JUL 24 1998

STATION 4

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 622233

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8. Originator Remarks: For approval and release of a new supporting document. This document has been generated to ensure retrievability of the Project W-320 "Piping Calculations, Vol. 5".				9. Equip./Component No.: n/a	
				10. System/Bldg./Facility: 241-C-106	
11. Receiver Remarks: 11A. Design Baseline Document? ☒ Yes ☐ No				12. Major Assm. Dwg. No.: n/a	
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15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	HNF-2475	-	0	Project W-320, 241-C-106 Sluicing, Piping Calculations, Vol. 5	NA			-

16. KEY											
Approval Designator (F)		Reason for Transmittal (G)				Disposition (H) & (I)					
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval 2. Release 3. Information		4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)		1. Approved 2. Approved w/comment 3. Disapproved w/comment		4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged			
17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
2	1	Design Authority	JW Bailey	7/23/98	S2-48						
		Design Agent	MC Davenport	7/23/98							
2	1	Cog. Eng.	EE Graves	7/23/98	S2-48						
2	1	Cog. Mgr	JW Bailey	7/23/98	S2-48						
		QA									
		Safety									
		Env.									
18. MC Davenport Signature of EDT Originator 7/23/98		19. Authorized Representative Date for Receiving Organization		20. JW Bailey Design Authority/ Cognizant Manager 7/23/98		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments					

BD-7400-172-2 (05/96) GEF097

BD-7400-172-1

Project W-320, 241-C-106 Sluicing Piping Calculations, Vol. 5

John W. Bailey

Numatec Hanford Co., Richland, WA 99352

U.S. Department of Energy Contract DE-AC09-96RL13200

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Key Words: W-320, Sluicing, Tank 241-C-106, Tank 241-AY-102, WRSS, calculations, piping.

Abstract: This supporting document has been prepared to make the FDNW calculations for Project W-320, readily retrievable.

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Release Approval

Date

Approved for Public Release

Project W-320, 241-C-106 Sluicing Piping Calculations, Vol. 5

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W320-27-028

Miscellaneous Pipe Stress Analysis

This sheet shows the status and description of the attached Design Analysis sheets.

Discipline 27, Piping and Vessels WO/Job No. ER4319 Calculation No. W320-27-028
Project No. & Name Project W-320 Waste Retrieval for Tank 241-C-106
Calculation Item Miscellaneous Pipe Stress Analysis

These calculations apply to:

Dwg. No. H-2-818482 Sheets 1, 2, and 3 Rev. No. 0
Dwg. No. ES-320-M07, ES-320-M08 Rev. No. 0
Other (Study, CDR) _____ Rev. No. _____

The status of these calculations is:

- ☐ Preliminary Calculations
☒ Final Calculations
☐ Check Calculations (On Calculation Dated _____)
☐ Void Calculation (Reason Voided _____)

Incorporated in Final Drawings?

☒ Yes ☐ No

This calculation verified by independent "check" calculation?

☐ Yes ☒ No

Original and Revised Calculation Approvals:

	Rev. 0 Signature / Date	Rev. 1 Signature / Date	Rev. 2 Signature / Date
Originator	<u>D. L. Stone</u> <u>8/22/95</u>	<u>Kelly H. Haynes</u> <u>12/1/97</u>	
Checked by	<u>C. D. Jones</u> <u>9/22/95</u>	<u>M. Ahmed</u> <u>3.23.98</u>	
Approved by	<u>C. D. Jones</u> <u>9/22/95</u>	<u>D. L. Stone</u> <u>4/3/98</u>	
Checked Against Approved Vendor Data		<u>M. Ahmed</u> <u>4.10.98</u>	

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Design Analysis

Description

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Subject Calculation No. W320-27-028

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KEH 1975.00 (12/88)

DESIGN ANALYSIS

Calc No. W-320-27-028

Revision No. 81

Page No. 1 of 11

Client WESTINGHOUSE HANFORD COMPANY
Subject MISCELLANEOUS PIPING STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location C TANK FARM - 200 EAST AREA - HANFORD

WO/Job No. ER4319

Date 8/22/95

Checked 9/22/95

Revised 12/1/97

Filename TEXT-M.WP

By D.L.STONE

By CD Jones

By K. Hays

OBJECTIVE:

CHKD BY: M. Ahmed 3.23.98

The objective of this calculation is:

1. To perform static and dynamic stress analysis of the Drain Pipeline servicing Tanks 241-C-106 in order to be in compliance with the Code ASME B31.3 requirements.
2. To calculate the pipe anchor loads at building penetrations in order to transmit these loads to Civil / Structural group.

DESIGN CRITERIA:

1. ASME CODE B31.3-93 with Addenda up to 1994.
2. SDC 4.1, REV-11. (Now FDMW Practice # 134, 215, 1217)
3. PROJECT W-320 FDC: WHC-SD-W320-FDC-001, REV. 2: 4

DESIGN INPUTS:

1. Ambient temperature	40°F	(Ref: 11)
2. Pipe Wall	Schedule 40	(Ref: 16)
3. Encasement Pipe material:	ASTM A53 Type E Grade B, Seamless	(Ref: 16)
4. Process Pipe Materials:	ASTM SA 312 TP304L Stainless Steel	(Ref: 16)
5. Corrosion rate:	2 mils/yr, for 20 years (considered as 0.06)	(Ref: 19)
6. Safety Class category:	SC-2 (2 yr life, conservative, ok as is)	(Ref: 15)
7. Pipe mechanical properties:	(See second page of "STAB", Appx. B)	(Ref: 3)
8. Soil characteristics:	(See third page of "STAB", Appx. B)	(Ref: 12)
9. Design Pressure:	60 psig	(Ref: 16)
10. Design Temperature:	100°F	(Ref: 16)
11. Process Fluid	Waste Solids blown from metal filters	(Ref: 20)
12. Specific gravity	1.25 (conservative)	(Ref: 11)
13. Piping Dimensions	Drawings ES-320-M07 and ES-320-M08
(Composite sketches from these drawings
have been provided in Appendix A.)	(Ref: 20)

DESIGN METHODOLOGY:

The calculation includes analysis of the encased drain line connecting the Process Air Building Seal Pot and Floor Drain with the Tank 241-C-106 Sluice Pit 241-C-06C through Nozzle U-8. (Ref: 20)

The stress analysis includes the following :

1. Analysis of the buried (outer) encasement piping for sustained, seismic and thermal loading under the impact of soil friction in order to qualify for Code B31.3-90 requirements. The analysis is performed using the computer program "STAB" (Ref: 7) which is based on the principles promulgated in ASME Papers (Ref: 5 & 6).

The Safety Class designation of the encasement pipe is dependent upon the designation of the Primary process pipe inside the encasement pipe, and is therefore categorized as Safety Class-2 (Ref: 2) pipe.

DESIGN ANALYSIS

Calc No. W-320-27-028
Revision No. 0
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Client	WESTINGHOUSE HANFORD COMPANY	WO/Job No.	ER4319	Filename	TEXT-M.WP
Subject	MISCELLANEOUS PIPING STRESS ANALYSIS	Date	8 / 22 / 95	By	D.L.STONE
	PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106	Checked	9/22/95	By	CD Jones
Location	C TANK FARM - 200 EAST AREA - HANFORD	Revised	/ /	By	

2. Analysis of the primary (inner) process piping for sustained, thermal and seismic loading is performed using the computer program "AutoPipe" Version-4.5 by "Engineering Design Automation" (EDA). (Ref:8)

Seismic & thermal displacements for the encasement pipe elbows, determined by the "STAB" (Ref: 7), are checked and tabulated to ensure minimal impact on the Primary pipe.

The Primary process pipe of each line is categorized as Safety Class-2 (Ref: 15) pipe.
3. Pipe Loading at Building Penetration Anchors is summarized using spreadsheet program, "Excel" (Ref. 9.)

SUSTAINED LOADS:

ENCASEMENT PIPE

The dead load for the encasement pipe is considered to include the weight of the inner primary pipe, the weight of its contents, and the weight of the soil cover over the encasement pipe. The weight of the encasement pipe is not a significant factor since it is supported continuously by the surrounding soil.

The AASHTO, H20 live loads (Ref: 4) are considered to include the impact of the surface vehicles moving over the buried encasement pipe. (Page 7 & 8)

The encasement pipe longitudinal stress due to the sum of the dead loads and live loads is calculated and added to the summation of pressure stress & seismic stress obtained from the computer program "STAB" (Ref: 7). (Page 9)

The pressure stress for the outer encasement pipe is considered similar to that of the primary pipe in order to ensure operability if the primary pipe fails.

PRIMARY PIPE

The sustained stress on the inner primary pipe is the summation of longitudinal stresses resulting from internal pressure and the dead weight of the pipe. The pipe material is stainless steel ASME SA 312, Grade TP 304L whose Allowable stress "S" Per Code B31.3 is 16,700 psi. (Ref: 1)

The "AutoPipe" program checks the sustained stress in the primary pipe against Code Allowable. (Ref: 8).

DESIGN ANALYSIS

Calc No. W-320-27-028

Revision No. 0

Page No. 3 of 11

Client	WESTINGHOUSE HANFORD COMPANY	WO/Job No.	ER4319	Filename	TEXT-M.WP
Subject	MISCELLANEOUS PIPING STRESS ANALYSIS	Date	8 / 22 / 95	By	D.L.STONE
	PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106	Checked	9/22/95	By	CD Jones
Location	C TANK FARM - 200 EAST AREA - HANFORD	Revised	1 / 1	By	

SEISMIC STRESSES:

ENCASEMENT PIPE

The buried encasement pipe elbow stresses due to propagation of ground seismic waves are computed using the computer program "STAB" (Ref: 7) which has been programmed based on the principles promulgated in ASME Papers (Ref: 5 & 6).

The peak free field acceleration factor (ag) of "0.12g" and peak free field ground velocity of "48Xag" are considered as stipulated in SDC 4.1, Rev-11 (Ref: 2) for Safety Class 2 & 3 piping.

The pipe mechanical properties are obtained from "Crane Technical Paper" (Ref: 3).

The soil data for dynamic analysis is based on the report were obtained from the Shannon & Wilson Inc's "Geotechnical Engineering Studies" (Ref:12)

Since the depth of the soil cover varies at different locations and since shallower depths produces higher stresses in pipe bends, the minimum required depth for shielding (Ref:14) three feet is used as the basis in this analysis.

Since the seismic stresses do not occur concurrently in both pipe legs around the elbow, the elbow will be subjected to seismic stress from only one leg at a time. As such, seismic analysis is performed for the longest straight pipe run adjacent to each pipe bend.

The sustained and seismic stresses are added together and compared to the Code B31.3 allowable requirements for Sustained + Occasional stresses. These stresses are summarized on page 9. The maximum seismic displacements at pipe bends are also listed on page 9.

PRIMARY PIPE

Since the Primary pipe has been classified as Safety Class 2 Pipe in the FDC (Ref: 11), Dynamic analysis is performed using "Fig 5" seismic response spectra (5% Damping) of SDC 4.1, Rev-11. (Ref: 2) This response spectra has been created in "AutoPipe" as "SC2&3" and is used in dynamic analysis.

The seismic stresses from the dynamic analysis are added to the sustained stresses from the static analysis to qualify against ASME B31.3 occasional stress allowable 1.33Sh. (Ref.1)

The encasement pipe seismic movements (See page 9) are negligibly small and will not have any significant impact on the primary pipe stress analysis. Therefore, these movements are not considered.

DESIGN ANALYSIS

Client WESTINGHOUSE HANFORD COMPANY

WO/Job No. ER4319

Filename TEXT-M.WP

Subject MISCELLANEOUS PIPING STRESS ANALYSIS

Date 8 / 22 / 95

By D.L.STONE

PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106

Checked 9/12/95

By CD Jones

Location C TANK FARM - 200 EAST AREA - HANFORD

Revised / /

By

THERMAL (DISPLACEMENT) STRESS:

ENCASEMENT PIPE

The thermal analysis for the Encasement pipe is performed at the same temperature as it is for the Primary pipe (100° F) to ensure operability in case primary pipe fails. Soil static properties were obtained from the "Geotechnical Engineering Studies" report furnished by the Shannon & Wilson Inc (Ref: 12).

The computer program "STAB" is used to perform the thermal analysis and compute the stresses in each pipe leg around each pipe bend. Since thermal stresses in each leg occur concurrently, "STAB" adds these stresses together to compute total thermal stress at the pipe bend and qualify it for Code B31.3 Allowable thermal stress. Results are summarized on page 9. Thermal displacements at the pipe bends are also listed on pages 9. The effects of thermal displacement at guide locations were checked and since support displacements of less than 0.063 inches are not considered critical, the analysis has been omitted from this package. (See Page 9)

The maximum design temperature for the Primary pipe is 100°F in accordance with the project construction specification (Ref: 16) and has been considered in the "AutoPipe" program.

PRIMARY PIPE

Since the primary pipe is intermittently welded to the encasement pipe, the thermal movements of the encasement pipe have been taken into consideration in the primary pipe thermal analysis.

The "AutoPipe" program has been run to qualify the thermal stress to Code B31.3 allowable for displacement stress "Sa". (Ref: 1)

The thermal expansion of the Primary pipe at any bend obtained from Autopipe is found to be less than the gap available between the primary pipe and the encasement pipe.

SOIL CHARACTERISTICS:

The "Geotechnical Engineering Studies" report by Shannon & Wilson Inc, (Ref: 12 Tables 2 & 3) furnishes characteristics for both Natural sand and Backfill sand. Since the "STAB" test run made using the properties of the Natural sand produces higher stresses in pipe bend than that of the test run using the properties of the Backfill sand, Natural sand properties are used conservatively for entire seismic and thermal analysis.

COMBINED LOADING AT BUILDING PENETRATION ANCHORS

The spreadsheet program, "Excel" (Ref. 9), has been used to calculate Pipe Loading at Building Penetration Anchors. (Pages 10 & 11.) Seismic and thermal loads on an anchor by the Encasement Pipe are calculated by multiplying the soil friction force for the underground pipe (obtained from the corresponding "STAB" calculations) by the length of pipe attached to the anchor. For cases in which the effects of loading by the Inner Process Pipe and Encasement Pipe are concurrent (such as pit wall penetrations), anchor loading is considered as the sum of the Inner Pipe restraint reactions at the anchor (obtained from "Autopipe" analysis) plus the calculated Encasement seismic and thermal loads. For cases in which the effects of loading by the Inner Process Pipe and Encasement Pipe are not concurrent (such as at the Process Air Building Floor Drain Seal Pot), anchor loads are represented in the spreadsheet, separately. (See Appx. A, Dwg.# H-2-818482)

DESIGN ANALYSIS

Calc No. W-320-27-028
Revision No. 01
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Client	WESTINGHOUSE HANFORD COMPANY	WO/Job No.	ER4319	Filename	TEXT-M.WP
Subject	MISCELLANEOUS PIPING STRESS ANALYSIS	Date	8/22/95	By	D.L.STONE
	PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106	Checked	9/22/95	By	CD Jones
Location	C TANK FARM - 200 EAST AREA - HANFORD	Revised	12/1/97	By	K. Hayase

ASSUMPTIONS:

CHKD BY: *L. Ahmed* 3.23.98

1. Since "Geotechnical Engineering Studies" by Shannon & Wilson Inc (Ref:12, Sect 12.1) indicates that the geological hazards such as ground faulting, soil liquefaction, ground differential settlements, land slides, ground collapse potential and flooding either not pertinent or insignificant to the native soil encompassing W-320 project, these hazards are not considered in the analysis.
2. The building structures are adequate to withstand the pipe loads.
3. The impact of building permanent settlements, if any, will be mitigated by designing voids between the pipe and the soil, so that the pipe will move in tandem with the building and will not be restrained by the soil.

CALCULATIONS:

Sustained load analysis (Pages 7 & 8)

Summary of Encasement Pipe Expansions and Pipe Bend Stresses for: (Page 9)

Pipe Loads at Building Wall Penetrations for: (Pages 10 & 11)

See Appendices for seismic & thermal analysis by "STAB" program. (Appx. B)

See Appendices for AutoPipe analysis. (Appx. C)

CONCLUSION:

1. The results of the "STAB" analyses indicate that sustained, seismic and thermal stresses in the Encasement Pipe have met the Code B31.3-1990 requirements.
2. The review of the "AutoPipe" summary results indicates that pipe stresses are in compliance with ASME Code B31.3 requirements.
3. Building penetration anchor loads are calculated and listed on pages 10 & 11.

Rev. 1

Rev. 1 of this calculation verified the analysis against the as-built conditions. There are minor dimensional

differences ($\pm 1'$) between the analysis and the as-built conditions, however, these differences are negligible. There are differences in pipe bend radii, however, these are also negligible.

DESIGN ANALYSIS

Calc No. W-320-27-028
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Client	WESTINGHOUSE HANFORD COMPANY	WO/Job No.	ER4319	Filename	TEXT-M.WP
Subject	MISCELLANEOUS PIPING STRESS ANALYSIS	Date	8 / 22 / 95	By	D.L.STONE
	PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106	Checked	9/22/95	By	CD Jones
Location	C TANK FARM - 200 EAST AREA - HANFORD	Revised	12 / 1 / 97	By	K. Hayase

REFERENCES:

CHKD BY: A. Ahmed 3.23.98.

1. ASME Code B31.3 and B31.3a-1994 Addenda for "Chemical and Petroleum Refinery."
2. SDC 4.1, Rev. 11, "Standard Architecture & Civil Design Criteria."
(Now FOMW Practice # 134.215.1217, Design Loads for Facilities)
3. Crane Technical Paper No: 410, 22nd Printing-1986.
4. AISI "Modern Sewer Design" First Edition, 1980.
5. ASME PAPER on "Hand Calculation of Seismic & Thermal Stresses in Buried Pipe" by G.C.K. Yeh. PVP Volume-77, June' 1983.
6. ASME PAPER on "Flexibility analysis of Buried Pipe" By E. C. Goodling. PVP Volume-82, June, 1978
7. Computer Program "STAB" (Seismic and Thermal analysis of Buried Piping), Version-0
8. Computer application "AutoPipe" Version 4.5 by "Engineering Design Automation."
9. Computer application "Excel" Version 4.0, by Microsoft.
10. Computer application "Mathcad" Version 4.0, by Mathsoft, Inc.
11. WHC-SD-W320-FDC-001, Rev-2, "Functional Design Criteria for Tank 241-C-106 Waste Retrieval, Project W-320".
4
12. Shannon & Wilson Inc. Geotechnical and Environmental Consultants, "Final Report of Geotechnical Engineering Studies, W-320 Waste Retrieval and Sluicing Systems", Dated April 12, 1994.
13. Data Compendium, Bruce A. Castaing
14. Calculations #W320-33-004, "Earth Cover Shielding Thickness for C-farm Piping", Dated: April 12, 1994. (DSI from G.J.Peter dated April 12, 1994)
15. WHC-SD-WM-SEL-033, Rev-1. "Safety Equipment List for 241-C-106 Waste Retrieval, Project W-320"
16. Project W-320 Construction specifications W320-C1 Rev-0 for piping materials.
17. Drawing # H-2-818482
18. Calculation No: W030-034 Rev-0 for "Recirculation Building - Foundation."
19. Calculation No: W-030-011, Rev-1 for "Fouling factor and Corrosion rate."
20. Piping Stress Isometric drawings: ES-320-M07 and ES-320-M08

DESIGN ANALYSIS

Client WESTINGHOUSE HANFORD COMPANY
Subject MISCELLANEOUS PIPING STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location C TANK FARM - 200 EAST AREA HANFORD

WO/Job No. ER4319
Date 8 / 22 / 95
Checked 9 / 22 / 95
Revised

Filename HOOP.MCD
By D.L. STONE
By *CD Jones*
By

TOTAL SUSTAINED LOADING ANALYSIS

for 3" in 6" drain Pipes (ES-320-M7 and ES-320-M8)

The purpose of this calculation is to determine the total sustained stress (weight of the process pipe and its contents, overlying soil column weight and impact of surface vehicular weight) on the transfer line encasement pipe. This value will be added to the stresses computed by STAB to determine the maximum stress on the encasement.

Unit Initialization:

$$\text{PSF} := \frac{\text{lb} \cdot \text{f}}{\text{ft}^2}$$

Unit representing weight per square foot.

PROCESS PIPE AND CONTENTS

$$\text{SpG} := 1.25$$

Specific Gravity of Process Fluid.

$$w_{\text{H}_2\text{O}} := 3.2 \cdot \text{PSF}$$

Weight of water per linear foot of 3" Schedule 40 pipe.

Ref. 3

$$w_{\text{pipe}} := 7.58 \cdot \text{PSF}$$

Weight of pipe per linear foot of 3" Schedule 40 pipe.

Ref. 3

$$w_{\text{contents}} := w_{\text{H}_2\text{O}} \cdot \text{SpG}$$

Weight of Process Fluid per Linear foot of 3" Schedule 40 pipe.

$$W_1 := w_{\text{pipe}} + w_{\text{contents}}$$

$$W_1 = 11.58 \cdot \text{PSF}$$

Weight of Process Pipe and Contents
per linear foot of 3" Schedule 40 pipe.

OVERLYING SOIL

$$H := 3 \cdot \text{ft}$$

Soil depth. (Minimum required for shielding.)

$$\rho := 0.066 \frac{\text{lb} \cdot \text{f}}{\text{in}^3}$$

Static Specific Weight of Soil

$$W_2 := H \cdot \rho$$

$$W_2 = 342.144 \cdot \text{PSF}$$

Weight of soil overlying Encasement
per linear foot of 6" Schedule 40 pipe.

DESIGN ANALYSIS

Client WESTINGHOUSE HANFORD COMPANY
Subject MISCELLANEOUS PIPING STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location C TANK FARM - 200 EAST AREA HANFORD

WO/Job No. ER4319
Date 8/22/95
Checked 9/22/95
Revised

Filename HOOP.MCD
By D.L. STONE
By CD Jones
By

$$DL := W_1 + W_2$$

$$DL = 353.724 \cdot \text{PSF}$$

DEAD LOAD (Weight of the process pipe and its contents
and overlying soil per linear foot of pipe).

$$LL := 600 \cdot \text{PSF}$$

LIVE LOAD AASHTO, H-20 Hwy Load per linear foot of pipe.

$$P := DL + LL$$

$$P = 953.724 \cdot \text{PSF}$$

TOTAL SUSTAINED LOAD per square foot, per linear foot of pipe.

$$P = 6.623 \cdot \text{psi}$$

TOTAL SUSTAINED LOAD per square inch, per linear foot of pipe.

$$D_6 := 6.625 \cdot \text{in}$$

$$t_6 := 0.280 \cdot \text{in}$$

Encasement Diameter for 6" Bends.

Wall thickness of 6" Schedule 40 pipe, Bends.

$$S_6 := P \cdot \frac{D_6}{2 \cdot t_6}$$

$$S_6 = 78.353 \cdot \text{psi}$$

Ring Compression (Hoop stress).

ICF KAISER
HANFORD COMPANY

Calc. No. W-320-27-28

Revision No. 0

Page No. 9 of 11

DESIGN ANALYSIS

Client WESTINGHOUSE HANFORD CO.

WO/Job No. ER4319

Filename SUMRY.MCD

Subject MISCELLANEOUS PIPING STRESS ANALYSIS

Date 8/22/95

By D. L. STONE

PROJECT W-320 WASTE RETRIEVAL for Tank 241-C-106

Checked 9/22/95

By CD Jones

Location C TANK FARM 200 EAST AREA

Revised

By

SUMMARY OF ENCASEMENT PIPE EXPANSIONS
 (Process Drain Line ES-320-M7 & ES-320-M8 Appdx. D)

Nodepoint	SEISMIC	THERMAL	
	δ (inches)	δt (inches)	$\delta 1$ (inches)
E09	0.047		
E04		0.066	0.047

SUMMARY OF ENCASEMENT PIPE BEND STRESSES

NODE POINT	SEISMIC				THERMAL	
	PR + SEIS (psi) (STAB)	DEAD WT. (psi) (Page # 14)	TOTAL (psi)	ALLOWABLE (psi)	ACTUAL (psi)	ALLOWABLE (psi)
E09	5725	78	5803	22610		
E04					5797	49650

ICF KAISER
HANFORD COMPANY

DESIGN ANALYSIS

Calc. No. W-320-27-028

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Client WESTINGHOUSE HANFORD CO.
 Subject MISCELLANEOUS PIPING STRESS ANALYSIS
 PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
 Location C TANK FARM 200 EAST AREA

WO/Job No. ER4319
 Date 8/22/1995
 Checked 9/22/95
 Revised

Filename ANCOR.xls
 By D. L. STONE
 By CD Jones
 By

ANCHOR LOADS AT PIT WALLS

Nozzle: U-8		Pipe Loads	Pipe Length (*2)	Friction Force (*3)	Fx	Fy	Fz	Mx	My	Mz
Location: 241-C-06C Sluice Pit			(in.)	(lb/in)	(lbs)	(lbs)	(lbs)	(in-lb)	(in-lb)	(in-lb)
Identification: W-320 Process Air Bldg. Floor Drain Piping Node #: B14 Orientation: (*6) <div><div>X A Z Y Plan View</div></div>	Inner Pipe									
	(Seismic)				114	13	27	804	3120	396
	(adjusted See *6)				100		100	848		848
	(Thermal)				903	-106	138	3240	21348	2028
	(adjusted See *6)				736		736	3724		3724
	(*1)									
	Encasement									
	(Seismic)	L = 88	F1 = 24.48				2153.26			
	(*4)									
	(Thermal)	L = 88	F2 = 23.18				2038.91			
	(*5)									
Absolute Sum					836	119	5028	4573	24468	4573

SEAL POT		Pipe Loads	Pipe Length (*2)	Friction Force (*3)	Fx	Fy	Fz	Mx	My	Mz
Location: Process Air Bldg.			(in.)	(lb/in)	(lbs)	(lbs)	(lbs)	(in-lb)	(in-lb)	(in-lb)
Identification: W-320 Process Air Bldg. Floor Drain Piping		Inner Pipe Loads are not applicable since both Process and Encasement Pipe anchors are not coincident at the Seal Pot.								
Node #: B04										
Orientation: <div>(Elevation View) </div>	Encasement									
	(Seismic) (*4)	L = 28.6	F1 = 24.48			699.15				
	(Thermal) (*5)	L = 28.6	F2 = 23.18			662.02				
	Absolute Sum				0	1361	0	0	0	0

(*1) (Ref. Appendix C, Autopipe Filename: M7-R0)

(*2) L = Pipe lengths immediately preceding anchors as per DWG # ES-320-M07 and ES-320-M08 : (Ref. Appendix A)

(*3) For underground pipe. (Ref. Appendix B, STAB)

(*4) LOAD = F1 x L

(*5) LOAD = F2 x L

(*6) Orientation to Axis "z" is assumed for Nozzle U-8 in this tabulation.

Actual orientation of the Autopipe Model is as per DWG # ES-320-M07, 45 degrees to the assigned axes, and adjusted for this table by the equations:
 0.707 x (Fx + Fz) and 0.707 x (Mx + Mz).

ICF KAISER
HANFORD COMPANY

DESIGN ANALYSIS

Calc. No. W-320-27-028

Revision No. 0

Page No. // of //

Client WESTINGHOUSE HANFORD CO.
Subject MISCELLANEOUS PIPING STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location C TANK FARM 200 EAST AREA

W/O/Job No. ER4319
Date 1 8/22/1995
Checked 9/22/95
Revised

Filename ANCOR.xls
By D. L. STONE
By C. D. Jones

Location: Process Air Bldg. Skid Floor	Pipe Loads	Pipe Length (*2) (in.)	Friction Force (*3) (lb/in)	Fx (lbs)	Fy (lbs)	Fz (lbs)	Mx (in-lb)	My (in-lb)	Mz (in-lb)
Identification: W-320 Process Air Bldg. Metal Filter Piping Node #: E10 Orientation: (Elevation View)	Inner Pipe								
	(Seismic)			5	74	217	7464	48	216
	(Thermal)			-1	44	-178	5484	-24	24
	(*1)								
	Encasement								
	(Seismic)	L = 49	F1 = 24.48		1198.54				
	(*4)								
	(Thermal)	L = 49	F2 = 23.18		1134.89				
	(*5)								
	Absolute Sum			6	2451	395	12948	72	240

(*1) (Ref. Appendix C, Autopipe Filename: M7-R0)

(*2) L = Pipe lengths immediately preceding anchors as per DWG # ES-320-M07 and ES-320-M08 : (Ref. Appendix A)

(*3) For underground pipe. (Ref. Appendix B, STAB)

(*4) LOAD = F1 x L

(*5) LOAD = F2 x L

(*6) Orientation to Axis "z" is assumed for Nozzle U-8 in this tabulation.

Actual orientation of the Autopipe Model is as per DWG # ES-320-M07, 45 degrees to the assigned axes, and adjusted for this table by the equations:
 $0.707 \times (F_x + F_z)$ and $0.707 \times (M_x + M_z)$.

APPENDIX A

Process Air Building Floor Drain Seal Pot

From Drawing # H-2-818482

DRAIN LINE - 3" - M9
ENCASEMENT LINE - 6" - M26a
ALL BENDS SHALL BE 36" RAD (UNLES OTHERWISE NOTED)

SEISMIC AND THERMAL STRESS ANALYSIS OF BURIED PIPE

- SOURCES: 1. ASME PAPER ON 'HAND CALCULATION OF SEISMIC
AND THERMAL STRESSES IN BURIED PIPE' BY
G.C.K.YEH, ENGINEERING SPECIALIST, BECHTEL
POWER CORP. PVP VOLUME-77, JUNE'83
2. ASME PAPER ON 'FLEXIBILITY ANALYSIS OF BURIED
PIPE' BY E.C.GOODLING, SUPERVISING ENGINEER,
GILBERT ASSOCIATES. PVP VOLUME-82, JUNE-78

PROGRAM VERSION: 0

PROGRAM AUTHOR: M.M.AHMED

PROGRAM VERIFIER: T.J.SCHALL

JOB OR WORK ORDER NO: W 320 / ER 4319

FILE NAME: STAB MO8.mcd - SEISMIC

INPUT BY: D.L. STONE *DL Stone* DATE: 8 / 22 / 95

CHECKED BY: *CD Jansen* DATE: 9/22/95

STEP 1: "DESIGN DATA."

ALL UNITS IN POUNDS, INCHES, RADIAN AND DEGREE F.

A. PIPE DATA: (REF:CRANE TECH PAPER NO:410, 22nd PRINT-1985)

PIPE MATERIAL: ASTM A53, TYPE E, GR B. SCH 40

PIPE SIZE: 6" SCH 40. BEND SIZE: 6" SCH 40, RADIUS=36".

$D = 6.625$ -in PIPE OUTSIDE DIAMETER, IN

$t = 0.280$ -in PIPE WALL THICKNESS, IN

$A = 5.581$ -in² PIPE METAL AREA, IN²

$I = 28.14$ -in⁴ PIPE MOMENT OF INERTIA, IN⁴

$Z = 8.496$ -in³ PIPE SECTION MODULUS, IN³

$A_b = 5.581$ -in² BEND METAL AREA, IN²

$Z_b = 8.496$ -in³ BEND SECTION MODULUS, IN³

$R = 36.00$ -in PIPE BEND RADIUS, IN (36" radius, 90 degree Bend)

$E = 29.34 \cdot 10^6 \frac{\text{lb}}{\text{in}^2}$ MODULUS OF ELASTICITY, PSI
(REF:ASME CODE B31.3-1993 ADDENDA 1994)

$\alpha = 6.13 \cdot 10^{-6} \frac{\text{in}}{\left(\frac{\text{in}}{\text{K}}\right)}$ THERMAL EXPANSION OF ELASTICITY, IN/IN/F.
(REF:ASME CODE B31.3-1993 ADDENDA 1994)

$\phi = 1.57$ -rad BEND ANGLE IN RADIAN (90 deg.)

$P = 60 \frac{\text{lb}}{\text{in}^2}$ DESIGN PRESSURE, PSI
(REF: CONSTRUCTION SPEC W-320, PIPING CODE M-24)

$T = 100$ -K DESIGN TEMPERATURE, DEG F
(REF: CONSTRUCTION SPEC W-320, PIPING CODE M-24)

$S_c = 20000 \frac{\text{lb}}{\text{in}^2}$ COLD ALLOWABLE STRESS, PSI
(REF:ASME CODE B31.3-1993 ADDENDA 1994)

$S_h = 20000 \frac{\text{lb}}{\text{in}^2}$ HOT ALLOWABLE STRESS, PSI
(REF:ASME CODE B31.3-1993 ADDENDA 1994)

$E_j = 0.85$ WELD JOINT QUALITY FACTOR
(REF:ASME CODE B31.3-1993 ADDENDA 1994)

$h = \frac{t \cdot R \cdot 4}{(D - t)^2}$ $h = 1.002$ FLEXIBILITY CHARACTER
(REF:ASME CODE B31.3-1990 APPDX-D)

$k = \frac{1.65}{h}$ $k = 1.648$ FLEXIBILITY FACTOR

$i = \frac{0.9}{h^{0.66}}$ $i = 0.899$ SIF FACTOR

IF CALCULATED 'i' IS LESS THAN 1.0, USE $i = 1.0$ $i = 1.00$

B: SOIL CHARACTERISTICS
(REF: SHANNON & WILSON, INC GEOTECH INVESTIGATION REPORT.)

B1: SOIL DATA FOR SEISMIC ANALYSIS

$C = 12000 \cdot \frac{\text{in}}{\text{sec}}$	SOIL SHEAR WAVE VELOCITY, IN/SEC
$\text{POI} = 0.3$	POISSON RATIO
$\text{Kd} = 0.32$	COEF OF LATERAL STRESS
$\mu = 0.75$	COEF OF SOIL FRICTION
$E_d = 62000 \cdot \frac{\text{lb}}{\text{in}^2}$	DYNAMIC ELASTICITY MODULUS, PSI
$\Gamma_d = 0.066 \cdot \frac{\text{lb}}{\text{in}^3}$	DYNAMIC SOIL SPECIFIC WT, LBS/IN ³

B2: SOIL DATA FOR STATIC ANALYSIS

$\text{Ks} = 0.25$	COEF OF LATERAL STRESS
$E_s = 21000 \cdot \frac{\text{lb}}{\text{in}^2}$	STATIC ELASTICITY MODULUS, PSI
$\Gamma_s = 0.066 \cdot \frac{\text{lb}}{\text{in}^3}$	STATIC SOIL SPECIFIC WT, LBS/IN ³
$H = 36 \cdot \text{in}$	DEPTH OF BURIED PIPE, IN

C: SEISMIC RESPONSE FOR GROUND MOTION
(REF: SDC-4.1 REV-11)

$a_g = 0.12$	FREE FIELD HORIZONTAL ACCEL, FRACTION OF 'G'
$V_m = 48 \cdot a_g \cdot \frac{\text{in}}{\text{sec}}$	MAX GROUND VELOCITY, IN/SEC
$V_m = 5.76 \cdot \frac{\text{in}}{\text{sec}}$	

COMPUTED EFFECTIVE LENGHTS:

1. SEISMIC EFFECTIVE LENGTH (L_{es}) :

$$L_{es} = 844.392 \cdot \text{in}$$

STAB Subroutine T-3 for Type 3 Bend Analysis

For Calculation of Seismic Effective Length:
from Table 3, Classification of Legs:

$$L_p = (3 + (3 \cdot 10) + 4.08) \cdot \text{ft} \quad L_p = 444.96 \cdot \text{in}$$

$$L_t = (4.08) \cdot \text{ft} \quad L_t = 48.96 \cdot \text{in}$$

$$L_{es} = 844.392 \cdot \text{in}$$

Since L_p ($<$) L_{es} , this is a case of SP Leg, therefore:

$$\text{SP: } L := L_p \\ L = 444.96 \cdot \text{in}$$

$$L = 444.96 \cdot \text{in}$$

ANALYSIS RESULTS :

SEISMIC (OCCASIONAL) STRESS (Socc) :

$$S_{all} = 1.33 \cdot E_j \cdot S_h$$

$$S_{occ} = 5.725 \cdot 10^3 \cdot \frac{\text{lb}}{\text{in}^2} < \text{ALLOWABLE}$$

$$S_{all} = 2.261 \cdot 10^4 \cdot \frac{\text{lb}}{\text{in}^2}$$

CONCLUSION:

PIPE OCCASIONAL STRESSES SATISFY THE CODE B31.3-1990 REQUIREMENTS.

STEP 2A: SEISMIC ANALYSIS OF BURIED PIPE AND COMPUTATION
OF INDEPENDENT VARIABLES.

1. SEISMIC SOIL STRAIN. (ϵ_m) :

$$\epsilon_m = \frac{V_m}{2 \cdot C}$$

REF: 2 ON COVER SHEET

$$\epsilon_m = 2.4 \cdot 10^{-4}$$

2. SUBGRADE REACTION MODULUS. ($K = \text{LBS/IN}^3$) :

$$K = \left(\frac{0.65}{D} \right) \cdot \left(\frac{E_d D^4}{E I} \right)^{0.0833} \cdot \frac{E_d}{1 - \text{POI}^2}$$

$$K = 5.69 \cdot 10^3 \cdot \frac{\text{lb}}{\text{in}^3}$$

3. SPRING CONSTANT. ($S = \text{LBS/IN}^2$) :

$$S = K \cdot D$$

$$S = 3.77 \cdot 10^4 \cdot \frac{\text{lb}}{\text{in}^2}$$

4. SYSTEM CHARACTERISTIC ($\lambda = \text{IN}^{-1}$) :

$$\lambda = \left(\frac{S}{4 \cdot E \cdot I} \right)^{0.25}$$

$$\lambda = 0.058 \cdot \text{in}^{-1}$$

5. SOIL FRICTION.

$$f = \pi \cdot D \cdot \frac{1 + Kd}{2} \cdot \Gamma_d \cdot H \cdot \mu$$

$$f = 24.479 \cdot \frac{\text{lb}}{\text{in}}$$

6. MAXIMUM SLIPPAGE LENGTH ($L_m = \text{IN}$) :

$$L_m = \epsilon_m \cdot A \cdot \frac{E}{f}$$

$$L_m = 1.605 \cdot 10^3 \cdot \text{in}$$

7. MAXIMUM AXIAL FORCE ($F = \text{LBS}$) :

$$F = f \cdot L_m$$

$$F = 3.93 \cdot 10^4 \cdot \text{lb}$$

8. MINIMUM TRANSVERSE LEG LENGTH REQUIRED (1 = IN) :

$$l = \frac{\pi}{\lambda}$$

REF: 2 ON COVER SHEET

$$l = 54.048 \cdot \text{in}$$

NOTE: SINCE ALL PIPE RUNS WILL GENERALLY BE LONGER THAN, "l", IT IS ASSUMED THAT TRANSVERSE LEG LENGTH CRITERIA HAS BEEN SATISFIED AND ALL CONSTANTS C1 THRU C6 IN SUCCEEDING FORMULAE ARE EQUAL TO 1.0 . THEREFORE THE FOLLWING FORMULAS ARE MODIFIED USING THE VALUES OF CONSTANTS AS 1.0

9. INDEPENDENT VARIABLE (a21) :

$$a21 = \lambda \cdot \left(kR \cdot \frac{\phi}{E \cdot I} + 4 \cdot \frac{\lambda^3}{K \cdot D} \right)^{-1}$$

$$a21 = 4.35 \cdot 10^5 \cdot \text{lb}$$

10. INDEPENDENT VARIABLE (a31) :

$$a31 = \frac{S}{2 \cdot \lambda}$$

$$a31 = 3.243 \cdot 10^5 \cdot \frac{\text{lb}}{\text{in}}$$

11. INDEPENDENT VARIABLE (a32) :

$$a32 = \lambda$$

$$a32 = 0.058 \cdot \text{in}^{-1}$$

12. INDEPENDENT VARIABLE (a) :

$$a = a31 + a21 \cdot a32$$

$$a = 3.496 \cdot 10^5 \cdot \frac{\text{lb}}{\text{in}}$$

13. SEISMIC EFFECTIVE LENGTH (Les = IN) :

$$Les = \left(A \cdot \frac{E}{a} \right) \cdot \left[\left(1 + 2 \cdot \epsilon m \cdot \frac{a}{f} \right)^{0.5} - 1 \right]$$

$$Les = 844.392 \cdot \text{in}$$

**STEP 3B: SEISMIC ANALYSIS AND CALCULATION OF SHEAR FORCES,
MOMENTS AND STRESSES IN PIPE BEND.**

1. DEPENDENT VARIABLE (a11) :

$$a11 = \epsilon m \cdot L - \left(f \cdot \frac{L^2}{2 \cdot A \cdot E} \right)$$

$$a11 = 0.092 \cdot \text{in}$$

2. DEPENDENT VARIABLE (a12) :

$$a12 = \frac{-L}{A \cdot E}$$

$$a12 = -2.717 \cdot 10^{-6} \frac{\text{in}}{\text{lb}}$$

3. DISPLACEMENT AT BEND (δ = inches) :

$$\delta = \frac{a11}{1 - a12 \cdot a}$$

$$\delta = 0.047 \cdot \text{in}$$

4. SHEAR IN TRANSVERSE LEG (Q_t = LBS) :

$$Q_t = a \cdot \delta$$

$$Q_t = 1.649 \cdot 10^4 \cdot \text{lb}$$

5. MOMENT IN BEND (M = IN-LBS):

$$M = a21 \cdot \delta$$

$$M = 2.052 \cdot 10^4 \cdot \text{in} \cdot \text{lb}$$

6. SHEAR IN LONGITUDINAL LEG (Q_p = LBS) :

$$Q_p = \lambda \cdot M$$

$$Q_p = 1.193 \cdot 10^3 \cdot \text{lb}$$

7. CODE B31.3 COMPLIANCE FOR SEISMIC + SUSTAINED STRESSES.

$$S_{occ} < S_{all}$$

$$S_{occ} = \frac{P \cdot D}{4 \cdot t} + i \cdot \frac{M}{Z_b} + \frac{Q \cdot t}{A_b}$$

$$S_{all} = 1.33 \cdot E_j \cdot Sh$$

$$S_{occ} = 5.725 \cdot 10^3 \cdot \frac{lb}{in^2}$$

<

$$S_{all} = 2.261 \cdot 10^4 \cdot \frac{lb}{in^2}$$

CONCLUSION: PIPE OCCASIONAL STRESSES SATISFY CODE
B31.3 REQUIREMENTS.

S T A B

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SEISMIC AND THERMAL STRESS ANALYSIS OF BURIED PIPE

- SOURCES: 1. ASME PAPER ON 'HAND CALCULATION OF SEISMIC
AND THERMAL STRESSES IN BURIED PIPE' BY
G.C.K.YEH, ENGINEERING SPECIALIST, BECHTEL
POWER CORP. PVP VOLUME-77, JUNE'83
2. ASME PAPER ON 'FLEXIBILITY ANALYSIS OF BURIED
PIPE' BY E.C.GOODLING, SUPERVISING ENGINEER,
GILBERT ASSOCIATES. PVP VOLUME-82, JUNE-78

PROGRAM VERSION: 0

PROGRAM AUTHOR: M.M.AHMED.

PROGRAM VERIFIER: T.J.SCHALL.

JOB OR WORK ORDER NO: W 320 / ER 4319

FILE NAME: SB45M8-T.mcd

INPUT BY: D.L. STONE DATE: 8 / 22 / 95

CHECKED BY: ~~M.M. AHMED~~ *CD Stone* DATE: 9/22/95

STEP 1: " DESIGN DATA."

ALL UNITS IN POUNDS, INCHES, RADIAN AND DEGREE F.

A. PIPE DATA. (REF: CRANE TECH PAPER NO. 410, 22nd PRINT-1985)

PIPE MATERIAL: ASTM A53, TYPE E, GR B. SCH 40

PIPE SIZE: 6" SCH 40. BEND SIZE: 6" SCH 40, RADIUS= 36"

$D = 6.625\text{-in}$	PIPE OUTSIDE DIAMETER, IN
$t = 0.280\text{-in}$	PIPE WALL THICKNESS, IN
$A_s = 5.581\text{-in}^2$	PIPE METAL AREA, IN ²
$I_s = 28.14\text{-in}^4$	MOMENT OF INERTIA, IN ⁴
$Z_s = 8.496\text{-in}^3$	SECTION MODULUS, IN ³
$A_b = 5.581\text{-in}^2$	BEND METAL AREA, IN ²
$Z_b = 8.496\text{-in}^3$	BEND SECTION MODULUS, IN ³
$R = 36.00\text{-in}$	PIPE BEND RADIUS, IN (36" Radius, 45 degree Bend)
$E = 29.34 \cdot 10^6 \frac{\text{lb}}{\text{in}^2}$	MODULUS OF ELASTICITY, PSI (REF: ASME CODE B31.3-1993 ADDENDA 1994)
$\alpha = 6.13 \cdot 10^{-6} \frac{\text{in}}{(\text{in}\cdot\text{K})}$	THERMAL EXPANSION OF ELASTICITY, IN/IN/F. (REF: ASME CODE B31.3-1993 ADDENDA 1994)
$\phi = 2.356\text{-rad}$	BEND ANGLE IN RADIAN
$P = 60 \frac{\text{lb}}{\text{in}^2}$	DESIGN PRESSURE, PSI (REF: CONSTRUCTION SPEC W-320, PIPING CODE M-24)
$T = 100\text{-K}$	DESIGN TEMPERATURE, DEG F (REF: CONSTRUCTION SPEC W-320, PIPING CODE M-24)
$S_c = 20000 \frac{\text{lb}}{\text{in}^2}$	COLD ALLOWABLE STRESS, PSI (REF: ASME CODE B31.3-1993 ADDENDA 1994)
$S_h = 20000 \frac{\text{lb}}{\text{in}^2}$	HOT ALLOWABLE STRESS, PSI (REF: ASME CODE B31.3-1993 ADDENDA 1994)
$EJ = 0.85$	WELD JOINT QUALITY FACTOR (REF: ASME CODE B31.3-1993 ADDENDA 1994)
$F = 1.00$	CYCLIC FACTOR FOR 7000 C/S
$h = \frac{t \cdot R \cdot 4}{(D - t)^2}$ $h = 1.002$	FLEXIBILITY CHARACTER (REF: ASME CODE B31.3-1990 APPDX-D)
$k = \frac{1.65}{h}$ $k = 1.648$	FLEXIBILITY FACTOR
$i = \frac{0.9}{h^{0.66}}$ $i = 0.899$	SIF FACTOR

IF CALCULATED 'I' IS LESS THAN 1.0, USE $i = 1.0$ $i = 1.00$

B: SOIL CHARACTERISTICS
(REF: SHANNON & WILSON, INC GEOTECH INVESTIGATION REPORT.)

B1: SOIL DATA FOR SEISMIC ANALYSIS

$C = 12000 \cdot \frac{\text{in}}{\text{sec}}$	SOIL SURFACE WAVE VELOCITY, IN/SEC
$\text{POI} = 0.3$	POISSON RATIO
$\text{Kd} = 0.32$	COEF OF LATERAL STRESS
$\mu = 0.75$	COEF OF SOIL FRICTION
$E_d = 62000 \cdot \frac{\text{lb}}{\text{in}^2}$	DYNAMIC ELASTICITY MODULUS, PSI
$\Gamma_d = 0.066 \cdot \frac{\text{lb}}{\text{in}^3}$	DYNAMIC SOIL SPECIFIC WT, LBS/IN ³

B2: SOIL DATA FOR STATIC ANALYSIS

$K_s = 0.25$	COEF OF LATERAL STRESS
$E_s = 21000 \cdot \frac{\text{lb}}{\text{in}^2}$	STATIC ELASTICITY MODULUS, PSI
$\Gamma_s = 0.066 \cdot \frac{\text{lb}}{\text{in}^3}$	STATIC SOIL SPECIFIC WT, LBS/IN ³
$H = 36 \cdot \text{in}$	DEPTH OF BURIED PIPE, IN .

C: SEISMIC RESPONSE FOR GROUND MOTION
(REF: SDC-4.1 REV-11)

$a_g = 0.12$	FREE FIELD HORIZONTAL ACCEL, FRACTION OF 'G'
$V_m = 48 \cdot a_g \cdot \frac{\text{in}}{\text{sec}}$	MAX GROUND VELOCITY, IN/SEC
$V_m = 5.76 \cdot \frac{\text{in}}{\text{sec}}$	

COMPUTED THERMAL EFFECTIVE LENGTH

$$L_{et} = 1.546 \cdot 10^3 \cdot \text{in}$$

STAB Subroutine T-2 for Type 2 Bend Analysis

For Calculation of Thermal Effective Length:

from Table 3, Classification of Legs:

$$L_p = (3 + (3 \cdot 10) + 4.08) \cdot \text{ft}$$

$$L_t = (6.5 + 10 + 8.07) \cdot \text{ft}$$

$$L_p = 444.96 \cdot \text{in}$$

$$L_t = 294.84 \cdot \text{in}$$

$$2 \cdot \text{Let} = 3.092 \cdot 10^3 \cdot \text{in}$$

Since $L_p (<) 2 \cdot \text{Let}$

this is a case of SP Leg, therefore:

$$\text{SP: } L1 := \frac{L_p}{2}$$

$$L1 = 222.48 \cdot \text{in}$$

Since $L_t (<) 2 \cdot \text{Let}$

this is a case of SP Leg, therefore:

$$\text{SP: } L2 := \frac{L_t}{2}$$

$$L2 = 147.42 \cdot \text{in}$$

$$L1 = 222.48 \cdot \text{in}$$

$$L2 = 147.42 \cdot \text{in}$$

ANALYSIS RESULTS:

$$\text{Set} = 5.797 \cdot 10^3 \cdot \frac{\text{lb}}{\text{in}^2} < \text{ALLOWABLE}$$

$$\text{Sa} = 4.965 \cdot 10^4 \cdot \frac{\text{lb}}{\text{in}^2}$$

CONCLUSION:

PIPE DISPLACEMENT STRESSES SATISFY THE CODE B31.3-90 REQUIREMENTS.

STEP 2B: THERMAL ANALYSIS OF BURIED PIPE AND COMPUTATION OF
INDEPENDENT VARIABLES.

1.THERMAL STRAIN ($\epsilon_t = \text{IN/IN}$)

$$\epsilon_t = \alpha \cdot (T - 40 \cdot K)$$

$$\epsilon_t = 3.678 \cdot 10^{-4} \cdot \frac{\text{in}}{\text{in}}$$

2. SUBGRADE REACTION MODULUS ($K_t = \text{LBS/IN}^3$) :

$$K_t = \left(\frac{0.65}{D} \right) \cdot \left(\frac{E_s \cdot D^4}{E \cdot I} \right)^{0.0833} \cdot \frac{E_s}{1 - \text{POI}^2}$$

$$K_t = 1.761 \cdot 10^3 \cdot \frac{\text{lb}}{\text{in}^3}$$

3. SPRING CONSTANT ($St = \text{LBS/IN}^2$) :

$$St = K_t \cdot D$$

$$St = 1.167 \cdot 10^4 \cdot \frac{\text{lb}}{\text{in}^2}$$

4. SYSTEM CHARACTERISTIC ($\lambda_t = \text{IN}^{-1}$) :

$$\lambda_t = \left(\frac{St}{4 \cdot E \cdot I} \right)^{0.25}$$

$$\lambda_t = 0.043 \cdot \text{in}^{-1}$$

5. SOIL STATIC FRICTION ($f_t = \text{LBS/IN}$) :

$$f_t = \pi \cdot D \cdot \frac{1 + K_s}{2} \cdot \Gamma_s \cdot H \cdot \mu$$

$$f_t = 23.181 \cdot \frac{\text{lb}}{\text{in}}$$

6. MAXIMUM SLIPPAGE LENGTH ($L_t = \text{IN}$) :

$$L_t = \epsilon_t \cdot A \cdot \frac{E}{f_t}$$

$$L_t = 2.598 \cdot 10^3 \cdot \text{in}$$

7. MAXIMUM AXIAL FORCE ($F_t = \text{LBS}$) :

$$F_t = f_t \cdot L_t$$

$$F_t = 6.023 \cdot 10^4 \cdot \text{lb}$$

8. MINIMUM LENGTH OF TRANSVERSE LEG (It = IN)

$$It = \frac{\pi}{\lambda_t} \quad \text{REF: 2 ON COVER SHEET}$$

$$It = 72.463 \cdot \text{in}$$

ASSUMED THE LENGTH OF ALL TRANSVERSE LEGS WILL
GENERALLY
BE MORE THAN "It". AS SUCH ALL CONSTANTS C1 THRU C6 IN
FOLLOWING EQUATIONS ARE CONSIDERED AS 1.0 AND FORMULAE
ARE MODIFIED ACCORDINGLY.

9. INDEPENDENT VARIABLE (A21) :

$$A21 = \lambda_t \left(\frac{k \cdot R \cdot \phi}{E \cdot I} + \frac{4 \cdot \lambda_t^3}{K \cdot D} \right)^{-1}$$

$$A21 = 2.199 \cdot 10^5 \cdot \text{lb}$$

10. INDEPENDENT VARIABLE (A31) :

$$A31 = \frac{K \cdot t \cdot D}{2 \cdot \lambda_t}$$

$$A31 = 1.346 \cdot 10^5 \cdot \frac{\text{lb}}{\text{in}}$$

11. INDEPENDENT VARIABLE (A32) :

$$A32 = \lambda_t$$

$$A32 = 0.043 \cdot \text{in}^{-1}$$

12. INDEPENDENT VARIABLE (At) :

$$At = A31 + A21 \cdot A32$$

$$At = 1.441 \cdot 10^5 \cdot \frac{\text{lb}}{\text{in}}$$

13. THERMAL EFFECTIVE LENGTH (Let) :

$$Let = \frac{A \cdot E}{At} \left[\left(1 + \frac{2 \cdot st \cdot At}{ft} \right)^{0.5} - 1 \right]$$

$$Let = 1.546 \cdot 10^3 \cdot \text{in}$$

THERMAL ANALYSIS OF PIPE BEND AND COMPUTATION OF SHEAR FORCES, MOMENTS AND STRESSES IN PIPE BEND. DUE TO THERMAL STRAIN IN LONG PIPE LEG.

1.DEPENDENT VARIABLE (A11) :

$$A11 = \delta t \cdot L1 - \left(\frac{L1^2}{2 \cdot A \cdot E} \right)$$

$$A11 = 0.078 \cdot \text{in}$$

2. DEPENDENT VARIABLE (A12) :

$$A12 = \frac{-L1}{A \cdot E}$$

$$A12 = -1.359 \cdot 10^{-6} \cdot \frac{\text{in}}{\text{lb}}$$

3. DISPLACEMENT AT BEND ($\delta t = \text{in}$) :

$$\delta t = \frac{A11}{1 - A12 \cdot A1}$$

$$\delta t = 0.066 \cdot \text{in}$$

4. SHEAR IN TRANSVERSE LEG ($Vt = \text{lbs}$) :

$$Vt = A1 \cdot \delta t$$

$$Vt = 9.438 \cdot 10^3 \cdot \text{lb}$$

5. MOMENT IN BEND ($Mt = \text{in} \cdot \text{lbs}$)

$$Mt = A21 \cdot \delta t$$

$$Mt = 1.44 \cdot 10^4 \cdot \text{in} \cdot \text{lb}$$

6. SHEAR IN LONGITUDINAL LEG ($Vp = \text{in} \cdot \text{lbs}$)

$$Vp = \lambda t \cdot Mt$$

$$Vp = 624.376 \cdot \text{lb}$$

7. DISPLACEMENT STRESS AT BEND ($Se = \text{Psi}$)

$$Se = i \left(\frac{Mt}{Z_b} \right) + \frac{Vt}{A_b}$$

$$Se = 3.386 \cdot 10^3 \cdot \frac{\text{lb}}{\text{in}^2}$$

NOTE: THIS DISPLACEMENT STRESS AT BEND IS DUE TO STRAIN IN ONE PIPE LEG. COMPUTE STRESSSS DUE TO OTHER LEG AND ADD THESE TOGETHER.

