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PACER - A FAST RUNNING COMPUTER CODE FOR THE CALCULATION OF SHORT-TERM CONTAINMENT/CONFINEMENT LOADS FOLLOWING COOLANT BOUNDARY FAILURE

VOLUME 2: USER INFORMATION

by

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ABSTRACT

A fast running and simple computer code has been developed to calculate pressure loadings inside light water reactor containments/confinements under loss-of-coolant accident conditions. PACER was originally developed to calculate containment/confinement pressure and temperature time histories for loss-of-coolant accidents in Soviet-designed VVER reactors and is relevant to the activities of the U. S. International Nuclear Safety Center. The code employs a multicompartment representation of the containment volume and is focused upon application to early time containment phenomena during and immediately following blowdown. PACER has been developed for FORTRAN 77 and earlier versions of FORTRAN. The code has been successfully compiled and executed on SUN SPARC and Hewlett-Packard HP-735 workstations provided that appropriate compiler options are specified. The code incorporates both capabilities built around a "hardwired" default generic VVER-440 Model V230 design as well as fairly general user-defined input. However, array dimensions are hardwired and must be changed by modifying the source code if the number of compartments/cells differs from the default number of nine. Detailed input instructions are provided as well as a description of outputs. Input files and selected output are presented for two sample problems run on both HP-735 and SUN SPARC workstations.

1.0 INTRODUCTION AND GENERAL USER INFORMATION

The PACER (Pressurization Accompanying Coolant Escape from Ruptures) computer code has been developed to calculate pressure loadings inside light water reactor containments and confinements under loss-of-coolant accident (LOCA) conditions. PACER was originally developed to specifically calculate containment/confinement pressure and temperature time histories for LOCAs in VVER designs. It was used in the "Department of Energy's Team's Analyses of Soviet Designed VVERs" in 1987.[1-3] More recently, the code has been applied to calculate time dependent pressure loadings during a design basis LOCA in a generic VVER-440 Model V213.[4]

PACER was developed with the objective of being computationally fast running, easy to use, and (where possible) to incorporate best estimate models and correlations rather than conservative bounding assumptions. These objectives have been principally achieved in two ways. First, the containment/confinement is described using a multicompartment representation in which the containment volume is partitioned into a number of compartments or cells. Inside each compartment, uniform conditions of pressure, temperature, and concentration are assumed. An arbitrary number of compartments may be defined and connected in a fairly general manner. Second, the modeling in PACER is directed only at early time phenomena occurring over a timescale of the order of tens of minutes following break inception. This eliminates the need to perform detailed multicell calculations of the heatup of the structural walls and equipment, eliminating a significant amount of computation. The restriction to short-term behavior also avoids the need to consider beyond design basis accident phenomena such as hydrogen combustion, core-concrete interaction, and direct containment heating.

The modeling and correlations incorporated into PACER as well as the numerical solution methodology employed are discussed in Volume 1 of this report. The present volume is devoted to the general and specific information that the user needs to know to prepare PACER input, execute the code, and read the output.

The subroutines comprising PACER have beeen written for FORTRAN 77 and earlier versions of FORTRAN. To achieve an adequate degree of precision in computation, real variables have been defined as double precision using DOUBLE PRECISION and IMPLICIT DOUBLE PRECISION (A-H, O-Z) statements in each routine. To date, the code has been executed on both

SUN SPARC and Hewlett-Packard HP-735 workstations. The source coding is compiled using the **f77** compiler specific to each of these systems. In both cases, the **-onetrip** compiler option should be selected to ensure that all DO loops are passed through. In addition, the **-K** compiler option must also be selected on Hewlett-Packard computers to save all local variables and to initialize all variables when invoking the **f77** compiler.

PACER was originally developed with the problem setup and nodalization defined entirely by means of source coding rather than controlled through a separate input file. The code was subsequently modified to incorporate user-supplied input. However, the old "hardwired" capabilities have also been retained as options that may be selected through the input. One fundamental aspect of the hardwired approach has been retained in the current code, however. This is the definition of array dimensions. If the number of compartments is specified to be different than nine, then the dimensions of all of the arrays must be manually changed in the source coding. All of these arrays belong to the COMMON block named SUPCOM within which they are dimensioned. Thus, PACER does not incorporate any dynamic storage allocation. Fortunately, the only other arrays in the code have dimensions of 3 or 100 such that those arrays dependent upon the number of compartments are easily identified are modified.

On UNIX operating systems, PACER reads input off of a file, fort.5, that must be present. Input information is read during problem setup as well as at the beginning of a restart calculation. Output is written on the file, fort.6. Selected variables are written at a specified increment of time onto the file, fort. 11, for later plotting using a separate user-supplied plotting program. The files, fort.5, fort.6, and fort.11, are therefore reserved for use by the code.

