.766	.000	.25192	

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO
155	21	4809.802	.000	657.256	.000	2100.809	7767.866	.000	.22763	
155	22	4809.802	.000	556.182	.000	2221.910	7587.893	.000	.22235	
165	23	4809.802	.000	564.783	.000	1753.095	7127.674	.000	.20887	
165	62	4809.802	.000	744.847	.000	1081.908	6635.657	.000	.19445	
175	25	4809.802	.000	583.443	.000	1022.216	6420.461	.000	.18815	
175	26	4809.802	.000	173.020	.000	1379.794	6322.615	.000	.16640	
185	26	4809.802	.000	193.207	.000	1379.794	6374.803	.000	.18661	
185	64	4809.802	.000	325.374	.000	1714.271	6850.446	.000	.20075	
195	27	4934.577	.000	1177.497	.000	8954.024	15009.498	.000	.43981	
195	29	4934.577	.000	783.248	.000	5065.727	10772.550	.000	.31564	
205	29	4934.577	.000	783.248	.000	5065.727	10772.550	.000	.31564	
205	30	4934.577	.000	493.532	.000	2506.924	7927.033	.000	.23239	
215	30	4934.577	.000	493.532	.000	2506.924	7927.033	.000	.23239	
215	31	4934.577	.000	452.337	.000	2733.665	8124.397	.000	.23419	
225	32	4934.577	.000	567.235	.000	3157.166	8656.078	.000	.25351	
225	33	4934.577	.000	1126.225	.000	6992.161	12856.563	.000	.37670	
235	33	4934.577	.000	1357.415	.000	4435.286	10617.158	.000	.31114	
235	34	4934.577	.000	491.952	.000	1508.805	6991.734	.000	.20203	
245	35	4934.577	.000	429.531	.000	5133.689	12404.597	.000	.30734	
245	60	4934.577	.000	373.792	.000	2081.796	7368.165	.000	.21592	
265	35	4934.577	.000	60.538	.000	1934.129	6585.242	.000	.19297	
265	36	4934.577	.000	605.525	.000	1650.803	7090.905	.000	.20777	
275	37	4934.577	.000	737.158	.000	1854.582	7527.319	.000	.22064	
275	38	4934.577	.000	727.413	.000	2427.275	8091.214	.000	.23571	
275	39	4934.577	.000	1045.114	.000	2412.933	8427.674	.000	.24696	
285	40	4934.577	.000	1211.753	.000	2335.810	8457.140	.000	.24783	
285	41	4934.577	.000	1193.514	.000	2284.495	8405.905	.000	.24618	
285	41	4934.577	.000	540.255	.000	1755.609	7233.532	.000	.21197	
295	41	4934.577	.000	555.254	.000	1756.054	7235.953	.000	.21197	
295	42	4934.577	.000	371.542	.000	760.058	6733.052	.000	.17709	
315	43	4934.577	.000	376.625	.000	802.543	6045.695	.000	.17233	
315	44	4934.577	.000	273.665	.000	3745.198	7944.230	.000	.24.14	
315	45	4934.577	.000	251.734	.000	3733.336	8941.045	.000	.24223	
355	46	4934.577	.000	717.587	.000	2854.637	7939.002	.000	.25443	
355	46	4934.577	.000	244.567	.000	2056.627	8031.732	.000	.23443	
355	47	4934.577	.000	351.371	.000	5333.726	10731.671	.000	.22913	
385	47	4934.577	.000	434.577	.000	7261.751	12130.197	.000	.31744	
385	48	4934.577	.000	525.032	.000	6713.164	12103.263	.000	.31474	
395	47	4934.577	.000	549.683	.000	10284.003	14101.637	.000	.41190	
395	48	4934.577	.000	812.441	.000	6166.805	11991.702	.000	.34569	

		INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HR)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO
365	50	4926.577	.000	709.017	.000	5555.539	11291.113	.000	.33054	
	51	4926.577	.000	774.225	.000	5085.872	10791.674	.000	.31674	
365	81	4926.577	.000	745.540	.000	5005.872	10791.919	.000	.31645	
	52	4926.577	.000	2332.394	.000	2209.504	9449.175	.000	.29744	
375	52	4926.577	.000	2332.394	.000	2209.504	9449.175	.000	.29743	
	53	4926.577	.000	277.019	.000	3155.668	835.276	.000	.26494	
365	54	4926.577	.000	613.431	.000	3707.169	9327.173	.000	.27332	
	55	4926.577	.000	591.395	.000	3292.665	8812.676	.000	.29425	
395	55	4926.577	.000	447.564	.000	3292.665	8662.875	.000	.25397	
	56	4926.577	.000	395.790	.000	2110.435	7432.792	.000	.21761	
405	57	4926.577	.000	380.974	.000	1649.308	6956.869	.000	.20338	
	58	4926.577	.000	367.646	.000	1990.374	7203.957	.000	.21345	
415	62	4809.802	.000	773.395	.000	1041.408	6664.994	.000	.19531	
	63	4809.802	.000	715.691	.000	478.584	6001.777	.000	.17593	
425	63	4809.802	.000	745.813	.000	478.584	6033.659	.000	.17661	
	24	4809.802	.000	387.250	.000	722.158	5919.294	.000	.17346	
415	44	4809.802	.000	335.599	.000	1714.271	6860.072	.000	.20103	
	27	4809.802	.000	327.127	.000	1872.381	7009.309	.000	.20540	

CURVED MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HR)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO
7C	22	4809.802	.000	881.303	.000	3520.750	9211.855	.000	.26994	
	23	4809.802	.000	894.932	.000	2777.876	8482.610	.000	.24857	
8C	24	4809.802	.000	613.426	.000	1144.300	6557.727	.000	.19248	
	25	4809.802	.000	932.424	.000	1419.763	7361.989	.000	.21574	
9C	27	4809.802	.000	518.352	.000	2966.901	8295.054	.000	.24308	
	28	4809.802	.000	476.574	.000	3239.715	8473.092	.000	.24844	
10C	31	4926.577	.000	759.761	.000	4500.705	10186.443	.000	.29850	
	32	4926.577	.000	931.858	.000	5155.613	11045.048	.000	.32366	
11C	34	4926.577	.000	481.352	.000	1538.805	6996.734	.000	.20553	
	35	4926.577	.000	65.535	.000	1599.129	6585.242	.000	.19297	
12C	36	4926.577	.000	369.664	.000	2786.562	8484.802	.000	.24852	
	37	4926.577	.000	1202.790	.000	3063.165	9192.522	.000	.26934	
13C	38	4926.577	.000	1174.998	.000	3587.461	10109.036	.000	.29624	
	39	4926.577	.000	1787.560	.000	3963.983	10678.129	.000	.31291	
14C	42	4926.577	.000	418.668	.000	1159.654	6704.899	.000	.15648	
	43	4926.577	.000	618.275	.000	1514.342	7057.193	.000	.20660	
15C	44	4926.577	.000	449.250	.000	6154.263	11536.090	.000	.33788	
	45	4926.577	.000	462.634	.000	6133.146	11523.557	.000	.33768	
16C	48	4926.577	.000	1334.643	.000	10130.671	16391.931	.000	.48035	
	50	4926.577	.000	1312.631	.000	9126.676	15365.404	.000	.45028	
17C	53	4926.577	.000	446.875	.000	5186.783	10559.235	.000	.30943	
	54	4926.577	.000	1087.749	.000	6221.590	12156.956	.000	.35622	
18C	56	4926.577	.000	395.760	.000	2110.435	7432.792	.000	.21781	
	57	4926.577	.000	380.974	.000	1649.308	6956.859	.000	.20366	
19C	58	4926.577	.000	622.598	.000	3269.734	8799.297	.000	.25785	
	59	4926.577	.000	623.924	.000	3387.133	8937.634	.000	.26191	

LACRWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HR)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T11)	MODIFIED ALLOWABLE STRESS (SAM)	DESIGN STRESS RATIO T11/(SH+SA)	MODIFIED STRESS RATIO
445	1	5823.672	.000	373.789	.000	17327.623	23525.084	.000	.68935	
	2	5823.672	.000	585.812	.000	8083.426	14500.910	.000	.42494	
455	2	5823.672	.000	585.812	.000	8088.426	14500.910	.000	.42494	
	3	5823.672	.000	1327.840	.000	533.375	7684.887	.000	.22520	