B. DUE TO THERMAL STRAIN IN SHORT PIPE LEG:

1. DEPENDENT VARIABLE (B11) :

$$B11 = \epsilon t \cdot L2 - \left(\frac{L2^2}{2 \cdot A \cdot E} \right)$$

$$B11 = 0.053 \cdot \text{in}$$

2. DEPENDENT VARIABLE (B12) :

$$B12 = \frac{-L2}{A \cdot E}$$

$$B12 = -9.003 \cdot 10^{-7} \cdot \frac{\text{in}}{\text{lb}}$$

3. DISPLACEMENT AT BEND ($\delta 1 = \text{inches}$)

$$\delta 1 = \frac{B11}{1 - B12 \cdot A t}$$

$$\delta 1 = 0.047 \cdot \text{in}$$

4. SHEAR FORCE IN TRANSVERSE LEG ($V1 = \text{Lbs}$) :

$$V1 = A t \cdot \delta 1$$

$$V1 = 6.72 \cdot 10^3 \cdot \text{lb}$$

5. MOMENT IN BEND ($M1 = \text{in.lbs}$) :

$$M1 = A21 \cdot \delta 1$$

$$M1 = 1.025 \cdot 10^4 \cdot \text{in} \cdot \text{lb}$$

6. SHEAR IN LONGITUDINAL LEG ($V2 = \text{lbs}$) :

$$V2 = \lambda t \cdot M1$$

$$V2 = 444.523 \cdot \text{lb}$$

7. DISPLACEMENT STRESS AT BEND ($Se1 = \text{Psi}$) :

$$Se1 = i \cdot \left(\frac{M1}{Z_b} \right) + \frac{V1}{A_b}$$

$$Se1 = 2.411 \cdot 10^3 \cdot \frac{\text{lb}}{\text{in}^2}$$

8. CODE B31.3 COMPLIANCE FOR DISPLACEMENT STRESS.

$$Set = Se + Sel$$

$$SL = \frac{P \cdot D}{4 \cdot t}$$

$$SL = 354.911 \cdot \frac{lb}{in^2}$$

$$Sa = F \cdot (1.25 \cdot (Sc + Sh) - SL)$$

$$Set = 5.797 \cdot 10^3 \cdot \frac{lb}{in^2}$$

<

$$Sa = 4.965 \cdot 10^4 \cdot \frac{lb}{in^2}$$

**CONCLUSION: PIPE DISPLACEMENT STRESSES SATISFY
CODE B31.3-90 REQUIREMENTS.**

APPENDIX C

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)---			PIPE ID	DESCRIPTION
		X	Y	Z		
*** SEGMENT A						
A00	Run	0	0	0	PIPE 1	
B00	Tee	0	-0.31	0		
A01	Bend	0	-0.75	0		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
A02	Bend	0.24	0	0.24		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
D00	Tee	0	0.38	0		
A03	Run	0	0.69	0		
*** SEGMENT B						
B00	Tee	0	-0.31	0	PIPE 1	
B01	Bend	-0.27	0	-0.27		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
C00	Tee	0	-0.38	0		
B02	Redu	0	-0.21	0		
B03	Run	0	-0.33	0	PIPE 2	
B04	Run	0	-0.17	0		
B05	Bend	0	-2.38	0		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
B06	Run	0	0	3.86		
B07	Run	0	0	10.00		
B08	Run	0	0	10.00		
B09	Run	0	0	10.00		
B10	Bend	0	0	3.00		Elbow, Radius = 36.00 inch Bend angle change = 45.00 deg Mid point at 50.00 percent SIF - In 1.00, Out = 1.00 Flex = 1.000
B11	Run	2.43	0	2.43		
B12	Run	7.07	0	7.07		
B13	Bend	2.07	0	2.07		Elbow, Radius = 36.00 inch

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)---			PIPE ID	DESCRIPTION
		X	Y	Z		
E00	Tee	5.05	0	0		Bend angle change = 45.00 deg Mid point at 50.00 percent SIF - In 1.00, Out = 1.00 Flex = 1.000
B14	Run	1.82	0	-1.82		
*** SEGMENT C						
C00	Tee	-0.27	-0.69	-0.27	PIPE 1	
C01	Bend	-0.27	0	0.27		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
C02	Bend	0	0.33	0		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
C03	Run	0.09	0	0.16		
*** SEGMENT D						
D00	Tee	0.24	-0.69	0.24	PIPE 1	
D01	Bend	0	0	-0.33		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
D02	Run	0	0.69	0		
*** SEGMENT E						
E00	Tee	16.35	-3.78	48.17	PIPE 2	
E01	Bend	-3.35	0	3.35		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
E02	Run	-4.60	0	-4.60		
E03	Run	-7.07	0	-7.07		
E04	Bend	-5.71	0	-5.71		Long Elbow, Radius = 4.50 inch Bend angle change = 45.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)---			PIPE ID	DESCRIPTION
		X	Y	Z		
E05	Run	0	0	-3.00		
E06	Run	0	0	-10.00		
E07	Run	0	0	-10.00		
E08	Run	0	0	-10.00		
E09	Bend	0	0	-4.08		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577

E10 Run 0 4.08 0

Total weight of empty pipes : 1079 lb

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y		--- Z	DATA TYPE	DESCRIPTION
*** SEGMENT A					
A00	0.00	0.00	0.00	ANCHOR	Rigid
B00	0.00	-0.31	0.00	TEE	Thermal movements : None B16.9 welding tee SIF - In = 1.19, Out = 1.25
A01 N	0.00	-0.89	0.00		
A01	0.00	-1.06	0.00	TI	
A01 M	0.03	-1.01	0.03		
A01 F	0.12	-1.06	0.12		
A02 N	0.12	-1.06	0.12		
A02	0.24	-1.06	0.24	TI	
A02 M	0.20	-1.01	0.20		
A02 F	0.24	-0.89	0.24		
D00	0.24	-0.69	0.24	TEE	B16.9 welding tee SIF - In = 1.19, Out = 1.25
A03	0.24	0.00	0.24	ANCHOR	Rigid Thermal movements : None
*** SEGMENT B					
B00	0.00	-0.31	0.00	TEE	B16.9 welding tee SIF - In = 1.19, Out = 1.25
B01 N	-0.15	-0.31	-0.15		
B01	-0.27	-0.31	-0.27	TI	
B01 M	-0.23	-0.36	-0.23		
B01 F	-0.27	-0.48	-0.27		
C00	-0.27	-0.69	-0.27	TEE	B16.9 welding tee SIF - In = 1.19, Out = 1.25
B02	-0.27	-0.89	-0.27		
B03	-0.27	-1.23	-0.27		
B04	-0.27	-1.39	-0.27		
B05 N	-0.27	-3.40	-0.27		
B05	-0.27	-3.78	-0.27	TI	
B05 M	-0.27	-3.67	-0.16		
B05 F	-0.27	-3.78	0.11		
B06	-0.27	-3.78	3.59	GUIDE	ID : B06 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless
B07	-0.27	-3.78	13.60	GUIDE	ID : B07 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless
B08	-0.27	-3.78	23.60	GUIDE	ID : B08 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y Z	DATA TYPE	DESCRIPTION
B09	-0.27 -3.78 33.60	GUIDE	Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless ID : B09 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless
B10 N	-0.27 -3.78 35.35		
B10	-0.27 -3.78 36.60	TI	
B10 M	-0.04 -3.78 36.50		
B10 F	0.61 -3.78 37.47		
B11	2.16 -3.78 39.03	GUIDE	ID : B11 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless ID : B12 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless
B12	9.23 -3.78 46.10	GUIDE	
B13 N	10.43 -3.78 47.29		
B13	11.30 -3.78 48.17	TI	
B13 M	11.40 -3.78 47.94		
B13 F	12.55 -3.78 48.17		
E00	16.35 -3.78 48.17	TEE	B16.9 welding tee SIF - In = 1.22, Out = 1.30
B14	18.17 -3.78 46.35	ANCHOR	Rigid Thermal movements : None
*** SEGMENT C			
C00	-0.27 -0.69 -0.27	TEE	B16.9 welding tee SIF - In = 1.19, Out = 1.25
C01 N	-0.41 -0.69 -0.12		
C01 M	-0.53 -0.69 -0.03	TI	
C01 F	-0.53 -0.52 0.00		
C02 N	-0.53 -0.52 0.00		
C02	-0.53 -0.35 0.00	TI	
C02 M	-0.51 -0.40 0.04		
C02 F	-0.45 -0.35 0.14		
C03	-0.44 -0.35 0.16	ANCHOR	Rigid Thermal movements : None

*** SEGMENT D

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y Z	DATA TYPE	DESCRIPTION
D00	0.24 -0.69 0.24	TEE	B16.9 welding tee SIF - In = 1.19, Out = 1.25
D01 N	0.24 -0.69 0.07		
D01	0.24 -0.69 -0.10	TI	
D01 M	0.24 -0.64 -0.05		
D01 F	0.24 -0.52 -0.10		
D02	0.24 0.00 -0.10	ANCHOR	Rigid Thermal movements : None
*** SEGMENT E			
E00	16.35 -3.78 48.17	TEE	B16.9 welding tee SIF - In = 1.22, Out = 1.30
E01 N	13.27 -3.78 51.25		
E01	13.01 -3.78 51.52	TI	
E01 M	13.01 -3.78 51.36		
E01 F	12.74 -3.78 51.25		
E02	8.41 -3.78 46.92	GUIDE	ID : E02 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless ID : E03 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless
E03	1.34 -3.78 39.85	GUIDE	
E04 N	-4.27 -3.78 34.24		
E04	-4.37 -3.78 34.14	TI	
E04 M	-4.35 -3.78 34.12		
E04 F	-4.37 -3.78 33.98		
E05	-4.37 -3.78 31.14	GUIDE	ID : E05 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless ID : E06 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless ID : E07 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15
E06	-4.37 -3.78 21.14	GUIDE	
E07	-4.37 -3.78 11.14	GUIDE	

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y Z	DATA TYPE	DESCRIPTION
E08	-4.37 -3.78 1.14	GUIDE	Gaps set Weightless ID : E08 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless
E09 N	-4.37 -3.78 -2.57		
E09	-4.37 -3.78 -2.94	TI	
E09 M	-4.37 -3.67 -2.84		
E09 F	-4.37 -3.40 -2.94		
E10	-4.37 0.30 -2.94	ANCHOR	Rigid Thermal movements : None

Number of points in the system : 77

PIPE DATA LISTING

Pipe ID/ Material	Nom/ Sch	O.D. inch	-----Thickness(inch)----- W.Th. Corr Mill Insu Ling	Spec Grav	Weight(lb/ft) Pipe Other Total
PIPE 1 A312-TP304L STD	2.000	2.375	0.154 0.06 0.02 0 0	1.25	3.74 0 5.56
PIPE 2 A312-TP304L STD	3.000	3.500	0.216 0.06 0.03 0 0	1.25	7.75 0 11.76

M7-R0 PROJECT W-320 DRAWING ES-320-M7 ICF KAISER HANFORD CO
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MATERIAL DATA LISTING

Material Name	Pipe ID	Density lb/cu.ft	Pois. Ratio	Temper. deg F	Modulus E6 psi	Expans. in/100ft	Allow. psi
A312-TP304L PIPE 1		501.0	0.30	40.0 100.0	28.42	0.6457	16700.0 16700.0
A312-TP304L PIPE 2		501.0	0.30	40.0 100.0	28.42	0.6457	16700.0 16700.0

M7-R0 PROJECT W-320 DRAWING ES-320-M7 ICF KAISER HANFORD CO
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TEMPERATURE AND PRESSURE DATA

POINT NAME	1----- PRESS. psi	CASE TEMPER deg F	2----- EXPAN. in/100ft	3----- PRESS. psi	CASE TEMPER deg F	4----- EXPAN. in/100ft
*** SEGMENT A						
A00	60.00		100	60.00		0.646
A03	60.00		100	60.00		0.646
*** SEGMENT B						
B00	60.00		100	60.00		0.646
B14	60.00		100	60.00		0.646
*** SEGMENT C						
C00	60.00		100	60.00		0.646
C03	60.00		100	60.00		0.646
*** SEGMENT D						
D00	60.00		100	60.00		0.646
D02	60.00		100	60.00		0.646
*** SEGMENT E						
E00	60.00		100	60.00		0.646
E10	60.00		100	60.00		0.646

ANALYSIS SUMMARY

Current model revision number : 19

Static - Date and Time of analysis Aug 22, 1995 2:26 PM
Model Revision Number 19
Number of load cases 3
Load cases analyzed GR T1 P1
Gaps/Friction/Yielding considered No
Hanger design run No
Cut short included No
Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

Modal - Date and Time of analysis Aug 22, 1995 2:26 PM
Model Revision Number 19
Number of modes 7
Cutoff frequency (Hz) 33.0
Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

Response - Date and Time of analysis Aug 22, 1995 2:26 PM
Model Revision Number 19
Number of load cases 3
Load cases analyzed R1 R2 R3
Date and time of modal analysis Aug 22, 1995 2:26 PM
Number of modes 7
Cutoff frequency (Hz) 33.0
Model revision of modal analysis 19
Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

CODE COMPLIANCE COMBINATIONS

Combination	Category	Method	Load	Factor	Allowable	Remarks
GR + Max P	Sustain	Sum	Gravity Max Long	1.00 1.00	Automatic	Default
Cold to T1	Expansion	Sum	Thermal 1	1.00	Automatic	Default
Max P	Hoop		Max Hoop	1.00	Automatic	Default
SRSS	Occasion	SRSS	Response 1 Response 2 Response 3	1.00 1.00 1.00	Automatic	User

OTHER USER COMBINATIONS

Combination	Method	Load	Factor	Remarks
GR	Sum	Gravity	1.00	Default
T1	Sum	Thermal 1	1.00	Default
P1	Sum	Press 1	1.00	Default
SUM	Sum	Gravity Thermal 1 Press 1	1.00 1.00 1.00	User
RESP	Abs sum	Response 1 Response 2 Response 3	1.00 1.00 1.00	User
TOTAL	Abs sum	SUM RESP	1.00 1.00	User

CODE COMPLIANCE

Y - Factor 0.40
Weld efficiency factor 1.00
Range reduction factor 1.00
Design Pressure Factor 1.00
Minimum stress ratio used in reports... 0.00
Include corrosion in stress calcs. Y
Include torsion in code stress N
Include axial force in code stress N
Longitudinal pressure calculation PD/4t
Include rigorous pressure Y

RESPONSE SPECTRUM LOAD CASES :

Number of load cases analysed : 3

Load case 1 - R1

Missing mass : No
 ZPA : No

Combination method : SRSS

X- Spectrum : SC2&3
 Multiplier : 1.00

SC2&3

Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.02	0.250	0.04
0.400	0.06	0.600	0.09	1.100	0.17
1.640	0.25	8.000	0.25	12.000	0.20
20.000	0.16	33.000	0.12	100.000	0.12

Load case 2 - R2

Missing mass : No
 ZPA : No

Combination method : SRSS

Y- Spectrum : SC2&3
 Multiplier : 1.00

SC2&3

Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.02	0.250	0.04
0.400	0.06	0.600	0.09	1.100	0.17
1.640	0.25	8.000	0.25	12.000	0.20
20.000	0.16	33.000	0.12	100.000	0.12

Load case 3 - R3

Missing mass.: No
 ZPA : No

Combination method : SRSS

Z- Spectrum : SC2&3
 Multiplier : 1.00

SC2&3

Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.02	0.250	0.04
0.400	0.06	0.600	0.09	1.100	0.17
1.640	0.25	8.000	0.25	12.000	0.20
20.000	0.16	33.000	0.12	100.000	0.12

FREQUENCIES

Mode Number	Frequency (Rads/sec)	Frequency (Hertz)	Period (Sec)	Participation factors		
				X	Y	Z
1	50.1612	7.9834	0.125	-0.466	-0.002	-1.635
2	72.4863	11.5365	0.087	0.013	-0.611	0.026
3	73.6238	11.7176	0.085	0.230	0.019	0.689
4	109.0702	17.3591	0.058	-0.616	0.003	0.355
5	119.4096	19.0046	0.053	0.014	-0.306	0.004
6	172.3600	27.4319	0.036	0.319	-0.042	-0.082
7	183.5339	29.2103	0.034	0.355	0.022	0.001

D I S P L A C E M E N T S

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
*** Segment A begin ***							
A02 M	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.001	-0.007	-0.001	0.006	-0.008	-0.007
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.001	-0.007	-0.001	0.006	-0.008	-0.007
	TOTAL	0.000	0.000	0.000	0.001	0.000	0.001
A02 F	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.001	-0.006	0.000	0.007	-0.008	-0.007
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.001	-0.006	0.000	0.007	-0.008	-0.007
	TOTAL	0.000	0.000	0.000	0.001	0.000	0.001
D00	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.001	-0.005	0.000	0.003	-0.006	-0.006
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.001	-0.005	0.000	0.003	-0.005	-0.006
	TOTAL	0.000	0.000	0.000	0.001	0.000	0.001
A03	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000

*** Segment A end ***

*** Segment B begin ***

B00	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	-0.002	-0.001	0.036	0.015	-0.021
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	-0.002	-0.001	0.036	0.016	-0.021
	TOTAL	0.000	0.000	0.000	0.003	0.002	0.002
B01 N	GR	0.000	0.000	0.000	0.039	0.018	0.023
	T1	-0.002	0.001	-0.001	-0.001	0.000	0.001
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.002	0.001	-0.001	-0.001	0.000	0.001
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000

D I S P L A C E M E N T S

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
*** Segment A begin ***							
A00	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
B00	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	-0.002	-0.001	0.056	0.015	-0.021
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	-0.002	-0.001	0.056	0.016	-0.021
	TOTAL	0.000	0.000	0.000	0.003	0.002	0.002
A01 N	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.002	-0.006	-0.003	0.039	0.018	0.023
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.002	-0.006	-0.003	0.039	0.018	0.023
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
A01 M	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.002	-0.006	-0.003	0.007	-0.002	-0.011
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.002	-0.006	-0.003	0.007	-0.002	-0.011
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
A01 F	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.002	-0.007	-0.002	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.002	-0.007	-0.002	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
A02 N	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.002	-0.007	-0.002	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.002	-0.007	-0.002	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000

WT-R0 PROJECT M-320 DRAWING ES-320-M7
08/22/95 DRAIN PIPING REVISION 0
ICF KAISER HANFORD CO
Autopipe+4.60 RESULT PAGE 9

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
B01 M		0.000	0.000	0.000	-0.001	0.000	0.001
GR		0.000	0.000	0.000	-0.001	0.000	0.001
T1		-0.004	0.004	0.000	0.149	0.059	-0.088
P1		0.000	0.000	0.000	0.001	0.000	0.000
SUM		-0.004	0.004	0.000	0.149	0.059	-0.088
RESP		0.000	0.000	0.000	0.016	0.007	0.010
TOTAL		0.004	0.004	0.000	0.165	0.067	0.097
B01 F		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.007	0.006	0.000	0.221	0.063	-0.098
P1		0.000	0.000	0.000	0.001	0.000	0.000
SUM		-0.007	0.006	0.000	0.221	0.063	-0.098
RESP		0.001	0.001	0.000	0.025	0.007	0.012
TOTAL		0.008	0.007	0.000	0.246	0.070	0.111
C00		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.011	0.004	0.000	0.244	0.082	-0.101
P1		0.000	0.000	0.000	0.001	0.000	0.000
SUM		-0.011	0.004	0.000	0.244	0.082	-0.101
RESP		0.001	0.001	0.002	0.028	0.009	0.012
TOTAL		0.012	0.005	0.018	0.273	0.091	0.113
B02		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.015	0.003	0.000	0.293	0.082	-0.088
P1		0.000	0.000	0.000	0.001	0.000	0.000
SUM		-0.015	0.003	0.000	0.293	0.082	-0.088
RESP		0.002	0.001	0.003	0.034	0.009	0.011
TOTAL		0.017	0.004	0.032	0.328	0.091	0.099
B03		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.021	0.001	0.000	0.319	0.082	-0.079
P1		0.000	0.000	0.000	0.002	0.000	0.000
SUM		-0.021	0.001	0.000	0.320	0.082	-0.080
RESP		0.002	0.001	0.005	0.037	0.009	0.011
TOTAL		0.024	0.002	0.056	0.356	0.092	0.091
B04		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.024	0.000	0.000	0.323	0.082	-0.077
P1		0.000	0.000	0.000	0.002	0.000	0.000
SUM		-0.024	0.000	0.000	0.324	0.082	-0.078
RESP		0.003	0.001	0.007	0.037	0.009	0.011
TOTAL		0.027	0.001	0.068	0.361	0.092	0.089

DISPLACEMENTS

WT-R0.OUT 8-22-95 2:27p

WT-R0 PROJECT M-320 DRAWING ES-320-M7
08/22/95 DRAIN PIPING REVISION 0
ICF KAISER HANFORD CO
Autopipe+4.60 RESULT PAGE 10

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
B05 N		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.054	-0.013	0.000	0.271	0.082	-0.000
P1		0.000	0.000	0.000	0.001	0.000	0.000
SUM		-0.053	-0.013	0.000	0.271	0.082	-0.000
RESP		0.007	0.001	0.022	0.032	0.010	0.010
TOTAL		0.060	0.014	0.217	0.303	0.092	0.074
B05 M		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.163	-0.082	0.000	0.163	0.082	-0.000
P1		0.000	0.000	0.000	0.001	0.000	0.000
SUM		-0.163	-0.082	0.000	0.163	0.082	-0.000
RESP		0.001	0.000	0.000	0.001	0.000	0.000
TOTAL		0.162	0.082	0.000	0.162	0.082	-0.000
B05 F		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.051	-0.026	0.000	0.050	0.081	-0.000
P1		0.000	0.000	0.000	0.000	0.000	0.000
SUM		-0.051	-0.026	0.000	0.050	0.081	-0.000
RESP		0.007	0.026	0.000	0.009	0.011	0.010
TOTAL		0.058	0.026	0.251	0.057	0.092	0.070
B06		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.058	-0.050	0.000	0.058	0.050	-0.001
P1		0.000	0.000	0.000	0.000	0.000	0.000
SUM		-0.058	-0.050	0.000	0.058	0.050	-0.001
RESP		0.004	0.007	0.009	0.004	0.007	0.009
TOTAL		0.004	0.007	0.009	0.004	0.007	0.009
B07		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.001	-0.012	0.000	0.002	0.017	-0.002
P1		0.000	0.000	0.000	0.000	0.000	0.000
SUM		-0.001	-0.012	0.000	0.002	0.017	-0.002
RESP		0.000	0.000	0.000	0.000	0.000	0.000
TOTAL		0.000	0.000	0.000	0.002	0.017	-0.002
B08		0.000	0.000	0.000	-0.001	0.000	0.000
GR		0.000	0.000	0.000	-0.001	0.000	0.000
T1		-0.003	-0.017	0.000	0.003	0.017	-0.003
P1		0.000	0.000	0.000	0.000	0.000	0.000
SUM		-0.003	-0.017	0.000	0.003	0.017	-0.003
RESP		0.000	0.000	0.000	0.000	0.000	0.000
TOTAL		0.000	0.000	0.000	0.003	0.017	-0.003

DISPLACEMENTS

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DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
B09	GR	0.000	0.000	0.000	-0.006	0.000	0.005
	T1	0.000	0.000	0.006	-0.001	-0.052	-0.014
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.007	-0.006	-0.052	-0.014
	RESP	0.000	0.000	0.024	0.002	0.008	0.007
	TOTAL	0.000	0.000	0.031	0.010	0.059	0.016
B10 N	GR	0.000	0.001	0.000	0.001	0.000	0.005
	T1	-0.020	0.001	0.017	-0.003	-0.045	-0.011
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.021	0.001	0.018	-0.002	-0.045	-0.007
	RESP	0.004	0.001	0.024	0.003	0.012	0.007
	TOTAL	0.024	0.002	0.042	0.005	0.056	0.013
B10 M	GR	0.000	0.000	0.000	0.003	0.000	0.005
	T1	-0.025	0.001	0.026	-0.004	-0.002	-0.010
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.025	0.002	0.026	-0.001	-0.002	-0.005
	RESP	0.007	0.001	0.023	0.003	0.015	0.006
	TOTAL	0.032	0.003	0.049	0.004	0.017	0.011
B10 F	GR	0.000	0.000	0.000	0.004	0.000	0.006
	T1	-0.017	0.001	0.028	-0.005	0.045	-0.008
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.017	0.001	0.029	0.000	0.046	-0.003
	RESP	0.010	0.001	0.021	0.001	0.018	0.000
	TOTAL	0.027	0.002	0.050	0.004	0.063	0.009
B11	GR	0.000	0.000	0.000	0.009	0.000	0.004
	T1	0.016	0.000	0.016	-0.005	0.079	-0.007
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.016	0.000	0.016	0.005	0.080	-0.003
	RESP	0.015	0.000	0.015	0.003	0.016	0.007
	TOTAL	0.031	0.000	0.031	0.008	0.096	0.010
B12	GR	0.000	0.000	0.000	0.024	0.000	0.004
	T1	0.061	0.000	0.061	-0.003	-0.143	-0.002
	P1	0.000	0.000	0.000	0.000	-0.001	0.000
	SUM	0.061	0.000	0.061	0.021	-0.144	0.002
	RESP	0.015	0.000	0.015	0.010	0.018	0.002
	TOTAL	0.076	0.000	0.076	0.031	0.162	0.004

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
B13 N	GR	0.000	-0.009	0.000	0.038	0.000	-0.007
	T1	0.028	0.000	0.108	-0.003	-0.153	-0.001
	P1	0.000	0.000	0.000	0.000	-0.001	0.000
	SUM	0.028	-0.009	0.109	-0.003	-0.154	-0.001
	RESP	0.011	0.003	0.020	0.012	0.017	0.000
	TOTAL	0.039	0.011	0.129	0.048	0.171	0.009
B13 M	GR	0.000	-0.016	0.000	0.042	0.000	-0.009
	T1	0.016	0.000	0.138	-0.002	-0.096	-0.001
	P1	0.000	0.000	0.001	0.000	0.000	0.000
	SUM	0.017	-0.015	0.139	0.040	-0.096	-0.009
	RESP	0.009	0.005	0.023	0.013	0.009	0.001
	TOTAL	0.025	0.020	0.162	0.053	0.105	0.010
B13 F	GR	0.000	-0.020	0.000	0.044	0.000	-0.005
	T1	0.020	0.000	0.153	-0.002	-0.013	-0.001
	P1	0.000	0.000	0.001	0.000	0.000	0.000
	SUM	0.021	-0.019	0.154	0.042	-0.013	-0.006
	RESP	0.009	0.009	0.023	0.013	0.005	0.000
	TOTAL	0.029	0.025	0.177	0.056	0.017	0.006
E00	GR	0.000	-0.015	0.000	0.049	0.000	0.017
	T1	0.044	0.000	0.068	0.000	0.209	0.000
	P1	0.000	0.000	0.000	0.000	0.001	0.000
	SUM	0.045	-0.015	0.068	0.049	0.211	0.017
	RESP	0.001	0.000	0.008	0.000	0.033	0.004
	TOTAL	0.053	0.019	0.076	0.064	0.244	0.021
B14	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.000	0.000	0.000	0.000
	RESP	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
*** Segment B end ***							
*** Segment C begin ***							
C00	GR	0.000	0.000	0.000	-0.001	0.000	0.000
	T1	-0.011	0.004	-0.016	0.244	0.082	-0.101
	P1	0.000	0.000	0.000	0.001	0.000	0.000
	SUM	-0.011	0.004	-0.016	0.245	0.082	-0.101
	RESP	0.001	0.001	0.002	0.028	0.009	0.012
	TOTAL	0.012	0.005	0.018	0.273	0.091	0.113

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
C01 N	GR	0.000	0.000	0.000	-0.001	0.000	0.000
	T1	-0.009	0.001	-0.013	0.222	0.090	-0.112
	P1	0.000	0.000	0.000	0.001	0.000	-0.001
	SUM	-0.009	0.001	-0.013	0.222	0.090	-0.113
	RESP	0.001	0.000	0.001	0.026	0.009	0.012
	TOTAL	0.010	0.001	0.014	0.248	0.100	0.125
C01 M	GR	0.000	0.000	0.000	-0.001	0.000	0.000
	T1	-0.007	0.000	-0.008	0.184	0.072	-0.129
	P1	0.000	0.000	0.000	0.001	0.000	-0.001
	SUM	-0.007	0.000	-0.008	0.184	0.072	-0.130
	RESP	0.001	0.000	0.001	0.023	0.006	0.013
	TOTAL	0.007	0.000	0.009	0.206	0.079	0.143
C01 F	GR	0.000	0.000	0.000	-0.001	0.000	0.000
	T1	-0.004	0.001	-0.004	0.133	0.047	-0.101
	P1	0.000	0.000	0.000	0.001	0.000	0.000
	SUM	-0.004	0.001	-0.004	0.133	0.047	-0.101
	RESP	0.000	0.000	0.000	0.017	0.003	0.010
	TOTAL	0.004	0.001	0.004	0.149	0.051	0.111
C02 N	GR	0.000	0.000	0.000	-0.001	0.000	0.000
	T1	-0.004	0.001	-0.004	0.133	0.047	-0.101
	P1	0.000	0.000	0.000	0.001	0.000	0.000
	SUM	-0.004	0.001	-0.004	0.132	0.047	-0.101
	RESP	0.000	0.000	0.000	0.017	0.003	0.010
	TOTAL	0.004	0.001	0.004	0.149	0.051	0.110
C02 M	GR	0.000	0.000	0.000	-0.001	0.000	0.000
	T1	-0.001	0.000	-0.001	0.065	0.033	-0.049
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.001	0.000	-0.001	0.065	0.033	-0.048
	RESP	0.000	0.000	0.000	0.008	0.002	0.005
	TOTAL	0.001	0.000	0.001	0.073	0.035	0.053
C02 F	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.001	0.001	-0.001
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.000	0.001	0.001	-0.001
	RESP	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.001	0.001	0.001

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
C03	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.000	0.000	0.000	0.000
	RESP	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
*** Segment C end ***							
*** Segment D begin ***							
D00	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	-0.001	-0.005	0.000	0.003	-0.006	-0.006
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	-0.001	-0.005	0.000	0.003	-0.005	-0.006
	RESP	0.000	0.000	0.000	0.001	0.000	0.001
	TOTAL	0.001	0.005	0.000	0.004	0.006	0.007
D01 N	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	-0.005	-0.001	0.002	-0.005	-0.006
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	-0.005	-0.001	0.002	-0.005	-0.006
	RESP	0.000	0.000	0.000	0.001	0.000	0.001
	TOTAL	0.000	0.005	0.001	0.002	0.006	0.007
D01 M	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	-0.004	-0.002	0.010	-0.003	-0.004
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	-0.004	-0.002	0.010	-0.003	-0.004
	RESP	0.000	0.000	0.000	0.000	0.000	0.001
	TOTAL	0.000	0.004	0.002	0.011	0.003	0.005
D01 F	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	-0.003	-0.002	0.018	-0.002	-0.002
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	-0.003	-0.002	0.018	-0.002	-0.002
	RESP	0.000	0.000	0.000	0.001	0.000	0.000
	TOTAL	0.000	0.003	0.002	0.019	0.002	0.002
D02	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.000	0.000	0.000	0.000
	RESP	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000

*** Segment D end ***

*** Segment E begin ***

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
E00	GR	0.000	-0.015	0.000	0.049	0.000	0.017
	T1	0.044	0.000	0.068	0.000	0.209	0.000
	P1	0.000	0.000	0.000	0.000	0.001	0.000
	SUM	0.045	-0.015	0.068	0.049	0.211	0.017
	RESP	0.008	0.004	0.008	0.015	0.033	0.004
	TOTAL	0.053	0.019	0.076	0.064	0.244	0.021
E01 N	GR	0.000	-0.070	0.000	0.079	0.000	0.012
	T1	0.172	0.000	0.235	0.000	0.185	0.000
	P1	0.001	0.000	0.001	0.000	0.001	0.000
	SUM	0.173	-0.070	0.236	0.078	0.186	0.012
	RESP	0.035	0.023	0.035	0.028	0.039	0.005
	TOTAL	0.208	0.093	0.272	0.107	0.224	0.017
E01 M	GR	0.000	-0.073	0.000	0.079	0.000	0.009
	T1	0.174	0.000	0.244	0.000	0.118	0.000
	P1	0.001	0.000	0.001	0.000	0.001	0.000
	SUM	0.175	-0.072	0.245	0.079	0.118	0.009
	RESP	0.036	0.024	0.037	0.028	0.027	0.004
	TOTAL	0.211	0.096	0.282	0.107	0.146	0.013
E01 F	GR	0.000	-0.071	0.000	0.082	0.000	0.004
	T1	0.171	0.000	0.248	0.000	0.049	0.000
	P1	0.001	0.000	0.001	0.000	0.000	0.000
	SUM	0.172	-0.071	0.249	0.082	0.049	0.004
	RESP	0.036	0.023	0.038	0.029	0.015	0.003
	TOTAL	0.207	0.094	0.288	0.111	0.064	0.007
E02	GR	0.000	0.000	0.000	0.063	0.000	0.019
	T1	0.181	0.000	0.181	0.000	-0.068	0.000
	P1	0.001	0.000	0.001	0.000	0.000	0.000
	SUM	0.183	0.000	0.183	0.063	-0.069	0.019
	RESP	0.037	0.000	0.037	0.022	0.007	0.006
	TOTAL	0.220	0.000	0.220	0.085	0.076	0.025
E03	GR	0.000	0.000	0.000	0.028	0.000	0.047
	T1	0.136	0.000	0.136	0.000	0.075	0.001
	P1	0.001	0.000	0.001	0.000	0.000	0.000
	SUM	0.137	0.000	0.137	0.028	0.076	0.047
	RESP	0.037	0.000	0.037	0.009	0.010	0.015
	TOTAL	0.174	0.000	0.174	0.037	0.086	0.062

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
E04 N	GR	0.000	-0.019	0.000	0.037	0.000	0.032
	T1	-0.002	0.000	0.203	0.001	0.045	0.001
	P1	0.000	0.000	0.001	0.000	0.000	0.000
	SUM	-0.002	-0.020	0.204	0.037	0.046	0.033
	RESP	0.022	0.005	0.055	0.009	0.027	0.012
	TOTAL	0.024	0.025	0.259	0.046	0.072	0.045
E04 M	GR	0.000	-0.019	0.000	0.037	0.000	0.032
	T1	-0.004	0.000	0.202	0.001	0.029	0.001
	P1	0.000	0.000	0.001	0.000	0.000	0.000
	SUM	-0.004	-0.020	0.204	0.037	0.029	0.033
	RESP	0.021	0.005	0.055	0.009	0.030	0.012
	TOTAL	0.025	0.025	0.259	0.047	0.059	0.045
E04 F	GR	0.000	-0.018	0.000	0.037	0.000	0.032
	T1	-0.005	0.000	0.202	0.001	0.013	0.001
	P1	0.000	0.000	0.001	0.000	0.000	0.000
	SUM	-0.004	-0.019	0.203	0.037	0.013	0.033
	RESP	0.020	0.005	0.055	0.009	0.033	0.012
	TOTAL	0.025	0.024	0.258	0.047	0.046	0.044
E05	GR	0.000	0.000	0.000	0.017	0.000	0.030
	T1	0.000	0.000	0.183	0.001	-0.014	0.001
	P1	0.000	0.000	0.001	0.000	0.000	0.000
	SUM	0.000	0.000	0.185	0.018	-0.014	0.030
	RESP	0.000	0.000	0.055	0.006	0.027	0.011
	TOTAL	0.000	0.000	0.240	0.024	0.041	0.041
E06	GR	0.000	0.000	0.000	-0.004	0.000	0.022
	T1	0.000	0.000	0.119	-0.002	0.004	0.001
	P1	0.000	0.000	0.001	0.000	0.000	0.000
	SUM	0.000	0.000	0.120	-0.006	0.004	0.022
	RESP	0.000	0.000	0.055	0.002	0.007	0.009
	TOTAL	0.000	0.000	0.175	0.009	0.011	0.031
E07	GR	0.000	0.000	0.000	-0.001	0.000	0.013
	T1	0.000	0.000	0.055	0.009	-0.001	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.055	0.008	-0.001	0.014
	RESP	0.000	0.000	0.055	0.004	0.002	0.006
	TOTAL	0.000	0.000	0.110	0.012	0.003	0.020

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
E08	GR	0.000	0.000	0.000	0.006	-0.001	0.005
	T1	0.000	0.000	-0.009	-0.034	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	-0.009	-0.028	0.000	0.005
	RESP	0.000	0.000	0.055	0.012	0.002	0.004
	TOTAL	0.000	0.000	0.064	0.040	0.002	0.010
E09 N	GR	0.001	0.000	0.000	-0.001	-0.001	0.002
	T1	0.000	-0.027	-0.033	-0.014	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.001	-0.027	-0.033	-0.015	-0.001	0.002
	RESP	0.002	0.003	0.054	0.021	0.002	0.004
	TOTAL	0.002	0.030	0.087	0.036	0.003	0.006
E09 M	GR	0.001	0.000	0.000	-0.001	-0.001	0.002
	T1	0.000	-0.026	-0.035	0.017	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.001	-0.026	-0.035	0.016	-0.001	0.002
	RESP	0.002	0.001	0.053	0.051	0.002	0.004
	TOTAL	0.002	0.028	0.088	0.068	0.003	0.006
E09 F	GR	0.001	0.000	0.000	-0.001	-0.001	0.002
	T1	0.000	-0.024	-0.034	0.046	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	-0.024	-0.033	0.045	-0.001	0.000
	RESP	0.002	0.000	0.050	0.078	0.002	0.004
	TOTAL	0.002	0.024	0.083	0.124	0.002	0.005
E10	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	P1	0.000	0.000	0.000	0.000	0.000	0.000
	SUM	0.000	0.000	0.000	0.000	0.000	0.000
	RESP	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000

*** Segment E end ***

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL		Dirn	GLOBAL			
				Force	Deform		Force	Deform		
B06 B06 1 Stiff	Guide :RIGID	GR	down left	100 0	0.000 0.000	X Y Z	0 -100	0.000 0.000 0.000		
		T1	down right	330 65	0.000 0.000	X Y Z	-65 -330	0.000 0.000 -0.185		
		P1	down right	2 0	0.000 0.000	X Y Z	0 -2	0.000 0.000 -0.001		
		SUM	down right	431 65	0.000 0.000	X Y Z	-65 -431	0.000 0.000 -0.185		
		RESP	down left	31 11	0.000 0.000	X Y Z	11 31	0.000 0.000 0.024		
		TOTAL	down left	462 76	0.000 0.000	X Y Z	76 462	0.000 0.000 0.209		
		B07 B07 1 Stiff	Guide :RIGID	GR	down right	120 0	0.000 0.000	X Y Z	0 -120	0.000 0.000 0.000
				T1	up left	34 20	0.000 0.000	X Y Z	20 34	0.000 0.000 -0.121
				P1	up left	0 0	0.000 0.000	X Y Z	0 0	0.000 0.000 -0.001
				SUM	down left	86 20	0.000 0.000	X Y Z	20 -86	0.000 0.000 -0.121
RESP	down left			2 3	0.000 0.000	X Y Z	3 2	0.000 0.000 0.024		
TOTAL	down left			89 24	0.000 0.000	X Y Z	24 89	0.000 0.000 0.145		

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL Force	Deform	Dirn	GLOBAL Force	Deform
B08 B08 1 Stiff	Guide :RIGID	GR	down left	120 0	0.000 0.000	X Y Z	0 -120 0	0.000 0.000 0.000
		T1	down left	10 22	0.000 0.000	X Y Z	22 -10 -0.057	0.000 0.000 0.000
		P1	down left	0 0	0.000 0.000	X Y Z	0 0 0	0.000 0.000 0.000
		SUM	down left	131 22	0.000 0.000	X Y Z	22 -131 -0.057	0.000 0.000 0.000
		RESP	down left	2 4	0.000 0.000	X Y Z	4 2 0.024	0.000 0.000 0.000
		TOTAL	down left	132 26	0.000 0.000	X Y Z	26 132 0.081	0.000 0.000 0.000
B09 B09 1 Stiff	Guide :RIGID	GR	down right	96 1	0.000 0.000	X Y Z	-1 -96 0	0.000 0.000 0.000
		T1	up right	5 273	0.000 0.000	X Y Z	-273 5 0.006	0.000 0.000 0.000
		P1	up right	0 1	0.000 0.000	X Y Z	-1 0 0	0.000 0.000 0.000
		SUM	down right	91 275	0.000 0.000	X Y Z	-275 -91 0.007	0.000 0.000 0.000
		RESP	down left	3 19	0.000 0.000	X Y Z	19 3 0.024	0.000 0.000 0.000
		TOTAL	down left	94 294	0.000 0.000	X Y Z	294 94 0.031	0.000 0.000 0.000
B11		GR	down	82	0.000	X	-1	0.000

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL Force	Deform	Dirn	GLOBAL Force	Deform
B11 1 Stiff	Guide :RIGID		right	1	0.000	Y Z	-82 1	0.000 0.000
		T1	down right	2 138	0.000 0.000	X Y Z	-97 -2 97	0.016 0.000 0.016
		P1	down right	0 1	0.000 0.000	X Y Z	0 0 0	0.000 0.000 0.000
		SUM	down right	84 139	0.000 0.000	X Y Z	-98 -84 98	0.016 0.000 0.016
		RESP	down left	3 24	0.000 0.000	X Y Z	17 3 17	0.015 0.000 0.015
		TOTAL	down left	87 163	0.000 0.000	X Y Z	115 87 115	0.031 0.000 0.031
B12 B12 1 Stiff	Guide :RIGID	GR	down right	142 1	0.000 0.000	X Y Z	-1 -142 1	0.000 0.000 0.000
		T1	down right	0 470	0.000 0.000	X Y Z	-333 0 333	0.061 0.000 0.061
		P1	down right	0 2	0.000 0.000	X Y Z	-2 0 2	0.000 0.000 0.000
		SUM	down right	142 474	0.000 0.000	X Y Z	-335 -142 335	0.061 0.000 0.061
		RESP	down left	9 55	0.000 0.000	X Y Z	39 9 39	0.015 0.000 0.015
		TOTAL	down left	151 529	0.000 0.000	X Y Z	374 151 374	0.076 0.000 0.076
E02 E02 1	Guide	GR	down left	145 0	0.000 0.000	X Y	0 -145	0.000 0.000

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL Force	Deform	Dirn	GLOBAL Force	Deform
E03 E03 1 Stiff	Guide :RIGID							
		T1	up left	0 102	0.000 0.000	X Y Z	-72 0 72	0.181 0.000 0.181
		P1	up left	0 0	0.000 0.000	X Y Z	0 0 0	0.001 0.000 0.001
		SUM	down left	145 103	0.000 0.000	X Y Z	-73 -145 73	0.183 0.000 0.183
		RESP	down left	14 19	0.000 0.000	X Y Z	13 14 13	0.037 0.000 0.037
		TOTAL	down left	159 122	0.000 0.000	X Y Z	86 159 86	0.220 0.000 0.220
		GR	down left	107 0	0.000 0.000	X Y Z	0 -107 0	0.000 0.000 0.000
		T1	down left	0 57	0.000 0.000	X Y Z	-41 0 41	0.136 0.000 0.136
		P1	down left	0 0	0.000 0.000	X Y Z	0 0 0	0.001 0.000 0.001
		SUM	down left	107 58	0.000 0.000	X Y Z	-41 -107 41	0.137 0.000 0.137
		RESP	down left	6 13	0.000 0.000	X Y Z	9 6 9	0.037 0.000 0.037
		TOTAL	down left	114 71	0.000 0.000	X Y Z	50 114 50	0.174 0.000 0.174
		GR	down right	137 0	0.000 0.000	X Y Z	0 -137 0	0.000 0.000 0.000

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL Force	Deform	Dirn	GLOBAL Force	Deform
E06 E06 1 Stiff	Guide :RIGID							
		T1	up left	1 109	0.000 0.000	X Y Z	-109 1 0	0.000 0.000 0.183
		P1	up left	0 1	0.000 0.000	X Y Z	-1 0 0	0.000 0.000 0.001
		SUM	down left	136 109	0.000 0.000	X Y Z	-109 -136 0	0.000 0.000 0.185
		RESP	down left	11 66	0.000 0.000	X Y Z	66 11 0	0.000 0.000 0.055
		TOTAL	down left	147 175	0.000 0.000	X Y Z	175 147 0	0.000 0.000 0.240
		GR	down right	107 0	0.000 0.000	X Y Z	0 -107 0	0.000 0.000 0.000
		T1	down right	5 8	0.000 0.000	X Y Z	8 -5 0	0.000 0.000 0.119
		P1	down right	0 0	0.000 0.000	X Y Z	0 0 0	0.000 0.000 0.001
		SUM	down right	112 8	0.000 0.000	X Y Z	8 -112 0	0.000 0.000 0.120
		RESP	down left	5 16	0.000 0.000	X Y Z	16 5 0	0.000 0.000 0.055
		TOTAL	down left	117 24	0.000 0.000	X Y Z	24 117 0	0.000 0.000 0.175
		GR	down left	124 0	0.000 0.000	X Y Z	0 -124 0	0.000 0.000 0.000
		T1	up	19	0.000	X	-2	0.000

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL		Dirn	GLOBAL	
				Force	Deform		Force	Deform
			left	2	0.000	Y	19	0.000
						Z		0.055
	P1	up	0	0.000	X	0	0.000	
		left	0	0.000	Y	0	0.000	
					Z		0.000	
	SUM	down	105	0.000	X	-2	0.000	
		left	2	0.000	Y	-105	0.000	
					Z		0.055	
	RESP	down	8	0.000	X	5	0.000	
		left	5	0.000	Y	8	0.000	
					Z		0.055	
	TOTAL	down	113	0.000	X	7	0.000	
		left	7	0.000	Y	113	0.000	
					Z		0.110	
E08	GR	down	98	0.000	X	1	0.000	
E08 1		rght	1	0.000	Y	-98	0.000	
Stiff					Z		0.000	
	T1	down	110	0.000	X	1	0.000	
		rght	1	0.000	Y	-110	0.000	
					Z		-0.009	
	P1	down	1	0.000	X	0	0.000	
		rght	0	0.000	Y	-1	0.000	
					Z		0.000	
	SUM	down	209	0.000	X	2	0.000	
		rght	2	0.000	Y	-209	0.000	
					Z		-0.009	
	RESP	down	80	0.000	X	4	0.000	
		left	4	0.000	Y	80	0.000	
					Z		0.055	
	TOTAL	down	289	0.000	X	6	0.000	
		left	6	0.000	Y	289	0.000	
					Z		0.064	

RESTRAINT REACTIONS

Point name	Load combination	FORCES (lb)			Result	MOMENTS (ft-lb)			Result
		X	Y	Z		X	Y	Z	
A00	Anchor								
	GR	-5	-35	-6	35	-2	0	2	3
	T1	408	1378	509	1524	187	88	-91	226
	P1	2	6	2	7	1	0	0	1
	SUM	405	1349	505	1497	186	88	-90	225
	RESP	23	130	63	147	16	15	11	25
	TOTAL	428	1480	569	1642	202	103	101	249
A03	Anchor								
	GR	1	-2	1	3	-1	0	1	1
	T1	-33	-404	42	407	-4	-14	-32	35
	P1	0	-2	0	2	0	0	0	0
	SUM	-33	-408	43	412	-5	-14	-31	35
	RESP	6	45	12	47	7	1	5	9
	TOTAL	38	453	55	458	12	15	37	41
B06	Guide								
	GR	0	-100	0	100	0	0	0	0
	T1	-65	-330	0	336	0	0	0	0
	P1	0	-2	0	2	0	0	0	0
	SUM	-65	-431	0	436	0	0	0	0
	RESP	11	31	0	33	0	0	0	0
	TOTAL	76	462	0	468	0	0	0	0
B07	Guide								
	GR	0	-120	0	120	0	0	0	0
	T1	20	34	0	39	0	0	0	0
	P1	0	0	0	0	0	0	0	0
	SUM	20	-86	0	89	0	0	0	0
	RESP	3	2	0	4	0	0	0	0
	TOTAL	24	89	0	92	0	0	0	0
B08	Guide								
	GR	0	-120	0	120	0	0	0	0
	T1	22	-10	0	24	0	0	0	0
	P1	0	0	0	0	0	0	0	0
	SUM	22	-131	0	132	0	0	0	0
	RESP	4	2	0	4	0	0	0	0
	TOTAL	26	132	0	135	0	0	0	0

RESTRAINT REACTIONS

Point name	Load combination	FORCES (lb)			Result	MOMENTS (ft-lb)			Result
		X	Y	Z		X	Y	Z	
B09	Guide								
	GR	-1	-96	0	96	0	0	0	0
	T1	-273	5	0	273	0	0	0	0
	P1	-1	0	0	1	0	0	0	0
	SUM	-275	-91	0	290	0	0	0	0
	RESP	19	3	0	19	0	0	0	0
	TOTAL	294	94	0	308	0	0	0	0
B11	Guide								
	GR	-1	-82	1	82	0	0	0	0
	T1	-97	-2	97	138	0	0	0	0
	P1	0	0	0	1	0	0	0	0
	SUM	-98	-84	98	162	0	0	0	0
	RESP	17	3	17	24	0	0	0	0
	TOTAL	115	87	115	185	0	0	0	0
B12	Guide								
	GR	-1	-142	1	142	0	0	0	0
	T1	-333	0	333	470	0	0	0	0
	P1	-2	0	2	2	0	0	0	0
	SUM	-335	-142	335	495	0	0	0	0
	RESP	39	9	39	56	0	0	0	0
	TOTAL	374	151	374	550	0	0	0	0
B14	Anchor								
	GR	2	-105	0	105	271	4	169	320
	T1	897	0	137	908	-1	1786	0	1786
	P1	4	0	1	4	0	8	0	8
	SUM	903	-106	138	920	270	1799	169	1827
	RESP	114	13	27	118	67	260	33	270
	TOTAL	1017	119	165	1037	337	2058	202	2095
C03	Anchor								
	GR	3	-15	1	16	-3	-1	1	3
	T1	-322	-985	-727	1266	128	96	-65	173
	P1	-2	-5	-3	6	1	0	0	1
	SUM	-321	-1005	-730	1283	126	96	-65	171
	RESP	11	91	88	127	21	7	6	22
	TOTAL	332	1096	818	1408	146	102	70	192

RESTRAINT REACTIONS

Point name	Load combination	FORCES (lb)			Result	MOMENTS (ft-lb)			Result
		X	Y	Z		X	Y	Z	
D02	Anchor								
	GR	1	-8	2	8	-1	0	1	1
	T1	-8	315	-326	453	164	-6	-11	165
	P1	0	2	2	1	0	0	0	1
	SUM	-7	309	-325	448	164	-6	-10	165
	RESP	4	34	18	38	8	1	3	9
	TOTAL	11	342	343	485	173	6	13	173
E02	Guide								
	GR	0	-145	0	145	0	0	0	0
	T1	-72	0	72	102	0	0	0	0
	P1	0	0	0	0	0	0	0	0
	SUM	-73	-145	73	178	0	0	0	0
	RESP	13	14	13	24	0	0	0	0
	TOTAL	86	159	86	200	0	0	0	0
E03	Guide								
	GR	0	-107	0	107	0	0	0	0
	T1	-41	0	41	57	0	0	0	0
	P1	0	0	0	0	0	0	0	0
	SUM	-41	-107	41	122	0	0	0	0
	RESP	9	6	9	14	0	0	0	0
	TOTAL	50	114	50	134	0	0	0	0
E05	Guide								
	GR	0	-137	0	137	0	0	0	0
	T1	-109	1	0	109	0	0	0	0
	P1	-1	0	0	1	0	0	0	0
	SUM	-109	-136	0	175	0	0	0	0
	RESP	66	11	0	67	0	0	0	0
	TOTAL	175	147	0	229	0	0	0	0
E06	Guide								
	GR	0	-107	0	107	0	0	0	0
	T1	8	-5	0	9	0	0	0	0
	P1	0	0	0	0	0	0	0	0
	SUM	8	-112	0	112	0	0	0	0
	RESP	16	5	0	17	0	0	0	0
	TOTAL	24	117	0	119	0	0	0	0

RESTRAINT REACTIONS

Point name	Load combination	X	FORCES (lb)		Result	X	MOMENTS (ft-lb)		Result
			Y	Z			Y	Z	
E07	Guide								
	GR		0	-124	0	124	0	0	0
	T1		-2	19	0	19	0	0	0
	P1		0	0	0	0	0	0	0
	SUM		-2	-105	0	105	0	0	0
	RESP		5	8	0	9	0	0	0
	TOTAL		7	113	0	113	0	0	0
E08	Guide								
	GR		1	-98	0	98	0	0	0
	T1		1	-110	0	110	0	0	0
	P1		0	-1	0	1	0	0	0
	SUM		2	-209	0	209	0	0	0
	RESP		4	80	0	81	0	0	0
	TOTAL		6	289	0	289	0	0	0
E10	Anchor								
	GR		-1	-52	0	52	-2	-2	4
	T1		0	95	-178	202	458	0	-1 458
	P1		0	0	-1	1	2	0	2
	SUM		-1	44	-178	184	457	-2	2 457
	RESP		5	74	217	229	622	4	18 622
	TOTAL		6	118	395	413	1079	5	20 1080

ASME B31.3c (1992) CODE COMPLIANCE

Point name	Load combination	(Moments in ft-lb)			Torsion	S.I.F		(Stress in psi)		Code	Code
		In-Pl. Moment	Out-Pl. Moment	Moment		In	Out	Eq. Load no. type	Stress		
*** Segment A begin ***											
A00	Max P							(3a) HOOP	926	16700	
	GR + Max P	1	1		1.00	1.00	(18) SUST	424	16700		
	Cold to T1	187	91	88	1.00	1.00	(17) DISP	4839	25050		
	SRSS	13	9		1.00	1.00	(18) OCC	511	22211		
B00	- Max P							(3a) HOOP	926	16700	
	GR + Max P	0	3		1.19	1.25	(18) SUST	494	16700		
	Cold to T1	90	398	88	1.19	1.25	(17) DISP	11054	25050		
	SRSS	9	30		1.19	1.25	(18) OCC	1272	22211		
B00	+ Max P							(3a) HOOP	926	16700	
	GR + Max P	0	2		1.19	1.25	(18) SUST	448	16700		
	Cold to T1	103	175	40	1.19	1.25	(17) DISP	5440	25050		
	SRSS	7	16		1.19	1.25	(18) OCC	697	22211		
A01 N-	Max P							(3a) HOOP	926	16700	
	GR + Max P	0	0		1.00	1.00	(18) SUST	391	16700		
	Cold to T1	31	27	40	1.00	1.00	(17) DISP	1225	25050		
	SRSS	3	2		1.00	1.00	(18) OCC	107	22211		
A01 N+	Max P							(3a) HOOP	926	16700	
	GR + Max P	0	0		2.27	1.89	(18) SUST	406	16700		
	Cold to T1	41	3	40	2.27	1.89	(17) DISP	2173	25050		
	SRSS	3	0		2.27	1.89	(18) OCC	243	22211		
A01 M	Max P							(3a) HOOP	926	16700	
	GR + Max P	0	0		2.27	1.89	(18) SUST	382	16700		
	Cold to T1	10	10	34	2.27	1.89	(17) DISP	961	25050		
	SRSS	0	1		2.27	1.89	(18) OCC	78	22211		
A01 F-	Max P							(3a) HOOP	926	16700	
	GR + Max P	0	0		2.27	1.89	(18) SUST	401	16700		
	Cold to T1	12	11	25	2.27	1.89	(17) DISP	915	25050		
	SRSS	2	1		2.27	1.89	(18) OCC	159	22211		
A01 F+	Max P							(3a) HOOP	926	16700	
	GR + Max P	0	0		1.00	1.00	(18) SUST	390	16700		
	Cold to T1	12	11	25	1.00	1.00	(17) DISP	647	25050		
	SRSS	2	1		1.00	1.00	(18) OCC	75	22211		

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE				(Stress in psi)		(Code Allow.)	
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no. type	Code Stress	Code Allow.	
A02 N- Max P	GR + Max P	0	0		1.00 1.00	(3a) HOOP	926	16700	
	Cold to T1	12	11	25	1.00 1.00	(18) SUST	390	16700	
	SRSS	2	1		1.00 1.00	(17) DISP	647	25050	
						(18) OCC	75	22211	
A02 N+ Max P	GR + Max P	0	0		2.27 1.89	(3a) HOOP	926	16700	
	Cold to T1	12	11	25	2.27 1.89	(18) SUST	401	16700	
	SRSS	2	1		2.27 1.89	(17) DISP	915	25050	
						(18) OCC	159	22211	
A02 M Max P	GR + Max P	0	0		2.27 1.89	(3a) HOOP	926	16700	
	Cold to T1	11	6	19	2.27 1.89	(18) SUST	399	16700	
	SRSS	2	1		2.27 1.89	(17) DISP	714	25050	
						(18) OCC	139	22211	
A02 F- Max P	GR + Max P	0	0		2.27 1.89	(3a) HOOP	926	16700	
	Cold to T1	11	3	18	2.27 1.89	(18) SUST	382	16700	
	SRSS	0	0		2.27 1.89	(17) DISP	682	25050	
						(18) OCC	33	22211	
A02 F+ Max P	GR + Max P	0	0		1.00 1.00	(3a) HOOP	926	16700	
	Cold to T1	10	6	18	1.00 1.00	(18) SUST	381	16700	
	SRSS	0	0		1.00 1.00	(17) DISP	453	25050	
						(18) OCC	15	22211	
D00 - Max P	GR + Max P	0	0		1.19 1.25	(3a) HOOP	926	16700	
	Cold to T1	69	14	18	1.19 1.25	(18) SUST	399	16700	
	SRSS	5	2		1.19 1.25	(17) DISP	1846	25050	
						(18) OCC	215	22211	
D00 + Max P	GR + Max P	0	0		1.19 1.25	(3a) HOOP	926	16700	
	Cold to T1	25	9	14	1.19 1.25	(18) SUST	394	16700	
	SRSS	1	1		1.19 1.25	(17) DISP	742	25050	
						(18) OCC	60	22211	
A03 Max P	GR + Max P	1	1		1.00 1.00	(3a) HOOP	926	16700	
	Cold to T1	4	32	14	1.00 1.00	(18) SUST	419	16700	
	SRSS	6	4		1.00 1.00	(17) DISP	758	25050	
						(18) OCC	227	22211	

*** Segment A end ***

*** Segment B begin ***

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE				(Stress in psi)		(Code Allow.)	
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no. type	Code Stress	Code Allow.	
800 Max P	GR + Max P	5	0		1.19 1.25	(3a) HOOP	926	16700	
	Cold to T1	573	128	194	1.19 1.25	(18) SUST	553	16700	
	SRSS	46	15		1.19 1.25	(17) DISP	14589	25050	
						(18) OCC	1804	22211	
B01 N- Max P	GR + Max P	1	0		1.00 1.00	(3a) HOOP	926	16700	
	Cold to T1	305	149	194	1.00 1.00	(18) SUST	396	16700	
	SRSS	27	13		1.00 1.00	(17) DISP	8354	25050	
						(18) OCC	970	22211	
B01 N+ Max P	GR + Max P	1	0		2.27 1.89	(3a) HOOP	926	16700	
	Cold to T1	305	149	194	2.27 1.89	(18) SUST	420	16700	
	SRSS	27	13		2.27 1.89	(17) DISP	16498	25050	
						(18) OCC	2139	22211	
B01 M Max P	GR + Max P	2	0		2.27 1.89	(3a) HOOP	926	16700	
	Cold to T1	173	20	247	2.27 1.89	(18) SUST	489	16700	
	SRSS	18	4		2.27 1.89	(17) DISP	9964	25050	
						(18) OCC	1319	22211	
B01 F- Max P	GR + Max P	2	0		2.27 1.89	(3a) HOOP	926	16700	
	Cold to T1	159	177	165	2.27 1.89	(18) SUST	535	16700	
	SRSS	16	18		2.27 1.89	(17) DISP	11130	25050	
						(18) OCC	1606	22211	
B01 F+ Max P	GR + Max P	1	2		1.00 1.00	(3a) HOOP	926	16700	
	Cold to T1	238	12	165	1.00 1.00	(18) SUST	443	16700	
	SRSS	24	3		1.00 1.00	(17) DISP	6208	25050	
						(18) OCC	774	22211	
C00 - Max P	GR + Max P	2	0		1.19 1.25	(3a) HOOP	926	16700	
	Cold to T1	247	156	165	1.19 1.25	(18) SUST	439	16700	
	SRSS	22	19		1.19 1.25	(17) DISP	8329	25050	
						(18) OCC	1145	22211	
C00 + Max P	GR + Max P	3	5		1.19 1.25	(3a) HOOP	926	16700	
	Cold to T1	312	521	1	1.19 1.25	(18) SUST	597	16700	
	SRSS	45	28		1.19 1.25	(17) DISP	16049	25050	
						(18) OCC	2069	22211	
B02 Max P	GR + Max P	4	1		1.00 1.00	(3a) HOOP	926	16700	
	Cold to T1	483	139	1	1.00 1.00	(18) SUST	525	16700	
	SRSS	42	12		1.00 1.00	(17) DISP	10765	25050	
						(18) OCC	1425	22211	

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)				(Stress in psi)				Code	Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	Eq. Load Out	no. type	Stress	Code		
B03	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	365	16700		
	Cold to T1	318	124	1	1.00	1.00	(17) DISP	2374	25050		
	SRSS	28	11		1.00	1.00	(18) OCC	274	22211		
B04	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	358	16700		
	Cold to T1	232	117	1	1.00	1.00	(17) DISP	1810	25050		
	SRSS	21	10		1.00	1.00	(18) OCC	211	22211		
B05 N-	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	399	16700		
	Cold to T1	774	28	1	1.00	1.00	(17) DISP	5393	25050		
	SRSS	64	3		1.00	1.00	(18) OCC	587	22211		
B05 N+	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	449	16700		
	Cold to T1	774	28	1	1.78	1.48	(17) DISP	9581	25050		
	SRSS	64	3		1.78	1.48	(18) OCC	1043	22211		
B05 M	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	468	16700		
	Cold to T1	874	7	15	1.78	1.48	(17) DISP	10812	25050		
	SRSS	72	3		1.78	1.48	(18) OCC	1176	22211		
B05 F-	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	466	16700		
	Cold to T1	849	17	11	1.78	1.48	(17) DISP	10501	25050		
	SRSS	71	3		1.78	1.48	(18) OCC	1147	22211		
B05 F+	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	409	16700		
	Cold to T1	849	17	11	1.00	1.00	(17) DISP	5911	25050		
	SRSS	71	3		1.00	1.00	(18) OCC	646	22211		
B06	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	1039	16700		
	Cold to T1	208	172	11	1.00	1.00	(17) DISP	1878	25050		
	SRSS	11	18		1.00	1.00	(18) OCC	189	22211		
B07	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	1269	16700		
	Cold to T1	102	34	11	1.00	1.00	(17) DISP	462	25050		
	SRSS	56	4		1.00	1.00	(18) OCC	44	22211		

