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RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards response to 831205 request for addl info re NUREG-0737 Item II.D.1, "Performance Testing of Relief & Safety Valves." Microfiche of RELAP5/ADLPIPE computer analyses encl.

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NRC-84-48

WISCONSIN PUBLIC SERVICE CORPORATION

Public Service

P.O. Box 1200, Green Bay, Wisconsin 54305

March 23, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. S. A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Varga:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
NUREG-0737, Item II.D.1 "Performance Testing of Relief and Safety Valves" Request for Additional Information

References: 1) Letter to C. W. Giesler of WPSC from S. A. Varga of the NRC dated December 5, 1983
2) Letter to S. A. Varga of the NRC from C. W. Giesler of WPSC dated February 16, 1984

On December 5, 1983 (Reference 1), we received a questionnaire concerning our earlier responses to Item II.D.1 of NUREG-0737, "Performance Testing of Relief and Safety Valves," in which we were requested to respond within sixty (60) days. In Reference 2, we informed you that our response would take longer than originally anticipated due to the detailed nature of the questions, the number of submittals requested by the NRC recently, and the limited number of personnel available to respond within the time frame indicated. As such, we committed to a revised submittal schedule which had been discussed with and approved by our Project Manager.

This submittal fulfills our commitment to provide the requested additional information. For your convenience, please find enclosed four (4) copies of the completed questionnaire. These copies include microfiche of the RELAP5/ADLPIPE

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computer analyses (Appendix A and B). To the best of my knowledge, the information in this submittal is true and accurate.

Very truly yours,

Carl W. Giesler

C. W. Giesler
Vice President - Nuclear Power

JGT/js

Enc.

cc - Mr. Robert Nelson, US NRC - w/o attachment

50-305

RESPONSE TO NUREG-0737 ITEM II.D.1

REQUEST FOR ADDITIONAL INFORMATION
TMI ACTION NUREG-737 (II.D.1)
RELIEF AND SAFETY VALVE TESTING
FOR
KEWAUNEE

Docket No. 50-305

The results of the analyses reported in the submittal indicate several points in the piping are overstressed. Correspondence to the NRC subsequent to the submittal identifies the intended solution is to install rupture discs in the discharge piping. The requirements of Item II.D.1 cannot be considered satisfied until an analysis of the system with the rupture discs installed demonstrates that the system will function properly and that the piping will not be overstressed. Nevertheless the submittal has been evaluated and questions developed based on the information provided to date.

Q-1. The submittal treats steam flow type of valve actuation condition as a worst case transient for both safety and relief valves. It further states that water or steam-water transients are not possible in this plant. The submittal does not contain any discussion, though, on whether single failures after the initiating event were considered that could lead to water flow through the valve. Nor does the submittal address the fact that the pressurizer spray will be on as a result of the original pressure increase, leading to a steam-water flow condition. A discussion should be presented showing how single failures and other mechanisms that could lead to water or steam-water flow conditions were considered in selecting potential transients.

A-1. References:

1. "Valve Inlet Fluid Conditions for Pressurizer Safety and Relief Valves in Westinghouse-Designed Plants," EPRI NP-2296-LD, March 1982.

In Reference 1, transients that would result in steam and/or water discharge flow through the pressurizer power operated relief valves (PORV's) and safety valves were evaluated. The objective of this report was to assist PWR utilities with Westinghouse plants in demonstrating that the fluid conditions under which their valve designs were tested enveloped those fluid conditions expected. The Kewaunee Nuclear Power Plant (KNPP) was considered in this report and is covered by it.

This generic report indicated that FSAR events challenged both pressurizer relief and safety valves under steam conditions with the Loss of Load and Locked Rotor Accidents being the pressure enveloping Condition II and Condition IV events, respectively. Liquid discharge was predicted for only one FSAR event, the Feedline Break Accident. Extended high pressure liquid injection events were found to result in no relief or safety valve challenges for two loop plants, such as the KNPP. The shutoff head of the KNPP Safety Injection Pumps is approximately 2200 psia which is well below the opening setpoints for the pressurizer S/RV's.

The Locked Rotor Accident was considred the worst case transient for determining the KNPP S/RV discharge piping loads. No credit was taken in the accident analysis (KNPP UFSAR* Section 14.1.8) for the pressure-reducing effects of the pressurizer relief valves, pressurizer spray, steam dump, or controlled feedwater flow, although these operations are expected to occur. The worst case analysis for the Loss of Load Accident (KNPP UFSAR* Section 14.1.9) took no credit for a direct or immediate reactor trip, RCCA insertion until reactor trip, pressurizer relief valves, pressurizer spray, or steam dump. These multiple failure assumptions result in enveloping pressurization rates and peak pressures. Since pressurizer spray would condense steam in the pressurizer steam space and reduce system pressure, taking credit for their use during either of the above mentioned accidents would be nonconservative in determining peak pressurization rates and system pressures. If they were assumed functional and did produce a steam-water flow condition, the resultant loading on the discharge piping would be insignificant when compared to the thermal hydraulic forces caused by the solid slugs of loop seal water which move downstream subsequent to safety valve actuation. Both the KNPP pressurizer relief and safety valves were successfully tested for-two phase flow.

Multiple failures were also assumed for the analysis of the loss of Normal Feedwater Accident (KNPP UFSAR* Section 14.1.10), which includes pipe breaks. Only one motor-driven Auxiliary Feedwater Pump was considered available assuming the active failure of one pump while the other pump was out-of-service for maintenance. In addition, no credit was taken for steam dump or the steam generator PORV's. Steam relief was assumed through the spring loaded steam generator safety valves only.

This analysis concluded that the Loss of Normal Feedwater Accident does not result in water discharge through either the pressurizer relief or safety valves for the KNPP.

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*UFSAR implies Updated Final Safety Analysis Report.

The only other failures that could lead to water or steam-water flow through these valves would be if the valves themselves failed to close. The assumption of a pressurizer safety valve failing to close is outside the licensing basis of the KNPP. Only one active failure need be assumed and a safety valve is a passive device. Should a pressurizer relief valve fail to close it would be isolated by its respective block valve. The functional operability of the pressurizer block valves is discussed in response to question ten (10) of this submittal.

In either case, these scenarios have already been analyzed. Studies were performed to analyze an open PORV on top of the pressurizer (KNPP UFSAR* Section 7.2.3, Page 7.2-54), the rupture of a pipe connected to the pressurizer steam space (KNPP Historical FSAR,** Questions and Answers 14.8), and Small Breal LOCA's (KNPP UFSAR,* Section 14.3.1).

Cold overpressurization events will be discussed in response to question three (3) of this submittal.

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*UFSAR implies Updated Final Safety Analysis Report.

**Historical FSAR is the original FSAR.

Q-2. A locked rotor accident was evidently selected as the worst case transient for discharge piping analysis. The submittal states that the FSAR specifies the maximum pressure for this transient to be 2737 psia, while 2686 psia was used in the RELAP5 analysis. The pressure ramp rate used in the analysis was not identified in the submittal. A justification for use of 2686 psia should be provided. For the loop seal condition, the valve simmers while the loop seal liquid is passing through the valve. The simmering delays the opening after the set point is reached which was not expected prior to testing. Was the effect of the unexpected longer opening on the overpressure protection analysis and the FSAR events considered?

Based on Kewaunee FSAR evaluations, the locked rotor accident with both power operated relief valves failed provides the worst case transient for safety valve actuation. The locked rotor accident is presented on page 14.1-35 in Section 14.1.8 of the Kewaunee FSAR. The locked rotor primary pressure transient curve is presented on Figure 14.1-34.

A maximum pressurization rate of approximately 280 psi/second is interpreted from Figure 14.1-34 of the Kewaunee FSAR, and a peak pressure of 2737 psia is given on page 14.1-38 of the FSAR. The value of 304 psia/second reported in the Kewaunee Piping Report (see Table 5-1, "Kewaunee Nuclear Power Plant Safety and Relief Valves Piping Qualification Report," issued June 28, 1982), was an overly conservative interpretation of the pressurization rate taken from FSAR Figure 14.1-34. The Kewaunee FSAR lock rotor pressurization rate of 280 psi/second and peak pressure of 2737 psia are larger than the maximum pressurization rate and peak pressure (i.e., 240 psi/second and 2682 psia, respectively) given by Westinghouse for their worst case reference two-loop plant [see Table 4-1, "Valve Inlet Fluid Conditions for Pressurizer Safety and Relief Valves in Westinghouse-Designed Plants," EPRI NP-2296-LD (March 1982)]. Therefore, the Kewaunee locked rotor pressure transient is very conservative when compared against Westinghouse worst case locked rotor analyses.

The pressure transient curve used for the Kewaunee Locked rotor accident, presented in Figure 14.1-34 of the FSAR, was modeled in the RELAP5 calculation as a time dependent volume with a linear variation of saturated steam at 2686.0 psia for time equal to 0.0 second and of saturated steam at 2737.0 psia for time equals to .5 seconds. By using this procedure the Kewaunee FSAR calculated lock rotor peak pressure of 2737.0 psia was simulated by the RELAP5 calculation. This is a conservative peak pressure because the Crosby valve flow rates measured in the CE test program were in excess of the rated flow for the safety valves. Since the calculations made for the FSAR transient analyses were based on the rated flow, a more than rated flow will decrease the transient pressure rise below that which was calculated for the FSAR transient.

Due to the conservative simulation of the CE test 908 pressure transient (i.e., a constant ramp rate of 297 psi/second), the measured "pop" pressure for CE test 908 (2686 psi) was used to initiate the RELAP5 transient. Additional items relating to the conservatism included in the Kewaunee analysis are as follows.

The loop seal used in the CE testing contained approximately 1.0 ft^3 of water whereas the loop seal piping at the Kewaunee plant only contains .7 ft^3 of water. This represents 43 percent more water in the CE test 908 loop seal than contained in the Kewaunee loop seal. With less water in the Kewaunee loop seal, it would follow that the water would clear the Kewaunee valve sooner than the water clearing the CE 908 test valve thereby producing a lower "pop" pressure for the Kewaunee safety valve.

Westinghouse performed (see WCAP-10105) the original FSAR transient analyses with the pressurizer safety valve modeled to open by assuming that the valve starts to open at the design set pressure (2500 psia) and achieves rated flow at the accumulation pressure (2575 psia). To assess the effect on reactor coolant system pressure due to valve opening delay, Westinghouse (see WCAP-10105, Section 4.0), ran a series of overpressure transients with various time delays inserted for the valve opening. These analyses utilized the limiting overpressure FSAR transient condition. A worst case reference plant was selected for a two-loop plant which maximized the effect of the pressure rise due to an overpressure transient condition. These simulations revealed that even with the delays of up to 1.0 second, the pressure transient peaks and turns around in a very short period of time. The Westinghouse calculations reveal that the CE testing apparatus simulated the effects of the loop seal delay in the pressure transient fairly well. Using the limiting transient reference plant, the calculations indicated that the .8 to .9 second opening delay produced a peak popping pressure which was typical of what was seen in the Crosby safety valve loop seal testing.

Other calculations done by Westinghouse proved that the locked rotor pressure rise is only slightly dependent on safety valve actuation and that the reactor coolant system pressurization is dictated mainly by heat removal (steam generators) and core feedback models. As a result, the pressurization rate decreases with time until the transient pressure begins to subside even with no safety valve opening.

In summary, the following items were used in determining the Kewaunee popping pressure and peak pressure which were simulated using RELAP5.

1. The Kewaunee locked rotor transient was simulated on RELAP5 using the Kewaunee FSAR transient. The Kewaunee FSAR transient was shown to be very conservative when compared to the Westinghouse Two-loop worst case locked rotor transients.
2. The Kewaunee loop seal has less water than the CE test 908 loop. Therefore, when using a similar valve and pressurization rates, the CE test results are conservative relative to what would be expected at Kewaunee.
3. The CE test 908 popping pressure is typical of popping pressures calculated by Westinghouse when simulating a loop seal delay.

Based on this information, it was judged that the popping pressure of 2686 psia and the peak pressure of 2737 psia which were used to simulate the Kewaunee safety valve acuations are representative and conservative pressures.

Q-3. The submittal states that the safety/relief valve system is not challenged by cold overpressurization events because of the existence of an overpressurization mitigation system. This system is composed of a pressure relief valve aligned to the reactor coolant system from the RHR system. A failure of this one relief valve, however, would seemingly result in an overpressurization condition requiring relief from the safety/relief valve system. Has the potential for such a failure been considered in neglecting cold overpressurization events?

A-1. Reference:

1. Letter to S. R. Barge of the NRC from C. W. Giesler of Wisconsin Public Service Corporation, dated December 16, 1983.

The assumption that the pressurizer safety and relief valves are not challenged by cold overpressurization events is correct. the KNPP has an Overpressurization Protection System which consists of two spring loaded relief valves (2-inch and 4-inch) that are aligned to the Reactor Coolant System via the Residual Heat Removal System. An assumed failure of these safety valves is outside the design basis of the KNPP. Only one active failure need be assumed, while the safety valves are passive devices. This system is currently under review by the NRC staff as part of the Low Temperature Overpressurization Protection (LTOP) issue and is in the final stages of negotiation. (See Reference 1.)

Q. 4. In the RELAP5 analysis part of the water in the loop seal was apparently assumed to move downstream during valve simmering. The Tables 7.1 through 7.4 of the submittal indicate which sections of the model contain water; however, no explanation is given as how the water distribution was obtained. The submittal should provide justification for the water distribution and water temperatures used at the time of the valve popping open.

A. 4. The water was located directly downstream of the valve as a solid slug of water (i.e., no voids). The energy profile, predicted by TAC2D (See Section 7.1.1 of the Kewaunee piping report), was conserved by moving the water into the downstream piping with the same energy distribution as was calculated for upstream loop seal water.

To determine the downstream energy or temperature profile, the loop seal water was expanded through the valve while holding the enthalpy constant. The first two control volumes downstream of the valve contain the water above 212 F and below the saturated steam condition at 2250 psia (i.e., 653 F). These two volumes contain two-phase water, which represents the flashing of all water in the upstream loop seal between 212 F and 653 F into the downstream piping at a pressure of 14.7 psia. All other water below 212 F was distributed in the remaining downstream volumes. The primary criteria for calculating accurate downstream loading is to keep the water slug solid (no voids) in the piping system at the time of safety valve "pop."

This same technique of the downstream water distribution was used to determine the loads generated by the CE 908 safety valve test. These results were presented in Figure 6-16 of the "Kewaunee Nuclear Power Plant Safety and Relief Valves Piping Qualification Report" issued on June 28, 1982. Figure 6-16 presents the calculated versus measured load data of the piping leg which experiences the largest thermal/hydraulic load tested. As seen in the comparison, the RELAP5 calculated results are in good agreement with the measured results. Also, the studies done by ITI for EPRI (see "Application of RELAP5/MOD1 for Calculation of Safety and Relief Valve Discharge

Piping Hydrodynamic Loads," Interim Report prepared by Intermountain Technologies, Inc., for participating PWR Utilities and Electric Power Research Institute, March 1982) apparently used a similar method for distributing the downstream water. They also had good calculated results when compared to the test data.

Based on these comparisons, it was judged that the method for downstream water distribution used in the RELAP5 simulation was good in determining downstream loads on the Kewaunee S/RV piping system.

Q-5. An 8.3 percent blowdown occurred during EPRI test 908, which was the loop seal test evidently most representative of Kewaunee conditions. This exceeds the design value of 5 percent given in the valve specifications. Other EPRI loop seal-steam test blowdowns were as high as 9.4 percent. These increased blowdowns would cause a rise in pressurizer level such that the level may reach the discharge piping and result in a steam-water flow situation. Also, the pressure might be sufficiently decreased so that adequate cooling might not be achieved for decay heat removal. Since the specific combinations of ring settings and backpressures to be used at the Kewaunee plant were not tested, the maximum blowdown should be estimated by extrapolating the test data. A discussion should be provided demonstrating, that with the estimated blowdown, the water level will not reach the discharge piping and that adequate core cooling can be maintained.

Also, the effect of the difference in orifice sizes between the tested valve and the Kewaunee valve should be included in the extrapolation or justification provided that the effect is not significant.

A-5. References:

1. EPRI/C-E PWR Safety Valve Test Report, Volumes 5 and 6, EPRI NP-2770-LD (March 1983).
2. "Kewaunee Nuclear Power Plant Safety and Relief Valves Qualification Report," (June 25, 1983).
3. "Safety Valve Contingency Analysis in Support of the EPRI S/RV Test Program--Volume3: Westinghouse Systems," EPRI NP-2047-LD, (October 1981).

Results from the loop seal tests for the Crosby 6M6 Safety Valve (see Reference 1) are given in Table A5-1.

The ring settings for the three safety valves used at Kewaunee are as follows.

Valve	Ring Settings
PR-3A	Guide Ring - 250 notches Nozzle Ring - 18 notches
PR-3B	Guide Ring - 260 notches Nozzle Ring - 6 notches
Spare	Guide Ring - 250 notches Nozzle Ring - 18 notches

As explained in Reference 2 (page 9-8), the guide ring reference point for the above settings refers to the measurements relative to the upper limit of ring travel. The guide ring settings referred to in the C-E testing program referenced the measurements relative to the bottom of the disc ring. Therefore, the ring settings for the

TABLE A5-1. CROSBY 6M6 TEST RESULTS

Test	Valve Ring Settings Guide	Valve Ring Settings Nozzle	Pressure Rate psi/sec	Per Cent Rated Flow Rate At 3 Per Cent Accumulation	Peak Back Pressure psia	Per Cent of Blowdown
908	-136	-68	297	105	649	8.3
910	-136	-68	375	107	227	7.8
913	-44	-66	375	107	242	7.4
917	-136	-68	291	(1)	245	9.0
923	-186	-68	283	105	667	7.7
929	-71	-18	319	112	710	5.1
1406	-77	-18	325	109	250	9.4
1415	-77	-18	360	111	255	6.2

(1) The instrumentation malfunctioned; no reliable measurement was available.

Kewaunee safety valves relative to the bottom of the disc ring are as given below.

Valve	Ring Settings	
PR-3A	Guide Ring	-136
	Nozzle Ring	-18
PR-3B	Guide Ring	-146
	Nozzle Ring	-6
Spare	Guide Ring	-136
	Nozzle Ring	-18

The guide ring setting and the nozzle ring setting are not independent of each other, but to estimate the blowdown for the Kewaunee safety valves, only the guide ring setting will be considered. This is a good approximation since the guide ring setting mainly influences the blowdown reset pressure and the nozzle ring setting influences the accumulation opening pressure. Raising the guide ring setting decreases the blowdown and conversely lowering the ring setting increases the blowdown. This is shown to be true by examining the data presented in Table A5-1. The lower guide ring settings (see Tests 908, 910, 917, and 923) produce increased blowdown and the higher guide ring settings (see Tests 913, 929, and 1415) produce decreased blowdown. An exception to this rule was Test 1406 which produced the largest per cent blowdown using a relatively high guide ring setting.

Based on this test information it appears the the per cent blowdown for the Crosby 6M6 safety valve is between 5.1 and 9.4. Taking the average of the low ring setting test results, the average per cent blowdown is 8.2. Since the guide ring settings for the Kewaunee safety valves vary between -146 and -136 and the test guide ring settings for similar settings vary between -186 and -136, the average per cent blowdown of 8.2 is therefore a good estimate for the Kewaunee $6M_16$ Crosby 6M6 safety valves.

When considering the Crosby 3K6 safety valve testing, the average blowdown for the loop seal tested Crosby safety valves was found to be 18.8 per cent blowdown. The orifice flow area for the Crosby

3K6, $6M_16$, and 6M6 safety valves are 1.85 in^2, 3.00 in^2, and 3.64 in^2, respectively. Although the $6M_16$ orifice size is much closer to the 6M6 orifice size then the 3K6 orifice size, there is some appreciable difference between 6M6 and $6M_16$ orifice sizes. To account for this difference the Crosby 6M6 and 3K6 test results given in Table A5-1 and Table A5-2, respectively, were interpolated based on the average blowdown for the Crosby 6M6 and 3K6 safety valves and relative orifice areas with respect to the Crosby $6M_16$ safety valve orifice area. Using the following interpolation, the average area weighted blowdown was found to be 12.1 per cent.

Valve	Orifice Area (in^2)	Average Blowdown
3K6	1.85	18.8
$6M_16$	3.00	12.1 (interpolated)
6M6	3.64	8.2

A conservatively high 12.1 per cent blowdown was chosen to be evaluated for the Kewaunee locked rotor accident. From Figure 14.1-34 of the Kewaunee FSAR a 12.1 per cent blowdown equates to a reset pressure of 2197 psia, which is approximately 8.2 seconds into the locked rotor transient. This is the time when the safety valves are closed assuming a 12.1 per cent blowdown. A 5 per cent blowdown (2375 psia) occurs approximately 6.2 seconds into the transient. This represents a difference of 2.0 seconds in the transient between a 5 per cent blowdown and a 12.1 per cent blowdown.

If one assumes rated flow out of both safety valves (i.e., 345,000 lb/h) for 2.0 seconds, the mass loss out the open safety valves for the extended blowdown period is 383 pounds. This is not a significant loss of liquid inventory when compared to total liquid in the nuclear steam supply system. This very limited amount of inventory loss due to the extended blowdown is not expected to raise the pressurizer water level enough so that subcooled water would flow through the valves.

A worst case possibility of extended blowdown was analyzed by Westinghouse using WFLASH (see Reference 3). In this evaluation both safety valves were assumed to stick open which can be evaluated

TABLE A5-2. CROSBY 3K6 TEST RESULTS

Test	Valve Ring Settings Guide	Nozzle	Pressure Rate psia/sec	Per Cent of Blowdown
525	-115	-14	3.4	18.8
526	-115	-14	220.0	18.9
529	-115	-14	13.0	17.7
536	-115	-14	44.0	19.9

as a small break at the top of the pressurizer with an equivalent break area equal to the flow area of the two safety valves. The following is a description of the subsequent transient.

Initially the primary system becomes saturated, as the pressure drops to a value slightly above the secondary side pressure. The system remains at this approximately constant pressure for several hundred seconds; during this time, steam formation in the upper head and upper plenum is retarded by the lack of a route for steam flow to be released from the reactor vessel. At this time, essentially any steam flowing out the stuck-open safety valves is from flashing in the pressurizer, rather than from the core. The fluid flow out the break is two phase, of low to moderate quality, during this plateau period.

As more water is removed through the stuck-open safety valves, void fraction occurs in the upper head. This eventually leads to the upper plenum level dropping to the hot leg elevation. Steam can now flow from the reactor vessel. Pressure relief occurs through steam flowing out the break and through heat transfer to the steam generator tubes. The cold secondary water condenses the steam, which shrinks, and pulls more steam to the tubes, etc., leading to the rapid system despressurization. The RCS pressure is now following the secondary side transient behavior.

The core remains covered through the entire transient and the peak core temperature is approximately 610 F, which is equal to the initial RCS fluid operating temperature.

The methodology and assumptions used in the Westinghouse analyses are consistent with 10 CFR 50 Appendix K criteria and with those employed in Section 3.3 of WCAP-9600, entitled, "Report on Small Break Accidents for Westinghouse NSSS System," which considered the opening of pressurizer power-operated relief valves. As noted in Section 3.2 of WCAP-9600, pressurizer vapor space breaks behave similarly to small hot leg break LOCAs and, therefore, no core uncovery would be expected. This behavior is a general characteristic of all Westinghouse plant designs. This conclusion has been previously verified by numerous break spectra performed for Westinghouse two, three, and four loop plants to support the ECCS Evaluation Model, as well as in WCAP-9600.

Based on the above discussion, only flashing two-phase water is predicted to pass through the safety valves during a long extended blowdown and no core uncovery is expected.