LACRVR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

D.3 C L A S S   2   S T R E S S E S   F O R   A N A L Y S I S   S E T   N U M B E R   3

ASSIGNED LOAD COMBINATION IDENTIFIERS
HA = 1 HB = 9 HC = 0 P = 0 PMAX = 2

D.3.1 S A T I S F A C T I O N   O F   E Q U A T I O N   9   (ANALYSIS SET 3)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAH)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1S	3	.000	4463.227	1006.063	1527.092	.000	6996.341	.000	.36669	.24444
	4	.000	4463.227	742.621	1554.142	.000	6262.109	.000	.32971	.21889
2S	5	.000	4463.227	176.305	1611.455	.000	6250.997	.000	.32742	.21841
	6	.000	4463.227	151.332	673.950	.000	5287.509	.000	.27718	.18478
3S	6	.000	4463.227	151.332	673.950	.000	5288.509	.000	.27718	.18478
	7	.000	4463.227	174.108	1761.886	.000	6419.230	.000	.33644	.22429
4S	7	.000	4463.227	174.108	1761.296	.000	6419.230	.000	.33644	.22429
	8	.000	4463.227	256.524	1686.318	.000	6406.069	.000	.33575	.22393
5S	8	.000	4463.227	256.524	1706.778	.000	6429.528	.000	.33551	.22434
	9	.000	4463.227	349.780	2103.779	.000	7004.785	.000	.36723	.24482
6S	9	.000	4463.227	396.202	1743.372	.000	6652.800	.000	.34868	.23248
	10	.000	4463.227	542.903	1933.691	.000	6934.821	.000	.36367	.24245
7S	9	.000	4463.227	697.028	1491.652	.000	6651.907	.000	.34963	.23242
	10	.000	4463.227	710.318	1427.907	.000	6601.452	.000	.34569	.23044
8S	10	.000	4463.227	400.609	969.925	.000	5833.741	.000	.30575	.20384
	60	.000	4463.227	313.305	822.145	.000	5594.677	.000	.29343	.19547
9S	10	.000	4463.227	252.152	1134.716	.000	5850.095	.000	.30662	.20455
	61	.000	4463.227	252.917	949.754	.000	5665.898	.000	.29695	.19797
10S	12	.000	4204.387	253.913	738.892	.000	5197.192	.000	.27239	.18159
	13	.000	4204.387	126.102	1080.029	.000	5420.418	.000	.28409	.18939
11S	14	.000	4204.387	383.940	864.052	.000	5452.439	.000	.28577	.19051
	17	.000	4204.387	511.604	1146.307	.000	5862.298	.000	.30714	.20476
12S	20	.000	4463.227	605.566	1389.491	.000	6454.273	.000	.33843	.22556
	21	.000	4463.227	580.033	1218.459	.000	6261.719	.000	.32818	.21879
13S	60	.000	4204.387	579.934	1521.811	.000	6306.133	.000	.33051	.22034
	11	.000	4204.387	242.053	900.973	.000	5347.413	.000	.28026	.18684
14S	61	.000	4204.387	468.156	1758.017	.000	6430.560	.000	.33703	.22469
	15	.000	4204.387	464.470	994.612	.000	5663.470	.000	.29683	.19789

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAH)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1C	4	.000	5240.251	435.990	2794.382	.000	8470.322	.000	.47057	.31372
	5	.000	5240.251	316.559	2493.360	.000	8450.209	.000	.44946	.31237
2C	11	.000	4204.387	326.035	1206.125	.000	5734.548	.000	.30055	.20037
	12	.000	4204.387	339.912	985.150	.000	5533.449	.000	.29001	.19334
3C	13	.000	4204.387	164.811	1459.081	.000	5832.279	.000	.30568	.21374
	14	.000	4204.387	356.474	2066.687	.000	6627.548	.000	.34738	.23157
4C	15	.000	4204.387	671.783	1331.481	.000	6157.651	.000	.32273	.21515
	16	.000	4204.387	513.978	1156.740	.000	5875.106	.000	.30792	.20528
5C	17	.000	4204.387	684.881	1531.776	.000	6421.144	.000	.33654	.23434
	18	.000	4204.387	1043.377	2251.530	.000	7499.294	.000	.39304	.26203
6C	19	.000	4463.227	994.563	2054.991	.000	7512.771	.000	.39375	.26250
	20	.000	4463.227	847.893	1945.503	.000	7256.623	.000	.38033	.25355