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)				(Stress in psi)				Code	Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	Eq. Load Out	no. type	Stress	Code		
B08	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	1273	16700		
	Cold to T1	103	36	11	1.00	1.00	(17) DISP	289	25050		
	SRSS	17	5		1.00	1.00	(18) OCC	46	22211		
B09	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	1027	16700		
	Cold to T1	76	179	11	1.00	1.00	(17) DISP	1251	25050		
	SRSS	13	21		1.00	1.00	(18) OCC	200	22211		
B10 N-	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	550	16700		
	Cold to T1	23	2	11	1.00	1.00	(17) DISP	1835	25050		
	SRSS	9	27		1.00	1.00	(18) OCC	250	22211		
B10 N+	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	550	16700		
	Cold to T1	2	23	11	1.00	1.00	(17) DISP	1835	25050		
	SRSS	263	9		1.00	1.00	(18) OCC	250	22211		
B10 M	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	407	16700		
	Cold to T1	4	7	7	1.00	1.00	(17) DISP	3046	25050		
	SRSS	437	10		1.00	1.00	(18) OCC	284	22211		
B10 F-	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	392	16700		
	Cold to T1	3	6	4	1.00	1.00	(17) DISP	2478	25050		
	SRSS	356	9		1.00	1.00	(18) OCC	177	22211		
B10 F+	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	392	16700		
	Cold to T1	6	3	4	1.00	1.00	(17) DISP	2478	25050		
	SRSS	9	356		1.00	1.00	(18) OCC	177	22211		
B11	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	812	16700		
	Cold to T1	52	1	4	1.00	1.00	(17) DISP	231	25050		
	SRSS	4	33		1.00	1.00	(18) OCC	222	22211		
B12	Max P					(3a)	HOOP	790	16700		
	GR + Max P					(18)	SUST	1841	16700		
	Cold to T1	165	3	4	1.00	1.00	(17) DISP	2981	25050		
	SRSS	1	428		1.00	1.00	(18) OCC	341	22211		

Point name	Load combination	ASME B31.3c (1992) (Moments in ft-lb)			CODE COMPLIANCE		(Stress in psi)		Code Stress	Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In	S.I.F Out	Eq. Load no. type	Code Stress		
B13 N-	Max P						(3a) HOOP	790	16700	
	GR + Max P	60	3		1.00	1.00	(18) SUST	887	16700	
	Cold to T1	0	298	4	1.00	1.00	(17) DISP	2072	25050	
	SRSS	9	40		1.00	1.00	(18) OCC	376	22211	
B13 N+	Max P						(3a) HOOP	790	16700	
	GR + Max P	3	60		1.00	1.00	(18) SUST	887	16700	
	Cold to T1	298	0	4	1.00	1.00	(17) DISP	2072	25050	
	SRSS	40	9		1.00	1.00	(18) OCC	376	22211	
B13 M	Max P						(3a) HOOP	790	16700	
	GR + Max P	5	1		1.00	1.00	(18) SUST	384	16700	
	Cold to T1	671	1	3	1.00	1.00	(17) DISP	4669	25050	
	SRSS	76	2		1.00	1.00	(18) OCC	693	22211	
B13 F-	Max P						(3a) HOOP	790	16700	
	GR + Max P	5	43		1.00	1.00	(18) SUST	728	16700	
	Cold to T1	744	2	3	1.00	1.00	(17) DISP	5175	25050	
	SRSS	82	5		1.00	1.00	(18) OCC	753	22211	
B13 F+	Max P						(3a) HOOP	790	16700	
	GR + Max P	43	5		1.00	1.00	(18) SUST	728	16700	
	Cold to T1	2	744	3	1.00	1.00	(17) DISP	5175	25050	
	SRSS	5	82		1.00	1.00	(18) OCC	753	22211	
E00 -	Max P						(3a) HOOP	790	16700	
	GR + Max P	2	50		1.22	1.30	(18) SUST	901	16700	
	Cold to T1	469	1	3	1.22	1.30	(17) DISP	3757	25050	
	SRSS	77	15		1.22	1.30	(18) OCC	845	22211	
E00 +	Max P						(3a) HOOP	790	16700	
	GR + Max P	1	79		1.22	1.30	(18) SUST	1275	16700	
	Cold to T1	96	2	1	1.22	1.30	(17) DISP	813	25050	
	SRSS	33	35		1.22	1.30	(18) OCC	553	22211	
B14	Max P						(3a) HOOP	790	16700	
	GR + Max P	311	12		1.00	1.00	(18) SUST	3186	16700	
	Cold to T1	1	1786	1	1.00	1.00	(17) DISP	12433	25050	
	SRSS	65	207		1.00	1.00	(18) OCC	1988	22211	

*** Segment B end ***

*** Segment C begin ***

Point name	Load combination	ASME B31.3c (1992) (Moments in ft-lb)			CODE COMPLIANCE		(Stress in psi)		Code Stress	Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In	S.I.F Out	Eq. Load no. type	Code Stress		
C00	Max P						(3a) HOOP	926	16700	
	GR + Max P	5	0		1.19	1.25	(18) SUST	565	16700	
	Cold to T1	365	166	65	1.19	1.25	(17) DISP	9759	25050	
	SRSS	25	10		1.19	1.25	(18) OCC	995	22211	
C01 N-	Max P						(3a) HOOP	926	16700	
	GR + Max P	2	0		1.00	1.00	(18) SUST	432	16700	
	Cold to T1	160	12	65	1.00	1.00	(17) DISP	3703	25050	
	SRSS	10	1		1.00	1.00	(18) OCC	332	22211	
C01 N+	Max P						(3a) HOOP	926	16700	
	GR + Max P	2	0		2.27	1.89	(18) SUST	497	16700	
	Cold to T1	160	12	65	2.27	1.89	(17) DISP	7905	25050	
	SRSS	10	1		2.27	1.89	(18) OCC	752	22211	
C01 M	Max P						(3a) HOOP	926	16700	
	GR + Max P	0	1		2.27	1.89	(18) SUST	435	16700	
	Cold to T1	58	125	18	2.27	1.89	(17) DISP	5809	25050	
	SRSS	4	12		2.27	1.89	(18) OCC	823	22211	
C01 F-	Max P						(3a) HOOP	926	16700	
	GR + Max P	1	1		2.27	1.89	(18) SUST	479	16700	
	Cold to T1	43	189	112	2.27	1.89	(17) DISP	8282	25050	
	SRSS	6	16		2.27	1.89	(18) OCC	1098	22211	
C01 F+	Max P						(3a) HOOP	926	16700	
	GR + Max P	0	1		1.00	1.00	(18) SUST	432	16700	
	Cold to T1	164	103	112	1.00	1.00	(17) DISP	4791	25050	
	SRSS	16	8		1.00	1.00	(18) OCC	567	22211	
C02 N-	Max P						(3a) HOOP	926	16700	
	GR + Max P	0	1		1.00	1.00	(18) SUST	432	16700	
	Cold to T1	166	103	112	1.00	1.00	(17) DISP	4821	25050	
	SRSS	16	8		1.00	1.00	(18) OCC	571	22211	
C02 N+	Max P						(3a) HOOP	926	16700	
	GR + Max P	1	1		2.27	1.89	(18) SUST	480	16700	
	Cold to T1	195	7	112	2.27	1.89	(17) DISP	9786	25050	
	SRSS	18	1		2.27	1.89	(18) OCC	1295	22211	
C02 M	Max P						(3a) HOOP	926	16700	
	GR + Max P	0	0		2.27	1.89	(18) SUST	420	16700	
	Cold to T1	240	73	79	2.27	1.89	(17) DISP	12131	25050	
	SRSS	22	3		2.27	1.89	(18) OCC	1599	22211	

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)				(Stress in psi)			
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In Out	Eq. Load no. type	Code Stress	Code Allow.	
C02 F- Max P	GR + Max P	2	0			(3a) HOOP	926	16700	
	Cold to T1	163	98	9	2.27 1.89	(18) SUST	535	16700	
	SRSS	17	6		2.27 1.89	(17) DISP	8873	25050	
						(18) OCC	1290	22211	
C02 F+ Max P	GR + Max P	2	0			(3a) HOOP	926	16700	
	Cold to T1	163	98	8	1.00 1.00	(18) SUST	451	16700	
	SRSS	17	6		1.00 1.00	(17) DISP	4081	25050	
						(18) OCC	578	22211	
C03 Max P	GR + Max P	2	0			(3a) HOOP	926	16700	
	Cold to T1	143	96	8	1.00 1.00	(18) SUST	464	16700	
	SRSS	16	5		1.00 1.00	(17) DISP	3702	25050	
						(18) OCC	532	22211	
*** Segment C end ***									
*** Segment D begin ***									
D00 Max P	GR + Max P	1	0			(3a) HOOP	926	16700	
	Cold to T1	45	3	5	1.19 1.25	(18) SUST	397	16700	
	SRSS	6	1		1.19 1.25	(17) DISP	1074	25050	
						(18) OCC	229	22211	
D01 N- Max P	GR + Max P	0	0			(3a) HOOP	926	16700	
	Cold to T1	8	5	5	1.00 1.00	(18) SUST	386	16700	
	SRSS	2	0		1.00 1.00	(17) DISP	227	25050	
						(18) OCC	53	22211	
D01 N+ Max P	GR + Max P	0	0			(3a) HOOP	926	16700	
	Cold to T1	8	5	5	2.27 1.89	(18) SUST	398	16700	
	SRSS	2	0		2.27 1.89	(17) DISP	442	25050	
						(18) OCC	121	22211	
D01 M Max P	GR + Max P	0	0			(3a) HOOP	926	16700	
	Cold to T1	29	8	0	2.27 1.89	(18) SUST	383	16700	
	SRSS	1	1		2.27 1.89	(17) DISP	1449	25050	
						(18) OCC	75	22211	
D01 F- Max P	GR + Max P	0	0			(3a) HOOP	926	16700	
	Cold to T1	6	7	6	2.27 1.89	(18) SUST	389	16700	
	SRSS	1	1		2.27 1.89	(17) DISP	418	25050	
						(18) OCC	71	22211	

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)				(Stress in psi)			
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In Out	Eq. Load no. type	Code Stress	Code Allow.	
D01 F+ Max P	GR + Max P	0	0			(3a) HOOP	926	16700	
	Cold to T1	6	7	6	1.00 1.00	(18) SUST	383	16700	
	SRSS	1	1		1.00 1.00	(17) DISP	230	25050	
						(18) OCC	36	22211	
D02 Max P	GR + Max P	0	1			(3a) HOOP	926	16700	
	Cold to T1	164	11	6	1.00 1.00	(18) SUST	395	16700	
	SRSS	7	3		1.00 1.00	(17) DISP	3528	25050	
						(18) OCC	235	22211	
*** Segment D end ***									
*** Segment E begin ***									
E00 Max P	GR + Max P	0	123			(3a) HOOP	790	16700	
	Cold to T1	373	1	0	1.22 1.30	(18) SUST	1789	16700	
	SRSS	106	48		1.22 1.30	(17) DISP	3175	25050	
						(18) OCC	1317	22211	
E01 N- Max P	GR + Max P	4	3			(3a) HOOP	790	16700	
	Cold to T1	0	491	0	1.00 1.00	(18) SUST	377	16700	
	SRSS	3	68		1.00 1.00	(17) DISP	3419	25050	
						(18) OCC	619	22211	
E01 N+ Max P	GR + Max P	3	4			(3a) HOOP	790	16700	
	Cold to T1	491	0	0	1.78 1.48	(18) SUST	401	16700	
	SRSS	68	3		1.78 1.48	(17) DISP	6075	25050	
						(18) OCC	1099	22211	
E01 M Max P	GR + Max P	3	35			(3a) HOOP	790	16700	
	Cold to T1	532	0	0	1.78 1.48	(18) SUST	805	16700	
	SRSS	74	12		1.78 1.48	(17) DISP	6580	25050	
						(18) OCC	1215	22211	
E01 F- Max P	GR + Max P	3	44			(3a) HOOP	790	16700	
	Cold to T1	526	0	0	1.78 1.48	(18) SUST	936	16700	
	SRSS	74	15		1.78 1.48	(17) DISP	6499	25050	
						(18) OCC	1214	22211	
E01 F+ Max P	GR + Max P	44	3			(3a) HOOP	790	16700	
	Cold to T1	0	526	0	1.00 1.00	(18) SUST	741	16700	
	SRSS	15	74		1.00 1.00	(17) DISP	3658	25050	
						(18) OCC	687	22211	

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)				(Stress in psi)			
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no. type	Code Stress	Code Allow.	
E02	Max P					(3a) HOOP	790	16700	
	GR + Max P	199	1		1.00 1.00 (18)	SUST	2157	16700	
	Cold to T1	1	128	0	1.00 1.00 (17)	DISP	892	25050	
	SRSS	37	14		1.00 1.00 (18)	OCC	362	22211	
E03	Max P					(3a) HOOP	790	16700	
	GR + Max P	90	1		1.00 1.00 (18)	SUST	1159	16700	
	Cold to T1	1	171	0	1.00 1.00 (17)	DISP	1190	25050	
	SRSS	8	20		1.00 1.00 (18)	OCC	197	22211	
E04 N-	Max P					(3a) HOOP	790	16700	
	GR + Max P	11	1		1.00 1.00 (18)	SUST	433	16700	
	Cold to T1	1	250	0	1.00 1.00 (17)	DISP	1741	25050	
	SRSS	5	46		1.00 1.00 (18)	OCC	424	22211	
E04 N+	Max P					(3a) HOOP	790	16700	
	GR + Max P	1	11		1.78 1.48 (18)	SUST	480	16700	
	Cold to T1	250	1	0	1.78 1.48 (17)	DISP	3094	25050	
	SRSS	46	5		1.78 1.48 (18)	OCC	752	22211	
E04 M	Max P					(3a) HOOP	790	16700	
	GR + Max P	1	3		1.78 1.48 (18)	SUST	384	16700	
	Cold to T1	252	1	0	1.78 1.48 (17)	DISP	3118	25050	
	SRSS	45	5		1.78 1.48 (18)	OCC	738	22211	
E04 F-	Max P					(3a) HOOP	790	16700	
	GR + Max P	1	5		1.78 1.48 (18)	SUST	403	16700	
	Cold to T1	243	1	0	1.78 1.48 (17)	DISP	2999	25050	
	SRSS	41	5		1.78 1.48 (18)	OCC	677	22211	
E04 F+	Max P					(3a) HOOP	790	16700	
	GR + Max P	5	1		1.00 1.00 (18)	SUST	381	16700	
	Cold to T1	1	243	0	1.00 1.00 (17)	DISP	1688	25050	
	SRSS	5	41		1.00 1.00 (18)	OCC	382	22211	
E05	Max P					(3a) HOOP	790	16700	
	GR + Max P	159	0		1.00 1.00 (18)	SUST	1766	16700	
	Cold to T1	1	49	0	1.00 1.00 (17)	DISP	342	25050	
	SRSS	21	73		1.00 1.00 (18)	OCC	697	22211	
E06	Max P					(3a) HOOP	790	16700	
	GR + Max P	80	0		1.00 1.00 (18)	SUST	1071	16700	
	Cold to T1	8	13	0	1.00 1.00 (17)	DISP	108	25050	
	SRSS	6	20		1.00 1.00 (18)	OCC	187	22211	

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)				(Stress in psi)			
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no. type	Code Stress	Code Allow.	
E07	Max P					(3a) HOOP	790	16700	
	GR + Max P	108	1		1.00 1.00 (18)	SUST	1328	16700	
	Cold to T1	32	4	0	1.00 1.00 (17)	DISP	225	25050	
	SRSS	10	5		1.00 1.00 (18)	OCC	101	22211	
E08	Max P					(3a) HOOP	790	16700	
	GR + Max P	74	2		1.00 1.00 (18)	SUST	1011	16700	
	Cold to T1	121	1	0	1.00 1.00 (17)	DISP	841	25050	
	SRSS	36	6		1.00 1.00 (18)	OCC	333	22211	
E09 N-	Max P					(3a) HOOP	790	16700	
	GR + Max P	4	1		1.00 1.00 (18)	SUST	377	16700	
	Cold to T1	232	0	0	1.00 1.00 (17)	DISP	1613	25050	
	SRSS	187	3		1.00 1.00 (18)	OCC	1713	22211	
E09 N+	Max P					(3a) HOOP	790	16700	
	GR + Max P	4	1		1.78 1.48 (18)	SUST	408	16700	
	Cold to T1	232	0	0	1.78 1.48 (17)	DISP	2866	25050	
	SRSS	187	3		1.78 1.48 (18)	OCC	3043	22211	
E09 M	Max P					(3a) HOOP	790	16700	
	GR + Max P	4	3		1.78 1.48 (18)	SUST	409	16700	
	Cold to T1	237	0	0	1.78 1.48 (17)	DISP	2936	25050	
	SRSS	185	3		1.78 1.48 (18)	OCC	3001	22211	
E09 F-	Max P					(3a) HOOP	790	16700	
	GR + Max P	3	6		1.78 1.48 (18)	SUST	430	16700	
	Cold to T1	201	0	0	1.78 1.48 (17)	DISP	2483	25050	
	SRSS	146	2		1.78 1.48 (18)	OCC	2381	22211	
E09 F+	Max P					(3a) HOOP	790	16700	
	GR + Max P	3	6		1.00 1.00 (18)	SUST	397	16700	
	Cold to T1	201	0	0	1.00 1.00 (17)	DISP	1397	25050	
	SRSS	146	2		1.00 1.00 (18)	OCC	1340	22211	
E10	Max P					(3a) HOOP	790	16700	
	GR + Max P	0	2		1.00 1.00 (18)	SUST	359	16700	
	Cold to T1	458	1	0	1.00 1.00 (17)	DISP	3186	25050	
	SRSS	501	15		1.00 1.00 (18)	OCC	4588	22211	

*** Segment E end ***

SYSTEM SUMMARY

Maximum displacements (in)

Maximum X :	0.220	Point : E02	Load Comb.: TOTAL
Maximum Y :	0.096	Point : E01 M	Load Comb.: TOTAL
Maximum Z :	0.288	Point : E01 F	Load Comb.: TOTAL
Max. total:	0.367	Point : E01 F	Load Comb.: TOTAL

Maximum rotations (deg)

Maximum X :	0.361	Point : B04	Load Comb.: TOTAL
Maximum Y :	0.244	Point : E00	Load Comb.: TOTAL
Maximum Z :	0.143	Point : C01 M	Load Comb.: TOTAL
Max. total:	0.383	Point : B04	Load Comb.: TOTAL

Maximum restraint forces(lb)

Maximum X :	1017	Point : B14	Load Comb.: TOTAL
Maximum Y :	1480	Point : A00	Load Comb.: TOTAL
Maximum Z :	818	Point : C03	Load Comb.: TOTAL
Max. total:	1642	Point : A00	Load Comb.: TOTAL

Maximum restraint moments(ft-lb)

Maximum X :	1079	Point : E10	Load Comb.: TOTAL
Maximum Y :	2058	Point : B14	Load Comb.: TOTAL
Maximum Z :	202	Point : B14	Load Comb.: TOTAL
Max. total:	2095	Point : B14	Load Comb.: TOTAL

SYSTEM SUMMARY

Maximum sustained stress

Point	:	B14
Stress psi	:	3186
Allowable psi	:	16700
Ratio	:	0.19
Load combination	:	GR + Max P

Maximum displacement stress

Point	:	B01 N
Stress psi	:	16498
Allowable psi	:	25050
Ratio	:	0.66
Load combination	:	Cold to T1

Maximum occasional stress

Point	:	E10
Stress psi	:	4588
Allowable psi	:	22211
Ratio	:	0.21
Load combination	:	SRSS

Maximum hoop stress

Point	:	A00
Stress psi	:	926
Allowable psi	:	16700
Ratio	:	0.06
Load combination	:	Max P

Maximum sustained stress ratio

Point	:	B14
Stress psi	:	3186
Allowable psi	:	16700
Ratio	:	0.19
Load combination	:	GR + Max P

Maximum displacement stress ratio

Point	:	B01 N
Stress psi	:	16498
Allowable psi	:	25050
Ratio	:	0.66
Load combination	:	Cold to T1

SYSTEM SUMMARY

Maximum occasional stress ratio

Point : E10
 Stress psi : 4588
 Allowable psi : 22211
 Ratio : 0.21
 Load combination : SRSS

Maximum hoop stress ratio

Point : A00
 Stress psi : 926
 Allowable psi : 16700
 Ratio : 0.06
 Load combination : Max P

*** The system satisfies ASME B31.3 code requirements ***
 *** for the selected options ***

Max occasional stress

$4588 \text{ psi} + 3186 \text{ psi} = 7774 \text{ psi} < 22211 \text{ psi o.k.}$

Ratio = 0.35

Rev. 1

By: K. Hayase 12/1/97

chk: M. Ahmed 3.23.98

W320-27-029

AY Farm Jumper Stress Analysis

ICF KAISER HANFORD COMPANY	CALCULATION IDENTIFICATION AND INDEX	Page <u>i</u> of <u>iii</u> Date <u>09 /01 /95</u>
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This sheet shows the status and description of the attached Design Analysis sheets.

Discipline 27, Piping and Vessels WO/Job No. ER4319 Calculation No. W320-27-029
 Project No. & Name Project W-320 Waste Retrieval for Tank 241-C-106
 Calculation Item AY Farm Jumper Stress Analysis

These calculations apply to:

Dwg. No. ECN NO: W-320-380 Rev. No. _____
 Dwg. No. _____ Rev. No. _____
 Other (Study, CDR) _____ Rev. No. _____

The status of these calculations is:

- ☐ Preliminary Calculations
☒ Final Calculations
☐ Check Calculations (On Calculation Dated _____)
☐ Void Calculation (Reason Voided _____)

Incorporated in Final Drawings?

☒ Yes ☐ No

This calculation verified by independent "check" calculation?

☐ Yes ☒ No

Original and Revised Calculation Approvals:

	Rev. 0 Signature / Date	Rev. 1 Signature / Date	Rev. 2 Signature / Date
Originator	M.M. AHMED 9-1-95	M.M. Ahmed 7-12-96	M.M. Ahmed 3-12-97
Checked by	M.K. Pal 9/11/95	D.L. Stone 7-15-96	D.L. Stone 3-12-97
Approved by	C.D. Jones 9/11/95	C.D. Jones 7-16-96	D.L. Stone 3-12-97
Checked Against Approved Vendor Data			

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ISB Jumper Connectors qualification

8

Pit wall Anchor loads

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JUMPER PIPING 3D ISOMETRIC

11/26/97

This sheet shows the status and description of the attached Design Analysis sheets.

Discipline: (27) Piping and Vessels

WO/Job No.: ER4319

Calculation No.: W320-27-029

Project No. & Name: Project W-320 Waste Retrieval for Tank 241-C-106

Calculation Item: AY Farm Jumper Stress Analysis

These calculations apply to:

Dwg. No.: See Calculation Cross Index

Rev. No.

Dwg. No.:

Rev. No.

Other (Study, CDR):

Rev. No.

The status of these calculations is:

☐ Preliminary Calculations

☒ Final Calculations

☐ Check Calculations (On Calculation Dated)

☐ Void Calculation (Reason Voided)

Incorporated in Final Drawings?

☒ Yes ☐ No

This calculation verified by independent "check" calculations?

☐ Yes ☒ No

Original and Revised Calculation Approvals:

	Rev. 3 Signature/Date	Rev. 4 Signature/Date	Rev. 5 Signature/Date
Originator	Kelly K. Hayes 11/26/97		
Checked by	M. Ahmed 3.18.98		
Approved by	J.P. Evans 4/9/98		
Checked Against Approved Vendor Data	M. Ahmed 4.10.98		

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8	Pit Wall Anchor Loads
9 - 10	JUMPER PIPING 3D ISOMETRIC

**FLUOR DANIEL
NORTHWEST INC.**

**CALCULATION IDENTIFICATION
AND INDEX**
Continuation Sheet

Page *IIa* of *III*

Date

11/26/97

Discipline (27) Piping and Vessels

WO/Job No. ER4319

Calculation No. W320-27-029

	Rev. 3 Signature/Date	Rev. 4 Signature/Date	Rev. 5 Signature/Date
Originator	<i>Kelly V. Hagane</i> <i>11/26/97</i>		
Checked by	<i>M. Ahmed</i> <i>3.18.98</i>		

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Design Analysis
Page No.

Description

Appdx A	Autopipe File no: AY02A1R2 For Static Analysis and AY02A2R2 for Dynamic Analysis for Pump Pit jumper
Appdx B	Autopipe File no: AY02E-R2 for Static and Dynamic analysis for Sluice Pit jumper
Appdx C	Reference Documentation

REVISION

Revision
No.

Description

3	Verify As-Built conditions.
	Pages ia, iia, and 6a added. Pages iii, 1, 5, and 10 revised.

Subject Calculation No.: W320-27-029

Page iii of iii

[illegible]

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 0-3

Page No. 1 of 10

Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319
Date 8/31/95
Checked 9/11/95
Revised
Filename: AY02E.WP
By: M.M. Ahmed
By: M. K. Pal
By:

Rev-1 By: M.M. Ahmed 7/12/96
Checked By: D.L. Stone 7/15/96

Rev-2, By: *M. Ahmed* 3.12.97
Checked By: *D.L. Stone* 3.12.97

Rev-3 By: K. Hayase 11/26/97
Chk By: *M. Ahmed* 3.18.98

OBJECTIVE:

The objectives of this calculation are:

1. Perform static and dynamic piping stress analysis of the "AY Tank Farm" Jumper Assemblies in order to be in compliance with the Code ASME B31.3 requirements.
2. Qualify the Integral Seal Block (ISB) Jumper connectors for loads exerted by piping in accordance with document WHC-SD-W236A-DA-002, Rev-0
3. Prepare a report on piping loads exerted on pit wall at pipe penetration location.

REV-1:

To incorporate the design changes made by the ECN NO:W-320-380

I Rev-1

REV-2:

To incorporate the design changes made by the ECN NO:W-320-587

I Rev-2

Rev-3: Verify As-built conditions.

DESIGN CRITERIA:

1. ASME CODE B31.3-93 with Addenda up to 1994.
2. SDC 4.1, REV-12. (Now FDNV Practice # 134.215.1217)
3. PROJECT W-320 FDC: WHC-SD-W320-FDC-001, REV. 2.4
4. WHC-SD-W236A-DA-002, Rev-0

DESIGN INPUTS:

GENERAL (Applicable to all Jumpers)

Ambient Temperature	40°F			(Ref. 3)
Design Temperature:	180°F			(Ref. 3)
Design Pressure:	325 psig			(Ref. 10)
Pipe Materials:	ASTM A312 TP304L			(Ref. 19)
Pipe Sizes:	2 in., 3 in. and 4 in.			(Ref. 19)
Pipe Wall	Schedule 40			(Ref. 5)
Safety Class category:	SC-3			(Ref. 4)
Corrosion Allowance	0.06 inches			(Ref. 7)
B31.3 Code Allowable stress	16700 psi			(Ref. 11)
Flanges	300# ANSI rated			(Ref. 21)
Connector weights	4": 122 lbs(Vert)	3": 77 lbs	2": 29 lbs	(Ref: 9)
	4": 120 lbs(Horz)			
Nozzle weights	4": 11 lbs	3": 6.5 lbs	2": 2.5 lbs	(Ref: 9)
Kickplate weights	4": 16.5 lbs	3": 12 lbs	2": 3.5 lbs	(Ref: 9)

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 0

Page No. 2 of 10

Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319 Filename:AY02E.WP
Date 8/31/95 By: M.M. Ahmed
Checked 9/11/95 By: M. K. Pal
Revised By:

Rev-1 By: M.M. Ahmed 7/12/96

Checked By: D.L. Stone 7/15/96

Rev-2 By: *M. Ahmed* 3.12.97

Checked By: *D.L. Stone* 3.12.97

JUMPER U2-A, B SLUICE PIT 241-AY-02E (Autopipe Filename: AY02E-R2) I Rev-2

Process Fluid:	241-AY-102 Supernate	(Ref: 20)
Specific gravity:	1.12	(Ref: 8)
Piping Dimensions:	Dwg: B503AR2, Rev-2	(Ref: 19)
Pressure Element Weight	4": 27 lbs 2": 12 lbs	(Ref: 18)
Pump	$W_{\text{pump}} = 1000 \text{ lbs}$ I Rev-1	(Ref: 17)
Pump Motor	$W_{\text{pump motor}} = 2250 \text{ lbs}$ I Rev-1	(Ref: 17)
Blank 2" Connector with Counter Weight	86.98 lbs	(Ref: 22)
4" -2 Way Ball Valve w/ Actuator	93 lbs	(Ref: 15)

JUMPER U11-A PUMP PIT 241-AY-02A (Autopipe Filename: AY02A1R2 & AY02A2R2) I Rev-2

Process Fluid:	241-C-106 Slurry	(Ref: 20)
Specific gravity:	1.2	(Ref: 3)
Piping Dimensions:	H-2-818501, Rev-2	(Ref: 19)
Density/Flow/Temp sensor	153 lbs	(Ref: 24)
3" - 3 Way Ball Valve	65 lbs	(Ref: 15)

DESIGN METHODOLOGY:

AY Farm Jumper Piping Assemblies include Jumper U2-A that is located in Sluice Pit 241-AY-02E I Rev-1 and Jumper U11-A located in Pump Pit AY-02A. I Rev-2

The jumper assembly models include connectors and nozzles. The nozzles are considered to be rigidly anchored either to pit walls or cover plate for tanks (H-2-818545, Ref:19). I Rev-1

The jumper connectors used on W-320 project are PUREX Connectors. However for analysis I Rev-1 purpose, assumed as Integral Seal Block (ISB) connectors (Ref:9) The document WHC-SD-W236A-DA-002 (Ref:22) provides all the analytical data such as connector stiffness, acceptable piping loads & seating forces for the ISB connectors. These connectors have been modeled in Autopipe as short radius elbows and flexible couplings with specified translation and rotational stiffness. The connector and nozzle weights are imposed at Flexible coupling.

The weights of structural steel assemblies and lifting bails used to connect jumper piping to nozzles during installation are calculated and imposed at appropriate points.

Stress analysis of the jumpers has been performed in accordance with ASME B31.3 for sustained, thermal and seismic loading (Ref. 1) using the computer program "Autopipe" Version-4.6 by "Engineering Design Automation" (EDA) (Ref. 11).

DESIGN ANALYSIS

Calc No. W320-27-029

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Page No. 3 of 10

Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319 Filename: AY02E.WP
Date 8/31/95 By: M.M. Ahmed
Checked 9/11/95 By: M. K. Pal
Revised By:

Rev-1 By: M.M. Ahmed 7/12/96
Checked By: D.L. Stone 7/15/96

Rev-2, By: *M. Ahmed* 3.12.97
Checked By: *D.L. Stone* 3.12.97

SUSTAINED LOADS:

The "AutoPipe" program checks the sustained stress (the summation of gravity and pressure stresses) against the B31.3 Code Allowable stress "S" for the material specified for each jumper piping.

THERMAL (DISPLACEMENT) STRESS:

The maximum design temperature for the pipe of 180°F and the ambient temperature of 40°F has been used in "AutoPipe" program to qualify the thermal expansion stress to the Code B31.3 allowable for displacement stress, "Sa".

SEISMIC STRESSES:

The jumper piping has been categorized as Safety Class 3. However the pit structure is classified as Safety Class 1 category. In order to perform Safety Class 3/1 analysis for this investigation, dynamic response spectra analysis is performed using Safety class-1, "Fig 3" seismic response spectra (5% Damping) of SDC 4.1, Rev-12 (Ref.2). This response spectra is created in "AutoPipe" as "SC1" and used in this dynamic analysis. Autopipe qualifies seismic stresses as occasional stress with the code allowable 1.33S.

The Jumper Connectors are qualified in accordance with WHC-SD-236A-DA-002, Rev-0 (Ref:22) Table 3.4 Acceptable piping loads. The acceptable axial force is limited to allowable seating forces for 50 ft-lb torque of Table 3.3 assuming all the actual axial loads tend to un-seat connector assembly. This results in conservative analysis. The acceptable loads are not increased by 1/3 as permitted on page-6 of Ref:22, which is conservative. The interaction of loads for critical connector is calculated (See page-7 of this calculations) as specified on page-7 of Ref:22.

HYDRO-STATIC ANALYSIS:

I Rev-2

The Jumper Assembly U11-A in pump pit, as a worst case basis, has been analyzed for Hydro-Test pressure. The Hydro-Test pressures is considered as 490 psi which is 1.5 times of the design pressure 325 psi in accordance with ASME Code B31.3. The AutoPipe program combines pressure load with gravity load to obtain Sustained stress and compares against Code allowable for this category.

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 0

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Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319 Filename:AY02E.WP
Date 8/31/95 By: M.M. Ahmed
Checked 9/11/95 By: M. K. Pal
Revised By:

Rev-1 By: M.M. Ahmed 7/12/96
Checked By: D.L. Stone 7/15/96

Rev-2 By: *M. Ahmed* 3-12-97
Checked By: *DEB 3-12-97*

The following describes the modelling and analysis techniques unique to individual jumpers.

JUMPER U2-A, SLUICE PIT

Jumper U2-A includes the piping extending from the Tank 102 AY Submersible Pump Assembly nozzle (A) to the Tank 102 AY Booster Pump, and from the Booster Pump to the Transfer Line nozzle (U-2). The "Frame" feature of the "Autopipe" program has been used to assimilate the Booster Pump Assembly in order to consider the adequate stiffness of the pump in the system. The weight of the pump and motor is imposed at locations corresponding the centers of gravity of the pump and motor. The seismic stabilizer is represented in the model by Channel steel C3x4.1 that connect to the lifting frame sub-assembly and anchored to the pit wall. I Rev-1

A Gravity support (Y-stop) has been modeled directly below the pump assembly which is seated on concrete pedestal. I Rev-1

Weight of instrumentation has been applied at the instrument center on the pipe with flanges input as 300# ANSI rated in accordance with the 325 psig design pressure.

Because Autopipe does not provide an eccentric reducer component, the eccentric reducers are modeled as concentric reducers.

JUMPER U11-A, PUMP PIT

I Rev-2

The density/Flow/Temperature Sensor has been modelled as rigid section because it is relatively rigid compared to pipe section. The weight of the Sensor is equally divided and imposed at three locations where it is supported by the structural steel members.

Since three way valve can not be modelled in AutoPipe, it has been modelled as three separate valves with one third of weight of the 3" 3-Way Ball Valve.

The jumper supporting dunnage steel is modelled as the Frame members. The Guide and Y-stop supports are modelled at proper locations. Since AutoPipe can not perform Non-Linear dynamic analysis, Y-stop is not considered in Seismic Response Spectra analysis.

PIPING LOADS AT BUILDING PENETRATION ANCHORS

I Rev-2

The Pipe Nozzle (U-2 & U-11) Loads at Building Penetrations are summarized on page no:8.

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 03

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Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319
Date 8/31/95
Checked 9/11/95
Revised
Filename:AY02E.WP
By: M.M. Ahmed
By: M. K. Pal
By:

Rev 3 By: K. Hayase 1/20/97
Chk By: R. Ahmed 3.18.98

Rev-1 By: M.M. Ahmed 7/12/96
Checked By: D.L. Stone 7/15/96

Rev-2 By: R. Ahmed 3.12.97
Checked By: DL Stone 3-12-97

ASSUMPTIONS:

I Rev-1

1. It is assumed that the lifting bail and structural steel assemblies designed to support the jumper piping during installation will be supported by the jumper during operation.
2. ISB jumper connectors data considered in analysis is compatible with the PUREX connector used.
3. Building structures and tank nozzles are structurally adequate to withstand pipe loads.

REFERENCES:

1. ASME Code B31.3 and B31.3a-1994 Addenda for "Chemical and Petroleum Refinery."
2. SDC 4.1, Rev. 12, "Standard Architecture & Civil Design Criteria."
(Now FDUW Practice # 134.215.1217, Design Loads for Facilities)
3. WHC-SD-W320-FDC-001, Rev-2, "Functional Design Criteria for Tank 241-C-106 Waste Retrieval, Project W-320".
4. WHC-SD-WM-SEL-033, Rev-1, "Safety Equipment List for 241-C-106 Waste Retrieval Project W-230"
5. Construction specifications W-320-C5, Rev-0, Section 15493 for piping materials.
6. Construction Specification No: B-131-C1, Section 15415 for piping materials.
7. Calculation No: W-030-011, Rev-1 for "Fouling factor and Corrosion rate."
8. *Data Compendium*, Bruce A. Castaing
9. Jumper Design Fabrication Drawings: H-2-32440-2
10. DSI from C.D.Jones dated March 28, 1994 "Design Pressure for Slurry and Sluice Pumps".
11. Computer program "AutoPipe" Version 4.6 by "Engineering Design Automation."
12. Computer Program "EXCEL" Version 4.0, by Microsoft.
13. Crane Technical Paper No: 410, 22nd Printing-1986.
14. Ryerson Stock List and Data Book, 1985-86 Edition, Joseph T. Ryerson & Son, Inc.

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 0

Page No. 6 of 10

Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL for TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319
Date 8/31/95
Checked 9/11/95
Revised
Filename:AY02E.WP
By: M.M. Ahmed
By: M. K. Pal
By:

Rev-1, By: M.M. Ahmed 7/12/96

Rev-2, By:

Checked By: D.L. Stone 7/15/96

Checked By:

M. Ahmed 3-12-97
D.L. Stone 3-12-97

15. PBM Reference Book Sec. II (SP Series) and Sec. IV (MP Series), PBM, Inc.

16. Micro Motion, Inc. CMF300 Physical specifications. (Appendix-C)

17. Lawrence Pumps Inc. Vendor Dwg: 55641, Rev-2. (Appendix-C)

18. Red Valve Co. Inc., Vendor data on Series 40 Pressure Sensors. (Appendix-C)

19. Piping Arrangement and Detail drawings: H-2-818501 (2 Sheets) Rev-2, H-2-818503 (3 Sheets) Rev-2 and ECN No: W-320-587. I Rev-2

20. Process Flow Diagrams: H-2-818558 H-2-818559, and H-2-818560

21. ASME/ANSI B16.5

22. WHC-SD-W236A-DA-002, Rev-0 "Stress Analysis of Single Port (ISB) Jumper Connectors for 2-, 3-, and 4-in Sizes".

23. Seismic Design White Paper Project W-320 Tank 241-C-106 Sluicing

24. Micro-Motion Inc. Product Catalog.

I Rev-2

CALCULATIONS:

The calculations are documented in this package as shown below.

I Rev-2

AutoPipe stress analysis results

Appendices A & B

Jumper Connector load qualification

Page-7

Pit Wall Anchor Loads

Page-8

Jumper Piping 3D Isometric model for Autopipe

Pages- 9 & 10

CONCLUSION:

I Rev-2

The review of the "AutoPipe" summary results attached as Appendices to this calculation indicates that all pipe stresses are in compliance with the requirements of ASME Code B31.3 requirements.

The Jumper qualification on page-7 indicates that ISB connectors are adequate for piping loads. The Piping loads on Pit walls at piping penetrations are summarized on page 8.

DESIGN ANALYSIS

Client: Numatec

WO/Job No.: ER4319/W-320

Subject: AY Farm Jumper Stress Analysis
Project W-320 Waste Retrieval for Tank 241-C-106

Date: 11/26/97

By: K. Hayase

Checked: 3.18.98

By: R. Ahmed

Location: AY Tank Farm 200 East Area

Revised:

By:

Rev. 3

CONCLUSION (CONTINUED)

Rev. 3 of this calculation verified the analysis against the as-built conditions ~~(as of 11/24/97)~~ ^{11/23/98}. The analysis includes the weights of valves, flow meters, and pressure sensors. These weights are not critical to the results of the analysis. Therefore, any differences between the weights used in the analysis and the approved vendor data are negligible. There are minor dimensional differences ($\pm 2"$) between the Autopipe models and the as-built conditions, however, these differences are also negligible.

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 0

Page No. 7 of 10

Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL FOR TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319
Date 8/31/95
Checked 9/11/95
Revised
Filename:AY02E.WP
By: M.M. Ahmed
By: M. K. Pal
By:

Rev-1. By: M.M. Ahmed 7/12/96
Checked By: D.L. Stone 7/15/96

Rev-2. By: *M. Ahmed* 3-12-97
Checked By: *D.L. Stone* 3-12-97

ISB JUMPER CONNECTOR LOADS QUALIFICATION I Rev-2

CONNECTOR LOCATION	AUTOPIPE FILE NAME & NODE	SIZE	CONNECTOR ACTUAL LOADS I Rev-2 loads/ ALLOWABLE LOADS						REF NO:
			Axial X (lbs)	Shear Y (lbs)	Shear Z (lbs)	Torsion Mx (ft-lb)	Bend My (ft-lb)	Bend Mz (ft-lb)	
<u>SLUICE PIT</u> Connector A	AY02E-R2 A01(N)	4"	399	547	310	26	20	81	APDX-B
Connector U-2	B10(F)	4"	1061	258	179	22	304	128	APDX-B
<u>PUMP PIT</u> Connector U-11	AY02A1R2 AY02A2R2 A04(N)	4"	135	348	234	62	161	212	APDX-A GR+T1 + RESP
Connector A	A19(F)	4"	566	144	144	35	151	552	APDX-A
Connector Allowable loads		4"	6310	2220	2220	780	1170	1170	Ref: 22

SEATING FORCES BETWEEN CONNECTOR & NOZZLES:

The axial allowable load considered in table above are limited to seating forces for 4" Connectors for 50 ft-lb (pre-load) torque as specified in Table 3.3(Ref:22). Since the actual axial forces are less than the allowable seating forces, the connector will not be un-seated from the nozzle.

INTERACTION OF SHEAR, TORSION AND BENDING:

$$I = f_{yz}/F_{yz} + [m_x]/M_x + m_{yz}/M_{yz} < 1.0 \quad \text{Ref:22, page-7}$$

Review of actual loads and allowable loads in the table above indicates that the Connector-A in the Pump Pit is more critical for interaction. I Rev-2

$$f_{yz} = 204 \text{ lbs (SRSS of } f_y = 144 \text{ \& } f_z = 144)$$

$$m_{yz} = 572 \text{ ft-lbs (SRSS of } m_y = 151 \text{ \& } m_z = 552)$$

$$I = 204/2220 + 35/780 + 572/1170$$

$$I = 0.63 < 1.00 \quad \text{As such Jumper Connectors are adequate.}$$

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 0

Page No. 8 of 10

Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM - JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL FOR TANK 241-C-106
Location: C TANK FARM - 200 W.

WO/Job No. ER4319
Date 8/31/95
Checked 9/11/95
Revised
Filename: AY02E.WP
By: M.M. Ahmed
By: M. K. Pal
By:

Rev-2, By:

Checked By:

M. Ahmed
4-12-96
DL Shaw 3-12-97

PIT WALL ANCHOR LOADS I Rev-2

NOZZLE	ORIENTATION	LOAD CASES	LOADS (FORCES IN POUNDS & MOMENTS IN FT-LBS)						REF:
			Fx	Fy	Fz	Mx	My	Mz	
U-11 PUMP PIT AY-02A		Thermal	63	390	52	183	20	35	AY02A1R2 A00
		Seismic	205	102	90	209	200	27	AY02A2R2 A00
		Total	268	492	142	392	220	62	
U-2 SLUICE PIT AY-02E		Thermal	125	865	157	449	63	387	AY02E-R2 B12
		Seismic	102	86	125	94	53	68	SAME
		Total	227	951	282	543	116	455	

Notes:

1. Seismic Loads could be positive or negative.
2. Thermal loads specified are the algebraic sum of gravity and thermal loads.
3. Total loads specified are the absolute sum of thermal and seismic loads disregarding the signs.

Client WESTINGHOUSE HANFORD COMPANY

WO/Job No.ER4319

Filename:AY02E.WP

Subject AY FARM- JUMPER STRESS ANALYSIS

Date 8/31/95

By: M. M. Ahmed

PROJECT W-320 WASTE RETRIEVAL FOR TANK C-106

Checked 9/11/95

By: M. K. Pal

Location C TANK FARM - 200W.

Revised

By:

Rev-2, By: R. Ahmed 3-12-97

Checked By: DL Stone 3-12-97

JUMPER ASSEMBLY PUMP PIT: AY-02A-U11-A

DWG: H-2-818501

ACAD FILE: AY02A1

APIPE FILE: AY02A1R2

& AY02A2R2

PREPARED BY:

MM AHMED

CHECKED BY:

DL STONE

NOTES: 1. THREE WAY VALVE IS MODELLED AS
THREE VALVES EACH WEIGHING 22 Lbs.

2. FLOW METER'S WEIGHT 153# IS IMPOSED AT THREE SUPPORT LOCATIONS.

3. Y-STOP AT NODE "7" IS NOT CONSIDERED FOR DYNAMIC ANALYSIS.

DESIGN ANALYSIS

Calc No. W320-27-029

Revision No. 03

Page No. 10 of 10

Client WESTINGHOUSE HANFORD COMPANY
Subject AY FARM- JUMPER STRESS ANALYSIS
PROJECT W-320 WASTE RETRIEVAL FOR TANK C-106
Location C TANK FARM - 200W.

WO/Job No.ER4319
Date 8/31/95
Checked 9/11/95
Revised

Filename:AY02E.WP
By: M. M. Ahmed
By: M. K. Pal
By:

Rev 3 By: K. Hayase 11/26/97
chk By: M. Ahmed 3.18.98

Rev-2, By: M. Ahmed 3-12-97
Checked By: D. L. Stone 3-12-97

PROJECT W-320: JUMPER ASSY FOR SLUICE PIT

Valve at A03A should be closer to A04, however, the overall length between A03 & A07 is correct, therefore ok as is.

PREPARED BY: M. M. AHMED
CHECKED BY: D. L. STONE
REF: ECN W-320-380
ECN W-320-587
DWG: B503AR2 REV-2
AUTOCAD: AY02E
AUTOPIPE: AY02E-R2

POINT DATA LISTING

POINT NAME	TYPE	-----OFFSETS (ft)-----			PIPE ID	DESCRIPTION
		X	Y	Z		
*** SEGMENT A						
A00	Run	0	0	0	4"PIPE	
A01	Flex	0	0	0.25		Wt= 137 lb, Ar= 3.2 sq.in Axial= 23300000 Tors= 304.0 Y-Shear= RIGID Bend= 2080.0 Z-Shear= RIGID Bend= 2080.0
A03	Run	0	0	0.10		
A04	Bend	0	0	0.40		Short Elbow, Radius = 4.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A05	Bend	-0.17	-1.28	0		Long Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.95, Out = 1.63 Flex = 5.272
A06	Redu	0	0	0.87		
A07	Run	0	0	0.33	3"PIPE	
A08	Bend	0	0	0.38		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
A09	Run	0.38	0	0	RIGID	
A10	Tee	0.77	0	0		
A11	Tee	1.83	0	0		
A12	Run	0.77	0	0	3"PIPE	
A13	Valv	0.96	0	0		Rating = 300, Weight = 22 lb Surface factor = 4.40, SIF = 1.00
A13A	Run	0.16	0	0		
A14	Tee	0.10	0	0		
A15	Valv	0.10	0	0		Rating = 300, Weight = 22 lb Surface factor = 4.40, SIF = 1.00
A15A	Run	0.16	0	0		
A16	Bend	0.98	0	0		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
A16 F	Far				4"PIPE	
A17	Bend	0	-0.25	-0.83		Short Elbow, Radius = 4.00 inch

POINT DATA LISTING

POINT NAME	TYPE	-----OFFSETS (ft)----- X Y Z			PIPE ID	DESCRIPTION
A18	Bend	-0.67	-0.25	0		Bend angle change = 84.21 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A19	Bend	0	0	2.57		Short Elbow, Radius = 4.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A20	Flex	0	-0.40	0		Wt= 139 lb, Ar= 3.2 sq.in Axial= 23300000 Tors= 304.0 Y-Shear= RIGID Bend= 2080.0 Z-Shear= RIGID Bend= 2080.0
A21	Run	0	-0.10	0		
A22	Run	0	-0.25	0		
*** SEGMENT B						
A10	Tee	0.98	-1.28	2.33	RIGID	
B01	Run	0	0	2.00		
B02	Bend	0	0	0.71		Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg SIF - In 1.00, Out = 1.00 Flex = 1.000
B03	Bend	1.83	0	0		Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg SIF - In 1.00, Out = 1.00 Flex = 1.000
B04	Run	0	0	-0.71		
A11	Tee	0	0	-2.00		
*** SEGMENT C						
A14	Tee	4.80	-1.28	2.33	3"PIPE	
C01	Valv	0	0	-0.10		Rating = 300, Weight = 22 lb Surface factor = 4.40, SIF = 1.00
C01A	Run	0	0	-0.16		
C02	Bend	0	0	-0.66		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)---			PIPE ID	DESCRIPTION
		X	Y	Z		
						Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
C03	Redu	0	0.38	0		
C04	Run	-0	0.29	0	2"-PIPE	
C05	Bend	0	0.48	0		Long Elbow, Radius = 3.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.73, Out = 1.44 Flex = 4.404
C06	Bend	-0.50	0	0		Long Elbow, Radius = 3.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.73, Out = 1.44 Flex = 4.404
C07	Run	0	0	0.96		

Total weight of empty pipes : 132 lb

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft)---			DATA TYPE	DESCRIPTION
	X	Y	Z		
*** SEGMENT A					
A00	0.00	0.00	0.00	ANCHOR	Rigid Thermal movements : None
A01	0.00	0.00	0.25		
A03	0.00	0.00	0.35		
A04 N	0.00	0.00	0.42		
A04	0.00	0.00	0.75	TI	
A04 M	-0.01	-0.10	0.65		
A04 F	-0.04	-0.33	0.75		
A05 N	-0.10	-0.78	0.75		
A05	-0.17	-1.28	0.75	TI	
A05 M	-0.15	-1.13	0.90		
A05 F	-0.17	-1.28	1.25		
A06	-0.17	-1.28	1.62		
A07	-0.17	-1.28	1.95		
A08 N	-0.17	-1.28	1.95		
A08	-0.17	-1.28	2.33	TI	
A08 M	-0.06	-1.28	2.22		
A08 F	0.21	-1.28	2.33		
A09	0.21	-1.28	2.33	FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 15 lb
				FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 15 lb
A10	0.98	-1.28	2.33	TEE	B16.9 welding tee SIF - In = 1.00, Out = 1.00
A11	2.81	-1.28	2.33	TEE	B16.9 welding tee SIF - In = 1.00, Out = 1.00
A12	3.58	-1.28	2.33	FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 138 lb
				FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 138 lb
A13	4.54	-1.28	2.33		
A13A	4.70	-1.28	2.33		
A14	4.80	-1.28	2.33	TEE	B16.9 welding tee SIF - In = 1.22, Out = 1.30
				WEIGHT	5 lb , No offsets
A15	4.90	-1.28	2.33		
A15A	5.06	-1.28	2.33		
A16 N	5.66	-1.28	2.33		
A16	6.04	-1.28	2.33	TI	
A16 M	5.93	-1.31	2.22		
A16 F	6.04	-1.39	1.97		
A17 N	6.04	-1.44	1.79		
A17	6.04	-1.53	1.50	TI	
A17 M	5.96	-1.54	1.58		
A17 F	5.76	-1.64	1.50		
A18 N	5.68	-1.66	1.50		
A18	5.37	-1.78	1.50	TI	
A18 M	5.46	-1.75	1.60		

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y Z	DATA TYPE	DESCRIPTION
A18 F	5.37 -1.78 1.83		
A19 N	5.37 -1.78 3.74		
A19	5.37 -1.78 4.07	TI	
A19 M	5.37 -1.88 3.97		
A19 F	5.37 -2.11 4.07		
A20	5.37 -2.18 4.07		
A21	5.37 -2.28 4.07		
A22	5.37 -2.53 4.07	ANCHOR Rigid	Thermal movements : None

*** SEGMENT B

A10	0.98 -1.28 2.33	TEE	B16.9 welding tee SIF - In = 1.00, Out = 1.00
B01	0.98 -1.28 4.33	GUIDE	ID : B01 1, Connected to 9 Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.30 Gaps set Weightless
B02 N	0.98 -1.28 4.54		
B02	0.98 -1.28 5.04	TI	
B02 F	1.48 -1.28 5.04		
B03 N	2.31 -1.28 5.04		
B03	2.81 -1.28 5.04	TI	
B03 F	2.81 -1.28 4.54		
B04	2.81 -1.28 4.33	GUIDE	ID : B04 1, Connected to 5 Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.30 Gaps set Weightless

A11	2.81 -1.28 2.33	TEE	B16.9 welding tee SIF - In = 1.00, Out = 1.00
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*** SEGMENT C

A14	4.80 -1.28 2.33	TEE	B16.9 welding tee SIF - In = 1.22, Out = 1.30
C01	4.80 -1.28 2.23		
C01A	4.80 -1.28 2.07		
C02 N	4.80 -1.28 1.78		
C02	4.80 -1.28 1.41	TI	
C02 M	4.80 -1.17 1.52		
C02 F	4.80 -0.90 1.41		
C03	4.80 -0.90 1.41		
C04	4.80 -0.61 1.41		
C05 N	4.80 -0.38 1.41		
C05	4.80 -0.13 1.41	TI	
C05 M	4.73 -0.20 1.41		
C05 F	4.55 -0.13 1.41		

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y Z	DATA TYPE	DESCRIPTION
C06 N	4.55 -0.13 1.41		
C06	4.30 -0.13 1.41	TI	
C06 M	4.37 -0.13 1.48		
C06 F	4.30 -0.13 1.66		
C07	4.30 -0.13 2.37	WEIGHT 35 lb	No offsets

Number of points in the system : 73

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PIPE DATA LISTING

Pipe ID/ Material	Nom/ Sch	O.D. inch	-----Thickness(inch)-----				Spec Grav	Weight(lb/ft)		
			W.Th.	Corr	Mill	Insul		Pipe	Other	Total
4"PIPE A312-TP304L	4 STD	4.500	0.237	0.06	0.03	0	0	1.20	11.04	0 17.66
3"PIPE A312-TP304L	3,000 STD	3.500	0.216	0.06	0.03	0	0	1.20	7.75	0 11.60
2"-PIPE A312-TP304L	2,000 STD	2.375	0.154	0.06	0.02	0	0	1.20	3.74	0 5.48

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MATERIAL DATA LISTING

Material Name	Pipe ID	Density lb/cu.ft	Pois. Ratio	Temper. deg F	Modulus E6 psi	Expans. in/100ft	Allow. psi
A312-TP304L	4"PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0
A312-TP304L	3"PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0
A312-TP304L	2"-PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0

FRAME POINT DATA LISTING

POINT NAME	---COORDINATE(ft)	----	DATA TYPE	DESCRIPTION
X	Y	Z		
A09	0.21	-1.28	2.33	
1	0.21	-0.70	2.33	WEIGHT 51 lb , No offsets
2	0.98	-0.70	2.33	
3	2.81	-0.70	2.33	WEIGHT 8 lb , No offsets
4	3.58	-0.70	2.33	WEIGHT 51 lb , No offsets
A12	3.58	-1.28	2.33	
5	2.81	-0.70	4.33	
6	2.81	-0.70	5.33	
7	1.89	-0.70	5.33	Y-STOP ID : 7 1, Connected to Ground Gap-Below = 0.00, Above = 0.50 inch Friction = 0.30 Gaps set Weightless WEIGHT 51 lb , No offsets
8	0.98	-0.70	5.33	
9	0.98	-0.70	4.33	
B01	0.98	-1.28	4.33	
10	0.98	-0.70	2.33	
B05	2.81	-1.28	4.33	

BEAM DATA LISTING

BEAM ID	POINT NAME	LENGTH (ft)	SECTION ID/ MATERIAL ID	BETA ANGLE	RIGID END(ft)	RELEASE
						AX Y-Y Z-Z
M1	From A09 To 1	0.58	C4X5.4 A36	0.00	0.00 0.00	N N N N N N
M2	From 1 To 2	0.77	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M3	From 2 To 3	1.83	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M4	From 3 To 4	0.77	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M5	From 4 To A12	0.58	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M6	From 3 To 5	2.00	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M7	From 5 To 6	1.00	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M8	From 6 To 7	0.92	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M9	From 7 To 8	0.91	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M10	From 8 To 9	1.00	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M11	From 9 To 10	2.00	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M12	From 5 To B05	0.58	C4X5.4 A36	90.00	0.00 0.00	N N N N N N
M13	From 9 To B01	0.58	C4X5.4 A36	90.00	0.00 0.00	N N N N N N

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CROSS SECTION LISTING

Section ID ID	Axial	Area(sq.in)		Inertia (in**4)		
		Y-Shear	Z-Shear	Torsion	Y-Y Bend	Z-Z Bend
C4X5.4	1.59	0.74	0.62	0.0	0.3	3.8

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BEAM MATERIAL LISTING

MATERIAL ID	Elastic modulus E6 psi	Poissons ratio	Yield Stress psi	Density lb/cu.ft	Expansion E-6 /F	Ultimate stress psi
A36	29.000	0.250	36000	490.00	6.50000	58000

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TEMPERATURE AND PRESSURE DATA

POINT NAME	C A S E 1			C A S E 2			C A S E 3		
	PRESS. psi	TEMPER deg F	EXPAN. in/100ft	PRESS. psi	TEMPER deg F	EXPAN. in/100ft	PRESS. psi	TEMPER deg F	EXPAN. in/100ft

*** SEGMENT A

A00	490	180	1.544
A07	490	180	1.544
A09	490	180	0.000
A12	490	180	1.544
A16 F	490	180	1.544
A22	490	180	1.544

*** SEGMENT B

A10	490	180	0.000
A11	490	180	0.000

*** SEGMENT C

A14	490	180	1.544
C04	490	180	1.544
C07	490	180	1.544

ANALYSIS SUMMARY

Current model revision number : 5

Static - Date and Time of analysis	Mar 12, 1997	9:02 AM
Model Revision Number	5	
Number of load cases	2	
Load cases analyzed	GR T1	
Gaps/Friction/Yielding considered	Yes	
Tolerance - Force, Displacement	100.00 lb	0.0162 in
Friction - Factor, tolerance	1.00	0.10
Hanger design run	No	
Cut short included	No	
Occasional load analysis type	Nonlinear	
Non-linear analysis summary file	AY02A1R2.LOG	
Base load cases for nonlinear analysis	GR = None	
	T1 = GR	
Weight of contents included	Yes	
Pressure stiffening case	0	
Water elevation for buoyancy loads	Not considered	

CODE COMPLIANCE COMBINATIONS

Combination	Category	Method	Load	Factor	Allowable	Remarks
GR + Max P	Sustain	Sum	Gravity Max Long	1.00 1.00	Automatic	Default
Cold to T1	Expansion	Sum	Thermal 1	1.00	Automatic	Default
Max P	Hoop		Max Hoop	1.00	Automatic	Default

OTHER USER COMBINATIONS

Combination	Method	Load	Factor	Remarks
GR	Sum	Gravity	1.00	Default
T1	Sum	Thermal 1	1.00	Default
GR+T1	Sum	Gravity Thermal 1	1.00 1.00	User

CODE COMPLIANCE

Y - Factor 0.40
 Weld efficiency factor 1.00
 Range reduction factor 1.00
 Design Pressure Factor 1.00
 Minimum stress ratio used in reports... 0.00
 Include corrosion in stress calcs. Y
 Include torsion in code stress N
 Include axial force in code stress N
 Longitudinal pressure calculation PD/4t
 Include rigorous pressure Not analyzed