PACER writes restart files alternately onto two files, fort.KRST1 and fort.KRST2, where the file numbers, KRST1 and KRST2, are specified by the user through the input. Similarly, when a calculation is being restarted, information is read off of a previously generated restart file, fort.KRST0, where the number KRST0 is specified by the user as the first input item.

Whenever restart information is written, the file (i.e., either KRST1 or KRST2) is first rewound. Thus, only one set of restart information is ever present upon each file. This approach was followed to limit the file size but still provide a reasonable likelihood for a viable backup restart file should an abrupt termination of a run prevent successful generation of the most recent restart file.

A listing of the subroutines incorporated in PACER is provided in Appendix A.

2.0 PACER INPUT

The input operations for PACER are simple and straightforward. The user must specify a minimal amount of input instructions defining whether the run is a restart, the problem title, start and stop times, timestep sizes, print intervals, plot information interval, restart interval and restart files, plus general containment/confinement initial conditions. The user is then free to define the containment/confinement compartmentalization, break conditions, spray features, venting behavior, rupture disc behavior, and structure heat sink parameters or else let the code use default values for any of these aspects of the problem. These default values apply to a generic VVER-440 Model V230. Given the significance of the default values, the features of the default generic VVER-440 Model V230 shall be described first followed by a detailed discussion of all of the input instructions.

2.1 Generic VVER-440 Model V230 Description

Figure 1 illustrates the VVER-440 Model V230 accident localization system. The dashed line indicates the hermetic boundary following the onset of a loss-of-coolant accident shortly after which elements of the confinement ventilation system (not included in the figure) are isolated from the localization system. The nodalization of the confinement in terms of cells is shown in Figure 2. Nine cells are defined of which eight represent the confinement and one the atmosphere. The steam generator compartment is modeled with two cells separated by a vertical plane passing through the refueling pool. The broken pipe is assumed to be located in the half that is directly connected to the pressurizer compartment. The vent valves from the confinement to the atmosphere are located in the other half of the steam generator compartment. The assumed location of the break is expected to be a conservative assumption because of the greater distance for flow from the rupture to the vent valves. The pressurizer and quench tank compartments are represented by a single cell. Both halves of the steam generator compartment communicate with the pump motor compartment as well as the middle of the reactor shaft inside which the primary coolant nozzles are situated. An open manway is assumed to connect the lower portion of the reactor shaft with the half of the steam generator compartment containing the break. The upper shaft and shielding dome region above the bellows "s-seal" are assumed to initially be isolated from the middle portion of the shaft by intact rupture discs. The rupture discs are assumed to break to open up a flow path when the differential pressure