Q-6. The submittal indicates that there is some difference between ring settings used in the Electric Power Research Institute (EPRI) Crosby safety valve tests and those used at the plant and, for the same flow rate, the plant backpressure is greater than was tested. An evaluation should be presented that shows that the plant valves will pass rated flow capacity with the ring settings used at the plant together with expected backpressures.

A-6. References:

1. "Kewaunee Nuclear Power Plant Safety and Relief Valves Qualification Report," issued june 25, 1982.

2. E. M. Burns, et al., "Review of Pressurizer Safety Valve Performance as Observed in the EPRI Safety and Relief Valve Test Program," WCAP-10105, June 1982.

The backpressures presented in Reference 1 are the peak backpressures. The C-E tested flow rates for the Crosby safety valves were measured at steady state backpressures. The peak and steady state backpressures calculated for the Kewaunee S/RV discharge piping at the exits of safety valves, PR-3A and PR-3B are shown in Figures A6-1 and A6-2, respectively. These are calculated for the double rupture disc configuration as shown on Figure A23-1. As seen in Figure A6-1 and A6-2, the peak backpressure was calculated for safety valve PR-3A at 716 psia and the steady state backpressure was calculated to be approximately 245 psia. This steady backpressure is greater than the steady state backpressures measured for the C-E Crosby safety valve testing for high backpressure.

In Reference 2 it was shown that measured flow rates for the Crosby valves exhibited a linear flow above the closing "knee" and all the measured steam flow rates for the Crosby loop seal valves tested were above 100 per cent. Also, the valve flow rate was not dependent on backpressure.

Based on the measured flow rates for both Crosby 3K6 and the Crosby 6M6 safety valves with loop seals, it can be seen that the flow rates are insensitive to the ring settings for the Crosby valves.

This is shown in Table A5-1. Taking the average per cent rated flow rate at 3 per cent accumulation for the measured Crosby 6M6 test results from Table A5-1, the average per cent of rated flow rate at 3 per cent accumulation was found to be 108 per cent which is 8 per cent in excess of rated flow. Based on this evaluation, the Kewaunee safety valves will pass rated flow or greater at 3 per cent accumulation.

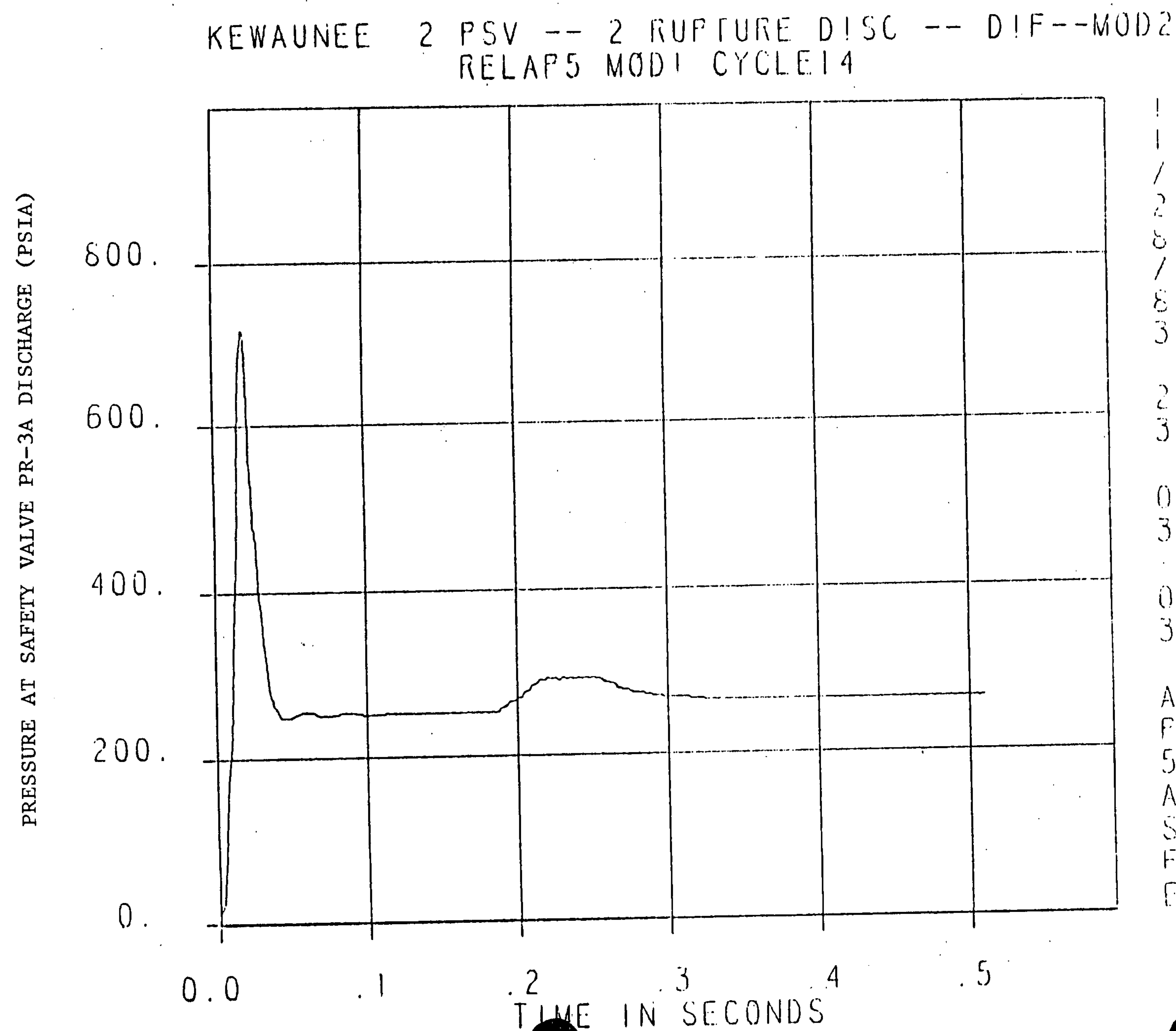
KEWAUNEE 2 PSV -- 2 RUPTURE DISC -- DIF--MOD2
RELAP5 MOD1 CYCLE14
PRESSURE AT SAFETY VALVE PR-3A DISCHARGE (PSIA)
800.
600.
400.
200.
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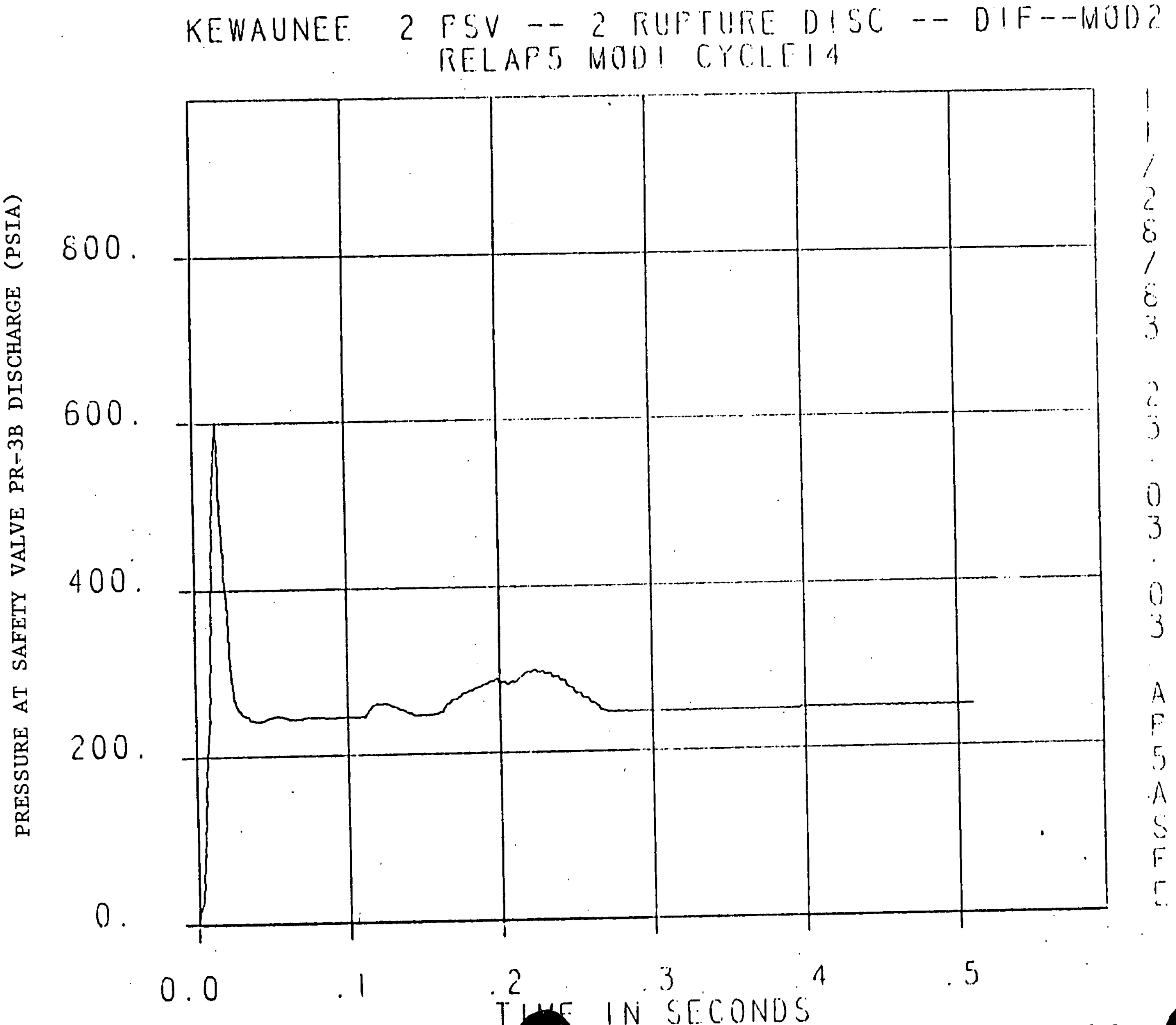
FIGURE A6-1



KEWAUNEE 2 PSV -- 2 RUPTURE DISC -- DIF--MOD2
RELAP5 MOD1 CYCLE14
PRESSURE AT SAFETY VALVE PR-3B DISCHARGE (PSIA)
800.
600.
400.
200.
0.
0.0
.1
.2
.3
.4
.5
TIME IN SECONDS
11/28/83 23.03.03
AP5ASFC

FIGURE A6-2

Q. 7. During loop-seal tests the Crosby safety valves flutterd and chattered while in a partial lift position and also chattered on closure. Does this behavior have an adverse effect on the operability or reliability of the values, so as to require an inspection after each such lift to assure the qualification of the valves has not been compromised?

A. 7. The operating procedures at the Kewaunee Nuclear Power Plant will be changed to indicate that the plant will be shutdown subsequent to a safety valve actuation to inspect the safety valves and to replace the rupture discs which are part of the Kewaunee S/RV discharge piping modification.

This would not include valve leakage during normal operation unless the leakage rate exceeds the KNPP technical specification limits.

Q-8. After the two tests on the Crosby valve, which were terminated by manually opening the valve to stop chattering, damaged internal parts were found which required refurbishment or replacement. After the loop seal tests the following parts were refurbished: bellows assembly landings, educator I.D., bonnet adapter I.D., upper and lower spring washer bearing surface, and adjusting bolt bearing surface. The following were replaced: spindle, nozzle, disc insert, piston, and piston slip ring. Should similar repairs or modifications be required if the safety valves lift to insure reliable operation of the plant valves?

A-8. As stated in A-7, the operating procedures at the Kewaunee Nuclear Power Plant will be changed to indicate that the plant will be shut down subsequent to a safety valve actuation to inspect the safety valves and to replace the rupture discs which are part of the Kewaunee S/RV discharge piping modification. (See Answer A-23 for a description of rupture disc assembly.)

This would not include valve leakage during normal operation unless the leakage rate exceeds the KNPP technical specification limits.

Q-9. Section 5.1.2 of the submittal identifies bending moment induced in the valve body as a parameter that could affect safety valve operaability. Thermal expansion of the pressurizer causing displacement of the piping nozzle and the thermal expansion of the piping from the nozzle to the load can contribute to this moment. Section 9.1 of the submittal, however, does not discuss the moment applied to the plant safety valves. A discussion should be included comparing the measured moments on the tested valves with the calculated moments on the plant valves and verifying that the moments would not have an adverse effect on the operability of the plant valves.

A-9. The loadings measured on the test facility valves and the loadings predicted by analysis on the Kewaunee S/RV's were compared. The Kewaunee safety valve, which is a Crosby $6M_{1}6$ safety valve, is similar to the Crosby 6M6 safety valve used at the CE Test Facility. Minor differences between the 6M6 and $6M_{1}6$ valves such as disc holder material and the orifice size have been documented in the Kewaunee Nuclear Power Plant Safety and Relief Valves Qualification report. The valve bodies and overall assembly are similar, thus, providing justification for comparing predicted loading on the Kewaunee safety valve to the measured loading on the CE Test Facility valve. The Masoneilan relief valve tested at the Marshall Test Facility used for comparison to the Kewaunee relief valve is the same valve type as the Kewaunee Masoneilan valve. This provides justification for using loads from the test facility for an upper bound analysis to predict loads for the Kewaunee relief valves.

The maximum bending moment induced on the safety valve by the test facility was 298,750-inch pounds. The largest ADLPIPE analysis predicted bending moment induced on either safety valve was less than 298,750-inch pounds. The analysis predicted bending moment includes plant faulted condition loads due to dead weight, thermal expansion, design basis earthquake and a simultaneous two-safety valve actuation.

The maximum bending moment induced on the power operated relief valve by the test facility was 35,600-inch pounds. The largest bending moment predicted by analysis simulating the plant upset condition was less than 35,600-inch pounds. This bending moment included analyzed loading due to dead weight, thermal expansion, operating basis earthquake, and the simultaneous actuation of two power operated relief valves.

Therefore, it was concluded, based on test information, that the Kewaunee safety and/or power operated relief valves operability would not be adversely affected by a worst case actuating transient.

Q-10. The Kewaunee safety/relief valve piping system contains block valves in-line with the relief valves. NUREG 0737, paragraph II.D.1, requires qualification of the block valves to ensure that a stuck-open relief valve can be isolated. The submittal, however, makes no attempt to qualify the block valves.

A-10. References:

1. Letter from C. W. Giesler, Wisconsin Public Service Corporation to D. G. Eisenhut, Nuclear Regulatory Commission dated November 23, 1982.
2. Letter from R. C. Youndahl, Chairman Electric Power Research Institute Research Advisory Committee (Consumers Power Company) to H. R. Denton, Nuclear Regulatory Commission, dated June 1, 1982.
3. "EPRI-Marshall Electric Motor-Operated Valve (Block Valve) Interim Test Data Report," EPRI NP-2514-LD, July 1982.

Wisconsin Public Service Corporation's position on pressurizer block valve testing is stated in Reference 1. Reference 1 refers to Reference 2 in qualifying the KNPP block valves. Reference 2 transmitted to the NRC information which documented the utilization and performance of PORV block valves in PWR plant service. It was provided to support utilities in their responses to NUREG 0737, Item II.D.1 "Block Valve Testing" and satisfied this requirement.

Reference 3, which was part of this information package, documents the results of block valve tests conducted at the Marshall Steam Station in Terrell, North Carolina. Section 3.1 of this report documents the successful testing of an identical valve and actuator to those installed at the KNPP. This valve was successfully tested over a range of torque switch settings (1.7-1.0) which envelope the settings used at KNPP (1.5).

Q-11. The backpressure measured during the tests should be representative of the plant backpressure since the valve performance is affected by the backpressure. The thermal hydraulic analysis on the loop seal-steam flow actuation condition yielded peak backpressure of 792 psi while the backpressure of 649 psi was measured during the corresponding test 908. While the submittal states that the tested and plant specific backpressure are very close, some justification should be provided that these pressure values are indeed sufficiently close that actual conditions were truly represented in the tests.

A-11. With the modification of the Kewaunee S/RV discharge piping, to include the rupture disc and baffle plate assemblies, the peak backpressures were reduced significantly. As stated on A-6 of these responses and shown in Figures A6-1 and A6-2, the peak backpressures were calculated by RELAP5 to be 716 psia and 600 psia for Kewaunee safety valves, PR-3A and PR-3B, respectively. The peak backpressure measured for the Crosby 6M6 safety valve testing was 725 for CE Test 931 which exceeds the peak backpressure calculated for the Kewaunee valves. Therefore, the Kewaunee safety valves were bounded by the test program.

Q-12. Although Tables 7.1 through 7.4 of the submittal provide much of the RELAP5 input data they do not contain some basic information needed to evaluate the thermal hydraulic analysis. What time step was used in the RELAP5 calculations and how was this determined to be acceptable? How were the safety/relief valve flow areas sized for the hydraulic analysis and how were junction loss coefficients established? What value was used for valve popping time and how was this justified? A RELAP5 computer printout of input and output for the Locked Rotor accident case for the safety-valves lifting should be provided.

A-12. The time step parameters used for the RELAP5 calculations were a maximum time step of .001 seconds and a minimum time of 1.0 E-07 seconds. The RELAP5 computer code has an automatic time step control scheme which sets the calculational time step being used between the maximum time step specified (.001 seconds) and the minimum time step specified (1.0E-07 seconds). Checks are made on the mass truncating error, the Courant limit, negative or zero densities, density differences and water properties in determining if the time advancement is successful. If unsuccessful, the time step is reduced and the advancement is repeated until all acceptance criteria are met.

The use of these maximum and minimum time steps were confirmed by comparing RELAP5 calculations using these time steps with measured data from the Edwards' and Hanson's experimental measurements. These experiments were done using subcooled water, so the applicability to the loop seal simulation is good. The RELAP5 calculated results were in good agreement with the measured data. Based on these comparisons it was judged that the time steps used for the Kewaunee analyses were sufficient to provide accurate results.

The safety valve flow area was found by using the Kewaunee S/RV piping RELAP5 model and setting the upstream pressure at 2575 psia (safety valve set point plus 3 per cent accumulation) with the safety valve completely open. The valve area was adjusted leaving the upstream pressure at 2575 psia, until the calculated flow through the valve was found to be 115 per cent (or 396,700 lb/h) of rated flow. Therefore, using an area of 0.017 ft^2 for the safety valve will produce 115 per cent of rated flow at 3 per cent accumulation. This is a conservative assumption for calculating thermal/hydraulic piping loads since all of the tested Crosby 6M6 safety valves produced less than 115 per cent rated flow at 3 per cent accumulation.

The loss coefficients were calculated for all geometry changes in the discharge piping (i.e., elbows, contraction-expansions, reducers). The loss coefficients were calculated using the handbook written by Idel'chik [I. E. Idel'chik, "Handbook of Hydraulic Resistance," AEC-tr-6630, (1966)].

A .015 second popping time was extracted from test data and was used for the Kewaunee simulation. The popping times for the Crosby 6M6 safety valve testing for loop seals ranged from .009 seconds to .019 seconds, therefore the popping time used for the Kewaunee safety valves is typical for that type of valve.

A microfiche of the RELAP5 two-safety valve actuation run for the rupture disc analysis is presented in Appendix A of this submittal.

Q-13. The submittal does not mention whether loading from a sequential opening of the safety and/or relief valve were considered for multiple actuation conditions. EG&G Idaho's experience indicates that maximum forces would be expected when a sequence of opening is such that the initial pressure waves from the safety valves opening reach the common header simultaneously. Was a sequential opening of the valves considered in establishing a maximum loading on the piping?

A-13. A sequential opening of the safety valves were not considered for this evaluation. For the initial evaluation based on a worst case locked rotor accident occurring with the as-built Kewaunee S/RV piping system, the sequential actuation was not considered because of its very low probability of occurring. A sequential actuation with a perfect timing to allow the pressure waves to reach the common header simultaneously along with both power operated relief valves failing, no spray actuation, and the locked rotor would be an incredibly low probability event. The assumptions associated with the locked rotor with simultaneous safety valve actuation are very unlikely to occur (i.e., faulted condition). Any other condition such as valve sequencing would further reduce the probability of the event beyond that of a faulted condition.

For the current evaluation, using the concept of the dual rupture discs at the valve discharges the possible larger forces caused by valve sequence are mitigated. Basically, if one valve opened before the other, that disc would rupture sooner, thus, relieveing the pressure caused by the open valve. Therefore, it was judged that the sequential opening of the safety valves should not be considered in establishing design basis thermal/hydraulic loads.

Q-14. The adequacy of using the RELAP5 and REPIPE in combination to calculate fluid forces was based on one steam discharge problem. The REPIPE momentum equations, however, contain an acceleration term which, when used with RELAP5 results, commonly introduces spurious spikes into the calculated fluid forces for water discharge problems. These spikes can be avoided by using a large time step in the REPIPE calculations, but this may result in losing the peak force values. Thus, for water transients or for loop seal-steam flow transients where some water does occur, a thorough assessment of the use of REPIPE in conjunction with RELAP5 should be provided.

A-14. For the original analyses (i.e., the Kewaunee as-built S/RV piping configuration), the RELAP5/REPIPE was used to calculate two variations of the loop seal discharge (see Section 6.0 of Kewaunee Piping Report, June 28, 1982). As presented in Subsection 6.3 a RELAP5/REPIPE model was developed to simulate CE Test 908 which was the test that closely approximated the Kewaunee plant specific faulted conditions Two situations were run using REPIPE as the RELAP5 post-processor.

As identified in Subsection 6.4 of the Kewaunee piping report, comparisons were made between test data and RELAP5/REPIPE CALCULATIONS. The two cases run were assuming water upstream of the safety valve and assuming water downstream of the safety valve. The results, as presented in Subsection 6.4 of the Kewaunee report, produced good agreement with test information. The REPIPE time steps used for the Kewaunee plant specific evaluation were chosen based on experience in calculations of these two cases. Based on these calculations using REPIPE, the REPIPE time steps used were judged to be adequate for Kewaunee plant specific evaluations.

In the subsequent analyses of the Kewaunee rupture disc configuration (see A-23 for description), the FORCE post-processor was used in place of REPIPE to determine thermal/hydraulic loads based on the output from RELAP5. FORCE was developed by Dr. Joe Chang for Boeing Computer Services.

Many benchmark comparisons were used to establish the accuracy of the RELAP5/FORCE calculations. The comparisons included running an analyses using RELAP5/REPIPE and running the same simulation using RELAP5/FORCE. The forces generated by each method were almost identical.

Other analyses were made using the RELAP5/FORCE combination which included simulating CE Test 908, CE Test 1411, Edwards' Pipe Problem, and Hanson's Problem. Each of the calculations were in good agreement with the test data. Therefore the time steps used for FORCE calculations were also found to be acceptable for use in determining Kewaunee plant specific thermal/hydraulic loads.

Q. 15. In performing a thermal hydraulic analysis the valve flow area is typically allowed to vary in some manner over the valve opening time. In the case of a loop seal transient, the valve simmers for a period of time after the set pressure is reached, and then pops open. Was the simmering time included in the valve opening time over which the flow area was assumed to vary, or was the transient assumed to begin after the simmering period? In what manner was the flow area assumed to vary during the opening time?

A. 15. For all safety valve simulations, all subcooled water upstream was assumed to simmer through the valve prior to the safety valve popping. When the safety began to "pop," the RELAP5 transient started. Therefore the simmering time was not included in the RELAP5 calculation.

The safety valve was simulated to ramp open from 0.0 seconds, with $A_{safety\ valve} = 0.0\ ft^2$ to .015 seconds, with $A_{safety\ valve} = .017\ ft^2$. After .015 seconds throughout the remainder of the RELAP5 transient, the safety valve(s) remain fully open ($A_{safety\ valve} = .017\ ft^2$).

Q-16. The submittal does not provide some of the details needed to make an assessment of the structural analysis. How were the pipe supports modeled and how did calculated loads in the supports compare with allowable values? What damping values were assumed in the piping analysis? What time steps were used in the time history integration model superposition analysis and in the fluid forcing functions applied to the model? A computer printout of input and output for the Locked Rotor accident problem for the safety valves lifting should be provided.