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
*** Segment A begin ***							
A00	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	GR+T1	0.000	0.000	0.000	0.000	0.000	0.000
A01	GR	0.000	0.000	0.000	0.001	0.001	0.000
	T1	0.000	0.000	0.004	0.000	0.000	0.000
	GR+T1	0.000	0.000	0.004	0.001	0.000	0.000
A03	GR	0.000	0.000	0.000	0.034	0.024	-0.109
	T1	0.000	0.000	0.004	0.001	-0.005	-0.007
	GR+T1	0.000	0.000	0.004	0.035	0.019	-0.117
A04 N	GR	0.001	-0.001	0.000	0.034	0.024	-0.109
	T1	0.000	0.000	0.005	0.001	-0.005	-0.007
	GR+T1	0.000	-0.001	0.005	0.035	0.019	-0.117
A04 M	GR	0.000	-0.002	-0.001	0.034	0.026	-0.109
	T1	-0.001	-0.002	0.008	0.002	-0.004	-0.007
	GR+T1	-0.001	-0.004	0.008	0.035	0.022	-0.117
A04 F	GR	-0.005	-0.002	-0.002	0.029	0.027	-0.112
	T1	-0.002	-0.005	0.010	0.002	-0.003	-0.005
	GR+T1	-0.007	-0.008	0.008	0.031	0.024	-0.117
A05 N	GR	-0.016	-0.001	-0.004	0.028	0.028	-0.113
	T1	-0.003	-0.012	0.010	0.002	-0.002	-0.005
	GR+T1	-0.019	-0.013	0.005	0.030	0.025	-0.118
A05 M	GR	-0.024	-0.001	-0.006	0.021	0.028	-0.119
	T1	-0.004	-0.018	0.012	-0.001	0.001	0.002
	GR+T1	-0.027	-0.018	0.006	0.020	0.029	-0.117
A05 F	GR	-0.025	-0.001	-0.006	0.009	0.029	-0.121
	T1	-0.004	-0.020	0.017	-0.004	0.007	0.006
	GR+T1	-0.029	-0.021	0.011	0.005	0.036	-0.115
A06	GR	-0.023	-0.002	-0.006	0.006	0.029	-0.123
	T1	-0.003	-0.019	0.023	-0.004	0.009	0.008
	GR+T1	-0.026	-0.021	0.017	0.002	0.038	-0.115
A07	GR	-0.021	-0.002	-0.006	-0.001	0.029	-0.126
	T1	-0.003	-0.019	0.028	-0.004	0.011	0.011
	GR+T1	-0.023	-0.021	0.022	-0.005	0.040	-0.115

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A08 N	GR	-0.021	-0.002	-0.006	-0.001	0.029	-0.126
	T1	-0.003	-0.019	0.028	-0.004	0.011	0.011
	GR+T1	-0.023	-0.021	0.022	-0.005	0.041	-0.115
A08 M	GR	-0.019	-0.004	-0.007	-0.043	0.031	-0.119
	T1	0.000	-0.018	0.032	-0.008	0.030	0.017
	GR+T1	-0.019	-0.022	0.025	-0.050	0.061	-0.102
A08 F	GR	-0.018	-0.009	-0.009	-0.064	0.033	-0.111
	T1	0.005	-0.017	0.031	-0.011	0.049	0.028
	GR+T1	-0.013	-0.026	0.022	-0.075	0.082	-0.083
A09	GR	-0.018	-0.009	-0.009	-0.065	0.033	-0.111
	T1	0.005	-0.017	0.031	-0.011	0.049	0.028
	GR+T1	-0.013	-0.026	0.022	-0.075	0.082	-0.083
A10	GR	-0.018	-0.027	-0.014	-0.065	0.033	-0.111
	T1	0.005	-0.012	0.023	-0.011	0.049	0.028
	GR+T1	-0.013	-0.039	0.009	-0.075	0.082	-0.083
A11	GR	-0.018	-0.070	-0.027	-0.065	0.033	-0.111
	T1	0.005	-0.001	0.004	-0.011	0.049	0.028
	GR+T1	-0.013	-0.071	-0.022	-0.075	0.082	-0.083
A12	GR	-0.018	-0.088	-0.032	-0.065	0.033	-0.111
	T1	0.005	-0.003	-0.004	-0.011	0.049	0.028
	GR+T1	-0.013	-0.085	-0.036	-0.075	0.082	-0.083
A13	GR	-0.018	-0.106	-0.039	-0.095	0.034	-0.070
	T1	0.020	0.009	-0.013	-0.010	0.044	0.025
	GR+T1	0.002	-0.097	-0.052	-0.105	0.078	-0.045
A13A	GR	-0.018	-0.108	-0.040	-0.095	0.034	-0.070
	T1	0.022	0.009	-0.015	-0.010	0.044	0.025
	GR+T1	0.004	-0.098	-0.055	-0.105	0.078	-0.045
A14	GR	-0.018	-0.109	-0.041	-0.099	0.034	-0.067
	T1	0.024	0.010	-0.016	-0.010	0.043	0.025
	GR+T1	0.006	-0.099	-0.056	-0.108	0.077	-0.042
A15	GR	-0.018	-0.111	-0.041	-0.102	0.034	-0.064
	T1	0.026	0.010	-0.016	-0.010	0.042	0.024
	GR+T1	0.007	-0.100	-0.058	-0.111	0.076	-0.040
A15A	GR	-0.018	-0.113	-0.042	-0.102	0.034	-0.064
	T1	0.028	0.011	-0.018	-0.010	0.042	0.024
	GR+T1	0.010	-0.102	-0.060	-0.111	0.076	-0.040

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A16 N	GR	-0.018	-0.120	-0.047	-0.120	0.035	-0.057
	T1	0.037	0.014	-0.023	-0.009	0.035	0.020
	GR+T1	0.019	-0.106	-0.070	-0.129	0.070	-0.037
A16 M	GR	-0.019	-0.126	-0.048	-0.134	0.034	-0.066
	T1	0.041	0.014	-0.026	-0.012	0.017	0.011
	GR+T1	0.022	-0.112	-0.074	-0.146	0.051	-0.054
A16 F	GR	-0.022	-0.136	-0.046	-0.171	0.035	-0.079
	T1	0.043	0.013	-0.030	-0.016	-0.003	0.010
	GR+T1	0.020	-0.123	-0.076	-0.188	0.032	-0.069
A17 N	GR	-0.025	-0.142	-0.044	-0.174	0.035	-0.080
	T1	0.043	0.011	-0.032	-0.016	-0.004	0.009
	GR+T1	0.018	-0.131	-0.077	-0.191	0.031	-0.071
A17 M	GR	-0.028	-0.149	-0.040	-0.203	0.042	-0.075
	T1	0.042	0.009	-0.036	-0.015	-0.017	0.011
	GR+T1	0.014	-0.140	-0.076	-0.218	0.025	-0.064
A17 F	GR	-0.030	-0.150	-0.033	-0.220	0.055	-0.069
	T1	0.040	0.007	-0.038	-0.010	-0.030	0.010
	GR+T1	0.009	-0.143	-0.071	-0.230	0.025	-0.060
A18 N	GR	-0.031	-0.149	-0.031	-0.222	0.055	-0.069
	T1	0.038	0.006	-0.038	-0.011	-0.030	0.009
	GR+T1	0.008	-0.143	-0.069	-0.232	0.024	-0.060
A18 M	GR	-0.030	-0.141	-0.025	-0.237	0.067	-0.075
	T1	0.034	0.005	-0.038	-0.009	-0.045	0.004
	GR+T1	0.004	-0.136	-0.063	-0.246	0.022	-0.071
A18 F	GR	-0.028	-0.127	-0.021	-0.266	0.071	-0.081
	T1	0.030	0.004	-0.035	-0.012	-0.059	0.001
	GR+T1	0.003	-0.122	-0.057	-0.277	0.012	-0.080
A19 N	GR	0.001	-0.018	-0.021	-0.270	0.071	-0.069
	T1	0.005	0.009	-0.006	-0.012	-0.066	-0.002
	GR+T1	0.006	-0.008	-0.027	-0.282	0.005	-0.071
A19 M	GR	0.003	-0.005	-0.016	-0.242	0.073	-0.066
	T1	0.002	0.008	-0.002	-0.009	-0.066	-0.003
	GR+T1	0.005	0.004	-0.018	-0.251	0.006	-0.068
A19 F	GR	0.001	0.000	-0.005	-0.208	0.075	-0.058
	T1	0.000	0.005	0.000	-0.007	-0.066	-0.003
	GR+T1	0.002	0.005	-0.005	-0.215	0.009	-0.061

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A20	GR	0.001	0.000	-0.002	-0.207	0.075	-0.057
	T1	0.000	0.004	0.000	-0.007	-0.066	-0.003
	GR+T1	0.001	0.004	-0.002	-0.214	0.009	-0.061
A21	GR	0.000	0.000	0.000	-0.004	0.000	-0.001
	T1	0.000	0.004	0.000	0.000	0.000	0.000
	GR+T1	0.000	0.004	0.000	-0.004	0.000	-0.001
A22	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	GR+T1	0.000	0.000	0.000	0.000	0.000	0.000

*** Segment A end ***

*** Segment B begin ***

A10	GR	-0.018	-0.027	-0.014	-0.065	0.033	-0.111
	T1	0.005	-0.012	0.023	-0.011	0.049	0.028
	GR+T1	-0.013	-0.039	0.009	-0.075	0.082	-0.083
B01	GR	-0.005	0.000	-0.014	-0.065	0.033	-0.111
	T1	0.026	-0.008	0.023	-0.011	0.049	0.028
	GR+T1	0.021	-0.008	0.009	-0.075	0.082	-0.083
B02 N	GR	-0.003	0.003	-0.014	-0.065	0.033	-0.111
	T1	0.028	-0.007	0.023	-0.011	0.049	0.028
	GR+T1	0.025	-0.004	0.009	-0.075	0.082	-0.083
B02 F	GR	0.000	-0.002	-0.018	-0.065	0.033	-0.111
	T1	0.033	-0.003	0.018	-0.011	0.049	0.028
	GR+T1	0.033	-0.005	0.000	-0.075	0.082	-0.083
B03 N	GR	0.000	-0.021	-0.023	-0.065	0.033	-0.111
	T1	0.033	0.002	0.010	-0.011	0.049	0.028
	GR+T1	0.033	-0.020	-0.014	-0.075	0.082	-0.083
B03 F	GR	-0.003	-0.040	-0.027	-0.065	0.033	-0.111
	T1	0.028	0.004	0.004	-0.011	0.049	0.028
	GR+T1	0.025	-0.036	-0.022	-0.075	0.082	-0.083
B04	GR	-0.005	-0.043	-0.027	-0.065	0.033	-0.111
	T1	0.026	0.003	0.004	-0.011	0.049	0.028
	GR+T1	0.021	-0.040	-0.022	-0.075	0.082	-0.083
A11	GR	-0.018	-0.070	-0.027	-0.065	0.033	-0.111
	T1	0.005	-0.001	0.004	-0.011	0.049	0.028
	GR+T1	-0.013	-0.071	-0.022	-0.075	0.082	-0.083

*** Segment B end ***

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
*** Segment C begin ***							
A14	GR	-0.018	-0.109	-0.041	-0.099	0.034	-0.067
	T1	0.024	0.010	-0.016	-0.010	0.043	0.025
	GR+T1	0.006	-0.099	-0.056	-0.108	0.077	-0.042
C01	GR	-0.019	-0.111	-0.041	-0.099	0.034	-0.067
	T1	0.023	0.010	-0.017	-0.010	0.043	0.025
	GR+T1	0.004	-0.102	-0.058	-0.108	0.077	-0.042
C01A	GR	-0.020	-0.115	-0.041	-0.099	0.034	-0.067
	T1	0.022	0.009	-0.020	-0.010	0.043	0.025
	GR+T1	0.001	-0.105	-0.060	-0.108	0.077	-0.042
C02 N	GR	-0.022	-0.121	-0.041	-0.099	0.034	-0.066
	T1	0.019	0.009	-0.024	-0.010	0.043	0.025
	GR+T1	-0.003	-0.112	-0.065	-0.108	0.077	-0.041
C02 M	GR	-0.023	-0.126	-0.043	-0.095	0.034	-0.065
	T1	0.016	0.010	-0.028	-0.010	0.043	0.025
	GR+T1	-0.007	-0.116	-0.071	-0.105	0.078	-0.040
C02 F	GR	-0.020	-0.128	-0.048	-0.091	0.035	-0.063
	T1	0.014	0.014	-0.030	-0.010	0.043	0.025
	GR+T1	-0.006	-0.114	-0.079	-0.101	0.079	-0.038
C03	GR	-0.020	-0.128	-0.048	-0.091	0.035	-0.063
	T1	0.014	0.014	-0.031	-0.010	0.043	0.025
	GR+T1	-0.006	-0.114	-0.079	-0.101	0.079	-0.038
C04	GR	-0.016	-0.128	-0.054	-0.089	0.035	-0.061
	T1	0.012	0.018	-0.031	-0.010	0.043	0.025
	GR+T1	-0.004	-0.110	-0.085	-0.099	0.079	-0.036
C05 N	GR	-0.013	-0.128	-0.058	-0.085	0.035	-0.059
	T1	0.011	0.022	-0.032	-0.010	0.043	0.025
	GR+T1	-0.002	-0.106	-0.089	-0.095	0.079	-0.034
C05 M	GR	-0.011	-0.127	-0.060	-0.073	0.038	-0.052
	T1	0.009	0.024	-0.031	-0.010	0.043	0.025
	GR+T1	-0.002	-0.103	-0.091	-0.083	0.082	-0.027
C05 F	GR	-0.010	-0.126	-0.060	-0.068	0.041	-0.047
	T1	0.006	0.025	-0.030	-0.010	0.043	0.025
	GR+T1	-0.004	-0.101	-0.090	-0.077	0.085	-0.022

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
C06 N	GR	-0.010	-0.126	-0.060	-0.068	0.041	-0.047
	T1	0.006	0.024	-0.030	-0.010	0.043	0.025
	GR+T1	-0.005	-0.101	-0.090	-0.077	0.085	-0.022
C06 M	GR	-0.010	-0.123	-0.058	-0.062	0.041	-0.042
	T1	0.004	0.024	-0.027	-0.010	0.043	0.025
	GR+T1	-0.006	-0.099	-0.085	-0.071	0.085	-0.017
C06 F	GR	-0.008	-0.120	-0.058	-0.052	0.041	-0.039
	T1	0.004	0.024	-0.024	-0.010	0.043	0.025
	GR+T1	-0.004	-0.097	-0.081	-0.062	0.085	-0.014
C07	GR	-0.002	-0.113	-0.058	-0.048	0.041	-0.039
	T1	0.011	0.025	-0.013	-0.010	0.043	0.025
	GR+T1	0.009	-0.088	-0.070	-0.058	0.085	-0.014
*** Segment C end ***							
A09	GR	-0.018	-0.009	-0.009	-0.065	0.033	-0.111
	T1	0.005	-0.017	0.031	-0.011	0.049	0.028
	GR+T1	-0.013	-0.026	0.022	-0.075	0.082	-0.083
1	GR	-0.005	-0.009	-0.017	-0.064	0.032	-0.111
	T1	0.002	-0.017	0.030	-0.011	0.049	0.028
	GR+T1	-0.003	-0.026	0.013	-0.075	0.082	-0.083
2	GR	-0.005	-0.028	-0.022	-0.061	0.033	-0.116
	T1	0.002	-0.012	0.022	-0.011	0.049	0.028
	GR+T1	-0.003	-0.040	0.000	-0.072	0.082	-0.087
3	GR	-0.005	-0.071	-0.035	-0.055	0.033	-0.106
	T1	0.002	-0.001	0.003	-0.011	0.049	0.028
	GR+T1	-0.003	-0.072	-0.032	-0.065	0.083	-0.078
4	GR	-0.005	-0.088	-0.040	-0.065	0.033	-0.108
	T1	0.002	0.003	-0.005	-0.011	0.049	0.028
	GR+T1	-0.003	-0.085	-0.045	-0.075	0.083	-0.080
A12	GR	-0.018	-0.088	-0.032	-0.065	0.033	-0.111
	T1	0.005	0.003	-0.004	-0.011	0.049	0.028
	GR+T1	-0.013	-0.085	-0.036	-0.075	0.082	-0.083
5	GR	0.009	-0.043	-0.035	-0.091	0.034	-0.112
	T1	0.022	0.003	0.003	-0.011	0.049	0.028
	GR+T1	0.032	-0.040	-0.032	-0.102	0.083	-0.084
6	GR	0.016	-0.021	-0.035	-0.108	0.034	-0.114
	T1	0.033	0.005	0.003	-0.012	0.049	0.028
	GR+T1	0.049	-0.016	-0.032	-0.120	0.083	-0.086

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
7	GR	0.016	0.000	-0.028	-0.097	0.034	-0.099
	T1	0.033	0.000	0.013	-0.011	0.049	0.028
	GR+T1	0.049	0.000	-0.016	-0.108	0.083	-0.070
8	GR	0.016	0.017	-0.022	-0.086	0.033	-0.083
	T1	0.033	-0.005	0.022	-0.011	0.049	0.029
	GR+T1	0.049	0.011	0.000	-0.097	0.083	-0.055
9	GR	0.009	0.000	-0.022	-0.067	0.033	-0.110
	T1	0.022	-0.008	0.022	-0.011	0.049	0.028
	GR+T1	0.031	-0.008	0.000	-0.078	0.083	-0.082
B01	GR	-0.005	0.000	-0.014	-0.065	0.033	-0.111
	T1	0.026	-0.008	0.023	-0.011	0.049	0.028
	GR+T1	0.021	-0.008	0.009	-0.075	0.082	-0.083
10	GR	-0.005	-0.030	-0.022	-0.073	0.033	-0.110
	T1	0.002	-0.012	0.022	-0.011	0.049	0.028
	GR+T1	-0.003	-0.042	0.000	-0.084	0.083	-0.082
B05	GR	-0.004	-0.043	-0.024	-0.091	0.034	-0.112
	T1	0.026	0.003	0.004	-0.011	0.049	0.028
	GR+T1	0.021	-0.040	-0.019	-0.102	0.083	-0.084

AY02A1R2 PROJECT W-320: TANK 241-C-106 SLUICING. FLUOR DANIEL NORTHWEST, INC.
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SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL		Dirn	GLOBAL	
				Force	Deform		Force	Deform
B01 B01 1 Stiff	9 Guide :RIGID	GR	down	26	0.000	X	-0.013	
			right		0.013	Y	-26	0.000
			forw		0.008	Z		0.008
		T1	down	1	0.000	X	0.003	
			left		0.003	Y	-1	0.000
			forw		0.001	Z		0.001
B04 B04 1 Stiff	5 Guide :RIGID	GR+T1	down	26	0.000	X	-0.010	
			right		0.010	Y	-26	0.000
			forw		0.009	Z		0.009
		GR	down	47	0.000	X	-0.014	
			left		0.014	Y	-47	0.000
			back		0.008	Z		0.008
7	1 Y - Stop :RIGID	T1	down	1	0.000	X	0.003	
			right		0.003	Y	-1	0.000
			back		0.001	Z		0.001
		GR+T1	down	48	0.000	X	-0.010	
			left		0.010	Y	-48	0.000
			back		0.009	Z		0.009
7	1 Y - Stop :RIGID	GR	down	146	0.000	X	0.016	
			-Z		0.028	Y	-146	0.000
			+X		0.016	Z		-0.028
		T1	down	2	0.000	X	0.033	
			+Z		0.013	Y	-2	0.000
			+X		0.033	Z		0.013
7	1 Y - Stop :RIGID	GR+T1	down	147	0.000	X	0.049	
			-Z		0.016	Y	-147	0.000
			+X		0.049	Z		-0.016

AY02A1R2 PROJECT W-320: TANK 241-C-106 SLUICING. FLUOR DANIEL NORTHWEST, INC.
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RESTRAINT REACTIONS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A00	Anchor								
	GR	19	-424	0	424	191	54	-33	201
	T1	-82	33	-52	102	-8	-34	-2	35
	GR+T1	-63	-390	-52	399	183	20	-35	187
A22	Anchor								
	GR	-19	-531	0	532	-421	23	-112	436
	T1	82	-32	52	102	1	-20	-31	36
	GR+T1	63	-563	52	569	-420	3	-142	443
B01	Guide								
	GR	0	-26	0	26	0	0	0	0
	T1	0	-1	0	1	0	0	0	0
	GR+T1	0	-26	0	26	0	0	0	0
B04	Guide								
	GR	0	-47	0	47	0	0	0	0
	T1	0	-1	0	1	0	0	0	0
	GR+T1	0	-48	0	48	0	0	0	0
7	Y - Stop								
	GR	0	-146	0	146	0	0	0	0
	T1	0	-2	0	2	0	0	0	0
	GR+T1	0	-147	0	147	0	0	0	0

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)			Result	MOMENTS (ft-lb)			Result
		X	Y	Z		X	Y	Z	
*** Segment A begin ***									
A00	GR	0	424	19	424	33	-54	191	201
	T1	52	-33	-82	102	2	34	-8	35
	GR+T1	52	390	-63	399	35	-20	183	187
A01	GR	0	282	19	283	33	-50	85	104
	T1	52	-33	-82	102	2	14	1	14
	GR+T1	52	249	-63	262	35	-36	86	100
A03	GR	0	282	19	283	33	-48	50	77
	T1	52	-33	-82	102	2	5	4	7
	GR+T1	52	249	-63	262	35	-42	54	77
A04 N	GR	0	-276	-56	282	33	50	-25	65
	T1	52	22	85	102	2	1	-6	7
	GR+T1	52	-254	30	261	35	51	-31	69
A04 M	GR	-192	-192	-55	277	53	-1	40	67
	T1	52	-21	85	102	11	19	-6	23
	GR+T1	-140	-213	30	256	64	18	33	74
A04 F	GR	-267	54	0	273	32	-66	-51	90
	T1	22	-85	-52	102	29	-4	26	39
	GR+T1	-245	-31	-52	252	61	-70	-25	96
A05 N	GR	-259	0	53	264	32	76	-66	106
	T1	22	52	-85	102	29	-65	-27	77
	GR+T1	-237	52	-32	244	61	11	-94	112
A05 M	GR	-178	178	52	258	84	50	-103	142
	T1	52	21	-85	102	-38	-97	-43	113
	GR+T1	-126	199	-33	238	46	-47	-146	160
A05 F	GR	0	250	19	251	102	-31	-189	217
	T1	52	-33	-82	102	-108	-77	-32	136
	GR+T1	52	217	-63	231	-6	-108	-221	246
A06	GR	0	243	19	244	102	-24	-280	299
	T1	52	-33	-82	102	-108	-107	-20	153
	GR+T1	52	210	-63	225	-6	-131	-300	328
A07	GR	0	239	19	239	102	-18	-360	374
	T1	52	-33	-82	102	-108	-134	-9	172
	GR+T1	52	205	-63	221	-6	-152	-369	399

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)			Result	MOMENTS (ft-lb)			Result
		X	Y	Z		X	Y	Z	
A08 N	GR	0	-19	239	239	102	361	-18	376
	T1	52	82	-33	102	-108	9	-134	173
	GR+T1	52	63	205	221	-6	370	-152	400
A08 M	GR	-13	-13	235	236	354	246	-13	431
	T1	94	21	-33	102	-74	74	-150	183
	GR+T1	81	8	202	218	280	319	-163	455
A08 F	GR	-19	232	0	232	449	-11	15	450
	T1	82	-33	52	102	-4	-146	-95	174
	GR+T1	63	198	52	214	446	-156	-81	479
A09 -	GR	-19	232	0	232	449	-11	13	450
	T1	82	-33	52	102	-4	-145	-95	174
	GR+T1	63	198	52	214	446	-156	-82	479
A09 +	GR	-49	132	2	141	451	-8	19	451
	T1	81	-33	52	102	-4	-145	-95	174
	GR+T1	33	99	54	117	447	-154	-76	479
A10 -	GR	-49	132	2	141	451	-7	-83	458
	T1	81	-33	52	102	-4	-105	-69	126
	GR+T1	33	99	54	117	447	-112	-152	485
A10 +	GR	-48	201	0	207	213	-4	1	213
	T1	93	-32	43	107	-6	-70	-61	94
	GR+T1	44	169	43	180	207	-75	-61	228
A11 -	GR	-48	201	0	207	213	-4	-367	424
	T1	93	-32	43	107	-6	9	13	11
	GR+T1	44	169	43	180	207	5	-370	424
A11 +	GR	-52	203	1	210	256	-11	-365	446
	T1	81	-31	52	101	-9	-11	-10	17
	GR+T1	29	172	53	182	247	-22	-374	449
A12 -	GR	-52	203	1	210	256	-10	-522	581
	T1	81	-31	52	101	-9	29	34	34
	GR+T1	29	172	53	182	247	19	-507	564
A12 +	GR	-19	-163	0	164	256	-10	-525	584
	T1	82	-32	52	102	-9	29	15	34
	GR+T1	63	-194	52	211	247	19	-510	568
A13	GR	-19	-174	0	175	256	-10	-364	445
	T1	82	-32	52	102	-9	79	45	91
	GR+T1	63	-206	52	221	247	69	-318	409

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (Lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A13A	GR	-19	-196	0	197	256	-10	-334	421
	T1	82	-32	52	102	-9	87	50	101
	GR+T1	63	-228	52	242	247	77	-284	384
A14	GR	-19	-198	0	198	256	-10	-314	405
	T1	82	-32	52	102	-9	93	53	107
	GR+T1	63	-229	52	243	247	82	-261	369
A14 +	GR	-19	-283	0	284	238	-10	-294	378
	T1	82	-32	52	102	-9	93	53	107
	GR+T1	63	-315	52	326	229	82	-240	342
A15	GR	-19	-285	0	285	238	-10	-265	357
	T1	82	-32	52	102	-9	98	57	113
	GR+T1	63	-316	52	327	229	88	-209	322
A15A	GR	-19	-307	0	308	238	-10	-218	323
	T1	82	-32	52	102	-9	106	62	123
	GR+T1	63	-339	52	349	229	96	-156	294
A16 N	GR	-19	91	-301	315	238	32	-1	240
	T1	82	-40	-45	102	-9	-117	108	160
	GR+T1	63	50	-346	356	229	-86	107	267
A16 M	GR	51	78	-304	318	157	-226	-27	277
	T1	29	-86	-45	102	-94	-89	128	182
	GR+T1	81	-8	-350	359	64	-315	101	337
A16 F	GR	93	-307	-19	322	-82	-42	352	364
	T1	-40	-45	82	102	-134	154	8	204
	GR+T1	52	-353	63	362	-216	112	361	435
A17 N	GR	93	122	-286	325	-82	-372	-181	422
	T1	-40	-62	-70	102	-134	-73	154	217
	GR+T1	53	61	-357	365	-216	-445	-28	496
A17 M	GR	153	28	-290	329	-335	-285	-201	484
	T1	-71	-19	-70	102	-155	20	164	226
	GR+T1	82	10	-360	370	-490	-265	-37	558
A17 F	GR	134	-306	0	334	-465	-201	-2	506
	T1	-65	-58	-52	102	-107	184	-55	220
	GR+T1	69	-364	-52	374	-572	-17	-57	575
A18 N	GR	135	0	-307	335	-465	-22	-201	507
	T1	-65	52	-58	102	-107	50	180	215
	GR+T1	69	52	-365	375	-572	28	-21	573

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (Lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A18 M	GR	96	-96	-311	340	-375	240	-188	483
	T1	-10	83	-58	102	-46	98	-161	194
	GR+T1	87	-13	-370	380	-421	338	-26	540
A18 F	GR	0	-344	19	344	-126	-19	-392	412
	T1	52	-32	-82	102	31	163	-33	169
	GR+T1	52	-376	-63	384	-95	143	-425	459
A19 N	GR	0	377	-19	378	-126	-16	-294	320
	T1	52	32	82	102	31	-7	-27	42
	GR+T1	52	409	63	417	-95	-24	-321	336
A19 M	GR	270	270	-19	383	-102	73	-384	404
	T1	59	-14	82	102	25	-8	-30	39
	GR+T1	329	256	63	422	-78	65	-413	426
A19 F	GR	387	0	19	387	-23	-119	421	438
	T1	32	52	-82	102	20	4	21	29
	GR+T1	418	52	-63	426	-3	-116	442	457
A20	GR	527	0	19	527	-23	-118	421	438
	T1	32	52	-82	102	20	-2	17	26
	GR+T1	559	52	-63	565	-3	-120	438	454
A21	GR	527	0	19	527	-23	-116	421	437
	T1	32	52	-82	102	20	-10	12	25
	GR+T1	559	52	-63	565	-3	-126	433	451
A22	GR	531	0	19	532	-23	-112	421	436
	T1	32	52	-82	102	20	-31	-1	36
	GR+T1	563	52	-63	569	-3	-142	420	443
*** Segment A end ***									
*** Segment B begin ***									
A10	GR	2	-69	0	69	-84	-2	-238	253
	T1	9	-2	12	15	-8	-35	-2	36
	GR+T1	11	-70	12	72	-91	-38	-240	260
B01 -	GR	2	-69	0	69	-84	-2	-101	131
	T1	9	-2	12	15	-8	-12	1	14
	GR+T1	11	-70	12	72	-91	-14	-99	136
B01 +	GR	1	-45	4	45	-80	-2	-48	93
	T1	9	-1	12	15	-8	-12	2	15
	GR+T1	10	-46	16	49	-87	-14	-46	100

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
B02 N	GR	1	-4	-45	45	-80	39	-1	89
	T1	9	-12	-1	15	-8	-2	-10	13
	GR+T1	10	-16	-46	49	-87	37	-11	95
B02 F	GR	-4	-45	1	45	17	2	-57	60
	T1	-12	-1	9	15	-3	1	-7	8
	GR+T1	-16	-46	10	49	14	2	-65	66
B03 N	GR	-4	-1	-45	45	17	20	3	26
	T1	-12	-9	-1	15	-3	7	8	11
	GR+T1	-16	-10	-46	49	14	27	11	32
B03 F	GR	-1	-45	-4	45	-2	1	39	39
	T1	-9	-1	-12	15	6	7	-2	9
	GR+T1	-10	-46	-16	49	4	8	37	38
B04 -	GR	-1	-45	-4	45	-2	0	48	48
	T1	-9	-1	-12	15	6	4	-2	8
	GR+T1	-10	-46	-16	49	4	5	46	46
B04 +	GR	-1	2	-4	5	-2	0	48	48
	T1	-9	0	-12	15	6	4	-2	8
	GR+T1	-10	3	-16	19	4	5	46	46
A11	GR	-1	2	-4	5	-2	-7	44	44
	T1	-9	0	-12	15	6	-19	-3	20
	GR+T1	-10	3	-16	19	4	-27	41	49
*** Segment B end ***									
*** Segment C begin ***									
A14	GR	0	81	0	81	21	0	18	27
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	81	0	81	21	0	18	27
C01	GR	0	80	0	80	21	0	10	23
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	80	0	80	21	0	10	23
C01A	GR	0	57	0	57	21	0	-1	21
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	57	0	57	21	0	-1	21
C02 N	GR	0	54	0	54	21	0	-17	27
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	54	0	54	21	0	-17	27

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
C02 M	GR	36	36	0	50	15	-15	-31	37
	T1	0	0	0	0	0	0	0	0
	GR+T1	36	36	0	50	15	-15	-31	37
C02 F	GR	47	0	0	47	0	-21	-36	42
	T1	0	0	0	0	0	0	0	0
	GR+T1	47	0	0	47	0	-21	-36	42
C03	GR	47	0	0	47	0	-21	-36	42
	T1	0	0	0	0	0	0	0	0
	GR+T1	47	0	0	47	0	-21	-36	42
C04	GR	44	0	0	44	0	-21	-36	42
	T1	0	0	0	0	0	0	0	0
	GR+T1	44	0	0	44	0	-21	-36	42
C05 N	GR	43	0	0	43	0	36	-21	42
	T1	0	0	0	0	0	0	0	0
	GR+T1	43	0	0	43	0	36	-21	42
C05 M	GR	30	-30	0	42	26	26	-17	40
	T1	0	0	0	0	0	0	0	0
	GR+T1	30	-30	0	42	26	26	-17	40
C05 F	GR	0	41	0	41	36	0	10	37
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	41	0	41	36	0	10	37
C06 N	GR	0	0	41	41	36	-10	0	37
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	0	41	41	36	-10	0	37
C06 M	GR	0	0	40	40	21	-25	0	33
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	0	40	40	21	-25	0	33
C06 F	GR	0	39	0	39	0	0	26	26
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	39	0	39	0	0	26	26
C07	GR	0	35	0	35	0	0	0	0
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	35	0	35	0	0	0	0

*** Segment C end ***

BEAM FORCES & MOMENTS

Beam ID	Load combination	Point name	FORCES (lb)			MOMENTS (ft-lb)			
			Axial	Y-Shear	Z-Shear	Torsion	Y-Y Mom.	Z-Z Mom.	
M1	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-11	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M2	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M3	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M4	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M5	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M6	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M7	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	

BEAM FORCES & MOMENTS

Beam ID	Load combination	Point name	FORCES (lb)			MOMENTS (ft-lb)			
			Axial	Y-Shear	Z-Shear	Torsion	Y-Y Mom.	Z-Z Mom.	
M8	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-11	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M9	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M10	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M11	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M12	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	
M13	GR	A09	69	-30	-2	-2	1	-6	
		1	-66	30	2	2	0	-12	
	T1	A09	0	0	0	0	0	0	
		1	0	0	0	0	0	0	

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)			Code Stress	Code Allow.
		In-Pl.	Out-Pl.	Torsion	S.I.	F	Eq.		
		Moment	Moment	Moment	In	Out	no. type		
*** Segment A begin ***									
A00	Max P						(3a) HOOP	7304	16700
	GR + Max P	191	54		1.00	1.00	(18) SUST	4066	16700
	Cold to T1	8	34		2	1.00	(17) DISP	130	25050
A01	Max P						(3a) HOOP	7304	16700
	GR + Max P	85	50		1.00	1.00	(18) SUST	3588	16700
	Cold to T1	1	14		2	1.00	(17) DISP	51	25050
A03	Max P						(3a) HOOP	7304	16700
	GR + Max P	50	48		1.00	1.00	(18) SUST	3447	16700
	Cold to T1	4	5		2	1.00	(17) DISP	26	25050
A04 N-	Max P						(3a) HOOP	7304	16700
	GR + Max P	31	46		1.00	1.00	(18) SUST	3383	16700
	Cold to T1	6	0		2	1.00	(17) DISP	24	25050
A04 N+	Max P						(3a) HOOP	7304	16700
	GR + Max P	25	50		2.56	2.13	(18) SUST	3712	16700
	Cold to T1	6	1		2	2.56	(17) DISP	59	25050
A04 M	Max P						(3a) HOOP	7304	16700
	GR + Max P	40	1		2.56	2.13	(18) SUST	3602	16700
	Cold to T1	6	19		11	2.56	(17) DISP	168	25050
A04 F-	Max P						(3a) HOOP	7304	16700
	GR + Max P	66	51		2.56	2.13	(18) SUST	4081	16700
	Cold to T1	4	26		29	2.56	(17) DISP	238	25050
A04 F+	Max P						(3a) HOOP	7304	16700
	GR + Max P	51	66		1.00	1.00	(18) SUST	3516	16700
	Cold to T1	26	4		29	1.00	(17) DISP	147	25050
A05 N-	Max P						(3a) HOOP	7304	16700
	GR + Max P	76	66		1.00	1.00	(18) SUST	3598	16700
	Cold to T1	65	27		29	1.00	(17) DISP	286	25050
A05 N+	Max P						(3a) HOOP	7304	16700
	GR + Max P	66	76		1.95	1.63	(18) SUST	3973	16700
	Cold to T1	27	65		29	1.95	(17) DISP	457	25050
A05 M	Max P						(3a) HOOP	7304	16700
	GR + Max P	103	50		1.95	1.63	(18) SUST	4159	16700
	Cold to T1	43	97		38	1.95	(17) DISP	681	25050

Point name	Load combination	ASME B31.3c (1992)			CODE COMPLIANCE			(Stress in psi	Code Allow.	
		In-Pl.	Out-Pl.	Torsion	In	S.I.F	Eq.	Load		
		Moment	Moment	Moment				type		Stress
A05 F-	Max P						(3a)	HOOP	7304	16700
	GR + Max P	191	6		1.95	1.63	(18)	SUST	4908	16700
	Cold to T1	42	72	108	1.95	1.63	(17)	DISP	669	25050
A05 F+	Max P						(3a)	HOOP	7304	16700
	GR + Max P	189	31		1.00	1.00	(18)	SUST	4033	16700
	Cold to T1	32	77	108	1.00	1.00	(17)	DISP	509	25050
A06	Max P						(3a)	HOOP	7304	16700
	GR + Max P	280	24		1.00	1.00	(18)	SUST	4464	16700
	Cold to T1	20	107	108	1.00	1.00	(17)	DISP	573	25050
A07	Max P						(3a)	HOOP	6451	16700
	GR + Max P	360	18		1.00	1.00	(18)	SUST	6043	16700
	Cold to T1	9	134	108	1.00	1.00	(17)	DISP	1199	25050
A08 N-	Max P						(3a)	HOOP	6451	16700
	GR + Max P	361	18		1.00	1.00	(18)	SUST	6054	16700
	Cold to T1	9	134	108	1.00	1.00	(17)	DISP	1202	25050
A08 N+	Max P						(3a)	HOOP	6451	16700
	GR + Max P	18	361		1.78	1.48	(18)	SUST	7645	16700
	Cold to T1	134	9	108	1.78	1.48	(17)	DISP	1827	25050
A08 M	Max P						(3a)	HOOP	6451	16700
	GR + Max P	13	246		1.78	1.48	(18)	SUST	6081	16700
	Cold to T1	150	74	74	1.78	1.48	(17)	DISP	2074	25050
A08 F-	Max P						(3a)	HOOP	6451	16700
	GR + Max P	11	15		1.78	1.48	(18)	SUST	3010	16700
	Cold to T1	146	95	4	1.78	1.48	(17)	DISP	2052	25050
A08 F+	Max P						(3a)	HOOP	6451	16700
	GR + Max P	15	11		1.00	1.00	(18)	SUST	2913	16700
	Cold to T1	95	146	4	1.00	1.00	(17)	DISP	1212	25050
A09	Max P						(3a)	HOOP	6451	16700
	GR + Max P	13	11		1.00	1.00	(18)	SUST	2904	16700
	Cold to T1	95	145	4	1.00	1.00	(17)	DISP	1210	25050
A12	Max P						(3a)	HOOP	6451	16700
	GR + Max P	525	10		1.00	1.00	(18)	SUST	7553	16700
	Cold to T1	15	29	9	1.00	1.00	(17)	DISP	236	25050
A13	Max P						(3a)	HOOP	6451	16700
	GR + Max P	364	10		1.00	1.00	(18)	SUST	6076	16700
	Cold to T1	45	79	9	1.00	1.00	(17)	DISP	636	25050

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)				(Stress in psi)		Code
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In Out	Eq. Load no.	Code Stress	
A13A	Max P					(3a) HOOP	6451	16700
	GR + Max P	334	10		1.00 1.00	(18) SUST	5805	16700
	Cold to T1	50	87		9 1.00 1.00	(17) DISP	704	25050
A14	Max P					(3a) HOOP	6451	16700
	GR + Max P	10	314		1.22 1.30	(18) SUST	6476	16700
	Cold to T1	93	53		9 1.22 1.30	(17) DISP	925	25050
A14 +	Max P					(3a) HOOP	6451	16700
	GR + Max P	10	294		1.22 1.30	(18) SUST	6232	16700
	Cold to T1	93	53		9 1.22 1.30	(17) DISP	925	25050
A15	Max P					(3a) HOOP	6451	16700
	GR + Max P	265	10		1.00 1.00	(18) SUST	5177	16700
	Cold to T1	57	98		9 1.00 1.00	(17) DISP	788	25050
A15A	Max P					(3a) HOOP	6451	16700
	GR + Max P	218	10		1.00 1.00	(18) SUST	4744	16700
	Cold to T1	62	106		9 1.00 1.00	(17) DISP	856	25050
A16 N-	Max P					(3a) HOOP	6451	16700
	GR + Max P	30	10		1.00 1.00	(18) SUST	3037	16700
	Cold to T1	81	137		9 1.00 1.00	(17) DISP	1111	25050
A16 N+	Max P					(3a) HOOP	6451	16700
	GR + Max P	1	32		1.78 1.48	(18) SUST	3176	16700
	Cold to T1	108	117		9 1.78 1.48	(17) DISP	1803	25050
A16 M	Max P					(3a) HOOP	6451	16700
	GR + Max P	27	226		1.78 1.48	(18) SUST	5843	16700
	Cold to T1	128	89		9 1.78 1.48	(17) DISP	1940	25050
A16 F-	Max P					(3a) HOOP	6451	16700
	GR + Max P	42	352		1.78 1.48	(18) SUST	7569	16700
	Cold to T1	154	8		134 1.78 1.48	(17) DISP	2122	25050
A16 F+	Max P					(3a) HOOP	7304	16700
	GR + Max P	352	42		1.00 1.00	(18) SUST	4818	16700
	Cold to T1	8	154		134 1.00 1.00	(17) DISP	763	25050
A17 N-	Max P					(3a) HOOP	7304	16700
	GR + Max P	411	46		1.00 1.00	(18) SUST	5101	16700
	Cold to T1	17	170		134 1.00 1.00	(17) DISP	809	25050
A17 N+	Max P					(3a) HOOP	7304	16700
	GR + Max P	181	372		2.56 2.13	(18) SUST	7524	16700
	Cold to T1	154	73		134 2.56 2.13	(17) DISP	1658	25050

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)				(Stress in psi)		Code
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In Out	Eq. Load no.	Code Stress	
A17 M	Max P					(3a) HOOP	7304	16700
	GR + Max P	201	285		2.56 2.13	(18) SUST	6935	16700
	Cold to T1	164	20		155 2.56 2.13	(17) DISP	1678	25050
A17 F-	Max P					(3a) HOOP	7304	16700
	GR + Max P	194	52		2.56 2.13	(18) SUST	5554	16700
	Cold to T1	162	103		107 2.56 2.13	(17) DISP	1797	25050
A17 F+	Max P					(3a) HOOP	7304	16700
	GR + Max P	2	201		1.00 1.00	(18) SUST	4078	16700
	Cold to T1	55	184		107 1.00 1.00	(17) DISP	821	25050
A18 N-	Max P					(3a) HOOP	7304	16700
	GR + Max P	22	201		1.00 1.00	(18) SUST	4084	16700
	Cold to T1	50	180		107 1.00 1.00	(17) DISP	804	25050
A18 N+	Max P					(3a) HOOP	7304	16700
	GR + Max P	201	22		2.56 2.13	(18) SUST	5590	16700
	Cold to T1	180	50		107 2.56 2.13	(17) DISP	1808	25050
A18 M	Max P					(3a) HOOP	7304	16700
	GR + Max P	188	240		2.56 2.13	(18) SUST	6482	16700
	Cold to T1	161	98		46 2.56 2.13	(17) DISP	1733	25050
A18 F-	Max P					(3a) HOOP	7304	16700
	GR + Max P	155	361		2.56 2.13	(18) SUST	7270	16700
	Cold to T1	141	88		31 2.56 2.13	(17) DISP	1520	25050
A18 F+	Max P					(3a) HOOP	7304	16700
	GR + Max P	392	19		1.00 1.00	(18) SUST	5000	16700
	Cold to T1	33	163		31 1.00 1.00	(17) DISP	630	25050
A19 N-	Max P					(3a) HOOP	7304	16700
	GR + Max P	294	16		1.00 1.00	(18) SUST	4528	16700
	Cold to T1	27	7		31 1.00 1.00	(17) DISP	156	25050
A19 N+	Max P					(3a) HOOP	7304	16700
	GR + Max P	294	16		2.56 2.13	(18) SUST	6729	16700
	Cold to T1	27	7		31 2.56 2.13	(17) DISP	291	25050
A19 M	Max P					(3a) HOOP	7304	16700
	GR + Max P	384	73		2.56 2.13	(18) SUST	7883	16700
	Cold to T1	30	8		25 2.56 2.13	(17) DISP	305	25050
A19 F-	Max P					(3a) HOOP	7304	16700
	GR + Max P	421	119		2.56 2.13	(18) SUST	8426	16700
	Cold to T1	21	4		20 2.56 2.13	(17) DISP	213	25050

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)		(Code Allow.)	
		In-Pl. Moment	Out-Pl. Moment	Torsion	S.I.F. In Out	Eq. Load no. type	Code Stress	Code Allow.
A19 F+	Max P					(3a) HOOP	7304	16700
	GR + Max P	421	119		1.00 1.00	(18) SUST	5215	16700
	Cold to T1	21	4	20	1.00 1.00	(17) DISP	108	25050
A20	Max P					(3a) HOOP	7304	16700
	GR + Max P	421	118		1.00 1.00	(18) SUST	5215	16700
	Cold to T1	17	2	20	1.00 1.00	(17) DISP	99	25050
A21	Max P					(3a) HOOP	7304	16700
	GR + Max P	421	116		1.00 1.00	(18) SUST	5211	16700
	Cold to T1	12	10	20	1.00 1.00	(17) DISP	95	25050
A22	Max P					(3a) HOOP	7304	16700
	GR + Max P	421	112		1.00 1.00	(18) SUST	5205	16700
	Cold to T1	1	31	20	1.00 1.00	(17) DISP	136	25050
*** Segment A end ***								
*** Segment B begin ***								
*** Segment B end ***								
*** Segment C begin ***								
A14	Max P					(3a) HOOP	6451	16700
	GR + Max P	0	18		1.22 1.30	(18) SUST	2952	16700
	Cold to T1	0	0	0	1.22 1.30	(17) DISP	0	25050
C01	Max P					(3a) HOOP	6451	16700
	GR + Max P	10	0		1.00 1.00	(18) SUST	2839	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C01A	Max P					(3a) HOOP	6451	16700
	GR + Max P	1	0		1.00 1.00	(18) SUST	2758	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C02 N-	Max P					(3a) HOOP	6451	16700
	GR + Max P	17	0		1.00 1.00	(18) SUST	2903	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C02 N+	Max P					(3a) HOOP	6451	16700
	GR + Max P	17	0		1.78 1.48	(18) SUST	3022	16700
	Cold to T1	0	0	0	1.78 1.48	(17) DISP	0	25050
C02 M	Max P					(3a) HOOP	6451	16700
	GR + Max P	31	15		1.78 1.48	(18) SUST	3285	16700
	Cold to T1	0	0	0	1.78 1.48	(17) DISP	0	25050

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)		(Code Allow.)	
		In-Pl. Moment	Out-Pl. Moment	Torsion	S.I.F. In Out	Eq. Load no. type	Code Stress	Code Allow.
C02 F-	Max P					(3a) HOOP	6451	16700
	GR + Max P	36	21		1.78 1.48	(18) SUST	3398	16700
	Cold to T1	0	0	0	1.78 1.48	(17) DISP	0	25050
C02 F+	Max P					(3a) HOOP	6451	16700
	GR + Max P	36	21		1.00 1.00	(18) SUST	3129	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C03	Max P					(3a) HOOP	6451	16700
	GR + Max P	36	21		1.00 1.00	(18) SUST	3129	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C04	Max P					(3a) HOOP	7562	16700
	GR + Max P	36	21		1.00 1.00	(18) SUST	4444	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C05 N-	Max P					(3a) HOOP	7562	16700
	GR + Max P	36	21		1.00 1.00	(18) SUST	4444	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C05 N+	Max P					(3a) HOOP	7562	16700
	GR + Max P	21	36		1.73 1.44	(18) SUST	5145	16700
	Cold to T1	0	0	0	1.73 1.44	(17) DISP	0	25050
C05 M	Max P					(3a) HOOP	7562	16700
	GR + Max P	17	26		1.73 1.44	(18) SUST	4643	16700
	Cold to T1	0	0	0	1.73 1.44	(17) DISP	0	25050
C05 F-	Max P					(3a) HOOP	7562	16700
	GR + Max P	10	0		1.73 1.44	(18) SUST	3664	16700
	Cold to T1	0	0	0	1.73 1.44	(17) DISP	0	25050
C05 F+	Max P					(3a) HOOP	7562	16700
	GR + Max P	10	0		1.00 1.00	(18) SUST	3424	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C06 N-	Max P					(3a) HOOP	7562	16700
	GR + Max P	10	0		1.00 1.00	(18) SUST	3421	16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050
C06 N+	Max P					(3a) HOOP	7562	16700
	GR + Max P	0	10		1.73 1.44	(18) SUST	3572	16700
	Cold to T1	0	0	0	1.73 1.44	(17) DISP	0	25050
C06 M	Max P					(3a) HOOP	7562	16700
	GR + Max P	0	25		1.73 1.44	(18) SUST	4287	16700
	Cold to T1	0	0	0	1.73 1.44	(17) DISP	0	25050

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)		
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In Out	Eq. Load no. type	Code Stress Allow.
C06 F-	Max P					(3a) HOOP	7562 16700
	GR + Max P	0	26		1.73 1.44	(18) SUST	4324 16700
	Cold to T1	0	0	0	1.73 1.44	(17) DISP	0 25050
C06 F+	Max P					(3a) HOOP	7562 16700
	GR + Max P	26	0		1.00 1.00	(18) SUST	3947 16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0 25050
C07	Max P					(3a) HOOP	7562 16700
	GR + Max P	0	0		1.00 1.00	(18) SUST	3095 16700
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0 25050

*** Segment C end ***

SYSTEM SUMMARY

Maximum displacements (in)

Maximum X :	0.049	Point : 8	Load Comb.: GR+T1
Maximum Y :	-0.150	Point : A17 F	Load Comb.: GR
Maximum Z :	-0.091	Point : C05 M	Load Comb.: GR+T1
Max. total:	0.160	Point : A17 F	Load Comb.: GR+T1

Maximum rotations (deg)

Maximum X :	-0.282	Point : A19 N	Load Comb.: GR+T1
Maximum Y :	0.085	Point : C05 F	Load Comb.: GR+T1
Maximum Z :	-0.126	Point : A08 N	Load Comb.: GR
Max. total:	0.291	Point : A19 N	Load Comb.: GR+T1

Maximum restraint forces(lb)

Maximum X :	-82	Point : A00	Load Comb.: T1
Maximum Y :	-563	Point : A22	Load Comb.: GR+T1
Maximum Z :	52	Point : A22	Load Comb.: GR+T1
Max. total:	569	Point : A22	Load Comb.: GR+T1

Maximum restraint moments(ft-lb)

Maximum X :	-421	Point : A22	Load Comb.: GR
Maximum Y :	54	Point : A00	Load Comb.: GR
Maximum Z :	-142	Point : A22	Load Comb.: GR+T1
Max. total:	443	Point : A22	Load Comb.: GR+T1

SYSTEM SUMMARY

Maximum pipe forces (lb)

Maximum X :	563	Point : A22	Load Comb.: GR+T1
Maximum Y :	424	Point : A00	Load Comb.: GR
Maximum Z :	-370	Point : A18 M	Load Comb.: GR+T1
Max. total:	569	Point : A22	Load Comb.: GR+T1

Maximum pipe moments (ft-lb)

Maximum X :	-572	Point : A17 F	Load Comb.: GR+T1
Maximum Y :	-445	Point : A17 N	Load Comb.: GR+T1
Maximum Z :	-525	Point : A12	Load Comb.: GR
Max. total:	584	Point : A12	Load Comb.: GR

SYSTEM SUMMARY

Maximum sustained stress

Point	:	A19 F
Stress psi	:	8426
Allowable psi	:	16700
Ratio	:	0.50
Load combination	:	GR + Max P

Maximum displacement stress

Point	:	A16 F
Stress psi	:	2122
Allowable psi	:	25050
Ratio	:	0.08
Load combination	:	Cold to T1

Maximum hoop stress

Point	:	C04
Stress psi	:	7562
Allowable psi	:	16700
Ratio	:	0.45
Load combination	:	Max P

Maximum sustained stress ratio

Point	:	A19 F
Stress psi	:	8426
Allowable psi	:	16700
Ratio	:	0.50
Load combination	:	GR + Max P

Maximum displacement stress ratio

Point	:	A16 F
Stress psi	:	2122
Allowable psi	:	25050
Ratio	:	0.08
Load combination	:	Cold to T1

Maximum hoop stress ratio

Point	:	C04
Stress psi	:	7562
Allowable psi	:	16700
Ratio	:	0.45
Load combination	:	Max P

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SYSTEM SUMMARY

*** The system satisfies ASME B31.3 code requirements ***
*** for the selected options ***

POINT DATA LISTING

POINT NAME	TYPE	-----OFFSETS (ft)-----			PIPE ID	DESCRIPTION
		X	Y	Z		
*** SEGMENT A						
A00	Run	0	0	0	4"PIPE	
A01	Flex	0	0	0.25		Wt= 137 lb , Ar= 3.2 sq.in Axial= 23300000 Tors= 304.0 Y-Shear= RIGID Bend= 2080.0 Z-Shear= RIGID Bend= 2080.0
A03	Run	0	0	0.10		
A04	Bend	0	0	0.40		Short Elbow, Radius = 4.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A05	Bend	-0.17	-1.28	0		Long Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.95, Out = 1.63 Flex = 5.272
A06	Redu	0	0	0.87		
A07	Run	0	0	0.33	3"PIPE	
A08	Bend	0	0	0.38		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
A09	Run	0.38	0	0	RIGID	
A10	Tee	0.77	0	0		
A11	Tee	1.83	0	0		
A12	Run	0.77	0	0	3"PIPE	
A13	Valv	0.96	0	0		Rating = 300, Weight = 22 lb Surface factor = 4.40, SIF = 1.00
A13A	Run	0.16	0	0		
A14	Tee	0.10	0	0		
A15	Valv	0.10	0	0		Rating = 300, Weight = 22 lb Surface factor = 4.40, SIF = 1.00
A15A	Run	0.16	0	0		
A16	Bend	0.98	0	0		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
A16 F	Far				4"PIPE	
A17	Bend	0	-0.25	-0.83		Short Elbow, Radius = 4.00 inch

POINT DATA LISTING

POINT NAME	TYPE	-----OFFSETS (ft)-----			PIPE ID	DESCRIPTION
		X	Y	Z		
						Bend angle change = 84.21 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A18	Bend	-0.67	-0.25	0		Short Elbow, Radius = 4.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A19	Bend	0	0	2.57		Short Elbow, Radius = 4.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A20	Flex	0	-0.40	0		Wt= 139 lb , Ar= 3.2 sq.in Axial= 23300000 Tors= 304.0 Y-Shear= RIGID Bend= 2080.0 Z-Shear= RIGID Bend= 2080.0
A21	Run	0	-0.10	0		
A22	Run	0	-0.25	0		
*** SEGMENT B						
A10	Tee	0.98	-1.28	2.33	RIGID	
B01	Run	0	0	2.00		
B02	Bend	0	0	0.71		Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg SIF - In 1.00, Out = 1.00 Flex = 1.000
B03	Bend	1.83	0	0		Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg SIF - In 1.00, Out = 1.00 Flex = 1.000
B04	Run	0	0	-0.71		
A11	Tee	0	0	-2.00		
*** SEGMENT C						
A14	Tee	4.80	-1.28	2.33	3"PIPE	
C01	Valv	0	0	-0.10		Rating = 300, Weight = 22 lb Surface factor = 4.40, SIF = 1.00
C01A	Run	0	0	-0.16		
C02	Bend	0	0	-0.66		Long Elbow, Radius = 4.50 inch Bend angle change = 90.00 deg

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)----- X Y Z			PIPE ID	DESCRIPTION
						Mid point at 50.00 percent SIF - In 1.78, Out = 1.48 Flex = 4.577
C03	Redu	0	0.38	0		
C04	Run	0	0.29	0	2"-PIPE	
C05	Bend	0	0.48	0		Long Elbow, Radius = 3.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.73, Out = 1.44 Flex = 4.404
C06	Bend	-0.50	0	0		Long Elbow, Radius = 3.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.73, Out = 1.44 Flex = 4.404
C07	Run	0	0	0.96		

Total weight of empty pipes : 132 lb

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft)--- X Y Z	DATA TYPE	DESCRIPTION
*** SEGMENT A			
A00	0.00 0.00 0.00	ANCHOR	Rigid Thermal movements : None
A01	0.00 0.00 0.25		
A03	0.00 0.00 0.35		
A04 N	0.00 0.00 0.42		
A04	0.00 0.00 0.75	TI	
A04 M	-0.01 -0.10 0.65		
A04 F	-0.04 -0.33 0.75		
A05 N	-0.10 -0.78 0.75		
A05	-0.17 -1.28 0.75	TI	
A05 M	-0.15 -1.13 0.90		
A05 F	-0.17 -1.28 1.25		
A06	-0.17 -1.28 1.62		
A07	-0.17 -1.28 1.95		
A08 N	-0.17 -1.28 1.95		
A08	-0.17 -1.28 2.33	TI	
A08 M	-0.06 -1.28 2.22		
A08 F	0.21 -1.28 2.33		
A09	0.21 -1.28 2.33	FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 15 lb
		FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 15 lb
A10	0.98 -1.28 2.33	TEE	B16.9 welding tee SIF - In = 1.00, Out = 1.00
A11	2.81 -1.28 2.33	TEE	B16.9 welding tee SIF - In = 1.00, Out = 1.00
A12	3.58 -1.28 2.33	FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 138 lb
		FLANGE	Weld neck SIF = 1.00 Rating = 300, Weight = 138 lb
A13	4.54 -1.28 2.33		
A13A	4.70 -1.28 2.33		
A14	4.80 -1.28 2.33	TEE	B16.9 welding tee SIF - In = 1.22, Out = 1.30
		WEIGHT	5 lb, No offsets
A15	4.90 -1.28 2.33		
A15A	5.06 -1.28 2.33		
A16 N	5.66 -1.28 2.33		
A16	6.04 -1.28 2.33	TI	
A16 M	5.93 -1.31 2.22		
A16 F	6.04 -1.39 1.97		
A17 N	6.04 -1.44 1.79		
A17	6.04 -1.53 1.50	TI	
A17 M	5.96 -1.54 1.58		
A17 F	5.76 -1.64 1.50		
A18 N	5.68 -1.66 1.50		
A18	5.37 -1.78 1.50	TI	
A18 M	5.46 -1.75 1.60		

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COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft)---			DATA TYPE	DESCRIPTION
	X	Y	Z		
A18 F	5.37	-1.78	1.83		
A19 M	5.37	-1.78	3.74		
A19	5.37	-1.78	4.07	TI	
A19 M	5.37	-1.88	3.97		
A19 F	5.37	-2.11	4.07		
A20	5.37	-2.18	4.07		
A21	5.37	-2.28	4.07		
A22	5.37	-2.53	4.07	ANCHOR	

Rigid Thermal movements : None

*** SEGMENT 8

A10	0.98	-1.28	2.33	TEE	B16.9 welding tee
B01	0.98	-1.28	4.33	GUIDE	SIF - In = 1.00, Out = 1.00 ID : B01 1, Connected to 9 Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.30 Gaps set Weightless
B02 N	0.98	-1.28	4.54		
B02	0.98	-1.28	5.04	TI	
B02 F	1.48	-1.28	5.04		
B03 N	2.31	-1.28	5.04		
B03	2.81	-1.28	5.04	TI	
B03 F	2.81	-1.28	4.54		
B04	2.81	-1.28	4.33	GUIDE	ID : B04 1, Connected to 5 Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.30 Gaps set Weightless
A11	2.81	-1.28	2.33	TEE	B16.9 welding tee SIF - In = 1.00, Out = 1.00

*** SEGMENT C

A14	4.80	1.28	2.33	TEE	816.9 welding tee SIF - In = 1.22, Out = 1.30
C01	4.80	-1.28	2.23		
C01A	4.80	-1.28	2.07		
C02 N	4.80	-1.28	1.78		
C02	4.80	-1.28	1.78	TI	
C02 M	4.80	-1.17	1.52		
C02 F	4.80	-0.90	1.41		
C03	4.80	-0.90	1.41		
C04	4.80	-0.61	1.41		
C05 N	4.80	-0.38	1.41		
C05	4.80	-0.13	1.41	TI	
C05 M	4.73	-0.20	1.41		
C05 F	4.55	-0.13	1.41		