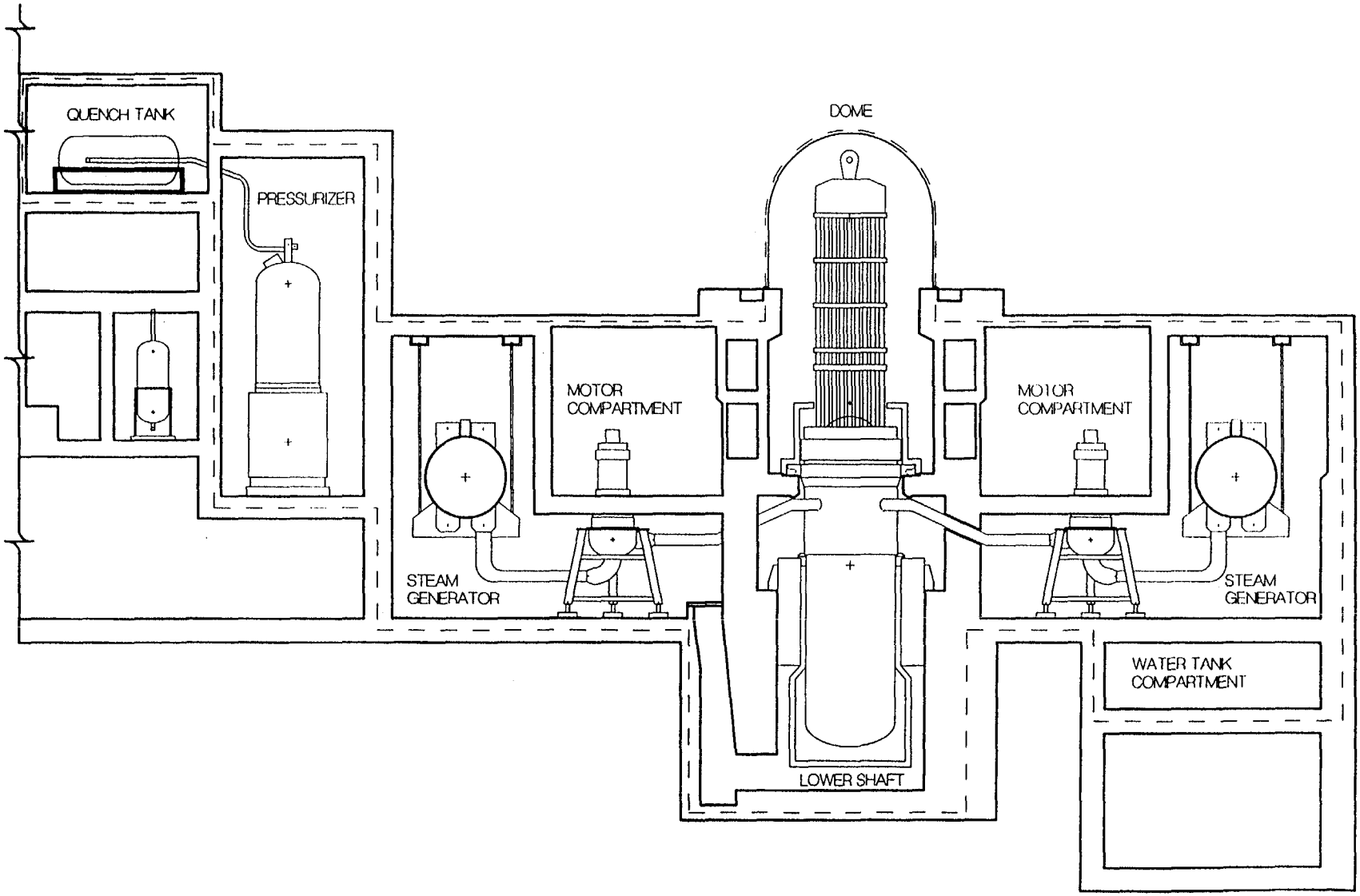

Figure 1. Illustration of VVER-440 Model V230 Confinement

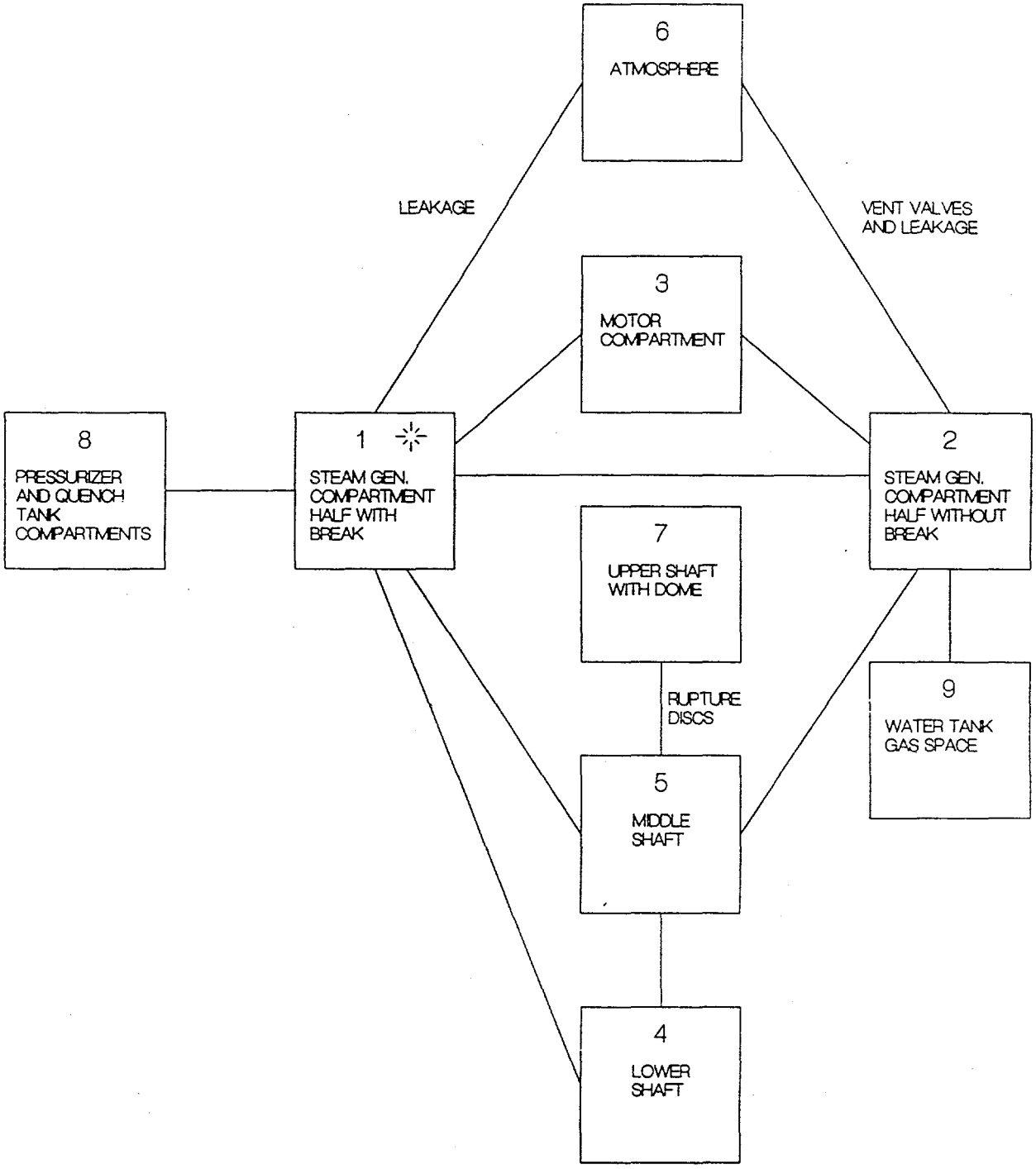

Figure 2. Default Nodalization for VVER-440 Model V230 Confinement

between the two cells exceeds 0.099 Megapascal. The half of the steam generator compartment containing the vent valves to the atmosphere is also assumed to be connected to the emergency water tank located beneath the floor of the steam generator compartment. The tank is not completely filled with water initially such that the tank contributes a volume equivalent to that of the gas free space above the water level.

The VVER-440 Model V230 confinement has a large leakage rate. Leakage to or from the atmosphere is modeled in terms of minimal flow areas connecting each half of the steam generator compartment with the atmosphere. In reality, there would be leakages involving other compartments as well. However, without a basis to apportion the total leakage among the various compartments, it is convenient to lump the total effective leakage area into that from the two steam generator compartment cells. The combined leakage area from the two cells is based upon a total leakage rate of 300 percent of the confinement total volume per day at an overpressure of 0.1 Megapascal.

It is assumed that there are nine vent valves. One of the valves has a relatively lesser diameter of 0.56 meter and opens at a differential overpressure of 0.066 Megapascal. The other eight valves have a diameter of 1.1 meter and open at a differential overpressure of 0.078 Megapascal.

Water droplet sprays are located inside both halves of the steam generator compartment. A spray mass flowrate of 180 kilograms per second is delivered into each half when the sprays are operating at the rated nominal capacity. The sprays are assumed to turn on when the mean pressure in the two halves of the steam generator compartment rises above 0.11 Megapascal absolute and turn off when the mean pressure falls below 