A-16. The dynamic piping supports were modeled as springs to ground each having a calculated spring constant for the overall support assembly based on a series spring combination of all the components in the restraint assembly. The dynamic supports for the Kewaunee piping consist of three hanger types which are structural components such as I-beam frame assemblies, ITT Grinnell Figure 211 rigid sway struts, and ITT Grinnell Figure 201 hydraulic shock and sway suppressors. The spring constant for the structural items were calculated with a structural computer code by modeling each structural assembly with the applicable beam properties included. The sway strut spring constant was based on a series spring combination of the calculated stiffness of the restraint components which included the clevis, pins, and center components. The snubber spring constants reflect test data values published by ITT Grinnell. The ITT Grinnell values are the average snubber spring rates based on test data.

The computer predicted loads on all supports have been compared to the allowable values. The largest value based on the normal, upset or faulted load combination has been used as a design basis to ensure that allowables have not been exceeded. The stresses in structural components such as beams and plates are within AISC allowable stress levels. The loads on ITT Grinnell hanger components have been compared to the published allowable loads in Catalog PH79 which corresponds to plant "normal" conditions.

The restraint loads based on Kewaunee normal, upset, and faulted load combinations are below the rated loads in Catalog PH79 with the exception of struts RC-H8, RC-H9, and snubber RC-H40. These loads, which exceed the ITT Grinnell "normal" allowables, were sent to ITT Grinnell for review. ITT Grinnell has qualified replacement restraints to the new loads.

The damping value used for the ADLPIPE time history analysis was 2 per cent. This value is consistent with suggested values for SSE earthquake analysis found in U.S. Nuclear Regulatory Guide 1.61.

The time steps used for the ADLPIPE modal superposition time history analysis was 0.001 seconds. This value is based on the following suggested formula from the Control Data Corporation REIPIE Application Manual.

$\Delta t \leq \frac{0.1}{fi}$ Where: Δt - suggested time step.
fi = highest significant frequency.

An additional computer analysis was run for the two safety valve actuation with a time step of 0.0004 seconds to confirm the acceptability of the 0.001 time step value. The maximum predicted piping stress increased less than 1.0 per cent with the time step value of 0.0004 seconds. The increase of less than 1 per cent is considered insignificant. The time step used in the forcing functions applied to the model was based on the RELAP5 calculation. The REPIPE post-processor was used in the original evaluation and the FORCE post-processor was used in the final evaluations (see A-14.0). The time steps varied depending on the transient conditions. For the locked rotor, double safety valve, double rupture disc FORCE calculations, the FORCE time steps varied between 1.25 msec and .625 msec. The FORCE post-processor also checks for peak forces in the data from RELAP5. If a peak force is discovered, it also includes this force in the forcing function table to be used in ADLPIPE calculations.

A packet which contains a microfiche copy of the two safety valve actuation time history analysis has been attached to this submittal and is contained in Appendix B.

Q-17. The submittal presents loading combinations for FSAR Class 1 and Class 2 piping and components. In this presentation the fluid transient load for the emergency condition for Class 1 items includes only a single safety valve actuation. Since the safety valves are set at the same pressure multiple actuation is probable. Multiple actuation should be included for the emergency load combination with appropriate consideration of sequential lift (see Question 13).

The loading combination presented for Class II items does not include any fluid transient loads from safety or relief valve actuation. Loading from valve actuation should be included in an appropriate load combination for Class II items.

A-17. The Kewaunee piping system has been analyzed for four separate valve actuation possibilities. These events are the double PORV actuation, the single actuation of safety valve PR-3A, the single actuation of safety valve PR-3B, and the simultaneous actuation of both safety valves. The Kewaunee Final Safety Analysis Report load combinations for components does not contain a loading combination for the plant emergency condition as indicated by Tables B.7-1 and B.7-5 found within Appendix B of the FSAR. Therefore, since the emergency loading combination was not used in the original design basis for the plant, the emergency loading combination was not used for this evaluation. It should be noted that the load combinations presented in Tables 8-4 and 8-5 of the original Kewaunee piping report (see "Kewaunee Nuclear Power Plant Safety and Relief Valves Piping Qualification Report," issued June 28, 1982) were based on EPRI recommendations. Subsequent to issuing this report, it was found that some of the information in the tables was not relevant to the Kewaunee design basis, therefore, the tables will be changed for the final issue of the report.

The FSAR considers the locked rotor accident as a plant faulted condition. This condition was considered the design basis for the Kewaunee evaluation. The sequence of safety valve actuation has been discussed under Question 13.

The piping downstream of the power operated relief valves and the safety valves is Class II piping per the FSAR. All piping upstream of the valves is Class I per the FSAR. The load combinations attached in Tables 1 and 2 are consistent with the Kewaunee FSAR load combinations in Table B.7-1 found in the FSAR. It is recognized that the downstream or Class II piping will affect the upstream or Class I piping during the plant normal, upset, and faulted condition loadings. To ensure the integrity of the upstream piping, all downstream or Class II piping has been subjected to Class I loading conditions for the plant normal, upset, and faulted condition. All piping, including upstream and downstream, has been evaluated to the load combinations for Class I piping and components. The resultant stresses are within the allowables for the FSAR Class I normal, upset, and faulted conditions.

TABLE 1. LOAD COMBINATIONS FOR FSAR CLASS I PIPING AND COMPONENTS

Condition	Load Combination*	B31.1 Equation	Stress Allowable	Remarks
Normal	DL + PI	11	S_h	Primary and normal loads
Upset	DL + PI $\pm$ $[SO^2 + SA^2 + ST1^2]^{1/2}$	12	$1.2S_h$	Primary and occasional loads
	TE + TA	13	S_a	Secondary loads
	TE + TA + DL + PI	14	$S_a + S_h$	Secondary and primary loads to be evaluated only if Equation 13 is exceeded
Faulted	DL + PI $\pm$ $[SS^2 + SA^2 + ST_n]^{1/2}$	12	$2.4S_h$	Primary loads

*See Table 3 for definitions of symbols.

TABLE 2. LOAD COMBINATIONS FOR FSAR CLASS II PIPING AND COMPONENTS

Condition	Load Combinations*	B31.1 Equation	Stress Allowable	Remarks
Normal	DL + PI	11	S_h	Primary and normal loads
Upset	DL + PI + $[SO^2 + SA^2]^{1/2}$	12	$1.2S_h$	Primary and occasional loads
	TE + TA	13	S_a	Secondary loads
	DL + PI + TE + TA	14	$S_a + S_h$	Secondary and primary loads to be evaluated only if Equation 13 is exceeded

*See Table 3 for definition of symbols.

TABLE 3. DEFINITIONS AND LOAD ABBREVIATIONS

DL	Dead Load
PI	Pressure
TE	Thermal Expansion
TA	Thermal Anchor Motions
SO	Operating Basis Earthquake (OBE)
SS	Design Basis Earthquake (DBE)
SA	Seismic Anchor Motions (OBE or DBE)
ST1	System Transient (2 relief valves)
ST2	System Transient (1 safety valve, PR-3B)
ST3	System Transient (2 safety valves)
ST4	System Transient (1 sfaety valve, PR-3A)
S_h	Hot allowable stress
S_a	Allowable stress range based on hot and cold stress allowables
S_n	Largest Loading Due to ST_2, ST_3, or ST_4

Q-18. The pressurizer and relief tank connections were modeled as anchors in the analysis. Was it verified that the tanks or connections possess no flexibility that could affect structural response of the piping system?

A-18. In order to verify the acceptability of modeling the pressurizer and the pressurizer relief tank as rigid anchors, a computer analysis for the two-safety valve actuation was run with the anchors modeled simulating the approximate stiffness of the pressurizer and pressurizer relief tank. The results of the analysis with approximate anchor stiffness was compared to the results of the analysis with anchors modeled rigid. The maximum stresses in the piping system yield negligible differences in value (about 1 per cent) thus, justifying the use of rigid anchor modeling.

Q-19. The program ADLPIPE is limited to the use of the modal superposition technique to generate the time history dynamic response of the piping system. Since the modal superposition will limit the solution to the set natural frequencies included in the solution, further information is required to evaluate accuracy of results obtained in using this method.

a. The hydrodynamic forces created by overpressure transients typically contain high frequencies. What was the cutoff frequency used in the analysis and how was it established?

b. The natural modes of the structure having frequencies above a properly established cutoff frequency will respond rigidly to the applied loading. This rigid response of the high frequency modes will not be included in a normal modal superposition solution, but is often a significant part of the total response in fluid transient time history problems. Was this high frequency rigid body response accounted for in the calculated total response of the system?

A-19. The forcing functions being used in the ADLPIPE two-safety valve time history analysis were examined for frequency content by extracting the fourier series coefficients and plotting the sine and cosine coefficients vs. frequency. Examination of the cosine coefficients indicate the majority of frequencies with large coefficients at or below 100 to 120 hertz. One forcing function in the upper portion of the piping system had significant cosine coefficients near the 200 hertz range. The cutoff frequency used for the analysis was 300 hertz. Review of the modal participation factors on pages 54 and 55 of the two safety-valve time history ADLPIPE analysis microfiche copy contained in Appendix B indicates the majority of the significant modal participation factors occur below 100 hertz with some vertical participation factors of about 0.4 near 130 and 230 hertz. The 300 hertz cutoff frequency and the relatively low modal participation factors of higher frequencies indicate that the major thermal/hydraulic loads due to the two-safety valve transient have been included in the ADLPIPE analysis.

Q-20. Some of the spacing between lumped masses (particularly in the lower region of the discharge piping) is too large to permit dynamic response to the high frequencies commonly contained in fluid forcing functions. What is the rationale for using the large spacing?

A-20. The lumped mass spacing used in the analysis was established for each pipe diameter and the corresponding pipe cross section based on the first mode (fundamental) frequency of a simply supported beam. The spacing span is based on the following equation.

$$L = \left(\frac{9.87}{2\pi}\right)^{1/2} \left(\frac{gEI}{f^2 W}\right)^{1/4}$$

Where L = Lumped mass spacing; in feet

E = Modulus of Elasticity; in psi

I = Moment of Inertia; in in^4

W = Distributed weight of the pipe; in lbs/in

f = Frequency, in hertz

g = Acceleration of gravity (in/sec^2)

Table 4 attached, is a summary of the lumped mass spacing for the Kewaunee S/RV piping. As indicated under Question 19, one forcing function, which is applied in the upper portion of the piping system, had a significant fourier coefficient at about 200 hertz. In order to confirm the adequacy of lumped mass spacing based on 100 hertz, the 10-inch piping in the lower section was lumped at a 6-foot spacing and the two safety-valve analysis was rerun. The analysis showed no significant changes in the piping stresses or loads on restraints. It is also noted that the lump mass spacing in the upper portion of the piping system is adequate for 200 Hertz as mass points are used at elbows, tees, valves, etc., which resulted in a set of closely spaced lumped mass points because of piping geometry.

TABLE 4.

Pipe	Schedule	E (psi x 10^{-6})	I (in^4)	W (lbs/in)	f (HZ)	L (ft)
3	160	28.3	5.0	1.2	100	5
4	40	28.3	7.2	0.9	100	6
6	160	28.3	59.0	3.8	100	7
10	40	28.3	160.8	3.4	100	9
10	40	28.3	160.8	3.4	200	6

Q-21. The program REPIPE calculates a wave force for each bounded segment of piping, which was evidently applied to the structural model. Application of only a wave force on a pipe segment, however, ignores the axial extension that is caused by opposing "blowdown" forces at the ends of the pipe segment. This axial extension induces bending moments on pipe segments adjacent to the bounded segment in question. How was this axial extension accounted for in the analysis?

A-21. The ADLPIPE analysis for the two safety valve actuation event was performed by utilizing forcing functions generated by the computer code FORCE. A single (net) forcing function was applied at the downstream end of each run of discharge piping. The two safety valve actuation analysis was also run with a set of forcing functions applied at both ends of each run to investigate the effect of axial pipe extensions on the bending stresses induced into the piping. The analysis with forces applied at both ends of each run includes bending stresses due to net forces and bending stresses induced on adjacent piping by the axial extension of pipe segments. The points of highest stress in the piping system had a negligible difference in stress values when comparing stresses produced by the analysis with net forces to the stresses produced by the analysis with forces applied at each end of pipe segments. These minor fluctuations in piping stress values were about 1 to 3 per cent.

Q-22. The submittal does not discuss how the safety valve bonnet assemblies and the relief valve actuators were modeled. They should be modeled as masses displaced from the pipe centerline and if the natural frequency of the bonnets or actuators could potentially be excited by piping or support motion then elements connecting the masses to the pipe should represent the flexibility of these structures. A discussion of the modeling of these items should be included.

A-22. The safety valves and power operated relief valves were modeled to represent the approximate valve stiffness with the weight of the valve lumped at the modeled center of gravity. The valve body and upper housing for both valves have been modeled with pipe diameters equal to the adjacent piping. The wall of the valve has been modeled as two times that of the connecting piping for both the valve body and upper housing. The entire weight of the valve has been located as a lumped mass in the valve upper housing model at the location corresponding to the center of gravity of the actual valve assembly.

Q-23. The submittal states that several overstressed points in the upstream and downstream piping were identified in the analysis. The overstresses were caused by the large thermal-hydraulic forces which are created when expanding steam forces the cold water slug through the downstream piping. A letter written subsequent to the submittal indicates that this problem will be resolved by installing rupture discs in the discharge piping. The rupture discs are intended to relieve the water slug from the loop seals into the pressurizer vault, thereby eliminating the hydrodynamic forces that result in the overstressed condition. Further details of the rupture disc design should be presented showing the viability of this concept. Also, an analysis should be provided that shows that no overstresses in the piping system will occur under any transient condition with the revised piping configuration

A-23. Two rupture disc/baffle plate assemblies will be used in the Kewaunee Nuclear Power Plant discharge piping to reduce the thermal/hydraulic loads caused by the actuation of one or both safety valves. A double or single safety valve actuation will create a pressure buildup in the discharge piping which will cause the rupture discs to burst, allowing the subcooled water from the safety valve loop seals to escape from the discharge piping. The loss of the fluid out the rupture disc openings will also reduce the pressure rise in the discharge piping, thereby reducing the downstream driving force which contributes to large thermal/hydraulic loads in the discharge piping.

A plan view of the upper portion of the S/RV piping showing the added rupture disc assemblies has been included on Figure A23-1. Figures A23-2a and A23-2b present a plan view comparison between the as-built Kewaunee S/RV discharge piping and the planned Kewaunee modification using the rupture discs, respectively.

Major features of the rupture disc design are given below.

(1) An eccentric orifice plate with a maximum open area of 1.37 ft^2 (approximately 25 per cent of full open area) will be located at the first 10-inch 90 degree elbow downstream of both safety valves. The orifice plate will be designed to allow drainage from leaking safety valves to pass into the downstream piping. This orifice plate serves two purposes. The first is to cause the upstream pressure to exceed the rated pressure set point

of the rupture disc during a single safety valve actuation. The disc was required to rupture during a single safety actuation to ensure discharge piping loads are minimized. The second is to minimize the downstream flow of subcooled water from the loop seals and to minimize the downstream pressure wave. This will minimize the downstream forces.

(2) The rupture disc will have a set point of 270 psid. This set point will provide a sufficient margin to ensure that the disc does not rupture during a worst case power operated relief valve (PORV) actuation. The worst case PORV actuation produced a pressure of 162 psig at the rupture disc/baffle plate assembly. The rupture disc will be constructed out of inconel material which is resistant to boric acid degradation.

(3) A 10-inch piping segment is required to replace the 6-inch piping run between the first 90-degree elbow at the safety valve PR-3A discharge and the 10-inch by 6-inch reducer. This additional 10-inch piping was necessary to decrease the water hammer pressure spikes caused by the double safety valve actuation.

(4) An additional snubber rated at 27 kips will be installed at elevation 626 feet on the 10-inch vertical discharge piping run.

As previously indicated a microfilm copy, found on page 12-3, contains the two safety actuation RELAP5 analysis.

The stresses due to the two-safety actuation is the major contributor to the overall piping stresses for the plant faulted loading conditions. Table A23-1, which indicates the largest stress values per the load combinations included in the answer to Question 17, has also been included. Specific analytical results will be presented in Revision 1 of the "Kewaunee Nuclear Power Plant Safety and Relief Valves Piping Qualification Report," to be issued at a later date.

With the rupture disc configuration and associated modification implemented, it was concluded that the piping stresses and restraint loading would be within acceptable values during worst case safety valve(s) or PORV(s) actuation.

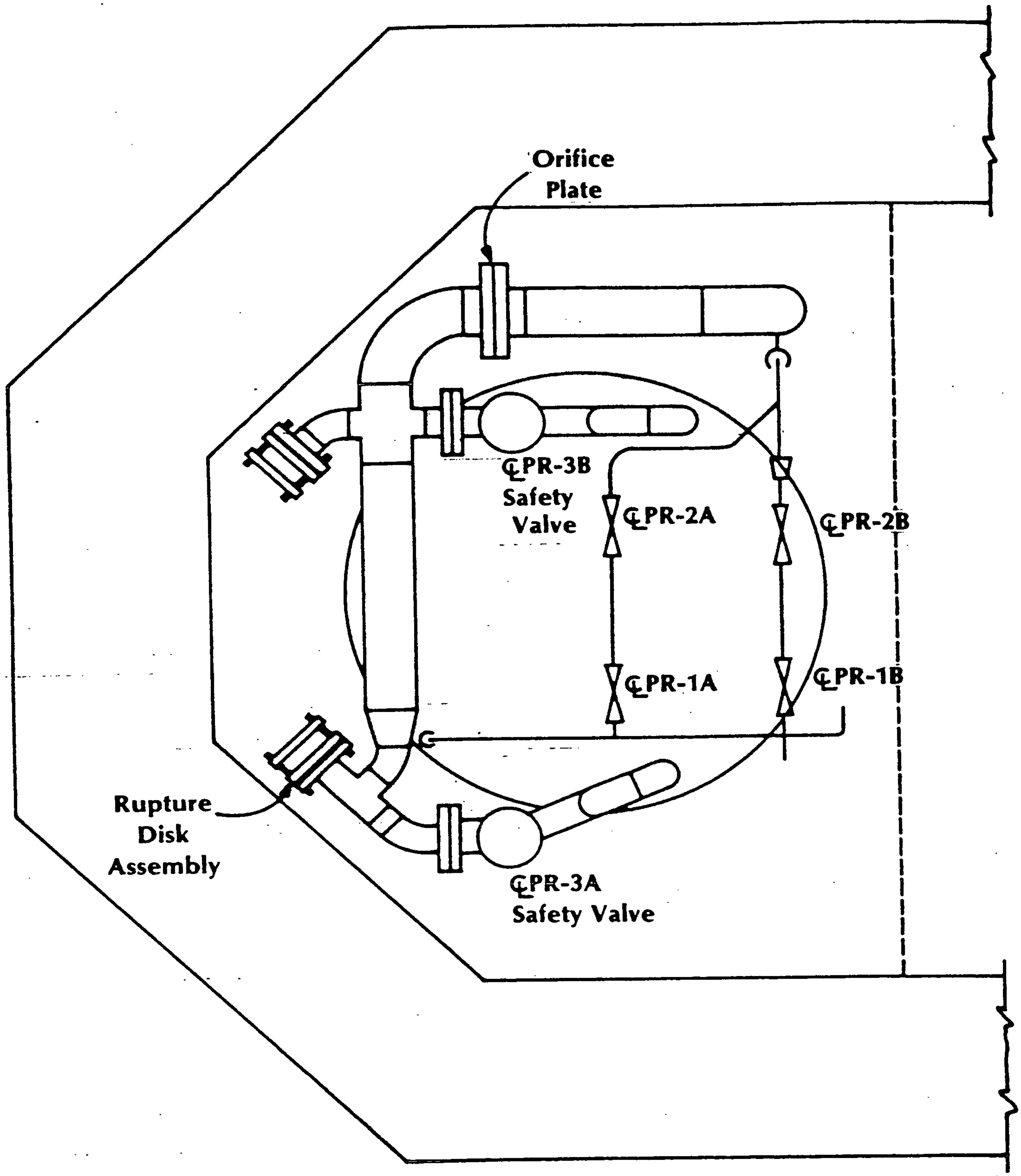


FIGURE A23-1. PLAN VIEW OF KEWAUNEE RUPTURE DISC CONFIGURATION

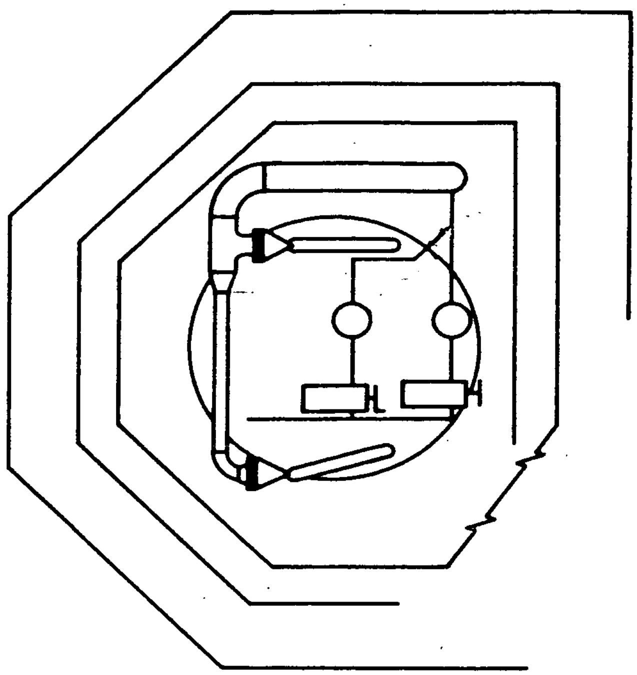


FIGURE A23-2a. KEWAUNEE AS-BUILT--PLAN VIEW

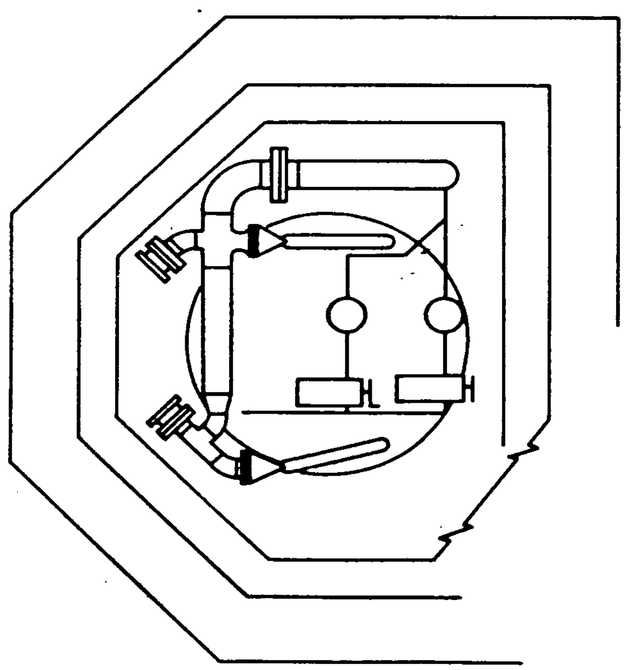


FIGURE A23-2b. KEWAUNEE RUPTURE DISC MODIFICATION--PLAN VIEW

WPSC-021784

TABLE A23-1. MAXIMUM STRESS IN THE S/RV PIPING

ADLPIPE Node	Stress psi	Allowable Stress psi	Plant Condition	B31.1 Equation	Location in Piping System
80	8,004	14,300	Normal	11	3" PORV Inlet Piping
94	13,272	17,160	Upset	12	3" PORV Inlet Piping
17	15,734*	27,013		13	6" Safety Inlet Piping
807	34,663**	43,440	Faulted	12	10" Discharge Piping

*Stress range of all thermal modes.

