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STRESS ANALYSIS FOR THE FIST PIPING SYSTEM

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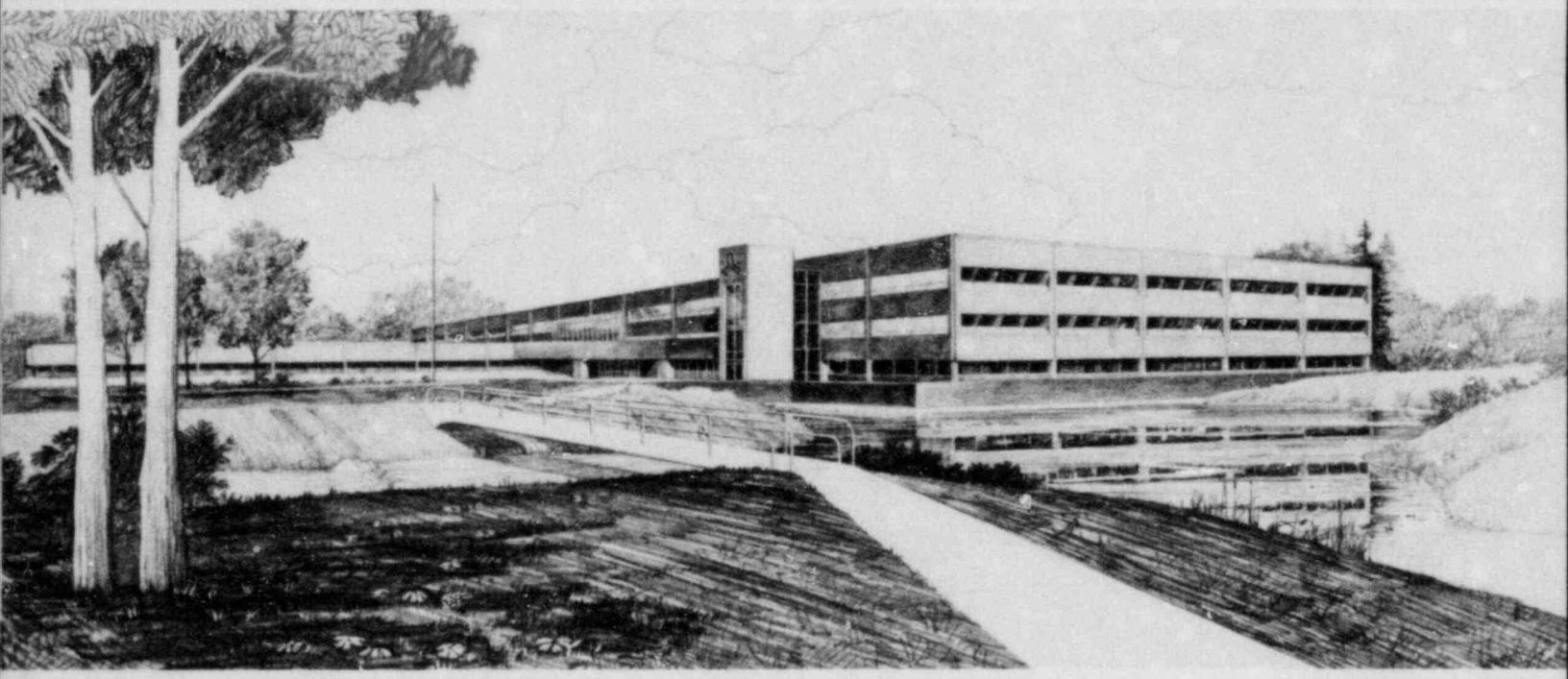
Idaho Operations Office • Idaho National Engineering Laboratory



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INTERIM REPORT

ABSTRACT

An investigation has been completed for the Full Integral Simulation Test (FIST) Steam Generator Vessel Piping which supplements the analysis previously performed for the Steam Generator Vessel. The piping analysis was performed to determine stresses due to deadweight, pressure, and thermal loads. The results were then evaluated according to the ASME B31.1 Code. A fatigue life evaluation was also performed at vessel nozzles and at selected piping locations that will be subject to significant transient thermal loads. Ranger selection and development of other support data was included.

Results indicate that B31.1 Code requirements are satisfied for the piping system (pipe and welding fittings) and that all components investigated will be suitable for the 200 blowdown/quench cycles plus 1000 normal heatup-cooldown cycles used in the previous vessel analysis. Certain other thermal expansion cases were considered and the piping will be suitable for 200 each of these particular cases.

SUMMARY

The FIST Steam Generator Vessel piping has been designed according to the ASME B31.1 Code. The piping analysis covered by this task provides an evaluation of selected piping according to the above code and provides data for selection of piping supports. The piping analyzed consists of: (1) 1 1/2 in. and larger piping extending from the Steam Generator Vessel to various components or other anchor points, (2) the piping between the feedwater tank and the feedwater pump suction nozzle, and (3) the piping between the feedwater pump discharge nozzle and intermediate anchor points.

Refer to Appendix A for computer plots of the piping included in this analysis.

The FIST Steam Generator Vessel was previously investigated (prior to completion of the piping design drawings) based on the assumption that nozzle loads would be insignificant. The present analysis takes nozzle loads due to deadweight and thermal expansion into consideration and thus upgrades the Steam Generator Vessel fatigue life evaluation. The fatigue analysis also includes the evaluation (for information only) of selected parts of the piping system subject to significant transient thermal gradients through the pipe wall. Note that transient thermal loads are not covered by B31.1 Code analysis procedures.

Thermal gradients used for piping components were based on the previous thermal analysis for the 8 in. flange and injection nozzle performed for the Steam Generator Vessel. Gradients were selected so that they would be as realistic as possible and still be on the conservative side. Since the gradients used depended in part on engineering judgement, it follows that results based on gradients obtained by thermal analysis would be more accurate.

Results of the analysis indicate that B31.1 Code requirements for design and operating conditions are satisfied for the piping system under consideration (as shown on preliminary drawings, or modified by discussions of later date and noted in Section 2 of this report). This piping system will be adequate for

200 or more blowdown/quench cycles, 1000 heatup-cooldown cycles, and 200 each of the other cases investigated (see discussion, page 2).

A summary of the major stress results and fatigue usage factors associated with the fatigue evaluation is presented below. Note that a total usage of U < 1.0 indicates suitability of the referenced region for the indicated number of stress cycles. Component loads and support load data are tabulated in Appendix B.

STRESS SUMMARY

B31.1 Analysis - Model 1

Line	Node	Material	Stress, psi (max)	Stress Eq.
3-204	39	(1)	7720	8
	39	(1)	3613	10
	39	(1)	11333	11
3-205	39	(1)	8307	8
	8	(1)	8378	10
	8	(1)	13737	11
3-203	164	(2)	8342	8
	85	(1)	10045	10
	164	(2)	17734	11
2-105	98	(1)	10510	8
	151	(1)	5654	10
	98	(1)	12323	11
1 1/2-101	362	(1)	5076	8
	362	(1)	7641	10
	362	(1)	12717	11
1 1/2-102	222	(1)	10188	8
	222	(1)	2934	10
	222	(1)	13122	11
1 1/2-503	262	(1)	5236	8
	313	(1)	4335	10
	313	(1)	9085	11
2-202	379	(2)	9948	8
	199	(1)	16310	10
	199	(1)	22912	11
2-203	389	(2)	5925	8
	389	(2)	17595	10
	389	(2)	23520	11
1 1/2-104	60	(1)	7897	8
	194	(1)	5358	10
	60	(1)	12385	11

STRESS SUMMARY (cont.)

Line	Node	Material	Stress, psi (max)	Stress Eq.
1 1/2-309	539	(1)	9326	8
	431	(1)	14096	10
	431	(1)	23003	11
1 1/2-304	539	(1)	9326	8
	548	(2)	9754	10
	548	(2)	15498	11
1 1/2-305	491	(2)	8686	8
	149	(1)	6736	10
	149	(1)	12047	11
2-401	495	(1)	5346	8
	518	(1)	18489	10
	518	(1)	23782	11
B31.1 Analysis - Model 2				
3-307	240	(2)	5095	8
	230	(1)	12951	10
	230	(1)	17895	11
B31.1 Analysis - Model 3				
1 1/2-201	280	(1)	4092	8
	280	(1)	7097	10
	280	(1)	11189	11
1 1/2-207	295	(1)	4372	8
	295	(1)	5279	10
	295	(1)	9650	11
1 1/2-208	100	(2)	4176	8
	110	(1)	3879	10
	100	(1)	8007	11

MATERIAL

(1) SA-105 Material - Forgings
Allowable Stress, psi
Equation 8 - 17500
Equation 10 - 26250
Equation 11 - 43750

(2) SA-106 Gr B - Pipe
Allowable Stress, psi
Equation 8 - 15000
Equation 10 - 22500
Equation 11 - 37500.

FATIGUE ANALYSIS - MODEL 1

Recirculating Line Discharge Side

Injection Nozzle — $U_T = 0.4415$
Line 1 1/2-102, Node 222

Injection Nozzle — $U_T = 0.3481$
Line 2-202, Node 245

Recirculating Line - Suction Side

Tee (Vessel-Cross) — $U_T = 0.0728$
Line 2-105, Node 170

Tee (Vessel-Cross) — $U_T = 0.0720$
Line 3-204, Node 170

Steam Line

Vessel - Branch Connection — $U_T = 0.0607$
Line 3-401, Node 495.

CONTENTS

1. INTRODUCTION

A previous investigation[1] of the FIST Steam Generator Vessel included a fatigue analysis performed in accordance with ASME Section III Code[2] requirements for Class 1 components (NB-3653). That analysis was based on the assumption that piping loads applied to vessel nozzles were negligible. The present analysis upgrades the previous one by including the effect of piping loads. A fatigue evaluation for selected locations in the piping system was also included (locations subject to significant thermal transients). However, the primary objective of the present analysis was to accomplish the following: (1) evaluate the piping system on the basis of ASME B31.1 criteria,[3] (2) verify piping supports and/or select other suitable ones, and (3) determine reaction forces applied to terminal equipment.

The layout of the piping system is as shown on preliminary drawings[4] and P&ID drawings.[5] Several modifications were affected in the NUPIPE representation of the piping. These changes were made with project concurrence primarily to reduce pipe stresses or component loads to satisfactory levels. Not all of the FIST piping was included in the analysis. The part included was selected on the basis of the following considerations: (1) piping size (1 1/2 in. and larger), (2) the severity of applied loads, and (3) interface with the steam generator vessel and other terminal equipment. In addition, several other lines branching from the above piping were included to provide a better representation of boundary conditions for a given model.

Line numbers of piping included in the analysis are shown below:

1 1/2 - 101	1 1/2 - 201	1 1/2 - 303	2 - 401
1 1/2 - 102	2 - 202	1 1/2 - 304	1 1/2 - 503
1 1/2 - 104	2 - 203	1 1/2 - 305	
2 - 105	3 - 204	3 - 307	
3 - 105	3 - 205	1 1/2 - 309	
	3 - 206		
	1 1/2 - 207		
	1 1/2 - 208		
	2 - 208		

2. METHOD OF ANALYSIS

The analysis of the vessel with attached piping was performed by use of the NUPIPE program.[6] Hard copy input, computer plots, nozzle load tabulations and microfiche output for the analysis are included in the Appendices. Pump discharge lines were qualified for a design pressure of 1580 psig and an operating pressure of 1235 psig. All other piping was qualified for a design pressure of 1580 psig and an operating pressure of 1050 psig.

Thermal operating conditions were chosen so as to include all limiting combinations of temperatures between the vessel and interacting pipes. Thermal expansion effects were determined on the basis of the piping going from ambient conditions to an operating temperature of 550^{o}F. However, there was one exception to this--operating temperature for the blowdown piping (when blowdown occurs) was taken as the mean metal temperature associated with the maximum thermal gradient established through the pipe wall.

Thermal gradient input was obtained by applying engineering judgement and by interpolating thermal analysis data obtained previously for the steam generator vessel analysis and reported in Reference 1.

The fatigue analysis was based on 200 blowdown/quench cycles, 1000 heatup-cooldown cycles, and 200 each of the other cases investigated. These cases, identified as planned cases (or unplanned events of high probability), are represented by NUPIPE cases 3 through 12. The analysis is conservative in that the probable number of these occurrences for most conditions will be less than 200.

Pipe supports were shown on the preliminary piping drawings[4] as pipe stands, rod hangers, and spring hangers. These were confirmed or modified during the analysis. Loads on rod hangers and loads required to size spring hangers were determined by analysis. The displacement range of spring hangers was also determined.

NUPIPE limitations required use of fewer material sections and operating parameters for the steam generator vessel than was used in the

previous analysis so that the added piping and components could be adequately represented. This was accomplished by averaging and combining effects of differing material sections in the vessel.

Three NUPIPE models were required to represent the various piping to be analyzed. These models are described in the following subsections.

2.1 Steam Generator Vessel with Attached Piping (Model 1)

The model was identified by the permanent file name FIST 2. The model consists of the basic steam generator vessel, warmup lines, recirculating pump lines, feedwater pump discharge line, steam line, blowdown lines and cold water injection line. Lines with intermediate anchor type (fixed) supports were modeled from the vessel to their particular anchor point. Vessel node numbers and restraints are the same as in the foregoing vessel analysis.[1] A plot of this model is shown by Figure 1 of Appendix A. Detail plots of each branching line and a plot with each individual line superimposed on the basic vessel are included in Figures 2 through 15.

The piping drawing, sheet 4,[4] shows two locations at which a flanged component will be replaced by blind flanges during most tests. One such location (see detail at coordinate D3 of the drawing) shows spool 504 connecting the jet pump nozzle piping (Line 1 1/2-102) to the cold water injection line (1 1/2-503). The second location at coordinate L10 shows an open section in the warmup line (1 1/2-303). This open section provided an alternative position for valve V609 presently shown in Line 1 1/2-309 near the vessel (at elevation 27 ft. - 11 in.). In order to obtain the effects of inserting spool 504 and valve V609 at the alternate positions, the NUPIPE model was run with the spool piece in place and with a component representing valve V609 at each valve location. Several modifications to the pipe support system as shown on the preliminary design drawings have been made. Descriptions of the supports and their locations are listed below:

(1) A pipe stand, item 2-100, was added on suction line 3-205 near the upturned elbow at the end of a horizontal run of pipe which connects

to pump P32. This support was added to reduce loads acting on the pipe. The location of this support is shown in Figures 2 and 3 of Appendix A.

(2) A sway brace, item 2-110, was added on suction line 3-205 acting in the north-south direction. It was added to minimize torsional loads acting on the pump. The sway brace is placed at the location of spring hanger, item 2-10, as shown in Figures 2 and 3.

(3) A pipe stand, item 1-100, was added on suction line 3-105 near the upturned elbow located at the far end of the horizontal pipe segment from pump P31. It was added to minimize pump loads. The location of this support is shown on Figures 4 and 5.

(4) A sway brace, item 1-110, was added on line 1 1/2-102. This sway brace should provide restraint in both the N-S and E-W directions. The location and support directions for the required restraints are shown on Figures 6, 7, and 8.

(5) The spring hanger, item 5-10, on line 1 1/2-503 was replaced by a rod hanger.

(6) The location of spring hanger, item 5-20, on line 1 1/2-503 was at the termination point of this line in the NUPIPE model. Therefore, the spring hanger was represented by a fixed support for modeling purposes.

(7) Spring hangers, items 2-90 and 2-70, are shown on an isometric sketch (see page A-18) along with rerouted piping for lines 2-202 and 2-203. These hangers are shown on Figures 9 and 10.

(8) The location of the fixed support, item 2-80, on line 2-203 is represented by the anchor that terminates line 2-203 as shown on Figures 9 and 10.

(9) The revised location of the fixed support, item 2-60, on line 1 1/2-208 is represented in the NUPIPE model by the "anchor" which terminates line 1 1/2-208. The location of this support is shown on Figures 9 and 10. This support is also indicated on Figure 18 showing the continuation of the discharge line to pump P32.

(10) A sway brace, item 2-120, acting in the north-south direction was added to line 2-202.

(11) The fixed support, item 4-30, on line 3-401 was replaced by a spring hanger. The spring hanger was used to decrease stresses due to thermal expansion.

(12) A rod hanger, item 3-120, was added at the north end of valve V637 in line 1 1/2-304. It was added to decrease stresses due to deadweight loading during the tests conducted when valve V609 is installed in line 1 1/2-303. The location of this support is shown on Figures 13 and 14.

2.2 Feedwater Pump Suction Line (Model 2)

This model, identified by the permanent file name FIST 3, consists of the feedwater pump suction line which is an isolated, unbranching, line extending between the feedwater tank and the feedwater pump. This line is shown on Figure 17 of Appendix A.

2.3 Recirculating Pump #2 Discharge Line (Model 3)

Model 3, file name FIST 4, consists of that part of the recirculating pump discharge line extending from the pump nozzle to fixed anchor points 1-60 and 2-60. This line is shown on Figure A-18 on Appendix A. Routing of this piping was revised while the analysis was in progress, as indicated by the isometric sketch found on page A-19.

3. STRUCTURAL ADEQUACY CRITERIA

Code classification for the Steam Generator Piping is according to ASME B31.1 whereas classification for the steam generator vessel is according to ASME Section VIII, Division 1. ASME B31.1 analysis results for regions associated with the steam generator vessel (piping nozzles) do not apply and are, therefore, not included in the evaluation. Fatigue life for these nozzles was evaluated per Section III, Class 1, criteria. At piping locations where Class 1 analysis was performed, no specification requirement for fatigue analysis exists and Class 1 results are given for information only.

4. ALLOWABLE STRESS VALUES

The material of fabrication and the allowable stress values at room and operating temperatures used for this analysis are as listed:

ASME B31.1 Analysis

Material	Sustained Stress Eq. 8, psi	Occasional Stress Eq. 9, psi	Expansion Stress Eq. 10, psi	Sustained Plus Expansion Stress Eq. 11, psi
SA-105 Forgings	17500	N/A	26250	43750
SA-106 GrB Piping	15000	N/A	22500	37500

Note that Code requirements are satisfied if either Equation 10 or Equation 11, but not both, are satisfied.

ASME Section III Analysis

Fatigue Analysis

Material	Temperature, ^{o}F	Allowable Stress, S_m, psi
SA-105 Forgings	70	17500
	550	17500
SA-106 GrB Piping	70	15000
	550	15000

5. RESULTS

Results for the NUPIPE analysis show that all components satisfy B31.1 criteria and that designated components also satisfy Section III criteria for primary plus secondary stress as required for a fatigue evaluation. Microfiche of the results are included in Appendix D. Results for various vessel and piping locations are summarized below. These locations are where the highest stresses occur. With respect to fatigue life, note that $U_T \leq 1.0$ is the Code limit for the total usage factor. Therefore, it is evident that the regions listed will be suitable for more than 200 blowdown/quench cycles combined with 1000 normal heatup-cooldown cycles, and 200 cycles each of the other test cases investigated.

As discussed in the introduction this task also included identification of spring hanger size, cold load, and thermal displacement data. Spring hanger identification was based on hanger data in Grinnell Catalog G-69.[7] The above data is contained in Appendix B. Appendix B also includes load data for rod hangers, sway braces, and rigid supports. These data do not include the effect of loads due to hydraulic forces.

5.1 Model 1 Analysis

5.1.1 B31.1 Analysis

Line No.	Component	Node No.	Stresses, psi Eq. 8	Eq. 10	Eq. 11
	Recirculating Pump (P32) - Suction Side				
3-204	Cross (Vessel Component)	170	5421	2843	8264
3-204	Tee	39	7720	3613	11333
3-205	Tee	39	8307	4243	12550
3-205	Elbow	26	5311	7012	12323
3-205	Elbow	8	4999	8738	13737
3-205	Elbow	4	4722	6872	11594
	Blowdown Line to Suppression Tank - Suction Side				
3-203	Tee	39	5423	6263	11686
3-203	Elbow	85	4972	10045	15017
3-203	Anchor	174	8342	9372	17734

	Recirculating Pump (P31) - Suction Side				
2-105	Cross (Vessel Component)	170	5257	1420	6677
2-105	Elbow	151	5132	5754	10786
2-105	Elbow	98	10510	1813	12323
2-105	Elbow	91	5045	6121	11166
2-105	Reducer	87	4359	5499	9858
	Recirculating Pump (P31) - Discharge Side				
1 1/2-102	Branch (Vessel Component)	222	10188	2934	13122
1 1/2-102	Tee	262	8415	1839	10254
1 1/2-101	Elbow	362	5076	7641	12717
	Cold Water Injection Line				
1 1/2-503	Tee	262	5236	3423	8658
1 1/2-503	Elbow	313	4750	4335	9085
	Recirculating Pump (P32) - Discharge Side from Vessel to Fixed Support				
2-202	Branch (Vessel Component)	245	5463	11331	16794
2-202	Reducer	199	6601	16301	22912
2-202	Elbow	155	5555	4944	10499
2-202	Tee	239	5699	3802	9501
2-202	Tee	239	7467	3478	10944
2-202	Elbow	212	5657	3899	9556
2-202	Reducer	339	6627	8144	14771
2-202	Elbow	352	6298	5117	11415
2-202	Pipe (weld)	379	9948	5826	15774
	Blowdown Line to Supression Tank - Discharge Side				
2-203	Tee	239	8666	2670	11336
	Pipe	364	8425	2991	11416
	Elbow	387	5265	11335	16600
	Pipe (Anchor 5-20)	389	5925	17595	23520
	(P31) Warmup Line from Vessel to Fixed Support				
1 1/2-104	Vessel Connection	60	7897	4488	12385
1 1/2-104	Elbow	194	5312	5358	10670
	Feedwater Line - Discharge Side				
1 1/2-309	Branch (Vessel Component)	415	6184	2159	8343
1 1/2-309	Elbow	431	8908	14096	23003
1 1/2-309	Elbow	467	5550	9982	15532
1 1/2-309	Elbow	477	5606	9504	15109

	Feedwater Line - Discharge Side (cont.)				
1 1/2-309	Tee	539	9326	4244	13569
1 1/2-304	Tee	539	9201	3148	12348
1 1/2-304	Pipe	548	5745	9754	15498
1 1/2-304	Reducer	568	4736	7578	12315
	(P662) Warmup Line from Vessel to Tee				
1 1/2-305	Tee	539	4934	4509	9443
1 1/2-305	Pipe	491	8686	1873	10559
1 1/2-305	Elbow	149	5311	6736	12047
1 1/2-305	Vessel Connection	80	5305	5750	11055
	Steam Line - Vessel to Fixed Support, 4-20				
2-401	Branch (Vessel Component)	495	5346	5714	11060
2-401	Elbow	518	5293	18489	23782
2-401	Elbow	532	4977	5845	10822
2-401	Reducer	562	5067	2946	8014
2-401	Elbow	604	5177	8515	13692

5.1.2 Class 1 Analysis

Class 1 NUPIPE analysis results are listed below for all components whose total usage factor was equal or greater than 0.05. For those cases where S_n exceeded the allowable stress, the Code provides an alternate method to determine the fatigue usage factor provided Equations 12 and 13 of Para. NB-3653.6 are satisfied. The NUPIPE results show that equations 12 and 13 are satisfied.