0.086 Megapascal absolute. When the sprays turn on and off, the flowrate is not assumed to suddenly increase to and decrease from the nominal value. Instead, there are assumed to be buildup and decay timescales over which the flowrate linearly increases and decreases, respectively. These timescales are taken to be 140 seconds for the spray to increase from zero to the nominal value and 26 seconds to decrease from the nominal to zero.

The cell volumes and surface areas for condensation are shown in Table 1. The atmosphere is represented by a cell having a volume ten thousand times that of the steam generator compartment. The total confinement free volume is 12100 cubic meters. Table 2 shows the flow areas and frictional discharge coefficients assumed between interconnected cells as well as the connections at which vent valves and rupture discs are present.

Table 1. Volumes and Condensation Surface Areas Assumed in PACER for Default Generic VVER-440 Model V230

Region	Cell No.	Volume, m^3	Surface Area for Condensation, m^2
Steam generator compartment half with break	1	3430	2116
Steam generator compartment half without break	2	4290	2848
Motor compartment	3	2608	1700
Lower portion of reactor shaft	4	123	0
Middle portion of reactor shaft	5	132	0
Atmosphere	6	7.720×10^7	0
Upper portion of reactor shaft and dome interior	7	427	222
Pressurizer and quench tank compartments	8	860	732
Emergency water tank gas space	9	200	699
Total Accident Localization System	1-5, 7-9	12071	8316

Table 2. Interconnecting Flow Areas and Discharge Coefficients Assumed in PACER for Default VVER-440 Model V230

Cell No.	Cell No.	Flow Area, m^2	Discharge Coefficient	Other Features
1	2	38	0.7	
1	3	2.08	0.7	
2	3	2.08	0.7	
1	4	1.43	0.7	
1	5	3.85	0.7	
2	5	3.85	0.7	
4	5	0.20	0.7	
1	6	0.00145	0.7	
2	6	0.00145[(a)]	0.7	Vent valve location
5	7	0[(b)]	0.7	Rupture disc location
1	8	10	0.7	
2	9	0.28	0.57	

(a) Area equals 0.25 m^2 with the single smaller vent valve open and 7.85 m^2 with all vent valves open.