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft)---		Z	DATA TYPE	DESCRIPTION
	X	Y			
C06 N	4.55	-0.13	1.41		
C06	4.30	-0.13	1.41	TI	
C06 M	4.37	-0.13	1.48		
C06 F	4.30	-0.13	1.66		
C07	4.30	-0.13	2.37	WEIGHT 35 lb	No offsets

Number of points in the system : 73

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PIPE DATA LISTING

Pipe ID/ Material	Nom/ Sch	O.D. inch	-----Thickness(inch)----- W.Th. Corr Mill Insu Ling	Spec Grav	Weight(lb/ft) Pipe Other Total
4"PIPE A312-TP304L	4 STD	4.500	0.237 0.06 0.03 0 0	1.20	11.04 0 17.66
3"PIPE A312-TP304L	3.000 STD	3.500	0.216 0.06 0.03 0 0	1.20	7.75 0 11.60
2"-PIPE A312-TP304L	2.000 STD	2.375	0.154 0.06 0.02 0 0	1.20	3.74 0 5.48

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MATERIAL DATA LISTING

Material Name	Pipe ID	Density lb/cu.ft	Pois. Ratio	Temper. deg F	Modulus E6 psi	Expans. in/100ft	Allow. psi
A312-TP304L	4"PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0
A312-TP304L	3"PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0
A312-TP304L	2"-PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0

FRAME POINT DATA LISTING

POINT NAME	---COORDINATE(ft)---			DATA TYPE	DESCRIPTION
	X	Y	Z		
A09	0.21	-1.28	2.33		
1	0.21	-0.70	2.33	WEIGHT 51 lb	, No offsets
2	0.98	-0.70	2.33		
3	2.81	-0.70	2.33	WEIGHT 8 lb	, No offsets
4	3.58	-0.70	2.33	WEIGHT 51 lb	, No offsets
A12	3.58	-1.28	2.33		
5	2.81	-0.70	4.33		
6	2.81	-0.70	5.33		
7	1.89	-0.70	5.33	WEIGHT 51 lb	, No offsets
8	0.98	-0.70	5.33		
9	0.98	-0.70	4.33		
B01	0.98	-1.28	4.33		
10	0.98	-0.70	2.33		
B05	2.81	-1.28	4.33		

BEAM DATA LISTING

BEAM ID	POINT NAME	LENGTH (ft)	SECTION ID/ MATERIAL ID	BETA ANGLE	RIGID END(ft)	RELEASE			
						Ax	Y-Y	Z-Z	
M1	From A09 To 1	0.58	C4X5.4 A36	0.00	0.00	N	N	N	N
M2	From 1 To 2	0.77	C4X5.4 A36	90.00	0.00	N	N	N	N
M3	From 2 To 3	1.83	C4X5.4 A36	90.00	0.00	N	N	N	N
M4	From 3 To 4	0.77	C4X5.4 A36	90.00	0.00	N	N	N	N
M5	From 4 To A12	0.58	C4X5.4 A36	90.00	0.00	N	N	N	N
M6	From 3 To 5	2.00	C4X5.4 A36	90.00	0.00	N	N	N	N
M7	From 5 To 6	1.00	C4X5.4 A36	90.00	0.00	N	N	N	N
M8	From 6 To 7	0.92	C4X5.4 A36	90.00	0.00	N	N	N	N
M9	From 7 To 8	0.91	C4X5.4 A36	90.00	0.00	N	N	N	N
M10	From 8 To 9	1.00	C4X5.4 A36	90.00	0.00	N	N	N	N
M11	From 9 To 10	2.00	C4X5.4 A36	90.00	0.00	N	N	N	N
M12	From 5 To B05	0.58	C4X5.4 A36	90.00	0.00	N	N	N	N
M13	From 9 To B01	0.58	C4X5.4 A36	90.00	0.00	N	N	N	N

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CROSS SECTION LISTING

Section ID	Area(sq.in)			Inertia (in**4)		
ID	Axial	Y-Shear	Z-Shear	Torsion	Y-Y Bend	Z-Z Bend
C4X5.4	1.59	0.74	0.62	0.0	0.3	3.8

AY02A2R2 PROJECT W-320: TANK 241-C-106 SLUICING FLUOR DANIEL NORTHWEST, INC.
 03/12/97 AY-02A-U11-A JUMPER DYNAMIC ANALYSIS AutoPIPE+4.60 MODEL PAGE 14

BEAM MATERIAL LISTING

MATERIAL ID	Elastic modulus E6 psi	Poissons ratio	Yield Stress psi	Density lb/cu.ft	Expansion E-6 /F	Ultimate stress psi
A36	29,000	0.250	36000	490.00	6.50000	58000

TEMPERATURE AND PRESSURE DATA

POINT NAME	CASE 1			CASE 2			CASE 3		
	PRESS. psi	TEMPER. deg F	EXPAN. in/100ft	PRESS. psi	TEMPER. deg F	EXPAN. in/100ft	PRESS. psi	TEMPER. deg F	EXPAN. in/100ft

*** SEGMENT A

A00	325	180	1.544
A07	325	180	1.544
A09	325	180	0.000
A12	325	180	1.544
A16 F	325	180	1.544
A22	325	180	1.544

*** SEGMENT B

A10	325	180	0.000
A11	325	180	0.000

*** SEGMENT C

A14	325	180	1.544
C04	325	180	1.544
C07	325	180	1.544

ANALYSIS SUMMARY

Current model revision number : 2

Modal - Date and Time of analysis Mar 12, 1997 9:52 AM
Model Revision Number 2
Number of modes 7
Cutoff frequency (Hz) 33.0
Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

Response - Date and Time of analysis Mar 12, 1997 9:53 AM
Model Revision Number 2
Number of load cases 3
Load cases analyzed R1 R2 R3
Date and time of modal analysis Mar 12, 1997 9:52 AM
Number of modes 7
Cutoff frequency (Hz) 33.0
Model revision of modal analysis 2
Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

CODE COMPLIANCE COMBINATIONS

Combination	Category	Method	Load	Factor	Allowable	Remarks
Sus. + R1	Occasion	Abs sum	Response 1 Max Sus	1.00 1.00	Automatic	Default
Sus. + R2	Occasion	Abs sum	Response 2 Max Sus	1.00 1.00	Automatic	Default
Sus. + R3	Occasion	Abs sum	Response 3 Max Sus	1.00 1.00	Automatic	Default

OTHER USER COMBINATIONS

Combination	Method	Load	Factor	Remarks
R1	Sum	Response 1	1.00	Default
R2	Sum	Response 2	1.00	Default
R3	Sum	Response 3	1.00	Default
RESPONSE	SRSS	Response 1 Response 2 Response 3	1.00 1.00 1.00	User

CODE COMPLIANCE

Y - Factor 0.40
Weld efficiency factor 1.00
Range reduction factor 1.00
Design Pressure Factor 1.00
Minimum stress ratio used in reports... 0.00
Include corrosion in stress calcs. Y
Include torsion in code stress N
Include axial force in code stress N
Longitudinal pressure calculation PD/4t
Include rigorous pressure Not analyzed

RESPONSE SPECTRUM LOAD CASES :

Number of load cases analysed : 3

Load case 1 - R1

Missing mass : Yes
ZPA : No

Combination method : SRSS

X- Spectrum : SC1
Multiplier : 1.00

SC1

Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.03	0.250	0.06
0.400	0.10	0.600	0.16	1.100	0.28
1.640	0.42	8.000	0.42	12.000	0.34
20.000	0.26	33.000	0.20	100.000	0.20

AY02A2R2 PROJECT W-320: TANK 241-C-106 SLUICING FLUOR DANIEL NORTHWEST, INC.
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Load case 2 - R2

Missing mass : Yes
 ZPA : No

Combination method : SRSS

Y- Spectrum : SC1
 Multiplier : 1.00

SC1

Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.03	0.250	0.06
0.400	0.10	0.600	0.16	1.100	0.28
1.640	0.42	8.000	0.42	12.000	0.34
20.000	0.26	33.000	0.20	100.000	0.20

AY02A2R2 PROJECT W-320: TANK 241-C-106 SLUICING FLUOR DANIEL NORTHWEST, INC.
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Load case 3 - R3

Missing mass : Yes
 ZPA : No

Combination method : SRSS

Z- Spectrum : SC1
 Multiplier : 1.00

SC1

Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.03	0.250	0.06
0.400	0.10	0.600	0.16	1.100	0.28
1.640	0.42	8.000	0.42	12.000	0.34
20.000	0.26	33.000	0.20	100.000	0.20

F R E Q U E N C I E S

Mode Number	Frequency (Rads/sec)	Frequency (Hertz)	Period (Sec)	Participation factors		
				X	Y	Z
1	48.5389	7.7252	0.129	0.484	1.076	0.195
2	54.6772	8.7021	0.115	1.292	-0.231	0.123
3	68.3506	10.8783	0.092	0.340	-0.688	-0.621
4	133.5456	21.2544	0.047	0.033	0.301	-1.046
5	171.4149	27.2815	0.037	0.027	-0.092	0.352
6	178.9405	28.4793	0.035	-0.041	0.068	0.088
7	202.7504	32.2687	0.031	0.026	-0.300	0.323

D I S P L A C E M E N T S

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
*** Segment A begin ***							
A00	R1	0.000	0.000	0.000	0.000	0.000	0.000
	R2	0.000	0.000	0.000	0.000	0.000	0.000
	R3	0.000	0.000	0.000	0.000	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.000	0.000	0.000
A01	R1	0.000	0.000	0.000	0.001	0.002	0.000
	R2	0.000	0.000	0.000	0.002	0.001	0.000
	R3	0.000	0.000	0.000	0.000	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.002	0.002	0.000
A03	R1	0.001	0.000	0.000	0.043	0.058	0.086
	R2	0.000	0.001	0.000	0.079	0.035	0.021
	R3	0.000	0.000	0.000	0.018	0.014	0.015
	RESPONSE	0.001	0.001	0.000	0.091	0.069	0.090
A04 N	R1	0.002	0.001	0.000	0.043	0.058	0.087
	R2	0.001	0.002	0.000	0.079	0.035	0.021
	R3	0.000	0.000	0.000	0.018	0.014	0.015
	RESPONSE	0.002	0.002	0.000	0.092	0.069	0.090
A04 M	R1	0.006	0.004	0.001	0.049	0.064	0.088
	R2	0.003	0.006	0.002	0.091	0.039	0.021
	R3	0.001	0.001	0.000	0.020	0.015	0.015
	RESPONSE	0.007	0.007	0.002	0.105	0.076	0.092
A04 F	R1	0.012	0.005	0.003	0.055	0.064	0.088
	R2	0.004	0.008	0.007	0.102	0.041	0.021
	R3	0.001	0.002	0.002	0.023	0.016	0.015
	RESPONSE	0.013	0.010	0.008	0.118	0.078	0.092
A05 N	R1	0.020	0.006	0.008	0.057	0.065	0.087
	R2	0.005	0.008	0.017	0.104	0.042	0.021
	R3	0.002	0.002	0.004	0.023	0.016	0.015
	RESPONSE	0.021	0.010	0.019	0.120	0.079	0.091
A05 M	R1	0.028	0.008	0.013	0.063	0.062	0.076
	R2	0.007	0.011	0.025	0.112	0.042	0.021
	R3	0.003	0.003	0.006	0.024	0.016	0.016
	RESPONSE	0.029	0.014	0.029	0.130	0.077	0.081
A05 F	R1	0.035	0.013	0.015	0.069	0.055	0.070
	R2	0.010	0.020	0.029	0.118	0.042	0.021
	R3	0.004	0.004	0.006	0.025	0.016	0.017
	RESPONSE	0.036	0.024	0.033	0.139	0.071	0.075

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A06	R1	0.039	0.018	0.015	0.070	0.054	0.066
	R2	0.013	0.029	0.029	0.119	0.041	0.021
	R3	0.004	0.006	0.006	0.025	0.016	0.017
	RESPONSE	0.041	0.035	0.033	0.140	0.070	0.071
A07	R1	0.042	0.023	0.015	0.070	0.051	0.060
	R2	0.015	0.037	0.029	0.119	0.041	0.022
	R3	0.005	0.008	0.006	0.026	0.015	0.018
	RESPONSE	0.045	0.045	0.033	0.141	0.067	0.067
A08 N	R1	0.042	0.023	0.015	0.070	0.051	0.060
	R2	0.015	0.038	0.029	0.119	0.041	0.022
	R3	0.005	0.008	0.006	0.026	0.015	0.018
	RESPONSE	0.045	0.045	0.033	0.141	0.067	0.067
A08 M	R1	0.044	0.027	0.015	0.078	0.024	0.048
	R2	0.017	0.044	0.028	0.119	0.033	0.022
	R3	0.005	0.009	0.006	0.029	0.013	0.018
	RESPONSE	0.048	0.052	0.032	0.146	0.043	0.055
A08 F	R1	0.045	0.027	0.014	0.084	0.017	0.025
	R2	0.018	0.046	0.027	0.118	0.026	0.027
	R3	0.006	0.009	0.006	0.032	0.010	0.018
	RESPONSE	0.049	0.054	0.031	0.148	0.032	0.041
A09	R1	0.045	0.027	0.014	0.084	0.017	0.025
	R2	0.018	0.046	0.027	0.118	0.026	0.027
	R3	0.006	0.009	0.006	0.032	0.010	0.018
	RESPONSE	0.049	0.054	0.031	0.148	0.032	0.041
A10	R1	0.045	0.024	0.012	0.084	0.017	0.025
	R2	0.018	0.043	0.023	0.118	0.026	0.027
	R3	0.006	0.008	0.005	0.032	0.010	0.018
	RESPONSE	0.049	0.049	0.026	0.148	0.032	0.041
A11	R1	0.045	0.017	0.007	0.084	0.017	0.025
	R2	0.018	0.036	0.015	0.118	0.026	0.027
	R3	0.006	0.009	0.006	0.032	0.010	0.018
	RESPONSE	0.049	0.041	0.017	0.148	0.032	0.041
A12	R1	0.045	0.016	0.006	0.084	0.017	0.025
	R2	0.018	0.034	0.012	0.118	0.026	0.027
	R3	0.006	0.011	0.007	0.032	0.010	0.018
	RESPONSE	0.049	0.039	0.015	0.148	0.032	0.041
A13	R1	0.045	0.014	0.007	0.074	0.028	0.025
	R2	0.018	0.030	0.010	0.099	0.021	0.038
	R3	0.006	0.014	0.007	0.033	0.009	0.018
	RESPONSE	0.049	0.036	0.014	0.128	0.036	0.049

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A13A	R1	0.045	0.014	0.008	0.074	0.028	0.025
	R2	0.018	0.030	0.009	0.099	0.021	0.038
	R3	0.006	0.014	0.007	0.033	0.009	0.018
	RESPONSE	0.049	0.036	0.014	0.128	0.036	0.049
A14	R1	0.045	0.014	0.008	0.072	0.029	0.025
	R2	0.018	0.029	0.009	0.097	0.020	0.039
	R3	0.006	0.014	0.007	0.034	0.009	0.017
	RESPONSE	0.049	0.035	0.014	0.126	0.037	0.049
A15	R1	0.045	0.014	0.009	0.071	0.030	0.025
	R2	0.018	0.029	0.009	0.095	0.020	0.039
	R3	0.006	0.015	0.007	0.034	0.010	0.017
	RESPONSE	0.049	0.035	0.015	0.124	0.037	0.050
A15A	R1	0.045	0.014	0.010	0.071	0.030	0.025
	R2	0.018	0.028	0.009	0.095	0.020	0.039
	R3	0.006	0.015	0.007	0.034	0.010	0.017
	RESPONSE	0.049	0.035	0.015	0.124	0.037	0.050
A16 N	R1	0.045	0.014	0.013	0.064	0.036	0.023
	R2	0.018	0.026	0.009	0.084	0.018	0.040
	R3	0.006	0.017	0.008	0.034	0.010	0.017
	RESPONSE	0.048	0.034	0.018	0.111	0.041	0.049
A16 M	R1	0.046	0.014	0.015	0.057	0.048	0.016
	R2	0.017	0.025	0.009	0.075	0.016	0.031
	R3	0.005	0.018	0.008	0.035	0.009	0.016
	RESPONSE	0.049	0.034	0.019	0.100	0.052	0.038
A16 F	R1	0.049	0.016	0.016	0.044	0.061	0.012
	R2	0.017	0.025	0.008	0.057	0.015	0.024
	R3	0.006	0.020	0.007	0.036	0.007	0.017
	RESPONSE	0.052	0.036	0.019	0.080	0.063	0.031
A17 N	R1	0.051	0.017	0.015	0.043	0.062	0.011
	R2	0.017	0.026	0.008	0.056	0.015	0.023
	R3	0.006	0.021	0.007	0.036	0.007	0.017
	RESPONSE	0.054	0.037	0.018	0.079	0.064	0.031
A17 M	R1	0.054	0.018	0.013	0.038	0.069	0.012
	R2	0.016	0.027	0.007	0.048	0.013	0.024
	R3	0.006	0.023	0.006	0.038	0.008	0.016
	RESPONSE	0.056	0.039	0.016	0.072	0.071	0.031
A17 F	R1	0.055	0.018	0.010	0.039	0.077	0.012
	R2	0.016	0.027	0.006	0.045	0.017	0.023
	R3	0.006	0.023	0.005	0.039	0.009	0.015
	RESPONSE	0.058	0.040	0.013	0.071	0.079	0.030

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A18 N	R1	0.055	0.018	0.008	0.038	0.077	0.012
	R2	0.016	0.027	0.006	0.045	0.017	0.023
	R3	0.006	0.022	0.005	0.039	0.009	0.015
	RESPONSE	0.058	0.039	0.011	0.071	0.079	0.030
A18 M	R1	0.053	0.017	0.004	0.038	0.087	0.009
	R2	0.016	0.025	0.005	0.044	0.023	0.019
	R3	0.006	0.021	0.004	0.039	0.010	0.015
	RESPONSE	0.056	0.037	0.007	0.070	0.091	0.026
A18 F	R1	0.049	0.016	0.003	0.035	0.099	0.009
	R2	0.014	0.023	0.004	0.047	0.028	0.017
	R3	0.005	0.019	0.003	0.040	0.011	0.015
	RESPONSE	0.051	0.034	0.006	0.071	0.103	0.024
A19 N	R1	0.008	0.002	0.003	0.032	0.104	0.009
	R2	0.003	0.003	0.004	0.050	0.030	0.015
	R3	0.001	0.003	0.003	0.040	0.011	0.013
	RESPONSE	0.008	0.005	0.006	0.072	0.109	0.022
A19 M	R1	0.003	0.001	0.002	0.029	0.103	0.009
	R2	0.001	0.001	0.003	0.046	0.030	0.014
	R3	0.001	0.001	0.002	0.036	0.011	0.013
	RESPONSE	0.003	0.001	0.004	0.065	0.108	0.021
A19 F	R1	0.000	0.000	0.001	0.025	0.103	0.009
	R2	0.000	0.000	0.001	0.040	0.030	0.013
	R3	0.000	0.000	0.001	0.032	0.011	0.011
	RESPONSE	0.000	0.000	0.001	0.057	0.107	0.019
A20	R1	0.000	0.000	0.000	0.025	0.102	0.009
	R2	0.000	0.000	0.000	0.040	0.030	0.013
	R3	0.000	0.000	0.000	0.032	0.011	0.011
	RESPONSE	0.000	0.000	0.001	0.057	0.107	0.019
A21	R1	0.000	0.000	0.000	0.001	0.000	0.000
	R2	0.000	0.000	0.000	0.001	0.000	0.000
	R3	0.000	0.000	0.000	0.001	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.001	0.000	0.000
A22	R1	0.000	0.000	0.000	0.000	0.000	0.000
	R2	0.000	0.000	0.000	0.000	0.000	0.000
	R3	0.000	0.000	0.000	0.000	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.000	0.000	0.000

*** Segment A end ***

*** Segment B begin ***

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A10	R1	0.045	0.024	0.012	0.084	0.017	0.025
	R2	0.018	0.043	0.023	0.118	0.026	0.027
	R3	0.006	0.008	0.005	0.032	0.010	0.018
	RESPONSE	0.049	0.049	0.026	0.148	0.032	0.041
B01	R1	0.041	0.058	0.012	0.084	0.017	0.025
	R2	0.027	0.091	0.023	0.118	0.026	0.027
	R3	0.008	0.020	0.005	0.032	0.010	0.018
	RESPONSE	0.050	0.110	0.026	0.148	0.032	0.041
B02 N	R1	0.040	0.062	0.012	0.084	0.017	0.025
	R2	0.028	0.097	0.023	0.118	0.026	0.027
	R3	0.009	0.021	0.005	0.032	0.010	0.018
	RESPONSE	0.050	0.117	0.026	0.148	0.032	0.041
B02 F	R1	0.039	0.068	0.010	0.084	0.017	0.025
	R2	0.031	0.107	0.021	0.118	0.026	0.027
	R3	0.010	0.023	0.005	0.032	0.010	0.018
	RESPONSE	0.051	0.129	0.023	0.148	0.032	0.041
B03 N	R1	0.039	0.064	0.008	0.084	0.017	0.025
	R2	0.031	0.103	0.017	0.118	0.026	0.027
	R3	0.010	0.021	0.005	0.032	0.010	0.018
	RESPONSE	0.051	0.123	0.019	0.148	0.032	0.041
B03 F	R1	0.040	0.053	0.007	0.084	0.017	0.025
	R2	0.028	0.089	0.015	0.118	0.026	0.027
	R3	0.009	0.017	0.006	0.032	0.010	0.018
	RESPONSE	0.050	0.105	0.017	0.148	0.032	0.041
B04	R1	0.041	0.050	0.007	0.084	0.017	0.025
	R2	0.027	0.084	0.015	0.118	0.026	0.027
	R3	0.008	0.016	0.006	0.032	0.010	0.018
	RESPONSE	0.050	0.099	0.017	0.148	0.032	0.041
A11	R1	0.045	0.017	0.007	0.084	0.017	0.025
	R2	0.018	0.036	0.015	0.118	0.026	0.027
	R3	0.006	0.009	0.006	0.032	0.010	0.018
	RESPONSE	0.049	0.041	0.017	0.148	0.032	0.041

*** Segment B end ***

*** Segment C begin ***

A14	R1	0.045	0.014	0.008	0.072	0.029	0.025
	R2	0.018	0.029	0.009	0.097	0.020	0.039
	R3	0.006	0.014	0.007	0.034	0.009	0.017
	RESPONSE	0.049	0.035	0.014	0.126	0.037	0.049

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
C01	R1	0.045	0.014	0.008	0.073	0.029	0.025
	R2	0.018	0.028	0.009	0.097	0.020	0.039
	R3	0.006	0.015	0.007	0.034	0.009	0.017
	RESPONSE	0.049	0.034	0.014	0.126	0.037	0.049
C01A	R1	0.046	0.014	0.008	0.073	0.029	0.025
	R2	0.017	0.026	0.009	0.097	0.020	0.039
	R3	0.005	0.015	0.007	0.034	0.009	0.017
	RESPONSE	0.050	0.033	0.014	0.126	0.037	0.049
C02 N	R1	0.048	0.015	0.008	0.073	0.029	0.024
	R2	0.016	0.024	0.009	0.098	0.020	0.039
	R3	0.006	0.017	0.007	0.034	0.010	0.018
	RESPONSE	0.051	0.033	0.014	0.126	0.037	0.050
C02 M	R1	0.049	0.017	0.009	0.074	0.028	0.024
	R2	0.016	0.022	0.009	0.099	0.020	0.040
	R3	0.006	0.018	0.008	0.035	0.011	0.018
	RESPONSE	0.052	0.034	0.015	0.129	0.036	0.050
C02 F	R1	0.049	0.018	0.013	0.075	0.028	0.024
	R2	0.018	0.022	0.011	0.101	0.020	0.041
	R3	0.006	0.019	0.010	0.036	0.011	0.018
	RESPONSE	0.052	0.034	0.019	0.131	0.036	0.050
C03	R1	0.049	0.018	0.013	0.075	0.028	0.024
	R2	0.018	0.022	0.011	0.101	0.020	0.041
	R3	0.006	0.019	0.010	0.036	0.011	0.018
	RESPONSE	0.052	0.034	0.019	0.131	0.036	0.050
C04	R1	0.048	0.018	0.017	0.075	0.027	0.024
	R2	0.020	0.022	0.015	0.101	0.020	0.041
	R3	0.007	0.019	0.012	0.036	0.012	0.018
	RESPONSE	0.052	0.034	0.026	0.131	0.036	0.051
C05 N	R1	0.047	0.018	0.020	0.076	0.025	0.023
	R2	0.021	0.022	0.019	0.102	0.021	0.042
	R3	0.007	0.019	0.013	0.037	0.013	0.017
	RESPONSE	0.053	0.034	0.031	0.132	0.035	0.051
C05 M	R1	0.047	0.018	0.023	0.077	0.022	0.023
	R2	0.023	0.022	0.023	0.104	0.021	0.043
	R3	0.008	0.019	0.015	0.038	0.016	0.017
	RESPONSE	0.053	0.034	0.035	0.135	0.035	0.052
C05 F	R1	0.047	0.018	0.023	0.078	0.018	0.023
	R2	0.023	0.022	0.023	0.104	0.022	0.044
	R3	0.008	0.018	0.015	0.039	0.021	0.016
	RESPONSE	0.053	0.034	0.036	0.136	0.036	0.052

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
C06 N	R1	0.047	0.018	0.023	0.079	0.018	0.023
	R2	0.023	0.022	0.023	0.104	0.022	0.044
	R3	0.008	0.018	0.015	0.039	0.021	0.016
	RESPONSE	0.053	0.034	0.036	0.136	0.036	0.052
C06 M	R1	0.047	0.017	0.023	0.079	0.015	0.024
	R2	0.024	0.023	0.023	0.105	0.024	0.044
	R3	0.008	0.017	0.016	0.040	0.025	0.016
	RESPONSE	0.053	0.033	0.036	0.137	0.038	0.052
C06 F	R1	0.047	0.015	0.022	0.079	0.013	0.024
	R2	0.025	0.025	0.022	0.106	0.026	0.045
	R3	0.008	0.017	0.016	0.041	0.028	0.016
	RESPONSE	0.053	0.033	0.035	0.139	0.040	0.053
C07	R1	0.046	0.016	0.022	0.079	0.013	0.024
	R2	0.028	0.035	0.022	0.107	0.027	0.045
	R3	0.010	0.015	0.016	0.042	0.029	0.016
	RESPONSE	0.055	0.042	0.035	0.140	0.041	0.053
*** Segment C end ***							
A09	R1	0.045	0.027	0.014	0.084	0.017	0.025
	R2	0.018	0.046	0.027	0.118	0.026	0.027
	R3	0.006	0.009	0.006	0.032	0.010	0.018
	RESPONSE	0.049	0.054	0.031	0.148	0.032	0.041
1	R1	0.042	0.027	0.006	0.087	0.018	0.025
	R2	0.020	0.046	0.013	0.120	0.027	0.026
	R3	0.007	0.009	0.005	0.034	0.011	0.018
	RESPONSE	0.047	0.054	0.015	0.152	0.034	0.040
2	R1	0.042	0.024	0.005	0.085	0.018	0.026
	R2	0.020	0.043	0.010	0.118	0.026	0.028
	R3	0.007	0.008	0.005	0.033	0.011	0.019
	RESPONSE	0.047	0.049	0.012	0.149	0.033	0.043
3	R1	0.042	0.017	0.009	0.082	0.015	0.024
	R2	0.020	0.036	0.008	0.112	0.023	0.025
	R3	0.007	0.009	0.008	0.031	0.008	0.018
	RESPONSE	0.047	0.041	0.014	0.142	0.028	0.039
4	R1	0.042	0.016	0.011	0.084	0.015	0.023
	R2	0.020	0.034	0.010	0.117	0.024	0.026
	R3	0.007	0.011	0.009	0.031	0.008	0.018
	RESPONSE	0.047	0.039	0.017	0.147	0.029	0.039

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A12	R1	0.045	0.016	0.006	0.084	0.017	0.025
	R2	0.018	0.034	0.012	0.118	0.026	0.027
	R3	0.006	0.011	0.007	0.032	0.010	0.018
	RESPONSE	0.049	0.039	0.015	0.148	0.032	0.041
5	R1	0.041	0.050	0.009	0.093	0.013	0.067
	R2	0.027	0.084	0.008	0.131	0.022	0.079
	R3	0.008	0.016	0.008	0.035	0.007	0.051
	RESPONSE	0.050	0.099	0.014	0.164	0.026	0.116
6	R1	0.039	0.070	0.009	0.099	0.015	0.030
	R2	0.033	0.112	0.008	0.140	0.024	0.031
	R3	0.010	0.023	0.008	0.038	0.009	0.021
	RESPONSE	0.052	0.134	0.014	0.176	0.030	0.048
7	R1	0.039	0.074	0.006	0.096	0.018	0.023
	R2	0.033	0.116	0.008	0.136	0.026	0.022
	R3	0.010	0.025	0.007	0.035	0.010	0.018
	RESPONSE	0.052	0.140	0.012	0.170	0.033	0.037
8	R1	0.039	0.077	0.005	0.095	0.019	0.017
	R2	0.033	0.118	0.010	0.131	0.028	0.016
	R3	0.010	0.027	0.005	0.036	0.011	0.015
	RESPONSE	0.052	0.143	0.012	0.166	0.035	0.027
9	R1	0.041	0.058	0.005	0.085	0.019	0.010
	R2	0.027	0.091	0.010	0.119	0.028	0.010
	R3	0.008	0.020	0.005	0.032	0.012	0.007
	RESPONSE	0.050	0.110	0.012	0.150	0.036	0.016
B01	R1	0.041	0.058	0.012	0.084	0.017	0.025
	R2	0.027	0.091	0.023	0.118	0.026	0.027
	R3	0.008	0.020	0.005	0.032	0.010	0.018
	RESPONSE	0.050	0.110	0.026	0.148	0.032	0.041
10	R1	0.045	0.024	0.005	0.084	0.019	0.006
	R2	0.017	0.043	0.010	0.116	0.028	0.011
	R3	0.005	0.008	0.005	0.032	0.012	0.007
	RESPONSE	0.049	0.050	0.012	0.147	0.036	0.015
B05	R1	0.046	0.050	0.007	0.093	0.013	0.067
	R2	0.020	0.084	0.016	0.131	0.021	0.079
	R3	0.006	0.016	0.006	0.035	0.007	0.051
	RESPONSE	0.051	0.099	0.018	0.164	0.026	0.116

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL		GLOBAL		
				Force	Deform	Dirn	Force	Deform
B01 801 1 Stiff	9 Guide :RIGID	R1	down	23	0.000	X	233	0.000
			left	233	0.000	Y	23	0.000
						Z		0.010
	R2		down	31	0.000	X	270	0.000
			left	270	0.000	Y	31	0.000
						Z		0.014
	R3		down	9	0.000	X	186	0.000
			left	186	0.000	Y	9	0.000
						Z		0.004
	RESPONSE		down	40	0.000	X	402	0.000
			left	402	0.000	Y	40	0.000
						Z		0.018
B04 804 1 Stiff	5 Guide :RIGID	R1	down	28	0.000	X	37	0.000
			left	37	0.000	Y	28	0.000
						Z		0.010
	R2		down	41	0.000	X	56	0.000
			left	56	0.000	Y	41	0.000
						Z		0.015
	R3		down	11	0.000	X	34	0.000
			left	34	0.000	Y	11	0.000
						Z		0.004
	RESPONSE		down	51	0.000	X	75	0.000
			left	75	0.000	Y	51	0.000
						Z		0.018

AY02A2R2 PROJECT W-320: TANK 241-C-106 SLUICING FLUOR DANIEL NORTHWEST, INC.
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LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
*** Segment A begin ***									
A00	R1	46	48	189	200	26	173	100	200
	R2	42	83	73	118	6	93	180	200
	R3	36	65	29	80	4	37	39	5
	RESPONSE	90	102	205	246	27	200	209	290
A01	R1	46	48	188	199	26	126	89	150
	R2	42	78	73	115	6	75	163	170
	R3	59	36	29	75	4	29	36	4
	RESPONSE	86	98	204	242	27	150	189	240
A03	R1	46	47	187	198	26	108	85	130
	R2	42	75	73	113	6	68	157	170
	R3	55	36	29	72	4	27	35	4
	RESPONSE	83	96	203	239	27	130	182	220
A04 N	R1	46	37	189	198	26	98	78	120
	R2	42	80	68	113	6	45	159	160
	R3	55	34	32	72	4	22	37	4
	RESPONSE	83	94	204	239	27	110	181	210
A04 M	R1	39	44	189	198	33	43	72	90
	R2	36	82	67	112	26	17	139	140
	R3	43	47	32	72	15	7	34	3
	RESPONSE	69	105	203	239	45	47	160	170
A04 F	R1	37	189	46	198	35	72	38	80
	R2	79	67	41	112	23	125	22	120
	R3	34	32	54	71	12	32	13	3
	RESPONSE	94	203	82	238	44	148	45	100
A05 N	R1	37	46	187	196	35	124	81	110
	R2	79	41	67	111	23	52	112	110
	R3	34	53	32	70	12	27	39	3
	RESPONSE	93	81	202	236	44	137	144	210
A05 M	R1	39	44	186	195	140	129	89	210
	R2	35	80	67	110	63	45	95	110
	R3	42	46	32	70	32	22	54	3
	RESPONSE	67	102	200	235	157	138	141	210
A05 F	R1	47	46	182	193	217	69	81	210
	R2	39	73	72	109	86	14	79	110
	R3	51	36	29	69	43	11	65	3
	RESPONSE	79	93	198	232	237	71	130	210

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LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A06	R1	47	45	180	192	217	135	71	266
	R2	38	72	71	108	86	33	75	119
	R3	50	36	29	68	43	16	73	86
	RESPONSE	78	92	196	230	237	140	126	303
A07	R1	47	45	179	191	217	195	64	299
	R2	37	71	71	107	86	55	80	130
	R3	50	36	29	68	43	23	94	86
	RESPONSE	78	92	195	229	237	204	130	339
A08 N	R1	47	179	45	190	217	64	195	299
	R2	37	71	71	107	86	80	56	130
	R3	50	29	36	68	43	81	24	94
	RESPONSE	78	194	91	228	237	130	205	339
A08 M	R1	158	94	44	189	128	182	238	326
	R2	69	39	70	106	102	73	71	144
	R3	40	41	36	67	84	48	30	101
	RESPONSE	177	109	90	227	184	202	250	370
A08 F	R1	177	44	47	188	60	245	207	327
	R2	70	70	36	105	93	73	99	154
	R3	29	36	49	67	91	35	34	103
	RESPONSE	193	90	77	226	143	258	232	376
A09 -	R1	177	44	47	188	60	245	207	326
	R2	70	70	36	105	93	73	99	154
	R3	29	36	49	67	91	35	34	103
	RESPONSE	193	90	77	226	143	258	232	375
A09 +	R1	100	32	34	110	50	239	170	298
	R2	96	52	33	114	84	75	113	159
	R3	50	39	36	72	82	36	44	99
	RESPONSE	147	73	60	175	127	253	209	352
A10 -	R1	100	32	34	110	50	214	158	271
	R2	96	52	33	114	84	57	132	166
	R3	50	39	36	72	82	47	30	99
	RESPONSE	147	73	60	175	127	227	208	333
A10 +	R1	139	32	13	143	31	114	100	155
	R2	82	50	19	98	65	53	153	175
	R3	42	36	23	60	49	29	67	87
	RESPONSE	166	70	32	183	87	129	195	249
A11 -	R1	139	32	13	143	31	94	93	136
	R2	82	50	19	98	65	36	195	208
	R3	42	36	23	60	49	54	37	82
	RESPONSE	166	70	32	183	87	114	219	262

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A11 +	R1	105	37	21	113	117	180	110	242
	R2	32	65	44	84	189	116	239	326
	R3	13	52	35	64	58	106	52	132
	RESPONSE	111	91	60	155	230	239	268	427
A12 -	R1	105	37	21	113	117	172	102	232
	R2	32	65	44	84	189	93	210	298
	R3	13	52	35	64	58	116	46	138
	RESPONSE	111	91	60	155	230	227	238	402
A12 +	R1	5	50	36	61	100	170	100	221
	R2	5	99	28	103	176	94	211	291
	R3	9	21	42	48	54	115	46	135
	RESPONSE	12	112	62	129	210	225	238	389
A13	R1	11	50	36	63	100	136	76	185
	R2	7	101	30	106	176	71	118	224
	R3	10	21	45	50	54	75	35	98
	RESPONSE	16	115	64	133	210	170	145	306
A13A	R1	15	51	35	64	100	130	74	180
	R2	8	103	31	108	176	67	103	215
	R3	10	21	46	52	54	68	33	93
	RESPONSE	19	117	66	136	210	161	131	295
A14 -	R1	15	51	35	64	100	127	73	177
	R2	8	103	31	108	176	65	93	210
	R3	10	21	46	52	54	63	32	89
	RESPONSE	19	117	66	136	210	156	122	288
A14 +	R1	46	55	31	78	106	123	55	171
	R2	20	116	44	126	177	59	81	204
	R3	9	31	66	74	42	55	31	76
	RESPONSE	51	133	85	165	211	147	103	277
A15	R1	50	56	30	81	106	120	53	169
	R2	22	118	45	128	177	56	70	198
	R3	10	33	67	76	42	49	28	70
	RESPONSE	55	135	86	170	211	141	92	270
A15A	R1	55	57	30	85	106	116	51	165
	R2	23	121	46	132	177	51	52	191
	R3	10	35	69	78	42	39	23	62
	RESPONSE	60	138	88	175	211	133	76	260
A16 N	R1	57	37	53	86	106	83	83	158
	R2	24	59	116	133	177	21	44	183
	R3	10	64	45	79	42	10	14	46
	RESPONSE	62	94	135	176	211	86	95	247

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A16 M	R1	61	31	53	87	48	133	83	164
	R2	43	48	117	133	104	165	55	203
	R3	50	41	46	79	31	37	25	54
	RESPONSE	90	70	136	178	119	215	103	266
A16 F	R1	37	53	59	88	90	97	124	181
	R2	60	117	25	134	59	64	220	237
	R3	64	46	11	80	23	30	51	63
	RESPONSE	95	136	65	179	110	120	257	305
A17 N	R1	37	59	55	89	90	141	96	193
	R2	61	60	104	134	59	207	143	258
	R3	64	21	43	80	23	53	35	68
	RESPONSE	96	87	125	180	110	256	176	330
A17 M	R1	38	60	55	90	162	68	110	207
	R2	73	46	104	135	190	139	153	281
	R3	39	56	44	81	52	38	32	72
	RESPONSE	91	94	125	181	255	159	191	356
A17 F	R1	60	61	29	91	164	129	42	213
	R2	63	109	48	135	242	146	44	286
	R3	18	38	70	81	66	29	13	73
	RESPONSE	89	131	90	182	300	197	62	364
A18 N	R1	61	29	61	92	164	38	130	213
	R2	64	48	110	136	242	37	146	285
	R3	18	70	38	82	66	13	29	73
	RESPONSE	90	90	131	183	300	54	198	363
A18 M	R1	59	37	62	93	98	128	128	205
	R2	58	55	110	136	159	169	141	272
	R3	58	43	39	82	51	40	34	73
	RESPONSE	101	79	132	184	194	216	193	349
A18 F	R1	29	59	74	99	24	135	126	186
	R2	49	127	28	139	21	55	235	242
	R3	71	46	12	85	20	26	59	67
	RESPONSE	91	147	80	190	37	148	273	313
A19 N	R1	29	59	75	100	24	7	48	54
	R2	50	127	29	140	21	4	41	46
	R3	71	46	13	86	20	4	41	45
	RESPONSE	92	147	81	192	37	8	75	84
A19 M	R1	40	52	75	100	28	10	48	57
	R2	91	103	29	140	17	14	60	64
	R3	65	55	13	86	16	13	51	55
	RESPONSE	118	128	81	192	36	22	92	101

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A19 F	R1	59	30	75	100	31	12	50	60
	R2	127	50	29	140	9	24	77	81
	R3	46	72	13	86	3	22	60	64
	RESPONSE	148	92	81	192	32	35	110	119
A20	R1	59	30	77	101	31	15	50	61
	R2	128	51	29	141	9	25	80	84
	R3	46	75	13	89	3	22	62	66
	RESPONSE	148	95	83	195	32	37	113	123
A21	R1	59	30	80	104	31	20	50	63
	R2	130	51	29	143	9	27	84	88
	R3	46	80	13	93	3	23	66	70
	RESPONSE	150	99	86	199	32	41	118	129
A22	R1	59	30	80	104	31	38	52	72
	R2	130	51	29	143	9	32	94	100
	R3	46	80	13	93	3	25	79	83
	RESPONSE	150	99	86	199	32	56	133	148
*** Segment A end ***									
*** Segment B begin ***									
A10	R1	22	2	45	50	80	102	32	134
	R2	16	5	19	25	60	23	40	75
	R3	14	9	19	25	54	31	36	72
	RESPONSE	30	10	52	61	114	109	63	169
B01	R1	22	2	45	50	80	18	33	89
	R2	16	5	19	25	60	24	35	73
	R3	14	9	19	25	54	14	28	62
	RESPONSE	30	10	52	61	114	33	55	131
B01 +	R1	13	24	55	62	65	19	9	68
	R2	27	29	11	41	103	23	18	107
	R3	17	13	14	25	48	13	14	52
	RESPONSE	35	40	58	78	131	33	24	137
B02 N	R1	13	55	24	62	65	9	11	66
	R2	27	11	29	41	103	17	23	107
	R3	17	14	13	25	48	15	14	52
	RESPONSE	35	58	40	78	131	24	29	136
B02 F	R1	55	24	13	62	17	23	53	60
	R2	11	29	27	41	22	11	89	93
	R3	14	13	17	25	19	10	43	48
	RESPONSE	58	40	35	78	34	27	113	121

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)				Result
		X	Y	Z	Result	X	Y	Z	Result	
B03 N	R1	55	13	24	62	17	35	21	44	
	R2	11	27	29	41	22	67	13	72	
	R3	14	17	13	25	19	35	8	40	
	RESPONSE	58	35	40	78	34	83	26	93	
B03 F	R1	13	24	55	62	26	15	9	32	
	R2	27	29	11	41	53	27	17	62	
	R3	17	13	14	25	31	17	15	38	
	RESPONSE	35	40	58	78	67	35	24	79	
B04 -	R1	13	24	55	62	26	24	9	37	
	R2	27	29	11	41	53	27	18	63	
	R3	17	13	14	25	31	18	14	38	
	RESPONSE	35	40	58	78	67	41	24	82	
B04 +	R1	13	52	39	66	26	24	9	37	
	R2	27	70	55	93	53	27	18	63	
	R3	17	21	35	44	31	18	14	38	
	RESPONSE	35	89	76	123	67	41	24	82	
A11	R1	13	52	39	66	26	89	106	141	
	R2	27	70	55	93	53	85	147	178	
	R3	17	21	35	44	31	59	37	76	
	RESPONSE	35	89	76	123	67	137	185	240	

*** Segment B end ***

*** Segment C begin ***

A14	R1	11	10	29	32	19	4	12	23	
	R2	13	20	12	27	13	6	15	21	
	R3	20	21	10	31	9	9	19	23	
	RESPONSE	26	31	33	52	25	12	27	39	
C01	R1	10	8	25	28	19	2	11	23	
	R2	12	17	11	24	13	5	14	20	
	R3	18	19	10	28	9	9	20	24	
	RESPONSE	24	27	29	46	25	11	27	38	
C01A	R1	9	7	20	23	19	4	11	22	
	R2	11	14	10	21	13	4	13	19	
	R3	17	17	10	26	9	10	21	25	
	RESPONSE	22	23	24	40	25	12	27	38	
C02 N	R1	9	6	19	22	19	9	10	24	
	R2	11	14	9	20	13	4	13	19	
	R3	17	16	10	25	9	12	23	28	
	RESPONSE	22	22	23	39	25	15	29	41	

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)				Result
		X	Y	Z	Result	X	Y	Z	Result	
C02 M	R1	6	9	17	20	22	3	9	24	
	R2	11	13	9	19	11	6	14	19	
	R3	19	12	10	25	14	8	24	29	
	RESPONSE	22	20	22	37	28	11	29	42	
C02 F	R1	6	8	17	20	16	13	7	21	
	R2	13	10	9	19	6	10	13	17	
	R3	15	16	10	24	15	6	22	27	
	RESPONSE	21	21	22	36	23	17	26	39	
C03	R1	6	8	16	19	16	13	7	21	
	R2	12	10	9	18	6	10	13	17	
	R3	15	16	10	24	15	6	22	27	
	RESPONSE	20	21	21	36	23	17	26	39	
C04	R1	5	8	16	18	16	8	5	18	
	R2	12	10	9	18	6	8	11	15	
	R3	15	15	10	24	15	5	18	24	
	RESPONSE	20	20	21	35	23	12	22	34	
C05 N	R1	5	15	8	18	16	4	5	17	
	R2	12	8	10	17	6	11	7	14	
	R3	14	10	15	23	15	15	6	22	
	RESPONSE	19	20	20	34	23	19	10	31	
C05 M	R1	10	12	8	17	11	11	3	16	
	R2	9	11	10	17	10	7	5	13	
	R3	16	8	15	23	7	18	6	20	
	RESPONSE	21	18	19	34	16	23	8	29	
C05 F	R1	15	5	8	17	4	14	1	15	
	R2	8	12	9	17	10	6	3	13	
	R3	10	14	15	23	13	12	4	18	
	RESPONSE	20	19	19	33	17	20	5	27	
C06 N	R1	14	7	5	17	4	1	14	15	
	R2	8	9	11	17	10	3	6	13	
	R3	10	15	14	23	13	4	12	18	
	RESPONSE	19	19	19	33	17	5	20	27	
C06 M	R1	7	14	5	16	3	3	12	13	
	R2	10	6	11	16	6	7	6	12	
	R3	9	15	14	22	8	9	10	15	
	RESPONSE	16	21	18	32	10	12	17	23	
C06 F	R1	7	5	13	15	0	9	3	10	
	R2	8	11	8	16	0	5	8	9	
	R3	13	13	10	21	0	7	10	12	
	RESPONSE	17	18	18	31	0	13	13	18	

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
C07	R1	7	5	13	15	0	0	0	0
	R2	8	11	8	16	0	0	0	0
	R3	13	13	10	21	0	0	0	0
	RESPONSE	17	18	18	31	0	0	0	0

*** Segment C end ***

BEAM FORCES & MOMENTS

Beam ID	Load combination	Point name	FORCES (lb)				MOMENTS (ft-lb)			
			Axial	Y-Shear	Z-Shear	Torsion	Y-Y Mom.	Z-Z Mom.		
M1	R1	A09	8	76	17	6	11	41		
		1	8	76	17	6	1	4		
	R2	A09	16	40	18	3	11	20		
		1	16	40	18	3	1	20		
	R3	A09	10	28	16	2	10	14		
M2		1	10	28	16	2	1	2		
	RESPONSE	A09	20	90	29	7	19	48		
		1	20	90	29	7	2	5		
	R1	1	60	17	3	1	4	6		
		2	60	17	3	1	2	3		
M3	R2	1	45	18	2	1	1	11		
		2	45	18	2	1	1	2		
	R3	1	31	13	2	1	1	7		
		2	31	13	2	1	1	7		
	RESPONSE	1	81	28	4	2	5	7		
M4		2	81	28	4	2	2	15		
	R1	2	58	17	3	1	2	8		
		3	58	17	3	1	5	39		
	R2	2	46	18	3	1	1	11		
		3	46	18	3	1	4	44		
M5	R3	2	31	13	2	1	1	7		
		3	31	13	2	1	3	31		
	RESPONSE	2	80	28	5	2	2	15		
		3	80	28	5	2	7	66		
	R1	3	6	37	3	3	2	26		
M6		4	6	37	3	3	1	2		
	R2	3	7	31	5	3	2	22		
		4	7	31	5	3	3	2		
	R3	3	5	25	3	2	1	17		
		4	5	25	3	2	1	2		
M7	RESPONSE	3	10	54	7	5	3	38		
		4	10	54	7	5	3	4		
	R1	4	5	32	12	2	1	3		
		A12	5	32	12	2	7	22		
	R2	4	11	27	3	2	3	3		
M8		A12	11	27	3	2	3	19		
	R3	4	9	29	3	2	1	2		
		A12	9	29	3	2	2	18		
	RESPONSE	4	16	51	13	4	5	3		
		A12	16	51	13	4	8	34		

BEAM FORCES & MOMENTS

Beam ID	Load combination	Point name	FORCES (lb)			MOMENTS (ft-lb)		
			Axial	Y-Shear	Z-Shear	Torsion	Y-Y Mom.	Z-Z Mom.
M6	R1	3	21	49	8	3	2	64
		5	21	49	8	3	15	34
	R2	3	14	54	12	3	2	66
		5	14	54	12	3	22	42
	R3	3	13	36	3	2	1	46
		5	13	36	3	2	27	27
	RESPONSE	3	29	81	15	4	3	103
		5	29	81	15	4	27	60
	R1	5	22	13	16	3	15	34
		6	22	13	16	3	2	45
M7	R2	5	15	5	24	3	22	42
		6	15	5	24	3	1	42
	R3	5	12	6	7	2	6	27
		6	12	6	7	2	1	30
	RESPONSE	5	29	15	29	5	27	60
		6	29	15	29	5	3	69
M8	R1	6	11	22	14	2	3	45
		7	11	22	14	2	15	25
	R2	6	4	15	20	1	3	42
		7	4	15	20	1	21	29
	R3	6	6	12	6	1	2	30
		7	6	12	6	1	7	20
	RESPONSE	6	14	30	25	3	5	69
		7	14	30	25	3	27	43
M9	R1	7	7	25	16	2	15	25
		8	7	25	16	2	6	6
	R2	7	12	17	21	1	21	29
		8	12	17	21	1	2	14
	R3	7	9	13	6	1	7	20
		8	9	13	6	1	2	10
	RESPONSE	7	17	33	27	3	27	43
		8	17	33	27	3	3	18
M10	R1	8	25	9	18	1	2	6
		9	25	9	18	1	20	6
	R2	8	17	14	25	2	1	14
		9	17	14	25	2	26	1
	R3	8	13	10	7	2	1	10
		9	13	10	7	2	8	1
	RESPONSE	8	33	19	32	3	3	18
		9	33	19	32	3	34	6
M11	R1	9	0	2	1	0	2	4
		10	0	2	1	0	0	0
	R2	9	1	1	1	0	3	1
		10	1	1	1	0	0	0

BEAM FORCES & MOMENTS

Beam ID	Load combination	Point name	FORCES (lb)			MOMENTS (ft-lb)		
			Axial	Y-Shear	Z-Shear	Torsion	Y-Y Mom.	Z-Z Mom.
R3	R3	9	1	0	1	0	2	1
		10	1	0	1	0	0	0
	RESPONSE	9	1	2	2	0	4	4
		10	1	2	2	0	0	0
M12	R1	5	1	0	1	0	0	0
		B05	1	0	1	0	0	0
	R2	5	1	0	0	0	0	0
		B05	1	0	0	0	0	0
	R3	5	0	0	0	0	0	0
		B05	0	0	0	0	0	0
	RESPONSE	5	1	0	1	0	0	0
		B05	1	0	1	0	0	0
M13	R1	9	0	25	239	2	1	19
		B01	0	25	239	2	137	33
	R2	9	0	18	255	1	2	23
		B01	0	18	255	1	146	31
	R3	9	0	14	176	1	2	8
		B01	0	14	176	1	100	15
	RESPONSE	9	0	34	391	2	3	31
		B01	0	34	391	2	224	48

Point name	Load combination	ASME B31.3c (1992)		CODE COMPLIANCE		(Stress in psi)		Code Stress	Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no.	psi type		
*** Segment A begin ***									
A00	Sus. + R1	100	173		1.00 1.00 (18)		OCC	959	22211
	Sus. + R2	180	93		1.00 1.00 (18)		OCC	971	22211
	Sus. + R3	39	37		1.00 1.00 (18)		OCC	258	22211
A01	Sus. + R1	89	126		1.00 1.00 (18)		OCC	741	22211
	Sus. + R2	163	75		1.00 1.00 (18)		OCC	861	22211
	Sus. + R3	36	29		1.00 1.00 (18)		OCC	224	22211
A03	Sus. + R1	85	108		1.00 1.00 (18)		OCC	657	22211
	Sus. + R2	157	68		1.00 1.00 (18)		OCC	819	22211
	Sus. + R3	35	27		1.00 1.00 (18)		OCC	213	22211
A04 N-	Sus. + R1	82	95		1.00 1.00 (18)		OCC	603	22211
	Sus. + R2	152	63		1.00 1.00 (18)		OCC	791	22211
	Sus. + R3	35	25		1.00 1.00 (18)		OCC	206	22211
A04 N+	Sus. + R1	78	98		2.56 2.13 (18)		OCC	1391	22211
	Sus. + R2	159	45		2.56 2.13 (18)		OCC	2001	22211
	Sus. + R3	37	22		2.56 2.13 (18)		OCC	505	22211
A04 M	Sus. + R1	72	43		2.56 2.13 (18)		OCC	983	22211
	Sus. + R2	139	17		2.56 2.13 (18)		OCC	1718	22211
	Sus. + R3	34	7		2.56 2.13 (18)		OCC	428	22211
A04 F-	Sus. + R1	72	38		2.56 2.13 (18)		OCC	961	22211
	Sus. + R2	125	22		2.56 2.13 (18)		OCC	1555	22211
	Sus. + R3	32	13		2.56 2.13 (18)		OCC	413	22211
A04 F+	Sus. + R1	38	72		1.00 1.00 (18)		OCC	389	22211
	Sus. + R2	22	125		1.00 1.00 (18)		OCC	611	22211
	Sus. + R3	13	32		1.00 1.00 (18)		OCC	165	22211
A05 N-	Sus. + R1	124	81		1.00 1.00 (18)		OCC	711	22211
	Sus. + R2	52	112		1.00 1.00 (18)		OCC	593	22211
	Sus. + R3	27	39		1.00 1.00 (18)		OCC	229	22211
A05 N+	Sus. + R1	81	124		1.95 1.63 (18)		OCC	1231	22211
	Sus. + R2	112	52		1.95 1.63 (18)		OCC	1125	22211
	Sus. + R3	39	27		1.95 1.63 (18)		OCC	424	22211
A05 M	Sus. + R1	89	129		1.95 1.63 (18)		OCC	1308	22211
	Sus. + R2	95	45		1.95 1.63 (18)		OCC	958	22211
	Sus. + R3	54	22		1.95 1.63 (18)		OCC	537	22211