Item	Transient - Load Case Pair	Stress, psi S_n	$3\ S_m$	S_{alt}	Usage Factor (U)
Injection	5, 10	55754	52500	110667	0.4403
Nozzle (Line 1 1/2-102)	6, 11	13829		12274	0.0007
Node 222	Others	13995 max		12335 max	0.0004
				U_T =	0.4415

Injection	3, 10	54122	52500	100685	0.3423
Nozzle	6, 11	20590		15590	0.0032
(Line 2-202)	4, 8	30325		20492	0.0020
Node 245	7, 9	19844		15260	0.0006
				U_T =	0.3481
Tee	5, 10	33121	52500	50436	0.0471
(Vessel-Cross)	6, 11	14924		23658	0.0179
(Line 2-105)	5, 8	16235		24314	0.0040
Node 170	7, 9	15928		24160	0.0039
				U_T =	0.0728
Tee	5, 10	35113	52500	51432	0.0500
(Vessel-Cross)	6, 11	14623		23508	0.0140
Line 3-204	6, 9	18530		25461	0.0047
Node 170	7, 11	14196		23294	0.0034
				U_T =	0.0720
Branch	4, 10	32835	52500	49327	0.0439
(Vessel Component)	3, 11	37409		27288	0.0061
Line 3-401	6, 11	22424		19796	0.0053
Node 95	Others	22435 max		19802 max	0.0054
				U_T =	0.0607

Load Case	Description	Cycles
3	Reheat-Hot Vessel-Cold Lines-Recirc. Pump Line Valves Closed	200
4	Reheat-Hot Vessel-Cold Lines-Recirc. Pump Line Valves Open	200
5	Heatup-Recirc. Pump Line Valves Open	1000
6	Steady State	1000
7	Make up (accident condition)	200
8	Blowdown-Phase 1-Recirc. Lines Hot, from Vessel to Pumps	200
9	Blowdown-Phase 2-Blowdown line heated-Recirc. Lines Hot	200
10	Blowdown-Phase 3-Recirc. Lines Hot from Valves to Pumps	200
11	Preload-Null Case	1000
12	Heatup-Recirc. Pump Line Valves Closed	1000

5.2 Model 2 Analysis

B31.1 stress results for the feedwater pump (P662) suction line were determined using Model 2. Stress results for the most highly stressed components are listed below:

Line No.	Component	Node No.	Eq. 8	Eq. 10	Eq. 11
3-307	Elbow	70	4760	6238	10998
3-307	Elbow	116	4652	8874	13526
3-307	Elbow	230	4945	12951	17895
3-307	Pipe	240	5095	9480	14575

5.3 Model 3 Analysis

B31.1 stress results for the isolated piping between recirculating pump P32 discharge line and fixed anchors 1-60 and 2-60 were determined using Model 3. Stress results for the most highly stressed components are listed below:

Line No.	Component	Node No.	Eq. 8	Eq. 10	Eq. 11
1 1/2-208	Pipe	100	4176	3831	8007
1 1/2-208	Elbow	110	4053	3879	7933
1 1/2-201	Elbow	240	4032	5390	9421
1 1/2-201	Elbow	280	4092	7097	11189
1 1/2-207	Elbow	295	4372	5279	9650

6. HISTORICAL FILES

6.1 Input Files

Input files used for the FIST piping analysis are contained in historical files as program number, F00839, program name FISTPIP. The source listing of JCL and input consist of the following items:

FIST 2 - Vessel with branching piping
FIST 3 - Feedwater Pump P662 suction side piping
FIST 4 - Pump P32 discharge side piping.

6.2 Program Modules

The NUPIPE Version 1.4.1 module and associated supporting files are contained in historical files as program number F00673 under the program name NUPIPE. These modules were used to run the FIST piping analysis.

7. REFERENCES

1. W. C. Jouse, et al., Fatigue Evaluation for the FIST Steam Generator Vessel, Technical Report No. EGG-EA-5785, February 1982.

2. American Society of Mechanical Engineers, ASME Boiler and Pressure Vessel Code, Section III, Division 1, "Nuclear Power Plant Components," Subjection NB, 1977 Edition, Summer 1979 Addenda.

3. American Society of Mechanical Engineers, ANSI B31.1, "Power Piping Code," 1977 Edition.

4. Preliminary Drawings No. 179F145-601, Sheets 1-5, Prepared by GE/San Jose, to be released.

5. Preliminary P&ID Drawing, "Full Integral Simulation," Drawing No. 179F145-401, July 9, 1981.

6. NUPIPE-II Piping Analysis Program, Version 1.4.1, Program Module V4PIF1L, Released December 15, 1980, by Applied Mechanics Branch.

7. Grinnell Catalog G-69, Grinnell Company, Inc., Providence, Rhode Island.

APPENDIX A

FIGURES
COMPUTER PLOTS AND ISOMETRIC SKETCH

CONTENTS

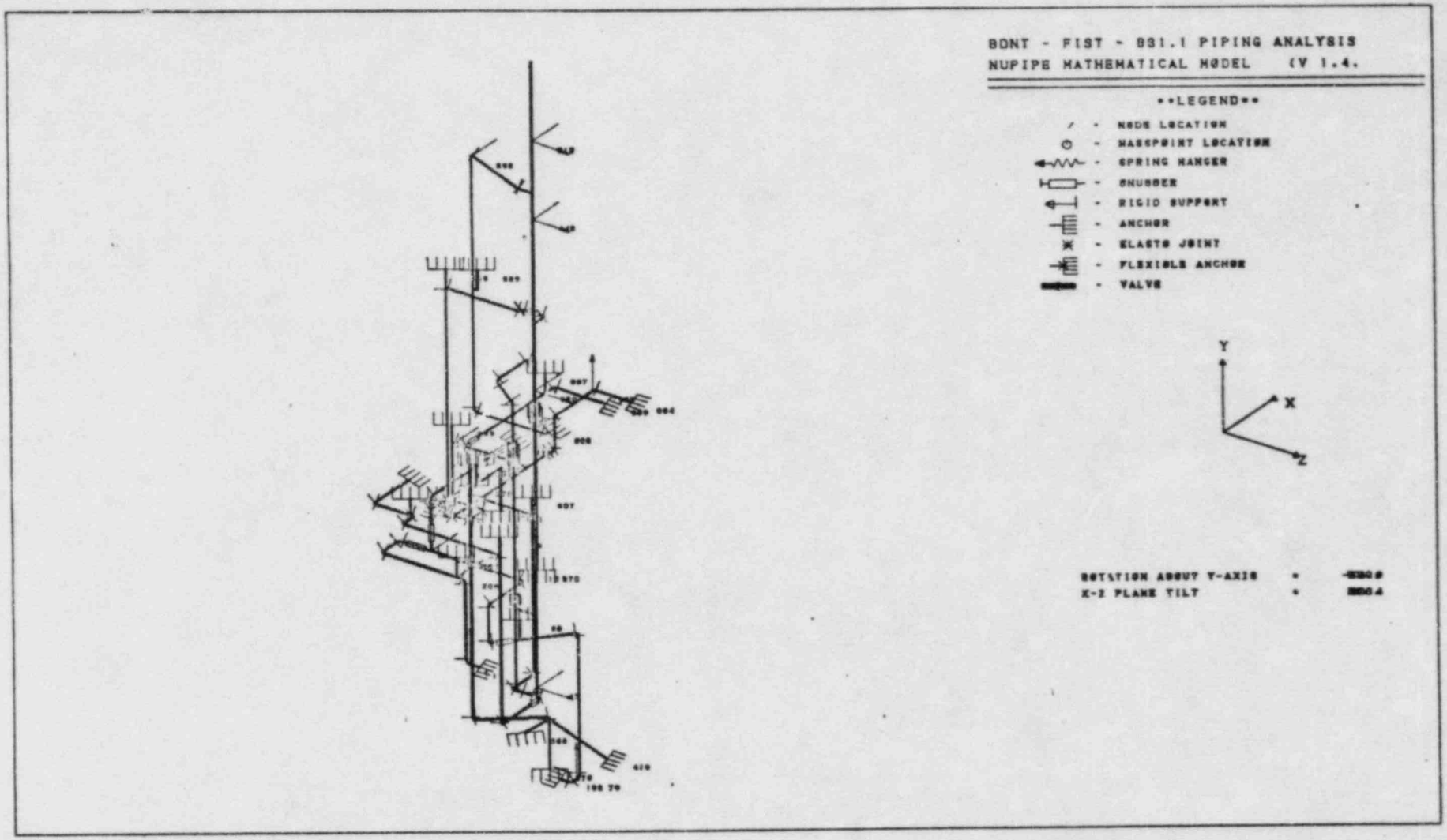

Figure 1. Model 1 - isometric.

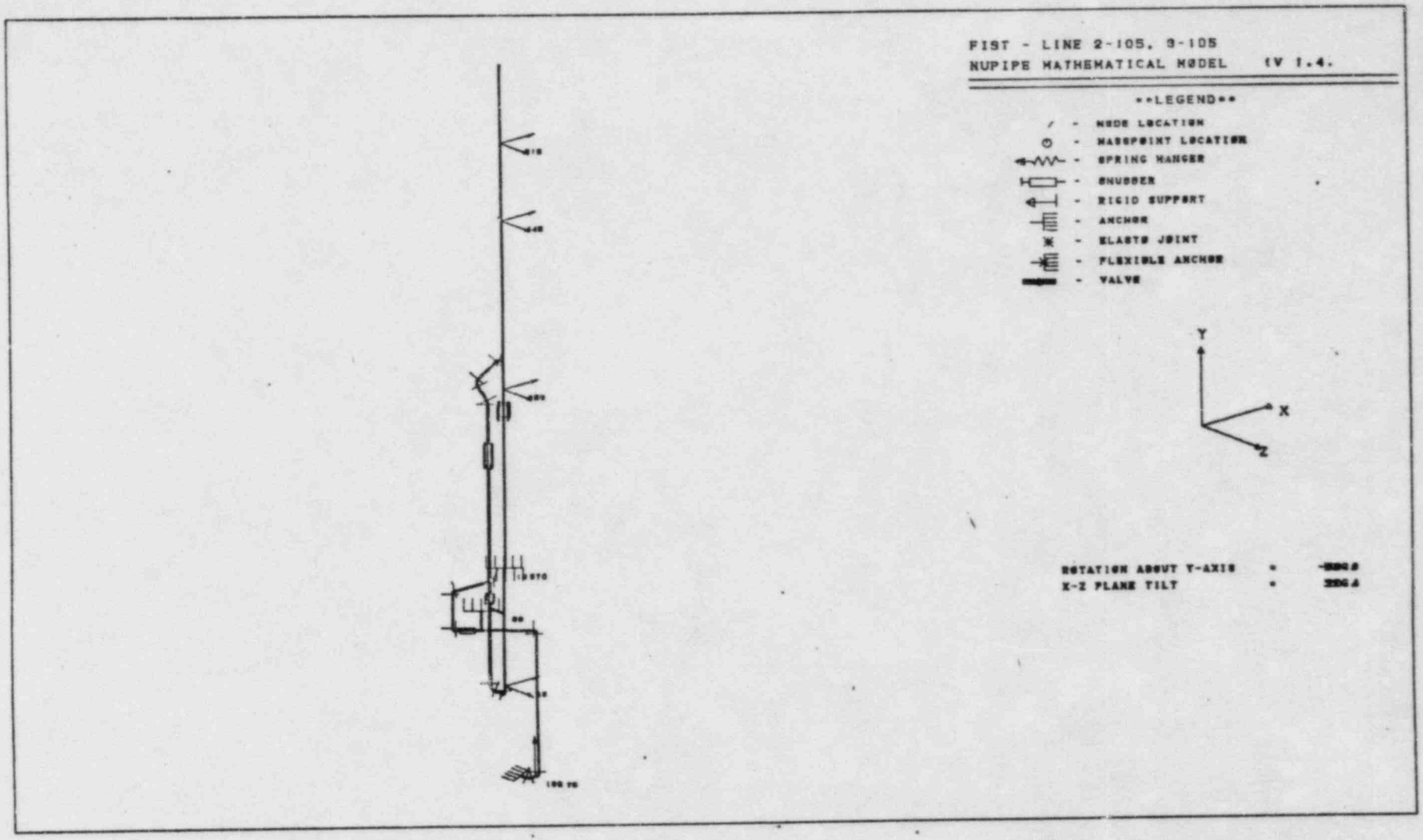

Figure 2. Vessel with lines 2-105, 3-105.

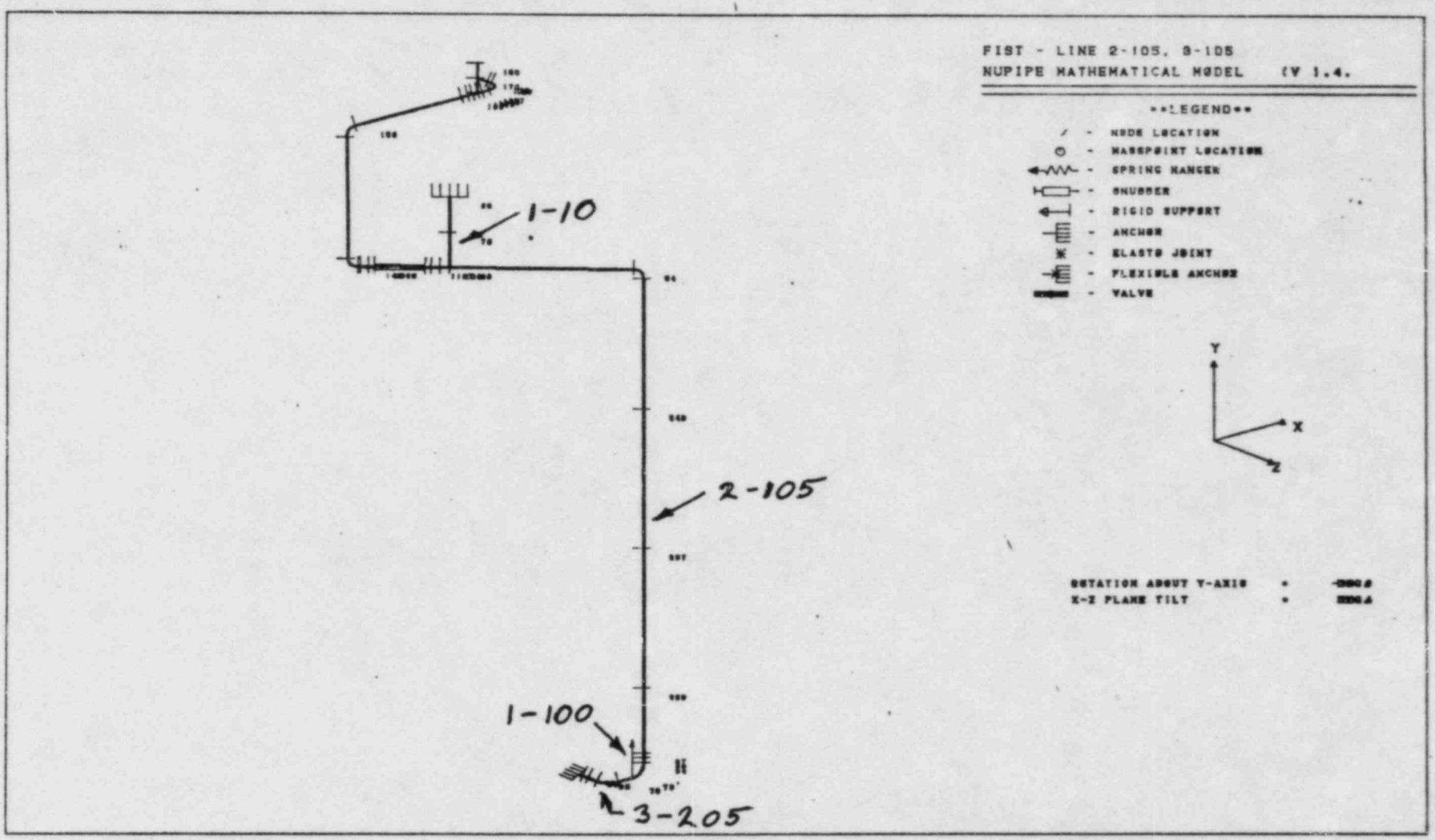

Figure 3. Detail - lines 2-105, 3-105.

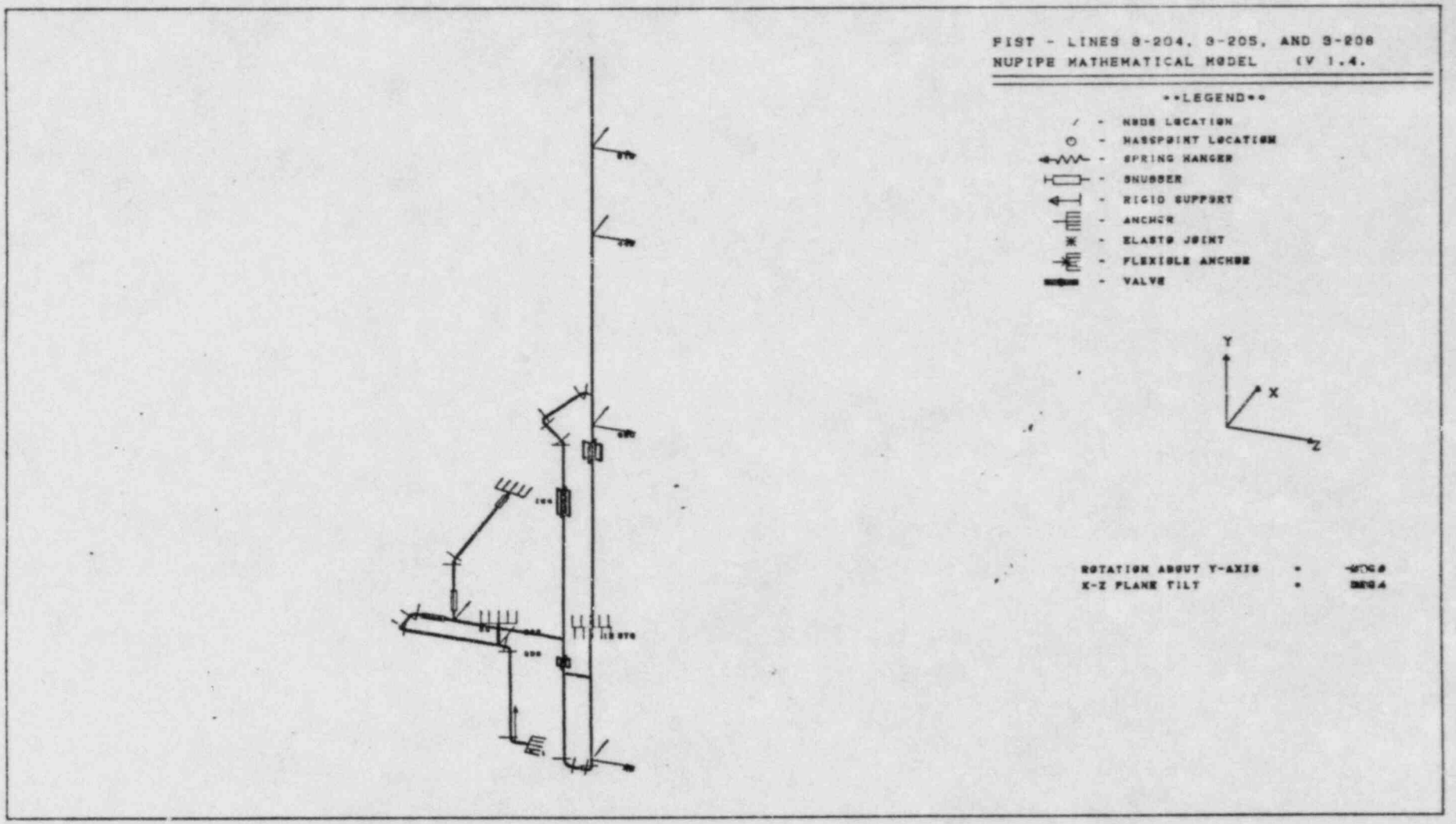

Figure 4. Vessel with lines 3-204, 3-205, and 3-206.

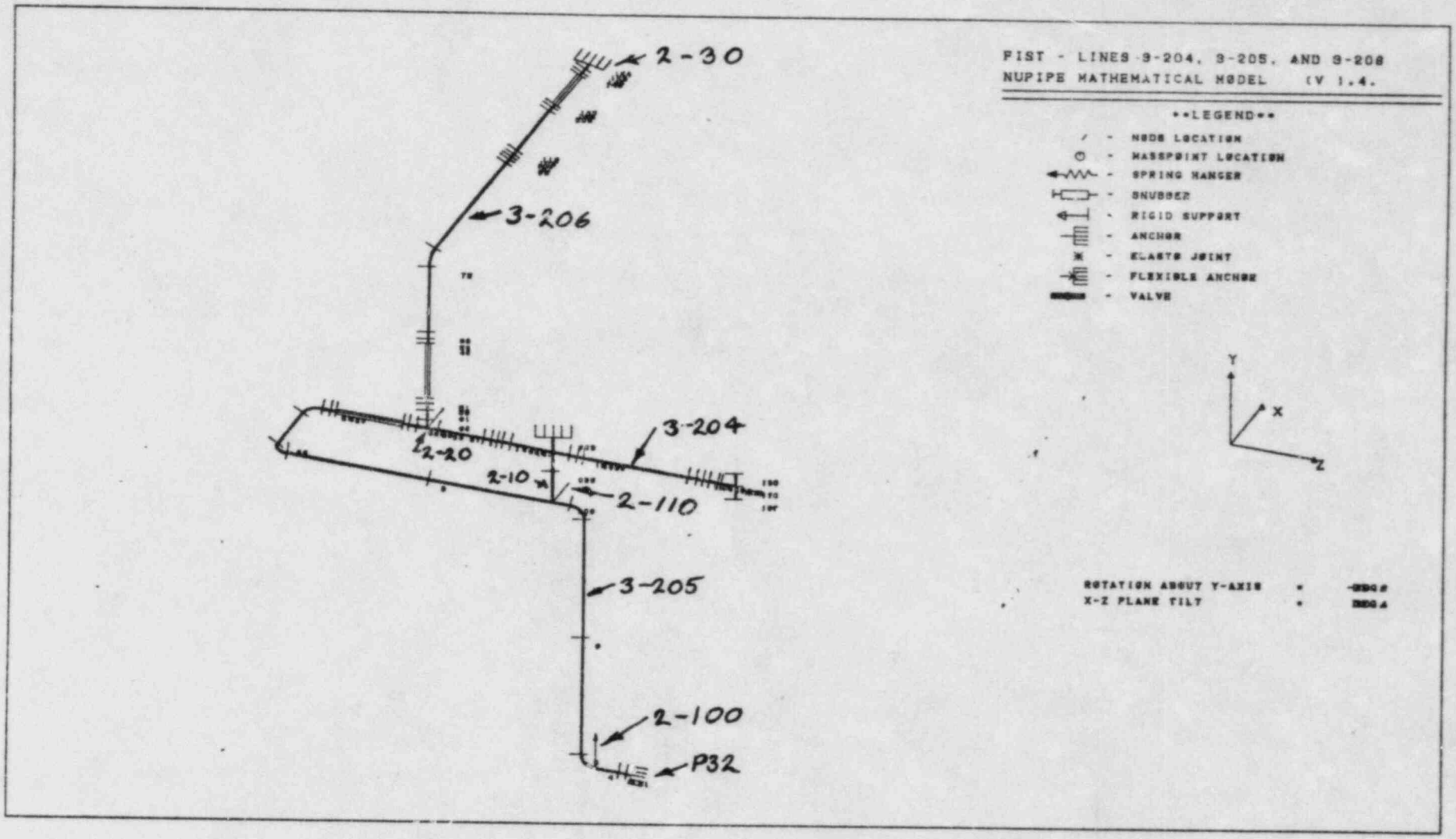

Figure 5. Detail - lines 3-204, 3-205, and 3-206.