**Includes loading due to two-safety actuation.

B & V

MICROFILM CENTER

SUBJECT: WISCONSIN PUBLIC SERVICE CORPORATION
KEWAUNEE NUCLEAR POWER PLANT
RELAP5 COMPUTER CALCULATION
9653.51.1006

START

FILMED: MAR 6 1984

COMPUTER GENERATED CALCULATIONS

Owner WPSC Computed By [signature]
Plant Kewaunee Unit ______ Date 12/20 19 83
Project No. 9653 File No. 9653.51.1006 rev 1
Title Kewaunee S/RV Analysis

PROGRAM NUMBER N28 VERSION RELAP5/MOD1

RUN DATE 11/28/83 RUN TIME 22:52:21

CASE TWO SAFETIES AP5ASFE NO. OF PAGES ______

STATUS* ______

By ______ Date ______ 19 ______

REVIEW AND APPROVAL

1. Input Data Printout

   Checked By M. Wolf Date 12/23 19 83

2. Output Data Printout

   Checked By M. Wolf Date 12/23 19 83

3. Approved ______ Date ______ 19 ______

P-GN-103C

*No special indication of status is required for calculations other than those that are superseded or declared void.

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AAAAAAAAAAAA  PPPPPPPPPPPP  555555555555  AAAAAAAAAAAA  XX         XX  QQQQQQQQQQQQ  AAAAAAAAAAAA
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AA        AA  PP        PP  55            AA        AA    XX     XX    QQ        QQ  AA        AA
AA        AA  PP        PP  55            AA        AA     XX   XX     QQ        QQ  AA        AA
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AAAAAAAAAAAA  PPPPPPPPPPP   555555555555  AAAAAAAAAAAA      XXXX       QQ        QQ  AAAAAAAAAAAA
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        JJ  00        00  BB        BB                 88        88  77        77  88        88     1111
        JJ  00        00  BB        BB                 88        88          77    88        88       11
        JJ  00        00  BB        BB                 88        88         77     88        88       11
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        JJ  00        00  BBBBBBBBBBB                   8888888888         77       8888888888        11
        JJ  00        00  BB        BB                 88        88        77      88        88       11
JJ      JJ  00        00  BB        BB                 88        88        77      88        88       11
JJ      JJ  00        00  BB        BB                 88        88        77      88        88       11
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 JJJJJJJJ   000000000000  BBBBBBBBBBB                   8888888888         77       8888888888    1111111111

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RRRRRRRRRRRR  222222222222      111       222222222222  77777777777   PPPPPPPPPPPP  RRRRRRRRRRRR     111
RR        RR  22        22     1111       22        22  77        77  PP        PP  RR        RR    1111
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RR        RR            22       11                 22         77     PP        PP  RR        RR      11
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RRRRRRRRRRR          22          11              22           77      PPPPPPPPPPP   RRRRRRRRRRR       11
RR     RR          22            11            22             77      PP            RR     RR         11
RR      RR       22              11          22               77      PP            RR      RR        11
RR       RR    22                11        22                 77      PP            RR       RR       11
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RR        RR  222222222222   1111111111   222222222222        77      PP            RR        RR  1111111111

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PPPPPPPPPPPP  RRRRRRRRRRRR  TTTTTTTTTTTT       111              444   0000000000  333333333333
PP        PP  RR        RR       TT           1111             4444  00        00 33        33
PP        PP  RR        RR       TT             11            44 44  00        00           33
PP        PP  RR        RR       TT             11           44  44  00        00           33
PPPPPPPPPPPP  RRRRRRRRRRRR       TT             11          44   44  00        00        3333
PPPPPPPPPPP   RRRRRRRRRRR        TT             11         44    44  00        00        3333
PP            RR     RR          TT             11        4444444444 00        00           33
PP            RR      RR         TT             11        4444444444 00        00           33
PP            RR       RR        TT             11               44  00        00 33        33
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PP            RR        RR       TT         1111111111           44    00000000    3333333333
```

RELAP5

2 PSV DIF MOD2

AP5ASFE 11/28/83 22:52:21

TSTD M2F

R51QA

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............................................
.                                          .
.       RELAP5 CERTIFICATION STATUS        .
.                                          .
............................................
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•81/12/11• VERSION 1.00 UPDATE SUMMARY

1.WORD SIZE DIFFERENCE BETWEEN CDC AND CRAY CHANGES THE FORMAT FOR HYDRODYNAMIC COMPONENTS, THE COMPONENT NAME SHOULD BE LIMITED TO 8 LETTERS.

```
PP          PP  RR          RR        TT              1111            4444    00          00  33          33
PP          PP  RR          RR        TT                11           44 44    00          00              33
PP          PP  RR          RR        TT                11          44  44    00          00              33
PPPPPPPPPPPP    RRRRRRRRRRRR          TT                11         44   44    00          00          3333
PPPPPPPPPPP     RRRRRRRRRRR           TT                11        44    44    00          00          3333
PP              RR    RR              TT                11        44444444444 00          00              33
PP              RR      RR            TT                11        44444444444 00          00              33
PP              RR        RR          TT                11              44    00          00  33          33
PP              RR          RR        TT            1111111111          44     0000000000    333333333333
PP              RR          RR        TT            1111111111          44      00000000      3333333333
```

R51GA

```
**************************************************
*                                                *
*          RELAP5 CERTIFICATION STATUS           *
*                                                *
**************************************************
```

81/12/11 VERSION 1.00 UPDATE SUMMARY

1.WORD SIZE DIFFERENCE BETWEEN CDC AND CRAY CHANGES THE FORMAT FOR HYDRODYNAMIC COMPONENTS, THE COMPONENT NAME SHOULD BE LIMITED TO 8 LETTERS.

2.CRAY VERSION HAS UNIQUE WAY OF HANDLING ITS PLOTTING TO MINIMIZE THE I/O AND DISK STORAGE CHARGES.

3.SOME SPECIAL MINOR EDIT SPECIFICATIONS ARE NOT ALLOWED ON CRAY. CONSULT THE CONSULTANTS IF YOU RUN INTO ONE.

82/05/25 VERSION 2.00 UPDATE SUMMARY

1.PLOTTING AND FORCING-FUNCTION DATA FILE OUTPUT FREQUENCY IS CONTROLLED BY THE FIRST DATA ITEM IN A 199 CARD, WHICH IS AN INTEGER REPRESENTING THE NUMBER OF ACTUAL TIME STEPS PER OUTPUTTING OF DATA. (DEFAULT IS 1) A "0" ENTRY DIRECT THE CODE TO SKIP GENERATION OF PLOTTING FILE.

2.AIR MASS ERROR TOLERANCE CONTROL BY A 199 INPUT CARD. THE SECOND DATA ITEM IN 199 CARD IS A REAL NUMBER REPRESENTING THE AIR MASS ERROR TOLERANCE TO BE USED.(DEFAULT IS 0.01)

83/05/06 VERSION 3.00 UPDATE SUMMARY

1.RELAP5-FORCE VOLUME/JUNCTION CORRELATIONS ARE PROVIDED AFTER INPUT PREPARATION.

2.DIMENSION OF PROBLEM SIZE JACKED UP TO 500. DUE TO THE DYNAMIC DIMENSIONING NATURE OF RELAP5, THE ACTUAL SIZE OF THE PROBLEM THAT CAN BE RUN CAN NOT BE DETERMINED. EXTENSIVE TESTING FOR PROBLEMS LESS THAN 300 JUNCTION/ VOLUME HAVE BEEN PERFORMED. ANY THING ABOUT 300 MOST LIKELY WILL RUN BUT NOT GUARANTEED. CONTACT THE NUCLIB CONSULTANT IF YOU BOMBED OUT ON 'OPERAND RANGE ERROR'.

3.BUG IN SUBROUTINE RPMPDC WAS REPORTED BY INEL(RJW) AND CORRECTED IN CRAY VERSION.

2 PSV
Rev 1

```
**************************************************
*                                                *
*       CERTIFICATION STATUS (CONTINUED)         *
*                                                *
**************************************************
```

83/09/13 VERSION 4.00 UPDATE SUMMARY

83/08/07 BY J.T.CHING AND K.TAKAZAWA
PRESSURE,FLOW AND FORCE OSCILLATIONS ARE SMOOTHED OUT BY
(1)TWO UPDATE CARDS FROM INEL TO SKIP CHOKING IN CERTAIN UNWARRANTED SITUATION.
(2)LINEARIZATION OF THE UNDER-RELAXATION OF THE PHASE TRANSITION REGION FOR VOID FRACTION BETWEEN 0.0 AND 0.1 CENTERED AROUND 0.05.

CONSULTANT IF YOU BOMBED OUT ON 'OPERAND RANGE ERROR'.

3.BUG IN SUBROUTINE RPMPDC WAS REPORTED BY INEL(RJW) AND CORRECTED IN CRAY VERSION.

2 PSV Rev 1

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*********************************************
*                                           *
*      CERTIFICATION STATUS (CONTINUED)     *
*                                           *
*********************************************
```

83/09/13 VERSION 4.00 UPDATE SUMMARY

83/08/07 BY J.T.CHING AND K.TAKAZAWA
PRESSURE,FLOW AND FORCE OSCILLATIONS ARE SMOOTHED OUT BY
(1)TWO UPDATE CARDS FROM INEL TO SKIP CHOKING IN CERTAIN UNWARRANTED SITUATION.
(2)LINEARIZATION OF THE UNDER-RELAXATION OF THE PHASE TRANSITION REGION FOR VOID FRACTION BETWEEN 0.0 AND 0.1 CENTERED AROUND 0.05.

83/08/10 BY J.T.CHING
INCORPORATION OF A LIQUID-FLOW SEPARATOR JUNCTION IN SUBR. JPROP FOR STEAM GENERATOR SECONDARY,DOWNCOMER MODELLING VIA INPUT BY THE 199 CARD,THIRD INTEGER VARIABLE.

83/08/20 BY K.TAKAZAWA
INCORPORATION OF CYCLE 15 TO CYCLE 18 FROM INEL.
AN OCCASIONAL HEAT STRUCTURE CALCULATION BUG CORRECTED.

83/09/04 BY J.T.CHING
SEVERE TRANSIENT ENCOUNTERED IN MULTIPLE JUNCTION SUBCOOL BLOWDOWN CAUSED 'RAISING (0.8) TO A NEGATIVE POWER' IN SUBROUTINE JCHOKE. CORRECTED BY SET NEGATIVE NUMBER TO ZERO IN THE ITERATION. RESULTS APPEAR SATISFACTORY.

83/09/13 EXECUTION PROCEDURE FILE CHANGE
PROCEDURE MODIFIED TO ACCESS VERSION 4.00

83/09/13 VERSION 4.01 ERROR CORRECTION
LIQUID-FLOW SEPARATOR JUNCTION MOVED FROM FIFTH VALUE TO THIRD VALUE ON 199 CARD. VARIABLES TWOMUL AND THICKN DELETED FROM PROGRAM.

83/09/16 PROCEDURE INSTALLATION
PROCEDURE TO ACCESS EXPERIMENTAL VERSION OF RELAP5 (R51EXX) INSTALLED ON SYSTEM.

83/09/16 PROCEDURE INSTALLATION
PROCEDURE TO ACCESS BCS Q.A. VERSION OF RELAP5 (R51EXQ) INSTALLED ON SYSTEM.

83/09/16 VERSION 4.00 VERSION RELEASE
SOME MODIFICATIONS DID NOT GET TRANSFERED INTO

THE VERSION 4.00 UPDATE. VERSION 4.00 WAS RE-COMPILED WITH CORRECTIONS IN PLACE. ALL PREVIOUS VERSION 4.00 RUNS AFTER SEPT. 13 ARE INVALID.

83/09/18 VERSION 4.00 VERSION RELEASE
CYCLE 18 MODS PULLED FROM VERSION 4. MODS WERE CAUSING FAILURE OF STANDARD BCS TEST CASE 1.

83/09/18 LIQUID-FORCE JUNCTION MODEL
THIS INPUT TEST THE LIQUID-FORCED JUNCTION MODEL FOR ANY JUNCTION, BESIDES A SEPARATOR MODEL JUNCTION. THE FLOW EVENTUALLY BECOME

PROCEDURE TO ACCESS EXPERIMENTAL VERSION OF
RELAP5 (R51EXX) INSTALLED ON SYSTEM.

83/09/16 PROCEDURE INSTALLATION
PROCEDURE TO ACCESS BCS Q.A. VERSION OF
RELAP5 (R51EXQ) INSTALLED ON SYSTEM.

83/09/16 VERSION 4.00 VERSION RELEASE
SOME MODIFICATIONS DID NOT GET TRANSFERED INTO

THE VERSION 4.00 UPDATE. VERSION 4.00 WAS RE-COMPILED
WITH CORRECTIONS IN PLACE. ALL PREVIOUS VERSION
4.00 RUNS AFTER SEPT. 13 ARE INVALID.

83/09/18 VERSION 4.00 VERSION RELEASE
CYCLE 18 MODS PULLED FROM VERSION 4. MODS WERE
CAUSING FAILURE OF STANDARD BCS TEST CASE 1.

83/09/18 LIQUID-FORCE JUNCTION MODEL
THIS INPUT TEST THE LIQUID-FORCED JUNCTION MODEL FOR ANY JUNCTION,
BESIDES A SEPARATOR MODEL JUNCTION. THE FLOW EVENTUALLY BECOME
ALL LIQUID(VOIDGJ=0.0,AND VOIDFJ=1.0 IN '200000')

83/09/18 FLOATING-ERROR ELIMINATOR IN SUBR. JCHOKE
A CHECK IS MADE IN SUBROUTINE JCHOKE TO PREVENT RAISING (0.8) TO
A NEGATIVE POWER IN ITERATION.

83/09/18 LIQUID-FORCED JUNCTION MODEL
THE THIRD ENTRY IN CARD 199 CAN BE ENTERED AS A JUNCTION THRU
WHICH LIQUID ARE FORCED TO FLOW UNTIL EITHER IT BECOME ALL LIQUID
OR THERE IS NO LIQUID LEFT IN THE FROM VOLUME. THIS INPUT TEST
SUCH A MODEL FOR A SEPARATOR COMPONENT.

83/09/18 OSCILLATION SMOOTHING MODEL
A LINEAR MODEL IS USED TO REPLACE THE CONSTANT MODEL IN PHASE
CROSSING UNDER-RELAXATION MODEL IN SUBR. JCHOKE .
A INEL UPDATE CARD IS INTRODUCED TO ELIMINATE CHOKING TREATMENT
IN CERTAIN CRITICAL STATES.

83/09/18 TEST CASE INSTALLATION
R51IQ14 RE-INSTALLED WITH UNIQUE RECORD NAME

83/09/18 TEST CASE INSTALLATION
R51IQ13 RE-INSTALLED WITH UNIQUE RECORD NAME

83/09/18 TEST CASE INSTALLATION
R51IQ12 RE-INSTALLED WITH UNIQUE RECORD NAME

83/09/18 TEST CASE INTSALLATION
TEST CASE RE-INSTALLED WITH UNIQUE RECORD NAME

83/09/20 TEST CASE INSTALLATION
TEST CASE 10 SIMPLE VALVE TEST

83/09/20 TEST CASE INSTALLATION
TEST CASE 9 CE STEAM TEST NO. 1411

83/09/20 TEST CASE INSTALLATION
TEST CASE 7 CE TEST 1411 (BCS MODEL)

```
.83/09/18. TEST CASE INSTALLATION
        R51IQ13 RE-INSTALLED WITH UNIQUE RECORD NAME .

.83/09/18. TEST CASE INSTALLATION
        R51IQ12 RE-INSTALLED WITH UNIQUE RECORD NAME

.83/09/18. TEST CASE INTSALLATION
        TEST CASE RE-INSTALLED WITH UNIQUE RECORD NAME

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 10  SIMPLE VALVE TEST

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 9  CE STEAM TEST NO. 1411

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 7  CE TEST 1411 (RCS MODEL)

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 6  LOFT L9-1 POSTTEST ANALYSIS INITIALIZATION DECK

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 5   LIQUID OVER VAPOR VERTICAL PIPE

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 4  SUPERHEATED VAPOR PIPE (HIGH PRESSURE)

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 3  EDWARDS PIPE 9 VOL, 1VOL, 10 VOL CASE -- SCRAMBLED

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 2  TWO PHASE PIPE FILLED WITH SAME WATER

.83/09/20. TEST CASE INSTALLATION
        TEST CASE 1  SUPERHEATED VAPOR PIPE (LOW PRESSURE)

.10/23/83. CONFIMATORY TEST PERFORMED FOR LIQUID JUNCTION MODEL
         AT REQUEST OF TWO CLIENTS(J.CHING)

        PROBLEM R51IQ14 IS RERUN WITH R51EXQ WITH AND WITHOUT
        THE SPECIFICATION OF FORCED-LIQUID JUNCTION(THIRD ENTRY
        IN 199 CARD=1/0 RESPECTIVELY). THE MINOR EDIT AT 10 SEC
        GIVES:
        CASE        TIME        VOIDGJ(VAPOR)       VOIDFJ(LIQUID)

        LIQ JUN    10.0SEC      1.66E-5              0.99998

        NO LIQ J  10.0SEC      0.98923              1.07E-2

.10/23/83. LIQUID-JUNCTION MODEL, RESTART AND REVERSE FLOW.

         BY J.CHING

         IT WAS DEMONSTRATED THAT:
         (1) THE LIQ-JUN MODEL CAN BE TURN ON IN A RESTART
         (2) IT DOES NOT,HOWEVER,WORK FOR A REVERSE FLOW
             (WHICH IS PHYSICALLY REASONABLE).

.83/11/07. VERSION 4.01        ERROR CORRECTION
        VERSION 4.01 RE-BUILT FROM VERSION 4.00,
        INCLUDES CYCLE 18 MODIFICATIONS AFTER A SMALL
        BUG FIX WAS INCORPORATED TO GET Q.A. PROBLEM 1
        TO WORK, ALSO THE OSCILLATION SMOOTHING MODEL
```

```
•10/23/83•  CONFIMATORY TEST PERFORMED FOR LIQUID JUNCTION MODEL
            AT REQUEST OF TWO CLIENTS(J.CHING)

          PROBLEM R51IQ14 IS RERUN WITH R51EXQ WITH AND WITHOUT
          THE SPECIFICATION OF FORCED-LIQUID JUNCTION(THIRD ENTRY
          IN 199 CARD=1/0 RESPECTIVELY). THE MINOR EDIT AT 10 SEC
          GIVES:
          CASE        TIME        VOIDGJ(VAPOR)        VOIDFJ(LIQUID)

          LIQ JUN    10.0SEC      1.66E-5               0.99998

          NO LIQ J   10.0SEC      0.98923               1.07E-2

•10/23/83• LIQUID-JUNCTION MODEL, RESTART AND REVERSE FLOW.



           BY J.CHING

           IT WAS DEMONSTRATED THAT:
           (1) THE LIQ-JUN MODEL CAN BE TURN ON IN A RESTART
           (2) IT DOES NOT,HOWEVER,WORK FOR A REVERSE FLOW
               (WHICH IS PHYSICALLY REASONABLE).


•83/11/07•  VERSION 4.01        ERROR CORRECTION
          VERSION 4.01 RE-BUILT FROM VERSION 4.00,
          INCLUDES CYCLE 18 MODIFICATIONS AFTER A SMALL
          BUG FIX WAS INCORPORATED TO GET Q.A. PROBLEM 1
          TO WORK, ALSO THE OSCILLATION SMOOTHING MODEL
          WAS CORRECTED IN SUBROUTINE JCHOKE. '


•83/11/07•  INPUT PREPARATION PROGRAM CHANGE
          EXTEND CAPABILITY IN HEAT STRUCTURE INPUT.


•83/11/07•  TEST CASE INSTALLATION
          R51Q15  MOTOR OPERATED VALVE TEST


•83/11/18•  PRE-CERTIFIED PROCEDURE
          PROCEDURE TO ACCESS BCS PRE-CERTIFIED VERSION
          ADDED TO NUCLIB INTERACTIVE.
```

*** D I S C L A I M E R ***

R51AB3 IS BEING ACCESSED FROM THE NUCLIB VENDOR ACCOUNT ON AN EXPERIMENTAL BASIS ONLY. BCS ASSUMES NO RESPONSIBILITY FOR THE VALIDITY OF RESULTS OBTAINED BY THE USE OF THIS PROGRAM OR DATA SET. THE VENDOR IS MAINTAINING CONFIGURATION CONTROL RECORDS FOR THIS FILE. Q.A. RESPONSIBILITY RESIDES SOLELY WITH YOUR ORGANIZATION FOR THE CERTIFICATION AND VALIDATION OF THESE RESULTS. PLEASE CONTACT JON JERVERT (BCS Q.A. MANAGER) AT (206) 763-5024 FOR FURTHER DETAILS.