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (HA)	OCCASIONAL LOAD STRESS (HB)	THERMAL EXPANSION STRESS (HC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAH)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
15S	21	.000	5240.251	487.256	1388.697	.000	7274.183	.000	.40434	.26046
	22	.000	5240.251	654.182	1425.478	.000	7231.911	.000	.40122	.26782
16S	23	.000	5240.251	564.753	1452.015	.000	7257.948	.000	.40322	.26943
	62	.000	5240.251	744.047	1356.691	.000	7340.719	.000	.40938	.27217
17S	25	.000	5240.251	642.443	1294.055	.000	7120.649	.000	.39507	.26331
	26	.000	5240.251	171.020	930.591	.000	6391.462	.000	.36286	.23935
18S	26	.000	5240.251	190.387	920.519	.000	6351.375	.000	.35385	.23574
	64	.000	5240.251	328.374	892.429	.000	6468.454	.000	.35619	.23544
19S	28	.000	5367.477	1177.897	3865.790	.000	10411.714	.000	.57804	.38469
	29	.000	5367.477	720.268	2001.247	.000	8771.593	.000	.48742	.32466
20S	29	.000	5367.477	720.268	2047.037	.000	8771.859	.000	.48762	.32408
	30	.000	5367.477	491.932	2306.299	.000	8227.308	.000	.45737	.31479
21S	30	.000	5367.477	493.522	2357.069	.000	8207.314	.000	.45707	.31479
	31	.000	5367.477	497.137	1974.695	.000	7744.191	.000	.43704	.29403
22S	32	.000	5367.477	617.135	2071.319	.000	7866.501	.000	.43736	.29491
	33	.000	5367.477	1196.239	939.067	.000	7620.740	.000	.45511	.30174
23S	33	.000	5367.477	1377.615	924.305	.000	11667.808	.000	.50956	.33926
	34	.000	5367.477	461.157	1340.139	.000	7170.644	.000	.50541	.26576
24S	35	.000	5367.477	425.311	1375.177	.000	7170.215	.000	.50902	.35174
	65	.000	5367.477	309.272	1345.164	.000	9144.413	.000	.50222	.35474
25S	35	.000	5367.477	322.525	1751.373	.000	737.711	.000	.50746	.24417
	36	.000	5367.477	419.505	2049.314	.000	7433.334	.000	.44442	.31778
26S	37	.000	5367.477	335.159	2065.397	.000	8133.334	.000	.44437	.31778
	38	.000	5367.477	287.433	1374.713	.000	7739.162	.000	.45337	.33726
27S	39	.000	5367.477	1844.114	1861.335	.000	8077.912	.000	.45474	.37668
	65	.000	5367.477	1711.353	104.577	.000	8427.054	.000	.44023	.31618

2°5	45	.000	5367.477	1189.914	1787.043	.000	8344.473	.000	.46358	.31965
2°5	41	.000	5367.477	550.356	1437.556	.000	7356.670	.000	.46437	.27225
	42	.000	5367.477	974.592	1094.443	.000	7347.736	.000	.40793	.27193
305	42	.000	5367.477	354.626	118.956	.000	6834.951	.000	.37972	.25315
	44	.000	5367.477	273.465	1411.505	.000	7052.537	.002	.38389	.25791
315	45	.000	5367.477	231.724	1335.544	.000	6967.754	.000	.34141	.25171
	44	.000	5367.477	217.907	1477.606	.000	7062.476	.000	.38021	.25591
325	46	.000	5367.477	394.547	1472.382	.000	7134.407	.000	.39236	.24157
	47	.000	5367.477	383.371	1057.554	.000	7588.491	.000	.47154	.24424
335	47	.000	5367.477	634.277	3722.855	.000	9724.549	.000	.54029	.27105
	48	.000	5367.477	527.022	3156.966	.000	9056.455	.000	.50280	.31517
345	47	.000	5367.477	949.643	4570.869	.000	10097.329	.000	.60448	.35524
	48	.000	5367.477	817.441	2317.848	.000	8402.778	.000	.47182	.47324
355	56	.000	5367.477	795.517	721.491	.000	8154.975	.000	.44583	.31495
	51	.000	5367.477	779.225	931.272	.000	8461.074	.000	.47029	.32055
365	51	.000	5367.477	788.540	2265.860	.000	8423.677	.000	.46795	.31397
	42	.000	5367.477	2339.794	1774.046	.000	9474.317	.000	.52846	.31199
375	52	.000	5367.477	2339.794	1776.747	.000	9476.318	.000	.57646	.37097
	53	.000	5367.477	272.019	2543.431	.000	8102.927	.000	.45461	.31397
375	54	.000	5367.477	613.431	3947.443	.000	9074.571	.000	.50159	.31307
	55	.000	5367.477	593.305	2403.035	.000	8363.736	.000	.46466	.33439
395	55	.000	5367.477	467.584	2377.739	.000	8197.299	.000	.45445	.31977
	56	.000	5367.477	395.780	1445.575	.000	7208.892	.000	.40069	.31321
405	57	.000	5367.477	350.974	1665.512	.000	7397.243	.000	.41096	.26599
	58	.000	5367.477	357.046	3225.487	.000	8941.018	.000	.49672	.27357
415	62	.000	5240.251	773.345	1345.364	.000	7357.070	.000	.46872	.33115
	43	.000	5240.251	715.091	1234.903	.000	7199.325	.000	.39957	.27244
425	43	.000	5240.251	745.013	1214.564	.000	7203.850	.000	.40021	.34634
	24	.000	5240.251	347.750	1212.129	.000	6839.679	.000	.37996	.24581
435	26	.000	5240.251	335.099	897.313	.000	6464.563	.000	.35936	.25332
	27	.000	5240.251	327.127	914.547	.000	6485.925	.000	.36033	.24022