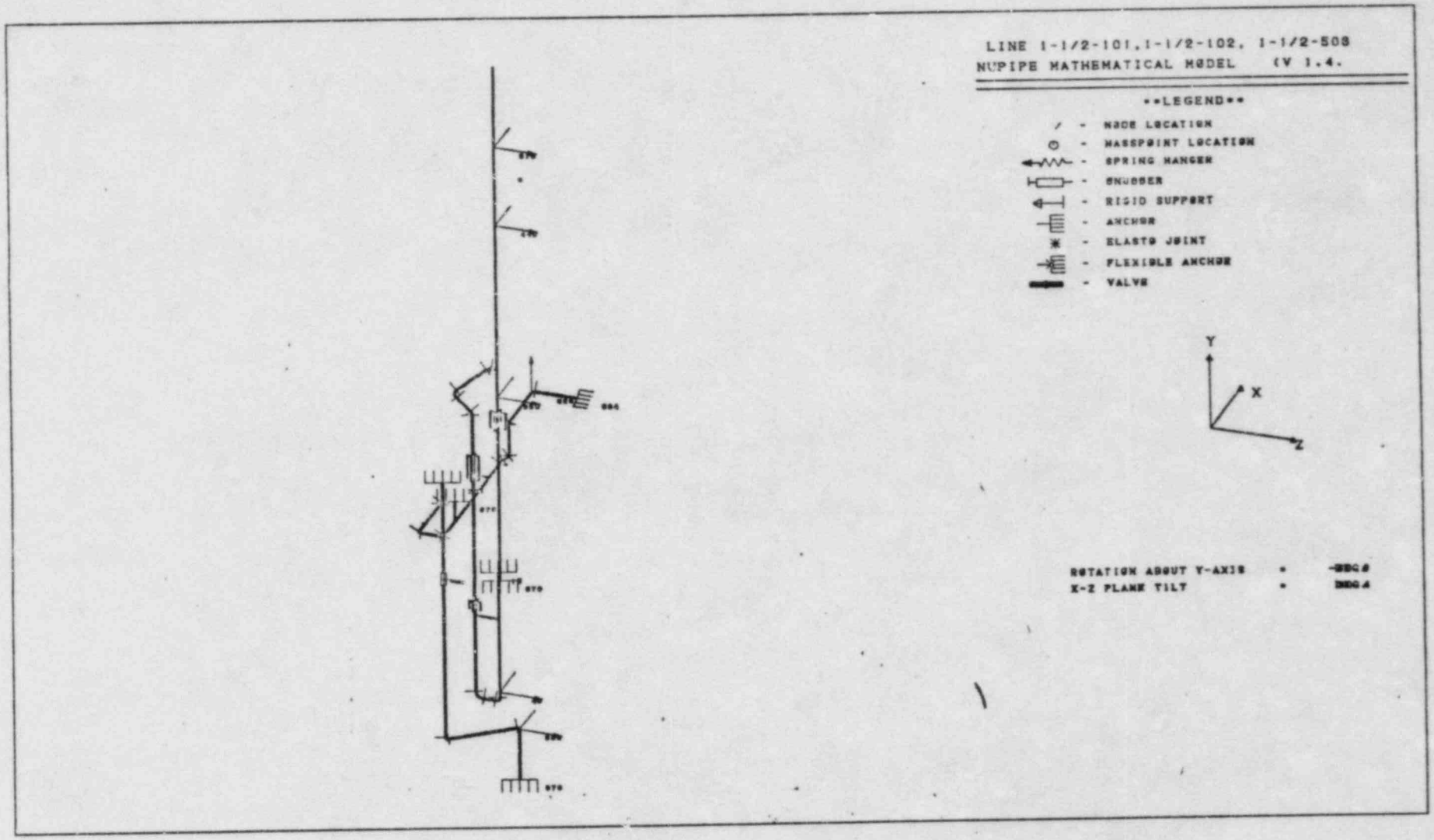

Figure 6. Vessel with lines 1 1/2-101, 1 1/2-102, and 1 1/2-503.

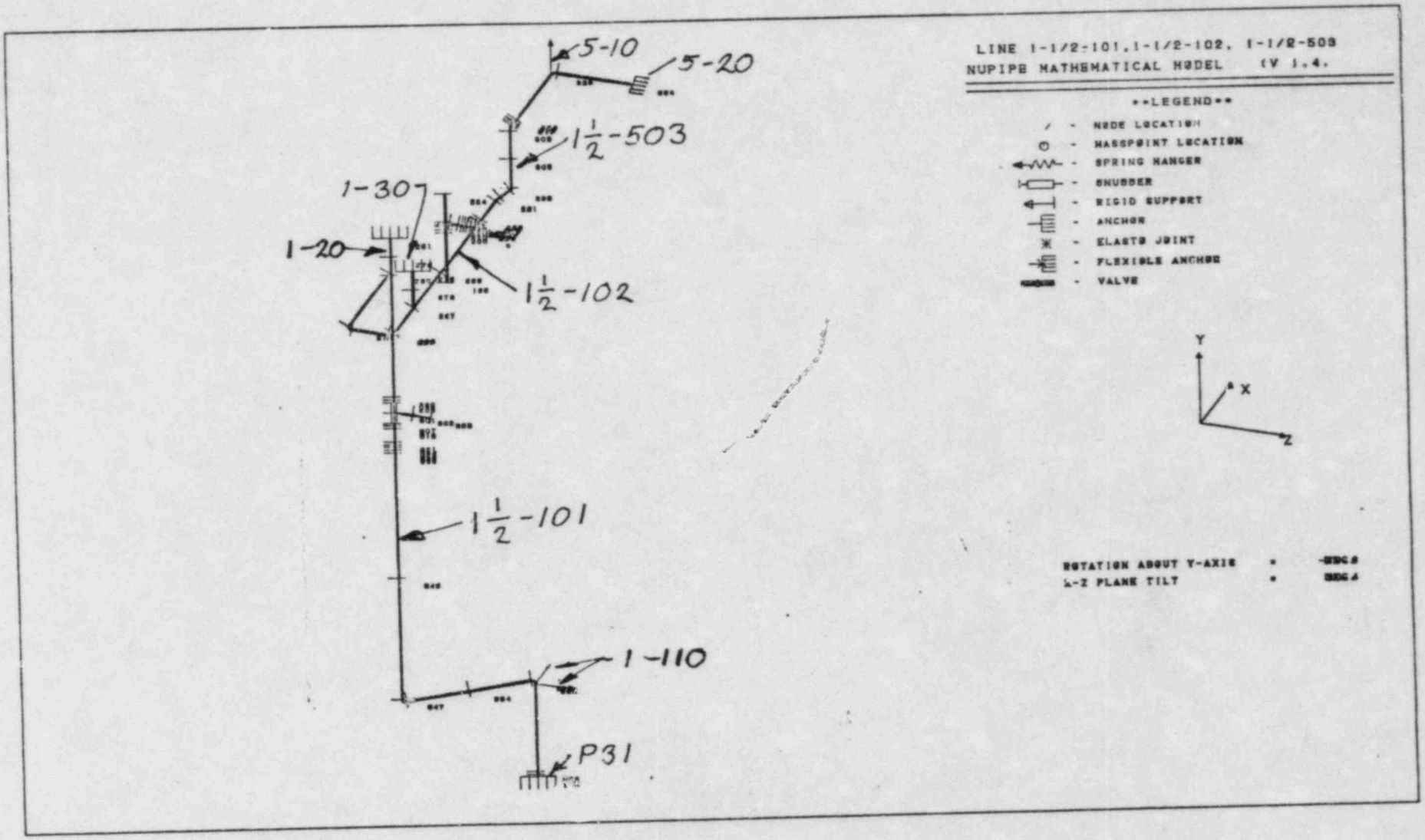

Figure 7. Detail - lines 1 1/2-101, 1 1/2-102, and 1 1/2-503.

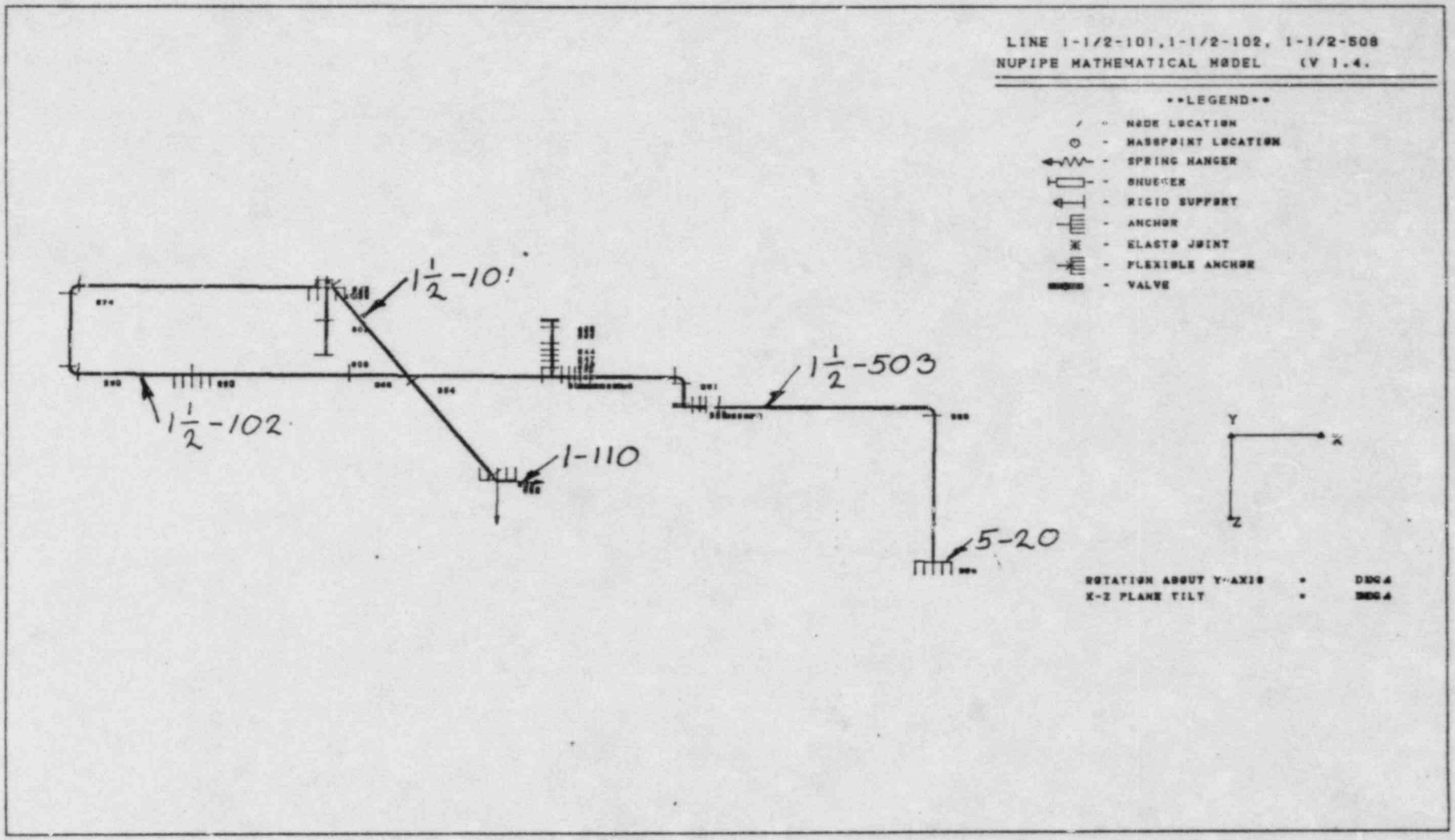

Figure 8. Plan - lines 1 1/2-101, 1 1/2-102, and 1 1/2-503.

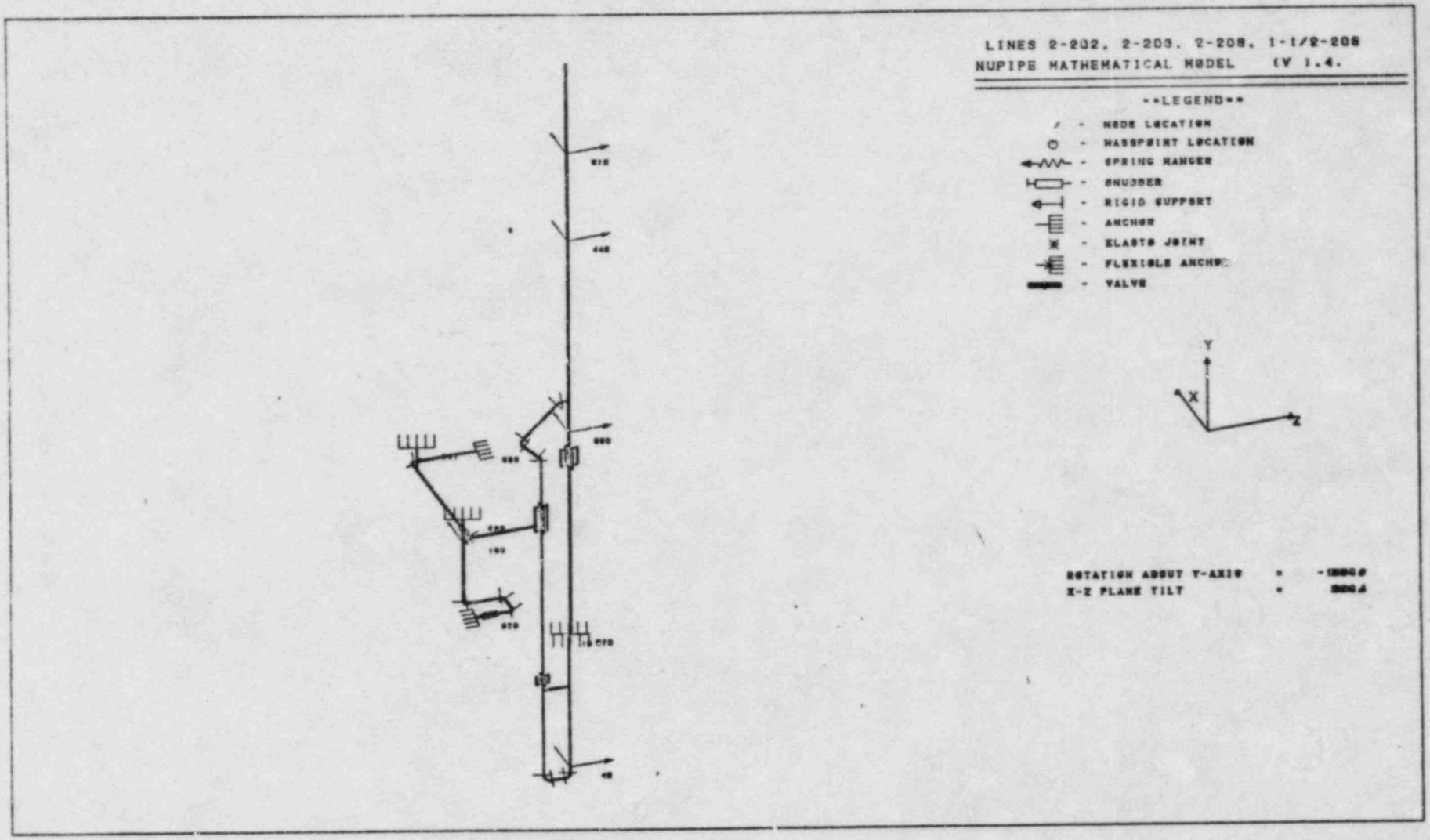

Figure 9. Vessel with lines 2-202, 2-203.

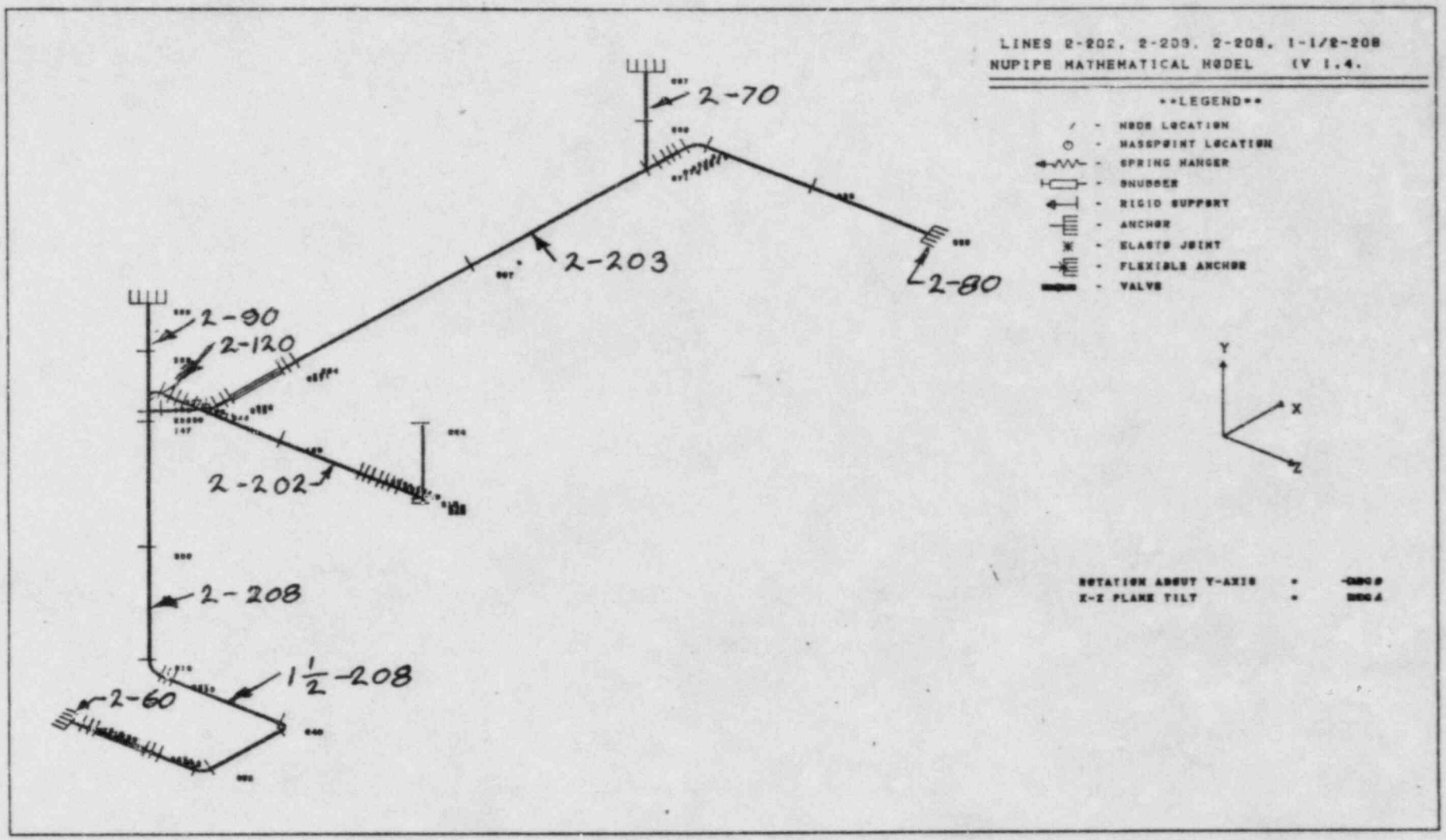

Figure 10. Detail - lines 2-202, 2-203.

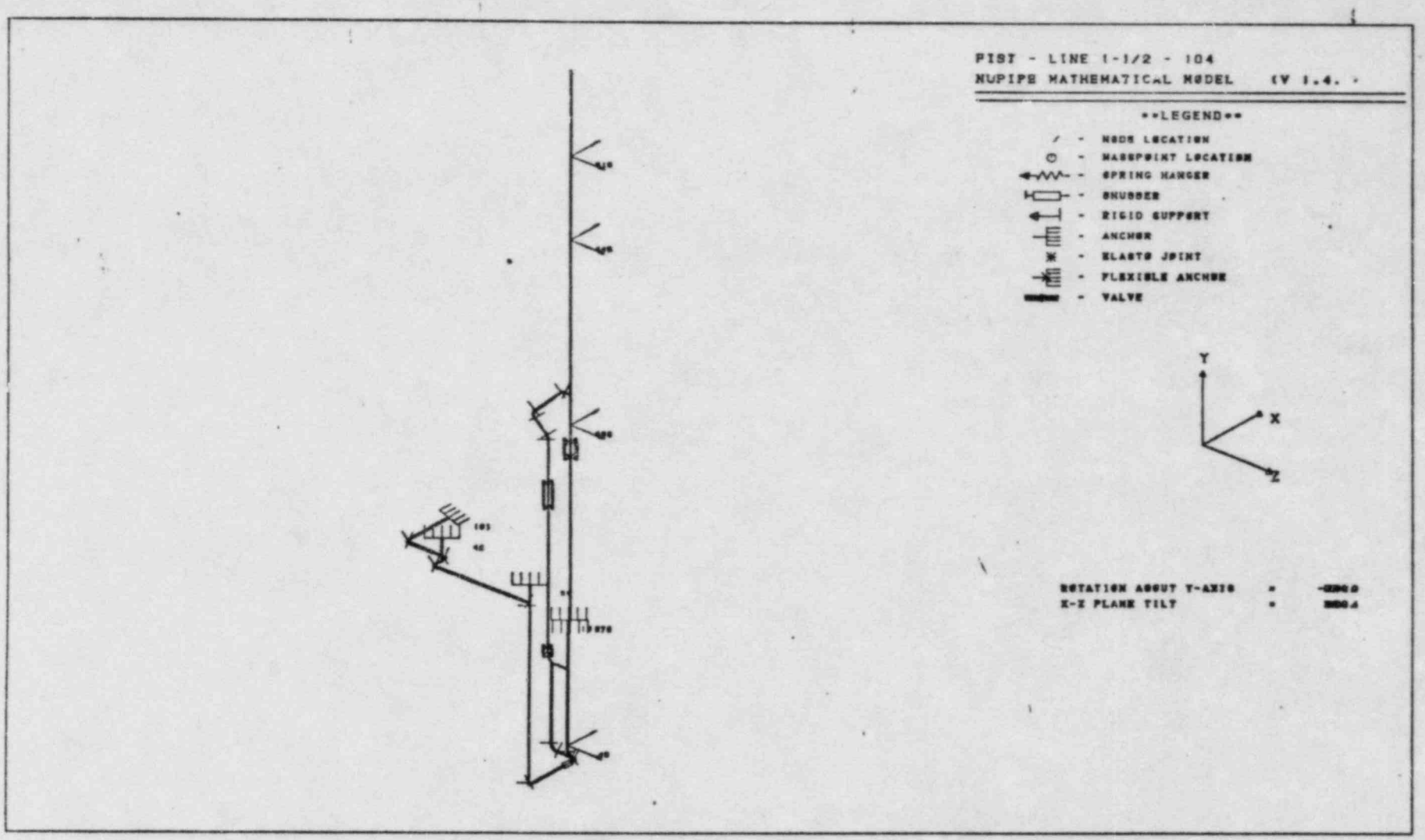

Figure 11. Vessel with line 1 1/2-104.