Point name	Load combination	ASME B31.3c (1992) (Moments in ft.-lb.)		CODE COMPLIANCE		(Stress in psi)		(Code)	
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no.	psi type	Code Stress	Code Allow.
A05 F-	Sus. + R1	89	58		1.95 1.63 (18)		OCC	951	22211
	Sus. + R2	79	13		1.95 1.63 (18)		OCC	744	22211
	Sus. + R3	66	6		1.95 1.63 (18)		OCC	616	22211
A05 F+	Sus. + R1	81	69		1.00 1.00 (18)		OCC	511	22211
	Sus. + R2	79	14		1.00 1.00 (18)		OCC	383	22211
	Sus. + R3	65	11		1.00 1.00 (18)		OCC	316	22211
A06	Sus. + R1	71	135		1.00 1.00 (18)		OCC	733	22211
	Sus. + R2	75	33		1.00 1.00 (18)		OCC	393	22211
	Sus. + R3	73	16		1.00 1.00 (18)		OCC	357	22211
A07	Sus. + R1	64	195		1.00 1.00 (18)		OCC	1874	22211
	Sus. + R2	80	55		1.00 1.00 (18)		OCC	888	22211
	Sus. + R3	81	23		1.00 1.00 (18)		OCC	769	22211
A08 N-	Sus. + R1	64	195		1.00 1.00 (18)		OCC	1881	22211
	Sus. + R2	80	56		1.00 1.00 (18)		OCC	891	22211
	Sus. + R3	81	24		1.00 1.00 (18)		OCC	771	22211
A08 N+	Sus. + R1	195	64		1.78 1.48 (18)		OCC	3293	22211
	Sus. + R2	56	80		1.78 1.48 (18)		OCC	1410	22211
	Sus. + R3	24	81		1.78 1.48 (18)		OCC	1160	22211
A08 M	Sus. + R1	238	182		1.78 1.48 (18)		OCC	4583	22211
	Sus. + R2	71	73		1.78 1.48 (18)		OCC	1525	22211
	Sus. + R3	30	48		1.78 1.48 (18)		OCC	811	22211
A08 F-	Sus. + R1	245	207		1.78 1.48 (18)		OCC	4874	22211
	Sus. + R2	73	99		1.78 1.48 (18)		OCC	1789	22211
	Sus. + R3	35	34		1.78 1.48 (18)		OCC	732	22211
A08 F+	Sus. + R1	207	245		1.00 1.00 (18)		OCC	2936	22211
	Sus. + R2	99	73		1.00 1.00 (18)		OCC	1124	22211
	Sus. + R3	34	35		1.00 1.00 (18)		OCC	447	22211
A09	Sus. + R1	207	245		1.00 1.00 (18)		OCC	2934	22211
	Sus. + R2	99	73		1.00 1.00 (18)		OCC	1125	22211
	Sus. + R3	34	35		1.00 1.00 (18)		OCC	447	22211
A12	Sus. + R1	100	170		1.00 1.00 (18)		OCC	1803	22211
	Sus. + R2	211	94		1.00 1.00 (18)		OCC	2114	22211
	Sus. + R3	46	115		1.00 1.00 (18)		OCC	1132	22211
A13	Sus. + R1	76	136		1.00 1.00 (18)		OCC	1420	22211
	Sus. + R2	118	71		1.00 1.00 (18)		OCC	1263	22211
	Sus. + R3	35	75		1.00 1.00 (18)		OCC	755	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)			(Stress in psi)			Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	Eq. Load no.	Code Stress	
A13A	Sus. + R1	74	130		1.00	1.00 (18)	1367	22211
	Sus. + R2	103	67		1.00	1.00 (18)	1125	22211
	Sus. + R3	33	68		1.00	1.00 (18)	692	22211
A14 -	Sus. + R1	127	73		1.22	1.30 (18)	1657	22211
	Sus. + R2	65	93		1.22	1.30 (18)	1321	22211
	Sus. + R3	63	32		1.22	1.30 (18)	806	22211
A14 +	Sus. + R1	123	55		1.22	1.30 (18)	1519	22211
	Sus. + R2	59	81		1.22	1.30 (18)	1170	22211
	Sus. + R3	55	31		1.22	1.30 (18)	717	22211
A15	Sus. + R1	53	120		1.00	1.00 (18)	1202	22211
	Sus. + R2	70	56		1.00	1.00 (18)	820	22211
	Sus. + R3	28	49		1.00	1.00 (18)	515	22211
A15A	Sus. + R1	51	116		1.00	1.00 (18)	1161	22211
	Sus. + R2	52	51		1.00	1.00 (18)	665	22211
	Sus. + R3	23	39		1.00	1.00 (18)	412	22211
A16 N-	Sus. + R1	57	102		1.00	1.00 (18)	1073	22211
	Sus. + R2	27	40		1.00	1.00 (18)	442	22211
	Sus. + R3	10	15		1.00	1.00 (18)	161	22211
A16 N+	Sus. + R1	83	83		1.78	1.48 (18)	1754	22211
	Sus. + R2	44	21		1.78	1.48 (18)	763	22211
	Sus. + R3	14	10		1.78	1.48 (18)	270	22211
A16 M	Sus. + R1	83	133		1.78	1.48 (18)	2257	22211
	Sus. + R2	55	165		1.78	1.48 (18)	2405	22211
	Sus. + R3	25	37		1.78	1.48 (18)	639	22211
A16 F-	Sus. + R1	97	124		1.78	1.48 (18)	2294	22211
	Sus. + R2	64	220		1.78	1.48 (18)	3157	22211
	Sus. + R3	30	51		1.78	1.48 (18)	844	22211
A16 F+	Sus. + R1	124	97		1.00	1.00 (18)	753	22211
	Sus. + R2	220	64		1.00	1.00 (18)	1100	22211
	Sus. + R3	51	30		1.00	1.00 (18)	283	22211
A17 N-	Sus. + R1	133	108		1.00	1.00 (18)	820	22211
	Sus. + R2	242	68		1.00	1.00 (18)	1207	22211
	Sus. + R3	57	30		1.00	1.00 (18)	308	22211
A17 N+	Sus. + R1	96	141		2.56	2.13 (18)	1867	22211
	Sus. + R2	143	207		2.56	2.13 (18)	2751	22211
	Sus. + R3	35	53		2.56	2.13 (18)	699	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)			(Stress in psi)			Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	Eq. Load no.	Code Stress	
A17 M	Sus. + R1	110	68		2.56	2.13 (18)	1519	22211
	Sus. + R2	153	139		2.56	2.13 (18)	2356	22211
	Sus. + R3	32	38		2.56	2.13 (18)	555	22211
A17 F-	Sus. + R1	118	66		2.56	2.13 (18)	1599	22211
	Sus. + R2	152	16		2.56	2.13 (18)	1873	22211
	Sus. + R3	29	12		2.56	2.13 (18)	377	22211
A17 F+	Sus. + R1	42	129		1.00	1.00 (18)	649	22211
	Sus. + R2	44	146		1.00	1.00 (18)	733	22211
	Sus. + R3	13	29		1.00	1.00 (18)	151	22211
A18 N-	Sus. + R1	38	130		1.00	1.00 (18)	649	22211
	Sus. + R2	37	146		1.00	1.00 (18)	724	22211
	Sus. + R3	13	29		1.00	1.00 (18)	153	22211
A18 N+	Sus. + R1	130	38		2.56	2.13 (18)	1642	22211
	Sus. + R2	146	37		2.56	2.13 (18)	1835	22211
	Sus. + R3	29	13		2.56	2.13 (18)	382	22211
A18 M	Sus. + R1	128	128		2.56	2.13 (18)	2043	22211
	Sus. + R2	141	169		2.56	2.13 (18)	2448	22211
	Sus. + R3	34	40		2.56	2.13 (18)	590	22211
A18 F-	Sus. + R1	115	144		2.56	2.13 (18)	2042	22211
	Sus. + R2	126	206		2.56	2.13 (18)	2617	22211
	Sus. + R3	35	54		2.56	2.13 (18)	697	22211
A18 F+	Sus. + R1	126	135		1.00	1.00 (18)	885	22211
	Sus. + R2	235	55		1.00	1.00 (18)	1159	22211
	Sus. + R3	59	26		1.00	1.00 (18)	308	22211
A19 N-	Sus. + R1	48	7		1.00	1.00 (18)	232	22211
	Sus. + R2	41	4		1.00	1.00 (18)	196	22211
	Sus. + R3	41	4		1.00	1.00 (18)	197	22211
A19 N+	Sus. + R1	48	7		2.56	2.13 (18)	592	22211
	Sus. + R2	41	4		2.56	2.13 (18)	502	22211
	Sus. + R3	41	4		2.56	2.13 (18)	502	22211
A19 M	Sus. + R1	48	10		2.56	2.13 (18)	599	22211
	Sus. + R2	60	14		2.56	2.13 (18)	746	22211
	Sus. + R3	51	13		2.56	2.13 (18)	640	22211
A19 F-	Sus. + R1	50	12		2.56	2.13 (18)	623	22211
	Sus. + R2	77	24		2.56	2.13 (18)	978	22211
	Sus. + R3	60	22		2.56	2.13 (18)	769	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)			Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	Eq. Load no. type	Code Stress	
A19 F+	Sus. + R1	50	12		1.00	1.00 (18)	246	22211
	Sus. + R2	77	24		1.00	1.00 (18)	388	22211
	Sus. + R3	60	22		1.00	1.00 (18)	306	22211
A20	Sus. + R1	50	15		1.00	1.00 (18)	250	22211
	Sus. + R2	80	25		1.00	1.00 (18)	401	22211
	Sus. + R3	62	22		1.00	1.00 (18)	317	22211
A21	Sus. + R1	50	20		1.00	1.00 (18)	261	22211
	Sus. + R2	84	27		1.00	1.00 (18)	422	22211
	Sus. + R3	66	23		1.00	1.00 (18)	336	22211
A22	Sus. + R1	52	38		1.00	1.00 (18)	311	22211
	Sus. + R2	94	32		1.00	1.00 (18)	477	22211
	Sus. + R3	79	25		1.00	1.00 (18)	396	22211
*** Segment A end ***								
*** Segment B begin ***								
*** Segment B end ***								
*** Segment C begin ***								
A14	Sus. + R1	4	12		1.22	1.30 (18)	143	22211
	Sus. + R2	6	15		1.22	1.30 (18)	182	22211
	Sus. + R3	9	19		1.22	1.30 (18)	240	22211
C01	Sus. + R1	11	2		1.00	1.00 (18)	106	22211
	Sus. + R2	14	5		1.00	1.00 (18)	138	22211
	Sus. + R3	20	9		1.00	1.00 (18)	199	22211
C01A	Sus. + R1	11	4		1.00	1.00 (18)	103	22211
	Sus. + R2	13	4		1.00	1.00 (18)	128	22211
	Sus. + R3	21	10		1.00	1.00 (18)	210	22211
C02 N-	Sus. + R1	10	9		1.00	1.00 (18)	123	22211
	Sus. + R2	13	4		1.00	1.00 (18)	128	22211
	Sus. + R3	23	12		1.00	1.00 (18)	238	22211
C02 N+	Sus. + R1	10	9		1.78	1.48 (18)	202	22211
	Sus. + R2	13	4		1.78	1.48 (18)	224	22211
	Sus. + R3	23	12		1.78	1.48 (18)	410	22211
C02 H	Sus. + R1	9	3		1.78	1.48 (18)	150	22211
	Sus. + R2	14	6		1.78	1.48 (18)	236	22211
	Sus. + R3	24	8		1.78	1.48 (18)	412	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)			Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	Eq. Load no. type	Code Stress	
C02 F-	Sus. + R1	7	13		1.78	1.48 (18)	207	22211
	Sus. + R2	13	10		1.78	1.48 (18)	243	22211
	Sus. + R3	22	6		1.78	1.48 (18)	366	22211
C02 F+	Sus. + R1	7	13		1.00	1.00 (18)	133	22211
	Sus. + R2	13	10		1.00	1.00 (18)	145	22211
	Sus. + R3	22	6		1.00	1.00 (18)	208	22211
C03	Sus. + R1	7	13		1.00	1.00 (18)	132	22211
	Sus. + R2	13	10		1.00	1.00 (18)	145	22211
	Sus. + R3	22	6		1.00	1.00 (18)	208	22211
C04	Sus. + R1	5	8		1.00	1.00 (18)	315	22211
	Sus. + R2	11	8		1.00	1.00 (18)	441	22211
	Sus. + R3	18	5		1.00	1.00 (18)	610	22211
C05 N-	Sus. + R1	4	5		1.00	1.00 (18)	214	22211
	Sus. + R2	11	7		1.00	1.00 (18)	402	22211
	Sus. + R3	15	6		1.00	1.00 (18)	532	22211
C05 N+	Sus. + R1	5	4		1.73	1.44 (18)	344	22211
	Sus. + R2	7	11		1.73	1.44 (18)	616	22211
	Sus. + R3	6	15		1.73	1.44 (18)	789	22211
C05 M	Sus. + R1	3	11		1.73	1.44 (18)	541	22211
	Sus. + R2	5	7		1.73	1.44 (18)	444	22211
	Sus. + R3	6	18		1.73	1.44 (18)	910	22211
C05 F-	Sus. + R1	1	14		1.73	1.44 (18)	669	22211
	Sus. + R2	3	6		1.73	1.44 (18)	342	22211
	Sus. + R3	4	12		1.73	1.44 (18)	597	22211
C05 F+	Sus. + R1	1	14		1.00	1.00 (18)	463	22211
	Sus. + R2	3	6		1.00	1.00 (18)	229	22211
	Sus. + R3	4	12		1.00	1.00 (18)	407	22211
C06 N-	Sus. + R1	1	14		1.00	1.00 (18)	463	22211
	Sus. + R2	3	6		1.00	1.00 (18)	228	22211
	Sus. + R3	3	12		1.00	1.00 (18)	406	22211
C06 N+	Sus. + R1	14	1		1.73	1.44 (18)	800	22211
	Sus. + R2	6	3		1.73	1.44 (18)	386	22211
	Sus. + R3	12	4		1.73	1.44 (18)	695	22211
C06 M	Sus. + R1	12	3		1.73	1.44 (18)	700	22211
	Sus. + R2	6	7		1.73	1.44 (18)	498	22211
	Sus. + R3	10	9		1.73	1.44 (18)	689	22211

ASME B31.3c (1992) CODE COMPLIANCE										
Point name	Load combination	(Moments in ft-lb)			(Stress in psi)			Eq. Load no. type	Code Stress	Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F In	S.I.F Out				
C06 F-	Sus. + R1	9	3		1.73	1.44	(18)	OCC	545	22211
	Sus. + R2	5	8		1.73	1.44	(18)	OCC	465	22211
	Sus. + R3	7	10		1.73	1.44	(18)	OCC	602	22211
C06 F+	Sus. + R1	3	9		1.00	1.00	(18)	OCC	320	22211
	Sus. + R2	8	5		1.00	1.00	(18)	OCC	301	22211
	Sus. + R3	10	7		1.00	1.00	(18)	OCC	388	22211
C07	Sus. + R1	0	0		1.00	1.00	(18)	OCC	0	22211
	Sus. + R2	0	0		1.00	1.00	(18)	OCC	0	22211
	Sus. + R3	0	0		1.00	1.00	(18)	OCC	0	22211

*** Segment C end ***

SYSTEM SUMMARY

Maximum displacements (in)

Maximum X :	0.058	Point : A17 F	Load Comb.: RESPONSE
Maximum Y :	0.143	Point : 8	Load Comb.: RESPONSE
Maximum Z :	0.036	Point : C05 F	Load Comb.: RESPONSE
Max. total:	0.153	Point : 8	Load Comb.: RESPONSE

Maximum rotations (deg)

Maximum X :	0.176	Point : 6	Load Comb.: RESPONSE
Maximum Y :	0.109	Point : A19 N	Load Comb.: RESPONSE
Maximum Z :	0.116	Point : B05	Load Comb.: RESPONSE
Max. total:	0.203	Point : B05	Load Comb.: RESPONSE

Maximum restraint forces(lb)

Maximum X :	402	Point : B01	Load Comb.: RESPONSE
Maximum Y :	150	Point : A22	Load Comb.: RESPONSE
Maximum Z :	99	Point : A22	Load Comb.: RESPONSE
Max. total:	404	Point : B01	Load Comb.: RESPONSE

Maximum restraint moments(ft-lb)

Maximum X :	209	Point : A00	Load Comb.: RESPONSE
Maximum Y :	200	Point : A00	Load Comb.: RESPONSE
Maximum Z :	96	Point : A22	Load Comb.: RESPONSE
Max. total:	291	Point : A00	Load Comb.: RESPONSE

SYSTEM SUMMARY

Maximum pipe forces (lb)

Maximum X :	193	Point : A08 F	Load Comb.: RESPONSE
Maximum Y :	203	Point : A04 F	Load Comb.: RESPONSE
Maximum Z :	205	Point : A00	Load Comb.: RESPONSE
Max. total:	246	Point : A00	Load Comb.: RESPONSE

Maximum pipe moments (ft-lb)

Maximum X :	300	Point : A18 N	Load Comb.: RESPONSE
Maximum Y :	258	Point : A08 F	Load Comb.: RESPONSE
Maximum Z :	273	Point : A18 F	Load Comb.: RESPONSE
Max. total:	427	Point : A11	Load Comb.: RESPONSE

SYSTEM SUMMARY

Maximum occasional stress

Point	: A08 F
Stress psi	: 4874
Allowable psi	: 22211
Ratio	: 0.22
Load combination	: Sus. + R1

Maximum occasional stress ratio

Point	: A08 F
Stress psi	: 4874
Allowable psi	: 22211
Ratio	: 0.22
Load combination	: Sus. + R1

*** The system satisfies ASME B31.3 code requirements ***
 *** for the selected options ***

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)---			PIPE ID	DESCRIPTION
		X	Y	Z		
*** SEGMENT A						
A00	Run	0	0	0	4PIPE	Wt= 144 lb, Ar= 3.2 sq.in Axial= 23300000 Tors= 304.0 Y-Shear= RIGID Bend= 2080.0 Z-Shear= RIGID Bend= 2080.0
A01A	Flex	0	0.25	0		
A01B	Run	0	0.04	0		
A01	Bend	0	0.34	0		Short Elbow, Radius = 4.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
A02	Run	0	0	-0.81		
A03	Bend	0	0	-0.65		Long Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.95, Out = 1.63 Flex = 5.272
A03A	Valv	1.76	0	0		Rating = 350, Weight = 93 lb Surface factor = 4.50, SIF = 1.00
A03B	Run	0.72	0	0		
A04	Run	0.69	0	0		
A05	Run	0.09	0	0		
A06	Run	0.09	0	0		
A07	Bend	0.50	0	0		Long Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.95, Out = 1.63 Flex = 5.272
A08	Redu	0	0	0.60		
A09	Run	0	0	0.33	3"PIPE	
A10	Run	0	0	0.63	10	
2	Run	0	0	0.46		
*** SEGMENT B						
3	Run	3.85	0.94	0.56	10	
B00	Run	0	0	0.46	3"PIPE	
B01	Redu	0	0	0.63		
B02	Run	0	0	0.33	4PIPE	
B03	Bend	0	0	1.27		Long Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.95, Out = 1.63 Flex = 5.272

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)---			PIPE ID	DESCRIPTION
		X	Y	Z		
B04	Run	0	0.50	0		
B05	Run	0	0.75	0		
B06	Run	0	2.12	0		
B07	Run	0	1.00	0		
B08	Tee	0	0.35	0		
B09	Bend	0	0.86	0		Long Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.95, Out = 1.63 Flex = 5.272
B10	Bend	1.07	0	0		Short Elbow, Radius = 4.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.56, Out = 2.13 Flex = 7.908
B10A	Flex	0	-0.40	0		Wt= 144 lb, Ar= 3.2 sq.in Axial= 23300000 Tors= 304.0 Y-Shear= RIGID Bend= 2080.0 Z-Shear= RIGID Bend= 2080.0
B10B	Run	0	-0.04	0		
B11	Bend	0	-0.69	0		Long Elbow, Radius = 6.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 1.95, Out = 1.63 Flex = 5.272
B12	Run	0	0	0.50		
*** SEGMENT C						
B08	Tee	3.85	5.66	3.25	2PIPE	
C01	Bend	-0.46	0	0		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
C02	Bend	0	0.54	0		Short Elbow, Radius = 2.00 inch Bend angle change = 90.00 deg Mid point at 50.00 percent SIF - In 2.27, Out = 1.89 Flex = 6.606
C03	Flex	-0.25	0	0		Wt= 87 lb, Ar= 1.1 sq.in Axial= 13500000 Tors= 107.0 Y-Shear= RIGID Bend= 659.0 Z-Shear= RIGID Bend= 659.0

POINT DATA LISTING

POINT NAME	TYPE	---OFFSETS (ft)--- X Y Z			PIPE ID	DESCRIPTION
C04	Run	-0.04	0	0		

Total weight of empty pipes : 291 lb

COMPONENT DATA LISTING

POINT NAME	---	COORDINATE(ft) X Y Z	---	DATA TYPE	DESCRIPTION
*** SEGMENT A					
A00	0.00	0.00	0.00	ANCHOR	Rigid Thermal movements : None
A01A	0.00	0.25	0.00		
A01B	0.00	0.29	0.00		
A01 N	0.00	0.30	0.00		
A01	0.00	0.63	0.00	TI	
A01 M	0.00	0.53	-0.10		
A01 F	0.00	0.63	-0.33		
A02	0.00	0.63	-0.81	GUIDE	ID : A02 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.15 Gaps set Weightless
A03 N	0.00	0.63	-0.96		
A03	0.00	0.63	-1.46	TI	
A03 M	0.15	0.63	-1.31		
A03 F	0.50	0.63	-1.46		
A03A	1.76	0.63	-1.46		
A03B	2.48	0.63	-1.46		
A04	3.17	0.63	-1.46	FLANGE	Weld neck SIF = 1.00 Rating = 400, Weight = 35 lb
A05	3.26	0.63	-1.46	WEIGHT	12 lb, No offsets
A06	3.35	0.63	-1.46	FLANGE	Weld neck SIF = 1.00 Rating = 400, Weight = 35 lb
A07 N	3.35	0.63	-1.46		
A07	3.85	0.63	-1.46	TI	
A07 M	3.70	0.63	-1.31		
A07 F	3.85	0.63	-0.96		
A08	3.85	0.63	-0.86		
A09	3.85	0.63	-0.53	GUIDE	ID : A09 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.06, Right = 0.06 inch Friction = 0.00 Gaps set Weightless
A10	3.85	0.63	0.10		
2	3.85	0.63	0.56		
*** SEGMENT B					
3	3.85	0.94	0.56		
B00	3.85	0.94	1.02		
B01	3.85	0.94	1.65	GUIDE	ID : B01 1, Connected to Ground Stiffness = RIGID Gap-down = 0.00, Above = 0.06 inch Gap-left = 0.00, Right = 0.06 inch Friction = 0.00 Gaps set Weightless

COMPONENT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y Z	DATA TYPE	DESCRIPTION
B02	3.85 0.94	1.98	
B03 N	3.85 0.94	2.75	
B03	3.85 0.94	3.25	TI
B03 M	3.85 1.09	3.10	
B03 F	3.85 1.44	3.25	
B04	3.85 1.44	3.25	
B05	3.85 2.19	3.25	WEIGHT 27 lb , No offsets
B06	3.85 4.31	3.25	
B07	3.85 5.31	3.25	WEIGHT 35 lb , No offsets
B08	3.85 5.66	3.25	TEE B16.9 welding tee SIF - In = 1.34, Out = 1.45
B09 N	3.85 6.02	3.25	
B09	3.85 6.52	3.25	TI
B09 M	4.00 6.37	3.25	
B09 F	4.35 6.52	3.25	
B10 N	4.59 6.52	3.25	
B10	4.92 6.52	3.25	TI
B10 M	4.82 6.42	3.25	
B10 F	4.92 6.19	3.25	
B10A	4.92 6.12	3.25	
B10B	4.92 6.08	3.25	
B11 N	4.92 5.89	3.25	
B11	4.92 5.39	3.25	TI
B11 M	4.92 5.54	3.40	
B11 F	4.92 5.39	3.75	
B12	4.92 5.39	3.75	ANCHOR Rigid Thermal movements : None
*** SEGMENT C			
B08	3.85 5.66	3.25	TEE B16.9 welding tee SIF - In = 1.34, Out = 1.45
C01 N	3.56 5.66	3.25	
C01	3.39 5.66	3.25	TI
C01 M	3.44 5.71	3.25	
C01 F	3.39 5.83	3.25	
C02 N	3.39 6.03	3.25	
C02	3.39 6.20	3.25	TI
C02 M	3.34 6.15	3.25	
C02 F	3.22 6.20	3.25	
C03	3.14 6.20	3.25	
C04	3.10 6.20	3.25	

Number of points in the system : 64

PIPE DATA LISTING

Pipe ID/ Material	Nom/ Sch	O.D. inch	-----Thickness(inch)----- W.Th. Corr Mill Insu Ling	Spec Grav	Weight(lb/ft) Pipe Other Total
3"PIPE AU	3.000 STD	3.500	0.216 0.06 0.03 0 0	1.12	7.75 0 11.34
4"PIPE AU	4 STD	4.500	0.237 0.06 0.03 0 0	1.12	11.04 0 17.22
2"PIPE AU	2.000 STD	2.375	0.154 0.06 0.02 0 0	1.12	3.74 0 5.37
10 CS	10 XXS	10.750	1.000 0.06 0.13 0 0	1.12	104 0 133

MATERIAL DATA LISTING

Material Name	Pipe ID	Density lb/cu.ft	Pois. Ratio	Temper. deg F	Modulus E6 psi	Expans. in/100ft	Allow. psi
AU	4PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0
AU	3"PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0
CS	10	489.0	0.30	40.0 180.0	29.62	1.0406	20000.0 20000.0
AU	2PIPE	501.0	0.30	40.0 180.0	28.42	1.5442	16700.0 16700.0

FRAME POINT DATA LISTING

POINT NAME	---COORDINATE(ft) X Y Z	DATA TYPE	DESCRIPTION
2	3.85 0.63 0.56		
1	3.85 0.38 0.56	Y-STOP	ID : 1 1, Connected to Ground Gap-Below = 0.00, Above = 0.06 inch Friction = 0.00 Gaps set Weightless
3	3.85 0.94 0.56		
4	3.85 1.44 0.56	WEIGHT	1000 lb , No offsets
5	3.85 3.64 0.56		
6	3.85 5.50 0.56	WEIGHT	2250 lb , Offsets in ft DX = 0.00, DY = 0.00, DZ = 0.04
7	3.85 8.60 0.56		
A02	0.00 0.63 -0.81		
8	5.60 5.50 -1.00	ANCHOR	Rigid Thermal movements : None

BEAM DATA LISTING

BEAM ID	POINT NAME	LENGTH (ft)	SECTION ID/ MATERIAL ID	BETA ANGLE	RIGID END(ft)	RELEASE Ax Y-Y Z-Z
M1	From 2 To 1	0.25	XS10 A36	0.00	0.00 0.00	N N N N N N
M2	From 2 To 3	0.31	XS10 A36	0.00	0.00 0.00	N N N N N N
M3	From 3 To 4	0.50	XS10 A36	0.00	0.00 0.00	N N N N N N
M4	From 4 To 5	2.20	XS12 A36	0.00	0.00 0.00	N N N N N N
M5	From 5 To 6	1.86	XS12 A36	0.00	0.00 0.00	N N N N N N
M6	From 6 To 7	3.10	XS12 A36	0.00	0.00 0.00	N N N N N N
M7	From 5 To A02	5.08	C3X4.1 A36	0.00	0.00 0.00	N N N N N N
M8	From 6 To 8	2.34	C3X4.1 A36	0.00	0.00 0.00	N N N N N N

CROSS SECTION LISTING

Section ID	Area(sq.in)			Inertia (in**4)		
ID	Axial	Y-Shear	Z-Shear	Torsion	Y-Y Bend	Z-Z Bend
XS10	16.10	8.05	8.05	424.0	212.0	212.0
XS12	19.20	9.60	9.60	724.0	362.0	362.0
XS12	19.20	9.60	9.60	724.0	362.0	362.0
C3X4.1	1.21	0.51	0.51	0.0	0.2	1.7

AY02E-R2 PROJECT W-320, 241-AY-02E SLUICE PIT FLUOR DANIEL NORTHWEST, INC.
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BEAM MATERIAL LISTING

MATERIAL ID	Elastic modulus E6 psi	Poissons ratio	Yield Stress psi	Density lb/cu.ft	Expansion E-6 /F	Ultimate stress psi
A36	29.000	0.250	36000	490.00	6.50000	58000

AY02E-R2 PROJECT W-320, 241-AY-02E SLUICE PIT FLUOR DANIEL NORTHWEST, INC.
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TEMPERATURE AND PRESSURE DATA

POINT NAME	-----C A S E 1----- PRESS. psi	TEMPER deg F	EXPAN. in/100ft	-----C A S E 2----- PRESS. psi	TEMPER deg F	EXPAN. in/100ft	-----C A S E 3----- PRESS. psi	TEMPER deg F	EXPAN. in/100ft
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*** SEGMENT A

A00	325	180	1.544
A09	325	180	1.544
A10	325	180	1.041
2	325	180	1.041

*** SEGMENT B

3	325	180	1.041
B00	325	180	1.544
B02	325	180	1.544
B12	325	180	1.544

*** SEGMENT C

B08	325	180	1.544
C04	325	180	1.544

ANALYSIS SUMMARY

Current model revision number : 1

Static - Date and Time of analysis Mar 4, 1997 10:27 AM
Model Revision Number 1
Number of load cases 2
Load cases analyzed GR T1
Gaps/Friction/Yielding considered Yes
Tolerance - Force, Displacement 100.00 lb 0.0600 in
Friction - Factor, tolerance 1.00 0.10
Hanger design run No
Cut short included No
Occasional load analysis type Nonlinear
Non-linear analysis summary file AY02E-R2.LOG
Base load cases for nonlinear analysis

GR = None
T1 = GR

Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

Modal - Date and Time of analysis Mar 4, 1997 10:27 AM
Model Revision Number 1
Number of modes 4
Cutoff frequency (Hz) 33.0
Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

Response - Date and Time of analysis Mar 4, 1997 10:27 AM
Model Revision Number 1
Number of load cases 3
Load cases analyzed R1 R2 R3
Date and time of modal analysis Mar 4, 1997 10:27 AM
Number of modes 4
Cutoff frequency (Hz) 33.0
Model revision of modal analysis 1
Weight of contents included Yes
Pressure stiffening case 0
Water elevation for buoyancy loads Not considered

CODE COMPLIANCE COMBINATIONS

Combination	Category	Method	Load	Factor	Allowable	Remarks
GR + Max P	Sustain	Sum	Gravity Max Long	1.00 1.00	Automatic	Default
Cold to T1	Expansion	Sum	Thermal 1	1.00	Automatic	Default
Sus. + R1	Occasion	Abs sum	Response 1 Max Sus	1.00 1.00	Automatic	Default
Sus. + R2	Occasion	Abs sum	Response 2 Max Sus	1.00 1.00	Automatic	Default
Sus. + R3	Occasion	Abs sum	Response 3 Max Sus	1.00 1.00	Automatic	Default
Max P	Hoop		Max Hoop	1.00	Automatic	Default

OTHER USER COMBINATIONS

Combination	Method	Load	Factor	Remarks
GR	Sum	Gravity	1.00	Default
T1	Sum	Thermal 1	1.00	Default
R1	Sum	Response 1	1.00	Default
R2	Sum	Response 2	1.00	Default
R3	Sum	Response 3	1.00	Default
GR+T1	Sum	Gravity Thermal 1	1.00 1.00	User
RESPONSE	SRSS	Response 1 Response 2 Response 3	1.00 1.00 1.00	User
TOTAL	Abs sum	GR+T1 RESPONSE	1.00 1.00	User

CODE COMPLIANCE

Y - Factor 0.40
Weld efficiency factor 0.80
Range reduction factor 1.00

Design Pressure Factor 1.00
 Minimum stress ratio used in reports... 0.00
 Include corrosion in stress calcs. Y
 Include torsion in code stress N
 Include axial force in code stress N
 Longitudinal pressure calculation PD/4t
 Include rigorous pressure Not analyzed

RESPONSE SPECTRUM LOAD CASES :

Number of load cases analysed : 3

Load case 1 - R1

Missing mass : Yes

ZPA : No

Combination method : SRSS

X- Spectrum : SC1

Multiplier : 1.00

SC1

Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.03	0.250	0.06
0.400	0.10	0.600	0.16	1.100	0.28
1.640	0.42	8.000	0.42	12.000	0.34
20.000	0.26	33.000	0.20	100.000	0.20

Load case 2 - R2

Missing mass : Yes
 ZPA : No

Combination method : SRSS

Y- Spectrum : SC1
 Multiplier : 1.00

SC1					
Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.03	0.250	0.06
0.400	0.10	0.600	0.16	1.100	0.28
1.640	0.42	8.000	0.42	12.000	0.34
20.000	0.26	33.000	0.20	100.000	0.20

Load case 3 - R3

Missing mass : Yes
 ZPA : No

Combination method : SRSS

Z- Spectrum : SC1
 Multiplier : 1.00

SC1					
Freq(Hz)	Grav()	Freq(Hz)	Grav()	Freq(Hz)	Grav()
0.100	0.01	0.160	0.03	0.250	0.06
0.400	0.10	0.600	0.16	1.100	0.28
1.640	0.42	8.000	0.42	12.000	0.34
20.000	0.26	33.000	0.20	100.000	0.20

F R E Q U E N C I E S

Mode Number	Frequency (Rads/sec)	Frequency (Hertz)	Period (Sec)	Participation factors		
				X	Y	Z
1	75.5913	12.0307	0.083	-0.013	0.065	-1.079
2	110.5581	17.5959	0.057	-0.930	0.025	-2.747
3	122.1752	19.4448	0.051	1.476	0.063	0.491
4	139.4641	22.1964	0.045	0.452	0.559	0.054

D I S P L A C E M E N T S

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
*** Segment A begin ***							
A00	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	GR+T1	0.000	0.000	0.000	0.000	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
A01A	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.004	0.000	-0.001	0.000	0.000
	GR+T1	0.000	0.004	0.000	-0.001	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.001	0.000	0.000
	TOTAL	0.000	0.004	0.000	0.002	0.000	0.000
A01B	GR	0.000	0.000	0.000	0.001	0.007	-0.001
	T1	0.000	0.004	0.000	-0.039	0.080	-0.002
	GR+T1	0.000	0.004	0.000	-0.038	0.087	-0.004
	RESPONSE	0.000	0.000	0.000	0.010	0.000	0.005
	TOTAL	0.000	0.004	0.000	0.048	0.087	0.009
A01 N	GR	0.000	0.000	0.000	0.001	0.007	-0.001
	T1	0.000	0.004	0.000	-0.039	0.080	-0.002
	GR+T1	0.000	0.004	0.000	-0.038	0.087	-0.004
	RESPONSE	0.000	0.000	0.000	0.010	0.000	0.005
	TOTAL	0.000	0.004	0.000	0.048	0.087	0.009
A01 M	GR	0.000	0.000	0.000	0.001	0.007	-0.002
	T1	-0.002	0.007	-0.004	-0.044	0.080	-0.004
	GR+T1	-0.002	0.007	-0.004	-0.043	0.086	-0.006
	RESPONSE	0.000	0.000	0.001	0.006	0.001	0.004
	TOTAL	0.002	0.007	0.004	0.049	0.087	0.010
A01 F	GR	-0.000	0.000	0.000	0.000	0.006	-0.002
	T1	-0.005	0.006	-0.008	-0.044	0.078	-0.005
	GR+T1	-0.006	0.006	-0.008	-0.044	0.084	-0.008
	RESPONSE	0.000	0.000	0.001	0.001	0.003	0.003
	TOTAL	0.006	0.006	0.009	0.045	0.087	0.011
A02	GR	-0.001	0.000	0.000	-0.001	0.006	-0.003
	T1	-0.013	0.002	-0.016	-0.042	0.076	-0.007
	GR+T1	-0.014	0.002	-0.016	-0.043	0.082	-0.010
	RESPONSE	0.000	0.000	0.001	0.002	0.004	0.003
	TOTAL	0.014	0.002	0.016	0.045	0.087	0.012

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A03 N	GR	-0.001	0.000	0.000	-0.002	0.006	-0.003
	T1	-0.016	0.000	-0.018	-0.041	0.076	-0.007
	GR+T1	-0.017	0.000	-0.018	-0.043	0.081	-0.010
	RESPONSE	0.000	0.000	0.001	0.002	0.005	0.002
	TOTAL	0.017	0.000	0.019	0.045	0.086	0.012
A03 M	GR	-0.001	0.000	0.000	-0.005	0.004	-0.004
	T1	-0.018	-0.003	-0.026	-0.032	0.063	-0.004
	GR+T1	-0.020	-0.003	-0.026	-0.037	0.066	-0.008
	RESPONSE	0.001	0.000	0.001	0.002	0.011	0.002
	TOTAL	0.021	0.003	0.027	0.039	0.077	0.010
A03 F	GR	-0.002	-0.001	0.000	-0.006	0.002	-0.004
	T1	-0.015	-0.004	-0.032	-0.027	0.043	0.001
	GR+T1	-0.016	-0.005	-0.032	-0.033	0.045	-0.003
	RESPONSE	0.001	0.000	0.002	0.002	0.015	0.002
	TOTAL	0.017	0.005	0.034	0.035	0.060	0.005
A03A	GR	-0.002	-0.002	-0.001	-0.007	0.001	-0.001
	T1	0.005	-0.003	-0.041	-0.018	0.028	0.003
	GR+T1	0.003	-0.005	-0.042	-0.025	0.029	0.002
	RESPONSE	0.001	0.001	0.006	0.003	0.015	0.001
	TOTAL	0.004	0.006	0.048	0.028	0.043	0.003
A03B	GR	-0.002	-0.002	-0.001	-0.007	0.001	-0.001
	T1	0.016	-0.003	-0.046	-0.018	0.028	0.003
	GR+T1	0.014	-0.005	-0.046	-0.025	0.029	0.002
	RESPONSE	0.001	0.001	0.008	0.003	0.015	0.001
	TOTAL	0.015	0.005	0.054	0.028	0.043	0.003
A04	GR	-0.002	-0.002	-0.001	-0.008	0.001	0.002
	T1	0.026	-0.002	-0.049	-0.014	0.015	0.005
	GR+T1	0.025	-0.004	-0.050	-0.021	0.016	0.007
	RESPONSE	0.001	0.001	0.010	0.003	0.013	0.001
	TOTAL	0.026	0.005	0.060	0.024	0.029	0.007
A05	GR	-0.002	-0.002	-0.001	-0.008	0.001	0.002
	T1	0.028	-0.002	-0.049	-0.013	0.013	0.005
	GR+T1	0.026	-0.004	-0.050	-0.021	0.014	0.007
	RESPONSE	0.001	0.001	0.010	0.003	0.013	0.001
	TOTAL	0.027	0.005	0.060	0.024	0.027	0.008

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
A06	GR	-0.002	-0.002	-0.001	-0.008	0.001	0.002
	T1	0.029	-0.002	-0.049	-0.012	0.011	0.006
	GR+T1	0.028	-0.004	-0.050	-0.020	0.012	0.008
	RESPONSE	0.001	0.001	0.011	0.003	0.013	0.001
	TOTAL	0.029	0.005	0.061	0.024	0.025	0.009
A07 N	GR	-0.002	-0.002	-0.001	-0.008	0.001	0.002
	T1	0.029	-0.002	-0.049	-0.012	0.011	0.006
	GR+T1	0.028	-0.004	-0.050	-0.020	0.012	0.008
	RESPONSE	0.001	0.001	0.011	0.003	0.013	0.001
	TOTAL	0.029	0.005	0.061	0.024	0.025	0.009
A07 M	GR	-0.002	-0.001	-0.001	-0.008	0.001	0.004
	T1	0.034	-0.001	-0.046	-0.010	-0.031	0.010
	GR+T1	0.033	-0.002	-0.047	-0.019	-0.030	0.014
	RESPONSE	0.001	0.001	0.011	0.004	0.008	0.001
	TOTAL	0.033	0.003	0.059	0.022	0.038	0.015
A07 F	GR	-0.001	0.000	-0.001	-0.006	0.002	0.003
	T1	0.032	0.000	-0.039	-0.003	-0.071	0.011
	GR+T1	0.031	-0.001	-0.041	-0.009	-0.069	0.014
	RESPONSE	0.000	0.000	0.012	0.005	0.005	0.002
	TOTAL	0.032	0.001	0.052	0.014	0.074	0.015
A08	GR	-0.001	0.000	-0.001	-0.006	0.002	0.003
	T1	0.031	0.000	-0.038	-0.003	-0.072	0.011
	GR+T1	0.030	0.000	-0.039	-0.008	-0.071	0.014
	RESPONSE	0.000	0.000	0.012	0.005	0.005	0.002
	TOTAL	0.030	0.001	0.051	0.013	0.076	0.016
A09	GR	-0.001	0.000	-0.001	-0.004	0.002	0.002
	T1	0.024	0.000	-0.033	-0.001	-0.080	0.014
	GR+T1	0.024	0.000	-0.034	-0.004	-0.078	0.016
	RESPONSE	0.000	0.000	0.012	0.005	0.005	0.002
	TOTAL	0.024	0.000	0.046	0.009	0.083	0.018
A10	GR	-0.001	0.000	-0.001	0.000	0.003	0.000
	T1	0.014	0.000	-0.023	-0.003	-0.099	0.022
	GR+T1	0.013	0.000	-0.024	-0.003	-0.096	0.022
	RESPONSE	0.001	0.001	0.012	0.004	0.001	0.003
	TOTAL	0.013	0.001	0.036	0.009	0.097	0.026

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
2	GR	-0.001	0.000	-0.001	0.000	0.003	0.000
	T1	0.004	0.000	-0.018	-0.003	-0.099	0.023
	GR+T1	0.003	0.000	-0.019	-0.003	-0.096	0.022
	RESPONSE	0.001	0.000	0.012	0.006	0.001	0.003
	TOTAL	0.004	0.000	0.031	0.009	0.097	0.026

*** Segment A end ***

*** Segment B begin ***

3	GR	-0.001	0.000	-0.001	0.000	0.003	0.000
	T1	0.003	0.000	-0.019	-0.003	-0.099	0.023
	GR+T1	0.002	0.000	-0.020	-0.003	-0.096	0.022
	RESPONSE	0.001	0.000	0.011	0.007	0.001	0.003
	TOTAL	0.002	0.000	0.031	0.010	0.097	0.026

B00	GR	0.000	0.000	-0.001	0.000	0.003	0.000
	T1	-0.007	0.000	-0.014	-0.003	-0.099	0.023
	GR+T1	-0.007	0.000	-0.015	-0.003	-0.096	0.022
	RESPONSE	0.001	0.001	0.011	0.006	0.001	0.003
	TOTAL	0.008	0.001	0.026	0.010	0.097	0.026

B01	GR	0.000	0.000	-0.001	0.006	0.005	0.000
	T1	-0.020	0.000	-0.004	0.035	-0.106	0.014
	GR+T1	-0.020	0.000	-0.005	0.041	-0.101	0.014
	RESPONSE	0.000	0.000	0.011	0.005	0.008	0.004
	TOTAL	0.020	0.000	0.016	0.046	0.109	0.018

B02	GR	0.000	-0.001	-0.001	0.010	0.006	0.000
	T1	-0.028	-0.003	0.001	0.054	-0.107	0.012
	GR+T1	-0.027	-0.004	0.000	0.064	-0.101	0.011
	RESPONSE	0.001	0.000	0.011	0.005	0.011	0.004
	TOTAL	0.028	0.004	0.011	0.069	0.111	0.015

B03 N	GR	0.001	-0.003	-0.001	0.013	0.007	-0.001
	T1	-0.045	-0.014	0.013	0.064	-0.106	0.008
	GR+T1	-0.044	-0.017	0.012	0.077	-0.099	0.007
	RESPONSE	0.003	0.001	0.011	0.006	0.015	0.005
	TOTAL	0.046	0.018	0.023	0.083	0.114	0.012

B03 M	GR	0.002	-0.004	-0.001	0.012	0.008	-0.001
	T1	-0.053	-0.016	0.020	0.041	-0.096	0.002
	GR+T1	-0.051	-0.020	0.019	0.052	-0.087	0.001
	RESPONSE	0.004	0.002	0.011	0.010	0.025	0.004
	TOTAL	0.055	0.021	0.031	0.062	0.113	0.004

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
B03 F	GR	0.002	-0.004	0.000	0.007	0.008	-0.001
	T1	-0.055	-0.011	0.024	-0.004	-0.088	-0.012
	GR+T1	-0.053	-0.015	0.024	-0.003	-0.080	-0.013
	RESPONSE	0.005	0.002	0.011	0.015	0.029	0.003
	TOTAL	0.058	0.017	0.035	0.018	0.109	0.016

B04	GR	0.002	-0.004	0.000	0.006	0.008	-0.001
	T1	-0.055	-0.011	0.024	-0.004	-0.088	-0.012
	GR+T1	-0.053	-0.015	0.024	0.003	-0.080	-0.013
	RESPONSE	0.005	0.002	0.011	0.015	0.029	0.003
	TOTAL	0.058	0.017	0.035	0.018	0.109	0.016

B05	GR	0.002	-0.004	0.001	0.005	0.009	0.000
	T1	-0.053	0.000	0.022	-0.019	-0.082	-0.019
	GR+T1	-0.051	-0.004	0.023	-0.015	-0.073	-0.019
	RESPONSE	0.004	0.002	0.010	0.017	0.035	0.004
	TOTAL	0.055	0.006	0.033	0.032	0.108	0.023

B06	GR	0.002	-0.004	0.002	0.001	0.010	0.004
	T1	-0.037	0.033	0.006	-0.045	-0.064	-0.057
	GR+T1	-0.036	0.028	0.008	-0.044	-0.054	-0.053
	RESPONSE	0.003	0.002	0.012	0.021	0.052	0.006
	TOTAL	0.038	0.030	0.020	0.065	0.107	0.059

B07	GR	0.001	-0.004	0.002	0.000	0.011	0.007
	T1	-0.023	0.048	-0.004	-0.048	-0.056	-0.084
	GR+T1	-0.022	0.044	-0.002	-0.049	-0.045	-0.076
	RESPONSE	0.002	0.002	0.014	0.021	0.060	0.007
	TOTAL	0.024	0.046	0.016	0.070	0.106	0.083

B08	GR	0.000	-0.004	0.002	0.000	0.011	0.009
	T1	-0.016	0.053	-0.007	-0.048	-0.053	-0.094
	GR+T1	-0.016	0.049	-0.005	-0.049	-0.042	-0.085
	RESPONSE	0.001	0.002	0.016	0.021	0.063	0.008
	TOTAL	0.018	0.051	0.021	0.070	0.106	0.093

B09 N	GR	-0.001	-0.004	0.002	-0.001	0.011	0.010
	T1	-0.005	0.059	-0.011	-0.047	-0.050	-0.106
	GR+T1	-0.010	0.055	-0.009	-0.048	-0.039	-0.097
	RESPONSE	0.001	0.002	0.017	0.021	0.065	0.008
	TOTAL	0.011	0.056	0.026	0.068	0.104	0.105

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
B09 M	GR	-0.002	-0.004	0.002	-0.001	0.012	0.014
	T1	0.004	0.059	-0.015	-0.042	-0.048	-0.175
	GR+T1	0.002	0.054	-0.011	-0.043	-0.037	-0.161
	RESPONSE	0.001	0.002	0.016	0.019	0.067	0.009
	TOTAL	0.004	0.057	0.027	0.062	0.104	0.170
B09 F	GR	-0.002	-0.003	0.001	-0.001	0.012	0.017
	T1	0.015	0.046	-0.011	-0.039	-0.043	-0.222
	GR+T1	0.013	0.044	-0.010	-0.040	-0.031	-0.205
	RESPONSE	0.002	0.001	0.011	0.018	0.070	0.010
	TOTAL	0.015	0.045	0.021	0.059	0.102	0.215
B10 N	GR	-0.002	-0.002	0.000	-0.001	0.012	0.017
	T1	0.019	0.035	-0.009	-0.037	-0.043	-0.224
	GR+T1	0.017	0.033	-0.009	-0.038	-0.030	-0.207
	RESPONSE	0.002	0.001	0.008	0.019	0.071	0.010
	TOTAL	0.018	0.034	0.016	0.057	0.101	0.217
B10 M	GR	-0.002	-0.001	-0.001	-0.001	0.012	0.017
	T1	0.018	0.022	-0.006	-0.032	-0.037	-0.221
	GR+T1	0.016	0.022	-0.006	-0.034	-0.025	-0.204
	RESPONSE	0.001	0.000	0.004	0.019	0.071	0.010
	TOTAL	0.018	0.022	0.010	0.052	0.096	0.214
B10 F	GR	-0.001	0.000	-0.001	-0.002	0.012	0.016
	T1	0.009	0.014	-0.004	-0.023	-0.033	-0.209
	GR+T1	0.008	0.014	-0.005	-0.024	-0.021	-0.185
	RESPONSE	0.001	0.001	0.002	0.019	0.071	0.009
	TOTAL	0.009	0.014	0.006	0.043	0.093	0.194
B10A	GR	-0.001	0.000	-0.001	-0.002	0.012	0.016
	T1	0.006	0.013	-0.004	-0.022	-0.033	-0.199
	GR+T1	0.005	0.013	-0.004	-0.024	-0.021	-0.184
	RESPONSE	0.001	0.001	0.002	0.019	0.071	0.009
	TOTAL	0.006	0.013	0.006	0.043	0.092	0.193
B10B	GR	-0.001	0.000	-0.001	-0.005	0.002	0.004
	T1	0.005	0.013	-0.004	0.028	-0.020	-0.044
	GR+T1	0.004	0.013	-0.004	0.023	-0.018	-0.040
	RESPONSE	0.001	0.001	0.001	0.012	0.005	0.005
	TOTAL	0.005	0.013	0.006	0.035	0.023	0.046

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
B11 N	GR	0.000	0.000	-0.001	-0.005	0.002	0.004
	T1	0.003	0.010	-0.005	0.029	-0.020	-0.042
	GR+T1	0.003	0.010	-0.005	0.024	-0.018	-0.038
	RESPONSE	0.001	0.001	0.001	0.012	0.005	0.005
	TOTAL	0.004	0.010	0.006	0.036	0.023	0.043
B11 M	GR	0.000	0.000	0.000	-0.005	0.002	0.001
	T1	0.001	0.004	-0.005	0.028	-0.012	-0.014
	GR+T1	0.001	0.003	-0.005	0.023	-0.011	-0.013
	RESPONSE	0.000	0.000	0.000	0.007	0.004	0.003
	TOTAL	0.001	0.004	0.005	0.030	0.014	0.015
B11 F	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	GR+T1	0.000	0.000	0.000	0.000	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
B12	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	GR+T1	0.000	0.000	0.000	0.000	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000
*** Segment B end ***							
*** Segment C begin ***							
B08	GR	0.000	-0.004	0.002	0.000	0.011	0.009
	T1	-0.016	0.053	-0.007	-0.048	-0.053	-0.094
	GR+T1	-0.016	0.049	-0.005	-0.049	-0.042	-0.085
	RESPONSE	0.001	0.002	0.016	0.021	0.063	0.008
	TOTAL	0.018	0.051	0.021	0.070	0.106	0.093
C01 N	GR	0.000	-0.005	0.003	0.000	0.011	0.016
	T1	-0.021	0.059	-0.011	-0.048	-0.053	-0.094
	GR+T1	-0.021	0.054	-0.008	-0.049	-0.042	-0.079
	RESPONSE	0.001	0.002	0.020	0.029	0.070	0.011
	TOTAL	0.022	0.057	0.028	0.078	0.113	0.090
C01 M	GR	0.000	-0.005	0.003	0.000	0.011	0.028
	T1	-0.022	0.062	-0.012	-0.048	-0.053	-0.094
	GR+T1	-0.022	0.057	-0.009	-0.049	-0.042	-0.066
	RESPONSE	0.001	0.003	0.022	0.038	0.086	0.021
	TOTAL	0.023	0.059	0.031	0.087	0.129	0.087

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
C01 F	GR	-0.001	-0.006	0.003	0.000	0.011	0.038
	T1	-0.020	0.065	-0.014	-0.048	-0.053	-0.094
	GR+T1	-0.021	0.059	-0.011	-0.049	-0.042	-0.057
	RESPONSE	-0.002	0.003	0.024	0.054	0.094	0.030
	TOTAL	0.023	0.062	0.035	0.102	0.136	0.087
C02 N	GR	-0.003	-0.006	0.003	0.000	0.011	0.040
	T1	-0.016	0.068	-0.016	-0.048	-0.053	-0.094
	GR+T1	-0.019	0.062	-0.013	-0.049	-0.042	-0.055
	RESPONSE	0.003	0.003	0.026	0.056	0.097	0.032
	TOTAL	0.022	0.065	0.039	0.105	0.139	0.086
C02 M	GR	-0.004	-0.006	0.003	0.000	0.011	0.048
	T1	-0.015	0.071	-0.018	-0.048	-0.053	-0.094
	GR+T1	-0.018	0.065	-0.015	-0.049	-0.042	-0.046
	RESPONSE	0.004	0.003	0.029	0.061	0.101	0.036
	TOTAL	0.022	0.068	0.043	0.110	0.143	0.082
C02 F	GR	-0.004	-0.008	0.003	0.000	0.011	0.054
	T1	-0.015	0.074	-0.020	-0.048	-0.053	-0.094
	GR+T1	-0.020	0.066	-0.016	-0.049	-0.042	-0.041
	RESPONSE	0.004	0.004	0.032	0.063	0.106	0.039
	TOTAL	0.024	0.070	0.048	0.112	0.148	0.079
C03	GR	-0.004	-0.008	0.004	0.000	0.011	0.054
	T1	-0.017	0.076	-0.021	-0.048	-0.053	-0.094
	GR+T1	-0.021	0.067	-0.017	-0.049	-0.042	-0.041
	RESPONSE	0.004	0.005	0.034	0.063	0.106	0.039
	TOTAL	0.025	0.072	0.051	0.112	0.148	0.079
C04	GR	-0.004	-0.009	0.004	0.000	0.011	0.055
	T1	-0.017	0.076	-0.021	-0.048	-0.053	-0.094
	GR+T1	-0.021	0.067	-0.017	-0.049	-0.042	-0.041
	RESPONSE	0.004	0.005	0.035	0.063	0.107	0.039
	TOTAL	0.025	0.072	0.052	0.112	0.150	0.079
*** Segment C end ***							
2	GR	-0.001	0.000	-0.001	0.000	0.003	0.000
	T1	0.004	0.000	-0.018	-0.003	-0.009	0.029
	GR+T1	0.003	0.000	-0.019	-0.003	-0.006	0.022
	RESPONSE	0.001	0.000	0.012	0.006	0.001	0.003
	TOTAL	0.004	0.000	0.031	0.009	0.097	0.026

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
1	GR	-0.001	0.000	-0.001	0.000	0.003	0.000
	T1	0.005	0.000	-0.018	-0.003	-0.099	0.023
	GR+T1	0.005	0.000	-0.019	-0.003	-0.096	0.022
	RESPONSE	0.001	0.000	0.012	0.006	0.001	0.003
	TOTAL	0.005	0.000	0.031	0.009	0.097	0.026
3	GR	-0.001	0.000	-0.001	0.000	0.003	0.000
	T1	0.003	0.000	-0.019	-0.003	-0.099	0.023
	GR+T1	0.002	0.000	-0.020	-0.003	-0.096	0.022
	RESPONSE	0.001	0.000	0.011	0.007	0.001	0.003
	TOTAL	0.002	0.000	0.031	0.010	0.097	0.026
4	GR	-0.001	0.000	-0.001	0.000	0.003	0.000
	T1	0.000	0.000	-0.019	-0.003	-0.099	0.023
	GR+T1	0.000	0.000	-0.020	-0.003	-0.096	0.022
	RESPONSE	0.000	0.000	0.011	0.008	0.001	0.004
	TOTAL	0.001	0.000	0.030	0.010	0.097	0.026
5	GR	-0.001	0.000	-0.001	0.001	0.003	0.000
	T1	-0.010	0.000	-0.020	-0.003	-0.099	0.023
	GR+T1	-0.011	0.000	-0.021	-0.002	-0.096	0.022
	RESPONSE	0.002	0.000	0.007	0.009	0.001	0.005
	TOTAL	0.012	0.000	0.028	0.011	0.097	0.027
6	GR	0.000	0.000	0.000	0.001	0.002	0.000
	T1	-0.019	0.000	-0.021	-0.003	-0.099	0.023
	GR+T1	-0.019	0.000	-0.022	-0.002	-0.096	0.022
	RESPONSE	0.004	0.000	0.005	0.009	0.001	0.006
	TOTAL	0.023	0.000	0.027	0.012	0.097	0.028
7	GR	0.000	0.000	0.000	0.001	0.002	0.000
	T1	-0.034	0.000	-0.023	-0.003	-0.099	0.023
	GR+T1	-0.034	0.000	-0.023	-0.002	-0.096	0.022
	RESPONSE	0.003	0.000	0.007	0.009	0.001	0.006
	TOTAL	0.042	0.000	0.030	0.012	0.097	0.028
A02	GR	-0.001	0.000	0.000	-0.001	0.006	-0.003
	T1	-0.013	0.002	-0.016	-0.042	0.076	-0.007
	GR+T1	-0.014	0.002	-0.016	-0.043	0.082	-0.010
	RESPONSE	0.000	0.000	0.001	0.002	0.004	0.003
	TOTAL	0.014	0.002	0.016	0.045	0.087	0.012

DISPLACEMENTS

Point name	Load combination	TRANSLATIONS (in)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
8	GR	0.000	0.000	0.000	0.000	0.000	0.000
	T1	0.000	0.000	0.000	0.000	0.000	0.000
	GR+T1	0.000	0.000	0.000	0.000	0.000	0.000
	RESPONSE	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	0.000	0.000	0.000	0.000	0.000	0.000

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL		Dirn	GLOBAL	
				Force	Deform		Force	Deform
A02 A02 1 Stiff	Guide :RIGID	GR	down	216	0.000	X		-0.001
			left		0.001	Y	-216	0.000
						Z		0.000
		T1	up	216	0.002	X		-0.013
			left		0.013	Y	216	0.002
						Z		-0.016
		GR+T1	up		0.002	X		-0.014
			left		0.014	Y		0.002
						Z		-0.016
		RESPONSE	down	1160	0.000	X	1388	0.000
			left	1388	0.000	Y	1160	0.000
						Z		0.001
A09 A09 1 Stiff	Guide :RIGID	GR	down	361	0.000	X		-0.001
			right		0.001	Y	-361	0.000
						Z		-0.001
		T1	down	461	0.000	X		0.026
			left		0.026	Y	-461	0.000
						Z		-0.033
		GR+T1	down	822	0.000	X		0.024
			left		0.024	Y	-822	0.000
						Z		-0.034
		RESPONSE	down	633	0.000	X	347	0.000
			left	347	0.000	Y	633	0.000
						Z		0.012
B01 B01 1 Stiff	Guide :RIGID	TOTAL	down	1455	0.000	X	347	0.024
			left	347	0.024	Y	1455	0.000
						Z		0.046
		GR	down	670	0.000	X	48	0.000
			left	48	0.000	Y	-670	0.000
						Z		-0.001
		T1	down	2709	0.000	X	-48	-0.020
			right	48	0.020	Y	-2709	0.000
						Z		-0.004

SUPPORT FORCES

Point/ Supp. ID	Connect/ Type	Load Combination	Dirn	LOCAL Force	Deform	Dirn	GLOBAL Force	Deform
1 1 Stiff	Y - Stop :RIGID	GR+T1	down right	3379	0.000 0.020	X Y Z	-0.020 -0.000 -0.005	
		RESPONSE	down left	714 284	0.000 0.000	X Y Z	284 714 0.011	0.000
		TOTAL	down left	4093 284	0.000 0.020	X Y Z	284 4093 0.016	0.020
		GR	down	3248	0.000	X Y Z	-0.001 0.000 -0.001	
		T1	up	2031	0.000	X Y Z	0.005 0.000 -0.018	
		GR+T1	down	1217	0.000	X Y Z	0.005 0.000 -0.019	
		RESPONSE	down	1161	0.000	X Y Z	0.001 0.000 0.012	
		TOTAL	down	2378	0.000	X Y Z	0.005 0.000 0.031	

RESTRAINT REACTIONS

Point name	Load combination	FORCES (lb)			Result	MOMENTS (ft-lb)			Result
		X	Y	Z		X	Y	Z	
A00	Anchor								
	GR	-33	-67	-1	75	2	2	6	6
	T1	-158	-262	-74	315	-99	24	37	108
	GR+T1	-190	-330	-75	388	-97	26	43	109
	RESPONSE	133	221	477	542	147	0	45	154
A02	TOTAL	323	551	552	844	244	26	88	261
	Guide								
	GR	0	-216	0	216	0	0	0	0
	T1	0	216	0	216	0	0	0	0
	GR+T1	0	0	0	0	0	0	0	0
A09	RESPONSE	1388	1160	0	1809	0	0	0	0
	TOTAL	1388	1160	0	1809	0	0	0	0
	Guide								
	GR	0	-361	0	361	0	0	0	0
	T1	0	-461	0	461	0	0	0	0
B01	GR+T1	0	-822	0	822	0	0	0	0
	RESPONSE	347	633	0	722	0	0	0	0
	TOTAL	347	1455	0	1496	0	0	0	0
	Guide								
	GR	48	-670	0	672	0	0	0	0
B12	T1	-48	-2709	0	2710	0	0	0	0
	GR+T1	0	-3379	0	3379	0	0	0	0
	RESPONSE	284	714	0	768	0	0	0	0
	TOTAL	284	4093	0	4102	0	0	0	0
	Anchor								
1	GR	-23	-243	13	245	-103	14	40	112
	T1	147	1108	144	1127	553	-78	-427	703
	GR+T1	125	865	157	888	449	-63	-387	596
	RESPONSE	102	86	125	183	94	53	68	128
	TOTAL	227	950	282	1017	543	117	456	719
1	Y - Stop								
	GR	0	-3248	0	3248	0	0	0	0
	T1	0	2031	0	2031	0	0	0	0
	GR+T1	0	-1217	0	1217	0	0	0	0
	RESPONSE	0	1161	0	1161	0	0	0	0
1	TOTAL	0	2378	0	2378	0	0	0	0

RESTRAINT REACTIONS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
8	Anchor								
	GR	8	-10	-12	18	6	-4	7	10
	T1	58	78	-70	120	-32	-46	-45	72
	GR+T1	65	68	-82	125	-27	-49	-38	68
	RESPONSE	580	52	533	789	23	23	32	46
	TOTAL	645	121	615	899	50	73	70	113

LOCAL FORCES & MOMENTS

point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
*** Segment A begin ***									
A00	GR	67	1	33	75	-2	-6	-2	6
	T1	262	74	158	315	-24	-37	99	108
	GR+T1	330	75	190	388	-26	-43	97	109
	RESPONSE	221	477	133	542	0	45	147	154
	TOTAL	551	552	323	844	26	88	244	261
A01A	GR	-81	1	33	87	-2	2	-2	4
	T1	262	74	158	315	-24	2	80	84
	GR+T1	182	75	190	273	-26	5	78	83
	RESPONSE	217	473	123	535	0	12	28	31
	TOTAL	399	549	313	747	26	17	106	111
A01B	GR	-81	1	33	87	-2	4	-2	5
	T1	262	74	158	315	-24	8	77	81
	GR+T1	182	75	190	273	-26	12	75	81
	RESPONSE	218	471	120	533	0	8	9	12
	TOTAL	399	547	310	745	26	20	85	91
A01 N	GR	-81	-1	-33	87	-2	-4	2	5
	T1	262	-74	-158	315	-24	-9	-77	81
	GR+T1	181	-75	-190	273	-26	-13	-75	80
	RESPONSE	218	471	120	533	0	7	6	9
	TOTAL	399	547	310	745	26	20	81	88
A01 M	GR	-61	59	-33	91	-7	-9	-6	13
	T1	133	-238	-158	315	-39	-27	-34	58
	GR+T1	72	-178	-190	270	-47	-36	-40	71
	RESPONSE	486	181	120	533	7	24	84	87
	TOTAL	558	360	310	733	54	59	123	147
A01 F	GR	-1	-90	33	96	-15	9	27	32
	T1	-74	262	158	315	-62	28	-35	77
	GR+T1	-75	172	190	267	-77	37	-9	86
	RESPONSE	471	218	120	533	33	40	79	95
	TOTAL	546	390	310	740	110	77	88	161
A02	GR	-1	-98	33	103	-15	24	71	77
	T1	-74	262	158	315	-62	103	-161	201
	GR+T1	-75	164	190	262	-77	128	-89	174
	RESPONSE	471	218	120	533	33	97	33	108
	TOTAL	546	382	310	735	110	225	122	279