CURVED MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
7C	27	.000	5240.251	881.303	2258.756	.000	8355.316	.000	.46557	.31034
	23	.000	5240.251	894.932	2302.931	.000	8437.414	.000	.46476	.31253
8C	24	.000	5240.251	615.429	1929.602	.000	7774.563	.000	.43192	.29795
	25	.000	5240.251	912.424	2095.103	.000	8227.278	.000	.45710	.31473
9C	27	.000	5240.251	515.352	1456.494	.000	7214.096	.000	.40007	.34713
	24	.000	5240.251	479.576	1407.508	.000	7074.334	.000	.39313	.27719
10C	31	.000	5367.477	759.201	3435.454	.000	9562.132	.000	.53123	.32209
	32	.000	5367.477	931.058	3412.179	.000	9711.714	.000	.53954	.39415
11C	34	.000	5367.477	481.952	1345.614	.000	7189.443	.000	.39941	.35649
	35	.000	5367.477	68.536	1731.658	.000	7159.701	.000	.39776	.26679
12C	36	.000	5367.477	769.664	3447.556	.000	9580.736	.000	.53226	.26517
	37	.000	5367.477	1202.760	3397.725	.000	9967.942	.000	.55374	.36484
13C	38	.000	5367.477	1194.998	2724.061	.000	9289.476	.000	.51683	.34412
	39	.000	5367.477	1787.560	2985.535	.000	10140.572	.000	.56337	.34467

14C	42	.000	5367.477	618.668	1702.133	.000	7778.278	.000	.43213	.28803
	43	.000	5367.477	616.275	3095.459	.000	8077.450	.000	.44868	.29905
15C	44	.000	5367.477	640.250	2313.336	.000	8136.053	.000	.45200	.30134
	45	.000	5367.477	467.934	2198.749	.000	8029.370	.000	.44607	.30757
16C	49	.000	5367.477	1334.683	3744.550	.000	10501.710	.000	.58343	.34895
	56	.000	5367.477	1317.631	3577.110	.000	10257.216	.000	.56945	.37591
17C	51	.000	5367.477	644.475	4174.953	.000	9902.705	.000	.55515	.37015
	54	.000	5367.477	1007.749	4987.203	.000	11302.539	.000	.63175	.42695
18C	54	.000	5367.477	595.780	3374.786	.000	7134.542	.000	.39656	.26427
	57	.000	5367.477	380.574	1664.812	.000	7397.243	.000	.41096	.27307
19C	58	.000	5367.477	602.986	5262.680	.000	11232.943	.000	.62405	.41603
	59	.000	5367.477	623.924	5591.730	.000	11582.631	.000	.64348	.42899

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
44C	1	.000	5823.672	373.789	4667.179	.000	12264.460	.000	.68137	.45435
	2	.000	5823.672	644.812	1334.180	.000	9748.664	.000	.54159	.35154
44C	2	.000	5823.672	644.812	3334.180	.000	9748.664	.000	.54159	.35154
	3	.000	5823.672	1327.940	1667.794	.000	8819.306	.000	.48996	.32064

LACPWR MAIN STEAM LINE PIPING CLASS 2 ANALYSIS

D.4 C L A S S 2 S T R E S S E S F O R A N A L Y S I S S E T N U M B E R 4

ASSIGNED LOAD COMBINATION IDENTIFIERS
MA = 1 MB =10 MC = 0 P = 0 PMAX = 2

D.4.1 S A T I S F A C T I O N O F E Q U A T I O N 9 (ANALYSIS SET 4)