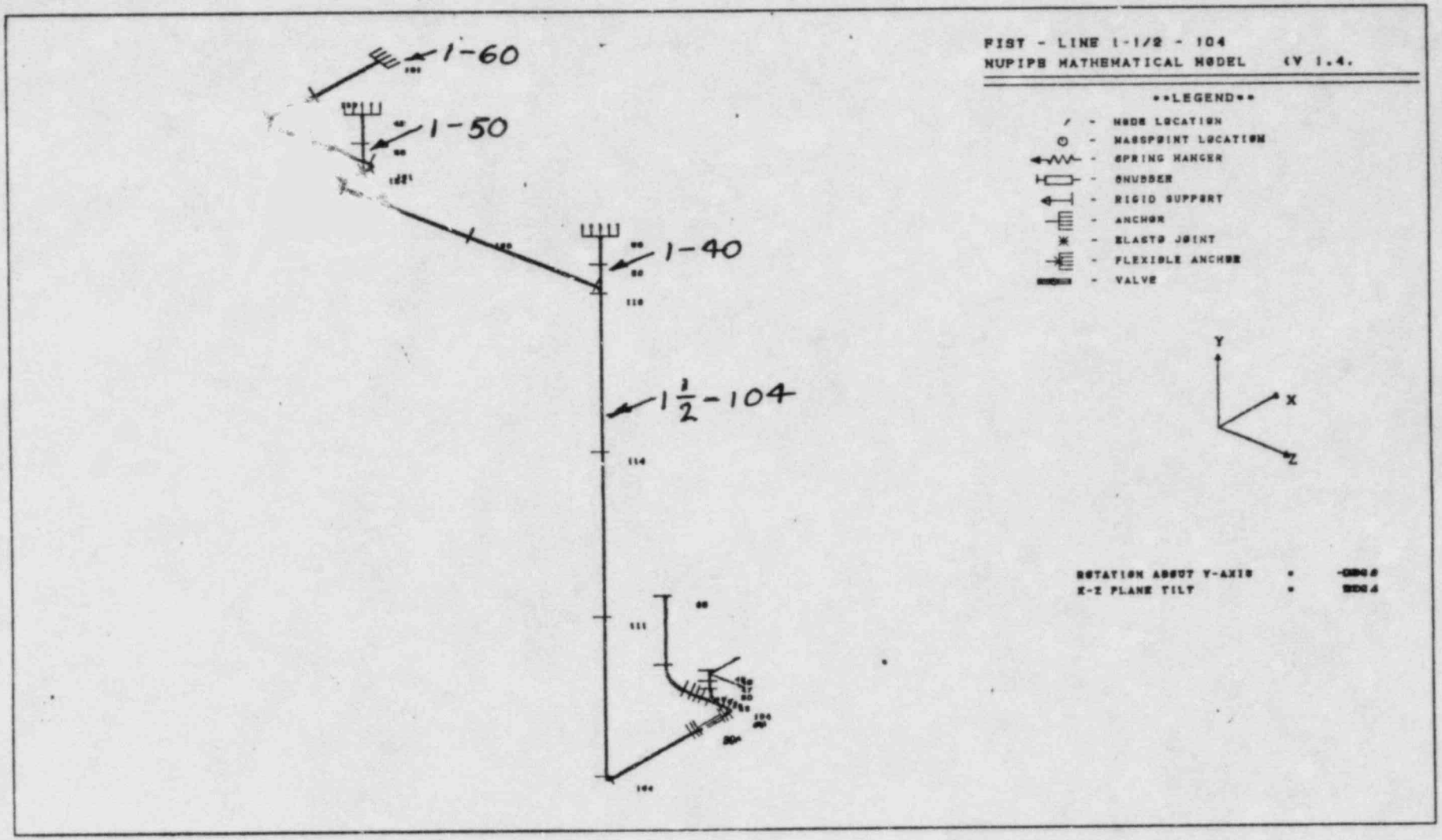

Figure 12. Detail - line 1 1/2-104.

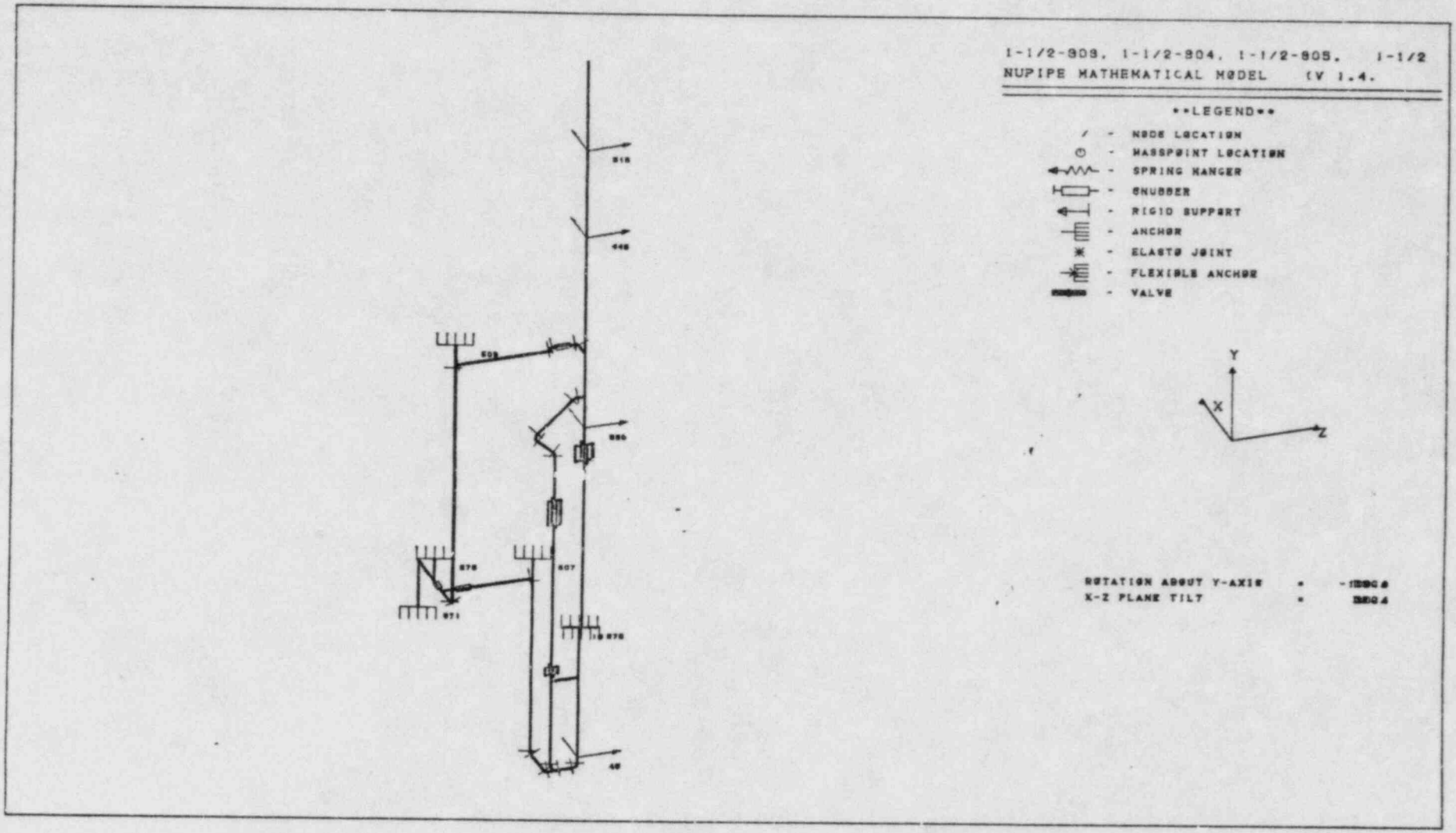

Figure 13. Vessel with lines 1 1/2-303, 1 1/2-304, 1 1/2-305, and 1 1/2-309.

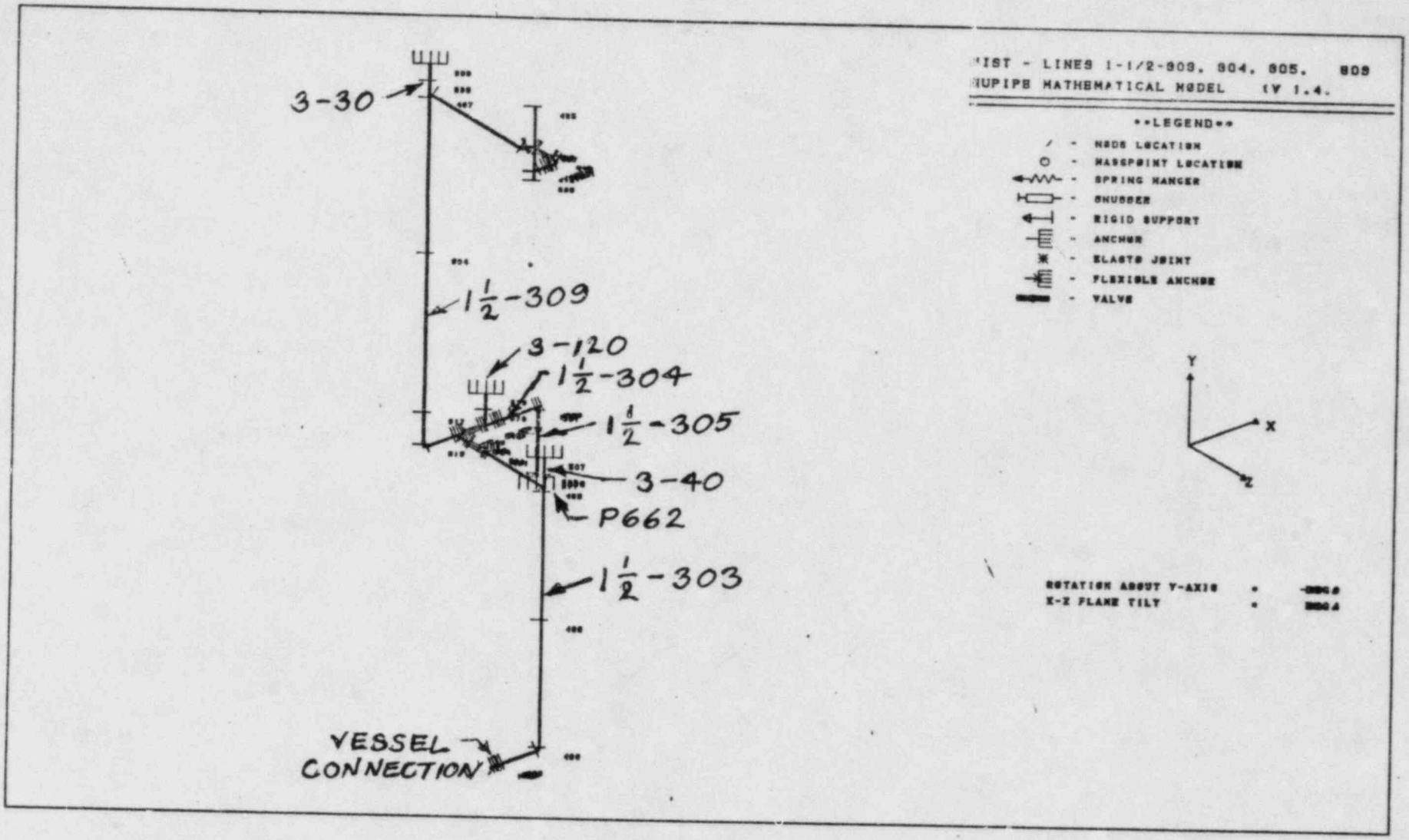

Figure 14. Detail -.lines 1 1/2-303, 1 1/2-304, 1 1/2-305 and 1 1/2-309.

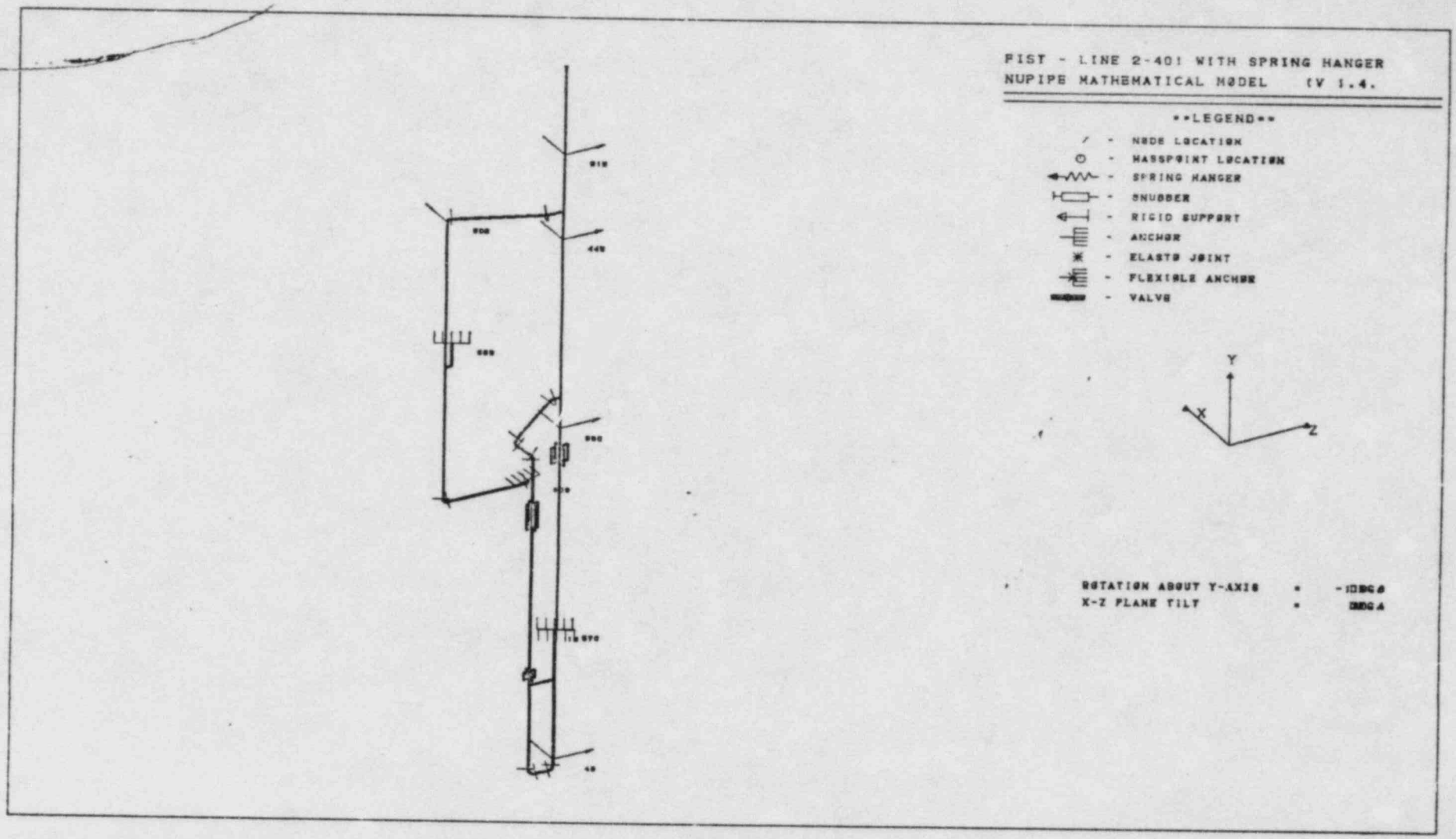

Figure 15. Vessel with line 2-401.

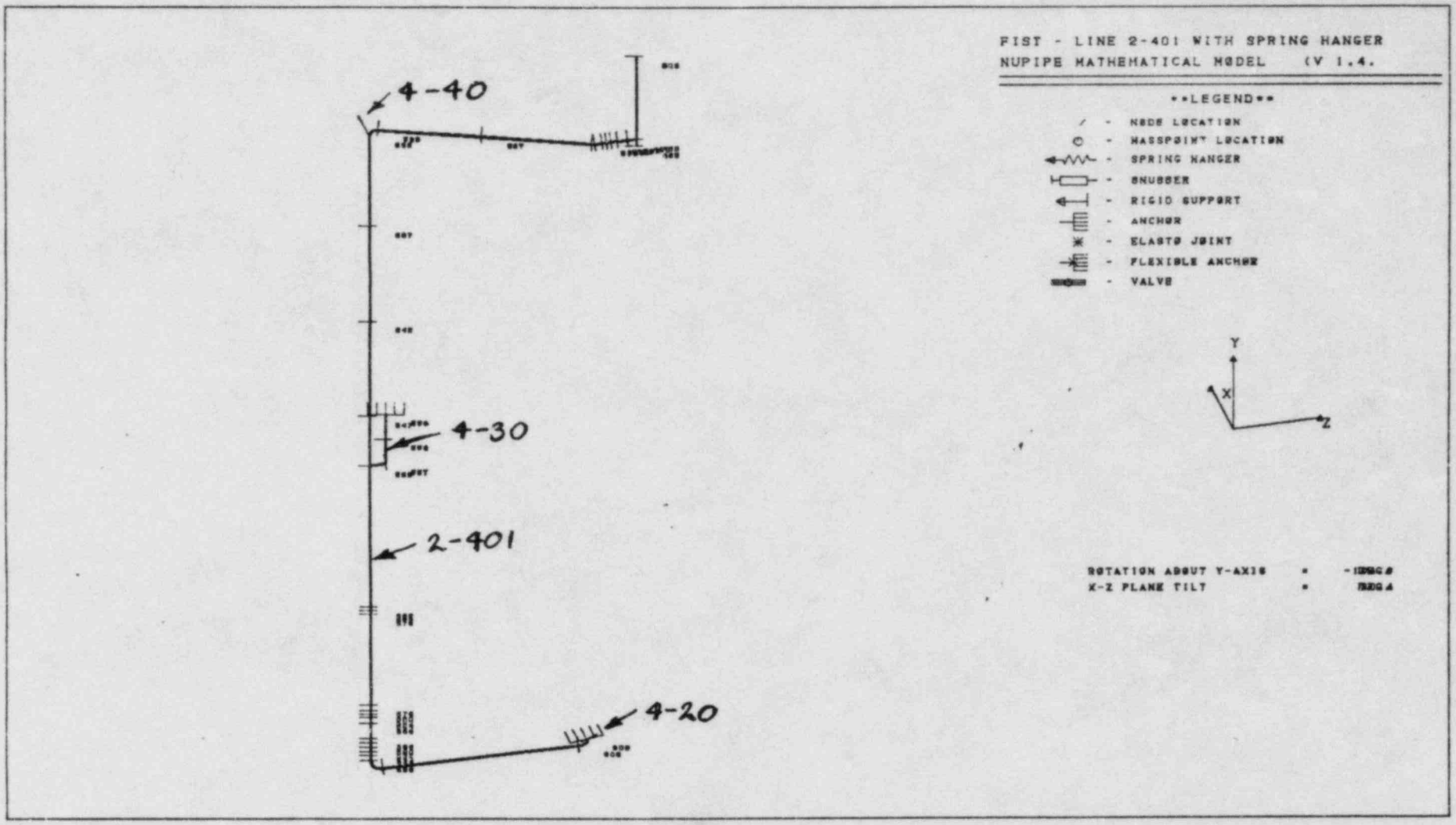

Figure 16. Detail - line 2-401.

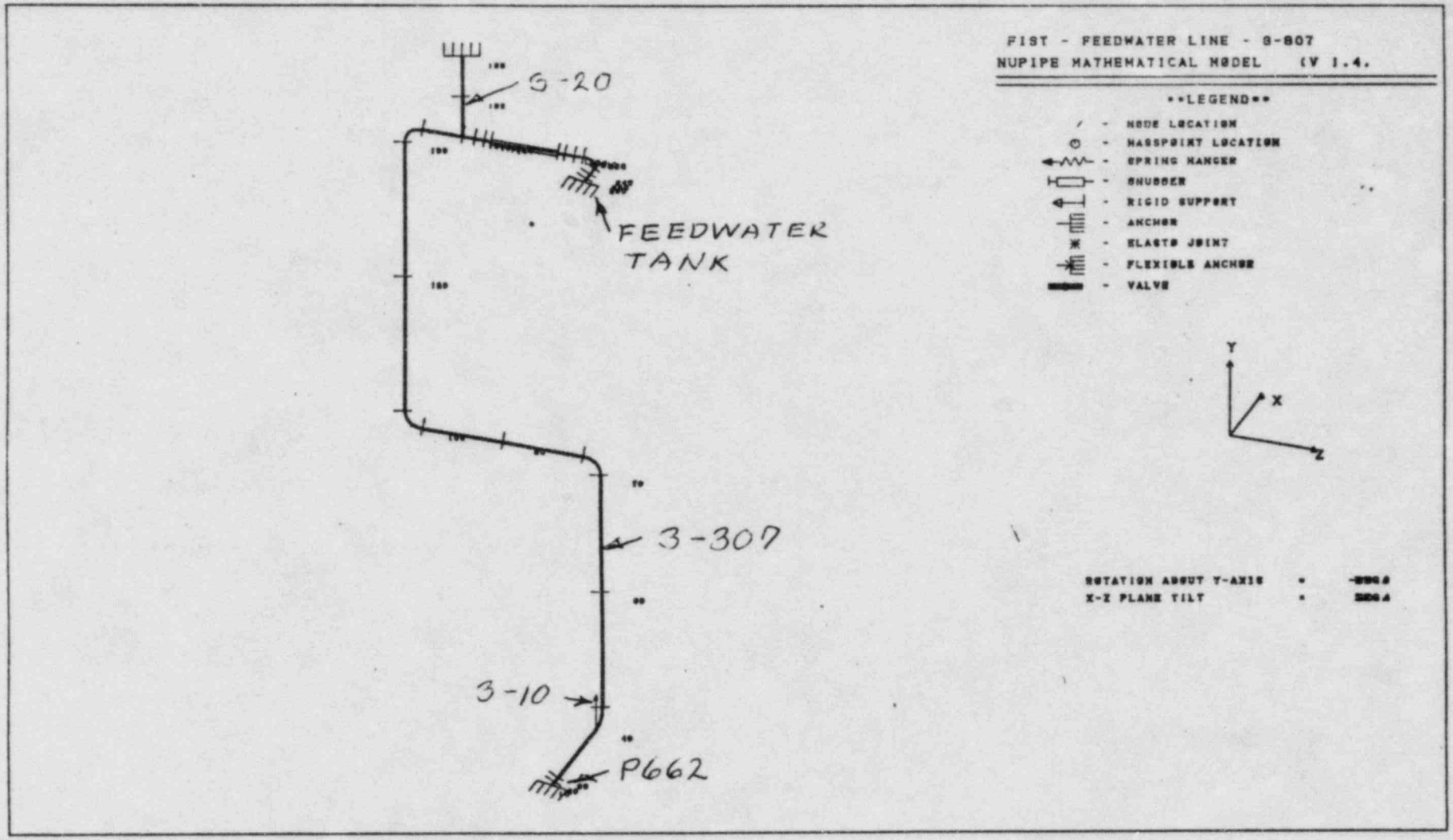

Figure 17. Model 2 - Line 3-307.