*** D I S C L A I M E R ***

ST5DAT IS BEING ACCESSED FROM THE NUCLIB VENDOR ACCOUNT ON AN EXPERIMENTAL BASIS ONLY. BCS ASSUMES NO RESPONSIBILITY FOR THE VALIDITY OF RESULTS OBTAINED BY THE USE OF THIS PROGRAM OR DATA SET. THE VENDOR IS MAINTAINING CONFIGURATION CONTROL RECORDS FOR THIS FILE. Q.A. RESPONSIBILITY RESIDES SOLELY WITH YOUR ORGANIZATION FOR THE CERTIFICATION AND VALIDATION OF THESE RESULTS. PLEASE CONTACT JON JERVERT (BCS Q.A. MANAGER) AT (206) 763-5024 FOR FURTHER DETAILS.

```
  . . .   D I S C L A I M E R   . . .
STSDAT IS BEING ACCESSED FROM THE NUCLIB VENDOR
ACCOUNT ON AN EXPERIMENTAL BASIS ONLY. BCS ASSUMES
NO RESPONSIBILITY FOR THE VALIDITY OF RESULTS
OBTAINED BY THE USE OF THIS PROGRAM OR DATA SET.
THE VENDOR IS MAINTAINING CONFIGURATION CONTROL
RECORDS FOR THIS FILE.   Q.A. RESPONSIBILITY
RESIDES SOLELY WITH YOUR ORGANIZATION FOR THE
CERTIFICATION AND VALIDATION OF THESE RESULTS.
PLEASE CONTACT JON JERVERT (BCS Q.A. MANAGER)
AT (206) 763-5024 FOR FURTHER DETAILS.
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            ...................
            .C R A Y  -  1 S.
            ...................

    XXXXX    XXXX   XX  XXXX
    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
    X XX     XX     XX    XX  XXXXXXXXXX
    X XX     XX     XX    XX  X        X
    X XX     XX     XX    XX  X        X
    X XX     XX     XX    XX  X        X
    X XX     XX     XX    XX  X        X
    X XX     XX     XX    XX  X        X
    X XX     XX     XX    XX  X        X
```

CRAY - 1S

NUCLEAR PROGRAM LIBRARY
BOEING COMPUTER SERVICES
ENERGY ENGINEERING COMPUTER CODE LABORATORY

RELAP5

```
RRRRRRRRRRRR    EEEEEEEEEEEEE   LL                AAAAAAAAA    PPPPPPPPPPPP    5555555555555
RRRRRRRRRRRRR   EEEEEEEEEEEEE   LL               AAAAAAAAAAA   PPPPPPPPPPPPP   5555555555555
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RR         RR   EE              LL              AA         AA  PP         PP   55
RR         RR   EE              LL              AA         AA  PP         PP   55
RRRRRRRRRRRRR   EEEEEEEEE       LL              AAAAAAAAAAAAA  PPPPPPPPPPPPP   555555555555
RRRRRRRRRRRR    EEEEEEEEE       LL              AAAAAAAAAAAAA  PPPPPPPPPPPP    5555555555555
RR      RR      EE              LL              AA         AA  PP                         55
RR       RR     EE              LL              AA         AA  PP                         55
RR        RR    EE              LL              AA         AA  PP              55         55
RR         RR   EEEEEEEEEEEEE   LLLLLLLLLLLLL   AA         AA  PP              5555555555555
RR         RR   EEEEEEEEEEEEE   LLLLLLLLLLLLL   AA         AA  PP               55555555555

MM         MM    00000000000    DDDDDDDDDDDD        11                    CCCCCCCCCCC      11             44
MMM       MMM   0000000000000   DDDDDDDDDDDDD      111                   CCCCCCCCCCCCC    111            444
MMMM     MMMM   00         00   DD         DD     1111                   CC         CC   1111           4444
MM MM   MM MM   00         00   DD         DD       11                   CC                 11          44 44
MM  MM MM  MM   00         00   DD         DD       11                   CC                 11         44  44
MM   MMM   MM   00         00   DD         DD       11                   CC                 11        44   44
MM    M    MM   00         00   DD         DD       11                   CC                 11       44    44
MM         MM   00         00   DD         DD       11                   CC                 11       4444444444444
MM         MM   00         00   DD         DD       11                   CC                 11       4444444444444
MM         MM   00         00   DD         DD       11                   CC         CC      11              44
MM         MM   0000000000000   DDDDDDDDDDDDD    11111111                CCCCCCCCCCCCC   11111111            44
MM         MM    00000000000    DDDDDDDDDDDD     11111111                 CCCCCCCCCCC    11111111            44

VV         VV   EEEEEEEEEEEEE   RRRRRRRRRRRR                   33333333333                     0000000        0000000
VV         VV   EEEEEEEEEEEEE   RRRRRRRRRRRRR                 3333333333333                   000000000      000000000
VV         VV   EE              RR         RR                 33         33                  00       00    00       00
VV         VV   EE              RR         RR                            33                 00         00  00         00
VV         VV   EE              RR         RR                            33                 00         00  00         00
VV         VV   EEEEEEEEE       RRRRRRRRRRRRR                          333                  00         00  00         00
 VV       VV    EEEEEEEEE       RRRRRRRRRRRR                           333        .....     00         00  00         00
  VV     VV     EE              RR      RR                               33       .....     00         00  00         00
   VV   VV      EE              RR       RR                              33       .....     00         00  00         00
    VV VV       EE              RR        RR                  33         33       .....      00       00    00       00
     VVV        EEEEEEEEEEEEE   RR         RR                 3333333333333                   000000000      000000000
      V         EEEEEEEEEEEEE   RR         RR                  33333333333                     0000000        0000000

  AAAAAAAAA     PPPPPPPPPPPP    5555555555555     AAAAAAAAA      SSSSSSSSSSS    FFFFFFFFFFFFF   EEEEEEEEEEEEE
 AAAAAAAAAAA    PPPPPPPPPPPPP   5555555555555    AAAAAAAAAAA    SSSSSSSSSSSSS   FFFFFFFFFFFFF   EEEEEEEEEEEEE
AA         AA   PP         PP   55              AA         AA   SS         SS   FF              EE
AA         AA   PP         PP   55              AA         AA   SS              FF              EE
AA         AA   PP         PP   55              AA         AA   SS              FF              EE
AAAAAAAAAAAAA   PPPPPPPPPPPPP   555555555555    AAAAAAAAAAAAA   SSSSSSSSSSSS    FFFFFFFFF       EEEEEEEEE
AAAAAAAAAAAAA   PPPPPPPPPPPP    5555555555555   AAAAAAAAAAAAA    SSSSSSSSSSSS   FFFFFFFFF       EEEEEEEEE
AA         AA   PP                         55   AA         AA              SS   FF              EE
AA         AA   PP                         55   AA         AA              SS   FF              EE
AA         AA   PP              55         55   AA         AA   SS         SS   FF              EE
AA         AA   PP              5555555555555   AA         AA   SSSSSSSSSSSSS   FF              EEEEEEEEEEEEE
AA         AA   PP               55555555555    AA         AA    SSSSSSSSSSS    FF              EEEEEEEEEEEEE
```

```
VV      VV      EE               RR        RR                  33      .....        00         00   00          00
 VV    VV       EE               RR         RR                 33      .....        00         00   00          00
  VV  VV        EE               RR          RR       33       33      .....         00       00     00        00
   VVV          EEEEEEEEEEEEE    RR           RR      333333333333                   000000000       000000000
    V           EEEEEEEEEEEEE    RR            RR      3333333333                      0000000         0000000
```

```
  AAAAAAAAA      PPPPPPPPPPPP    5555555555555    AAAAAAAAA      SSSSSSSSSSS    FFFFFFFFFFFFF   EEEEEEEEEEEEE
 AAAAAAAAAAA     PPPPPPPPPPPPP   5555555555555   AAAAAAAAAAA    SSSSSSSSSSSSS   FFFFFFFFFFFFF   EEEEEEEEEEEEE
AA         AA    PP         PP   55             AA         AA   SS         SS   FF              EE
AA         AA    PP         PP   55             AA         AA   SS              FF              EE
AA         AA    PP         PP   55             AA         AA   SS              FF              EE
AAAAAAAAAAAAA    PPPPPPPPPPPPP   555555555555   AAAAAAAAAAAAA    SSSSSSSSSSS    FFFFFFFFF       EEEEEEEEE
AAAAAAAAAAAAA    PPPPPPPPPPPP    5555555555555  AAAAAAAAAAAAA     SSSSSSSSSSS   FFFFFFFFF       EEEEEEEEE
AA         AA    PP                         55  AA         AA              SS   FF              EE
AA         AA    PP                         55  AA         AA              SS   FF              EE
AA         AA    PP              55         55  AA         AA   SS         SS   FF              EE
AA         AA    PP              5555555555555  AA         AA   SSSSSSSSSSSSS   FF              EEEEEEEEEEEEE
AA         AA    PP               55555555555   AA         AA    SSSSSSSSSSS    FF              EEEEEEEEEEEEE
```

```
    11          11              //    22222222222    88888888888           //    88888888888    33333333333
   111         111             //    2222222222222  8888888888888         //    8888888888888  3333333333333
  1111        1111            //     22         22  88         88        //     88         88  33         33
    11          11           //                 22  88         88       //      88         88             33
    11          11          //                  22  88         88      //       88         88             33
    11          11         //                  22    88888888888      //         88888888888             333
    11          11        //                 22      88888888888     //          88888888888             333
    11          11       //                22       88         88   //          88         88             33
    11          11      //               22         88         88  //           88         88             33
    11          11     //              22           88         88 //            88         88  33         33
 11111111    11111111 //              2222222222222  8888888888888 //             8888888888888  3333333333333
 11111111    11111111 //              2222222222222   88888888888 //               88888888888    33333333333
```

```
 22222222222    22222222222                  5555555555555   22222222222              22222222222       11
2222222222222  2222222222222                 5555555555555  2222222222222            2222222222222     111
22         22  22         22     : : :       55             22         22    : : :   22         22    1111
           22             22     : : :       55                        22    : : :              22      11
           22             22     : : :       55                        22    : : :              22      11
          22             22                  555555555555             22                       22       11
        22             22                    5555555555555          22                       22         11
      22             22          : : :                  55        22         : : :         22           11
    22             22            : : :                  55      22           : : :       22             11
  22             22              : : :       55         55    22             : : :     22               11
2222222222222  2222222222222                 5555555555555  2222222222222            2222222222222   11111111
2222222222222  2222222222222                  55555555555   2222222222222            2222222222222   11111111
```

```
BOEING COMPUTER SERVICES / NUCLIB        R E L A P 5     M O D 1   C 1 4          EL2.07   AP5ASFE  11/28/83  22:52:21 PAGE      1
                                            LISTING OF INPUT DATA FOR CASE    1
                                          NUCLIB VERSION 3.00     CRAY     05/06/83

      = KEWAUNEE  2 PSV -- 2 RUPTURE DISC -- DIF--MOD2
1     100 NEW TRANSNT
2     102 BRITISH BRITISH
3     199  5
      *   TIME STEP CONTROL
4     201  5.1000E-1  1.0000E-07  1.0000E-03    1   1   50     100
      *202  0.60E-01  1.00E-07  1.00E-03  1  1  50  100
5     302 P   38010000
6     303 TEMP  97010000
7     304  P  97010000
```

```
  22            22            : : :          55          22             : : :          22            11
  22          22              : : :          55        22               : : :        22              11
22          22                : : :     55   55      22                            22                11
2222222222222   2222222222222             5555555555555  2222222222222                 2222222222222   11111111
2222222222222   2222222222222              55555555555   2222222222222                 2222222222222   11111111
```



```
        = KEWAUNEE  2 PSV -- 2 RUPTURE DISC -- DIF--MOD2
  1     100 NEW TRANSNT
  2     102 BRITISH BRITISH
  3     199  5
        *    TIME STEP CONTROL
  4     201  5.1000E-1  1.0000E-07  1.0000E-03    1   1   50    100
        *202  0.60E-01  1.00E-07  1.00E-03  1  1  50  100
  5     302 P   38010000
  6     303 TEMP  97010000
  7     304  P  97010000
  8     305 TEMP  36010000
  9     306 P  36010000
 10     307 TEMP   96010000
 11     308 P 96010000
 12     309 TEMP  38010000
 13     310 P 38010000
 14     311 TEMP 42010000
 15     312 P 42010000
 16     313 TEMP 76010000
 17     314 P 76010000
 18     315 TEMP  44010000
 19     316  P  44010000
 20     317  TEMP  114030000
 21     318  P  114030000
 22     319 P 48010000
 23     320  P  114020000
 24     321  RHO  114020000
 25     322  TEMP  48010000
 26     323  TEMP  48080000
 27     324  P  48080000
 28     325  TEMP  52010000
 29     326  P  52010000
 30     327  TEMP  52010000
 31     328  P  52010000
 32     329  TEMP  54500000
 33     330  P  54500000
 34     331  TEMP  60010000
 35     332  P  60010000
 36     333  P  97010000
 37     334  P  95010000
 38     335  RHO  97010000
 39     336  TEMP  95010000
 40     337  RHO  95010000
 41     338  MFLOWJ  114020000
 42     339  MFLOWJ  94000000
 43     340 TEMP 114030000
 44     341 P     114030000
 45     342 P     114020000
 46     343 P       48010000
 47     344 P  195020000
 48     345 TEMP 195020000
 49     346 MFLOWJ 194000000  ✓
        * TRIP CONTROL
 50     505 TIME 0 GT NULL 0  11.0000E-01 L
 51     506 P,95010000 GE NULL,0 285.0 L
```