STRAIGHT MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1S	3	.000	4463.227	1008.863	1494.131	.000	6985.478	.000	.36496	.24331
2S	4	.000	4463.227	242.821	2533.872	.000	7239.919	.000	.37945	.25297
3S	6	.000	4463.227	174.305	3446.767	.000	7124.208	.000	.37349	.24916
4S	6	.000	4463.227	151.332	1594.456	.000	6210.215	.000	.32544	.21690
5S	7	.000	4463.227	174.108	1827.703	.000	6464.727	.000	.33882	.22548
6S	7	.000	4463.227	174.108	1827.193	.000	6464.727	.000	.33882	.22588
7S	8	.000	4463.227	256.524	1729.732	.000	6468.603	.000	.33707	.22571
8S	9	.000	4463.227	349.780	3107.873	.000	7970.040	.000	.41510	.27673
9S	10	.000	4463.227	396.202	2783.427	.000	7642.856	.000	.40057	.26704
10S	9	.000	4463.227	547.903	3090.091	.000	7096.271	.000	.37192	.24795
11S	19	.000	4463.227	710.318	1457.119	.000	6625.654	.000	.35345	.21563
12S	19	.000	4463.227	480.109	1147.563	.000	6511.341	.000	.34726	.23158
13S	40	.000	4463.227	313.305	981.763	.000	5758.275	.000	.30193	.21064
14S	19	.000	4463.227	252.152	1957.424	.000	6673.302	.000	.30193	.20120
15S	41	.000	4463.227	252.917	1691.647	.000	6407.192	.000	.34979	.23317
16S	12	.000	4204.387	253.913	1246.249	.000	5782.596	.000	.33581	.22387
17S	11	.000	4204.387	126.102	800.724	.000	5130.817	.000	.26848	.19995
18S	14	.000	4204.387	383.949	1544.346	.000	6154.674	.000	.28691	.17927
19S	17	.000	4204.387	511.604	1454.146	.000	6170.137	.000	.32226	.21512
20S	26	.000	4463.227	635.566	1368.547	.000	6423.340	.000	.32338	.21594
21S	21	.000	4463.227	584.033	1214.731	.000	6257.991	.000	.33657	.22445
22S	40	.000	4204.387	579.934	1817.736	.000	6501.551	.000	.32799	.21864
23S	11	.000	4204.387	242.053	1294.432	.000	6501.551	.000	.34599	.23064
24S	61	.000	4204.387	468.156	3130.168	.000	5741.272	.000	.30091	.20060
25S	15	.000	4204.387	464.470	1903.958	.000	7892.712	.000	.46895	.27263
		.000	4204.387			.000	6572.813	.000	.34449	.22966

CURVED MEMBERS FOR RUN 1

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1C	4	.000	5248.251	435.990	4545.515	.000	10225.456	.000	.54810	.37874
2C	5	.000	5248.251	316.559	4476.424	.000	10527.233	.000	.55707	.37138
3C	11	.000	4204.387	324.039	1731.362	.000	6251.804	.000	.32919	.21873
	12	.000	4204.387	330.912	1665.722	.000	6210.021	.000	.32547	.21693
4C	13	.000	4204.387	169.411	1071.344	.000	5444.592	.000	.28535	.19024
	14	.000	4204.387	354.474	1277.008	.000	5934.470	.000	.30580	.20347
5C	15	.000	4204.387	621.783	2544.813	.000	7374.983	.000	.30653	.25749
	16	.000	4204.387	513.918	2090.535	.000	6817.900	.000	.35733	.23972
6C	17	.000	4204.387	684.881	1944.455	.000	6835.974	.000	.35824	.23885
	18	.000	4204.387	1043.377	2660.674	.000	7912.342	.000	.41459	.27664
7C	19	.000	4463.227	994.563	2076.945	.000	7533.375	.000	.39483	.24222
	20	.000	4463.227	847.892	1904.992	.000	7216.112	.000	.37820	.25214