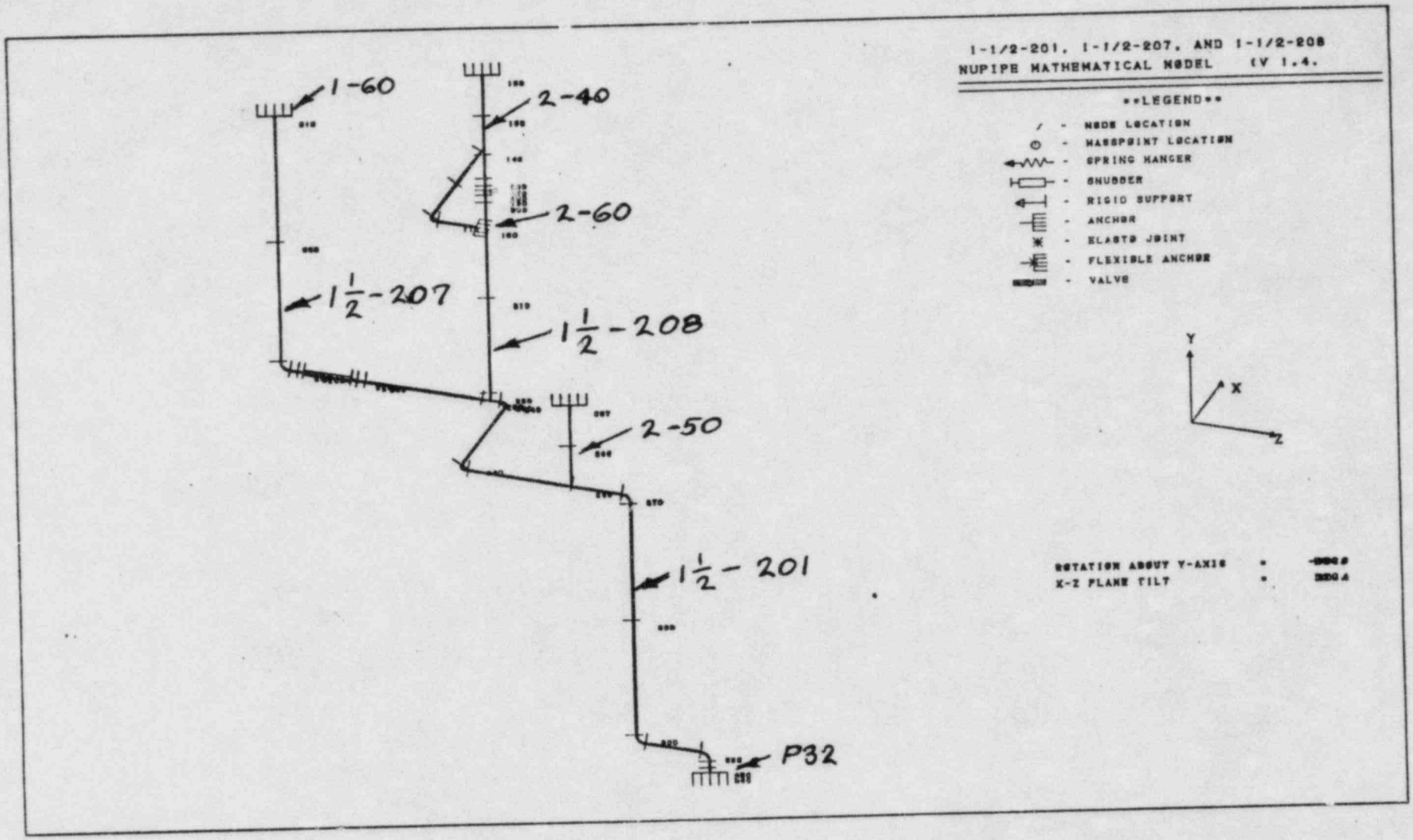

Figure 18. Model 3 - lines 1 1/2-201, 1 1/2-207, and 1 1/2-208.

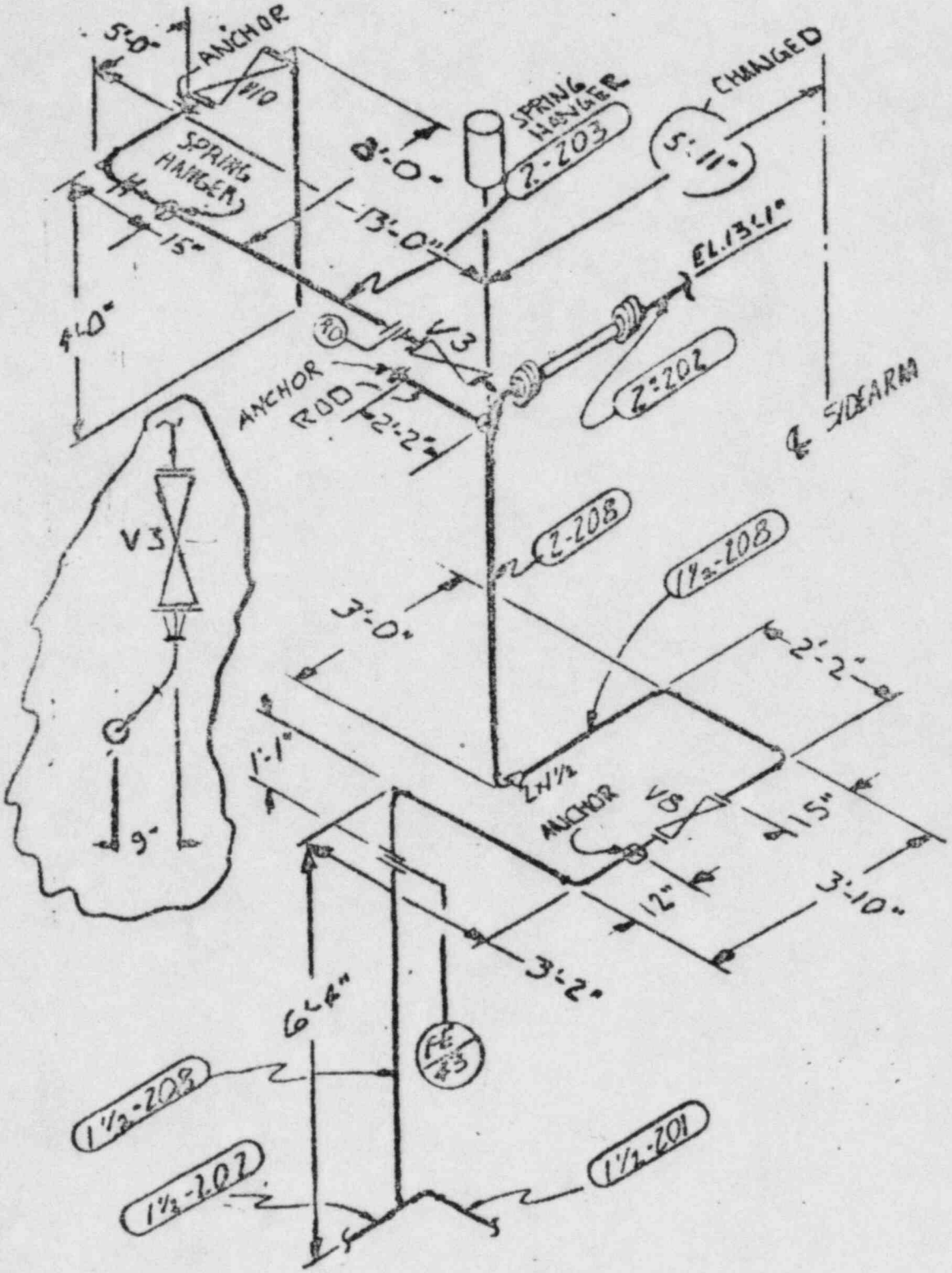

Figure 19. G.E. project - isometric sketch.

APPENDIX B

SUPPORT LOAD DATA AND NOZZLE LOADS

SPRING HANGER DATA

SUPPORT NO.	LINE NO.	NUPIPE MODEL	ATTACHMENT NODE NO.	GRINNELL IDENT. NO.	COLD LOAD (LB)	MAXIMUM DISPLACEMENT UP (in.)	DOWN (in.)
1-10	2-105	1	98	Fig. 82 #6	450	0.206	-0.043
1-20	1 1/2-102	1	284	Fig. B-268 #6	450	0.502	-
1-30	1 1/2-102	1	267	Fig. B-268 #1	110	0.418	-0.010
1-40	1 1/2-104	1	118	Fig. 82 #4	200	0.073	-0.313
2-10	3-205	1	206	Fig. 247 #4	225	0.328	-
2-40	1 1/2-208	3	150	Fig. 82 #3	170	0.116	-
2-50	1 1/2-201	3	263	Fig. 82 #0	75	0.252	-
3-20	3-307	2	150	Fig. 82 #6	441	0.164	-
3-30	1 1/2-309	1	492	Fig. B-268 #5	315	0.635	-0.112
3-40	1 1/2-303	1	446	Fig. B-368 #4	220	0.534	-0.448
4-30	2-401	1	559	Fig. B-268 #6	495	0.567	-0.021
2-90	2-202	1	155	Fig. 82 #6	450	0.241	-0.066
2-70	2-203	1	371	Fig. 247 #4	200	0.025	-0.016

SUPPORT DATA AND NOZZLE LOADS

ITEM	SUPPORT TYPE	NODE	LOAD TYPE	FORCE, LB. F_x(1)	F_y	F_z	MOMENT, IN. LB. M_x	M_y	M_z
5-10	Rod Hanger	328	Deadweight		48				
			Thermal		- 42				
					4				
1-50	Rod Hanger	154	Deadweight		12				
			Thermal		- 7				
					0				
3-120	Rod Hanger	548	Deadweight		325				
			Thermal		- 156				
					83				
1-100	Pipe Stand	78	Deadweight		92				
			Thermal		0				
					615				
2-20	Pipe Stand	39	Deadweight	- 8	1012				
			Thermal	- 4	- 36				
				376	111				
2-100	Pipe Stand	4	Deadweight		20				
			Thermal		- 674				
					335				
3-10 (Model 2)	Pipe Stand	40	Deadweight		195				
			Thermal		0				
					629				
1-60[2]	Fixed Support	191	Deadweight	0	30	1	300	64	- 915
			Thermal	- 2	- 6	- 2	- 60	- 277	- 128
				0	3	3	21	233	325

1-60[2] (Model 3)	Fixed Support	100	Deadweight	1	16	4	120	- 149	- 22
			Thermal	- 9	- 57	0	- 923	- 353	-1288
				3	5	13	161	0	0
2-30	Fixed Support	164	Deadweight	4	438	16	245	1632	-8856
			Thermal	- 474	- 282	- 10	-1772	- 394	- 40
				8	1	111	0	11132	19060
2-60[2]	Fixed Support	379	Deadweight	24	206	39	- 278	- 378	- 165
			Thermal	- 18	- 55	- 8	- 827	- 416	- 960
				20	41	11	1200	281	615
2-60[2] (Model 3)	Fixed Support	315	Deadweight	0	193	- 5	116	- 12	- 27
			Thermal	- 17	- 53	0	-1815	- 167	- 617
				0	9	45	0	79	0
2-80	Fixed Support	389	Deadweight	5	7	3	-1119	- 166	- 623
				- 317	- 8	- 63	- 98	- 219	- 60
				12	1	9	131	12876	527
4-20	Fixed Support	606	Deadweight	0	84	- 14	1269	- 88	- 379
			Thermal	0	- 155	- 11	-13059	- 720	- 302
				3	36	0	0	55	5
5-20	Fixed Support	334	Deadweight	- 15	13	- 6	- 41	345	- 402
			Thermal	- 36	0	- 9	- 7	- 117	- 92
				5	4	2	195	1124	964
1-110	Sway Brace	362	Deadweight	- 8	- 5				
			Thermal	- 21	- 12				
				56	55				
4-40	Sway Brace	532	Deadweight	- 5					
			Thermal	- 12					
				0					

2-120	Sway Brace	155	Deadweight	-	22					
			Thermal	-	23					
					334					
2-110	Sway Brace	206	Deadweight		7					
			Thermal	-	5					
					96					
Pump P31	N/A	373	Deadweight	-	10	62	11	244	167	- 211
Discharge			Thermal	-	41	- 4	- 52	-1145	- 16	- 55
Nozzle					39	55	4	89	41	908
Pump P31	N/A	192	Deadweight	-	3	25	2	100	- 12	68
Suction			Thermal	-	23	- 231	- 25	0	0	- 434
Nozzle					0	0	0	1318	22	0
Pump P32	N/A	1	Deadweight	-	6	21	1	42	136	133
Suction			Thermal	-	33	- 193	- 252	- 189	- 697	0
Nozzle					2	972	38	1881	38	945
Pump P32	N/A	360	Deadweight	-	1	22	1	209	32	48
Discharge			Thermal		0	0	- 55	- 498	- 279	- 784
Nozzle (Model 3)					19	93	0	470	0	0
Pump P662	N/A	571	Deadweight	-	2	28	5	- 49	289	- 38
Discharge			Thermal	-	6	0	- 7	- 847	- 242	- 674
Nozzle					3	66	5	840	233	0
Pump P662	N/A	10	Deadweight		2	30	- 6	- 121	175	- 117
Suction			Thermal		4	- 77	- 134	923	4404	- 726
Nozzle (Model 2)										

Feedwater Tank Nozzle (Line 3-307)	N/A	260	Deadweight	-	2	198	6	545	- 28	1770
			Thermal	-	4	- 524	134	-22548	-1291	-5998

(1) The referenced coordinate system is as shown on figures of Appendix A.

(2) Flagged components have load input from two directions. The total load will correspond to the sum of the loads for components with the same item number.

APPENDIX C

COMPUTER INPUT DATA

CONTENTS

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
  1    RMF01,STANY,T377,P1.
  2    ACCOUNT,3B20,44608100?,wDD.
  3    ATTACH,AMBMAN,ID=JKO.
  4    AMBMAN.
  5    PIPROK,
  6    PROG=V4PIFIL,
  7    FICHE,
  8    END.
  9    COMMENT.  FILE, FIST2
 10    COMMENT.  PIPING ADDED TO VESSEL MODEL
 11    EXIT.
 12    COMMENT.  FILE, FIST2
 13    COMMENT.  PIPING ADDED TO VESSEL MODEL
 14    COMMENT.
 15    C*EOR
 16    BDNT - FIST - 831.1 PIPING ANALYSIS PLUS PARTIAL FATIGUE ANALYSIS
 17    CONTROL                 17.0
 18    CONTROL
 19    FLEXAN          1     1     3.0
 20     DEAD WEIGHT
 21    FLEXAN          2     1     4.0
 22     DUMMY SEISMIC
 23    FLEXAN          3     9     2.0                                          200.0
 24    REHEAT - HOT VESSEL - COLD LINES - RECIRC. PUMP LINE VALVES CLOSED
 25    FLEXAN          4    10     2.0                                          200.0
 26    REHEAT - HOT VESSEL - COLD LINES - RECIRC. PUMP LINE VALVES OPEN
 27    FLEXAN          5     3     2.0                                         1000.
 28    HEATUP - RECIRCULATING PUMP LINE VALVES OPEN
 29    FLEXAN          6     4     2.0                                         1000.
 30    STEADY STATE
 31    FLEXAN          7     5     2.0                                          200.0
 32    MAKEUP
 33    FLEXAN          8     6     2.0                                          200.
 34    BLOWDOWN - PHASE 1 RECIRCULATING LINES HOT; PUMPS TO VESSEL
 35    FLEXAN          9     7     2.0                                          200.
 36    BLOWDOWN - PHASE 2 BLOWDOWN LINE HOT,RECIRC. LINES HOT
 37    FLEXAN         10     8     2.0                                          200.
 38    BLOWDOWN - PHASE 3 RECIRCULATING LINES HOT; VALVES TO PUMPS
 39    FLEXAN         11     1     2.0                                         1000.
 40    PRELOAD - NULL CASE
 41    FLEXAN         12     2     2.0                                         1000.
 42    HEATUP - RECIRCULATING PUMP LINE VALVES CLOSED
 43    ACCEL
 44    XSECTN                 1   7.625       0.6875     37.0     27.9        1580.       1.0
 45    XSECTN                 2  10.75        0.593     100.0     27.9        1580.0      1.0
 46    XSECTN                 3   8.625       0.593      71.0     27.9        1580.0      1.0
 47    XSECTN                 4   6.625       0.500      00.0     27.9        1580.0      1.0
 48    XSECTN                 5   5.563       0.375      30.0     27.9        1580.0      1.0
 49    XSECTN                 6   4.500       0.337      21.0     27.9        1580.0      1.0
 50    XSECTN                 7   4.0         0.31?      17.0     27.9        1580.0      1.0
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  52   XSECTN              9    3.50      0.30       10.35     27.9     1580.0       1.0
  53   XSECTN             10    2.375     .218        9.16     27.9     1580.0       1.0
  54   XSECTN             11   10.58      1.475     339.0      29.9     1580.0       1.0
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  58   XSECTN             15    4.250     .675       25.47     29.9     1580.0       1.0
  59   XSECTN             16    3.250     .655       17.95     29.9     1580.0       1.0
  60   XSECTN             17    2.325     .412        8.33     29.9     1580.0       1.0
  61   XSECTN             18    9.50      3.300     216.0      29.9     1580.0       1.0
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  63   XSECTN             20    7.00      2.75      124.0      29.9     1580.0       1.0
  64   XSECTN             21    4.00      1.0        93.0      29.9     1580.0       1.0
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  66   XSECTN             23    3.50      .30       151.4      29.9     1580.0       1.0
  67   XSECTN             24    2.826     1.288      21.0      29.9                  1.0
  68   XSECTN             25    2.395     1.072      15.0      29.9                  1.0
  69   XSECTN             26    1.785     0.768       9.0      29.9                  1.0
  70   XSECTN             27    3.50      .30        68.6      29.9     1580.0       1.0
  71   XSECTN             28    2.375     0.218     162.5      29.9     1580.0       1.0
  72   XSECTN             29    0.5       0.22        .66      27.9                  1.0
  73   XSECTN             30    8.        1.         75.0       3.0     1580.0       1.0
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  76   OPVAL       1       3    29.9     -.027                           1.       17500.
  77   OPVAL       1       4    29.9     -.018                           1.       17500.
  78   OPVAL       1       5    29.9     -.020                           1.       17500.
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103     OPVAL       2   1    27.9                                                    1.      17500.
104     OPVAL       2   2    29.9    -.021                                           1.      17500.
105     OPVAL       2   3    29.9    -.027                                           1.      17500.
106     OPVAL       2   4    29.9    -.018                                           1.      17500.
107     OPVAL       2   5    29.9    -.020                                           1.      17500.
108     OPVAL       2   6    27.9                                                 1050.      15000.
109     OPVAL       2   7    29.9                                                 1050.      17500.
110     OPVAL       2   8    27.9                                                 1050.      15000.
111     OPVAL       2   9    29.9                                                 1050.      17500.
112     OPVAL       2  10    26.05   .0414                                        1050.      15000.
113     OPVAL       2  11    27.05   .0414                                        1050.      17500.
114     OPVAL       2  12    27.9                                                 1050.      15000.
115     OPVAL       2  13    29.9                                                 1050.      17500.
116     OPVAL       2  14    27.9                                                 1050.      15000.
117     OPVAL       2  15    29.9                                                 1050.      17500.
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119     OPVAL       2  17    29.9                                                   1.0      17500.
120     OPVAL       2  18    27.9                                                 1050.      15000.
121     OPVAL       2  19    29.9                                                 1050.      17500.
122     OPVAL       2  20    27.9                                                 1050.      15000.
123     OPVAL       2  21    29.9                                                 1050.      17500.
124     OPVAL       2  22    26.05   .0414                                        1050.      15000.
125     OPVAL       2  23    27.05   .0414                                        1050.      17500.
126     OPVAL       2  24    26.05   .0414                                        1050.      15000.
127     OPVAL       2  25    27.05   .0414                                        1050.      17500.
128     OPVAL       2  26    27.9                                                 1050.      15000.
129     OPVAL       2  27    29.9                                                 1050.      17500.
130     OPVAL       2  28    26.05   .0414                                        1050.      15000.
131     OPVAL       2  29    27.05   .0414                                        1050.      17500.
132     OPVAL       3   1    27.9                                                   1.0      17500.
133     OPVAL       3   2    29.9    -.021                                          1.0      17500.
134     OPVAL       3   3    29.9    -.027                                          1.0      17500.
135     OPVAL       3   4    29.9    -.018                                          1.0      17500.
136     OPVAL       3   5    29.9    -.020                                          1.0      17500.
137     OPVAL       3   6    27.9                                                 1050.      15000.
138     OPVAL       3   7    29.9                                                 1050.      17500.
139     OPVAL       3   8    27.9                                                 1050.      15000.
140     OPVAL       3   9    29.9                                                 1050.      17500.
141     OPVAL       3  10    26.05   .0414                                        1050.      15000.
142     OPVAL       3  11    27.05   .0414                                        1050.      17500.
143     OPVAL       3  12    27.9                                                 1235.      15000.
144     OPVAL       3  13    29.9                                                 1235.      17500.
145     OPVAL       3  14    27.9                                                 1235.      15000.
146     OPVAL       3  15    29.9                                                 1235.      17500.
147     OPVAL       3  16    27.9                                                 1235.      15000.
148     OPVAL       3  17    29.9                                                 1235.      17500.
149     OPVAL       3  18    27.9                                                 1050.      15000.
150     OPVAL       3  19    29.9                                                 1050.      17500.
        1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
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        1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
151  OPVAL    3  20  27.9                                    1050.    15000.
152  OPVAL    3  21  29.9                                    1050.    17500.
153  OPVAL    3  22  26.05     .0414                          1050.    15000.
154  OPVAL    3  23  27.05     .0414                          1050.    17500.
155  OPVAL    3  24  26.05     .0414                          1050.    15000.
156  OPVAL    3  25  27.05     .0414                          1050.    17500.
157  OPVAL    3  26  27.9                                                15000.
158  OPVAL    3  27  29.9                                                17500.
159  OPVAL    3  28  26.05     .0414                          1050.    15000.
160  OPVAL    3  29  27.05     .0414                          1050.    17500.
161  OPVAL    4   1  27.9                                       1.0    17500.
162  OPVAL    4   2  27.7      .0197                            1.0    17500.
163  OPVAL    4   3  27.7      .0137                            1.0    17500.
164  OPVAL    4   4  27.7      .0227                            1.0    17500.
165  OPVAL    4   5  27.7      .0207                            1.0    17500.
166  OPVAL    4   6  26.05     .0414                          1050.    15000.
167  OPVAL    4   7  27.05     .0414                          1050.    17500.
168  OPVAL    4   8  26.05     .0414                          1050.    15000.
169  OPVAL    4   9  27.05     .0414                          1050.    17500.
170  OPVAL    4  10  26.05     .0414                          1050.    15000.
171  OPVAL    4  11  27.05     .0414                          1050.    17500.
172  OPVAL    4  12  26.05     .0414                          1235.    15000.
173  OPVAL    4  13  27.05     .0414                          1235.    17500.
174  OPVAL    4  14  26.05     .0414                          1235.    15000.
175  OPVAL    4  15  27.05     .0414                          1235.    17500.
176  OPVAL    4  16  26.05     .0414                          1235.    15000.
177  OPVAL    4  17  27.05     .0414                          1235.    17500.
178  OPVAL    4  18  27.9                                       1.0    15000.
179  OPVAL    4  19  29.9                                       1.0    17500.
180  OPVAL    4  20  26.05     .0414                          1050.    15000.
181  OPVAL    4  21  27.05     .0414                          1050.    17500.
182  OPVAL    4  22  26.05     .0414                          1050.    15000.
183  OPVAL    4  23  27.05     .0414                          1050.    17500.
184  OPVAL    4  24  26.05     .0414                          1050.    15000.
185  OPVAL    4  25  27.05     .0414                          1050.    17500.
186  OPVAL    4  26  27.9                                                15000.
187  OPVAL    4  27  29.9                                                17500.
188  OPVAL    4  28  26.05     .0414                          1050.    15000.
189  OPVAL    4  29  27.05     .0414                          1050.    17500.
190  OPVAL    5   1  27.9                                       1.0    17500.
191  OPVAL    5   2  27.7      .0197                            1.0    17500.
192  OPVAL    5   3  27.7      .0137                            1.0    17500.
193  OPVAL    5   4  27.7      .0227                            1.0    17500.
194  OPVAL    5   5  27.7      .0207                            1.0    17500.
195  OPVAL    5   6  26.05     .0414                          1050.    15000.
196  OPVAL    5   7  27.05     .0414                          1050.    17500.
197  OPVAL    5   8  26.05     .0414                          1050.    15000.
198  OPVAL    5   9  27.05     .0414                          1050.    17500.
199  OPVAL    5  10  27.9                                       1.0    15000.
200  OPVAL    5  11  29.9                                       1.0    17500.
        1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
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201	OPVAL	5	12	26.05	.0414		1235.	15000.
202	OPVAL	5	13	27.05	.0414		1235.	17500.
203	OPVAL	5	14	26.05	.0414		1235.	15000.
204	OPVAL	5	15	27.05	.0414		1235.	17500.
205	OPVAL	5	16	26.05	.0414		1235.	15000.
206	OPVAL	5	17	27.05	.0414		1235.	17500.
207	OPVAL	5	18	27.9			1.0	15000.
208	OPVAL	5	19	29.9			1.0	17500.
209	OPVAL	5	20	26.05	.0414		1050.	15000.
210	OPVAL	5	21	27.05	.0414		1050.0	17500.
211	OPVAL	5	22	27.9			1.0	15000.
212	OPVAL	5	23	29.9			1.0	17500.
213	OPVAL	5	24	27.9			1.0	15000.
214	OPVAL	5	25	29.9			1.0	17500.
215	OPVAL	5	26	27.9			1.0	15000.
216	OPVAL	5	27	29.9			1.0	17500.
217	OPVAL	5	28	27.9			1.0	15000.
218	OPVAL	5	29	29.9			1.0	17500.
219	OPVAL	6	1	27.9			1.0	17500.
220	OPVAL	6	2	29.9	-.021		1.0	17500.
221	OPVAL	6	3	29.9	-.027		1.0	17500.
222	OPVAL	6	4	29.9	-.018		1.0	17500.
223	OPVAL	6	5	29.9	-.026		1.0	17500.
224	OPVAL	6	6	27.9			1.0	15000.
225	OPVAL	6	7	29.9			1.0	17500.
226	OPVAL	6	8	27.9			1.0	15000.
227	OPVAL	6	9	29.9			1.0	17500.
228	OPVAL	6	10	27.9			1.0	15000.
229	OPVAL	6	11	29.9			1.0	17500.
230	OPVAL	6	12	27.9			1.0	15000.
231	OPVAL	6	13	29.9			1.0	17500.
232	OPVAL	6	14	26.05	.0414		1050.	15000.
233	OPVAL	6	15	27.05	.0414		1050.	17500.
234	OPVAL	6	16	26.05	.0414		1050.	15000.
235	OPVAL	6	17	27.05	.0414		1050.	17500.
236	OPVAL	6	18	26.05	.0414	-4.180E-03-5.400E-04	1050.	15000.
237	OPVAL	6	19	27.05	.0414	-4.180E-03-5.400E-04	1050.	17500.
238	OPVAL	6	20	27.9			1.0	15000.
239	OPVAL	6	21	29.9			1.0	17500.
240	OPVAL	6	22	27.9			1.0	15000.
241	OPVAL	6	23	29.9			1.0	17500.
242	OPVAL	6	24	27.9			1.0	15000.
243	OPVAL	6	25	29.9			1.0	17500.
244	OPVAL	6	26	26.05	.0414		1050.0	15000.
245	OPVAL	6	27	27.05	.0414		1050.0	17500.
246	OPVAL	6	28	26.05	.0414		1050.0	15000.
247	OPVAL	6	29	27.05	.0414		1050.0	17500.
248	OPVAL	7	1	27.9			1.0	17500.
249	OPVAL	7	2	29.9	-.021		1.0	17500.
250	OPVAL	7	3	29.9	-.027		1.0	17500.