347 RHO 114030000
348 MFLOWJ 123000000


```
 52     507 P,95010000 LT NULL,0 .05 L
 53     508 P,195020000 GE NULL,0  285.0 L
 54     509 P,195020000 LT NULL,0    .05  L
 55     600 505
        *
        * HYDRODYNAMIC COMPONENTS
        *
        *PRESSURIZER
 56     0010000 C-001    TMDPVOL
 57     0010101    3.8480E+01   2.5980E+01  0.          0.           9.0000E+01
```

```
40      337 RHO  95010000
41      338  MFLOWJ  114020000
42      339  MFLOWJ  94000000
43      340 TEMP 114030000
44      341 P     114030000
45      342 P     114020000
46      343 P      48010000
47      344 P  195020000
48      345 TEMP 195020000
49      346 MFLOWJ 194000000
        * TRIP CONTROL
50      505 TIME 0 GT NULL 0  11.0000E-01 L
51      506 P,95010000 GE NULL,0 285.0 L
```



```
52      507 P,95010000 LT NULL,0 .05 L
53      508 P,195020000 GE NULL,0  285.0 L
54      509 P,195020000 LT NULL,0    .05  L
55      600 505
        *
        * HYDRODYNAMIC COMPONENTS
        *
        *PRESSURIZER
56      0010000 C-001     TMDPVOL
57      0010101   3.8480E+01  2.5980E+01  0.          0.          9.0000E+01
58      0010102   2.5980E+01  1.5000E-04  0.          10
59      0010200      2
        *    TIME     PRESSURE     QUALITY --- KEWAUNEE LOCKED ROTOR
60      0010201  0.0    2686.0       1.0
61      0010202  .5    2737.0       1.0
62      0010203 1.0    2712.0       1.0
        * HORIZONTAL PIPING  SEGMENT DOWNSTREAM FROM PSV
63      0360000 C-36      PIPE
64      0360001   3
65      0360101   2.0100E-01   3
66      0360301   7.0000E-01   3
67      0360601   0.           3
68      0360801   1.5000E-04  0.           3
69      0361001  10  3
70      0361101 1000    2
71      0361201  2   14.7  .01  0.  0.  2
72      0361202  3  14.7  204.2  0.0      0.            3
73      0361301  0.          0.          0.          2
        *SECOND 45 DEGREE ELBOW DOWNSTREAM FROM PSV PR-3A
74      0370000 C-96-040  SNGLJUN
75      0370101 096010000 040000000
76      0370102  .201  .15  .15    0000
77      0370201     0  0.          0.          0.
        * HORIZONTAL PIPING 10 INCH FROM 45 ELBOW TO REDUCER
78      0380000 C-38      PIPE
79      0380001   7
80      380101    .548    7
81      380301   .64  7
82      380601   0.0       7
83      0380801     1.50000E-04    0.0      7
84      0381001 00    7
85      0381101 1000    6
86      0381201  4  14.7  120. .948           0.            7
87      0381301  0.          0.          0.          6
        *JUNCTION AT 6 INCH END OF REDUCER
88      0390000 C-40-38   SNGLJUN
89      0390101  040010000  038000000
90      0390102   .375  .94  .348          1000   0.          0.
91      0390201     0  0.          0.          0.
        *6 INCH BY 10 INCH REDUCER
92      0400000 C-40      SNGLVOL
93      0400101   3.7500E-01 5.8300E-01  0.          0.          0.
94      0400102   0.          1.5000E-04  0.          00
95      0400200  4  14.7  120.  .948          0.
        *JUNCTION AT 10 INCH END OF REDUCER
```



```
96      0410000 C-38-42   SNGLJUN
97      0410101 038010000 042000000
98      0410102 .548  0.0          0.          1000   0.          0.
99      0410201     0  0.          0.          0.
        *HORIZONTAL SEGMENT DOWNSTREAM OF REDUCER
        *CONNECTS DOWNSTREAM PIPING ADJACENT TO SECOND PSV DISCHARGE
100     0420000  C-42  SNGLVOL
101     0420101  .548  .60  0.  0.  0.  0.  .00015  0.  00
102     0420200  4  14.7  120.  .948  0.0
        *
103     0430000 C-42-44  SNGLJUN
```

```
 87     0381301  0.            0.            0.            6
        *JUNCTION AT 6 INCH END OF REDUCER
 88     0390000 C-40-38  SNGLJUN
 89     0390101  040010000  038000000
 90     0390102   .375  .94  .348          1000   0.           0.
 91     0390201    0  0.             0.            0.
        *6 INCH BY 10 INCH REDUCER
 92     0400000 C-40      SNGLVOL
 93     0400101   3.7500E-01 5.8300E-01  0.            0.           0.
 94     0400102   0.             1.5000E-04  0.           00
 95     0400200  4  14.7  120.  .948              0.
        *JUNCTION AT 10 INCH END OF REDUCER
```



```
 96     0410000 C-38-42  SNGLJUN
 97     0410101 038010000 042000000
 98     0410102  .548  0.0            0.          1000   0.          0.
 99     0410201    0  0.             0.            0.
        *HORIZONTAL SEGMENT DOWNSTREAM OF REDUCER
        *CONNECTS DOWNSTREAM PIPING ADJACENT TO SECOND PSV DISCHARGE
100     0420000  C-42  SNGLVOL
101     0420101  .548  .60  0.  0.  0.  0.  .00015  0.  00
102     0420200  4  14.7  120.  .948  0.0
        *
103     0430000  C-42-44  SNGLJUN
104     0430101 042010000 044000000
105     0430102  .201  0.0  0.0  0100  0.  0.
106     0430201    0  0.             0.            0.
        *DISCHARGE FROM SECOND PSV INTO MAIN PIPING RUN
107     0440000 C-44        BRANCH
108     0440001    0
109     0440101    2.0100E-01  8.3000E-01  0.            0.           0.
110     0440102    0.            1.5000E-04  0.           00
111     0440200  3  14.7  120.  0.0  0.0
        *
        *
112     1140000  C-114  PIPE
113     1140001  3
114     1140101  .548 3
115     1140301  .574  3
116     1140601  0.  3
117     1140801  .00015  0.  3
118     1141001  00  3
119     1141101  1000  2
120     1141201  4  14.7  120.  .948  0.  3
121     1141301  0.  0.  0.  2
        *CONNECTS DOWNSTREAM PIPING FROM TWO SAFETY VALVES
122     0450000 C-44-46  SNGLJUN
123     0450101 044010000 046000000
124     0450102  .201  0.0  0.0           0100   0.           0.
125     0450201    0  0.             0.            0.
        *HORIZONTAL SEGMENT UPSTREAM OF SECOND DISCHARGE ELBOW
126     0460000 C-46       PIPE
127     0460001    3
128     0460101    5.4800E-01    3
129     0460301  .38  1
130     0460302  .65  3
131     0460601    0.           3
132     0460801  1.5000E-04  0.            3
133     0461001 00    3
134     0461101 1000    2
135     0461201  3  14.7  120.  0.0  0.0  1
136     0461202 4 14.7 120. .948              0.            3
137     0461301  0.            0.            0.            2
        *SECOND ELBOW IN PSV DOWNSTREAM PIPING
138     0470000 C-46-48  SNGLJUN
139     0470101 046010000 114000000
140     0470102  .548  .171  .171  1000  0.  0.
141     0470201     0  0.             0.            0.
```



```
        *HORIZONTAL PIPE BETWEEN SECOND AND THIRD PSV DISCHARGE ELBOWS
142     0480000 C-48       PIPE
143     0480001  9
144     0480101    5.4800E-01  9
145     0480301    5.1000E-01  9
146     0480601    0.          9
147     0480801  1.5000E-04  0.           9
148     0481001 00  9
149     0481101 1000    8
150     0481201 4 14.7 120. .948              0.            9
151     0481301  0.            0.            0.            8
```

```
130     0460302  .65  3
131     0460601   0.             3
132     0460801   1.5000E-04  0.            3
133     0461001 00   3
134     0461101 1000   2
135     0461201  3  14.7  120.  0.0  0.0  1
136     0461202 4 14.7 120. .948              0.          3
137     0461301  0.            0.            0.           2
        *SECOND ELBOW IN PSV DOWNSTREAM PIPING
138     0470000 C-46-48   SNGLJUN
139     0470101 046010000 114000000
140     0470102  .548  .171  .171  1000  0.  0.
141     0470201    0  0.           0.            0.
```



```
        *HORIZONTAL PIPE BETWEEN SECOND AND THIRD PSV DISCHARGE ELBOWS
142     0480000 C-48      PIPE
143     0480001   9
144     0480101    5.4800E-01   9
145     0480301    5.1000E-01   9
146     0480601    0.           9
147     0480801   1.5000E-04  0.            9
148     0481001 00   9
149     0481101 1000    8
150     0481201 4 14.7 120. .948              0.          9
151     0481301  0.            0.            0.           8
        *THIRD ELBOW IN PSV DOWNSTREAM PIPING
152     0490000 C-48-50   SNGLJUN
153     0490101 048010000 050000000
154     0490102    5.4800E-01  1.7200E-01  1.7200E-01 1000    0.           0.
155     0490201    0  0.           0.            0.
        *FIRST VERTICAL SEGMENT IN PSV DOWNSTREAM PIPING
156     0500000 C-50      PIPE
157     0500001   5
158     0500101    5.4800E-01   5
159     0500301    5.2600E-01   5
160     0500601   -9.0000E+01   5
161     0500801   1.5000E-04  0.            5
162     0501001 00    5
163     0501101 1000    4
164     0501201 4 14.7 120. .948              0.          5
165     0501301  0.            0.            0.           4
        *CONNECTS VERTICAL SEGMENTS
166     0510000 C-50-52   SNGLJUN
167     0510101 050010000 052000000
168     0510102  .548            0.            0.          1000   0.           0.
169     0510201    0  0.           0.            0.
        *PIPING TEE WHERE PORV FLOW ENTERS PSV 10 INCH VERTICAL DISCHARGE PIPING RUN
170     0520000 C-52      SNGLVOL
171     0520101  .548 .5  0. -90.          0.
172     0520102   0.             1.5000E-04  0.          00
173     0520200  4  14.7  120.  .948            0.
        *CONNECTS PORV-PSV TEE TO VERTICAL DISCHARGE PIPING
174     0530000 C-52-54   SNGLJUN
175     0530101 052010000 054000000
176     0530102   .548    .55  .55          1000   0.           0.
177     0530201    0  0.           0.            0.
        *PSV 10 INCH VERTICAL  DISCHARGE SEGMENT TO FOURTH DISCHARGE ELBOW
178     0540000 C-54      PIPE
179     0540001   95
180     0540101    5.4800E-01  95
181     0540301    5.5800E-01  95
182     0540601   -9.0000E+01  95
183     0540801   1.5000E-04  0.           95
184     0541001 00   95
185     0541101 1000  94
186     0541201 4 14.7 120. .948              0.          95
187     0541301  0.            0.            0.          94
        *FOURTH ELBOW IN PSV DOWNSTREAM PIPING
188     0550000 C-54-56   SNGLJUN
```



```
189     0550101 054010000 056000000
190     0550102  .548            1.7200E-01  1.7200E-01 1000   0.           0.
191     0550201    0  0.           0.            0.
        *HORIZONTAL SEGMENT
192     0560000 C-56      PIPE
193     0560001  35
194     0560101    5.4800E-01  35
195     0560301    8.9700E-01  35
196     0560601    0.          35
197     0560801   1.5000E-04  0.           35
```

```
        *PSV 10 INCH VERTICAL  DISCHARGE SEGMENT TO FOURTH DISCHARGE ELBOW
 178    0540000 C-54      PIPE
 179    0540001  95
 180    0540101    5.4800E-01  95
 181    0540301    5.5800E-01  95
 182    0540601   -9.0000E+01  95
 183    0540801  1.5000E-04  0.            95
 184    0541001 00  95
 185    0541101 1000  94
 186    0541201 4 14.7 120. .948              0.             95
 187    0541301  0.            0.           0.           94
        *FOURTH ELBOW IN PSV DOWNSTREAM PIPING
 188    0550000 C-54-56  SNGLJUN
```



```
 189    0550101 054010000 056000000
 190    0550102  .548            1.7200E-01  1.7200E-01 1000    0.           0.
 191    0550201     0  0.            0.          0.
        *HORIZONTAL SEGMENT
 192    0560000 C-56      PIPE
 193    0560001  35
 194    0560101    5.4800E-01  35
 195    0560301    8.9700E-01  35
 196    0560601    0.          35
 197    0560801  1.5000E-04  0.            35
 198    0561001 00  35
 199    0561101 1000  34
 200    0561201 4 14.7 120. .948              0.             35
 201    0561301  0.            0.           0.           34
        *16.6 DEGREE BEND IN DOWNSTREAM PIPING
 202    0570000 C-56-58  SNGLJUN
 203    0570101 056010000 058000000
 204    0570102  .548            6.0000E-02  6.0000E-02 1000    0.           0.
 205    0570201     0  0.            0.          0.
        *HORIZONTAL SEGMENT
 206    0580000 C-58      PIPE
 207    0580001    7
 208    0580101    5.4800E-01   7
 209    0580301    9.9700E-01   7
 210    0580601    0.           7
 211    0580801  1.5000E-04  0.            7
 212    0581001 00   7
 213    0581101 1000   6
 214    0581201 4 14.7 120. .948              0.             7
 215    0581301  0.            0.           0.           6
        *FIFTH ELBOW IN DOWNSTREAM PIPING
 216    0590000 C-58-60  SNGLJUN
 217    0590101 058010000 060000000
 218    0590102 .548             1.7200E-01  1.7200E-01 1000    0.           0.
 219    0590201     0  0.            0.          0.
        *VOLUME FROM RELIEF TANK ORIFICE TO AIR/WATER INTERFACE WITHIN TANK
 220    0600000 C-60      PIPE
 221    0600001    3
 222    0600101    5.4800E-01   3
 223    0600301    1.1100E+00   3
 224    0600601   -4.5000E+01   3
 225    0600801  1.5000E-04  0.            3
 226    0601001 00   3
 227    0601101 1000   2
 228    0601201 4 14.7 120. .948              0.             3
 229    0601301  0.            0.           0.           2
        *AIR/WATER INTERFACE WITHIN PRESSURE RELIEF TANK
 230    0610000 C-60-62  SNGLJUN
 231    0610101 060010000 062000000
 232    0610102  .548            0.          0.          1000    0.           0.
 233    0610201     0  0.            0.          0.
        *VOLUME DIRECTLY BELOW WATER SURFACE IN RELIEF TANK
 234    0620000 C-62      PIPE
 235    0620001    2
 236    0620101    5.4800E-01   2
```



```
 237    0620301    1.0000E+00   2
 238    0620601   -4.5000E+01   2
 239    0620801  1.5000E-04  0.            2
 240    0621001 00   2
 241    0621101 1000   1
 242    0621201 4  14.7  120.  .948              0.             2
 243    0621301  0,            0.           0.           1
        *45 DEGREE BEND IN RELIEF TANK
 244    0630000 C-62-64  SNGLJUN
 245    0630101 062010000 064000000
```

```
         •PSV 10 INCH VERTICAL  DISCHARGE SEGMENT TO FOURTH DISCHARGE ELBOW
 178     0540000 C-54      PIPE
 179     0540001  95
 180     0540101    5.4800E-01  95
 181     0540301    5.5800E-01  95
 182     0540601   -9.0000E+01  95
 183     0540801  1.5000E-04  0.           95
 184     0541001 00  95
 185     0541101 1000  94
 186     0541201 4 14.7 120. .948              0.             95
 187     0541301  0.          0.          0.          94
         •FOURTH ELBOW IN PSV DOWNSTREAM PIPING
 188     0550000 C-54-56  SNGLJUN
```



```
 189     0550101 054010000 056000000
 190     0550102 .548          1.7200E-01  1.7200E-01 1000   0.          0.
 191     0550201    0  0.          0.          0.
         •HORIZONTAL SEGMENT
 192     0560000 C-56      PIPE
 193     0560001  35
 194     0560101    5.4800E-01  35
 195     0560301    8.9700E-01  35
 196     0560601    0.          35
 197     0560801  1.5000E-04  0.           35
 198     0561001 00  35
 199     0561101 1000  34
 200     0561201 4 14.7 120. .948              0.             35
 201     0561301  0.          0.          0.          34
         •16.6 DEGREE BEND IN DOWNSTREAM PIPING
 202     0570000 C-56-58  SNGLJUN
 203     0570101 056010000 058000000
 204     0570102 .548          6.0000E-02  6.0000E-02 1000   0.          0.
 205     0570201    0  0.          0.          0.
         •HORIZONTAL SEGMENT
 206     0580000 C-58      PIPE
 207     0580001   7
 208     0580101    5.4800E-01   7
 209     0580301    9.9700E-01   7
 210     0580601    0.           7
 211     0580801  1.5000E-04  0.           7
 212     0581001 00   7
 213     0581101 1000   6
 214     0581201 4 14.7 120. .948              0.             7
 215     0581301  0.          0.          0.          6
         •FIFTH ELBOW IN DOWNSTREAM PIPING
 216     0590000 C-58-60  SNGLJUN
 217     0590101 058010000 060000000
 218     0590102 .548          1.7200E-01  1.7200E-01 1000   0.          0.
 219     0590201    0  0.          0.          0.
         •VOLUME FROM RELIEF TANK ORIFICE TO AIR/WATER INTERFACE WITHIN TANK
 220     0600000 C-60      PIPE
 221     0600001   3
 222     0600101    5.4800E-01   3
 223     0600301    1.1100E+00   3
 224     0600601   -4.5000E+01   3
 225     0600801  1.5000E-04  0.           3
 226     0601001 00   3
 227     0601101 1000   2
 228     0601201 4 14.7 120. .948              0.             3
 229     0601301  0.          0.          0.          2
         •AIR/WATER INTERFACE WITHIN PRESSURE RELIEF TANK
 230     0610000 C-60-62  SNGLJUN
 231     0610101 060010000 062000000
 232     0610102  .548          0.          0.         1000   0.          0.
 233     0610201    0  0.          0.          0.
         •VOLUME DIRECTLY BELOW WATER SURFACE IN RELIEF TANK
 234     0620000 C-62      PIPE
 235     0620001   2
 236     0620101    5.4800E-01   2
```



```
 237     0620301    1.0000E+00   2
 238     0620601   -4.5000E+01   2
 239     0620801  1.5000E-04  0.           2
 240     0621001 00   2
 241     0621101 1000   1
 242     0621201 4  14.7  120.  .948              0.             2
 243     0621301  0.          0.          0.          1
         •45 DEGREE BEND IN RELIEF TANK
 244     0630000 C-62-64  SNGLJUN
 245     0630101 062010000 064000000
```

```
226     0601001 00   3
227     0601101 1000   2
228     0601201 4 14.7 120. .948             0.              3
229     0601301  0.            0.            0.          2
        *AIR/WATER INTERFACE WITHIN PRESSURE RELIEF TANK
230     0610000 C-60-62  SNGLJUN
231     0610101 060010000 062000000
232     0610102  .548            0.            0.          1000    0.          0.
233     0610201     0  0.          0.            0.
        *VOLUME DIRECTLY BELOW WATER SURFACE IN RELIEF TANK
234     0620000 C-62       PIPE
235     0620001    2
236     0620101    5.4800E-01   2
```



```
237     0620301    1.0000E+00   2
238     0620601   -4.5000E+01   2
239     0620801   1.5000E-04  0.           2
240     0621001 00   2
241     0621101 1000   1
242     0621201 4  14.7  120.  .948            0.              2
243     0621301  0.            0.            0.          1
        *45 DEGREE BEND IN RELIEF TANK
244     0630000 C-62-64  SNGLJUN
245     0630101 062010000 064000000
246     0630102  .548           1.0300E-01  1.0300E-01 1000    0.          0.
247     0630201     0  0.          0.            0.
        *VOLUME OF DISCHARGE PIPING BELOW WATER IN PRESSURE RELIEF TANK
248     0640000 C-64       SNGLVOL
249     0640101  .548  1.65  0. -90.            0.
250     0640102   0.            1.5000E-04   0.          10
251     0640200      3  14.7    1.2000E+02   0.           0.
        *CONNECTS C-64 TO C-66
252     0650000 C-64-66  SNGLJUN
253     0650101 064010000 066000000
254     0650102  .548            0.            0.          1000    0.          0.
255     0650201     0  0.          0.            0.
        *90 DEGREE BEND IN RELIEF TANK
256     0660000 C-66       SNGLVOL
257     0660101 .548  1.5  0. -90.          0.
258     0660102   0.            1.5000E-04   0.          10
259     0660200      3  14.7    1.2000E+02   0.           0.
        *90 DEGREE BEND IN RELIF TANK WATER
260     0670000 C-66-68  SNGLJUN
261     0670101 066010000 068000000
262     0670102  .548           1.7200E-01  1.7200E-01 1000    0.          0.
263     0670201     0  0.          0.            0.
        *BEND VOLUME
264     0680000 C-68       SNGLVOL
265     0680101    5.4800E-01  1.5000E+00  0.           0.           0.
266     0680102   0.            1.5000E-04   0.          10
267     0680200      3  14.7    1.2000E+02   0.           0.
        *HORIZONTAL DISCHARGE SPARGER WITHIN RELIEF TANK
268     0690000 C-69       BRANCH
269     0690001      3
270     0690101    5.4800E-01  4.0800E+00  0.           0.           0.
271     0690102   0.            1.5000E-04   0.          10
272     0690200      3  14.7    1.2000E+02   0.           0.
273     0691101 068010000 069000000    5.4800E-01  0.           0.          1000
274     0692101 069010000 073000000    2.7300E-01 1.89  1.71 0000
275     0693101  069010000  070000000  .548   0.0   0.0   1000
276     0692201  0.            0.            0.
277     0693201  0.            0.            0.
278     0691201   0.0   0.0    0.0
        *HORIZONTAL DISCHARGE SPARGER WITHIN RELIEF TANK
279     0700000 C-70       BRANCH
280     0700001      2
281     0700101    5.4800E-01  4.0800E+00  0.           0.           0.
282     0700102   0.            1.5000E-04   0.          10
283     0700200      3  14.7    1.2000E+02   0.           0.
```



```
284     0701101 070010000 073000000    2.7300E-01  1.89  1.71 0000
285     0701201  0.            0.            0.
286     0702101 070010000 071000000    5.4800E-01  0.           0.          1000
287     0702201  0.            0.            0.
        *HORIZONTAL DISCHARGE SPARGER WITHIN RELIEF TANK
288     0710000 C-71       SNGLVOL
289     0710101    5.4800E-01  4.0800E+00  0.           0.           0.
290     0710102   0.            1.5000E-04   0.          10
291     0710200      3  14.7    1.2000E+02   0.           0.
        *CONNECTS COMPONENT SPARGER 71 TO WATER IN RELIEF TANK
```

```
272     0690200      3  14.7   1.2000E+02  0.             0.
273     0691101 068010000 069000000    5.4800E-01  0.              0.             1000
274     0692101 069010000 073000000    2.7300E-01 1.89  1.71 0000
275     0693101  069010000  070000000  .548    0.0   0.0   1000
276     0692201  0.             0.             0.
277     0693201  0.             0.             0.
278     0691201   0.0   0.0    0.0
        *HORIZONTAL DISCHARGE SPARGER WITHIN RELIEF TANK
279     0700000 C-70       BRANCH
280     0700001    2
281     0700101   5.4800E-01  4.0800E+00  0.           0.            0.
282     0700102   0.            1.5000E-04  0.          10
283     0700200      3  14.7    1.2000E+02  0.           0.
```



```
284     0701101 070010000 073000000    2.7300E-01  1.89  1.71 0000
285     0701201  0.             0.             0.
286     0702101 070010000 071000000    5.4800E-01  0.              0.             1000
287     0702201  0.             0.             0.
        *HORIZONTAL DISCHARGE SPARGER WITHIN RELIEF TANK
288     0710000 C-71       SNGLVOL
289     0710101   5.4800E-01  4.0800E+00  0.           0.            0.
290     0710102   0.            1.5000E-04  0.          10
291     0710200      3  14.7    1.2000E+02  0.           0.
        *CONNECTS COMPONENT SPARGER 71 TO WATER IN RELIEF TANK
292     0720000 C-71-73  SNGLJUN
293     0720101 071010000 073000000
294     0720102   2.8500E-01  1.89  1.71 0000   1.0000E+00  1.0000E+00
295     0720201     0  0.            0.           0.
        *WATER IN RELIEF TANK (REPRESENTS 75 % OF FREE VOLUME OF RELIEF TANK)
296     0730000 C-73       BRANCH
297     0730001  0
298     0730101   1.0665E+02  5.6290E+00  0.           0.            9.0000E+01
299     0730102   5.6290E+00  1.5000E-04  0.          00
300     0730200      3  14.7    1.2000E+02  0.           0.
        *AIR/WATER INTERFACE WITHIN RELIEF TANK
301     0740000 C-73-75  SNGLJUN
302     0740101 073010000 075000000
303     0740102   1.0660E+02  0.            0.          1000    1.0000E+00  1.0000E+00
304     0740201     0  0.            0.           0.
        *VOLUME OF AIR IN RELIEF TANK
305     0750000 C-75       SNGLVOL
306     0750101   1.0660E+02  1.8760E+00  0.           0.            9.0000E+01
307     0750102   1.8760E+00  1.5000E-04  0.          00
308     0750200      4  14.7    1.2000E+02  9.4800E-01  0.
        *HORIZONTAL SEGMENT DOWNSTREAM FROM SECOND PSV
309     0760000 C-76       PIPE
310     0760001    4
311     0760101   2.0100E-01    4
312     0760301   5.0000E-01    4
313     0760601   0.            4
314     0760801  1.5000E-04  0.             4
315     0761001 10    3
316     0761002  00   4
317     0761101 1000    3
318     0761201  2  14.7  .01  0.  0.  2
319     0761202  3  14.7  204.2  0.  0.  4
320     0761301  0.            0.            0.            3
        *JUNCTION TO BRANCH COMPONENT 44
321     0770000 C-76-044  SNGLJUN
322     0770101 076010000 044000000
323     0770102  .201  0.0  0.0          0100   1.0000E+00  1.0000E+00
324     0770201     0  0.            0.           0.
        *
        *  INLET TO VALVE NOZZLE PSV  PR-3A
        *
325     1980000   V-CASE   SNGLVOL
326     1980101   .017  .92  0.  0.  0.  0.  .00005  0.  11
327     1980200   2  2686.  1.0
        *
```



```
328     2980000   V-INLET   SNGLJUN
329     2980101   99010000  198000000  .017  0.  0.  0100
330     2980201   1  0.  0.  0.
        *
        *
        *
331     1780000   V-CASE   SNGLVOL
332     1780101   .017  .92  0.  0.  0.  0.  .00005  0.  11
333     1780200   2  2686.  1.0
        *
334     2780000   V-INLET   SNGLJUN
```

```
320     0761301  0.          0.           0.           3
        *JUNCTION TO BRANCH COMPONENT 44
321     0770000 C-76-044  SNGLJUN
322     0770101 076010000 044000000
323     0770102  .201  0.0  0.0           0100    1.0000E+00  1.0000E+00
324     0770201    0  0.           0.           0.
        *
        *  INLET TO VALVE NOZZLE PSV  PR-3A
        *
325     1980000  V-CASE  SNGLVOL
326     1980101  .017  .92  0.  0.  0.  0.  .00005  0.  11
327     1980200  2  2686.  1.0
        *
```



```
328     2980000  V-INLET   SNGLJUN
329     2980101  99010000  198000000  .017  0.  0.  0100
330     2980201  1  0.  0.  0.
        *
        *
        *
331     1780000  V-CASE  SNGLVOL
332     1780101  .017  .92  0.  0.  0.  0.  .00005  0.  11
333     1780200  2  2686.  1.0
        *
334     2780000  V-INLET  SNGLJUN
335     2780101  79010000  178000000  .017  .0  0.  0100
336     2780201  1  0.  0.  0.
        *
        *  VALVE TABLE
        *
337     20221000 REAC-T       0
338     20221001    0.           0.
339     20221002    .015  1.0000E+00
340     20221003  9.0  1.0
        * CONTROL SYSTEM  INPUT
341     20500100  PSV  FUNCTION  1.0  0.0  0
342     20500101  TIME  0  210
        *
        *SAFETY VALVE
343     0780000 C178-76  VALVE
344     0780101  178010000  076000000
345     0780102   1.7000E-02  0.            0.           0100    1.0000E+00  1.0000E+00
346     0780201     0  0.           0.           0.
347     0780300          SRVVLV
348     0780301       1
        *VERTICAL LOOP SEAL SEGMENT UPSTREAM FROM PSV
        *CONNECTS LOWER PART OF LOOP SEAL
349     0790000  C-79  SNGLVOL
350     0790101  .147  .8  0.  0.  0.0  0.  .00015  0.  00
351     0790200  2  2686.  1.0
        *
352     0800000 C-81-79  SNGLJUN
353     0800101 081010000 079000000
354     0800102   1.4700E-01  0.            0.           1000    1.0000E+00  1.0000E+00
355     0800201     0  0.           0.           0.
        *LOWER PART OF LOOP SEAL
356     0810000 C-81      SNGLVOL
357     0810101   1.4700E-01  5.8900E-01  0.           0.           0.
358     0810102   0.            1.5000E-04  0.           00
359     0810200  2  2686.  1.0  0.  0.
        *CONNECTS LOWER LOOP SEAL TO VERTICAL PART OF LOOP SEAL
360     0820000 C-83-81  SNGLJUN
361     0820101 083010000 081000000
362     0820102   1.4700E-01  0.            0.           1000    1.0000E+00  1.0000E+00
363     0820201     0  0.           0.           0.
        *VERTICAL PART OF LOOP SEAL
364     0830000 C-83      PIPE
365     0830001   2
366     0830101   1.4700E-01   2
```



```
367     0830301   5.4000E-01   1
368     0830302   6.3800E-01   2
369     0830601   9.0000E+01   2
370     0830801  1.5000E-04  0.          2
371     0831001 00   2
372     0831101 1000    1
373     0831201  2  2686.  1.0  0.  0.  1
374     0831202  2 2.686000E+03  1.0  0.           0.           2
375     0831301  0.          0.           0.           1
        *TOP 90 DEGREE BEND INTO PRESSURIZER
376     0840000 C-85-83  SNGLJUN
```

```
357    0810101   1.4700E-01  5.8900E-01  0.          0.          0.
358    0810102   0.          1.5000E-04  0.          00
359    0810200  2  2686.  1.0  0.  0.
       *CONNECTS LOWER LOOP SEAL TO VERTICAL PART OF LOOP SEAL
360    0820000 C-83-81   SNGLJUN
361    0820101 083010000 081000000
362    0820102    1.4700E-01  0.          0.          1000    1.0000E+00  1.0000E+00
363    0820201     0  0.          0.          0.
       *VERTICAL PART OF LOOP SEAL
364    0830000 C-83      PIPE
365    0830001   2
366    0830101    1.4700E-01   2
```



```
367    0830301    5.4000E-01   1
368    0830302    6.3800E-01   2
369    0830601    9.0000E+01   2
370    0830801   1.5000E-04  0.            2
371    0831001 00    2
372    0831101 1000    1
373    0831201  2   2686.  1.0  0.  0.  1
374    0831202  2 2.686000E+03  1.0  0.            0.            2
375    0831301  0.          0.          0.          1
       *TOP 90 DEGREE BEND INTO PRESSURIZER
376    0840000 C-85-83   SNGLJUN
377    0840101 083010000 085000000
378    0840102    1.4700E-01  1.6000E-01  1.6000E-01 1000    1.0000E+00  1.0000E+00
379    0840201     0  0.          0.          0.
       *VERTICAL PART OF PIPE FROM LOOP SEAL WATER
380    0850000 C-85      PIPE
381    0850001   2
382    0850101    1.4700E-01   2
383    0850201    1.4700E-01   1
384    0850301    7.0300E-01   2
385    0850601   -9.0000E+01   2
386    0850801   1.5000E-04  0.            2
387    0851001 00    2
388    0851101 1000    1
389    0851201 2   2.686000E+03  1.000000E+00  0.            0.            2
390    0851301  0.          0.          0.          1
       *SECOND ELBOW VOLUME
391    0860000 C-87-85   SNGLJUN
392    0860101 087010000 085000000
393    0860102    1.4700E-01  0.          0.          1000    1.0000E+00  1.0000E+00
394    0860201     0  0.          0.          0.
       *HORIZONTAL SEGMENT
395    0870000 C-87      PIPE
396    0870001   1
397    0870101    1.4700E-01   1
398    0870301    5.8400E-01   1
399    0870601    0.           1
400    0870801   1.5000E-04  0.            1
401    0871001 00    1
402    0871201 2   2.686000E+03  1.000000E+00  0.            0.            1
       *CONNECTS HORIZONTAL SEGMENTS
403    0880000 C-89-87   SNGLJUN
404    0880101 089010000 087000000
405    0880102    1.4700E-01  1.9500E-01  1.9500E-01 1000    1.0000E+00  1.0000E+00
406    0880201     0  0.          0.          0.
       *HORIZONTAL SEGMENT
407    0890000 C-89      SNGLVOL
408    0890101    1.4700E-01  7.8500E-01  0.          0.          0.
409    0890102    0.          1.5000E-04  0.          00
410    0890200     2  2.6860E+03  1.0000E+00  0.          0.
       *CONNECTS HORIZONTAL SEGMENT
411    0900000 C-91-89   SNGLJUN
412    0900101 091010000 089000000
413    0900102    1.4700E-01  0.          0.          1000    1.0000E+00  1.0000E+00
414    0900201     0  0.          0.          0.
```



```
       *VERTICAL PIPE FROM PRESSURIZER TO FIRST LOOP SEAL ELBOW VOLUME
415    0910000 C-91      PIPE
416    0910001   3
417    0910101    1.4700E-01   3
418    0910201    1.4700E-01   2
419    0910301    1.0740E+00   3
420    0910601    9.0000E+01   3
421    0910801   1.5000E-04  0.            3
422    0911001 00    3
423    0911101 1000    2
424    0911201 2   2.686000E+03  1.000000E+00  0.            0.            3
```

```
403     0880000 C-89-87  SNGLJUN
404     0880101 089010000 087000000
405     0880102   1.4700E-01  1.9500E-01  1.9500E-01 1000    1.0000E+00  1.0000E+00
406     0880201    0  0.              0.              0.
        *HORIZONTAL SEGMENT
407     0890000 C-89      SNGLVOL
408     0890101   1.4700E-01  7.8500E-01  0.            0.            0.
409     0890102   0.            1.5000E-04  0.            00
410     0890200      2  2.6860E+03  1.0000E+00  0.            0.
        *CONNECTS HORIZONTAL SEGMENT
411     0900000 C-91-89  SNGLJUN
412     0900101 091010000 089000000
413     0900102   1.4700E-01  0.            0.            1000    1.0000E+00  1.0000E+00
414     0900201    0  0.              0.              0.
```



```
        *VERTICAL PIPE FROM PRESSURIZER TO FIRST LOOP SEAL ELBOW VOLUME
415     0910000 C-91      PIPE
416     0910001   3
417     0910101   1.4700E-01   3
418     0910201   1.4700E-01   2
419     0910301   1.0740E+00   3
420     0910601   9.0000E+01   3
421     0910801  1.5000E-04  0.            3
422     0911001 00    3
423     0911101 1000    2
424     0911201 2  2.686000E+03  1.000000E+00  0.            0.            3
425     0911301  0.            0.            0.            2
        *CONNECTS LOOP SEAL PIPING TO PRESSURIZER
426     0920000 C-01-91  SNGLJUN
427     0920101 001000000 091000000
428     0920102   1.4700E-01  5.9400E-01  9.9200E-01 0000    1.0000E+00  1.0000E+00
429     0920201    0  0.              0.              0.
        *
        * PRESSURIZER VAULT
        *
430     0930000   C-93  SNGLVOL
431     0930101 90. 100.  0. 0. 0.0 0. .00015 0. 00
432     0930200   4 14.7  120.  .948
        *
        *  RUPTURE  DISC
        *
433     0940000   RD  VALVE
434     0940101   095010000 093000000 .163 0. 0. 0100
435     0940201  0 0. 0. 0.
436     0940300    MTRVLV
        **  CONTROL  VARIABLE  NUMBER
437     0940301   506  507    100.  0.0  2
        *
        *   RUPTURE  DISC   TABLE
438     20200200  NORMAREA
439     20200201  0.  0.
440     20200202  1.0  1.0
        *  RUPTURE  DISC  BAFFLE  CAVITY
        *
441     0950000   C-95  SNGLVOL
442     0950101   .201  .51  0. 0. 0. 0. .00015  0. 00
443     0950200  3  14.7  120.  0.0  0.0
        *
        *
        *  PRESSURIZER VAULT
        *
444     1930000   C-193  SNGLVOL
445     1930101   90.  100.  0.  0.  0.  0.  .00015  0.  00
446     1930200   4  14.7  120.  .948
        *
        *  RUPURE DISC AT PR-3B
        *
447     1940000   RD  VALVE
448     1940101   195010000  193000000  .163  0.  0. 0100
449     1940201   0  0.  0.  0.
```



```
450     1940300  MTRVLV
        **  CONTROL  VARIABLE
451     1940301   508  509 100.  0.0  2
        *
452     1950000   C-195  PIPE
453     1950001   2
454     1950101   .201  1
455     1950102   .188  2
456     1950301   .62  1
457     1950302   .62  2
```

```
          *
          *  PRESSURIZER VAULT
          *
444       1930000  C-193  SNGLVOL
445       1930101  90.  100.  0.  0.  0.  0.  .00015  0.  00
446       1930200  4  14.7  120.  .948
          *
          *  RUPURE DISC AT PR-3B
          *
447       1940000  RD  VALVE
448       1940101  195010000  193000000  .163  0.  0. 0100
449       1940201  0  0.  0.  0.
```



```
450       1940300  MTRVLV
          **  CONTROL  VARIABLE
451       1940301  508  509 100.  0.0  2
          *
452       1950000  C-195  PIPE
453       1950001  2
454       1950101  .201  1
455       1950102  .188  2
456       1950301  .62  1
457       1950302  .62  2
458       1950601  0.  2
459       1950801  .00015  0.  2
460       1950901  .15  .15  1
461       1951001  00  2
462       1951101  0000  1
463       1951201  3  14.7  120.  0.0  0.0  1
464       1951202  4  14.7  120.  .948  0.0  2
465       1951301  0.  0.  0.  1
          *
466       1960000  C-44-195  SNGLJUN
467       1960101  044010000  195000000
468       1960102  .201  0.0  0.0  0100
469       1960201  0  0.  0.  0.
          *
          *  INLET  TO DISCHARGE  PIPING
          *
470       0960000   C-96  SNGLVOL
471       0960101  .201  .843  0.  0.  0.  0.  .00015  0.  00
472       0960200  3  14.7  120.  0.0  0.0
          *
          *  OUTLET  FROM  INACTVE  SAFETY VALVE
          *
473       0970000  C-97  BRANCH
474       0970001  0
475       0970101  .201  .604  0. 0. 0. 0. .00015  0.  00
476       0970200  3  14.7  120.  0.0  0.0
          **
          *
          *VALVE PR-2A
477       0980000 PR-2A     VALVE
478       0980101 198010000 036000000
479       0980102   1.7000E-02    0.0  0.0 0100   1.0000E+00  1.0000E+00
480       0980201     0  0.           0.          0.
481       0980300        SRVVLV
482       0980301        1
          *VERTICAL LOOP SEAL SEGMENT UPSTREAM FROM PSV
483       0990000  C-99  SNGLVOL
484       0990101  .147  .8  0.  0.  0.0
485       0990102  0.  .00015  0.  00
486       0990200  2  2686.  1.0  0.  0.
          *ELBOW JUNCTION TO BOTTOM OF LOOP SEAL
487       1000000 C-100     SNGLJUN
488       1000101 101010000 099000000
489       1000102    .147    0.           0.          1000   1.0000E+00  1.0000E+00
490       1000201     0  0.           0.          0.
```



```
          *ELBOW JUNCTION TO BOTTOM OF LOOP SEAL
491       1010000 C-101     SNGLVOL
492       1010101   1.4700E-01  5.8900E-01  0.          0.          0.
493       1010102   0.          1.5000E-04  0.          00
494       1010200  2  2686.  1.0  0.  0.
          *JUNCTION TO CONNECT BOTTOM OF LOOP SEAL
495       1020000 C1-103  SNGLJUN
496       1020101 103010000 101000000
497       1020102  .147           1.6000E-01  1.6000E-01 1000   1.0000E+00  1.0000E+00
498       1020201     0  0.           0.          0.
          *HORIZONTAL LOOP SEAL PIPE
```

```
480     0980201     0  0.           0.          0.
481     0980300        SRVVLV
482     0980301        1
        *VERTICAL LOOP SEAL SEGMENT UPSTREAM FROM PSV
483     0990000  C-99   SNGLVOL
484     0990101  .147  .8  0.  0.  0.0
485     0990102  0.  .00015  0.  00
486     0990200  2  2686.  1.0  0.  0.
        *ELBOW JUNCTION TO BOTTOM OF LOOP SEAL
487     1000000 C-100    SNGLJUN
488     1000101 101010000 099000000
489     1000102    .147     0.           0.          1000   1.0000E+00  1.0000E+00
490     1000201     0  0.          0.          0.
```



```
        *ELBOW JUNCTION TO BOTTOM OF LOOP SEAL
491     1010000 C-101    SNGLVOL
492     1010101   1.4700E-01  5.8900E-01  0.           0.          0.
493     1010102   0.          1.5000E-04  0.          00
494     1010200  2  2686.  1.0  0.  0.
        *JUNCTION TO CONNECT BOTTOM OF LOOP SEAL
495     1020000 C1-103  SNGLJUN
496     1020101 103010000 101000000
497     1020102  .147            1.6000E-01  1.6000E-01 1000   1.0000E+00  1.0000E+00
498     1020201     0  0.          0.          0.
        *HORIZONTAL LOOP SEAL PIPE
499     1030000 C-103    PIPE
500     1030001   2
501     1030101    1.4700E-01   2
502     1030301    6.8400E-01   1
503     1030302    6.3800E-01   2
504     1030601    0.           2
505     1030801  1.5000E-04  0.            2
506     1031001 00   2
507     1031101 1000    1
508     1031201  2  2686.  1.0  0.  0.  1
509     1031202  2  2686.  1.0  0.  0.  2
510     1031301  0.           0.           0.           1
        *ELBOW TO CONNECT BOTTOM OF LOOP TO VERTICAL SEGMENT
511     1040000 C5-103  SNGLJUN
512     1040101 105010000 103000000
513     1040102  .147            1.6000E-01  1.6000E-01 1000   1.0000E+00  1.0000E+00
514     1040201     0  0.          0.          0.
        *SECOND LOOP SEAL ELBOW AND VERTICAL SEGMENT
515     1050000 C-105    PIPE
516     1050001   2
517     1050101    1.4700E-01   2
518     1050301    1.0310E+00   2
519     1050601    0.           2
520     1050801  1.5000E-04  0.            2
521     1051001 00   2
522     1051101 1000    1
523     1051201 2  2.686000E+03  1.000000E+00  0.           0.           2
524     1051301  0.           0.           0.           1
        *CONNECTS TOP OF LOOP SEAL PIPING
525     1060000 C7-105  SNGLJUN
526     1060101 107010000 105000000
527     1060102    .147     0.           0.          1000   1.0000E+00  1.0000E+00
528     1060201     0  0.          0.          0.
        *HORIZONTAL SEGMENT AT TOP OF PIPING
529     1070000 C-107    SNGLVOL
530     1070101    1.4700E-01  5.8400E-01  0.           0.          0.
531     1070102    0.          1.5000E-04  0.          00
532     1070200        2  2.6860E+03  1.0000E+00  0.          0.
        *FIRST ELBOW JUNCTION
533     1080000 C9-107  SNGLJUN
534     1080101 109010000 107000000
535     1080102  .147            1.9500E-01  1.9500E-01 1000   1.0000E+00  1.0000E+00
536     1080201     0  0.          0.          0.
        *TOP OF LOOP SEAL
```



```
537     1090000 C-109    SNGLVOL
538     1090101    1.4700E-01  7.8500E-01  0.           0.          0.
539     1090102    0.          1.5000E-04  0.          00
540     1090200        2  2.6860E+03  1.0000E+00  0.          0.
        *CONNECTS TOP OF LOOP TO PIPING DOWNSTREAM OF PRESSURIZER
541     1100000 C11-109  SNGLJUN
542     1100101 111010000 109000000
543     1100102    .147     0.           0.          1000   1.0000E+00  1.0000E+00
544     1100201     0  0.          0.          0.
        *VERTICAL PIPE FROM PRESSURIZER TO FIRST LOOP SEAL ELBOW VOLUME
```

```
527    1060102  .147    0.            0.            1000   1.0000E+00  1.0000E+00
528    1060201   0  0.           0.            0.
       *HORIZONTAL SEGMENT AT TOP OF PIPING
529    1070000 C-107    SNGLVOL
530    1070101   1.4700E-01  5.8400E-01  0.          0.           0.
531    1070102   0.            1.5000E-04  0.          00
532    1070200     2  2.6860E+03  1.0000E+00  0.          0.
       *FIRST ELBOW JUNCTION
533    1080000 C9-107   SNGLJUN
534    1080101 109010000 107000000
535    1080102  .147         1.9500E-01  1.9500E-01 1000   1.0000E+00  1.0000E+00
536    1080201    0  0.           0.            0.
       *TOP OF LOOP SEAL
```



```
537    1090000 C-109    SNGLVOL
538    1090101   1.4700E-01  7.8500E-01  0.          0.           0.
539    1090102   0.            1.5000E-04  0.          00
540    1090200     2  2.6860E+03  1.0000E+00  0.          0.
       *CONNECTS TOP OF LOOP TO PIPING DOWNSTREAM OF PRESSURIZER
541    1100000 C11-109  SNGLJUN
542    1100101 111010000 109000000
543    1100102   .147    0.            0.            1000   1.0000E+00  1.0000E+00
544    1100201   0  0.           0.            0.
       *VERTICAL PIPE FROM PRESSURIZER TO FIRST LOOP SEAL ELBOW VOLUME
545    1110000 C-111    PIPE
546    1110001   3
547    1110101   1.4700E-01   3
548    1110301   1.0740E+00   3
549    1110601   9.0000E+01   3
550    1110801  1.5000E-04  0.            3
551    1111001 00   3
552    1111101 1000   2
553    1111201 2  2.686000E+03  1.000000E+00  0.          0.          3
554    1111301  0.            0.           0.            2
       *CONNECTS TO PRESSURIZER
555    1120000 C13-111  SNGLJUN
556    1120101 113000000 111000000
557    1120102   .147          5.9400E-01  5.9400E-01 0000   1.0000E+00  1.0000E+00
558    1120201    0  0.           0.            0.
       *PRESSURIZER
559    1130000 C-113     TMDPVOL
560    1130101    38.48  2.5980E+01  0.          0.            9.0000E+01
561    1130102    2.5980E+01  1.5000E-04  0.          00
562    1130200      2
563    1130201    0.            2.6860E+03  1.0000E+00
564    1130202  .5  2737.0  1.0000E+00
565    1130203  1.0   2712.0  1.0000E+00
       *
566    1190000  C-119   SNGLJUN
567    1190101  36010000  136000000
568    1190102  .201  .15  .15  1000
569    1190201  0  0.  0.  0.
       *
570    1200000  C-120   SNGLJUN
571    1200101  136010000  97000000
572    1200102  .201  0.0  0.0  0100
573    1200201  0  0.  0.  0.
       *
574    1210000  C-121   SNGLJUN
575    1210101  97010000  96000000
576    1210102  .201  0.0  0.0  0100
577    1210201  0  0.  0.  0.
       *
578    1220000  C-122   SNGLJUN
579    1220101  97010000  95000000
580    1220102  .185  0.0  0.0  0100
581    1220201  0  0.  0.  0.
       *
582    1230000  C-123   SNGLJUN
```



```
583    1230101  114010000  48000000
584    1230102  .137    0.0  0.0  0100
585    1230201  0  0.  0.  0.
       *
586    1360000  C-136  SNGLVOL
587    1360101  .201  .854  0.  0.  0.
588    1360102  0.  .00015  0.  00
589    1360200  3  14.7  120.  0.  0.
       .END OF CASE
IERSKP=  5 AIRFCR=  0.10E-01 [illegible]
```

```
573      1200201  0  0.  0.  0.
         *
574      1210000  C-121  SNGLJUN
575      1210101  97010000  96003000
576      1210102  .201  0.0  0.0  0100
577      1210201  0  0.  0.  0.
         *
578      1220000  C-122  SNGLJUN
579      1220101  97010000  45000000
580      1220102  .185  0.0  0.0  0100
581      1220201  0  0.  0.  0.
         *
582      1230000  C-123  SNGLJUN
```



```
583      1230101  114010000  48000000
584      1230102  .137   0.0  0.0  0100
585      1230201  0  0.  0.  0.
         *
586      1360000  C-136  SNGLVOL
587      1360101  .201  .854  0.  0.  0.
588      1360102  0.  .00015  0.  00
589      1360200  3  14.7  120.  0.  0.
         .END OF CASE

IFPSKP=    5 AIRERR=  0.10E-01 TWOMUL=  0.00E+00 THICKN=  0.00E+00

INP-CHK, RUN OPTION IS RUN.

NO ACTION ON RESTART-PLOT FILE IS TO BE TAKEN AT END OF PROBLEM.

INPUT UNITS ARE ASSUMED BRITISH       OUTPUT UNITS ARE BRITISH

REMAINING CPU TIME VALUES ARE   1.0      AND   2.0      SEC.

                                              TIME STEP CONTROL DATA
    END TIME          MIN.TIME STEP     MAX.TIME STEP  OPTION   MINOR EDIT    MAJOR EDIT      RESTART
    (SEC)             (SEC)             (SEC)                    FREQUENCY     FREQUENCY     FREQUENCY
    5.100000E-01      1.000000E-07      1.000000E-03      1            1            50            100

        MINOR EDIT REQUESTS
REG.NUM.    VARIABLE CODE     PARAMETER
     302    P                  38010000
     303    TEMP               97010000
     304    P                  97010000
     305    TEMP               36010000
     306    P                  36010000
     307    TEMP               96010000
     308    P                  96010000
     309    TEMP               38010000
     310    P                  38010000
     311    TEMP               42010000
     312    P                  42010000
     313    TEMP               76010000
     314    P                  76010000
     315    TEMP               44010000
     316    P                  44010000
     317    TEMP              114030000
     318    P                 114030000
     319    P                  48010000
     320    P                 114020000
     321    RHO               114020000
     322    TEMP               48010000
     323    TEMP               48080000
     324    P                  48080000
     325    TEMP               52010000
     326    P                  52010000
     327    TEMP               52010000
     328    P                  52010000
     329    TEMP               54500000
     330    P                  54500000

     331    TEMP               60010000
     332    P                  60010000
     333    P                  97010000
     334    P                  95010000
     335    RHO                97010000
     336    TEMP               95010000
     337    RHO                95010000
     338    MFLOWJ            114020000
     339    MFLOWJ             94000000
     340    TEMP              114030000
     341    P                 114030000
     342    P                 114020000
     343    P                  48010000
     344    P                 195020000
```