STRAIGHT MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
1FS	21	.000	5248.251	657.256	1376.453	.000	7271.959	.000	.40411	.26543
16S	23	.000	5248.251	566.172	1527.159	.000	7222.592	.000	.40126	.26756
	43	.000	5248.251	566.281	1663.632	.000	7249.606	.000	.40381	.21693
17S	25	.000	5248.251	598.443	1774.229	.000	7223.923	.000	.40097	.23504
	26	.000	5248.251	173.770	957.809	.000	6371.245	.000	.40133	.26754
18S	26	.000	5248.251	182.037	847.781	.000	6371.193	.000	.35394	.23567
	65	.000	5248.251	308.374	817.369	.000	6371.193	.000	.35486	.23606
19S	28	.000	5367.477	1127.807	568.297	.000	10055.771	.000	.54707	.39151
	29	.000	5367.477	746.748	919.477	.000	8734.700	.000	.44331	.30047
20S	29	.000	5367.477	781.556	2156.577	.000	8334.355	.000	.44351	.30047
21S	31	.000	5367.477	453.537	2477.167	.000	8346.173	.000	.44374	.30910
	31	.000	5367.477	995.722	2507.167	.000	8346.173	.000	.44374	.30910
22S	33	.000	5367.477	466.477	912.209	.000	7911.003	.000	.44368	.25924
	33	.000	5367.477	1157.700	2747.804	.000	7911.003	.000	.41518	.20125
23S	33	.000	5367.477	1577.571	2954.751	.000	6671.773	.000	.50847	.33638
	36	.000	5367.477	421.730	1973.189	.000	9344.008	.000	.51150	.32633
24S	37	.000	5367.477	491.977	3100.609	.000	9345.273	.000	.50500	.29333
25S	36	.000	5367.407	443.725	3081.769	.000	8391.208	.000	.45800	.29191
	36	.000	5367.477	701.714	3917.573	.000	7917.173	.000	.48404	.29135
26S	39	.000	5367.477	377.013	3414.000	.000	7911.573	.000	.46862	.30262
	40	.000	5367.477	1554.214	1581.000	.000	8345.135	.000	.44227	.30151
		.000	5367.477	1411.202	1941.124	.000	6270.303	.000	.40604	.31152

22S	40	.000	5367.477	1180.914	1865.149	.000	8207.540	.000	.45570	.36349
	41	.000	5367.477	550.256	1310.340	.000	7228.714	.000	.40140	.26773
24S	41	.000	5367.477	550.256	1303.483	.000	7221.226	.000	.40115	.26764
	42	.000	5367.477	376.592	977.916	.000	6722.865	.000	.37345	.25637
36S	43	.000	5367.477	356.626	1066.359	.000	6751.061	.000	.37724	.25192
	44	.000	5367.477	373.465	1305.772	.000	6904.714	.000	.38593	.25733
31S	45	.000	5367.477	291.734	1299.868	.000	8006.359	.000	.32367	.25571
	46	.000	5367.477	717.907	1359.321	.000	6937.735	.000	.39543	.25845
32S	46	.000	5367.477	296.047	1348.658	.000	7015.722	.000	.39048	.26996
	47	.000	5367.477	361.371	1704.703	.000	7433.470	.000	.41297	.27531
33S	47	.000	5367.477	636.277	3272.574	.000	9274.329	.000	.51535	.34367
	48	.000	5367.477	527.022	2766.777	.000	8646.775	.000	.47004	.32023
34S	47	.000	5367.477	945.893	4097.658	.000	10416.178	.000	.57867	.39577
	49	.000	5367.477	812.641	2936.413	.000	8715.330	.000	.45866	.30451
35S	50	.000	5367.477	745.817	2825.933	.000	8195.624	.000	.45530	.30253
	51	.000	5367.477	779.225	2133.802	.000	8208.334	.000	.48007	.30568
36S	51	.000	5367.477	786.560	2122.560	.000	8276.577	.000	.45981	.30654
	52	.000	5367.477	2332.794	1693.525	.000	9394.196	.000	.52190	.34703
37S	52	.000	5367.477	2332.794	1693.535	.000	9394.226	.000	.52190	.34743
	53	.000	5367.477	277.819	2433.874	.000	8072.570	.000	.44940	.29804
38S	54	.000	5367.477	613.431	2692.349	.000	8073.238	.000	.49765	.32794
	55	.000	5367.477	593.385	2780.762	.000	8749.570	.000	.47031	.30854
39S	55	.000	5367.477	447.586	2255.938	.000	8075.908	.000	.44639	.29403
	56	.000	5367.477	305.740	1390.724	.000	7153.971	.000	.39744	.26446
42S	57	.000	5367.477	380.974	1639.906	.000	7387.357	.000	.41041	.27341
	58	.000	5367.477	367.046	3150.454	.000	8884.977	.000	.49361	.32927
41S	62	.000	5248.251	773.395	1353.716	.000	7396.852	.000	.41096	.27354
	63	.000	5248.251	715.691	1301.417	.000	7754.749	.000	.46315	.26977
42S	63	.000	5248.251	745.013	1292.096	.000	7227.360	.000	.40432	.26953
	24	.000	5248.251	387.250	1321.426	.000	6940.326	.000	.38607	.25732
43S	66	.000	5248.251	335.999	876.232	.000	8446.442	.000	.35814	.23874
	27	.000	5248.251	327.127	875.265	.000	6440.632	.000	.35781	.23854