(b) Area equals 0.19 m^2 following breakage of rupture discs.

2.2 Input Instructions for PACER

The most important feature of PACER that needs to be remembered when preparing input and reading output is that the code works with variables in centimeter-gram-second (cgs) units. System International (SI) or meter-kilogram-second (mks) units are not employed. In cgs units, pressures are given in units of dynes per square centimeter (1 dyne = 1 g·cm/s^2) such that

$$10^6 \text{ dynes/cm}^2 = 10^6 \text{ g/(cm}^2\cdot\text{s}^2) = 10^5 \text{ Pascal} = 0.1 \text{ Megapascal} = 1 \text{ bar.}$$

Also,

$$10^6 \text{ dynes/cm}^2 = 1.0197 \text{ Kg}_{\text{force}}/\text{cm}^2.$$

PACER assumes that real variables are double precision. Thus, input for real variables should be in double precision format.

On UNIX systems, PACER reads from an input file, fort.5, and writes an output file, fort.6. Table 3 provides the instructions to create a fort.5 input file. Two examples of PACER input files are presented in the section on sample problems. Groups of lines are referred to as "cards" for historical reasons. Additional explanatory information is provided below.

Card/Group No. 1

A zero must be entered to enable the calculation of the setup and start of a problem. When any nonzero integer, n, is entered, PACER reads COMMON blocks off of the file, fort.n, to obtain values for all of the major variables. On restarts, the code also reads Cards/Groups Nos. 2 through 11. The user may optionally change the problem title, stop time, timestep, print timing, timing of writing information for future plotting, restart writing timing and files, as well as coolant release conditions. However, other information cannot be changed.

Card/Group No. 2

This is a title printed at the beginning of each of the output listings. It can be changed on a restart.

Table 3. Input Instructions for PACER

Card/ Group Number	Field	Format	Variable Name	Description
1	1-6	I6	KRST0	Restart flag 0 - This is not a restart run 1 - This is a restart. Read the restart file on fort.KRST0
2	1-80	A80	INTITL	80 column identifier heading
3	1-12 13-24	1PD12.5 1PD12.5	T3 T3STOP	Time at start of calculation (s) Calculation stop time (s)
4	1-12 13-24 25-36 37-48 49-60 61-72	1PD12.5 1PD12.5 1PD12.5 1PD12.5 1PD12.5 1PD12.5	DT3I(1) TDT3(1) DT3I(2) TDT3(2) DT3I(3) TDT3(3)	Timestep until TDT3(1) Time before which the timestep equals DT3I(1) (s) Timestep from TDT3(1) to TDT3(2) (s) Time before which the timestep equals DT3I(2) (s) Timestep from TDT3(2) to TDT3(3) (s) Time before which the timestep equals DT3I(3) (s)
5	1-12 13-24 25-36 37-48 49-60 61-72	1PD12.5 1PD12.5 1PD12.5 1PD12.5 1PD12.5 IPD12.5	TPRINC(1) TPRMAX(1) TPRINC(2) TPRMAX(2) TPRINC(3) TPRMAX(3)	Time interval between successive printouts until TPRMAX(1) (s) Time before which the interval between printouts equals TPRINC(1) (s) Time interval between successive printouts between TPRMAX(1) and TPRMAX(2) (s) Time before which the interval between printouts equals TPRINC(2) (s) Time interval between successive printouts between TPRMAX(2) and TPRMAX(3) (s) Time before which the interval between printouts equals TPRINC(3) (s)
6	1-12 13-24 25-36 37-48 49-60	1PD12.5 1PD12.5 1PD12.5 1PD12.5 1PD12.5	TPRT TPLT TPLINC TRST TRSI	Time at which the first printout occurs (s) Time at which the first plot information is written to File 11 (s) Time interval between successive writing of plot information to File 11 (s) Time at which a restart file is first written (s) Time interval between writing of successive restart files (s)
7	1-6 7-12	I6 I6	KRST1 KRST2	First restart file number upon which common blocks are written Second restart file number upon which common blocks are written

Table 3. (Contd.)