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                 1         2         3         4         5         6         7         8
        12345678901234567890123456789012345678901234567890123456789012345678901234567890
251     OPVAL       7    4    29.9      -.018                              1.0      17500.
252     OPVAL       7    5    29.9      -.020                              1.0      17500.
253     OPVAL       7    6    27.9                                         1.0      15000.
254     OPVAL       7    7    29.9                                         1.0      17500.
255     OPVAL       7    8    27.9                                         1.0      15000.
256     OPVAL       7    9    29.9                                         1.0      17500.
257     OPVAL       7   10    27.9                                         1.0      15000.
258     OPVAL       7   11    29.9                                         1.0      17500.
259     OPVAL       7   12    27.9                                         1.0      15000.
260     OPVAL       7   13    29.9                                         1.0      17500.
261     OPVAL       7   14    27.9                                         1.0      15000.
262     OPVAL       7   15    29.9                                         1.0      17500.
263     OPVAL       7   16    26.05     .0414                           1050.      15000.
264     OPVAL       7   17    27.05     .0414                           1050.      17500.
265     OPVAL       7   18    26.05     .0414  -4.180E-03-5.400E-04     1050.      15000.
266     OPVAL       7   19    27.05     .0414  -4.180E-03-5.400E-04     1050.      17500.
267     OPVAL       7   20    27.9                                         1.0      15000.
268     OPVAL       7   21    29.9                                         1.0      17500.
269     OPVAL       7   22    27.9                                         1.0      15000.
270     OPVAL       7   23    29.9                                         1.0      17500.
271     OPVAL       7   24    27.9                                         1.0      15000.
272     OPVAL       7   25    29.9                                         1.0      17500.
273     OPVAL       7   26    27.9                                         1.0      15000.
274     OPVAL       7   27    29.9                                         1.0      17500.
275     OPVAL       7   28    27.9                                         1.0      15000.
276     OPVAL       7   29    29.9                                         1.0      17500.
277     OPVAL       8    1    27.9                                         1.0      17500.
278     OPVAL       8    2    27.7      .0197                              1.0      17500.
279     OPVAL       8    3    27.7      .0137                              1.0      17500.
280     OPVAL       8    4    27.7      .0227                              1.0      17500.
281     OPVAL       8    5    27.7      .0207                              1.0      17500.
282     OPVAL       8    6    27.09     .02593 1.549E-02 3.164E-03       340.      15000.
283     OPVAL       8    7    28.05     .02593 1.549E-02 3.164E-03       340.      17500.
284     OPVAL       8    8    26.05     .0414  4.180E-03 5.400E-04       340.      15000.
285     OPVAL       8    9    27.05     .0414  4.180E-03 5.400E-04       340.      17500.
286     OPVAL       8   10    26.05     .0414  4.180E-03 5.400E-04       340.      15000.
287     OPVAL       8   11    27.05     .0414  4.180E-03 5.400E-04       340.      17500.
288     OPVAL       8   12    27.09     .02593 1.765E-02 4.502E-03       340.      15000.
289     OPVAL       8   13    28.62     .02593 1.765E-02 4.502E-03       340.      17500.
290     OPVAL       8   14    27.09     .02593 0.883E-02 2.700E-04       340.      15000.
291     OPVAL       8   15    28.62     .02593 0.883E-02 2.700E-04       340.      17500.
292     OPVAL       8   16    26.05     .0414                              1.0      15000.
293     OPVAL       8   17    27.05     .0414                              1.0      17500.
294     OPVAL       8   18    27.09     .02593 4.180E-03 5.400E-04       340.      15000.
295     OPVAL       8   19    28.62     .02593 4.180E-03 5.400E-04       340.      17500.
296     OPVAL       8   20    27.9                                         1.0      15000.
297     OPVAL       8   21    29.9                                         1.0      17500.
298     OPVAL       8   22    27.09     .02593 4.180E-03 5.400E-04       340.      15000.
299     OPVAL       8   23    28.62     .02593 4.180E-03 5.400E-04       340.      17500.
300     OPVAL       8   24    27.09     .02593 9.480E-03 1.758E-03       340.      15000.
                 1         2         3         4         5         6         7         8
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                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
301    OPVAL          8   25    28.62     .02593  9.480E-03 1.758E-03     340.    17500.
302    OPVAL          8   26    27.9                                              15000.
303    OPVAL          8   27    29.9                                              17500.
304    OPVAL          8   28    27.09     .02593  4.180E-03 5.400E-04     340.    15000.
305    OPVAL          8   29    26.62     .02593  4.180E-03 5.400E-04     340.    17500.
306    OPVAL          9    1    27.9                                        1.0     17500.
307    OPVAL          9    2    27.7      .0197                             1.0     17500.
308    OPVAL          9    3    27.7      .0137                             1.0     17500.
309    OPVAL          9    4    27.7      .0227                             1.0     17500.
310    OPVAL          9    5    27.7      .0207                             1.0     17500.
311    OPVAL          9    6    26.05     .0414                          1050.    15000.
312    OPVAL          9    7    27.05     .0414                          1050.    17500.
313    OPVAL          9    8    27.9                                       1050.    15000.
314    OPVAL          9    9    29.9                                       1050.    17500.
315    OPVAL          9   10    27.9                                       1050.    15000.
316    OPVAL          9   11    29.9                                       1050.    17500.
317    OPVAL          9   12    27.9                                       1050.    15000.
318    OPVAL          9   13    29.9                                       1050.    17500.
319    OPVAL          9   14    27.9                                       1050.    15000.
320    OPVAL          9   15    29.9                                       1050.    17500.
321    OPVAL          9   16    27.9                                        1.0     15000.
322    OPVAL          9   17    29.9                                        1.0     17500.
323    OPVAL          9   18    27.9                                       1050.    15000.
324    OPVAL          9   19    29.9                                       1050.    17500.
325    OPVAL          9   20    27.9                                        1.0     15000.
326    OPVAL          9   21    29.9                                        1.0     17500.
327    OPVAL          9   22    27.9                                       1050.    15000.
328    OPVAL          9   23    29.9                                       1050.    17500.
329    OPVAL          9   24    27.9                                       1050.    15000.
330    OPVAL          9   25    29.9                                       1050.    17500.
331    OPVAL          9   26    27.9                                       1050.    15000.
332    OPVAL          9   27    29.9                                       1050.    17500.
333    OPVAL          9   28    27.9                                       1050.    15000.
334    OPVAL          9   29    29.9                                       1050.    17500.
335    OPVAL         10    1    27.9                                        1.0     17500.
336    OPVAL         10    2    27.7      .0197                             1.0     17500.
337    OPVAL         10    3    27.7      .0137                             1.0     17500.
338    OPVAL         10    4    27.7      .0227                             1.0     17500.
339    OPVAL         10    5    27.7      .0207                             1.0     17500.
340    OPVAL         10    6    26.05     .0414                          1050.    15000.
341    OPVAL         10    7    27.05     .0414                          1050.    17500.
342    OPVAL         10    8    27.9                                       1050.    15000.
343    OPVAL         10    9    29.9                                       1050.    17500.
344    OPVAL         10   10    27.9                                       1050.    15000.
345    OPVAL         10   11    29.9                                       1050.    17500.
346    OPVAL         10   12    27.9                                       1050.    15000.
347    OPVAL         10   13    29.9                                       1050.    17500.
348    OPVAL         10   14    27.9                                       1050.    15000.
349    OPVAL         10   15    29.9                                       1050.    17500.
350    OPVAL         10   16    27.9                                       1050.    15000.
                1         2         3         4         5         6         7         8
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      1       2       3       4       5       6       7       8
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351   OPVAL    10   17   29.9                                    1050.   17500.
352   OPVAL    10   18   27.9                                    1050.   15000.
353   OPVAL    10   19   29.9                                    1050.   17500.
354   OPVAL    10   20   27.9                                     1.0    15000.
355   OPVAL    10   21   29.9                                     1.0    17500.
356   OPVAL    10   22   27.9                                    1050.   15000.
357   OPVAL    10   23   29.9                                    1050.   17500.
358   OPVAL    10   24   27.9                                    1050.   15000.
359   OPVAL    10   25   29.9                                    1050.   17500.
360   OPVAL    10   26   26.05    .0414                          1050.   15000.
361   OPVAL    10   27   27.05    .0414                          1050.   17500.
362   OPVAL    10   28   26.05    .0414                          1050.   15000.
363   OPVAL    10   29   27.05    .0414                          1050.   17500.
364   ANCHOR    0   15  104.166    3.020  108.333      11.        7.
365   RUN      15   20    0.000     -.323    0.000      11.        7.      0.000
366   GRUN     20   25    0.000    -3.651    0.000       4.        6.      0.000
367   RUN      25   30    0.000     -.583    0.000       4.        6.      0.000
368   RUN      30   35    0.000     -.583    0.000       4.        6.      0.000
369   GRUN     35   40    0.000    -6.542    0.000       4.        6.      0.000
370   GRUN     40   45    0.000     -.104    0.000       4.        6.      0.000
371   RESTRAINT 0   45 .100E+07 0.          .100E+07 0.          0.        0.
372   REDUCER  45   47    0.000     -.250    0.000       4.        6.      0.000
373   REDUCER  47   50    0.000     -.667    0.000       5.        6.      0.000
374   ELBOW    50   60    5.000                          5.        6.
375   GRUN     60   62    0.000     0.000    -.500       5.        6.      0.000
376   RUN      62   65    0.000     0.000    -.250      12.        7.      0.000
377   RUN      65   70    0.000     0.000    -.188      12.        7.      0.000
378   RUN      70   75    0.000     0.000    -.188      12.        7.      0.000
379   RUN      75   80    0.000     0.000    -.675      12.        7.      0.000
380   ELBOW    80   90    0.000     0.000    0.000       5.        6.      0.000
381   GRUN     90   95    0.000     2.997    0.000       5.        6.      0.000
382   RUN      95  100    0.000     2.372    0.000       5.        6.      0.000
383   RUN     100  105    0.000     2.372    0.000       5.        6.      0.000
384   RUN     105  110    0.000      .406    0.000       5.        6.      0.000
385   GRUN     30   43    0.000     0.000    -.510       6.        6.      0.000
386   TEE      30   43
387   GRUN     43   49    0.000     0.000    -.083       6.        6.      0.000
388   RUN      49   56    0.000     0.000    -.146      13.        7.      0.000
389   RUN      56   69    0.000     0.000    -.188      13.        7.      0.000
390   RUN      69   82    0.000     0.000    -.188      13.        7.      0.000
391   RUN      82   92    0.000     0.000    -.146      13.        7.      0.000
392   GRUN     92  102    0.000     0.000    -.354       6.        6.      0.000
393   GRUN    102  110    0.000     0.000    -.385       6.        6.      0.000
394   TEE     110  102
395   GRUN    110  115    0.000      .406    0.000       5.        6.      0.000
396   GRUN    115  117    0.000      .083    0.000       5.        6.      0.000
397   RUN     117  120    0.000      .167    0.000      12.        7.      0.000
398   RUN     120  125    0.000      .188    0.000      12.        7.      0.000
399   RUN     125  130    0.000      .250    0.000      27.        7.      0.000
400   RUN     130  135    0.000      .188    0.000      12.        7.      0.000

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        1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
401     RUN       120       119       0.000      .050      0.000      12.       1.       0.000
402     RUN       119       123       0.000     -.102       .458      12.       1.       0.000
403     RUN       123       128       0.000      .729      0.000      26.       5.       0.000
404     RUN       128       137       0.000     -.102      -.458      12.       1.       0.000
405     RUN       137       135       0.000      .050      0.000      12.       1.       0.000
406     RUN       119       124       0.000     -.102      -.458      12.       1.       0.000
407     RUN       124       129       0.000      .729      0.000      26.       5.       0.000
408     RUN       129       137       0.000     -.102       .458      12.       1.       0.000
409     RUN       119       126        .458     -.102      0.000      12.       1.       0.000
410     RUN       126       131       0.000      .729      0.000      26.       5.       0.000
411     RUN       131       137      -.458     -.052      0.000      12.       1.       0.000
412     RUN       120       127      -.458     -.052      0.000      12.       1.       0.000
413     RUN       127       132       0.000      .729      0.000      26.       5.       0.000
414     RUN       132       135        .458     -.052      0.000      12.       1.       0.000
415     RUN       135       140       0.000      .250      0.000      12.       6.       0.000
416     GRUN      140       160       0.000     1.146      0.000       5.       6.       0.000
417     RUN       160       170       0.000      .406      0.000       5.       7.
418     RUN       170       180       0.000      .406      0.000       5.       7.
419     GRUN      180       185       0.000     2.637      0.000       5.       6.       0.000
420     RUN       185       190       0.000     2.637      0.000       5.       6.       0.000
421     RUN       190       195       0.000     2.637      0.000       5.       6.       0.000
422     GRUN      195       200       0.000     2.720      0.000       5.       6.       0.000
423     RUN       200       210       0.000      .167      0.000      12.       7.       0.000
424     RUN       210       220       0.000      .188      0.000      12.       7.       0.000
425     RUN       220       222       0.000      .156      0.000       1.       6.       0.000
426     RUN       222       245                  .1                   1.       6.
427     RUN       245       224       0.000     1.549      0.000       1.       6.       0.000
428     RUN       224       226       0.000      .188      0.000      12.       7.       0.000
429     RUN       210       211       0.000      .050      0.000      12.       1.       0.000
430     RUN       211       216       0.000     -.102       .458      12.       1.       0.000
431     RUN       216       223       0.000     1.142      0.000      26.       4.       0.000
432     RUN       223       229       0.000     1.142      0.000      26.       4.       0.000
433     RUN       229       237       0.000     -.102      -.458      12.       1.       0.000
434     RUN       237       226       0.000      .050      0.000      12.       1.       0.000
435     RUN       211       217       0.000     -.102      -.458      12.       1.       0.000
436     RUN       217       225       0.000     1.142      0.000      26.       4.       0.000
437     RUN       225       231       0.000     1.142      0.000      26.       4.       0.000
438     RUN       231       237       0.000     -.102       .458      12.       1.       0.000
439     RUN       211       218        .458     -.102      0.000      12.       1.       0.000
440     RUN       218       221       0.000     1.142      0.000      26.       4.       0.000
441     RUN       221       232       0.000     1.142      0.000      26.       4.       0.000
442     RUN       232       237      -.458     -.102      0.000      12.       1.       0.000
443     RUN       210       219      -.458     -.052      0.000      12.       1.       0.000
444     RUN       219       227       0.000     1.142      0.000      26.       4.       0.000
445     RUN       227       233       0.000     1.142      0.000      26.       4.       0.000
446     RUN       233       226        .458     -.052      0.000      12.       1.       0.000
447     RUN       226       228       0.000      .146      0.000      13.       7.       0.000
448     GRUN      228       230       0.000      .354      0.000       6.       6.       0.000
449     RUN       230       241       0.000      .146      0.000      13.       7.       0.000
450     RUN       241       234       0.000      .167      0.000      13.       7.       0.000
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451     RUN     234     236     0.000   .167    0.000   13.     7.      0.000
452     RUN     236     238     0.000   .146    0.000   13.     7.      0.000
453     RUN     238     240     0.000   3.125   0.000   6.      6.      0.000
454     ELBOW   240     242     0.000   0.000   0.000   6.      6.      0.000
455     GRUN    242     246     0.000   .781    -.781   6.      6.      0.000
456     RUN     246     248     0.000   .103    -.103   13.     7.      0.000
457     RUN     248     250     0.000   .118    -.118   13.     7.      0.000
458     RUN     250     252     0.000   .118    -.118   13.     7.      0.000
459     RUN     252     254     0.000   .103    -.103   13.     7.      0.000
460     GRUN    254     255     0.000   .413    -.413   6.      6.      0.000
461     ELBOW   255     256     0.000   0.000   0.000   6.      6.      0.000
462     GRUN    256     260     0.000   .471    .471    6.      6.      0.000
463     GRUN    260     270     0.000   .321    .321    6.      6.      0.000
464     ELASTOJT 270    272  .100E+11  .100E+11  .100E+11  .100E+07  .162E+05  -.162E+05
465     OCOS    270     272  0.        .70711    .70711              .70711  -  .70711
466     GRUN    272     282     0.000   .372    .372    6.      6.      0.000
467     RUN     282     292     0.000   .500    .500    6.      6.      0.000
468     GRUN    292     294     0.000   .372    .372    6.      6.      0.000
469     ELASTOJT 294    296  .100E+11  .100E+11  .100E+11  .100E+07  .162E+05  .162E+05
470     OCOS    294     296  0.        .70711    .70711              .70711  -  .70711
471     GRUN    296     306     0.000   .321    .321    6.      6.      0.000
472     GRUN    306     308     0.000   .118    .118    6.      6.      0.000
473     RUN     308     310     0.000   .103    .103    13.     7.      0.000
474     RUN     310     312     0.000   .118    .118    13.     7.      0.000
475     RUN     312     314     0.000   .118    .118    13.     7.      0.000
476     RUN     314     316     0.000   .250    .250    13.     7.      0.000
477     ELBOW   316     318     0.000   0.000   0.000   6.      6.      0.000
478     GRUN    318     320     0.000   0.000   .718    6.      6.      0.000
479     TEE     320     318
480     GRUN    320     330     0.000   -.583   0.000   3.      6.      0.000
481     GRUN    330     340     0.000   -.904   0.000   3.      6.      0.000
482     RUN     340     350     0.000   -1.291  0.000   3.      6.      0.000
483     RESTRAINT 0     350  .100E+07  0.        .100E+07  0.        0.        0.
484     RUN     350     360     0.000   -.529   0.000   3.      6.      0.000
485     GRUN    360     370     0.000   -.686   0.000   3.      6.      0.000
486     RUN     370     380     0.000   -.333   0.000   11.     6.      0.000
487     RUN     380     390     0.000   -.323   0.000   11.     6.      0.000
488     RUN     390     400     0.000   -.573   0.000   11.     6.      0.000
489     RUN     400     407     0.000   -.064   0.000   12.     6.
490     RUN     407     410     0.000   -.042   0.000   30.     6.      0.000
491     RUN     410     420     0.000   -.323   0.000   11.     6.      0.000
492     RUN     380     381     0.000   -.050   0.000   12.     1.      0.000
493     RUN     381     391     0.000   .118    .646    11.     1.      0.000
494     RUN     391     401     0.000   -.729   0.000   25.     3.      0.000
495     RUN     401     411     0.000   -.729   0.000   25.     3.      0.000
496     RUN     411     417     0.000   .118    -.646   20.     1.      0.000
497     RUN     417     420     0.000   -.050   0.000   12.     1.      0.000
498     RUN     381     392     0.000   .118    -.646   20.     1.      0.000
499     RUN     392     402     0.000   -.729   0.000   25.     3.      0.000
500     RUN     402     412     0.000   -.729   0.000   25.     3.      0.000