317	TEMP	114030000
318	P	114030000
319	P	48010000
320	P	114020000
321	RHO	114020000
322	TEMP	48010000
323	TEMP	48080000
324	P	48080000
325	TEMP	52010000
326	P	52010000
327	TEMP	52010000
328	P	52010000
329	TEMP	54500000
330	P	54500000
331	TEMP	60010000
332	P	60010000
333	P	97010000
334	P	95010000
335	RHO	97010000
336	TEMP	95010000
337	RHO	95010000
338	MFLOWJ	114020000
339	MFLOWJ	94000000
340	TEMP	114030000
341	P	114030000
342	P	114020000
343	P	48010000
344	P	195020000
345	TEMP	195020000
346	MFLOWJ	194000000

EDIT OF COMPONENT INPUT DATA
(QUANTITIES PRINTED ARE INPUT VALUES, SET BY DEFAULT, OR SET BY ERROR RECOVERY)

INPUT DATA FOR COMPONENT 1, C-001 TMDPVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
1010000	3.848000E+01	2.598000E+01	9.997103E+02	0.000000E+00	9.000000E+01	2.598000E+01

VOL.NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	EQUIL. FLAG
1010000	1.500000E-04	6.999590E+00	0

TABULAR DATA

TIME (SEC)	PRESSURE (LBF/IN2)	QUALITY
0.000000E+00	2.686000E+03	1.000000E+00
5.000000E-01	2.737000E+03	1.000000E+00
1.000000E+00	2.712000E+03	1.000000E+00

INPUT DATA FOR COMPONENT 36, C-36 PIPE , HAVING 3 VOLUMES AND 2 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
36010000	2.010000E-01	7.000000E-01	1.407000E-01	0.000000E+00	0.000000E+00	0.000000E+00
36020000	2.010000E-01	7.000000E-01	1.407000E-01	0.000000E+00	0.000000E+00	0.000000E+00
36030000	2.010000E-01	7.000000E-01	1.407000E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
36010000	1.500000E-04	5.058865E-01	10	2	1.470000E+01	1.000000E-02	0.000000E+00	0.000000E+0
36020000	1.500000E-04	5.058865E-01	10	2	1.470000E+01	1.000000E-02	0.000000E+00	0.000000E+0
36030000	1.500000E-04	5.058865E-01	10	3	1.470000E+01	2.042000E+02	0.000000E+00	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
36010000	2.010000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
36020000	2.010000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 37, C-96-040 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
37000000	96010000	40000000	2.010000E-01	1.500000E-01	1.500000E-01	0	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
37000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 38, C-38 PIPE , HAVING 7 VOLUMES AND 6 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
38010000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38020000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38030000	5.480000E-01	6.400000E-01	3.507200E-01	[illegible]	[illegible]	[illegible]

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
36010000	1.500000E-04	5.058865E-01	10	2	1.470000E+01	1.000000E-02	0.000000E+00	0.000000E+0
36020000	1.500000E-04	5.058865E-01	10	2	1.470000E+01	1.000000E-02	0.000000E+00	0.000000E+0
36030000	1.500000E-04	5.058865E-01	10	3	1.470000E+01	2.042000E+02	0.000000E+00	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
36010000	2.010000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
36020000	2.010000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 37, C-96-040 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
37000000	96010000	40000000	2.010000E-01	1.500000E-01	1.500000E-01	0	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
37000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 38, C-38 PIPE , HAVING 7 VOLUMES AND 6 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
38010000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38020000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38030000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38040000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38050000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38060000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00
38070000	5.480000E-01	6.400000E-01	3.507200E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
38010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
38020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
38030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
38040000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
38050000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
38060000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
38070000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
38010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
38020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
38030000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
38040000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
38050000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
38060000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 39, C-40-38 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
39000000	40010000	38000000	3.750000E-01	9.400000E-01	3.480000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO. INIT. LIQ. VEL. INIT

	(FT/SEC)	(FT/SEC)	(FT/SEC)
39000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 40, C-40 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
40010000	3.750000E-01	5.830000E-01	2.186250E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
40010000	4.572000E-05	2.106132E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

INPUT DATA FOR COMPONENT 41, C-38-42 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
41000000	38010000	42000000	5.480000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
41000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 42, C-42 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
42010000	5.480000E-01	6.000000E-01	3.288000E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO. ROUGHNESS HYDRAULIC DIAM. VOLUME

	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
39000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 40, C-40 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
40010000	3.750000E-01	5.830000E-01	2.186250E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
40010000	4.572000E-05	2.106132E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

INPUT DATA FOR COMPONENT 41, C-38-42 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
41000000	38010000	42000000	5.480000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
41000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 42, C-42 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
42010000	5.480000E-01	6.000000E-01	3.288000E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
42010000	4.572000E-05	2.546011E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

INPUT DATA FOR COMPONENT 43, C-42-44 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
43000000	42010000	44000000	2.010000E-01	0.000000E+00	0.000000E+00	100	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
43000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 44, C-44 BRANCH , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
44010000	2.010000E-01	8.300000E-01	1.668300E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C. VALUE 1	I.C. VALUE 2	I.C.VALUE 3	I.C. VALUE
44010000	1.500000E-04	5.058865E-01	0	3	1.470000E+01	1.200000E+02	0.000000E+00	1.500000E-

INPUT DATA FOR COMPONENT 45, C-44-46 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
45000000	44010000	46000000	2.010000E-01	0.000000E+00	0.000000E+00	100	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
45000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 46, C-46 PIPE , HAVING 3 VOLUMES AND 2 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
46010000	5.480000E-01	3.800000E-01	2.082400E-01	0.000000E+00	0.000000E+00	0.000000E+00
46020000	5.480000E-01	6.500000E-01	3.562000E-01	0.000000E+00	0.000000E+00	0.000000E+00
46030000	5.480000E-01	6.500000E-01	3.562000E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
46010000	1.500000E-04	8.353055E-01	0	3	1.470000E+01	1.200000E+02	0.000000E+00	0.000000E+0
46020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
46030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
46010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
46020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 47, C-46-48 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
47000000	46010000	114000000	5.480000E-01	1.710000E-01	1.710000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)

45000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 46, C-46 PIPE , HAVING 3 VOLUMES AND 2 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
46010000	5.480000E-01	3.800000E-01	2.082400E-01	0.000000E+00	0.000000E+00	0.000000E+00
46020000	5.480000E-01	6.500000E-01	3.562000E-01	0.000000E+00	0.000000E+00	0.000000E+00
46030000	5.480000E-01	6.500000E-01	3.562000E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
46010000	1.500000E-04	8.353055E-01	0	3	1.470000E+01	1.200000E+02	0.000000E+00	0.000000E+0
46020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
46030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
46010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
46020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 47, C-46-48 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEFF.	TWO-PHASE DISCHARGE COEF.
47000000	46010000	114000000	5.480000E-01	1.710000E-01	1.710000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
47000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 48, C-48 PIPE , HAVING 9 VOLUMES AND 8 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
48010000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48020000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48030000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48040000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48050000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48060000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48070000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48080000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00
48090000	5.480000E-01	5.100000E-01	2.794800E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
48010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48040000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48050000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48060000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48070000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48080000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
48090000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
48010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48030000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48040000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48050000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48060000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48070000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48080000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 49, C-48-50 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEFF.	TWO-PHASE DISCHARGE COEF.
49000000	48010000	50000000	5.480000E-01	1.720000E-01	1.720000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
49000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 50, C-50 PIPE , HAVING 5 VOLUMES AND 4 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
50010000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50020000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50030000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50040000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50050000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01

VOL NO. ROUGHNESS HYDRAULIC DIAM. VOLUME

48020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48030000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48040000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48050000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48060000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48070000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
48080000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 49, C-48-50 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
49000000	48010000	50000000	5.480000E-01	1.720000E-01	1.720000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
49000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 50, C-50 PIPE , HAVING 5 VOLUMES AND 4 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
50010000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50020000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50030000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50040000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01
50050000	5.480000E-01	5.260000E-01	2.882480E-01	0.000000E+00	-9.000000E+01	-5.260000E-01

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
50010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
50020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
50030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
50040000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
50050000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAG	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
50010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
50020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
50030000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
50040000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 51, C-50-52 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
51000000	50010000	52000000	5.480000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
51000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 52, C-52 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
52010000	5.480000E-01	5.000000E-01	2.740000E-01	-9.000000E+01	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
52010000	4.572000E-05	2.546011E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

INPUT DATA FOR COMPONENT 53, C-52-54 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
53000000	52010000	54000000	5.480000E-01	5.500000E-01	5.500000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
53000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 54, C-54 PIPE , HAVING 95 VOLUMES AND 94 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
54010000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54020000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54030000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54040000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54050000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54060000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54070000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54080000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54090000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54100000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54110000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54120000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54130000	[illegible]	[illegible]	[illegible]			

	(FT)	(FT)	FLAGS	FLAG				
52010000	4.572000E-05	2.546011E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

INPUT DATA FOR COMPONENT 53, C-52-54 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
53000000	52010000	54000000	5.480000E-01	5.500000E-01	5.500000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
53000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 54, C-54 PIPE , HAVING 95 VOLUMES AND 94 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
54010000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54020000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54030000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54040000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54050000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54060000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54070000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54080000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54090000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54100000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54110000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54120000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54130000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54140000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54150000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54160000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54170000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54180000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54190000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54200000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54210000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54220000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54230000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54240000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54250000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54260000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54270000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54280000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54290000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54300000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54310000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54320000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54330000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54340000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54350000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54360000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54370000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54380000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54390000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54400000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54410000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54420000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54430000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54440000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54450000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54460000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54470000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54480000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54490000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54500000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54510000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54520000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54530000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54540000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54550000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54560000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54570000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54580000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54590000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54600000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54610000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54620000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54630000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54640000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54650000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54660000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54670000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54680000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54690000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54700000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54710000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54720000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54730000	5.480000E-01	5.580000E-01	3.057840E-01	[illegible]	[illegible]	[illegible]