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A02 +	GR	8	89	4	90	-18	22	72	77
	T1	-86	23	194	213	17	88	-117	148
	GR+T1	-78	112	198	241	-1	110	-45	119
	RESPONSE	46	18	42	88	14	95	24	99
	TOTAL	125	130	270	325	14	205	69	216
A03 N	GR	8	4	-87	87	-18	59	-22	65
	T1	-86	194	-23	213	17	-121	-117	169
	GR+T1	-78	198	-109	240	-1	-62	-140	153
	RESPONSE	46	72	17	87	14	22	85	89
	TOTAL	124	270	126	323	14	84	225	240
A03 M	GR	9	-2	-80	80	17	25	-23	38
	T1	76	198	-23	213	-77	-105	-198	237
	GR+T1	85	196	-103	237	-60	-81	-221	243
	RESPONSE	34	78	15	86	23	8	57	62
	TOTAL	119	273	118	321	83	88	279	304
A03 F	GR	4	73	-8	74	18	21	-21	35
	T1	194	23	86	213	-132	257	-28	290
	GR+T1	198	96	78	234	-114	278	-50	304
	RESPONSE	70	13	45	84	19	34	14	42
	TOTAL	269	108	123	315	133	312	64	345
A03A	GR	4	51	-8	52	18	11	-100	102
	T1	194	23	86	213	-132	365	-57	393
	GR+T1	198	74	78	220	-110	376	-137	423
	RESPONSE	67	2	33	75	19	24	25	40
	TOTAL	266	77	112	298	133	401	182	460
A03B	GR	4	-46	-8	47	18	6	-101	103
	T1	194	23	86	213	-132	427	-74	453
	GR+T1	198	-23	78	214	-114	433	-175	481
	RESPONSE	66	11	20	70	19	47	25	57
	TOTAL	265	34	98	284	133	480	200	537
A04 -	GR	4	-58	-8	59	18	0	-65	68
	T1	194	23	86	213	-132	486	-90	512
	GR+T1	198	-35	78	216	-114	487	-155	523
	RESPONSE	66	11	20	70	19	60	20	66
	TOTAL	265	46	98	286	133	547	175	589

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A04 +	GR	4	-93	-8	93	18	0	-65	68
	T1	194	23	86	213	-132	486	-90	512
	GR+T1	198	-70	78	224	-114	487	-155	523
	RESPONSE	67	19	8	70	19	60	20	66
	TOTAL	265	89	86	293	133	547	175	589
A05 -	GR	4	-95	-8	95	18	0	-57	60
	T1	194	23	86	213	-132	494	-92	520
	GR+T1	198	-72	78	225	-114	494	-149	528
	RESPONSE	67	19	8	70	19	61	18	66
	TOTAL	265	91	86	293	133	554	167	594
A05 +	GR	4	-107	-8	107	18	0	-57	60
	T1	194	23	86	213	-132	494	-92	520
	GR+T1	198	-84	78	229	-114	494	-149	528
	RESPONSE	67	22	6	71	19	61	18	66
	TOTAL	266	106	84	298	133	554	167	594
A06 -	GR	4	-108	-8	108	18	-1	-47	51
	T1	194	23	86	213	-132	502	-94	527
	GR+T1	198	-85	78	230	-114	501	-141	533
	RESPONSE	67	22	6	71	19	61	17	66
	TOTAL	266	107	84	299	133	562	158	599
A06 +	GR	4	-143	-8	143	18	-1	-47	51
	T1	194	23	86	213	-132	502	-94	527
	GR+T1	198	-120	78	245	-114	501	-141	533
	RESPONSE	69	29	13	76	19	61	17	66
	TOTAL	267	149	91	320	133	562	158	599
A07 N	GR	4	-8	143	143	18	-47	1	50
	T1	194	85	-23	213	-132	-93	-502	528
	GR+T1	198	78	120	245	-114	-141	-501	533
	RESPONSE	69	16	30	77	19	17	61	66
	TOTAL	268	92	150	320	134	158	562	599
A07 M	GR	-2	-9	150	150	1	6	4	7
	T1	198	-76	-23	213	-163	19	-504	530
	GR+T1	196	-85	127	248	-162	24	-500	526
	RESPONSE	44	57	31	78	11	20	49	54
	TOTAL	239	141	158	320	174	44	549	577

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
A07 F	GR	-8	-157	-4	157	27	-7	58	64
	T1	86	23	-194	213	-105	448	121	476
	GR+T1	78	-134	-198	252	-78	441	178	482
	RESPONSE	18	32	70	79	15	36	20	44
	TOTAL	96	166	268	330	93	477	198	525
A08	GR	-8	-158	-4	159	27	-8	73	78
	T1	86	23	-194	213	-105	429	118	457
	GR+T1	78	-135	-198	253	-78	421	192	469
	RESPONSE	19	33	70	80	15	35	22	44
	TOTAL	97	168	269	332	93	457	213	513
A09 -	GR	-8	-163	-4	163	27	-9	126	130
	T1	86	23	-194	213	-105	365	111	396
	GR+T1	78	-140	-198	255	-78	356	237	435
	RESPONSE	19	33	70	80	15	43	29	54
	TOTAL	97	173	269	334	93	399	266	488
A09 +	GR	-8	198	-4	198	27	-9	126	130
	T1	86	484	-194	529	-105	365	111	396
	GR+T1	78	682	-198	714	-78	356	237	435
	RESPONSE	21	636	277	694	15	43	29	54
	TOTAL	99	1318	476	1404	93	399	266	488
A10	GR	-8	190	-4	191	27	-12	4	30
	T1	86	484	-194	529	-105	243	-194	328
	GR+T1	78	675	-198	708	-78	231	-190	309
	RESPONSE	34	635	274	692	15	155	386	416
	TOTAL	112	1309	473	1396	93	386	576	700
2	GR	-8	129	-4	129	27	-14	-69	76
	T1	86	484	-194	529	-105	153	-417	457
	GR+T1	78	613	-198	649	-78	140	-486	512
	RESPONSE	34	635	274	692	15	280	678	733
	TOTAL	112	1248	473	1339	93	419	1164	1241
*** Segment A end ***									
*** Segment B begin ***									
3	GR	13	-391	-25	392	2	-21	-241	242
	T1	144	-1601	-100	1611	102	186	-611	647
	GR+T1	157	-1992	-125	2002	104	166	-852	874
	RESPONSE	32	709	269	759	38	263	724	771
	TOTAL	190	2701	393	2736	142	429	1576	1640

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
B00	GR	13	-452	-25	453	2	-32	-47	57
	T1	144	-1601	-100	1611	102	141	125	214
	GR+T1	157	-2053	-125	2063	104	109	78	170
	RESPONSE	23	710	272	761	38	172	400	437
	TOTAL	180	2763	396	2797	142	281	479	573
B01 -	GR	13	-459	-25	460	2	-48	240	245
	T1	144	-1601	-100	1611	102	78	1134	1141
	GR+T1	157	-2060	-125	2070	104	30	1374	1378
	RESPONSE	23	710	272	761	38	159	85	184
	TOTAL	180	2770	396	2804	142	189	1459	1478
B01 +	GR	13	211	23	212	2	-48	240	245
	T1	144	1108	-147	1127	102	78	1134	1141
	GR+T1	157	1319	-125	1334	104	30	1374	1378
	RESPONSE	22	54	26	64	38	159	85	184
	TOTAL	179	1373	150	1393	142	189	1459	1478
B02	GR	13	206	23	208	2	-40	171	176
	T1	144	1108	-147	1127	102	29	768	776
	GR+T1	157	1314	-125	1329	104	-11	940	946
	RESPONSE	20	53	24	62	38	157	78	179
	TOTAL	177	1367	148	1386	142	168	1017	1041
B03 N	GR	14	193	23	194	2	-23	18	29
	T1	146	1108	-147	1127	102	-85	-85	157
	GR+T1	160	1300	-125	1316	104	-107	-67	164
	RESPONSE	18	52	22	59	38	154	75	175
	TOTAL	178	1352	147	1372	142	261	142	329
B03 M	GR	141	122	23	188	-11	-9	-47	49
	T1	887	690	-147	1127	-9	-184	-455	491
	GR+T1	1028	802	-125	1309	-21	-193	-502	538
	RESPONSE	43	33	21	58	133	86	80	177
	TOTAL	1070	835	145	1365	153	279	581	663
B03 F	GR	179	13	-23	181	-11	-9	69	71
	T1	1108	144	147	1127	-158	176	566	613
	GR+T1	1287	157	125	1303	-169	166	635	677
	RESPONSE	20	17	20	57	154	36	79	177
	TOTAL	1338	175	145	1357	323	203	714	809

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
B04	GR	179	13	-23	181	-11	-9	69	71
	T1	1108	144	147	1127	-158	176	565	613
	GR+T1	1287	157	125	1303	-169	167	634	677
	RESPONSE	50	17	19	56	154	36	79	177
	TOTAL	1337	174	144	1356	323	203	714	809
B05	GR	166	13	-23	168	-11	-26	59	66
	T1	1108	144	147	1127	-158	287	457	562
	GR+T1	1274	157	125	1290	-169	260	516	602
	RESPONSE	50	17	19	56	154	38	71	174
	TOTAL	1324	174	144	1343	323	299	588	734
B05 +	GR	139	13	-23	142	-11	-26	59	66
	T1	1108	144	147	1127	-158	287	457	562
	GR+T1	1247	157	125	1263	-169	260	516	602
	RESPONSE	43	21	12	50	154	38	71	174
	TOTAL	1290	179	136	1310	323	299	588	734
B06	GR	103	13	-23	106	-11	-75	30	81
	T1	1108	144	147	1127	-158	599	153	638
	GR+T1	1211	157	125	1227	-169	524	183	581
	RESPONSE	40	22	10	47	154	45	27	162
	TOTAL	1251	179	135	1271	323	569	210	687
B07	GR	85	13	-23	89	-11	-97	17	99
	T1	1108	144	147	1127	-158	746	9	763
	GR+T1	1193	157	125	1210	-169	649	26	671
	RESPONSE	40	22	10	47	154	48	8	161
	TOTAL	1234	179	135	1254	323	697	34	769
B07 +	GR	50	13	-23	57	-11	-97	17	99
	T1	1108	144	147	1127	-158	746	9	763
	GR+T1	1158	157	125	1176	-169	649	26	671
	RESPONSE	37	22	13	45	154	48	8	161
	TOTAL	1195	179	138	1216	323	697	34	769
B08	GR	44	13	-23	52	-11	-105	12	107
	T1	1108	144	147	1127	-158	798	-41	814
	GR+T1	1152	157	125	1170	-169	693	-29	713
	RESPONSE	37	22	13	45	154	48	7	161
	TOTAL	1189	179	138	1210	323	740	35	808

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
B08 +	GR	-48	13	-23	55	-11	-39	12	43
	T1	1108	144	147	1127	-158	798	-41	814
	GR+T1	1059	157	125	1078	-169	758	-29	778
	RESPONSE	31	95	50	112	85	35	53	107
	TOTAL	1091	253	175	1133	254	794	82	838
B09 N	GR	-55	-23	-13	61	-11	8	48	50
	T1	1108	147	-144	1127	-158	-93	-851	870
	GR+T1	1053	125	-157	1072	-169	-85	-803	825
	RESPONSE	32	51	97	114	85	23	23	91
	TOTAL	1085	176	254	1128	254	109	827	872
B09 M	GR	-60	27	-13	67	-5	9	47	48
	T1	888	-679	-144	1127	-198	-5	-741	767
	GR+T1	828	-652	-157	1066	-203	4	-694	723
	RESPONSE	39	48	99	116	64	39	19	77
	TOTAL	867	700	256	1143	267	43	713	762
B09 F	GR	-23	-68	13	73	1	-5	-27	28
	T1	147	-1108	144	1127	-165	-86	371	415
	GR+T1	125	1040	157	1059	-164	-91	343	391
	RESPONSE	53	33	100	117	36	36	20	35
	TOTAL	177	1073	257	1117	200	127	364	434
B10 N	GR	-23	72	-13	77	1	2	11	11
	T1	147	-1108	-144	1127	-165	52	-108	204
	GR+T1	125	-1036	-157	1055	-164	53	-98	198
	RESPONSE	53	34	100	118	36	13	22	44
	TOTAL	178	1069	257	1114	200	66	119	242
B10 M	GR	38	70	-13	81	0	-3	-9	9
	T1	-679	-888	-144	1127	-94	119	167	226
	GR+T1	-641	-817	-157	1051	-94	117	158	218
	RESPONSE	50	39	100	119	26	15	21	37
	TOTAL	691	857	257	1130	120	131	179	252
B10 F	GR	81	13	23	85	-3	22	-5	23
	T1	-1108	144	-147	1127	4	-310	117	331
	GR+T1	-1027	157	-125	1046	1	-288	112	309
	RESPONSE	34	100	54	119	21	16	16	31
	TOTAL	1061	258	179	1106	22	304	128	330

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
B10A	GR	226	13	23	228	-3	24	-6	25
	T1	-1108	144	-147	1127	4	-320	107	338
	GR+T1	-882	157	-125	904	1	-296	101	313
	RESPONSE	56	108	75	143	21	14	18	31
	TOTAL	937	266	200	994	22	311	119	334
B10B	GR	226	13	23	228	-3	24	-7	26
	T1	-1108	144	-147	1127	4	-326	102	341
	GR+T1	-882	157	-125	904	1	-301	95	316
	RESPONSE	83	123	100	179	21	14	20	32
	TOTAL	964	280	224	1029	22	315	115	336
B11 N	GR	230	13	23	231	-3	29	-9	30
	T1	-1108	146	-147	1127	3	-354	74	362
	GR+T1	-878	159	-125	901	0	-325	65	331
	RESPONSE	84	124	101	180	21	22	37	47
	TOTAL	962	283	225	1027	21	347	102	362
B11 M	GR	176	-158	23	238	22	30	20	43
	T1	-680	887	-147	1127	-269	-305	-139	430
	GR+T1	-504	728	-125	894	-248	-274	-119	388
	RESPONSE	118	94	102	182	29	52	76	96
	TOTAL	621	823	226	1055	277	326	194	470
B11 F	GR	13	-243	23	245	40	14	103	111
	T1	144	1108	-147	1127	-427	-78	-550	701
	GR+T1	157	865	-125	888	-387	-63	-447	595
	RESPONSE	125	86	102	183	68	53	94	128
	TOTAL	282	950	227	1017	456	116	542	717
B12	GR	13	-243	23	245	40	14	103	112
	T1	144	1108	-147	1127	-427	-78	-553	703
	GR+T1	157	865	-125	888	-387	-63	-449	596
	RESPONSE	125	86	102	183	68	53	94	128
	TOTAL	282	950	227	1017	456	117	543	719

*** Segment B end ***

*** Segment C begin ***

B08	GR	0	93	0	93	0	0	66	66
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	93	0	93	0	0	66	66
	RESPONSE	43	45	96	114	51	69	44	97
	TOTAL	43	138	96	173	51	69	110	140

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)				MOMENTS (ft-lb)			
		X	Y	Z	Result	X	Y	Z	Result
C01 N	GR	0	91	0	91	0	0	39	39
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	91	0	91	0	0	39	39
	RESPONSE	43	45	95	114	51	41	34	74
	TOTAL	43	136	95	172	51	41	72	98
C01 M	GR	64	64	0	91	0	0	28	28
	T1	0	0	0	0	0	0	0	0
	GR+T1	64	64	0	91	0	0	28	28
	RESPONSE	38	49	95	113	12	54	28	62
	TOTAL	102	113	95	179	12	54	56	79
C01 F	GR	90	0	0	90	0	-24	0	24
	T1	0	0	0	0	0	0	0	0
	GR+T1	90	0	0	90	0	-24	0	24
	RESPONSE	45	95	42	113	25	22	35	49
	TOTAL	134	95	42	170	25	46	35	63
C02 N	GR	89	0	0	89	0	0	-24	24
	T1	0	0	0	0	0	0	0	0
	GR+T1	89	0	0	89	0	0	-24	24
	RESPONSE	44	42	95	113	25	16	15	34
	TOTAL	133	42	95	169	25	16	39	49
C02 M	GR	62	-62	0	88	0	0	-19	19
	T1	0	0	0	0	0	0	0	0
	GR+T1	62	-62	0	88	0	0	-19	19
	RESPONSE	37	48	94	112	11	18	11	24
	TOTAL	100	111	94	176	11	18	30	37
C02 F	GR	0	87	0	87	0	0	9	9
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	87	0	87	0	0	9	9
	RESPONSE	42	44	94	112	0	10	5	11
	TOTAL	42	132	94	167	0	10	14	17
C03	GR	0	0	0	0	0	0	2	2
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	0	0	0	0	0	2	2
	RESPONSE	21	23	48	57	0	2	1	2
	TOTAL	21	23	48	57	0	2	3	3

LOCAL FORCES & MOMENTS

Point name	Load combination	FORCES (lb)			Result	MOMENTS (ft-lb)			Result
		X	Y	Z		X	Y	Z	
C04	GR	0	0	0	0	0	0	0	0
	T1	0	0	0	0	0	0	0	0
	GR+T1	0	0	0	0	0	0	0	0
	RESPONSE	21	23	48	57	0	0	0	0
	TOTAL	21	23	48	57	0	0	0	0

*** Segment C end ***

BEAM FORCES & MOMENTS

Beam ID	Load combination	Point name	FORCES (lb)			MOMENTS (ft-lb)		
			Axial	Y-Shear	Z-Shear	Torsion	Y-Y Mom.	Z-Z Mom.
M1	GR	2	3234	0	0	0	0	0
		1	-3248	0	0	0	0	0
	T1	2	-2031	0	0	0	0	0
		1	2031	0	0	0	0	0
	GR+T1	2	1203	0	0	0	0	0
		1	-1217	0	0	0	0	0
	RESPONSE	2	1160	1	3	0	1	0
		1	1160	1	3	0	0	0
	TOTAL	2	2363	1	3	0	1	0
		1	2377	1	3	0	0	0
M2	GR	2	3363	-4	-8	-14	-69	27
		3	-3346	4	8	14	72	-28
	T1	2	-1546	-194	86	153	-417	-105
		3	1546	194	-86	-153	390	45
	GR+T1	2	1817	-198	78	140	-486	-78
		3	-1800	198	-78	-140	462	17
	RESPONSE	2	1582	270	53	280	677	15
		3	1582	270	53	280	662	96
	TOTAL	2	3399	468	131	419	1163	93
		3	3382	468	131	419	1124	113
M3	GR	3	3737	20	-21	7	169	26
		4	-3710	-20	21	-7	-159	-16
	T1	3	55	-94	-58	-33	221	-147
		4	-55	94	58	33	-192	100
	GR+T1	3	3792	-74	-79	-26	390	-121
		4	-3764	74	79	26	-350	84
	RESPONSE	3	1170	509	101	20	1337	365
		4	1170	509	101	20	1337	365
	TOTAL	3	4962	583	180	47	1774	243
		4	4934	583	180	47	1688	449
M4	GR	4	2710	20	-21	7	159	16
		5	-2566	-20	21	-7	-112	29
	T1	4	55	-94	-58	-33	192	-100
		5	-55	94	58	33	-65	-107
	GR+T1	4	2764	-74	-79	-26	350	-84
		5	-2621	74	79	26	-177	-78
	RESPONSE	4	1045	479	467	20	1337	365
		5	1045	479	467	20	545	1390
	TOTAL	4	3810	553	546	47	1688	449
		5	3666	553	546	47	722	1468

BEAM FORCES & MOMENTS

Beam ID	Load combination	Point name	FORCES (lb)			MOMENTS (ft-lb)		
			Axial	Y-Shear	Z-Shear	Torsion	Y-Y Mom.	Z-Z Mom.
M5	GR	5	2574	-8	-12	5	115	-17
		6	-2452	8	12	-5	-93	2
	T1	5	78	-58	-70	-14	40	-15
		6	-78	58	70	14	90	-93
	GR+T1	5	2652	-65	-82	-8	155	-32
		6	-2530	65	82	8	-90	32
	RESPONSE	5	505	729	269	24	552	1386
		6	505	729	269	24	109	87
	TOTAL	5	3157	795	350	32	707	1417
		6	3035	795	350	32	112	177
M6	GR	6	203	0	0	0	0	0
		7	0	0	0	0	0	0
	T1	6	0	0	0	0	0	0
		7	0	0	0	0	0	0
	GR+T1	6	203	0	0	0	0	0
		7	0	0	0	0	0	0
	RESPONSE	6	20	33	35	0	107	103
		7	20	33	35	0	0	0
	TOTAL	6	223	33	35	0	107	103
		7	20	33	35	0	0	0
M7	GR	5	28	11	-1	0	2	13
		A02	-41	5	1	0	3	2
	T1	5	-17	-42	1	-3	-26	-123
		A02	17	42	-1	3	21	-89
	GR+T1	5	12	-30	0	-2	-24	-111
		A02	-24	47	0	2	24	-87
	RESPONSE	5	1597	8	2	1	19	4
		A02	1597	8	2	1	4	22
	TOTAL	5	1609	38	2	3	30	129
		A02	1621	55	2	3	28	109
M8	GR	6	14	-1	-4	0	5	-4
		8	-14	10	4	0	4	-9
	T1	6	90	78	-14	6	-14	129
		8	-90	-78	14	-6	14	55
	GR+T1	6	103	78	-18	5	-8	125
		8	-103	-78	18	-5	49	46
	RESPONSE	6	787	52	20	4	24	83
		8	787	52	20	4	23	40
	TOTAL	6	890	130	38	9	32	209
		8	890	121	38	9	73	86

ASME B31.3c (1992) CODE COMPLIANCE

Point name	Load combination	(Moments in ft-lb)			S.I.F		(Stress in psi)		Code Stress	Code Allow.
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	In	Out	Eq. Load no.	Load type		
*** Segment A begin ***										
A00	Max P						(3a)	HOOP	4844	13360
	GR + Max P	2	6		1.00	1.00	(18)	SUST	2094	16700
	Cold to T1	99	37	24	1.00	1.00	(17)	DISP	404	25050
	Sus. + R1	56	27		1.00	1.00	(18)	OCC	2372	22211
	Sus. + R2	4	6		1.00	1.00	(18)	OCC	2104	22211
	Sus. + R3	139	45		1.00	1.00	(18)	OCC	2779	22211
A01A	Max P						(3a)	HOOP	4844	13360
	GR + Max P	2	2		1.00	1.00	(18)	SUST	2081	16700
	Cold to T1	80	2	24	1.00	1.00	(17)	DISP	312	25050
	Sus. + R1	12	7		1.00	1.00	(18)	OCC	2136	22211
	Sus. + R2	2	3		1.00	1.00	(18)	OCC	2085	22211
	Sus. + R3	28	14		1.00	1.00	(18)	OCC	2218	22211
A01B	Max P						(3a)	HOOP	4844	13360
	GR + Max P	2	4		1.00	1.00	(18)	SUST	2086	16700
	Cold to T1	77	8	24	1.00	1.00	(17)	DISP	303	25050
	Sus. + R1	6	7		1.00	1.00	(18)	OCC	2108	22211
	Sus. + R2	2	5		1.00	1.00	(18)	OCC	2091	22211
	Sus. + R3	10	11		1.00	1.00	(18)	OCC	2139	22211
A01 N-	Max P						(3a)	HOOP	4844	13360
	GR + Max P	2	4		1.00	1.00	(18)	SUST	2087	16700
	Cold to T1	77	9	24	1.00	1.00	(17)	DISP	302	25050
	Sus. + R1	4	7		1.00	1.00	(18)	OCC	2104	22211
	Sus. + R2	2	5		1.00	1.00	(18)	OCC	2092	22211
	Sus. + R3	8	10		1.00	1.00	(18)	OCC	2128	22211
A01 N+	Max P						(3a)	HOOP	4844	13360
	GR + Max P	2	4		2.56	2.13	(18)	SUST	2113	16700
	Cold to T1	77	9	24	2.56	2.13	(17)	DISP	741	25050
	Sus. + R1	4	7		2.56	2.13	(18)	OCC	2153	22211
	Sus. + R2	2	5		2.56	2.13	(18)	OCC	2123	22211
	Sus. + R3	8	10		2.56	2.13	(18)	OCC	2208	22211
A01 M	Max P						(3a)	HOOP	4844	13360
	GR + Max P	6	9		2.56	2.13	(18)	SUST	2184	16700
	Cold to T1	34	27	39	2.56	2.13	(17)	DISP	412	25050
	Sus. + R1	37	18		2.56	2.13	(18)	OCC	2581	22211
	Sus. + R2	7	10		2.56	2.13	(18)	OCC	2203	22211
	Sus. + R3	84	31		2.56	2.13	(18)	OCC	3164	22211

AY02E-R2 PROJECT W-320, 241-AV-02E SULICE PIT
FLUOR DANIEL NORTHWEST, INC.
03/04/97 JUMPER ASSEMBLY STRESS ANALYSIS
AUTOPLOT#4.60 RESULT PAGE 55

Point	Load	name	combination	In-Pl. Moment	Out-Pl. Moment	S.I.F. Torsion	Eq. Load	Stress	Code
				(Moments in ft-lb)	(Moments in ft-lb)			(stress in psi)	
A01 F- Max P	GR + Max P	(3A) HOOP		27	9	2.56	2.13	13560	
	GR + Max P	(3A) HOOP		27	9	2.56	2.13	13560	
	Cold to T1	(17) D1SP		35	28	2.56	2.13	13560	
	Sus. + R1	(18) OCC		59	24	2.56	2.13	13560	
	Sus. + R2	(18) OCC		31	10	2.56	2.13	13560	
	Sus. + R3	(18) OCC		99	46	2.56	2.13	13560	
A01 F+ Max P	GR + Max P	(3A) HOOP		27	9	2.56	2.13	13560	
	GR + Max P	(3A) HOOP		27	9	2.56	2.13	13560	
	Cold to T1	(17) D1SP		35	28	2.56	2.13	13560	
	Sus. + R1	(18) OCC		59	24	2.56	2.13	13560	
	Sus. + R2	(18) OCC		31	10	2.56	2.13	13560	
	Sus. + R3	(18) OCC		99	46	2.56	2.13	13560	
A02 Max P	GR + Max P	(3A) HOOP		72	22	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		72	22	1.00	1.00	13560	
	Cold to T1	(17) D1SP		117	88	1.00	1.00	13560	
	Sus. + R1	(18) OCC		82	57	1.00	1.00	13560	
	Sus. + R2	(18) OCC		88	24	1.00	1.00	13560	
	Sus. + R3	(18) OCC		88	109	1.00	1.00	13560	
A02 N- Max P	GR + Max P	(3A) HOOP		59	22	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		59	22	1.00	1.00	13560	
	Cold to T1	(17) D1SP		121	117	1.00	1.00	13560	
	Sus. + R1	(18) OCC		69	56	1.00	1.00	13560	
	Sus. + R2	(18) OCC		71	24	1.00	1.00	13560	
	Sus. + R3	(18) OCC		75	101	1.00	1.00	13560	
A03 N+ Max P	GR + Max P	(3A) HOOP		22	59	1.95	1.63	13560	
	GR + Max P	(3A) HOOP		22	59	1.95	1.63	13560	
	Cold to T1	(17) D1SP		117	121	1.95	1.63	13560	
	Sus. + R1	(18) OCC		56	69	1.95	1.63	13560	
	Sus. + R2	(18) OCC		24	71	1.95	1.63	13560	
	Sus. + R3	(18) OCC		101	75	1.95	1.63	13560	
A03 M Max P	GR + Max P	(3A) HOOP		23	25	1.95	1.63	13560	
	GR + Max P	(3A) HOOP		23	25	1.95	1.63	13560	
	Cold to T1	(17) D1SP		198	105	1.95	1.63	13560	
	Sus. + R1	(18) OCC		51	105	1.95	1.63	13560	
	Sus. + R2	(18) OCC		73	28	1.95	1.63	13560	
	Sus. + R3	(18) OCC		25	73	1.95	1.63	13560	
A03 F- Max P	GR + Max P	(3A) HOOP		21	21	1.95	1.63	13560	
	GR + Max P	(3A) HOOP		21	21	1.95	1.63	13560	
	Cold to T1	(17) D1SP		257	28	1.95	1.63	13560	
	Sus. + R1	(18) OCC		41	28	1.95	1.63	13560	
	Sus. + R2	(18) OCC		22	26	1.95	1.63	13560	
	Sus. + R3	(18) OCC		48	34	1.95	1.63	13560	

AY02E-R2.OUT 3-4-97 10:30a

AY02E-R2 PROJECT W-320, 241-AV-02E SULICE PIT
FLUOR DANIEL NORTHWEST, INC.
03/04/97 JUMPER ASSEMBLY STRESS ANALYSIS
AUTOPLOT#4.60 RESULT PAGE 56

Point	Load	name	combination	In-Pl. Moment	Out-Pl. Moment	S.I.F. Torsion	Eq. Load	Stress	Code
				(Moments in ft-lb)	(Moments in ft-lb)			(stress in psi)	
A03 F+ Max P	GR + Max P	(3A) HOOP		21	28	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		21	28	1.00	1.00	13560	
	Cold to T1	(17) D1SP		257	21	1.00	1.00	13560	
	Sus. + R1	(18) OCC		26	26	1.00	1.00	13560	
	Sus. + R2	(18) OCC		26	22	1.00	1.00	13560	
	Sus. + R3	(18) OCC		34	48	1.00	1.00	13560	
A03A Max P	GR + Max P	(3A) HOOP		100	11	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		100	11	1.00	1.00	13560	
	Cold to T1	(17) D1SP		166	146	1.00	1.00	13560	
	Sus. + R1	(18) OCC		57	19	1.00	1.00	13560	
	Sus. + R2	(18) OCC		120	34	1.00	1.00	13560	
	Sus. + R3	(18) OCC		113	113	1.00	1.00	13560	
A03B Max P	GR + Max P	(3A) HOOP		101	6	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		101	6	1.00	1.00	13560	
	Cold to T1	(17) D1SP		169	153	1.00	1.00	13560	
	Sus. + R1	(18) OCC		107	25	1.00	1.00	13560	
	Sus. + R2	(18) OCC		122	77	1.00	1.00	13560	
	Sus. + R3	(18) OCC		115	49	1.00	1.00	13560	
A04 Max P	GR + Max P	(3A) HOOP		65	0	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		65	0	1.00	1.00	13560	
	Cold to T1	(17) D1SP		90	486	1.00	1.00	13560	
	Sus. + R1	(18) OCC		72	27	1.00	1.00	13560	
	Sus. + R2	(18) OCC		78	54	1.00	1.00	13560	
	Sus. + R3	(18) OCC		78	54	1.00	1.00	13560	
A05 Max P	GR + Max P	(3A) HOOP		57	0	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		57	0	1.00	1.00	13560	
	Cold to T1	(17) D1SP		92	494	1.00	1.00	13560	
	Sus. + R1	(18) OCC		63	27	1.00	1.00	13560	
	Sus. + R2	(18) OCC		69	55	1.00	1.00	13560	
	Sus. + R3	(18) OCC		70	55	1.00	1.00	13560	
A06 Max P	GR + Max P	(3A) HOOP		47	1	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		47	1	1.00	1.00	13560	
	Cold to T1	(17) D1SP		94	502	1.00	1.00	13560	
	Sus. + R1	(18) OCC		54	28	1.00	1.00	13560	
	Sus. + R2	(18) OCC		57	2	1.00	1.00	13560	
	Sus. + R3	(18) OCC		60	52	1.00	1.00	13560	
A07 N- Max P	GR + Max P	(3A) HOOP		47	1	1.00	1.00	13560	
	GR + Max P	(3A) HOOP		47	1	1.00	1.00	13560	
	Cold to T1	(17) D1SP		94	501	1.00	1.00	13560	
	Sus. + R1	(18) OCC		54	28	1.00	1.00	13560	
	Sus. + R2	(18) OCC		57	2	1.00	1.00	13560	
	Sus. + R3	(18) OCC		60	52	1.00	1.00	13560	

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Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)			(Stress in psi)				
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	S.I.F. Out	Eq. Load no. type	Code Stress	Code Allow.
A07 N+ Max P	GR + Max P	1	47		1.95	1.63	(18) SUST	4844	13360
	Cold to T1	502	93	132	1.95	1.63	(17) DISP	2434	16700
	Sus. + R1	28	54		1.95	1.63	(18) OCC	3736	25050
	Sus. + R2	2	57		1.95	1.63	(18) OCC	2693	22211
	Sus. + R3	55	60		1.95	1.63	(18) OCC	2510	22211
A07 M Max P	GR + Max P	4	6		1.95	1.63	(18) SUST	4844	13360
	Cold to T1	504	19	163	1.95	1.63	(17) DISP	2126	16700
	Sus. + R1	30	12		1.95	1.63	(18) OCC	3725	25050
	Sus. + R2	6	7		1.95	1.63	(18) OCC	2367	22211
	Sus. + R3	47	24		1.95	1.63	(18) OCC	2141	22211
A07 F- Max P	GR + Max P	7	58		1.95	1.63	(18) SUST	4844	13360
	Cold to T1	448	120	106	1.95	1.63	(17) DISP	2521	16700
	Sus. + R1	34	66		1.95	1.63	(18) OCC	3370	25050
	Sus. + R2	9	69		1.95	1.63	(18) OCC	2784	22211
	Sus. + R3	30	72		1.95	1.63	(18) OCC	2613	22211
A07 F+ Max P	GR + Max P	58	7		1.00	1.00	(18) SUST	4844	13360
	Cold to T1	121	448	105	1.00	1.00	(17) DISP	2344	16700
	Sus. + R1	66	34		1.00	1.00	(18) OCC	1777	25050
	Sus. + R2	69	9		1.00	1.00	(18) OCC	2481	22211
	Sus. + R3	72	30		1.00	1.00	(18) OCC	2400	22211
A08 Max P	GR + Max P	73	8		1.00	1.00	(18) SUST	4844	13360
	Cold to T1	118	429	105	1.00	1.00	(17) DISP	2420	16700
	Sus. + R1	81	37		1.00	1.00	(18) OCC	1706	25050
	Sus. + R2	88	10		1.00	1.00	(18) OCC	2564	22211
	Sus. + R3	87	27		1.00	1.00	(18) OCC	2491	22211
A09 Max P	GR + Max P	126	9		1.00	1.00	(18) SUST	4279	13360
	Cold to T1	111	365	105	1.00	1.00	(17) DISP	2982	16700
	Sus. + R1	133	47		1.00	1.00	(18) OCC	2753	25050
	Sus. + R2	152	12		1.00	1.00	(18) OCC	3334	22211
	Sus. + R3	140	29		1.00	1.00	(18) OCC	3215	22211
A10 - Max P	GR + Max P	4	12		1.00	1.00	(18) SUST	4279	13360
	Cold to T1	194	243	105	1.00	1.00	(17) DISP	1938	16700
	Sus. + R1	255	74		1.00	1.00	(18) OCC	2284	25050
	Sus. + R2	17	15		1.00	1.00	(18) OCC	4305	22211
	Sus. + R3	297	154		1.00	1.00	(18) OCC	2060	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)			(Stress in psi)				
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	S.I.F. Out	Eq. Load no. type	Code Stress	Code Allow.
A10 + Max P	GR + Max P	4	12		1.00	1.00	(18) SUST	2013	16000
	Cold to T1	194	243	105	1.00	1.00	(17) DISP	931	20000
	Sus. + R1	255	74		1.00	1.00	(18) OCC	58	30000
	Sus. + R2	17	15		1.00	1.00	(18) OCC	991	26600
	Sus. + R3	297	154		1.00	1.00	(18) OCC	934	26600
2 Max P	GR + Max P	69	14		1.00	1.00	(18) SUST	2013	16000
	Cold to T1	417	153	105	1.00	1.00	(17) DISP	942	20000
	Sus. + R1	508	138		1.00	1.00	(18) OCC	80	30000
	Sus. + R2	99	20		1.00	1.00	(18) OCC	1026	26600
	Sus. + R3	585	264		1.00	1.00	(18) OCC	948	26600
*** Segment A end ***									
*** Segment B begin ***									
3 Max P	GR + Max P	241	21		1.00	1.00	(18) SUST	2013	16000
	Cold to T1	611	186	102	1.00	1.00	(17) DISP	974	20000
	Sus. + R1	712	137		1.00	1.00	(18) OCC	114	30000
	Sus. + R2	297	26		1.00	1.00	(18) OCC	1063	26600
	Sus. + R3	787	256		1.00	1.00	(18) OCC	984	26600
B00 - Max P	GR + Max P	47	32		1.00	1.00	(18) SUST	2013	16000
	Cold to T1	125	141	102	1.00	1.00	(17) DISP	940	20000
	Sus. + R1	310	90		1.00	1.00	(18) OCC	38	30000
	Sus. + R2	63	40		1.00	1.00	(18) OCC	989	26600
	Sus. + R3	348	194		1.00	1.00	(18) OCC	943	26600
B00 + Max P	GR + Max P	47	32		1.00	1.00	(18) SUST	4279	13360
	Cold to T1	125	141	102	1.00	1.00	(17) DISP	2343	16700
	Sus. + R1	310	90		1.00	1.00	(18) OCC	1491	25050
	Sus. + R2	63	40		1.00	1.00	(18) OCC	4805	22211
	Sus. + R3	348	194		1.00	1.00	(18) OCC	2503	22211
B01 - Max P	GR + Max P	240	48		1.00	1.00	(18) SUST	4279	13360
	Cold to T1	1134	78	102	1.00	1.00	(17) DISP	4062	16700
	Sus. + R1	279	80		1.00	1.00	(18) OCC	7943	25050
	Sus. + R2	290	60		1.00	1.00	(18) OCC	4526	22211
	Sus. + R3	297	203		1.00	1.00	(18) OCC	4532	22211

		ASME B31.3c (1992) CODE COMPLIANCE				(Stress in psi)				
Point name	Load combination	(Moments in ft-lb)		S.I.F.		Eq. Load		(Code Allow.)		
		In-Pl. Moment	Out-Pl. Moment	In	Out	no.	type	Stress	Code Allow.	
B01 +	Max P					(3a)	HOOP	4279	13360	
	GR + Max P	240	48	1.00	1.00	(18)	SUST	4062	16700	
	Cold to T1	1134	78	102	1.00	1.00	(17)	DISP	7943	25050
	Sus. + R1	279	80	1.00	1.00	(18)	OCC	4526	22211	
	Sus. + R2	290	60	1.00	1.00	(18)	OCC	4532	22211	
	Sus. + R3	297	203	1.00	1.00	(18)	OCC	5575	22211	
B02	Max P					(3a)	HOOP	4844	13360	
	GR + Max P	171	40	1.00	1.00	(18)	SUST	2911	16700	
	Cold to T1	768	29	102	1.00	1.00	(17)	DISP	2895	25050
	Sus. + R1	204	65	1.00	1.00	(18)	OCC	3108	22211	
	Sus. + R2	207	52	1.00	1.00	(18)	OCC	3088	22211	
	Sus. + R3	232	195	1.00	1.00	(18)	OCC	3708	22211	
B03 N-	Max P					(3a)	HOOP	4844	13360	
	GR + Max P	18	23	1.00	1.00	(18)	SUST	2205	16700	
	Cold to T1	85	84	102	1.00	1.00	(17)	DISP	587	25050
	Sus. + R1	44	32	1.00	1.00	(18)	OCC	2339	22211	
	Sus. + R2	22	32	1.00	1.00	(18)	OCC	2253	22211	
	Sus. + R3	88	176	1.00	1.00	(18)	OCC	3015	22211	
B03 N+	Max P					(3a)	HOOP	4844	13360	
	GR + Max P	18	23	1.95	1.63	(18)	SUST	2310	16700	
	Cold to T1	85	85	102	1.95	1.63	(17)	DISP	889	25050
	Sus. + R1	44	32	1.95	1.63	(18)	OCC	2569	22211	
	Sus. + R2	22	32	1.95	1.63	(18)	OCC	2392	22211	
	Sus. + R3	88	176	1.95	1.63	(18)	OCC	3677	22211	
B03 M	Max P					(3a)	HOOP	4844	13360	
	GR + Max P	47	9	1.95	1.63	(18)	SUST	2512	16700	
	Cold to T1	455	184	9	1.95	1.63	(17)	DISP	3498	25050
	Sus. + R1	76	18	1.95	1.63	(18)	OCC	2790	22211	
	Sus. + R2	60	15	1.95	1.63	(18)	OCC	2641	22211	
	Sus. + R3	120	94	1.95	1.63	(18)	OCC	3465	22211	
B03 F-	Max P					(3a)	HOOP	4844	13360	
	GR + Max P	69	9	1.95	1.63	(18)	SUST	2716	16700	
	Cold to T1	566	176	158	1.95	1.63	(17)	DISP	4299	25050
	Sus. + R1	100	16	1.95	1.63	(18)	OCC	3008	22211	
	Sus. + R2	86	12	1.95	1.63	(18)	OCC	2881	22211	
	Sus. + R3	140	45	1.95	1.63	(18)	OCC	3438	22211	
B03 F+	Max P					(3a)	HOOP	4844	13360	
	GR + Max P	69	9	1.00	1.00	(18)	SUST	2400	16700	
	Cold to T1	566	176	158	1.00	1.00	(17)	DISP	2288	25050
	Sus. + R1	100	16	1.00	1.00	(18)	OCC	2550	22211	
	Sus. + R2	86	12	1.00	1.00	(18)	OCC	2484	22211	
	Sus. + R3	140	45	1.00	1.00	(18)	OCC	2782	22211	

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE				(Stress in psi)				
		(Moments in ft-lb)		S.I.F		Eq. Load		()		
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	In	Out	no.	Load type	Code Stress	Code Allow.
B04	Max P						(3a)	HOOP	4844	13360
	GR + Max P	69	9		1.00	1.00	(18)	SUST	2400	16700
	Cold to T1	565	176	158	1.00	1.00	(17)	DISP	2287	25050
	Sus. + R1	100	16		1.00	1.00	(18)	OCC	2550	22211
	Sus. + R2	86	12		1.00	1.00	(18)	OCC	2484	22211
	Sus. + R3	140	45		1.00	1.00	(18)	OCC	2782	22211
B05	Max P						(3a)	HOOP	4844	13360
	GR + Max P	59	26		1.00	1.00	(18)	SUST	2376	16700
	Cold to T1	457	287	158	1.00	1.00	(17)	DISP	2100	25050
	Sus. + R1	89	40		1.00	1.00	(18)	OCC	2534	22211
	Sus. + R2	73	32		1.00	1.00	(18)	OCC	2451	22211
	Sus. + R3	122	62		1.00	1.00	(18)	OCC	2722	22211
B06	Max P						(3a)	HOOP	4844	13360
	GR + Max P	30	75		1.00	1.00	(18)	SUST	2452	16700
	Cold to T1	153	599	158	1.00	1.00	(17)	DISP	2381	25050
	Sus. + R1	44	105		1.00	1.00	(18)	OCC	2611	22211
	Sus. + R2	38	93		1.00	1.00	(18)	OCC	2546	22211
	Sus. + R3	53	102		1.00	1.00	(18)	OCC	2623	22211
B07	Max P						(3a)	HOOP	4844	13360
	GR + Max P	17	97		1.00	1.00	(18)	SUST	2540	16700
	Cold to T1	9	746	158	1.00	1.00	(17)	DISP	2848	25050
	Sus. + R1	21	132		1.00	1.00	(18)	OCC	2706	22211
	Sus. + R2	21	122		1.00	1.00	(18)	OCC	2658	22211
	Sus. + R3	22	121		1.00	1.00	(18)	OCC	2654	22211
B08 -	Max P						(3a)	HOOP	4844	13360
	GR + Max P	105	12		1.34	1.45	(18)	SUST	2347	16700
	Cold to T1	798	41	158	1.34	1.45	(17)	DISP	4032	25050
	Sus. + R1	139	14		1.34	1.45	(18)	OCC	2962	22211
	Sus. + R2	132	15		1.34	1.45	(18)	OCC	2917	22211
	Sus. + R3	127	18		1.34	1.45	(18)	OCC	2891	22211
B08 +	Max P						(3a)	HOOP	4844	13360
	GR + Max P	39	12		1.34	1.45	(18)	SUST	2333	16700
	Cold to T1	798	41	158	1.34	1.45	(17)	DISP	4032	25050
	Sus. + R1	61	18		1.34	1.45	(18)	OCC	2476	22211
	Sus. + R2	64	16		1.34	1.45	(18)	OCC	2490	22211
	Sus. + R3	54	65		1.34	1.45	(18)	OCC	2713	22211
B09 N-	Max P						(3a)	HOOP	4844	13360
	GR + Max P	8	48		1.00	1.00	(18)	SUST	2297	16700
	Cold to T1	93	851	158	1.00	1.00	(17)	DISP	3249	25050
	Sus. + R1	14	60		1.00	1.00	(18)	OCC	2365	22211
	Sus. + R2	10	61		1.00	1.00	(18)	OCC	2364	22211
	Sus. + R3	30	62		1.00	1.00	(18)	OCC	2423	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)			(Stress in psi)			(Code Allow.)	
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	S.I.F. Out	Eq. Load no. type	Code Stress	Code Allow.
B09 N+	Max P						(3a) HOOP	4844	13360
	GR + Max P	48	8		1.95	1.63	(18) SUST	2516	16700
	Cold to T1	851	93	158	1.95	1.63	(17) DISP	6255	25050
	Sus. + R1	60	14		1.95	1.63	(18) OCC	2644	22211
	Sus. + R2	61	10		1.95	1.63	(18) OCC	2646	22211
	Sus. + R3	62	30		1.95	1.63	(18) OCC	2733	22211
B09 M	Max P						(3a) HOOP	4844	13360
	GR + Max P	47	9		1.95	1.63	(18) SUST	2511	16700
	Cold to T1	741	5	198	1.95	1.63	(17) DISP	5449	25050
	Sus. + R1	59	13		1.95	1.63	(18) OCC	2632	22211
	Sus. + R2	56	11		1.95	1.63	(18) OCC	2596	22211
	Sus. + R3	58	48		1.95	1.63	(18) OCC	2832	22211
B09 F-	Max P						(3a) HOOP	4844	13360
	GR + Max P	27	5		1.95	1.63	(18) SUST	2324	16700
	Cold to T1	371	86	165	1.95	1.63	(17) DISP	2818	25050
	Sus. + R1	43	7		1.95	1.63	(18) OCC	2475	22211
	Sus. + R2	39	7		1.95	1.63	(18) OCC	2431	22211
	Sus. + R3	33	41		1.95	1.63	(18) OCC	2611	22211
B09 F+	Max P						(3a) HOOP	4844	13360
	GR + Max P	27	5		1.00	1.00	(18) SUST	2199	16700
	Cold to T1	371	86	165	1.00	1.00	(17) DISP	1548	25050
	Sus. + R1	43	7		1.00	1.00	(18) OCC	2276	22211
	Sus. + R2	39	7		1.00	1.00	(18) OCC	2253	22211
	Sus. + R3	33	41		1.00	1.00	(18) OCC	2374	22211
B10 N-	Max P						(3a) HOOP	4844	13360
	GR + Max P	11	2		1.00	1.00	(18) SUST	2117	16700
	Cold to T1	108	52	165	1.00	1.00	(17) DISP	761	25050
	Sus. + R1	28	3		1.00	1.00	(18) OCC	2200	22211
	Sus. + R2	23	2		1.00	1.00	(18) OCC	2176	22211
	Sus. + R3	17	14		1.00	1.00	(18) OCC	2185	22211
B10 N+	Max P						(3a) HOOP	4844	13360
	GR + Max P	11	2		2.56	2.13	(18) SUST	2198	16700
	Cold to T1	108	52	165	2.56	2.13	(17) DISP	1272	25050
	Sus. + R1	28	3		2.56	2.13	(18) OCC	2408	22211
	Sus. + R2	23	2		2.56	2.13	(18) OCC	2347	22211
	Sus. + R3	17	14		2.56	2.13	(18) OCC	2348	22211
B10 M	Max P						(3a) HOOP	4844	13360
	GR + Max P	9	3		2.56	2.13	(18) SUST	2180	16700
	Cold to T1	167	119	94	2.56	2.13	(17) DISP	1891	25050
	Sus. + R1	25	8		2.56	2.13	(18) OCC	2378	22211
	Sus. + R2	20	4		2.56	2.13	(18) OCC	2313	22211
	Sus. + R3	19	16		2.56	2.13	(18) OCC	2364	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft.-lb.)			(Stress in psi)			(Code Allow.)	
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In	S.I.F. Out	Eq. Load no. type	Code Stress	Code Allow.
B10 F-	Max P						(3a) HOOP	4844	13360
	GR + Max P	22	5		2.56	2.13	(18) SUST	2342	16700
	Cold to T1	310	117	4	2.56	2.13	(17) DISP	3105	25050
	Sus. + R1	32	12		2.56	2.13	(18) OCC	2475	22211
	Sus. + R2	27	7		2.56	2.13	(18) OCC	2409	22211
	Sus. + R3	33	20		2.56	2.13	(18) OCC	2545	22211
B10 F+	Max P						(3a) HOOP	4844	13360
	GR + Max P	5	22		1.00	1.00	(18) SUST	2175	16700
	Cold to T1	117	310	4	1.00	1.00	(17) DISP	1237	25050
	Sus. + R1	12	32		1.00	1.00	(18) OCC	2229	22211
	Sus. + R2	7	27		1.00	1.00	(18) OCC	2201	22211
	Sus. + R3	20	33		1.00	1.00	(18) OCC	2263	22211
B10A	Max P						(3a) HOOP	4844	13360
	GR + Max P	6	24		1.00	1.00	(18) SUST	2183	16700
	Cold to T1	107	320	4	1.00	1.00	(17) DISP	1260	25050
	Sus. + R1	12	32		1.00	1.00	(18) OCC	2232	22211
	Sus. + R2	8	28		1.00	1.00	(18) OCC	2207	22211
	Sus. + R3	23	35		1.00	1.00	(18) OCC	2279	22211
B10B	Max P						(3a) HOOP	4844	13360
	GR + Max P	7	24		1.00	1.00	(18) SUST	2188	16700
	Cold to T1	102	326	4	1.00	1.00	(17) DISP	1274	25050
	Sus. + R1	13	31		1.00	1.00	(18) OCC	2233	22211
	Sus. + R2	9	29		1.00	1.00	(18) OCC	2213	22211
	Sus. + R3	25	35		1.00	1.00	(18) OCC	2292	22211
B11 N-	Max P						(3a) HOOP	4844	13360
	GR + Max P	9	29		1.00	1.00	(18) SUST	2211	16700
	Cold to T1	74	354	4	1.00	1.00	(17) DISP	1350	25050
	Sus. + R1	16	44		1.00	1.00	(18) OCC	2291	22211
	Sus. + R2	12	39		1.00	1.00	(18) OCC	2263	22211
	Sus. + R3	45	40		1.00	1.00	(18) OCC	2392	22211
B11 N+	Max P						(3a) HOOP	4844	13360
	GR + Max P	9	29		1.95	1.63	(18) SUST	2307	16700
	Cold to T1	74	354	3	1.95	1.63	(17) DISP	2216	25050
	Sus. + R1	16	44		1.95	1.63	(18) OCC	2442	22211
	Sus. + R2	12	39		1.95	1.63	(18) OCC	2393	22211
	Sus. + R3	45	40		1.95	1.63	(18) OCC	2656	22211
B11 M	Max P						(3a) HOOP	4844	13360
	GR + Max P	20	30		1.95	1.63	(18) SUST	2371	16700
	Cold to T1	139	305	269	1.95	1.63	(17) DISP	2337	25050
	Sus. + R1	29	72		1.95	1.63	(18) OCC	2702	22211
	Sus. + R2	30	52		1.95	1.63	(18) OCC	2564	22211
	Sus. + R3	95	53		1.95	1.63	(18) OCC	3090	22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)		
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no. type	Code Stress Code Allow.
B11 F- Max P	GR + Max P	103	14			(3a) HOOP	4844 13360
	Cold to T1	550	78			(18) SUST	3037 16700
	Sus. + R1	118	59	427	1.95 1.63	(17) DISP	4342 25050
	Sus. + R2	140	35		1.95 1.63	(18) OCC	3410 22211
	Sus. + R3	188	35		1.95 1.63	(18) OCC	3424 22211
B11 F+ Max P	GR + Max P	103	14			(3a) HOOP	4844 13360
	Cold to T1	550	78			(18) SUST	2565 16700
	Sus. + R1	118	59	427	1.00 1.00	(17) DISP	2617 25050
	Sus. + R2	140	35		1.00 1.00	(18) OCC	2789 22211
	Sus. + R3	188	35		1.00 1.00	(18) OCC	2770 22211
B12 Max P	GR + Max P	103	14			(3a) HOOP	4844 13360
	Cold to T1	553	78			(18) SUST	2567 16700
	Sus. + R1	118	59	427	1.00 1.00	(17) DISP	2624 25050
	Sus. + R2	141	35		1.00 1.00	(18) OCC	2792 22211
	Sus. + R3	189	35		1.00 1.00	(18) OCC	2773 22211
*** Segment B end ***							
*** Segment C begin ***							
BOB Max P	GR + Max P	66	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	4110 16700
	Sus. + R1	95	7	0	1.34 1.45	(17) DISP	0 25050
	Sus. + R2	98	5		1.34 1.45	(18) OCC	5064 22211
	Sus. + R3	75	69		1.34 1.45	(18) OCC	5115 22211
C01 N- Max P	GR + Max P	39	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	3313 16700
	Sus. + R1	60	4	0	1.00 1.00	(17) DISP	0 25050
	Sus. + R2	64	3		1.00 1.00	(18) OCC	4030 22211
	Sus. + R3	45	41		1.00 1.00	(18) OCC	4127 22211
C01 N+ Max P	GR + Max P	39	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	4913 16700
	Sus. + R1	60	4	0	2.27 1.89	(17) DISP	0 25050
	Sus. + R2	64	3		2.27 1.89	(18) OCC	6529 22211
	Sus. + R3	45	41		2.27 1.89	(18) OCC	6756 22211

Point name	Load combination	ASME B31.3c (1992) CODE COMPLIANCE (Moments in ft-lb)			(Stress in psi)		
		In-Pl. Moment	Out-Pl. Moment	Torsion Moment	S.I.F. In Out	Eq. Load no. type	Code Stress Code Allow.
C01 M Max P	GR + Max P	28	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	4122 16700
	Sus. + R1	46	6	0	2.27 1.89	(17) DISP	0 25050
	Sus. + R2	49	4		2.27 1.89	(18) OCC	5481 22211
	Sus. + R3	33	54		2.27 1.89	(18) OCC	5687 22211
C01 F- Max P	GR + Max P	24	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	3797 16700
	Sus. + R1	38	4	0	2.27 1.89	(17) DISP	0 25050
	Sus. + R2	40	2		2.27 1.89	(18) OCC	4866 22211
	Sus. + R3	28	35		2.27 1.89	(18) OCC	5023 22211
C01 F+ Max P	GR + Max P	0	24			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	2821 16700
	Sus. + R1	4	38	0	1.00 1.00	(17) DISP	0 25050
	Sus. + R2	2	40		1.00 1.00	(18) OCC	3297 22211
	Sus. + R3	35	28		1.00 1.00	(18) OCC	3363 22211
C02 N- Max P	GR + Max P	0	24			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	2821 16700
	Sus. + R1	2	34	0	1.00 1.00	(17) DISP	0 25050
	Sus. + R2	1	35		1.00 1.00	(18) OCC	3162 22211
	Sus. + R3	16	27		1.00 1.00	(18) OCC	3338 22211
C02 N+ Max P	GR + Max P	24	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	3797 16700
	Sus. + R1	34	2	0	2.27 1.89	(17) DISP	0 25050
	Sus. + R2	35	1		2.27 1.89	(18) OCC	4567 22211
	Sus. + R3	27	16		2.27 1.89	(18) OCC	4603 22211
C02 M Max P	GR + Max P	19	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	3479 16700
	Sus. + R1	27	2	0	2.27 1.89	(17) DISP	0 25050
	Sus. + R2	26	1		2.27 1.89	(18) OCC	4038 22211
	Sus. + R3	22	18		2.27 1.89	(18) OCC	4009 22211
C02 F- Max P	GR + Max P	9	0			(3a) HOOP	5016 13360
	Cold to T1	0	0			(18) SUST	2717 16700
	Sus. + R1	12	1	0	2.27 1.89	(17) DISP	0 25050
	Sus. + R2	12	1		2.27 1.89	(18) OCC	2969 22211
	Sus. + R3	10	10		2.27 1.89	(18) OCC	2943 22211

ASME B31.3c (1992) CODE COMPLIANCE										
			(Moments in ft-lb)			(Stress in psi)				
Point	Load	In-Pl.	Out-Pl.	Torsion	S.L.F.	Eg. Load	Code	Code		
name	combination	Moment	Moment	Moment	In Out	no. type	Stress	Allow.		
C02 F+	Max P					(3a) HOOP	5016	13360		
	GR + Max P	9	0		1.00 1.00	(18) SUST	2345	16700		
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050		
	Sus. + R1	12	1		1.00 1.00	(18) OCC	2458	22211		
	Sus. + R2	12	1		1.00 1.00	(18) OCC	2446	22211		
C03	Sus. + R3	10	10		1.00 1.00	(18) OCC	2661	22211		
	Max P					(3a) HOOP	5016	13360		
	GR + Max P	2	0		1.00 1.00	(18) SUST	2109	16700		
	Cold to T1	0	0	0	1.00 1.00	(17) DISP	0	25050		
	Sus. + R1	2	0		1.00 1.00	(18) OCC	2132	22211		
	Sus. + R2	2	0		1.00 1.00	(18) OCC	2129	22211		
	Sus. + R3	2	2		1.00 1.00	(18) OCC	2171	22211		

*** Segment C end ***

SYSTEM SUMMARY

Maximum displacements (in)

Maximum X :	0.058	Point : B03 F	Load Comb. : TOTAL
Maximum Y :	0.076	Point : C04	Load Comb. : T1
Maximum Z :	0.061	Point : A07 N	Load Comb. : TOTAL
Max. total:	0.093	Point : C04	Load Comb. : TOTAL

Maximum rotations (deg)

Maximum X :	0.112	Point : C02 F	Load Comb. : TOTAL
Maximum Y :	0.150	Point : C04	Load Comb. : TOTAL
Maximum Z :	-0.224	Point : B10 N	Load Comb. : T1
Max. total:	0.246	Point : B10 N	Load Comb. : TOTAL

Maximum restraint forces(lb)

Maximum X :	1388	Point : A02	Load Comb. : RESPONSE
Maximum Y :	4093	Point : B01	Load Comb. : TOTAL
Maximum Z :	615	Point : 8	Load Comb. : TOTAL
Max. total:	4102	Point : B01	Load Comb. : TOTAL

Maximum restraint moments(ft-lb)

Maximum X :	553	Point : B12	Load Comb. : T1
Maximum Y :	117	Point : B12	Load Comb. : TOTAL
Maximum Z :	456	Point : B12	Load Comb. : TOTAL
Max. total:	719	Point : B12	Load Comb. : TOTAL

SYSTEM SUMMARY

Maximum pipe forces (lb)

Maximum X :	1338	Point : B03 F	Load Comb.: TOTAL
Maximum Y :	2770	Point : B01	Load Comb.: TOTAL
Maximum Z :	476	Point : A09	Load Comb.: TOTAL
Max. total:	2804	Point : B01	Load Comb.: TOTAL

Maximum pipe moments (ft-lb)

Maximum X :	456	Point : B11 F	Load Comb.: TOTAL
Maximum Y :	798	Point : B08	Load Comb.: T1
Maximum Z :	1576	Point : 3	Load Comb.: TOTAL
Max. total:	1640	Point : 3	Load Comb.: TOTAL

SYSTEM SUMMARY

Maximum sustained stress

Point	:	C01 N
Stress psi	:	4913
Allowable psi	:	16700
Ratio	:	0.29
Load combination	:	GR + Max P

Maximum displacement stress

Point	:	B01
Stress psi	:	7943
Allowable psi	:	25050
Ratio	:	0.32
Load combination	:	Cold to T1

Maximum occasional stress

Point	:	C01 N
Stress psi	:	7472
Allowable psi	:	22211
Ratio	:	0.34
Load combination	:	Sus. + R3

Maximum hoop stress

Point	:	B08
Stress psi	:	3016
Allowable psi	:	13360
Ratio	:	0.38
Load combination	:	Max P

Maximum sustained stress ratio

Point	:	C01 N
Stress psi	:	4913
Allowable psi	:	16700
Ratio	:	0.29
Load combination	:	GR + Max P

Maximum displacement stress ratio

Point	:	B01
Stress psi	:	7943
Allowable psi	:	25050
Ratio	:	0.32
Load combination	:	Cold to T1

AY02E-R2 PROJECT H-320, 241-AV-02E SLUTICE PIT FLOOR DANIEL NORTHWEST, INC.
 03/04/97 JUMPER ASSEMBLY STRESS ANALYSIS AUTPIPE=4.60 RESULT PAGE 49

SYSTEM SUMMARY

Maximum occasional stress ratio

Point : C01 N
 Stress psi : 7472
 Allowable psi : 22211
 Ratio : 0.34
 Load combination : Sus. + R3

Maximum hoop stress ratio

Point : 808
 Stress psi : 5016
 Allowable psi : 13360
 Ratio : 0.38
 Load combination : Max P

*** The system satisfies ASME B31.3 code requirements ***
 *** for the selected options ***

A

WIRING CONNECTION DIAGRAM

[illegible]

EXPIRES 3-24-97

U.S. DEPARTMENT OF ENERGY	SAFETY CLASS	3	DATE	CONSTRUCTION
			REVISED NO.	2 DATE 02/18/97

Richard Operations Office
FLUOR DANIEL NORTHWEST, INC.
JUMPER ASSEMBLY

PUMP PIT

AY-02A-1111-

MI 02A 011
IF 700 TALK 041 C 5

W-320	120K	241-6-1
W-320	120K	241-6-1

NY	8405	H-2-3
----	------	-------

606537

A SECTION

NOTES:

1. FOR NOTES, SEE SHEET 1.
2. IF EXISTING TIE HANDLES DO NOT INDICATE TOTAL LETTERS, INDICATE US, PUMP PIT 1/2\"/>
3. TIE HANDLE SHALL BE PER H-2-80172, ASSY 1, TYPE B. IF TIE HANDLE IS NOT INDICATED, THE TIE HANDLE SHALL BE PER H-2-80172, ASSY 1, TYPE B. IF TIE HANDLE IS NOT INDICATED, THE TIE HANDLE SHALL BE PER H-2-80172, ASSY 1, TYPE B. IF TIE HANDLE IS NOT INDICATED, THE TIE HANDLE SHALL BE PER H-2-80172, ASSY 1, TYPE B.