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501     RUN          412  417      0.000      .118      .646      20.       1.      0.000
502     RUN          381  393       .646      .068     0.000      20.       1.      0.000
503     RUN          393  403      0.000     -.729     0.000      25.       3.      0.000
504     RUN          403  413      0.000     -.729     0.000      25.       3.      0.000
505     RUN          413  417      -.646      .068     0.000      20.       1.      0.000
506     RUN          380  394      -.646      .068     0.000      20.       1.      0.000
507     RUN          394  404      0.000     -.729     0.000      25.       3.      0.000
508     RUN          404  414      0.000     -.729     0.000      25.       3.      0.000
509     RUN          414  420       .646      .068     0.000      20.       1.      0.000
510     RUN          420  430      0.000     -.383     0.000      11.       6.      0.000
511     GRUN         430  440      0.000     -.813     0.000       4.       6.      0.000
512     RUN          440  441      0.000     -.100     0.000       4.       6.      0.000
513     RUN          441  444      0.000     -.100     0.000       4.       6.      0.000
514     RUN          444  452      0.000     -.100     0.000       4.       6.      0.000
515     RUN          452  450      0.000    -3.417     0.000       4.       6.      0.000
516     RUN          450  460      0.000    -3.717     0.000       4.       6.      0.000
517     GRUN         460  470      0.000    -3.717     0.000       4.       6.      0.000
518     RUN          470  480      0.000     -.240     0.000      11.       7.      0.000
519     RUN          480  490      0.000     -.229     0.000      11.       7.      0.000
520     RUN          490  500      0.000     -.323     0.000      11.       6.      0.000
521     RUN          500  508      0.000     -.088     0.000      12.       6.
522     RUN          508  510      0.000     -.125     0.000      11.       6.      0.000
523     RUN          510  520      0.000     -.208     0.000       8.       7.      0.000
524     RUN          520  530      0.000     -.240     0.000      11.       6.      0.000
525     RUN          530  540      0.000     -.683     0.000       4.       6.      0.000
526     RUN          540  550      0.000     -.240     0.000      11.       6.      0.000
527     RUN          550  560      0.000     -.208     0.000       8.       7.      0.000
528     RUN          560  570      0.000     -.229     0.000      11.       7.      0.000
529     ANCHOR         0  570    104.166     3.020   108.333       4.       7.
530     GRUN         320  325      0.000      .583     0.000       3.       6.      0.000
531     GRUN         325  327      0.000      .083     0.000       3.       6.      0.000
532     RUN          327  335      0.000      .240     0.000      11.       7.      0.000
533     RUN          335  345      0.000      .229     0.000      11.       7.      0.000
534     RUN          345  355      0.000      .229     0.000      11.       7.      0.000
535     RUN          355  375      0.000      .323     0.000      11.       7.      0.000
536     REDUCER      375  377      0.000      .292     0.000       3.       6.      0.000
537     REDUCER      377  385      0.000      .292     0.000       2.       6.      0.000
538     GRUN         385  395      0.000      .990     0.000       2.       6.      0.000
539     RUN          395  415      0.000      .608     0.000       2.       6.
540     RUN          415  425      0.000     3.945     0.000       2.       6.
541     RUN          425  435      0.000     3.563     0.000       2.       6.      0.000
542     GRUN         435  445      0.000     2.870     0.000       2.       6.      0.000
543     RESTRAINT      0  445  .100E+07 0.          .100E+07 0.       0.       0.
544     RUN          445  449      0.000     1.068     0.000       2.       6.      0.000
545     RUN          449  455      0.000      .375     0.000       8.       6.      0.000
546     RUN          455  465      0.000      .250     0.000       8.       6.      0.000
547     RUN          465  475      0.000      .250     0.000       8.       6.      0.000
548     RUN          475  485      0.000      .375     0.000       8.       6.      0.000
549     GRUN         485  495      0.000      .262     0.000       2.       6.
550     RUN          495  506      0.000     3.286     0.000       2.       6.      0.000
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551    RUN          506   515       0.000     1.918     0.000     2.        0.        0.000
552    RESTRAINT      0   515   .100E+07 0.             .100E+07 0.      0.        0.
553    RUN          515   525       0.000     4.654     0.000     2.        6.        0.000
554    GRUN         525   535       0.000     3.286     0.000     2.        6.        0.000
555    BRANCH       222   235       0.000     0.000      .158    14.       25.        .95
556    RUN          235   244       0.000     0.000      .383    14.       25.
557    RUN          244   247       0.000     0.000      .167    17.       25.
558    RUN          247   249       0.000     0.000      .125    20.       25.
559    RUN          249   251       0.000     0.000      .125    20.       25.
560    RUN          251   258       0.000     0.000      .167    17.       25.
561    RUN          258   262       0.000     0.000     0.208    14.       25.
562    TEE          262   258
563    RUN          262   304      -0.208                        14.       25.
564    GRUN         304   265      -4.200     0.000     0.000    14.       14.
565    GRUN         265   267      -3.426                        14.       14.
566    GRUN         267   268      -2.667     0.000     0.000    14.       14.
567    ELBOW        268   271       0.000     0.000     0.000    14.       15.       0.000
568    GRUN         271   274       0.000     0.000    -2.083    14.       14.
569    ELBOW        274   277       0.000     0.000     0.000    14.       15.       0.000
570    GRUN         277   280       5.583     0.000     0.000    14.       14.
571    ELBOW        280   284       0.000     0.000     0.000    14.       15.       0.000
572    GRUN         284   287       0.000    -3.437     0.000    14.       14.       0.000
573    GRUN         287   290       0.000    -3.437     0.000    14.       14.       0.000
574    RUN          290   295       0.000     -.167     0.000    17.       15.       0.000
575    RUN          295   299       0.000     -.125     0.000    20.       15.       0.000
576    VALVE        299   301       0.000     -.583     0.000    14.       15.       0.000
577    VALVE        301   307       0.000     -.583     0.000    14.       15.       0.000
578    RUN          307   311       0.000     -.125     0.000    20.       17.       0.000
579    RUN          311   315       0.000     -.167     0.000    17.       17.
580    GRUN         315   321       0.000     -.750     0.000    14.       16.       0.000
581    RUN          321   324       0.000     -.167     0.000    17.       17.       0.000
582    RUN          324   329       0.000     -.125     0.000    20.       17.       0.000
583    RUN          329   333       0.000     -.125     0.000    20.       17.       0.000
584    RUN          333   338       0.000     -.167     0.000    17.       17.       0.000
585    GRUN         338   342       0.000    -6.812     0.000    14.       16.       0.000
586    GRUN         342   347       0.000    -6.812     0.000    14.       16.       0.000
587    ELBOW        347   351       0.000     0.000     0.000    14.       17.       0.000
588    GRUN         351   354       1.875     0.000     2.375    14.       16.       0.000
589    GRUN         354   358       1.875     0.000     2.375    14.       16.       0.000
590    ELBOW        358   362       0.000     0.000     0.000    14.       17.       0.000
591    GRUN         362   366       0.000    -4.958     0.000    14.       16.
592    RUN          366   369       0.000     -.167     0.000    17.       17.       0.000
593    RUN          369   373       0.000     -.125     0.000    20.       17.       0.000
594    ANCHOR         0   373     103.000   -15.792   110.333    20.       17.       0.000
595    RUN          301   302       0.000     0.000      .833    21.       1.        0.000
596    RUN          302   303       0.000     0.000      .833    21.       1.        0.000
597    RUN          362   399      -3.0                 -.25     29.       1.
598    ANCHOR             399                                   29.       1.
599    RUN          362   416      -3.0                 7.75     29.       1.
600    ANCHOR             416                                   29.       1.
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601    RUN        262  283      0.208                                14.       25.
602    RUN        283  285      0.167                                17.       25.
603    RUN        285  286      0.125                                20.       25.
604    RUN        286  288      0.125                                20.       25.
605    RUN        288  289      0.208                                17.       25.
606    GRUN       289  291      2.040                                14.        1.
607    ELBOW      291  297                                           14.        1.
608    GRUN       297  298                0.667    0.667            14.        1.
609    ELBOW      298  300                                           14.        1.
610    GRUN       300  305                1.667                       14.        1.
611    GRUN       305  309                1.667                       14.        1.
612    ELBOW      309  313                                           14.        1.
613    RUN        313  317      0.355                                17.        1.
614    RUN        317  319      0.125                                20.        1.
615    RUN        319  322      0.125                                20.        1.
616    RUN        322  326      0.167                                17.        1.
617    GRUN       326  328      4.689                                14.        1.
618    RESTRAINT       328           1.0 E+06
619    ELBOW      328  331                                           14.        1.
620    GRUN       331  334                          3.667            14.        1.
621    ANCHOR          334  112.500     16.938   112.000            14.        1.
622    BRANCH     245  215      0.000      0.000      -.158          14.       23.      .95
623    GRUN       215  213      0.000      0.000      -.383          14.       22.
624    RUN        213  208      0.000      0.000      -.167          17.       23.
625    RUN        208  205      0.000      0.000      -.125          20.       23.
626    RUN        205  202      0.000      0.000      -.125          20.       23.
627    RUN        202  199      0.000      0.000      -.167          17.       23.
628    REDUCER    199  196      0.000      0.000      -.125          14.       23.
629    REDUCER    196  193      0.000      0.000      -.125          10.       23.
630    GRUN       193  189      0.000      0.000     -1.708          10.       22.
631    GRUN       189  171      0.000      0.000     -1.875          10.       22.
632    RUN        171  165      0.000      0.000      -.208          16.       23.
633    RUN        165  162      0.000      0.000      -.146          19.       23.
634    RUN        162  157      0.000      0.000      -.146          19.       23.
635    RUN        157  207      0.000      0.000      -.458          16.       23.
636    ELBOW      207  155                                           10.       23.
637    RESTRAINT       155           1.0 E+06
638    RUN        155  239                -0.458                      10.       23.
639    RUN        239  147                -0.208                      10.       23.
640    GRUN       147  209                -2.583                      10.       14.
641    GRUN       209  212               -2.583                       10.       14.
642    ELBOW      212  214                                           10.       15.
643    REDUCER    214  337                          .375             10.       15.
644    REDUCER    337  339                          .125             14.       15.
645    GRUN       339  343                         2.50              14.       14.
646    ELBOW      343  348                                           14.       15.
647    GRUN       348  352     -2.167                                14.       14.
648    ELBOW      352  356                                           14.       15.
649    GRUN       356  359                          -.958            14.       14.
650    RUN        359  363                          -.167            17.       15.
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651	RUN	363	365			-.125	20.	15.	
652	VALVE	365	368			-1.083	22.	15.	
653	RUN	368	372			-.125	20.	15.	
654	RUN	372	376			-.167	17.	15.	
655	GRUN	376	379			-.208	14.	14.	
656	ANCHOR		379	102.000	7.250	100.584	14.	14.	
657	RUN	239	336	.147		.147	10.	23.	
658	TEE	239	336						
659	GRUN	336	344	.603		.603	10.	22.	
660	ELBOW	344	346				10.	19.	
661	RUN	346	349	.312			16.	19.	
662	RUN	349	353	.146			19.	19.	
663	VALVE	353	357	1.291			26.	19.	
664	RUN	357	361	.146			19.	19.	
665	RUN	361	364	.208			16.	19.	
666	GRUN	364	367	4.450			10.	18.	
667	GRUN	367	371	4.450			10.	18.	
668	GRUN	371	374	.292			10.	18.	
669	RUN	374	378	.208			16.	19.	
670	RUN	378	383	.146			19.	19.	
671	RUN	383	384	.146			19.	19.	
672	RUN	384	386	.458			16.	19.	
673	ELBOW	386	387				10.	19.	
674	GRUN	387	388			2.50	10.	18.	
675	GRUN	388	389			2.50	10.	18.	
676	ANCHOR		389	117.166	12.625	106.167	10.	18.	
677	RUN	170	173	0.000	0.000	.385	9.	15.	
678	TEE	170	173	1.023					
679	GRUN	173	187	0.000	0.000	.510	9.	14.	
680	ELBOW	187	175	0.000	0.000	0.000	9.	15.	
681	GRUN	175	177	-.583	0.000	0.000	9.	14.	
682	RUN	177	179	-.146	0.000	0.000	15.	15.	
683	RUN	179	183	-.167	0.000	0.000	18.	15.	
684	RUN	183	167	-.146	0.000	0.000	16.	15.	
685	RUN	167	163	-.208	0.000	0.000	15.	15.	
686	GRUN	163	158	-3.667	0.000	0.000	10.	14.	
687	ELBOW	158	153	0.000	0.000	0.000	10.	15.	0.000
688	GRUN	153	151	0.000	-3.680	0.000	10.	14.	0.000
689	ELBOW	151	145	0.000	0.000	0.000	10.	15.	0.000
690	GRUN	145	142	.224	0.000	.194	10.	14.	
691	RUN	142	134	.157		.136	16.	15.	
692	RUN	134	116	.110	0.000	.095	19.	15.	0.000
693	VALVE	116	112	.946	0.000	.817	26.	15.	0.000
694	RUN	112	107	.110		.095	19.	17.	
695	RUN	107	103	.157	0.000	.136	16.	17.	
696	GRUN	103	98	.189	0.000	.163	10.	16.	
697	GRUN	98	94	3.615	0.000	3.123	10.	16.	0.000
698	ELBOW	94	91	0.000	0.000	0.000	10.	17.	
699	GRUN	91	243	0.000	-4.0	0.000	10.	16.	
700	RUN	243	257		-4.0		10.	17.	

701	RUN	257	253		-9.0		16.	17.		
702	GRUN	253	87		-1.803		16.	16.		
703	REDUCER	87	86	0.000	-.140	0.000	16.	17.	0.000	
704	REDUCER	86	84	0.000	-.515	0.000	9.	17.		
705	ELBOW	84	78	0.000	0.000	0.000	9.	17.	0.000	
706	RESTRAINT		78		1.0 E+06					
707	GRUN	78	73	-1.186		0.000	9.	16.		
708	ELBOW	73	67	0.000	0.000	0.000	9.	17.	0.000	
709	GRUN	67	52	0.000	0.000	-.716	9.	16.		
710	RUN	52	38	0.000	0.000	-.208	16.	17.	0.000	
711	RUN	38	192	0.000	0.000	-.146	19.	17.	0.000	
712	ANCHOR	0	192	103.573	-16.792	110.917	19.	17.	0.000	
713	RUN	170	172	0.000	0.000	-.385	9.	13.		
714	TEE	170	172	1.023						
715	GRUN	172	176	0.000	0.000	-.083	9.	12.		
716	RUN	176	178	0.000	0.000	-.229	15.	15.		
717	RUN	178	182	0.000	0.000	-.167	18.	15.		
718	RUN	182	168	0.000	0.000	-.167	18.	15.	0.000	
719	RUN	168	159	0.000	0.000	-.229	15.	15.	0.000	
720	GRUN	159	139	0.000	0.000	-2.751	9.	14.	0.000	
721	RUN	139	133	0.000	0.000	-.146	18.	15.		
722	RUN	133	121	0.000	0.000	-.208	15.	15.		
723	GRUN	121	109	0.000	0.000	-1.542	9.	14.	0.000	
724	RUN	109	99	0.000	0.000	-.208	15.	15.	0.000	
725	RUN	99	89	0.000	0.000	-.146	18.	15.	0.000	
726	RUN	89	79	0.000	0.000	-.146	18.	15.	0.000	
727	RUN	79	71	0.000	0.000	-.208	15.	15.	0.000	
728	GRUN	71	57	0.000	0.000	-1.187	9.	14.	0.000	
729	RUN	57	39	0.000	0.000	-.281	9.	15.		
730	RESTRAINT		39	.100E+07	.100E+07					
731	RUN	39	33	0.000	0.000	-.281	9.	15.		
732	RUN	33	32	0.000	0.000	-.208	15.	15.	0.000	
733	RUN	32	31	0.000	0.000	-.146	18.	15.	0.000	
734	VALVE	31	29	0.000	0.000	-1.750	23.	15.	0.000	
735	RUN	29	27	0.000	0.000	-.146	18.	17.	0.000	
736	RUN	27	26	0.000	0.000	-.583	15.	17.		
737	ELBOW	26	24	0.000	0.000	0.000	9.	17.	0.000	
738	GRUN	24	23	-2.507	0.000	0.000	9.	16.		
739	ELBOW	23	19	0.000	0.000	0.000	9.	17.	0.000	
740	GRUN	19	9	0.000	0.000	4.033	9.	16.	0.000	
741	GRUN	9	206	0.000	0.000	3.250	9.	16.		
742	RESTRAINT		206	1.0 E+06						
743	GRUN	206	8			0.833	9.	16.		
744	ELBOW	8	7	0.000	0.000	0.000	9.	17.	0.000	
745	GRUN	7	6	0.000	-4.138	0.000	9.	16.	0.000	
746	GRUN	6	5	0.000	-4.138	0.000	9.	16.	0.000	
747	ELBOW	5	4	0.000	0.000	0.000	9.	17.	0.000	
748	RESTRAINT		4		1.0 E+06					
749	GRUN	4	3	0.000	0.000	.969	9.	16.	0.000	
750	RUN	3	2	0.000	0.000	.208	15.	17.	0.000	

751	RUN	2	1	0.000	0.000	-.146	18.	17.	0.000	
752	ANCHOR	0	1	101.660	-6.729	104.708	18.	17.		
753	RUN	39	66	0.000	.281	0.000	9.	15.	0.000	
754	TEE	39	66	1.023						
755	GRUN	66	61	0.000	.302	0.000	9.	14.	0.000	
756	RUN	61	55	0.000	.208	0.000	15.	15.	0.000	
757	RUN	55	51	0.000	.146	0.000	18.	15.	0.000	
758	VALVE	51	46	0.000	1.750	0.000	27.	15.	0.000	
759	RUN	46	53	0.000	.146	0.000	18.	19.	0.000	
760	RUN	53	63	0.000	.208	0.000	15.	19.		
761	GRUN	63	72	0.000	2.412	0.000	9.	18.	0.000	
762	ELBOW	72	85	0.000	0.000	0.000	9.	19.		
763	GRUN	85	93	5.293	0.000	0.000	9.	18.		
764	RUN	93	97	.208	0.000	0.000	15.	19.	0.000	
765	RUN	97	101	.146	0.000	0.000	18.	19.	0.000	
766	RUN	101	106	.146	0.000	0.000	18.	19.	0.000	
767	RUN	106	113	.208	0.000	0.000	15.	19.	0.000	
768	GRUN	113	203	2.292	0.000	0.000	9.	18.		
769	RUN	203	122	.208	0.000	0.000	15.	19.		
770	RUN	122	197	.146	0.000	0.000	18.	19.		
771	VALVE	197	143	1.750	0.000	0.000	23.	19.		
772	RUN	143	148	.146	0.000	0.000	18.	19.	0.000	
773	RUN	148	156	.208	0.000	0.000	15.	19.	0.000	
774	GRUN	156	164	.250	0.000	0.000	9.	18.	0.000	
775	ANCHOR	0	164	115.167	7.000	98.333	9.	18.	0.000	
776	RUN	60	194	0.000	0.000	-.833	14.	21.		
777	ELBOW	194	77	0.000	0.000	0.000	14.	21.		
778	RUN	77	81	-.355	0.000	0.000	17.	21.		
779	RUN	81	83	-.125	0.000	0.000	20.	21.	0.000	
780	VALVE	83	204	-1.000	0.000	0.000	22.	21.		
781	RUN	204	88	-.125	0.000	0.000	20.	21.		
782	RUN	88	96	-.167	0.000	0.000	17.	21.	0.000	
783	GRUN	96	104	-3.645	0.000	0.000	14.	20.	0.000	
784	ELBOW	104	108	0.000	0.000	0.000	14.	21.	0.000	
785	GRUN	108	111	0.000	5.644	0.000	14.	20.	0.000	
786	GRUN	111	114	0.000	5.644	0.000	14.	20.	0.000	
787	GRUN	114	118	0.000	5.644	0.000	14.	20.	0.000	
788	ELBOW	118	198	0.000	0.000	0.000	14.	21.		
789	GRUN	198	138	0.000	0.000	-4.708	14.	20.		
790	GRUN	138	146	0.000	0.000	-4.708	14.	20.	0.000	
791	ELBOW	146	152	0.000	0.000	0.000	14.	21.	0.000	
792	GRUN	152	154	1.083	0.000	0.000	14.	20.		
793	GRUN	154	161	.501	0.000	0.000	14.	20.		
794	ELBOW	161	201	0.000	0.000	0.000	14.	21.		
795	GRUN	201	166	0.000	0.000	-3.917	14.	20.		
796	ELBOW	166	169	0.000	0.000	0.000	14.	21.	0.000	
797	GRUN	169	186	2.103	0.000	0.000	14.	20.		
798	GRUN	186	191	2.729	0.000	0.000	14.	20.	0.000	
799	ANCHOR	0	191	105.166	7.250	95.417	14.	20.	0.000	
800	BRANCH	415	424	0.292	0.000		9.	11.	1.75	