Card/ Group Number	Field	Format	Variable Name	Description
8	1-12	1PD12.5	PCONT	Initial pressure inside accident localization volume (dynes/cm^2)
	13-24	1PD12.5	TGCONT	Initial steam-gas temperature inside accident localization volume (K)
	25-36	1PD12.5	PSATCT	Initial partial pressure of steam inside accident localization volume atmosphere (dynes/cm^2). A relative humidity of unity is assumed.
	37-48	1PD12.5	PSATSP	Initial saturation pressure of water delivered by the sprays (dynes/cm^2)
	49-60	1PD12.5	TBDNI	Reactor coolant system blowdown/release timescale used in correlations for condensation upon structure (s)
9	1-6	I6	IUCMPT	Nodalization index flag 0 - Default nodalization defined internally 1 - User-specified nodalization
	7-12	I6	IUBREK	Coolant break/release conditions index flag 0 - Default release conditions defined internally 1 - User-specified break/release conditions
	13-18	I6	IUSPRA	Water drop spray index flag 0 - Default spray parameters defined internally 1 - User-specified spray parameters
	19-24	I6	IUVENT	Vent valve index flag 0 - Default vent valve parameters defined internally 1 - User-specified vent valve parameters
	25-30	I6	IURUPT	Rupture disc index flag 0 - Default rupture disc parameters defined internally 1 - User-specified rupture disc parameters
	31-36	I6	IUCONC	Structure heat sink index flag 0 - Default heat sink parameters defined internally 1 - User-specified heat sink parameters
Include Card/Group 10 only if IUBREK ≠0.				
10	1-6	I6	ISDBRK	Break index 1 - One-way flow break with one set of break conditions 2 - Double-ended break with two sets of break conditions
Include Cards/Groups 11a and 11b only if IUBREK ≠0.				

Table 3. (Contd.)

Card/ Group Number	Field	Format	Variable Name	Description
11a	1-12	1PD12.5	TT(II)	Time (s)
	13-24	1PD12.5	GIT(II)	Break flowrate from inner side of break (g/s)
	25-36	1PD12.5	PIT(II)	Pressure immediately upstream of inner side of break (dynes/cm^2)
	37-48	1PD12.5	HIT(II)	Specific enthalpy immediately upstream of inner side of break (erg/g)
	49-60	1PD12.5	XIT(II)	Quality immediately upstream of inner side of break
	61-72	1PD12.5	GOT(II)	Break flowrate from outer side of break (g/s)
11b	1-12	1PD12.5	POT(II)	Pressure immediately upstream of outer side of break (dynes/cm^2)
	13-24	1PD12.5	HOT(II)	Specific enthalpy immediately upstream of outer side of break (erg/g)
	25-36	1PD12.5	XOT(II)	Quality immediately upstream of outer side of break
Repeat Cards/Groups 11a and 11b for a maximum of 99 successive times. A special final entry of Cards/Groups 11a and 11b is required to terminate the sequence. This final entry must begin with a time less than the preceding one and is ignored in constructing the table of break conditions.				
Use Card/Group 12 only if IUCMPT ≠0.				
12	1-6	I6	NT	Total number of compartments/cells including a cell representing the surrounding atmosphere

Table 3. (Contd.)

Card/ Group Number	Field	Format	Variable Name	Description
Use Cards/Groups 13a, 13b, and 13c only if IUCMPT ≠0. There must be exactly NT Cards/Groups 13a and 13b.				
13a	1-6	I6	I	Compartment/cell index
	7-18	1PD12.5	VOL(I)	Volume of compartment I (cm^3)
	19-30	1PD12.5	ACOND(I)	Surface area for condensation in compartment I (cm^2)
	31-42	1PD12.5	ZCOND(I)	Distance in condensation heat transfer coefficient for compartment I (cm)
	43-48	I6	IBREAK(I)	Break location index for compartment I 0 - Break is not located in I 1 - Break is located in I. The number of breaks is limited to one. Only a single compartment can contain the break.
	49-54	I6	ISUPP(I)	Suppression pool index 0 - The compartment is not a suppression pool 1 - The compartment is a suppression pool. If I contains a suppression pool, then the flow must enters I only from compartment I-1.

Table 3. (Contd.)

Card/ Group Number	Field	Format	Variable Name	Description
13b	1-12	1PD12.5	P3(I)	Initial pressure in compartment I (dynes/cm^2)
	13-24	1PD12.5	PV3(I)	Initial steam partial pressure in compartment I (dynes/cm^2). A relative humidity of unity is assumed.
	25-36	1PD12.5	TG3(I)	Initial steam-gas temperature in compartment I (K)
Use Cards/Groups 13c only if ISUPP (I) = 1.				
13c	1-12	1PD12.5	PL3(I)	Initial saturation pressure of water in suppression pool in cell I
	13-24	1PD12.5	FML3(I)	Initial water mass in suppression pool
	25-36	1PD12.5	FLVC(I)	Initial depth of water to be cleared to initiate gas flow through suppression pool
	37-48	1PD12.5	ASPOOL(I)	Flow area through suppression pool following vent clearing of water
Use Cards/Groups 14 only if IUCMPT ≠0.				
14	1-6	I6	I	Lower index of a pair of interconnected compartments
	7-12	I6	J	Higher index of a pair of interconnected compartments
	13-24	1PD12.5	A(I,J)	Flow area connecting compartments I and J (cm^2)
	25-36	1PD12.5	CD(I,J)	Flow resistance coefficient between compartments I and J
	37-42	I6	ICHECK(I,J)	Check valve index 0 - No check valve 1 - A check valve prevents flow from J to I
	43-48	I6	ILAST	Last entry index flag 0 - This is not the last Card/Group 13 1 - This is the final Card/Group 13

Table 3. (Contd.)