U.S. DEPARTMENT OF ENERGY

NATIONAL ENERGY LABORATORY

PIPELINE

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PROJECT NO.	62-4882	DATE	11-1-70	BY	1
REVISION	1	DATE	11-1-70	BY	1
REVISION	2	DATE	11-1-70	BY	1
REVISION	3	DATE	11-1-70	BY	1
REVISION	4	DATE	11-1-70	BY	1
REVISION	5	DATE	11-1-70	BY	1
REVISION	6	DATE	11-1-70	BY	1
REVISION	7	DATE	11-1-70	BY	1
REVISION	8	DATE	11-1-70	BY	1
REVISION	9	DATE	11-1-70	BY	1
REVISION	10	DATE	11-1-70	BY	1
REVISION	11	DATE	11-1-70	BY	1
REVISION	12	DATE	11-1-70	BY	1
REVISION	13	DATE	11-1-70	BY	1
REVISION	14	DATE	11-1-70	BY	1
REVISION	15	DATE	11-1-70	BY	1
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REVISION	22	DATE	11-1-70	BY	1
REVISION	23	DATE	11-1-70	BY	1
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REVISION	94	DATE	11-1-70	BY	1
REVISION	95	DATE	11-1-70	BY	1
REVISION	96	DATE	11-1-70	BY	1
REVISION	97	DATE	11-1-70	BY	1
REVISION	98	DATE	11-1-70	BY	1
REVISION	99	DATE	11-1-70	BY	1
REVISION	100	DATE	11-1-70	BY	1

2. PLOT SCALE: 1"=10'

RECORD

1. FOR GENERAL NOTES, LEGEND AND KEY PLAN, SEE H-2-818518.
2. FOR CONTINUATION OF NEW LINES SEE H-2-818540.
3. FOR CONTINUATION OF EXISTING LINES SEE H-2-64406 & H-2-70764.
4. JUMPER FLUSHING BLANK HEAD (H-2-818508) WILL BE FURNISH H-2-818509. BLANK HEAD OF JUMPER AND DRAWING H-2-818501. BLANK HEAD OF JUMPER AND DRAWING H-2-818502. WITH THE JUMPER FLUSHING SUPPLY HEAD PER DRAWING H-2-818510 WHEN FLUSHING IS REQUIRED.

[illegible][illegible][illegible]

PLAN
PUMP PIT
241-AY-02A

W320-27-030

W320 Tank 241-C-106 HVAC Seal Loop

This sheet shows the status and description of the attached Design Analysis sheets.

Discipline MECHANICAL WO/Job No. W320/ER 2919 Calculation No. W320-27-30
Project No. & Name W320 TANK 241-C-106 HVAC SEAL LOOP
Calculation Item _____

These calculations apply to:

Dwg. No. H-2-819477 Rev. No. 0
Dwg. No. _____ Rev. No. _____
Other (Study, CDR) _____ Rev. No. _____

The status of these calculations is:

- ☐ Preliminary Calculations
- ☒ Final Calculations
- ☐ Check Calculations (On Calculation Dated _____)
- ☐ Void Calculation (Reason Voided _____)

Incorporated in Final Drawings? ☐ Yes ☐ No
This calculation verified by independent "check" calculations? ☐ Yes ☒ No

Original and Revised Calculation Approvals:

	Rev. 0 Signature/Date	Rev. 1 Signature/Date	Rev. 2 Signature/Date
Originator	<u>AW McMichael</u> 3-10-95		
Checked by	<u>James J. G.</u> 3/10/95		
Approved by	<u>James J. G.</u> 3/10/95		
Checked Against Approved Vendor Data	<u>James J. G.</u> 4.11.98		

INDEX

Design Analysis
Page No.

Description

<u>1</u>	<u>calculation I.D. Index</u>
<u>2</u>	<u>calculation cross index</u>
<u>3</u>	<u>Design verification</u>
<u>4</u>	<u>Objectives, References, Assumptions</u>
<u>5</u>	<u>Calculations</u>

CALCULATION CROSS INDEX (Typical)

Subject Calculation No. W 320-27-30

Page 64 of 64[illegible]

DESIGN VERIFICATION SCREENING CRITERIA

Project/Document No. W320-27-30

When the design or design change affects hardware, formal design verification must be performed if one or more of the following questions must be answered affirmatively (YES).

YES

NO

_____ ✓

1. Does the design or design change involved meet the established criteria to be considered Safety Class 1?

_____ ✓

2. Does this design or design change cause or permit changes to Safety Class 1 instrument or alarm setpoints outside of previously approved operational limits?

_____ ✓

3. Does this design or design change significantly affect the nuclear or environmental safety consequences of a malfunction or failure of the structure, system, or component?

_____ ✓

4. Does this design or design change involve or change design that has previously undergone formal design verification?

CD Jones
Assigned Lead Engineer

3/10/95
Date

J.L. Evans
Responsible Discipline Manager

4/11/98
Date

Original Design Package Distribution:

Project Manager

Design Verification Officer

Engineering Document Control

Design Change Distribution:

Attach to Engineering Change Notice

Client WHC
Subject HVAC Seal Loop

Location: Tank 241-C-106

WO/Job No. ER4319/W320
Date 2/6/95 By AW McNichols
Checked 3/10/95 By J. JUPLO
Revised By

OBJECTIVE:

Determine that the weight of the overhanging seal loop will not over stress the 6 inch vertical pipe flange weld.

DESIGN INPUTS:

Criteria and Sources:

Project W320, Tank 241-C-106 Slucing, Functional Design Criteria.
(WHC document No. WHC-SD-W320-FDC-001, Rev. 0)

References/Souces:

1. Drawing No. H-2-818477, Rev. 0.
2. Flowline Catalog No.92, Fittings and Flanges.
3. Piping Engineering, 3rd edition.
4. Design of Welded Structures, Blodgett.
5. ASME B31.1, 1993
6. Machinery Handbook, 24 th edition.

Method Used:

Math Cad

Assumptions:

The strength of the pipe will be 16,700 PSI.

The strength of the welds will be the same strength as the pipe material.

Two 90 degree elbows and a 3" section of 6" dia. pipe will be filled with water.

Client WHC
Subject HVAC Seal Loop
Location: Tank 241-C-106

WO/Job No. ER4319/W320
Date 2/6/95 By AW McNichols
Checked 3/10/95 By J. JUPLO
Revised By

Calculations:

Determine that the bottom weld on the Pressure Relief Seal Loop 6" flange is strong enough to withstand the moment imposed by the cantilevered seal loop piping. Ref. 1, Sh. 2

Ref. 6, Pg.164 Torus

Ref. 2, Pg. 20

$$\text{Weight of water in 180 degree return} = W_{wr} := \frac{2 \cdot \pi \cdot R \cdot r^2}{2} \cdot 0.036 \cdot \frac{\text{lb}}{\text{in}^3}$$

$$R := 6 \cdot \text{in} \quad r := 3.03 \cdot \text{in}$$

$$W_{wr} = 19.572 \cdot \text{lb}$$

$$\text{Weight of water, 3" section of 6" pipe} = W_3 := 12.51 \cdot \frac{\text{lb}}{\text{ft}} \cdot 3 \cdot \text{in} \cdot \frac{1}{12} \cdot \frac{\text{ft}}{\text{in}}$$

$$W_3 = 3.127 \cdot \text{lb}$$

$$W_{wr} + W_3 = 22.7 \cdot \text{lb}$$

$$\text{Weight of 180 degree return} = W_{180} := 35 \cdot \text{lb}$$

Ref. 2, Pg. 20 2 x 45 ell.

$$\text{Weight of 90 degree elbow} = W_{90} := 17.5 \cdot \text{lb}$$

Ref. 2, Pg. 20

$$\text{Weight of 3" of 6" dia. pipe} = W_6 := 4.75 \cdot \text{lb}$$

Ref. 3, Pg. 9

$$\text{Moment arm from 180 return to centerline of vertical pipe} = M_1 := 21 \cdot \text{in}$$

Ref. 1, Sh. 2

$$\text{Moment arm from 3" - 6" dia. pipe to centerline of vertical pipe} = M_2 := 7.5 \cdot \text{in}$$

$$\text{Moment arm from 180 return (attached to vertical pipe) to centerline of vertical pipe} = M_3 := 6 \cdot \text{in}$$

$$M_{24} := W_{180} \cdot M_1 \quad M_{7.5} := (2 \cdot W_{90} + W_6 + W_{wr} + W_3) \cdot M_2$$

For simplicity the weight of both 180's is included in M_g .

$$M_9 := (2 \cdot W_{180} + 2 \cdot W_{90} + W_6 + W_{wr} + W_3) \cdot M_3$$

Because the weight vector is small it was not included in M_{tot} .

$$\text{Moment Total} = M_{tot} := \left[(M_{24} + M_{7.5})^2 + M_9^2 \right]^{\frac{1}{2}} \quad M_{tot} = 1.442 \cdot 10^3 \cdot \text{lb} \cdot \text{in}$$

Determine weld strength. Ref. 4, Pg. 7.4 - 6 & 7

$$S_w := \frac{\pi \cdot d^2}{4} \quad d := 6.345 \cdot \text{in}$$

$$\text{Weld line stress} = \sigma := \frac{M_{tot}}{S_w} \quad \sigma = 45.608 \cdot \frac{\text{lb}}{\text{in}}$$

$$\text{Minimum weld size} = W_{min} := \frac{\sigma}{16700 \cdot \frac{\text{lb}}{\text{in}^2}} \quad W_{min} = 0.003 \cdot \text{in}$$

Ref. 5, Pg. 172
Assume 304L
Material

Because of the light loads column buckling will not be considered.

0.003 in weld < Normal weld size on 6" pipe, Strength OK

W320-27-031

Booster Pump Restraint Analysis

This sheet shows the status and description of the attached Design Analysis sheets.

Discipline 27 - Piping WO/Job No. EH4319 / W320 Calculation No. W320 - 27 - 31
Project No. & Name W320; Tank 241-C-106 Skiving
Calculation Item Booster Pump Restraint Analysis

These calculations apply to:

Dwg. No. H-2-815503 Rev. No. 0
Dwg. No. H-2-815543 Rev. No. 0
Other (Study, CDR) _____

Rev. No. _____

The status of these calculations is:

- ☐ Preliminary Calculations
- ☒ Final Calculations
- ☐ Check Calculations (On Calculation Dated _____)
- ☐ Void Calculation (Reason Voided _____)

Incorporated in Final Drawings? ☒ Yes ☐ NoThis calculation verified by independent "check" calculations? ☐ Yes ☒ No

Original and Revised Calculation Approvals:

	Rev. 0 Signature/Date	Rev. 1 Signature/Date	Rev. 2 Signature/Date
Originator	<u>Tobias C. Campbell</u> <u>2-15-95</u>		
Checked by	<u>[Signature]</u> <u>3-9-95</u>		
Approved by	<u>[Signature]</u> <u>3/9/95</u>		
Checked Against Approved Vendor Data	<u>M. Ahmed</u> <u>4.10.98</u>		

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Page No.

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<u>i</u>	<u>Calculation Identification and Index</u>
<u>ii</u>	<u>Calculation Cross Index</u>
<u>iii</u>	<u>Design Verification Screening Criteria</u>
<u>1.</u>	<u>Objective, Criteria, Given Data, Assumptions, Methods, References, Calculs</u>
<u>5.</u>	<u>Conclusions</u>
<u>Appendix A</u>	<u>Images 3-D Analysis</u>
<u>Appendix B</u>	

Subject Calculation No. W320-27-31

Page 22 of 22[illegible]

DESIGN VERIFICATION SCREENING CRITERIA

Project/Document No. W320-27-31Pg 166 of 166

When the design or design change affects hardware, formal design verification must be performed if one or more of the following questions must be answered affirmatively (YES).

YES

NO

<u> </u> <u> X </u>	1. Does the design or design change involved meet the established criteria to be considered Safety Class 1?
<u> </u> <u> X </u>	2. Does this design or design change cause or permit changes to Safety Class 1 instrument or alarm setpoints outside of previously approved operational limits?
<u> </u> <u> X </u>	3. Does this design or design change significantly affect the nuclear or environmental safety consequences of a malfunction or failure of the structure, system, or component?
<u> </u> <u> X </u>	4. Does this design or design change involve or change design that has previously undergone formal design verification?

C.D. Jones
Assigned Lead Engineer

3/9/95
Date

D.L. Evans
Responsible Discipline Manager

4/10/98
Date

Original Design Package Distribution:

Project Manager
Design Verification Officer
Engineering Document Control

Design Change Distribution:

Attach to Engineering Change Notice

**ICF Kaiser Hanford
Company**

Calc. No. W320-27-031
Revision 0
Page No. 1 of 5

DESIGN ANALYSIS

Client WHC
Subject Booster Pump Restraint Analysis

WO/Job No. ER4319/W320
Date 2-15-95 By Rodney C. Campbell
Checked 3-9-95 By J. JUPLO
Revised By

Location: Sluice Pit AY-02E

OBJECTIVE:

The objective of this calculation is to verify that the pump restraint system is adequate to keep the booster pump in pit AY-02E from overturning during a seismic event.

CRITERIA:

1. Functional Design Criteria WHC-SD-W320-FDC-001, Rev. 2.
2. Standard Design Criteria 4.1, Rev. 12, Design Loads for Facilities.
3. Standard Design Criteria 4.2, Rev. 0, Design and Installation of Expansion Anchors.
4. W320-QAPP-001, Rev. 0, Project Specific Quality Assurance Plan.

GIVEN DATA:

1. The pit is safety class 1.
2. The horizontal components of the acceleration due to an earthquake are 0.2.
3. The compression strength of concrete in pit is 3000 psi.

ASSUMPTIONS:

None

METHODS:

1. Hand calculations using Mathcad.

REFERENCES:

1. Drawing H-2-818503, Rev. 0.
2. Drawing H-2-818543, Rev. 0.
3. Drawing H-2-818545, Rev. 0.
4. AISC Manual of Steel Construction, Ninth Ed.
5. Calculation W320-27-029, Rev. 0,
6. Blodgett, Design of Welded Structures

CALCULATION:

$E_s := 29 \cdot 10^6 \text{ psi}$	Modulus of Elasticity for steel. Ref. 4.
$F_{a36} := 22000 \text{ psi}$	Allowable stress in A36 steel. Ref. 4.
$F = 2774 \text{ lbf}$	Dynamic load at center of gravity of pump motor. Ref. 5.
$A_{cc} = 1.21 \cdot \text{in}^2$	Cross-sectional area of C3 x 4.1 channel. Ref. 4.
$A_{ch} = 1.5 \cdot \text{in}^2$	Cross-sectional area of 3" x 1/2" plate. Ref. 1
$D_h = 26 \cdot \text{in}$	Diameter of hoop made from rolled plate. Ref. 1, Sht. 2.
$W_h = 3 \cdot \text{in}$	Width of hoop made from rolled plate. Ref. 1, Sht. 2.
$T_h = .5 \cdot \text{in}$	Thickness of hoop made from rolled plate. Ref. 1, Sht. 2.

Client WHC
Subject Booster Pump Restraint Analysis

WO/Job No. ER4319/W320
Date 2-15-95 By Rodney C. Campbell
Checked 3-9-95 By J. J. J. J.
Revised By

Location: Sluice Pit AY-02E

1. Verify that stress in hoop is less than allowable.

Figure 1

The stress in the hoop was analyzed by Images 3-D and found to be within acceptable level. See appendix A.

2. Verify that stress in C3 x 4.1 channel is below the allowable.

Assume that the two channels shown are replaced by one channel of the same size, colinear with force. If one channel can carry the load, two in the configuration shown can carry the load.

$$\sigma = \frac{F}{A_{cc}} \quad \text{Formula for calculating stress in tension.}$$

$$\sigma = 2292.56 \text{ psi} \quad \text{Calculated stress in channel.}$$

$$\sigma < F_{a36} = 1 \quad \text{The calculated stress is less than the stress allowable. The two channels can carry the seismic load.}$$

3. Verify that welds on each end of channels can carry the load.

Calculate the required size of the fillet weld holding the plates on each end.

Assume that the two channels shown are replaced by one channel of the same size, colinear with force. If the welds of one channel can carry the load, the welds in the configuration shown can carry the load.

$$w = .1875 \text{ in} \quad \text{Size of fillet weld. Ref. 1, Sht 2.}$$

$$l = 3 \text{ in} + 2 \cdot 1.41 \text{ in} \quad \text{Conservative length of weld. Weld all around C3 x 4.1 channel.}$$

$$\tau = 9600 \text{ psi} \quad \text{Allowable shear stress. Ref. 6, Chapter 7, Table 6.}$$

$$f_t = \frac{F}{l} \quad f_t = 476.63 \frac{\text{lbf}}{\text{in}}$$

$$w_r = \frac{f_t}{\tau} \quad \text{Required size of fillet weld to carry load in tension. Ref. 6, Chapter 7.}$$

$$w_r = 0.0496 \text{ in} \quad \text{Calculated size of the fillet weld required to carry the load.}$$

**ICF Kaiser Hanford
Company**

DESIGN ANALYSIS

Calc. No. W320-27-031
Revision 0
Page No. 3 of 5

Client WHC
Subject Booster Pump Restraint Analysis

WO/Job No. ER4319/W320

Date 2-15-95

By Rodney C. Campbell

Checked 3-9-95 By M. J. J. J.

Revised

By

Location: Sluice Pit AY-02E

$\omega_r < \omega = 1$ This weld is strong enough to carry the maximum load.

The welds on each end of the channels are strong enough to carry the load imposed during a seismic event.

4. Verify that the weld holding item 46 (bar) to the plate attached on the end of the channels is adequate to carry the load.

Calculate the required size of the fillet weld holding the bar to the plate.

$\omega := .1875 \text{ in}$ Size of fillet weld. Ref. 1, Sht 2.

$l := 2.3 \text{ in}$ Conservative length of weld. Weld all around bar.

$\tau := 9600 \text{ psi}$ Allowable shear stress. Ref. 6, Chapter 7, Table 6.

$$f_t := \frac{F}{l} \quad f_t = 462.33 \frac{\text{lbf}}{\text{in}}$$

$\omega_r := \frac{f_t}{\tau}$ Required size of fillet weld to carry load in tension. Ref. 6, Chapter 7.

$\omega_r = 0.0482 \text{ in}$ Calculated size of the fillet weld required to carry the load.

$\omega_r < \omega = 1$ This weld is strong enough to carry the maximum load.

The weld attaching the bar to the plate is strong enough to carry the load imposed during a seismic event.

5. Verify that the pin will not shear the bar during a seismic event.

$A := 2 \text{ in} \cdot T_h$ Area of plate carrying load.

$$\sigma := \frac{F}{A}$$

$\sigma = 2774 \text{ psi}$ Calculated stress.

$F_{a36} = 22000 \text{ psi}$ Allowable stress.

$$\sigma < F_{a36} = 1$$

The allowable stress is greater than the calculated stress. The pin will not pull through the bar during a seismic event.

The plate that the pin is attached to (Ref. 2, Item 3) is 0.5" thick. The pin will not shear the plate during a seismic event nor will the pin shear since it has the same area.

6. Verify that the weld holding the plate with the pin (Ref. 2, Item 3) to the plate attached to the pit wall (Ref. 2, Item 2) is capable carrying the load imposed during an earthquake.

Figure 2

ICF Kaiser Hanford Company

Calc. No. W320-27-031

Revision 0

Page No. 4 of 5

DESIGN ANALYSIS

Client WHC

Subject Booster Pump Restraint Analysis

WO/Job No. ER4319/W320

Date 2-15-95

By Rodney C. Campbell

Checked 3-9-95 By J. J. J. J.

Revised

By

Location: Sluice Pit AY-02E

The weld is subjected to the combined loading of a tensile load, shear load and bending.

$\phi := .1875 \text{ in}$ Size of fillet weld. Ref. 2, Sht. 2.

$l := 10 \text{ in}$ Length of weld.

$a_m := 3 \text{ in}$ Length of moment arm.

$\tau := 9600 \text{ psi}$ Allowable shear stress. Ref. 6, Chapter 7, Table 6.

$f_t := \frac{F \cdot \sin(-45)}{l}$ $f_t = -236.04 \frac{\text{lb}}{\text{in}}$ Calculated tensile load per inch of weld.

$f_v := \frac{F \cdot \cos(-45)}{l}$ $f_v = 145.72 \frac{\text{lb}}{\text{in}}$ Calculated shear load per inch of weld.

$S_w := \frac{l^2}{3}$ $S_w = 33.33 \cdot \text{in}^2$ Section modulus of weld treating it as a line. Ref. 6, Table 5.

$M := F \cdot \cos(-45) \cdot a_m$ $M = 4371.73 \cdot \text{lb} \cdot \text{in}$ Calculated moment on weld.

$f_m := \frac{M}{S_w}$ $f_m = 131.15 \frac{\text{lb}}{\text{in}}$ Calculated bending load per inch of weld.

$f_r := \sqrt{f_t^2 + f_v^2 + f_m^2}$ $f_r = 306.84 \frac{\text{lb}}{\text{in}}$ Calculated combined load per inch of weld.

$\phi_r := \frac{f_r}{\tau}$ Required size of fillet weld to carry combined load. Ref. 6, Chapter 7.

$\phi_r = 0.032 \cdot \text{in}$ Calculated size of the fillet weld required to carry the load.

$\phi_r < \phi = 1$ This weld is strong enough to carry the maximum load.

7. Verify that the expansion anchors attaching the plate to the pit wall are adequate to carry the load.

A. Verify the edge distance to obtain maximum allowable load.

The minimum required edge spacing to obtain maximum allowable load is 6 3/4" for shear and 5" for tension. The actual edge distances are greater than this (Ref. 2). The maximum allowable load can be used.

B. Verify the bolt spacing to obtain maximum allowable load.

The minimum required bolt spacing to obtain maximum allowable load is 6". The actual bolt spacing is 9" (Ref. 2). The maximum allowable load can be used.

C. Verify that the load imposed does not exceed the maximum allowable load.

$V_a := 1470 \text{ lb}$ Allowable shear load per bolt. (SDC 4.2)

$T_a := 1230 \text{ lb}$ Allowable tension load per bolt. (SDC 4.2)

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ICF Kaiser Hanford
Company

DESIGN ANALYSIS

Calc. No. W320-27-031
Revision 0
Page No. 5 of 5

Client WHC
Subject Booster Pump Restraint Analysis

WO/Job No. ER4319/W320
Date 2-15-95 **By** Rodney C. Campbell
Checked B. A. 95 **By** N. J. PLO
Revised **By**

Location: Sluice Pit AY-02E

$$V := \frac{F \cdot \cos(45)}{4}$$

$$V = 364.31 \cdot \text{lbf} \quad \text{Calculated shear load per bolt.}$$

$$T := \frac{F \cdot \sin(45)}{4} + \frac{F \cdot \cos(45) \cdot 3 \cdot \text{in}}{2 \cdot 9 \cdot \text{in}}$$

$$T = 832.98 \cdot \text{lbf} \quad \text{Calculated tension load per bolt.}$$

$$\frac{V}{V_a} + \frac{T}{T_a} = 0.93$$

The combined load is less than the allowable combined load (by the sum of the loads divided by the allowable being less than one). The anchor bolts are adequate to carry the seismic load.

CONCLUSIONS:

The design of the seismic restraint system is adequate to carry the load.

APPENDIX A

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MATERIAL PROPERTIES

Material No	Modulus of Elasticity	Weight Density	Coeff of Thermal Exp.	Poisson's Ratio	Shear Web Modulus
1	3.00000E+07	2.83000E-01	6.33000E-06	3.00E-01	0.00000E+00

NODE COORDINATES

Node	X-Coord.	Y-Coord.	Z-Coord.
1	0.00000E+00	0.00000E+00	0.00000E+00
2	4.14310E-01	0.00000E+00	3.27960E+00
3	1.63120E+00	0.00000E+00	6.35313E+00
4	3.57423E+00	0.00000E+00	9.02746E+00
5	6.12129E+00	0.00000E+00	1.11346E+01
6	9.11234E+00	0.00000E+00	1.25421E+01
7	1.23595E+01	0.00000E+00	1.31615E+01
8	1.56586E+01	0.00000E+00	1.29539E+01
9	1.88025E+01	0.00000E+00	1.19324E+01
10	2.15935E+01	0.00000E+00	1.01611E+01
11	2.38564E+01	0.00000E+00	7.75142E+00
12	2.54489E+01	0.00000E+00	4.85464E+00
13	2.62710E+01	0.00000E+00	1.65283E+00
14	2.62710E+01	0.00000E+00	-1.65283E+00
15	2.54489E+01	0.00000E+00	-4.85464E+00
16	2.38564E+01	0.00000E+00	-7.75142E+00
17	2.15935E+01	0.00000E+00	-1.01611E+01
18	1.88025E+01	0.00000E+00	-1.19324E+01
19	1.56586E+01	0.00000E+00	-1.29539E+01
20	1.23595E+01	0.00000E+00	-1.31615E+01
21	9.11234E+00	0.00000E+00	-1.25421E+01
22	6.12129E+00	0.00000E+00	-1.11346E+01
23	3.57423E+00	0.00000E+00	-9.02747E+00
24	1.63121E+00	0.00000E+00	-6.35313E+00
25	4.14313E-01	0.00000E+00	-3.27960E+00
26	1.31875E-01	0.00000E+00	0.00000E+00

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BEAM PROPERTIES

Multiplier = 1 (For AISC database properties only)

Prop No	X-Section Area	Moment of Inertia Iy / Iz	Torsional Const. - J
1	1.500E+00	3.125E-02 1.125E+00	1.250E-01
2	9.000E+00	6.750E+00 6.750E+00	2.700E+01

Prop No	Max. Fiber Cy	Dist / Cz	Shear SSfy / SSFz	Shape SStors	Shear Stress SSTRfy / SSTRfz
1	2.50E-01	1.50E+00	1.20E+00 1.20E+00	1.00E+00	1.50E+00 1.50E+00
2	1.50E+00	1.50E+00	1.20E+00 1.20E+00	1.00E+00	1.50E+00 1.50E+00

BEAM CONNECTIVITY

Beam No	Nodes From / To	Prop No	Mat No	pincodes I / J	Rigid End Offset I / J	Length	Beam Type
1	1 2	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
2	2 3	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
3	3 4	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
4	4 5	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
5	5 6	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
6	6 7	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
7	7 8	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
8	8 9	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
9	9 10	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
10	10 11	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
11	11 12	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
12	12 13	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
13	13 14	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
14	14 15	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
15	15 16	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
16	16 17	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
17	17 18	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
18	18 19	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
19	19 20	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
20	20 21	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
21	21 22	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
22	22 23	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
23	23 24	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
24	24 25	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam
25	25 1	0	1	1	0.00E+00 0.00E+00	0.33E+01	Beam

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Beam No	Nodes From/ To	Ref	Prop No	Mat No	pincodes I / J	Rigid I	End J	Offset J	Length	Beam Type
28	26 8	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
29	26 9	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
30	26 10	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
31	26 11	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
32	26 12	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
33	26 13	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
34	26 14	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
35	26 15	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
36	26 16	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
37	26 17	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
38	26 18	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss
39	26 19	0	2	1	NA NA	NA	NA	NA	0.13E+02	Truss

RESTRAINTS

Node No	Global/Local	Restraint Directions
2	GLOBAL	X Y Z RX RY RZ
3	GLOBAL	X Y Z RX RY RZ
24	GLOBAL	X Y Z RX RY RZ
25	GLOBAL	X Y Z RX RY RZ
26	GLOBAL	- Y - - -

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RENUMBER NODES

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Node Renumbering Cross Reference List

Was	Is	Was	Is	Was	Is	Was	Is	Was	Is
1	26	2	25	3	23	4	21	5	19
6	17	7	15	8	13	9	11	10	8
11	7	12	6	13	5	14	4	15	3
16	2	17	1	18	9	19	12	20	14
21	16	22	18	23	20	24	22	25	24
26	10								

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ASSEMBLE STIFFNESS MATRIX Version 2.0 07/01/90

1

STIFFNESS ASSEMBLY SUMMARY

Number of Node Points.....	26
Number of Truss and Beam Elements.....	39
Number of Plate Elements.....	0
Number of Spring Elements.....	0
Number of Solid Elements.....	0
Number of Axisymmetric Elements.....	0
Number of Nodes with Restraints.....	5
Number of Equations to be Solved.....	128
Number of Blocks in the Matrix.....	1

BLOCK INFORMATION

BLCK NO	SIZE (Byte)	BLCK NO	SIZE (Byte)	BLCK NO	SIZE (Byte)	BLCK NO	SIZE (Byte)
1	15312						

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ASSEMBLE STIFFNESS MATRIX Version 2.0 07/01/90

1

EQUATION NUMBER LIST

NODE WAS	IS	TRANSLATION			ROTATION		
		X	Y	Z	X	Y	Z
1	26	123	124	125	126	127	128
2	25	0	0	0	0	0	0
3	23	0	0	0	0	0	0
4	21	117	118	119	120	121	122
5	19	105	106	107	108	109	110
6	17	93	94	95	96	97	98
7	15	81	82	83	84	85	86
8	13	69	70	71	72	73	74
9	11	57	58	59	60	61	62
10	8	43	44	45	46	47	48
11	7	37	38	39	40	41	42
12	6	31	32	33	34	35	36
13	5	25	26	27	28	29	30
14	4	19	20	21	22	23	24
15	3	13	14	15	16	17	18
16	2	7	8	9	10	11	12
17	1	1	2	3	4	5	6
18	9	49	50	51	52	53	54
19	12	63	64	65	66	67	68
20	14	75	76	77	78	79	80
21	16	87	88	89	90	91	92
22	18	99	100	101	102	103	104
23	20	111	112	113	114	115	116
24	22	0	0	0	0	0	0
25	24	0	0	0	0	0	0
26	10	55	0	56	0	0	0

STIFFNESS SUMMARY IN 1 BLOCKS

Minimum Diagonal Stiffness.....	.99990+06
Eq No of Minimum Diagonal.....	123
Maximum Diagonal Stiffness.....	.12800+09
Eq No of Maximum Diagonal.....	55

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SOLVE DISPLACEMENTS Version 2.0 07/01/90

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LOAD CASE 1

GRAVITY LOADING

Direction	Gravity Factor	Load Factor
X	.0000E+00	.1000E-01
Y	.0000E+00	.1000E-01
Z	.0000E+00	.1000E-01

INERTIA LOADING

Direction	Translational Accel.	Rotational Accel.	Rotational Velocity	Origin
X	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Y	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Z	.0000E+00	.0000E+00	.0000E+00	.0000E+00

Gravity Acceleration = .3864E+03

CONCENTRATED LOADS

Node	Fx	Fy	Fz	Mx	My	Mz
26	.2774E+04	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00

REFERENCE TEMPERATURE = .0000E+00

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SOLVE DISPLACEMENTS Version 2.0 07/01/90

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LOAD CASE 1

APPLIED LOAD VECTOR

Node	Fx	Fy	Fz	Mx	My	Mz
26	.2774E+04	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00

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SOLVE DISPLACEMENTS

Version 2.0 07/01/90

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LOAD CASE 1

DISPLACEMENTS

Node	Translations			Rotations		
	X	Y	Z	X	Y	Z
1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
3	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
4	.9349E-02	.3012E-19	-.6676E-02	-.1056E-19	.5325E-02	.9611E-20
5	.1974E-01	.8335E-19	-.1907E-01	-.1437E-19	.3555E-02	.1619E-19
6	.2164E-01	.1281E-18	-.2284E-01	-.7240E-20	-.1140E-02	.3109E-20
7	.1983E-01	.1566E-18	.1277E-01	-.8113E-20	-.4404E-02	.1018E-19
8	.2073E-01	.1870E-18	.3083E-04	-.8199E-20	-.1974E-02	.8176E-20
9	.2090E-01	.2410E-18	.2270E-03	-.3572E-20	.4339E-03	.2377E-19
10	.2102E-01	.3218E-18	.2207E-03	-.7792E-21	-.1376E-03	.2950E-19
11	.2116E-01	.3851E-18	.2096E-03	-.1986E-20	.4716E-05	.2983E-19
12	.2125E-01	.4262E-18	.1441E-03	-.2773E-20	-.1817E-04	.3087E-19
13	.2130E-01	.4427E-18	.5141E-04	-.3148E-20	-.2440E-05	.3225E-19
14	.2130E-01	.4323E-18	.5146E-04	-.3153E-20	.2443E-05	.3371E-19
15	.2125E-01	.3944E-18	.1442E-03	-.2884E-20	.1817E-04	.3506E-19
16	.2116E-01	.3302E-18	-.2096E-03	-.2152E-20	-.4713E-05	.3602E-19
17	.2102E-01	.2410E-18	.2208E-03	-.3783E-20	.1376E-03	.3882E-19
18	.2090E-01	.1296E-18	-.2270E-03	-.6317E-21	-.4339E-03	.3493E-19
19	.2073E-01	.2895E-19	-.3087E-04	.3548E-20	.1974E-02	.2264E-19
20	.1983E-01	-.3987E-19	.1277E-01	.3429E-20	.4404E-02	.2063E-19
21	.2164E-01	-.8675E-19	.2284E-01	.3249E-21	.1140E-02	.4531E-20
22	.1974E-01	-.7458E-19	.1907E-01	-.7628E-20	-.3555E-02	-.8478E-20
23	.9349E-02	-.3011E-19	.6676E-02	-.1048E-19	-.5325E-02	-.9705E-20
24	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
26	.2133E-01	.0000E+00	-.1276E-07	.0000E+00	.0000E+00	.0000E+00

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SOLVE BEAM LOADS/STRESSES

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Load Case 1:

BEAM LOADS AND/OR STRESSES

Gloads	Node	Fx	Fy	Fz	Mx	My	Mz
Lloads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
BEAM NO. 1							
Gloads	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Gloads	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Lloads	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Lloads	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
BEAM NO. 2							
Gloads	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Gloads	3	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Lloads	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Lloads	3	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	3	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	3	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
BEAM NO. 3							
Gloads	3	-.1387E+04	-.8331E-17	.5807E+03	-.7903E-17	-.2801E+04	-.8405E-15
Gloads	4	.1387E+04	.8331E-17	.5807E+03	.3018E-16	.2197E+03	.9243E-15
Lloads	3	-.1288E+03	-.2125E-14	.7808E+03	-.6846E-15	-.2801E+04	-.7164E-14
Lloads	4	.1285E+04	-.2125E-14	-.7808E+03	.6846E-15	.2197E+03	-.1402E-15
Stress	3	.8567E+03	.2125E-14	.7808E+03	.5477E-14	.2241E+05	-.9553E-14
Stress	3	.2326E+05	-.2155E+05	.1163E+05			
Stress	4	.8567E+03	.2125E-14	.7808E+03	.5477E-14	.1758E+04	-.1870E-15
Stress	4	.2614E+04	-.9011E+03	.1307E+04			
BEAM NO. 4							
Gloads	4	-.1387E+04	-.8331E-17	.5807E+03	-.3018E-16	-.2197E+03	-.8243E-15
Gloads	5	.1387E+04	.8331E-17	.5807E+03	.4774E-16	.1224E+04	.8031E-15
Lloads	4	-.1439E+04	-.1897E-14	.4367E+03	-.5487E-15	-.2197E+03	-.1566E-14
Lloads	5	.1439E+04	.1897E-14	-.4367E+03	.5487E-15	.1224E+04	.4706E-14
Stress	4	.9592E+03	-.1897E-14	.4367E+03	.4389E-14	.1758E+04	.2089E-14
Stress	4	.2717E+04	-.7985E+03	.1358E+04			
Stress	5	.9592E+03	-.1897E-14	.4367E+03	.4389E-14	-.9790E+04	-.6274E-14
Stress	5	.1075E+05	-.8831E+04	.5375E+04			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

1

Load Case 1:

		Fx	Fy	Fz	Mx	My	Mz
Lloads	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
Stress	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
Lloads	14	1400E+04	8331E-17	1665E-05	6352E-15	1385E+01	5879E-16
Stress	13	9336E+03	8331E-17	1665E-05	5082E-14	1108E+02	4167E-16
Stress	13	9447E+03	9225E+03	4723E+03	5082E-14	1108E+02	7839E-16
Stress	14	9336E+03	8331E-17	1665E-05	5082E-14	1108E+02	7839E-16
Stress	14	9447E+03	9225E+03	4723E+03	5082E-14	1108E+02	7839E-16
BEAM NO. 14							
Gloads	14	3464E+03	8331E-17	1357E+04	5879E-16	1385E+01	6352E-15
Gloads	15	3464E+03	8331E-17	1357E+04	5879E-16	1385E+01	6352E-15
Lloads	14	1400E+04	1792E-17	1861E+01	6006E-15	1385E+01	2100E-15
Lloads	15	1400E+04	1792E-17	1861E+01	6006E-15	1385E+01	2100E-15
Stress	14	9336E+03	1792E-17	1861E+01	4805E-14	1108E+02	2801E-15
Stress	14	9445E+03	9223E+03	4723E+03	4805E-14	1108E+02	2801E-15
Stress	15	9334E+03	1792E-17	1861E+01	4805E-14	6031E+02	2880E-15
Stress	15	9937E+03	8731E+03	4969E+03	4805E-14	6031E+02	2880E-15
BEAM NO. 15							
Gloads	15	6824E+03	8331E-17	1224E+04	8547E-16	1753E+01	6421E-15
Gloads	16	6824E+03	8331E-17	1224E+04	1096E-15	2052E+02	6553E-15
Lloads	15	1401E+04	9152E-16	8488E+01	5215E-15	1753E+01	3103E-15
Lloads	16	1401E+04	9152E-16	8488E+01	5215E-15	1753E+01	3103E-15
Stress	15	9340E+03	9152E-16	8488E+01	4172E-14	6031E+02	4138E-15
Stress	15	9943E+03	8737E+03	4971E+03	4172E-14	6031E+02	4138E-15
Stress	16	9340E+03	9152E-16	8488E+01	4172E-14	1642E+03	8172E-15
Stress	16	1098E+04	7698E+03	5491E+03	4172E-14	1642E+03	8172E-15
BEAM NO. 16							
Gloads	16	9297E+03	8331E-17	1044E+04	1096E-15	2052E+02	6553E-15
Gloads	17	9297E+03	8331E-17	1044E+04	1297E-15	1013E+03	6742E-15
Lloads	16	1397E+04	8041E-15	3684E+02	4027E-15	2052E+02	9810E-15
Lloads	17	1397E+04	8041E-15	3684E+02	4027E-15	1013E+03	1677E-14
Stress	16	9316E+03	8041E-15	3684E+02	3221E-14	1642E+03	1308E-14
Stress	16	1096E+04	7674E+03	5479E+03	3221E-14	1642E+03	1308E-14
Stress	17	9316E+03	8041E-15	3684E+02	3221E-14	8101E+03	2236E-14
Stress	17	1742E+04	1212E+03	8709E+03	3221E-14	8101E+03	2236E-14
BEAM NO. 17							
Gloads	17	1278E+04	8331E-17	6225E+03	1297E-15	1013E+03	6742E-15
Gloads	18	1278E+04	8331E-17	6225E+03	1444E-15	1255E+03	6974E-15
Lloads	17	1413E+04	1453E-14	1593E+03	2518E-15	1013E+03	2792E-15
Lloads	18	1413E+04	1453E-14	1593E+03	2518E-15	1255E+03	4523E-14
Stress	17	9419E+03	1453E-14	1593E+03	2014E-14	8101E+03	3722E-15
Stress	17	1752E+04	1318E+03	8760E+03	2014E-14	8101E+03	3722E-15

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

1

Load Case 1:

		Fx	Fy	Fz	Mx	My	Mz
Lloads	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
Stress	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
Lloads	18	9419E+03	1453E-14	1593E+03	2014E-14	3404E+04	6030E-14
Stress	18	4346E+04	2462E+04	2173E+04	2014E-14	3404E+04	6030E-14
BEAM NO. 18							
Gloads	18	1075E+04	8331E-17	1054E+04	1444E-15	4255E+03	6974E-15
Gloads	19	1075E+04	8331E-17	1054E+04	1529E-15	1791E+04	7236E-15
Lloads	18	1348E+04	3745E-14	6705E+03	7815E-16	4255E+03	1663E-14
Lloads	19	1348E+04	3745E-14	6705E+03	7815E-16	1791E+04	1072E-13
Stress	18	8989E+03	3745E-14	6705E+03	6252E-15	3404E+04	2217E-14
Stress	18	4302E+04	2505E+04	2151E+04	6252E-15	3404E+04	2217E-14
Stress	19	8989E+03	3745E-14	6705E+03	6252E-15	1433E+05	1429E-13
Stress	19	1523E+05	1343E+05	7614E+04	6252E-15	1433E+05	1429E-13
BEAM NO. 19							
Gloads	19	1387E+04	8331E-17	5807E+03	1529E-15	1791E+04	7236E-15
Gloads	20	1387E+04	8331E-17	5807E+03	1547E-15	4126E+03	7511E-15
Lloads	19	1348E+04	5780E-15	6666E+03	1072E-15	1791E+04	2307E-14
Lloads	20	1348E+04	5780E-15	6666E+03	1072E-15	4126E+03	5946E-15
Stress	19	8985E+03	5780E-15	6666E+03	8576E-15	1433E+05	3076E-14
Stress	19	1523E+05	1343E+05	7614E+04	8576E-15	1433E+05	3076E-14
Stress	20	8985E+03	5780E-15	6666E+03	8576E-15	3301E+04	5286E-15
Stress	20	1499E+04	2402E+04	2100E+04	8576E-15	3301E+04	5286E-15
BEAM NO. 20							
Gloads	20	1387E+04	8331E-17	5807E+03	1547E-15	4126E+03	7511E-15
Gloads	21	1387E+04	8331E-17	5807E+03	1495E-15	1439E+04	7782E-15
Lloads	20	1471E+04	1631E-14	3105E+03	2927E-15	4126E+03	2865E-14
Lloads	21	1471E+04	1631E-14	3105E+03	2927E-15	1439E+04	8252E-14
Stress	20	9808E+03	1631E-14	3105E+03	2341E-14	3301E+04	1880E-14
Stress	20	4282E+04	2320E+04	2141E+04	2341E-14	3301E+04	1880E-14
Stress	21	9808E+03	1631E-14	3105E+03	2341E-14	1151E+05	1101E-13
Stress	21	1249E+05	1053E+05	6247E+04	2341E-14	1151E+05	1101E-13
BEAM NO. 21							
Gloads	21	1387E+04	8331E-17	5807E+03	1495E-15	1439E+04	7782E-15
Gloads	22	1387E+04	8331E-17	5807E+03	1378E-15	1224E+04	8031E-15
Lloads	21	1502E+04	2049E-15	6513E+02	4666E-15	1439E+04	5352E-14
Lloads	22	1502E+04	2049E-15	6513E+02	4666E-15	1224E+04	4675E-14
Stress	21	1001E+04	2049E-15	6513E+02	3733E-14	1151E+05	7136E-14
Stress	21	1251E+05	1051E+05	6257E+04	3733E-14	1151E+05	7136E-14
Stress	22	1001E+04	2049E-15	6513E+02	3733E-14	9790E+04	6233E-14
Stress	22	1079E+05	8789E+04	5396E+04	3733E-14	9790E+04	6233E-14

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

1

Load Case 1:

Loads	Node	Fx	Fy	Fz	Mx	My	Mz
Stress	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
Stress	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
BEAM NO. 22							
GLoads	22	-1387E+04	-8331E-17	-5807E+03	-1378E-15	-1224E+04	-8031E-15
LLoads	23	-1387E+04	-8331E-17	-5807E+03	-1202E-15	-2197E+03	-8243E-15
LLoads	22	-1439E+04	-7066E-15	-4367E+03	-6181E-15	-1224E+04	-2534E-14
LLoads	23	-1439E+04	-7066E-15	-4367E+03	-6181E-15	-2197E+03	-1988E-14
Stress	22	9592E+03	-7066E-15	-4367E+03	-4944E-14	-9790E+04	-3379E-14
Stress	22	1075E+05	-8831E+04	-5375E+04			
Stress	23	9592E+03	-7066E-15	-4367E+03	-4944E-14	-1758E+04	-2650E-15
Stress	23	2717E+04	-7985E+03	-1358E+04			
BEAM NO. 23							
GLoads	23	-1387E+04	-8331E-17	-5807E+03	-1202E-15	-2197E+03	-8243E-15
GLoads	24	-1387E+04	-8331E-17	-5807E+03	-9795E-16	-2801E+04	-8405E-15
LLoads	23	-1285E+04	-2125E-14	-7808E+03	-7375E-15	-2197E+03	-2131E-15
LLoads	24	-1285E+04	-2125E-14	-7808E+03	-7375E-15	-2801E+04	-7237E-14
Stress	23	8567E+03	-2125E-14	-7808E+03	-5900E-14	-1758E+04	-2841E-15
Stress	23	2614E+04	-9010E+03	-1307E+04			
Stress	24	8567E+03	-2125E-14	-7808E+03	-5900E-14	-2241E+05	-9650E-14
Stress	24	2326E+05	-2155E+05	-1163E+05			
BEAM NO. 24							
GLoads	24	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
GLoads	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
LLoads	24	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
LLoads	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	24	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	24	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
BEAM NO. 25							
GLoads	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
GLoads	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
LLoads	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
LLoads	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
Stress	1	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
TRUSS NO. 28							
GLoads	26	.3119E+03	.0000E+00	.1635E+04	.0000E+00	.0000E+00	.0000E+00

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

1

Load Case 1:

Loads	Node	Fx	Fy	Fz	Mx	My	Mz
Stress	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
Stress	Node	Max	Min	Cmb	Torsion	Y-Bending	Z-Bending
BEAM NO. 29							
GLoads	8	-3119E+03	.0000E+00	.1635E+04	.0000E+00	.0000E+00	.0000E+00
LLoads	26	-1665E+04	-6416E-29	-5974E-12	.0000E+00	.0000E+00	.0000E+00
LLoads	8	-1665E+04	-6416E-29	-5974E-12	.0000E+00	.0000E+00	.0000E+00
Stress	26	-1849E+03	-1069E-29	-9956E-13	.0000E+00	.0000E+00	.0000E+00
Stress	26	-1849E+03	-1849E+03	.9247E+02			
Stress	8	-1849E+03	-1069E-29	-9956E-13	.0000E+00	.0000E+00	.0000E+00
Stress	8	-1849E+03	-1849E+03	.9247E+02			
TRUSS NO. 29							
GLoads	26	-2032E+03	.0000E+00	.4318E+03	.0000E+00	.0000E+00	.0000E+00
GLoads	9	-2032E+03	.0000E+00	.4318E+03	.0000E+00	.0000E+00	.0000E+00
LLoads	26	-4773E+03	.1921E-28	.7491E-12	.0000E+00	.0000E+00	.0000E+00
LLoads	9	-4773E+03	-.1921E-28	-.7491E-12	.0000E+00	.0000E+00	.0000E+00
Stress	26	-5303E+02	.3202E-29	.1249E-12	.0000E+00	.0000E+00	.0000E+00
Stress	26	-5303E+02	.5303E+02	.2651E+02			
Stress	9	-5303E+02	.3202E-29	.1249E-12	.0000E+00	.0000E+00	.0000E+00
Stress	9	-5303E+02	.5303E+02	.2651E+02			
TRUSS NO. 30							
GLoads	26	-3486E+03	.0000E+00	.4214E+03	.0000E+00	.0000E+00	.0000E+00
GLoads	10	-3486E+03	.0000E+00	.4214E+03	.0000E+00	.0000E+00	.0000E+00
LLoads	26	-5469E+03	.5041E-27	.8084E-11	.0000E+00	.0000E+00	.0000E+00
LLoads	10	-5469E+03	-.5041E-27	-.8084E-11	.0000E+00	.0000E+00	.0000E+00
Stress	26	-6076E+02	.8402E-28	.1347E-11	.0000E+00	.0000E+00	.0000E+00
Stress	26	-6076E+02	.6076E+02	.3388E+02			
Stress	10	-6076E+02	.8402E-28	.1347E-11	.0000E+00	.0000E+00	.0000E+00
Stress	10	-6076E+02	.6076E+02	.3388E+02			
TRUSS NO. 31							
GLoads	26	-2474E+03	.0000E+00	.1797E+03	.0000E+00	.0000E+00	.0000E+00
GLoads	11	-2474E+03	.0000E+00	.1797E+03	.0000E+00	.0000E+00	.0000E+00
LLoads	26	-3058E+03	.4321E-28	.1899E-11	.0000E+00	.0000E+00	.0000E+00
LLoads	11	-3058E+03	.4321E-28	.1899E-11	.0000E+00	.0000E+00	.0000E+00
Stress	26	-3397E+02	.7202E-29	.3166E-12	.0000E+00	.0000E+00	.0000E+00
Stress	26	-3397E+02	.3397E+02	.1699E+02			
Stress	11	-3397E+02	.7202E-29	.3166E-12	.0000E+00	.0000E+00	.0000E+00
Stress	11	-3397E+02	.3397E+02	.1699E+02			
TRUSS NO. 32							
GLoads	26	-3360E+03	.0000E+00	.1330E+03	.0000E+00	.0000E+00	.0000E+00
GLoads	12	-3360E+03	.0000E+00	.1330E+03	.0000E+00	.0000E+00	.0000E+00
LLoads	26	-3613E+03	.3994E-28	.6639E-11	.0000E+00	.0000E+00	.0000E+00

SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

Load Case 1:

Fx	Fy	Fz	Mx	My	Mz
Node	Node	Node	Node	Node	Node
Stress	Stress	Stress	Stress	Stress	Stress
Node	Node	Node	Node	Node	Node
Maximum	Minimum	Comb. Shear			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			
L1oads	12	-3.613E+03			
Stress	26	3.994E-28			
Stress	26	6.657E-29			
Stress	26	-4.015E+02			
Stress	12	-4.015E+02			
Stress	12	-4.015E+02			

```

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Load Case 1:

GLoads	Node	Fx	Fy	Fz	Mx	My	Mz
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear	Torsion	Y-Bending	Z-Bending
Stress	16	-.3397E+02	-.1221E-28	-.1031E-11	-.0000E+00	-.0000E+00	-.0000E+00
Stress	16	-.3397E+02	-.3397E+02	-.009E+02	-.0000E+00	-.0000E+00	-.0000E+00
TRUSS No. 37							
GLoads	26	-.3486E+03	-.0000E+00	-.4214E+03	-.0000E+00	-.0000E+00	-.0000E+00
GLoads	17	-.3486E+03	-.0000E+00	-.4214E+03	-.0000E+00	-.0000E+00	-.0000E+00
LLoads	26	-.5469E+03	-.6802E-27	-.1088E-10	-.0000E+00	-.0000E+00	-.0000E+00
LLoads	17	-.5469E+03	-.6802E-27	-.1088E-10	-.0000E+00	-.0000E+00	-.0000E+00
Stress	26	-.6076E+02	-.1134E-27	-.1813E-11	-.0000E+00	-.0000E+00	-.0000E+00
Stress	26	-.6076E+02	-.6076E+02	-.3038E+02	-.0000E+00	-.0000E+00	-.0000E+00
Stress	17	-.6076E+02	-.6076E+02	-.3038E+02	-.0000E+00	-.0000E+00	-.0000E+00
Stress	17	-.6076E+02	-.6076E+02	-.3038E+02	-.0000E+00	-.0000E+00	-.0000E+00
TRUSS No. 38							
GLoads	26	-.2032E+03	-.0000E+00	-.4318E+03	-.0000E+00	-.0000E+00	-.0000E+00
GLoads	18	-.2032E+03	-.0000E+00	-.4318E+03	-.0000E+00	-.0000E+00	-.0000E+00
LLoads	26	-.4773E+03	-.1030E-28	-.3045E-12	-.0000E+00	-.0000E+00	-.0000E+00
LLoads	18	-.4773E+03	-.1030E-28	-.3045E-12	-.0000E+00	-.0000E+00	-.0000E+00
Stress	26	-.5303E+02	-.1717E-29	-.5076E-13	-.0000E+00	-.0000E+00	-.0000E+00
Stress	26	-.5303E+02	-.5303E+02	-.2651E+02	-.0000E+00	-.0000E+00	-.0000E+00
Stress	18	-.5303E+02	-.5303E+02	-.2651E+02	-.0000E+00	-.0000E+00	-.0000E+00
TRUSS No. 39							
GLoads	26	-.3119E+03	-.0000E+00	-.1635E+04	-.0000E+00	-.0000E+00	-.0000E+00
GLoads	19	-.3119E+03	-.0000E+00	-.1635E+04	-.0000E+00	-.0000E+00	-.0000E+00
LLoads	26	-.1665E+04	-.2450E-28	-.2150E-11	-.0000E+00	-.0000E+00	-.0000E+00
LLoads	19	-.1665E+04	-.2450E-28	-.2150E-11	-.0000E+00	-.0000E+00	-.0000E+00
Stress	26	-.1849E+03	-.3838E-29	-.3583E-12	-.0000E+00	-.0000E+00	-.0000E+00
Stress	26	-.1849E+03	-.1849E+03	-.9247E+02	-.0000E+00	-.0000E+00	-.0000E+00
Stress	19	-.1849E+03	-.4083E-29	-.3583E-12	-.0000E+00	-.0000E+00	-.0000E+00
Stress	19	-.1849E+03	-.1849E+03	-.9247E+02	-.0000E+00	-.0000E+00	-.0000E+00

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Load Case 1:

MAXIMUM STRESS SUMMARY FOR BEAMS/TRUSSES
 WITHIN SPECIFIED RANGE 1- 39

Maximum (absolute) Stress = .2326E+05 at BEAM 3

Beam	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
3	.8567E+03	.2125E-14	.7808E+03	.5477E-14	.2241E+05	-.9553E-14
	Maximum	Minimum	Cmb. Shear			
	.2326E+05	-.2155E+05	.1163E+05			

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Load Case 1:

REACTIONS

Node	Fx	Fy	Fz	Mx	My	Mz
2	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
3	-.1387E+04	-.8331E-17	-.5807E+03	-.7903E-17	-.2801E+04	-.8405E-15
24	-.1387E+04	-.8331E-17	-.5807E+03	-.9795E-16	.2801E+04	-.8405E-15
25	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
26	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00

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Ver. 2.0
Geometry Plot

2/13/95
14:49:25

IMAGES-3D

VER. 2.0

L Case 1

S= 1.000E+01

2/13/95

14:52:00

1
Deflected Shape - Wireframe Plot

APPENDIX B

TABLE 11
ALLOWABLE ANCHOR VALUES FOR
CARBON STEEL HILTI KWIK-BOLT II

Concrete Minimum Strength 3000 psi

The following tabulated data also apply to these specific sites:
Bld. 236-Z of Z-Plant, Tank Farms 241-SX-115.

Bolt Diameter (INCHES)	"T" (INCHES) (Note 1)	Embedment Depth (INCHES) (Min./Standard) (Note 3)	Maximum Allowable Load (KIP/BOLT) (Note 2)	Installation Torque (FT-LBS) (Min-Max)
1/4	1/2	1 1/8	T=0.31 V=0.32	4-7
		2	T=0.55 V=0.32	5-8
3/8	3/4	1 5/8	T=0.61 V=0.78	20-25
		2 1/2	T=1.21 V=0.88	22-28
1/2	3/4	2 1/4	T=1.23 V=1.47	30-45
		3 1/2	T=2.00 V=1.47	45-60
5/8	3/4	2 3/4	T=1.75 V=2.53	75-90
		4	T=2.67 V=2.75	95-115
3/4	3/4	3 1/4	T=2.17 V=3.41	150-175
		4 3/4	T=3.87 V=3.71	225-240
1	3/4	4 1/2	T=3.80 V=6.27	200-350
		6	T=5.81 V=7.59	350-450

General Note: For bolt length, use as a minimum that which will satisfy the required embedment depth and "T".

1) T = maximum thread length above nut after torquing, minimum length equals two threads above nut.

2) The design shall not consider anchor pretension;

$$\frac{V_{\text{applied}}}{V} + \frac{T_{\text{applied}}}{T} \leq 1.0$$

3) Minimum embedment = Absolute minimum embedment depth allowed

DISTRIBUTION SHEET

To	From	Page 1 of 1				
Distribution	JW Bailey	Date 23 July 1998				
Project Title/Work Order		EDT No. 622233				
Project W-320 Tank 106-C, HNF-2475, Piping Calculations, Vol. 5		ECN No. n/a				
Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only	
JW Bailey	S2-48					
W-320 Project Files	R1-29					