801	GRUN	424	419	.292	0.000	0.000	9.	10.	
802	RUN	419	421	.208	0.000	0.000	13.	11.	0.000
803	RUN	421	423	.146	0.000	0.000	13.	11.	0.000
804	RUN	423	427	.125	0.000	0.000	20.	11.	0.000
805	RUN	427	431	.417	0.000	0.000	17.	11.	
806	ELBOW	431	437	0.000	0.000	0.000	14.	11.	0.000
807	GRUN	437	443	0.000	0.000	-.417	17.	11.	
808	RUN	443	448	0.000	0.000	-.125	20.	11.	0.000
809	VALVE	448	457	0.000	0.000	-1.094	22.	11.	
810	RUN	457	462	0.000	0.000	-.125	20.	11.	0.000
811	RUN	462	467	0.000	0.000	-.354	17.	11.	
812	ELBOW	467	472	0.000	0.000	0.000	14.	11.	0.000
813	GRUN	472	477	-.480	0.000	0.000	14.	10.	0.000
814	ELBOW	477	482	0.000	0.000	0.000	14.	11.	0.000
815	GRUN	482	487	0.000	0.000	-7.114	14.	10.	
816	ELBOW	487	492	0.000	0.000	0.000	14.	11.	0.000
817	GRUN	492	504	0.000	-9.666	0.000	14.	10.	0.000
818	GRUN	504	517	0.000	-9.667	0.000	14.	10.	0.000
819	GRUN	517	519		-2.167		14.	10.	
820	ELBOW	519	529				14.	11.	
821	GRUN	529	538	1.893			14.	10.	
822	RUN	538	539	.19			14.	11.	
823	RUN	539	541	.19			14.	11.	
824	RUN	541	543	.167			17.	29.	
825	RUN	543	544	.125			20.	29.	
826	VALVE	544	545	1.00			22.	29.	
827	RUN	545	546	.167			20.	29.	
828	RUN	546	548	.125			17.	29.	
829	GRUN	548	549	.50			14.	28.	
830	RUN	549	552	.167			17.	29.	
831	RUN	552	555	.125			20.	29.	
832	RUN	555	558	.125			20.	29.	
833	RUN	558	561	.167			17.	29.	
834	GRUN	561	563	2.035			14.	28.	
835	RUN	563	565	.19			14.	29.	
836	RUN	565	566	.19			14.	29.	
837	RUN	565	567		- .19		14.	29.	
838	TEE	565	567						
839	GRUN	567	568		-3.81		14.	28.	
840	REDUCER	568	569		- .125		14.	28.	
841	REDUCER	569	571		- .125		10.	29.	
842	ANCHOR		571	112.333	2.000	99.25	10.	29.	
843	RUN	539	534			.19	14.	11.	
844	TEE	539	534						
845	GRUN	534	533			.50	14.	26.	
846	RUN	533	526			.167	17.	27.	
847	RUN	526	524			.125	20.	27.	
848	VALVE	524	521			1.094	22.	27.	
849	RUN	521	511			.125	20.	27.	
850	RUN	511	491			.167	17.	27.	

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                1         2         3         4         5         6         7         8
       1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678
851    GRUN      491  458                                4.30      14.       26.
852    ELBOW     458  446                                          14.       27.
853    GRUN      446  438                    -7.966                14.       26.
854    GRUN      438  428                    -7.966                14.       26.
855    ELBOW     428  418                                          14.       27.
856    GRUN      418  409          -2.312                          14.       26.
857    RUN       409  408          - .167                          17.       27.
858    RUN       408  406          - .125                          20.       27.
859    RUN       406  405          - .125                          20.       27.
860    RUN       405  174          - .355                          17.       27.
861    ELBOW     174  149                                          14.       27.
862    GRUN      149   80                               1.04      14.       26.
863    BRANCH    495  498          0.000     0.000     -.292       9.        9.      1.75
864    GRUN      498  502          0.000     0.000     -.323       9.        8.
865    RUN       502  509          0.000     0.000     -.208      15.        9.
866    RUN       509  512          0.000     0.000     -.146      18.        9.
867    RUN       512  516                              -.146      18.        9.
868    RUN       516  518                              -.268      15.        9.
869    ELBOW     518  522                                         10.        9.
870    GRUN      522  527          1.333               -3.225     10.        8.
871    GRUN      527  528          1.333               -3.225     10.        8.
872    ELBOW     528  532                                         10.        9.
873    RESTRAINT      532  .100E+07
874    GRUN      532  537                    -3.792               10.        8.
875    GRUN      537  542                    -3.792               10.        8.
876    GRUN      542  547                    -3.792               10.        8.
877    GRUN      547  559                    -2.000               10.        8.
878    GRUN      559  562                    -5.634               10.        8.
879    REDUCER   562  564                    - .146               10.        9.
880    REDUCER   564  576                    - .146                9.        9.
881    GRUN      576  578                    -3.046                9.        8.
882    RUN       578  580                    - .208               15.        9.
883    RUN       580  582                    - .146               18.        9.
884    RUN       582  584                    - .146               18.        9.
885    RUN       584  586                    - .208               15.        9.
886    GRUN      586  588                    - .613                9.        8.
887    RUN       588  590                    - .208               15.        9.
888    RUN       590  592                    - .146               18.        9.
889    RUN       592  594                    - .200               18.        9.
890    RUN       594  596                    - .146               18.        9.
891    RUN       596  598                    - .583               15.        9.
892    ELBOW     598  600                                          9.        9.
893    GRUN      600  602                              7.0         9.        8.
894    ELBOW     602  604                                          9.        9.
895    GRUN      604  606          .36                             9.        8.
896    ANCHOR         606  107.214   15.167    107.645             9.        8.
897    RUN       559  557                               0.5      14.        1.
898    RUN       557  556                    1.0                 29.        1.
899    ELASTOJT  556  554   84.0
900    DCOS      556  554                    1.0                          1.0
                1         2         3         4         5         6         7         8
       1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678
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        1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
901  RUN       554  553                  1.0                  29.       1.
902  ANCHOR          553                                    29.       1.
903  RUN       267  273                  1.0                  29.       1.
904  ELASTOJT  273  275   21.0
905  DCOS      273  275                  1.0                1.0
906  RUN       275  278                  1.0                  29.       1.
907  ANCHOR          278                                    29.       1.
908  RUN       284  276                  1.0                  29.       1.
909  ELASTOJT  276  279   84.0
910  DCOS      276  279                  1.0                1.0
911  RUN       279  281                  1.0                  29.       1.
912  ANCHOR          281                                    29.       1.
913  RUN       155  264                  1.0                  29.       1.
914  ELASTOJT  264  266  168.0
915  DCOS      264  266                  1.0                1.0
916  RUN       266  269                  1.0                  29.       1.
917  ANCHOR          269                                    29.       1.
918  RUN        98   76                  1.0                  29.       1.
919  ELASTOJT   76   74  168.0
920  DCOS       76   74                  1.0                1.0
921  RUN        74   68                  1.0                  29.       1.
922  ANCHOR          68                                     29.       1.
923  RUN       206  259                  1.0                  29.       1.
924  ELASTOJT  259  261  214.0
925  DCOS      259  261                  1.0                1.0
926  RUN       261  263                  1.0                  29.       1.
927  ANCHOR          263                                    29.       1.
928  RUN       118   64                  1.0                  29.       1.
929  ELASTOJT   64   59   70.0
930  DCOS       64   59                  1.0                1.0
931  RUN        59   58                  1.0                  29.       1.
932  ANCHOR          58                                     29.       1.
933  RUN       154   54                  1.0                  29.       1.
934  ELASTOJT   54   48  1.0 E+06
935  DCOS       54   48                  1.0                1.0
936  RUN        48   42                  1.0                  29.       1.
937  ANCHOR          42                                     29.       1.
938  RUN       371  382                  1.0                  29.       1.
939  ELASTOJT  382  396  214.0
940  DCOS      382  396                  1.0                1.0
941  RUN       396  397                  1.0                  29.       1.
942  ANCHOR          397                                    29.       1.
943  RUN       492  499                1.000                  29.       1.
944  ELASTOJT  499  514   63.0
945  DCOS      499  514                  1.0                1.0
946  RUN       514  503                1.000                  29.       1.
947  ANCHOR          503                                    29.       1.
948  RUN       446  474                  1.                   29.       1.
949  ELASTOJT  474  505   47.0
950  DCOS      474  505                  1.0                1.0
        1         2         3         4         5         6         7         8
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                1       2       3       4       5       6       7       8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
  951  RUN          505   507                   1.                    29.     1.
  952  ANCHOR            507                                         29.     1.
  953  RUN          548   572                   1.                    29.     1.
  954  ELASTOJT     572   574   1.0 E+06
  955  DCOS         572   574                   1.0                   1.0
  956  RUN          574   575                   1.                    29.     1.
  957  ANCHOR            575                                         29.     1.
  958  GROSDISC       8    39    9777.
  959  GROSDISC       8    79    9777.
  960  GROSDISC       8    99    9777.
  961  GROSDISC       8   133    9777.
  962  GROSDISC       8   157    9777.
  963  GROSDISC       8   165    9777.
  964  GROSDISC       8   168    9777.
  965  GROSDISC       8   170   21811.
  966  GROSDISC       8   178    9777.
  967  GROSDISC       8   202    9777.
  968  GROSDISC       8   208    9777.
  969  GROSDISC       8   222   25551.
  970  GROSDISC       8   245   21811.
  971  GROSDISC       8   247    9777.
  972  GROSDISC       8   249    9777.
  973  GROSDISC       8   251    9777.
  974  GROSDISC       8   258    9777.
  975  GROSDISC       8   285    9777.
  976  GROSDISC       8   288    9777.
  977  GROSDISC       8   349    9777.
  978  GROSDISC       8   361    9777.
  979  GROSDISC       8   378    9777.
  980  GROSDISC       8   384    9777.
  981  FORCE          1    98                450.0
  982  FORCE          1   206                225.0
  983  FORCE          1   118                200.0
  984  FORCE          1   155                450.0
  985  FORCE          1   371                200.0
  986  FORCE          1   284                450.0
  987  FORCE          1   267                110.0
  988  FORCE          1   492                315.0
  989  FORCE          1   446                220.0
  990  FORCE          1   557                495.0
  991  STRESS7        1
  992  9CASES         1         2
  993  10CASES        3     4   5     6     7     8     9    10    11    12
  994  CKNODES        7     8  19    23    24    26    39    46    53    55    57    60    61    63
  995  CKNODES       66    72  79    85    97    99   106   109   113   121   122   133   139   143
  996  CKNODES      144   145 147   148   150   151   155   156   158   164   165   168   170   172
  997  CKNODES      173   175 176   178   182   187   193   194   197   199   203   209   212   213
  998  CKNODES      214   215 222   235   239   244   245   247   249   251   258   262   268   271
  999  CKNODES      274   277 280   283   284   285   288   336   344   346   349   361   378   384
 1000  CKNODES      415   419 424   495   498   518   522   528   532
                1       2       3       4       5       6       7       8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
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        12345678901234567890123456789012345678901234567890123456789012345678901234567890
1001    ALLDONE
1002    C*EOR
1003      BDNT - FIST - B31.1 PIPING ANALYSIS &
1004      AND PARTIAL FATIGUE ANALYSIS

        12345678901234567890123456789012345678901234567890123456789012345678901234567890
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                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
  1    RMF01,STANY,T37,P2.
  2    ACCOUNT,3E20,446081007,WDD.
  3    ATTACH,AMBMAN,ID=JRD.
  4    AMBMAN.
  5    PIPROK,
  6    PROG=V4PIFIL,
  7    FICHE,
  8    END.
  9    COMMENT.  FILE, FIST3
 10    COMMENT.  FEEDWATER LINE;  3-307.
 11    COMMENT.
 12    EXIT.
 13    COMMENT.
 14    COMMENT.  FILE, FIST3
 15    COMMENT.  FEEDWATER LINE;  3-307.
 16    COMMENT.
 17    C*EOR
 18     BDNI - FIST PROGRAM -- NPSED - PIPING ANALYSIS - FEEDWATER LINE 3-307
 19    CONTROL                    2.0
 20    CONTROL
 21    FLEXAN          1     1    3.0
 22    DEADWEIGHT PLUS PRESSURE
 23    FLEXAN          2     1    4.0
 24     DUMMY SEISMIC
 25    FLEXAN          3     2    2.0                                          1000.
 26     HEATUP
 27    ACCEL
 28    XSECTN                1    3.50        0.30       16.35    27.9        1580.0
 29    XSECTN                2    4.25        .675       25.47    29.9        1580.0
 30    XSECTN                3    9.50        3.300      216.0    29.9        1580.0
 31    XSECTN                4    3.50        0.30       233.0    29.9        1580.0
 32    OPVAL           1     1    27.9
 33    OPVAL           1     2    29.9
 34    OPVAL           1     3    27.9
 35    OPVAL           2     1    26.05       .0414                          1050.
 36    OPVAL           2     2    27.05       .0414                          1050.
 37    OPVAL           2     3    27.9
 38    ANCHOR                10   113.167     1.0        98.0     3.0         1.0
 39    RUN            10     20     .146                          3.0         2.0
 40    RUN            20     30     .208                          2.0         2.0
 41    GRUN           30     40    2.563                          1.0         1.0
 42    RESTRAINT             40                1.0E+06
 43    ELBOW          40     50                                    1.0         2.0
 44    GRUN           50     60                3.292               1.0         1.0
 45    GRUN           60     70                3.292               1.0         1.0
 46    ELBOW          70     80                                    1.0         2.0
 47    GRUN           80     90                           -2.083   1.0         1.0
 48    GRUN           90    100                           -2.083   1.0         1.0
 49    ELBOW         100    110                                    1.0         2.0
 50    GRUN          110    120                3.75                1.0         1.0
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
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      1       2       3       4       5       6       7       8
12345678901234567890123456789012345678901234567890123456789012345678
51    GRUN      120     130             3.75            1.0     1.0
52    ELBOW     130     140                             1.0     2.0
53    GRUN      140     150                     1.229   1.0     1.0
54    GRUN      150     160                     .25     1.0     1.0
55    RUN       160     170                     .208    2.0     2.0
56    RUN       170     180                     .146    3.0     2.0
57    VALVE     180     190                     1.417   4.0     2.0
58    RUN       190     200                     .146    3.0     2.0
59    RUN       200     210                     .208    2.0     2.0
60    GRUN      210     220                     .563    1.0     1.0
61    ELBOW     220     230                             1.0     2.0
62    GRUN      230     240     -.625                   1.0     1.0
63    RUN       240     250     -.208                   2.0     2.0
64    RUN       250     260     -.146                   3.0     2.0
65    ANCHOR            260   115.104   15.083  98.000  3.0     2.0
66    RUN       150     151             1.0             1.0     3.0
67    ELASTOJT  151     152   168.0
68    OCOS      151     152             1.0             1.0
69    RUN       152     153             1.0             1.0     3.0
70    ANCHOR            153                             1.0     3.0
71    FORCE       1     150           441.0
72    STRESS7     1
73    9CASES      1           2
74    10CASES     3
75    ALLDONE
76    C*EOR
77      BDNT-FIST PROGRAM-NPSED-PIPING ANALYSIS $
78      MODEL 2 - FEEDWATER LINE 3-307                                ,
      1       2       3       4       5       6       7       8
12345678901234567890123456789012345678901234567890123456789012345678
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      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

  1   RMF01,STANY,T37,P1.
  2   ACCOUNT,3620,446081007,nDD.
  3   ATTACH,AMBMAN,ID=JRD.
  4   AMBMAN.
  5   PIPRUN,
  6   PROG=V4PIPIL,
  7   FICHE,
  8   END.
  9   COMMENT.  FILE, FIST4
 10   COMMENT.  PIPING FROM RECIRC.PUMP 2                    TO FIXED ANCHORS
 11   COMMENT.  LINES 1-1/2 - 201; 1-1/2 - 208;              AND 1-1/2 - 207
 12   COMMENT.
 13   EXIT.
 14   COMMENT.
 15   COMMENT.  FILE, FIST4
 16   COMMENT.  PIPING FROM RECIRC.PUMP 2                    TO FIXED ANCHORS
 17   COMMENT.  LINES 1-1/2 - 201; 1-1/2 - 207;              AND 1-1/2 - 208
 18   C*EOR
 19   FIST - RECIRC. PUMP NO. P32 LINES; 1-1/2-201, 1-1/2-207, 1-1/2-208
 20   CONTROL                    2.0
 21   CONTROL
 22   FLEXAN          1    1     3.0
 23    DEAD WEIGHT PLUS PRESSURE
 24   FLEXAN          2    1     4.0
 25    DUMMY SEISMIC
 26   FLEXAN          3    2     2.0
 27   HEATUP ALL LINES HOT
 28   FLEXAN          4    3     2.0
 29   HEATUP 1-1/2 - 207 COLD
 30   FLEXAN          5    4     2.0
 31   HEATUP 1-1/2 - 208 COLD
 32   ACCEL
 33   XSECTN               1   2.375      .218       9.16   27.9        1580.0
 34   XSECTN               2   1.900      .200       7.11   27.9        1580.0
 35   XSECTN               3   2.325      .412       8.33   29.9        1580.0
 36   XSECTN               4   7.00      2.75      124.0    29.9        1580.0
 37   XSECTN               5   2.375      .218      157.0    29.9        1580.0
 38   XSECTN               6   1.900      .200      150.0    29.9        1580.0
 39   OPVAL          1     1    27.9                                    1050.
 40   OPVAL          1     2    29.9                                    1050.
 41   OPVAL          1     3    27.9                                    1050.
 42   OPVAL          1     4    29.9                                    1050.
 43   OPVAL          1     5    27.9                                    1050.
 44   OPVAL          1     6    29.9                                    1050.
 45   OPVAL          1     7    29.9                                    1050.
 46   OPVAL          2     1    26.05     .0414                         1050.
 47   OPVAL          2     2    27.05     .0414                         1050.
 48   OPVAL          2     3    26.05     .0414                         1050.
 49   OPVAL          2     4    27.05     .0414                         1050.
 50   OPVAL          2     5    26.05     .0414                         1050.

      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
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                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
  51   OPVAL          2     6     27.05      .0414                          1050.
  52   OPVAL          2     7     29.9
  53   OPVAL          3     1     26.05      .0414                          1050.
  54   OPVAL          3     2     27.05      .0414                          1050.
  55   OPVAL          3     3     26.05      .0414                          1050.
  56   OPVAL          3     4     27.05      .0414                          1050.
  57   OPVAL          3     5     27.9
  58   OPVAL          3     6     29.9
  59   OPVAL          3     7     29.9
  60   OPVAL          4     1     27.9
  61   OPVAL          4     2     29.9
  62   OPVAL          4     3     26.05      .0414                          1050.
  63   OPVAL          4     4     27.05      .0414                          1050.
  64   OPVAL          4     5     26.05      .0414                          1050.
  65   OPVAL          4     6     27.05      .0414                          1050.
  66   OPVAL          4     7     29.9
  67   ANCHOR               100   101.896    7.25      100.750     2.0      1.0
  68   GRUN      100    110                             -1.000     2.0      1.0
  69   ELBOW     110    120                                        2.0      1.0
  70   GRUN      120    130     1.636                              2.0      1.0
  71   GRUN      130    140     1.636                              2.0      1.0
  72   ELBOW     140    150                                        2.0      1.0
  73   RESTRAINT            150                2.0
  74   GRUN      150    160                 - .791                2.0      1.0
  75   RUN       160    170                 - .167                3.0      2.0
  76   RUN       170    180                 - .125                4.0      2.0
  77   RUN       180    190                 - .125                4.0      2.0
  78   RUN       190    200                 - .167                3.0      2.0
  79   GRUN      200    210                -2.385                 2.0      1.0
  80   GRUN      210    220                -2.385                 2.0      1.0
  81   GRUN      220    230                 - .188                2.0      1.0
  82   TEE       220    230
  83   GRUN      230    240                             .376       2.0      3.0
  84   ELBOW     240    250                                        2.0      3.0
  85   GRUN      250    260    -2.927                              2.0      3.0
  86   ELBOW     260    261                                        2.0      3.0
  87   GRUN      261    263                            2.374       2.0      3.0
  88   RESTRAINT            263                2.0
  89   GRUN      263    270                            1.250       2.0      3.0
  90   ELBOW     270    280                                        2.0      3.0
  91   GRUN      280    290                -3.083                  2.0      3.0
  92   GRUN      290    300                -3.083                  2.0      3.0
  93   ELBOW     300    310                                        2.0      3.0
  94   GRUN      310    320                            1.540       2.0      3.0
  95   ELBOW     320    340                                        2.0      3.0
  96   RUN       340    350                 -.355                  2.0      4.0
  97   RUN       350    360                 -.125                  2.0      4.0
  98   ANCHOR               360   102.25     -5.75     105.291     2.0      4.0
  99   GRUN      230    233                              -.186     2.0      5.0
 100   GRUN      233    235                             -2.473     2.0      5.0
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
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                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
101    RUN          235  245                              -.167     3.0       6.0
102    RUN          245  255                              -.125     4.0       6.0
103    VALVE        255  265                             -1.0       6.0       6.0
104    RUN          265  275                              -.125     4.0       6.0
105    RUN          275  285                              -.355     3.0       6.0
106    ELBOW        285  295                                        2.0       5.0
107    GRUN         295  305                3.167                   2.0       5.0
108    GRUN         305  315                3.167                   2.0       5.0
109    ANCHOR            315  105.167        7.25      95.417       2.0       5.0
110    RUN          150  151                1.                      1.        7.
111    ELASTOJT     151  152   70.
112    DCOS         151  152                  1.0                   1.0
113    RUN          152  153                1.                      1.        7.
114    ANCHOR            153                                        1.        7.
115    RUN          263  264                1.0                     1.0       7.
116    ELASTOJT     264  266   120.
117    DCOS         264  266                  1.0                   1.0
118    RUN          266  267                1.0                     1.0       7.
119    ANCHOR            267                                        1.0       7.
120    FORCE          1  150                170.
121    FORCE          1  263                 75.
122    STRESS7        1
123    9CASES         1              2
124    10CASES        3    4         5
125    ALLDONE
126    C*EOR
127      FIST - RECIRC.PUMP NO. P32 LINES 1
128      1-1/2 - 201, 207, AND 208
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

APPENDIX D

MICROFICHE

CONTENTS

NUPIPE Computer Results