Card/ Group Number	Field	Format	Variable Name	Description
Use Cards/Groups 15 only if IUSPRA ≠0.				
15	1-6	I6	I	Index of compartment containing water sprays. Sprays can be defined to exist inside any compartment.
	7-18	1PD12.5	GSPRAY(I)	Total nominal fully developed mass flowrate of the sprays in compartment I (g/s)
	19-30	1PD12.5	PSPON(I)	Absolute pressure at which the sprays are switched on in compartment I (dynes/cm^2)
	31-42	1PD12.5	PSPOF(I)	Absolute pressure at which the sprays are switched off in compartment I (dynes/cm^2)
	43-54	1PD12.5	DTSPON(I)	Rise time for sprays to increase linearly from zero to full flow in compartment I (s)
	55-66	1PD12.5	DTSPOF(I)	Decay time for sprays to decrease linearly from full flow to zero in compartment I (s)
	67-72	I6	ILAST	Last entry index flag 0 - This is not the last Card/Group 15 1 - This is the final Card/Group 15

Table 3. (Contd.)

Card/ Group Number	Field	Format	Variable Name	Description
Use Card/Group 16 only if IUVENT ≠0.				
16	1-6	I6	IVENTC	Index of compartment upstream of vent valve. Vent valves to the atmosphere can be defined only inside one accident localization compartment
	7-12	I6	IVENTA	Index of compartment representing the surrounding atmosphere downstream of vent valves
	13-24	1PD12.5	DVENTS	Diameter of the smaller-sized vent valves (cm)
	25-36	1PD12.5	DVENTL	Diameter of the larger-sized vent valves (cm)
	37-42	I6	NVENTS	Number of smaller-sized vent valves
	43-48	I6	NVENTL	Number of larger-sized vent valves
	49-60	1PD12.5	DPVNTS	Differential opening pressure of smaller-sized vent valves (dynes/cm^2)
	61-72	1PD12.5	DPVNTL	Differential opening pressure of larger-sized vent valves (dynes/cm^2)
Use Card/Group 17 only if IURUPT ≠0.				
17	1-6	I6	IRUPT1	Index of compartment upstream of rupture discs. Rupture discs can be defined only between a single pair of compartments.
	7-12	I6	IRUPT2	Index of compartment downstream of rupture discs
	13-24	1PD12.5	ARUPT	Flow area following breakage of the rupture discs (cm^2)
	25-36	1PD12.5	DPRUPT	Differential pressure causing breakage of the rupture discs (cm^2)
Use Card/Group 18 only if IUCONC ≠0.				
18	1-12	1PD12.5	TWALL	Initial wall temperature (K)
	13-24	1PD12.5	DLINER	Thickness of steel liner plate on wall (cm)
	25-36	1PD12.5	FKLINR	Thermal conductivity of steel liner plate on wall (erg/(cm·s·K))
	37-48	1PD12.5	ALINER	Thermal diffusivity of steel liner plate on wall (cm^2/s)
	49-60	1PD12.5	FKCONC	Thermal conductivity of wall concrete (erg/(cm·s·K))
	61-72	1PD12.5	ACONC	Thermal diffusivity of wall concrete (cm^2/s)

Card/Group No. 3

The variable, T3, is the time at the end of the current timestep. It is usually most convenient to set the start time equal to zero. On a restart, T3 is not read such that the value entered has no significance. T3STOP may be changed on a restart.

Card/Group No. 4

PACER permits up to three different timestep sizes to be specified over three successive intervals. The timestep remains constant within each interval, however, and changes abruptly at the beginning of the next interval. To use a single timestep size for the entire problem, set DT3I(1) equal to the desired timestep and TDT3(1) equal to a time larger than the problem stop time (e.g., set TDT3(1) = 10^{10}). The entries on this card/group can be changed on a restart.

Card/Group No. 5

Similarly, PACER allows three different time increment steps between successive printouts over three time intervals. To have equally space printouts throughout the entire problem set TPRMAX(1) equal to a value greater than the problem stop time. The values on this card/group may be changed on a restart.