54450000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54460000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54470000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54480000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54490000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54500000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54510000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54520000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54530000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54540000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54550000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54560000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54570000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54580000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54590000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54600000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54610000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54620000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54630000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54640000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54650000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54660000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54670000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54680000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54690000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54700000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54710000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54720000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54730000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54740000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54750000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54760000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54770000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54780000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54790000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54800000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54810000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54820000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54830000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54840000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54850000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54860000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54870000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54880000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54890000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54900000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54910000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54920000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54930000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54940000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01
54950000	5.480000E-01	5.580000E-01	3.057840E-01	0.000000E+00	-9.000000E+01	-5.580000E-01

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
54010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54040000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54050000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54060000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54070000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54080000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54090000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54100000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54110000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54120000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54130000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54140000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54150000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54160000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54170000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54180000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54190000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54200000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54210000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54220000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54230000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54240000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54250000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54260000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54270000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54280000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54290000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54300000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54310000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54320000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54330000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54340000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

54070000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54080000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54090000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54100000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54110000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54120000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54130000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54140000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54150000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54160000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54170000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54180000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54190000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54200000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54210000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54220000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54230000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54240000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54250000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54260000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54270000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54280000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54290000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54300000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54310000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54320000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54330000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54340000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54350000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54360000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54370000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54380000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54390000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54400000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54410000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54420000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54430000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54440000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54450000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54460000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54470000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54480000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54490000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54500000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54510000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54520000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54530000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54540000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
					54550000	1.500000E-04	8.353055E-01	
54560000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54570000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54580000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54590000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54600000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54610000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54620000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54630000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54640000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54650000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54660000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54670000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54680000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54690000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54700000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54710000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54720000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54730000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54740000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54750000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54760000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54770000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54780000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54790000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54800000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54810000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54820000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54830000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54840000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54850000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54860000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54870000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54880000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54890000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54900000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54910000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54920000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54930000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54940000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

54670000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54680000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54690000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54700000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54710000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54720000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54730000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54740000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54750000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54760000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54770000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54780000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54790000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54800000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54810000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54820000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54830000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54840000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54850000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54860000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54870000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54880000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54890000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54900000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54910000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54920000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54930000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54940000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
54950000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
54010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54030000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54040000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54050000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54060000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54070000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54080000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54090000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54100000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54110000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54120000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54130000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54140000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54150000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54160000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54170000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54180000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54190000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54200000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54210000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54220000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54230000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54240000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54250000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54260000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54270000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54280000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54290000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54300000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54310000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54320000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54330000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54340000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54350000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54360000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54370000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54380000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54390000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54400000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54410000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54420000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54430000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54440000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54450000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54460000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54470000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54480000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54490000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54500000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54510000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54520000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54530000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

54290000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54300000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54310000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54320000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54330000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54340000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54350000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54360000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54370000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54380000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54390000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54400000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54410000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54420000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54430000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54440000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54450000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54460000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54470000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54480000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54490000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54500000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54510000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54520000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54530000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54540000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54550000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54560000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54570000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54580000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54590000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54600000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54610000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54620000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54630000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54640000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54650000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54660000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54670000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54680000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54690000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54710000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54720000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54730000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54740000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54750000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54760000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54770000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54780000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54790000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54800000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54810000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54820000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54830000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54840000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54850000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54860000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54870000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54880000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54890000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54900000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54910000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54920000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54930000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54940000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 55, C-54-56 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
55000000	54010000	56000000	5.480000E-01	1.720000E-01	1.720000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
55000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 56, C-56 PIPE , HAVING 35 VOLUMES AND 34 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
56010000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56020000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56030000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56040000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00

54890000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54900000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54910000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54920000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54930000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
54940000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 55, C-54-56 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEFF.	TWO-PHASE DISCHARGE COEFF.
55000000	54010000	56010000	5.480000E-01	1.720000E-01	1.720000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
55000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 56, C-56 PIPE , HAVING 35 VOLUMES AND 34 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
56010000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56020000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56030000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56040000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56050000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56060000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56070000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56080000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56090000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56100000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56110000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56120000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56130000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56140000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56150000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56160000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56170000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56180000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56190000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56200000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56210000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56220000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56230000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56240000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56250000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56260000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56270000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56280000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56290000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56300000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56310000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56320000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56330000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56340000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00
56350000	5.480000E-01	8.970000E-01	4.915559E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
56010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56040000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56050000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56060000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56070000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56080000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56090000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56100000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56110000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56120000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56130000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56140000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56150000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56160000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56170000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56180000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56190000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56200000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56210000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56220000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56230000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56240000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56250000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56260000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56270000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

[illegible]	[illegible]	[illegible]	0	4	[illegible]	[illegible]	[illegible]	0.000000E+0
56020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56040000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56050000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56060000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56070000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.2[illegible]00E+02	9.480000E-01	0.000000E+0
56080000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56090000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56100000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56110000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56120000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56130000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56140000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56150000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56160000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56170000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56180000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56190000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56200000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56210000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56220000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56230000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56240000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56250000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56260000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56270000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56280000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56290000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56300000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56310000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56320000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56330000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56340000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
56350000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
56010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56030000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56040000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56050000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56060000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56070000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56080000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56090000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56100000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56110000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56120000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56130000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56140000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56150000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56160000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56170000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56180000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56190000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56200000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56210000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56220000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56230000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56240000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56250000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56260000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56270000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56280000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56290000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56300000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56310000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56320000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56330000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56340000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 57, C-56-58 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
57000000	56010000	58000000	5.480000E-01	6.000000E-02	6.000000E-02	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
57000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 58, C-58 PIPE , HAVING 7 VOLUMES AND 6 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)

56250000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56260000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56270000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56280000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56290000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56300000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56310000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56320000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56330000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
56340000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 57, C-56-58 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
57000000	56010000	58000000	5.480000E-01	6.000000E-02	6.000000E-02	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
57000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 58, C-58 PIPE , HAVING 7 VOLUMES AND 6 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
58010000	5.480000E-01	9.970000E-01	5.463559E-01	0.000000E+00	0.000000E+00	0.000000E+00
58020000	5.480000E-01	9.970000E-01	5.463559E-01	0.000000E+00	0.000000E+00	0.000000E+00
58030000	5.480000E-01	9.970000E-01	5.463559E-01	0.000000E+00	0.000000E+00	0.000000E+00
58040000	5.480000E-01	9.970000E-01	5.463559E-01	0.000000E+00	0.000000E+00	0.000000E+00
58050000	5.480000E-01	9.970000E-01	5.463559E-01	0.000000E+00	0.000000E+00	0.000000E+00
58060000	5.480000E-01	9.970000E-01	5.463559E-01	0.000000E+00	0.000000E+00	0.000000E+00
58070000	5.480000E-01	9.970000E-01	5.463559E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
58010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
58020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
58030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
58040000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
58050000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
58060000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
58070000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
58010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
5[illegible]0000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
5[illegible]30000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
58040000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
58050000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
58060000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 59, C-58-60 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
59000000	58010000	60000000	5.480000E-01	1.720000E-01	1.720000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
59000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 60, C-60 PIPE , HAVING 3 VOLUMES AND 2 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
60010000	5.480000E-01	1.110000E+00	6.082799E-01	0.000000E+00	-4.500000E+01	-7.848885E-01
60020000	5.480000E-01	1.110000E+00	6.082799E-01	0.000000E+00	-4.500000E+01	-7.848885E-01
60030000	5.480000E-01	1.110000E+00	6.082799E-01	0.000000E+00	-4.500000E+01	-7.848885E-01

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
60010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
60020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
60030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
60010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
60020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 61, C-60-62 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
61000000	60010000	62000000	5.480000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
59000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 60, C-60 PIPE , HAVING 3 VOLUMES AND 2 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
60010000	5.480000E-01	1.110000E+00	6.082799E-01	0.000000E+00	-4.500000E+01	-7.848885E-01
60020000	5.480000E-01	1.110000E+00	6.082799E-01	0.000000E+00	-4.500000E+01	-7.848885E-01
60030000	5.480000E-01	1.110000E+00	6.082799E-01	0.000000E+00	-4.500000E+01	-7.848885E-01

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
60010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
60020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
60030000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
60010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
60020000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 61, C-60-62 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
61000000	60010000	62000000	5.480000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
61000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 62, C-62 PIPE , HAVING 2 VOLUMES AND 1 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
62010000	5.480000E-01	1.000000E+00	5.479999E-01	0.000000E+00	-4.500000E+01	-7.071068E-01
62020000	5.480000E-01	1.000000E+00	5.479999E-01	0.000000E+00	-4.500000E+01	-7.071068E-01

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
62010000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0
62020000	1.500000E-04	8.353055E-01	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
62010000	5.480000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 63, C-62-64 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
63000000	62010000	64000000	5.480000E-01	1.030000E-01	1.030000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
63000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 64, C-64 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
64010000	5.480000E-01	1.650000E+00	9.041999E-01	-9.000000E+01	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
64010000	1.500000E-04	8.353055E-01	10	3	1.470000E+01	1.200000E+02	0.000000E+00	

INPUT DATA FOR COMPONENT 65, C-64-66 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
65000000	64010000	66000000	5.480000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
65000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 66, C-66 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
66010000	5.480000E-01	1.500000E+00	8.219999E-01	-9.000000E+01	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
66010000	1.500000E-04	8.353055E-01	10	3	1.470000E+01	1.200000E+02	0.000000E+00	

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
64010000	5.480000E-01	1.650000E+00	9.041999E-01	-9.000000E+01	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
64010000	1.500000E-04	8.353055E-01	10	3	1.470000E+01	1.200000E+02	0.000000E+00	

INPUT DATA FOR COMPONENT 65, C-64-66 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEFF.	TWO-PHASE DISCHARGE COEFF.
65000000	64010000	66000000	5.480000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
65000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 66, C-66 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
66010000	5.480000E-01	1.500000E+00	8.219999E-01	-9.000000E+01	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
66010000	1.500000E-04	8.353055E-01	10	3	1.470000E+01	1.200000E+02	0.000000E+00	

INPUT DATA FOR COMPONENT 67, C-66-68 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEFF.	TWO-PHASE DISCHARGE COEFF.
67000000	66010000	68000000	5.480000E-01	1.720000E-01	1.720000E-01	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
67000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 68, C-68 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
68010000	5.480000E-01	1.500000E+00	8.219999E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
68010000	1.500000E-04	8.353055E-01	10	3	1.470000E+01	1.200000E+02	0.000000E+00	

INPUT DATA FOR COMPONENT 69, C-69 BRANCH , HAVING 1 VOLUMES AND 3 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
69010000	5.480000E-01	4.080000E+00	2.235840E+00	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C. VALUE 1	I.C. VALUE 2	I.C.VALUE 3	I.C. VALUE
69010000	1.500000E-04	8.353055E-01	10	3	1.470000E+01	1.200000E+02	0.000000E+00	1.500000E-

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS
69010000	68010000	69000000	5.480000E-01	0.000000E+00	0.000000E+00	1000
69020000	69010000	73000000	2.730000E-01	1.690000E+00	1.710000E+00	0
69030000	69010000	70000000	5.480000E-01	0.000000E+00	0.000000E+00	1000

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
69010000	0.000000E+00	0.000000E+00	0.000000E+00
69020000	0.000000E+00	0.000000E+00	0.000000E+00
69030000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 70, C-70 BRANCH , HAVING 1 VOLUMES AND 2 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
70010000	5.480000E-01	4.080000E+00	2.235840E+00	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C. VALUE 1	I.C. VALUE 2	I.C.VALUE 3	I.C. VALUE
70010000	1.500000E-04	8.353055E-01	10	3	1.470000E+01	1.200000E+02	0.000000E+00	1.500000E-

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS
70010000	70010000	73000000	2.730000E-01	1.890000E+00	1.710000E+00	0
70020000	70010000	71000000	5.480000E-01	0.000000E+00	0.000000E+00	1000

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
[illegible]	[illegible]	[illegible]	[illegible]

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[illegible]                            [illegible]E-01     0.[illegible]E+00     0.[illegible]E+00          1000
69020000  69010000  73000000      2.730000E-01     1.890000E+00     1.710000E+00             0
69030000  69010000  70000000      5.480000E-01     0.000000E+00     0.000000E+00          1000

 JUN.NO.                          INIT. LIQ. VEL.  INIT. VAP. VEL.  INTERFACE VEL.
                                  (FT/SEC)        (FT/SEC)        (FT/SEC)
69010000                          0.000000E+00     0.000000E+00     0.000000E+00
69020000                          0.000000E+00     0.000000E+00     0.000000E+00
69030000                          0.000000E+00     0.000000E+00     0.000000E+00

                        INPUT DATA FOR COMPONENT  70,   C-70        BRANCH   , HAVING  1 VOLUMES AND  2 JUNCTIONS

 VOL NO.       FLOW AREA        FLOW LENGTH       VOLUME           HORIZ. ANGLE      VERT. ANGLE       ELEV. CHNG.
               (FT2)            (FT)              (FT3)            (DEG)             (DEG)             (FT)




70010000       5.480000E-01     4.080000E+00      2.235840E+00     0.000000E+00      0.000000E+00      0.000000E+00

 VOL NO.       ROUGHNESS        HYDRAULIC DIAM.    VOLUME  INIT. COND.     I.C. VALUE 1      I.C. VALUE 2      I.C.VALUE 3   I.C. VALUE
               (FT)             (FT)                FLAGS       FLAG
70010000       1.500000E-04     8.353055E-01          10           3     1.470000E+01      1.200000E+02      0.000000E+00  1.500000E-

 JUN.NO. FROM VOL.   TO VOL.      JUNCTION AREA    FORWARD LOSS     REVERSE LOSS       JUNCTION
                                  (FT2)            COEFFICIENT      COEFFICIENT           FLAGS
70010000  70010000  73000000      2.730000E-01     1.890000E+00     1.710000E+00             0
70020000  70010000  71000000      5.480000E-01     0.000000E+00     0.000000E+00          1000

 JUN.NO.                          INIT. LIQ. VEL.  INIT. VAP. VEL.  INTERFACE VEL.
                                  (FT/SEC)        (FT/SEC)        (FT/SEC)
70010000                          0.000000E+00     0.000000E+00     0.000000E+00
70020000                          0.000000E+00     0.000000E+00     0.000000E+00

                        INPUT DATA FOR COMPONENT  71,   C-71        SNGLVOL  , HAVING  1 VOLUMES AND  0 JUNCTIONS

 VOL NO.       FLOW AREA        FLOW LENGTH       VOLUME           HORIZ. ANGLE      VERT. ANGLE       ELEV. CHNG.
               (FT2)            (FT)              (FT3)            (DEG)             (DEG)             (FT)
71010000       5.480000E-01     4.080000E+00      2.235840E+00     0.000000E+00      0.000000E+00      0.000000E+00

 VOL NO.       ROUGHNESS        HYDRAULIC DIAM.    VOLUME  INIT. COND.    I.C.VALUE 1      I.C.VALUE 2      I.C.VALUE 3      I.C.VALUE 4
               (FT)             (FT)                FLAGS       FLAG
71010000       1.500000E-04     8.353055E-01          10           3    1.470000E+01     1.200000E+02     0.000000E+00

                        INPUT DATA FOR COMPONENT  72,   C-71-73     SNGLJUN  , HAVING  0 VOLUMES AND  1 JUNCTIONS

 JUN.NO. FROM VOL.   TO VOL.      JUNCTION AREA    FORWARD LOSS     REVERSE LOSS       JUNCTION      SUBCOOLED         TWO-PHASE
                                  (FT2)            COEFFICIENT      COEFFICIENT           FLAGS      DISCHARGE COEF.   DISCHARGE COEF.
72000000  71010000  73000000      2.850000E-01     1.890000E+00     1.710000E+00             0      1.000000E+00      1.000000E+00

 JUN.NO.                          INIT. LIQ. VEL.  INIT. VAP. VEL.  INTERFACE VEL.
                                  (FT/SEC)        (FT/SEC)        (FT/SEC)
72000000                          0.000000E+00     0.000000E+00     0.000000E+00

                        INPUT DATA FOR COMPONENT  73,   C-73        BRANCH   , HAVING  1 VOLUMES AND  0 JUNCTIONS

 VOL NO.       FLOW AREA        FLOW LENGTH       VOLUME           HORIZ. ANGLE      VERT. ANGLE       ELEV. CHNG.
               (FT2)            (FT)              (FT3)            (DEG)             (DEG)             (FT)
73010000       1.066500E+02     5.629000E+00      6.003328E+02     0.000000E+00      9.000000E+01      5.629000E+00

 VOL NO.       ROUGHNESS        HYDRAULIC DIAM.    VOLUME  INIT. COND.     I.C. VALUE 1      I.C. VALUE 2      I.C.VALUE 3   I.C. VALUE
               (FT)             (FT)                FLAGS       FLAG
73010000       1.500000E-04     1.165294E+01           0           3     1.470000E+01      1.200000E+02      0.000000E+00  1.500000E-

                        INPUT DATA FOR COMPONENT  74,   C-73-75     SNGLJUN  , HAVING  0 VOLUMES AND  1 JUNCTIONS

 JUN.NO. FROM VOL.   TO VOL.      JUNCTION AREA    FORWARD LOSS     REVERSE LOSS       JUNCTION      SUBCOOLED         TWO-PHASE
                                  (FT2)            COEFFICIENT      COEFFICIENT           FLAGS      DISCHARGE COEF.   DISCHARGE COEF.
74000000  73010000  75000000      1.066000E+02     0.000000E+00     0.000000E+00          1000      1.000000E+00      1.000000E+00

 JUN.NO.                          INIT. LIQ. VEL.  INIT. VAP. VEL.  INTERFACE VEL.
                                  (FT/SEC)        (FT/SEC)        (FT/SEC)
74000000                          0.000000E+00     0.000000E+00     0.000000E+00

                        INPUT DATA FOR COMPONENT  75,   C-75        SNGLVOL  , HAVING  1 VOLUMES AND  0 JUNCTIONS

 VOL NO.       FLOW AREA        FLOW LENGTH       VOLUME           HORIZ. ANGLE      VERT. ANGLE       ELEV. CHNG.
               (FT2)            (FT)              (FT3)            (DEG)             (DEG)             (FT)




75010000       1.066000E+02     1.876000E+00      1.999816E+02     0.000000E+00      9.000000E+01      1.876000E+00

 VOL NO.       ROUGHNESS        HYDRAULIC DIAM.    VOLUME  INIT. COND.    I.C.VALUE 1      I.C.VALUE 2      I.C.VALUE 3      I.C.VALUE 4
               (FT)             (FT)                FLAGS       FLAG
75010000       4.572000E-05     3.550983E+00           0           4    1.470000E+01     1.200000E+02     9.480000E-01     0.000000E+0

                        INPUT DATA FOR COMPONENT  76,   C-76        PIPE     , HAVING  4 VOLUMES AND  3 JUNCTIONS

 VOL NO.       FLOW AREA        FLOW LENGTH       VOLUME           HORIZ. ANGLE      VERT. ANGLE       ELEV. CHNG.
               (FT2)            (FT)              (FT3)            (DEG)             (DEG)             (FT)
76010000       2.010000E-01     5.000000E-01      1.005000E-01     0.000000E+00      0.000000E+00      0.000000E+00
76020000       2.010000E-01     5.000000E-01      1.005000E-01     0.000000E+00      0.000000E+00      0.000000E+00
76030000       2.010000E-01     5.000000E-01      1.005000E-01     0.000000E+00      0.000000E+00      0.000000E+00
76040000       2.010000E-01     5.000000E-01      1.005000E-01     0.000000E+00      0.000000E+00      0.000000E+00
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INPUT DATA FOR COMPONENT 74, C-73-75 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
74000000	73010000	75000000	1.066000E+02	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
74000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 75, C-75 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
75010000	1.066000E+02	1.876000E+00	1.999816E+02	0.000000E+00	9.000000E+01	1.876000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
75010000	4.572000E-05	3.550983E+00	0	4	1.470000E+01	1.200000E+02	9.480000E-01	0.000000E+0

INPUT DATA FOR COMPONENT 76, C-76 PIPE , HAVING 4 VOLUMES AND 3 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
76010000	2.010000E-01	5.000000E-01	1.005000E-01	0.000000E+00	0.000000E+00	0.000000E+00
76020000	2.010000E-01	5.000000E-01	1.005000E-01	0.000000E+00	0.000000E+00	0.000000E+00
76030000	2.010000E-01	5.000000E-01	1.005000E-01	0.000000E+00	0.000000E+00	0.000000E+00
76040000	2.010000E-01	5.000000E-01	1.005000E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
76010000	1.500000E-04	5.058865E-01	10	2	1.470000E+01	1.000000E-02	0.000000E+00	0.000000E+0
76020000	1.500000E-04	5.058865E-01	10	2	1.470000E+01	1.000000E-02	0.000000E+00	0.000000E+0
76030000	1.500000E-04	5.058865E-01	10	3	1.470000E+01	2.042000E+02	0.000000E+00	0.000000E+0
76040000	1.500000E-04	5.058865E-01	0	3	1.470000E+01	2.042000E+02	0.000000E+00	0.000000E+0

JUN.NO.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
76010000	2.010000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
76020000	2.010000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00
76030000	2.010000E-01	0.000000E+00	0.000000E+00	1000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 77, C-76-044 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
77000000	76010000	44000000	2.010000E-01	0.000000E+00	0.000000E+00	100	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
77000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 78, C178-76 VALVE , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
78000000	178010000	76000000	1.700000E-02	0.000000E+00	0.000000E+00	100	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
78000000	0.000000E+00	0.000000E+00	0.000000E+00

JUN.NO.	CONTROL NUMBER	TABLE NUMBER
78000000	1	0

INPUT DATA FOR COMPONENT 79, C-79 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS

VOL NO.	FLOW AREA (FT2)	FLOW LENGTH (FT)	VOLUME (FT3)	HORIZ. ANGLE (DEG)	VERT. ANGLE (DEG)	ELEV. CHNG. (FT)
79010000	1.470000E-01	8.000000E-01	1.176000E-01	0.000000E+00	0.000000E+00	0.000000E+00

VOL NO.	ROUGHNESS (FT)	HYDRAULIC DIAM. (FT)	VOLUME FLAGS	INIT. COND. FLAG	I.C.VALUE 1	I.C.VALUE 2	I.C.VALUE 3	I.C.VALUE 4
79010000	1.500000E-04	4.326271E-01	0	2	2.686000E+03	1.000000E+00	0.000000E+00	

INPUT DATA FOR COMPONENT 80, C-81-79 SNGLJUN , HAVING 0 VOLUMES AND 1 JUNCTIONS

JUN.NO.	FROM VOL.	TO VOL.	JUNCTION AREA (FT2)	FORWARD LOSS COEFFICIENT	REVERSE LOSS COEFFICIENT	JUNCTION FLAGS	SUBCOOLED DISCHARGE COEF.	TWO-PHASE DISCHARGE COEF.
80000000	81010000	79000000	1.470000E-01	0.000000E+00	0.000000E+00	1000	1.000000E+00	1.000000E+00

JUN.NO.	INIT. LIQ. VEL. (FT/SEC)	INIT. VAP. VEL. (FT/SEC)	INTERFACE VEL. (FT/SEC)
80000000	0.000000E+00	0.000000E+00	0.000000E+00

INPUT DATA FOR COMPONENT 81, C-81 SNGLVOL , HAVING 1 VOLUMES AND 0 JUNCTIONS