CURVED MEMBERS FOR RUN 2

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
7C	22	.000	5248.251	881.303	2259.835	.000	8381.309	.000	.46563	.31042
	23	.000	5248.251	894.932	2317.714	.000	8454.397	.000	.46969	.31213
8C	24	.000	5248.251	613.720	2094.513	.000	7948.374	.000	.44154	.29434
9C	25	.000	5248.251	932.424	2215.824	.000	8303.449	.000	.44579	.31054
	27	.000	5248.251	518.352	1389.725	.000	7142.327	.000	.39680	.26467
10C	28	.000	5248.251	428.536	1264.156	.000	6936.943	.000	.34539	.25683
	31	.000	5367.477	759.201	3487.611	.000	9409.299	.000	.53385	.35550
11C	32	.000	5367.477	931.858	3257.910	.000	9557.145	.000	.53095	.35357
	34	.000	5367.477	481.352	1271.798	.000	7120.627	.000	.34559	.26373
12C	35	.000	5367.477	60.536	1704.358	.000	7212.371	.000	.40069	.24712
	36	.000	5367.477	769.664	3419.010	.000	9556.150	.000	.53090	.35357
13C	37	.000	5367.477	1202.780	3310.889	.000	9880.946	.000	.54894	.34584
	38	.000	5367.477	1194.998	2675.923	.000	9237.998	.000	.51322	.34218
	39	.000	5367.477	1787.560	2764.978	.000	9940.016	.000	.55222	.36815

14C	42	.000	5367.477	618.668	1805.861	.000	7592.806	.000	.42182	.28122
	43	.000	5367.477	616.275	1905.596	.000	7889.338	.000	.43830	.29223
15C	44	.000	5367.477	449.250	2146.527	.000	7962.334	.000	.44235	.29464
	45	.000	5367.477	462.834	2051.802	.000	7892.112	.000	.43845	.29235
16C	49	.000	5367.477	1334.683	3345.432	.000	10047.502	.000	.55820	.37213
	50	.000	5367.477	1312.631	3322.549	.000	10003.056	.000	.55573	.37042
17C	53	.000	5367.477	445.875	3997.079	.000	9811.430	.000	.54509	.36373
	54	.000	5367.477	1007.749	4788.377	.000	11164.503	.000	.62025	.41355
18C	56	.000	5367.477	395.780	1350.549	.000	7121.806	.000	.39566	.26377
	57	.000	5367.477	380.974	1639.906	.000	7387.357	.000	.41041	.27361
19C	58	.000	5367.477	607.986	5175.069	.000	11145.512	.000	.61920	.41243
	59	.000	5367.477	623.924	5496.181	.000	11487.582	.000	.63820	.42547

STRAIGHT MEMBERS FOR RUN 3

MEMBER NO.	MEMBER ENDS	INTERNAL PRESSURE STRESS (P)	PEAK PRESSURE STRESS (PMAX)	SUSTAINED LOAD STRESS (MA)	OCCASIONAL LOAD STRESS (MB)	THERMAL EXPANSION STRESS (MC)	TOTAL STRESS (T9)	MODIFIED ALLOWABLE STRESS (SAM)	UPSET STRESS RATIO T9/(1.2*SH)	EMERGENCY STRESS RATIO T9/(1.8*SH)
44S	1	.000	5823.672	373.789	2463.519	.000	8659.980	.000	.48111	.32727
	2	.000	5823.672	548.812	754.557	.000	7167.041	.000	.39817	.26545
45S	2	.000	5823.672	548.812	754.557	.000	7167.041	.000	.39817	.26545
	3	.000	5823.672	1327.840	1965.628	.000	9117.140	.000	.50651	.33767