Cards/Groups Nos. 6 and 7

The time at which the first printout is executed is controllable through TPRT. Set TPRT equal to the start time to obtain a printout of initial values. PACER writes selected information to the file, fort.11, intended to be read from by a separate plotting program. Only a single time increment between successive writeouts is provided for. Restart files are written every TRSI time increment beginning at TRST onto two alternate files, fort.KRST1 and fort.KRST2. For example, set KRST1=21 and KRST2=22 to write restart information on fort.21 and fort.22. The restart information consists of two arrays equivalenced to the two COMMON blocks containing all significant variables. TPRT, TPLT, and TRST should be set equal to the current time or later on a restart.

Card/Group No. 8

For water/steam properties, PACER incorporates routines for which pressure and specific enthalpy are the fundamental independent variables while temperature is a dependent variable. To absolutely ensure that an inversion problem doesn't arise during problem setup, initial water/steam states are specified in terms of the saturation pressure corresponding to a desired temperature. Thus, the spray system water temperature is specified by entering the corresponding saturation vapor pressure, PSATSP. This is somewhat cumbersome in that it usually requires the user to refer to steam tables to determine the pressure for a desired temperature. Output at the start time should be checked to see if the desired water temperature is achieved. The condensation correlations contain the coolant blowdown timescale as a parameter. This timescale must be defined through the input variable, TBDNI.

Card/Group No. 9

This is the input line where the user selects which VVER-440 Model V230 default features are overridden with user-specified input. These features should not be changed on a restart.

Card/Group No. 10

System thermal hydraulic codes calculate conditions in the vicinity of both sides of a double-ended pipe rupture. Thus, PACER accepts break flow conditions from either single- or double-ended breaks. This value may be changed on a restart.

Cards/Groups Nos. 11a and 11b

PACER reads in a table of input break conditions at up to 99 times and performs a table lookup to determine the conditions during each timestep. The input conditions must therefore be at successively increasing times. The earliest entry must be less than or equal to the problem start time and the latest entry greater than or equal to the problem stop time. To terminate the reading of input break conditions, enter a line for which the time is less than that of the preceding entry. This final line is ignored in constructing the table arrays. The break conditions may be changed on a restart.

The input qualities, XIT(II) and XOT(II), should be set equal to zero.

Cards/Groups Nos. 12, 13a and 13b

The atmosphere should be represented by a cell having a very large volume such that the pressure in this cell does not vary significantly during the calculation.

Card/Group No. 13c

This input line is included only when ISUPP(I) is set equal to unity on the Card/Group No. 13a for Cell I. It is assumed that water having a depth of FLVC(I) must be cleared from a downward directed channel before gas can flow through the suppression pool. The flow area between Cells I-1 and I is therefore initially set equal to zero internally. Following vent clearing, the flow area between Cells I-1 and I is thereafter set equal to ASPOOL(I).

Card/Group No. 14

PACER works with an integer array, IEX(I,J), that is set equal to unity to denote which cells may be interconnected for at least some portion of the overall problem. Thus, IEX(I,J) should be set equal to unity even if the flow area between I and J is initially zero but could become nonzero due to the opening of valves, etc. This is accomplished by entering an input line with the pairs I and J where $I < J$. The interconnection may be through a check valve that prevents flow from J to I. Note that this implies some care in numbering cells so that a check valve can be specified through the input. To stop the input entry process, an integer flag, ILAST, is read in. Set ILAST equal to 1 for the final interconnection.

Card/Group No. 15

When defined in a compartment, the sprays are dependent upon the pressure inside that individual compartment. This differs from the default in which the sprays exist in Cells Nos. 1 and 2, and are dependent upon the mean pressure of Cells 1 and 2. Set ILAST = 1 in the final line entry.

Card/Group No. 16

Only a single cell can contain vent valves. The variable, IVENTA, must equal the cell number representing the atmosphere. Opening or closing of vent valves is assumed to change the flow area in a stepwise fashion.

Card/Group No. 17

Flow area is assumed to increase in a stepwise fashion when the rupture discs break. Following breakage, the flow area does not vary thereafter.

3.0 PACER OUTPUT

Examples of PACER output listings are presented in the section on sample problems. The code first prints the title identifier at the beginning of each listing. This is followed by the time, timestep cycle number, timestep size, as well as a number of global quantities such as the cumulative masses of steam and water formed by coolant release from the break.

There follows a listing of nine columns providing for each cell the cell number, cell pressure, partial pressure of steam in the cell, noncondensable gas (i.e., air) partial pressure inside the cell, the temperature of the steam-gas mixture, the saturation temperature at the steam partial pressure, the condensation rate upon structure, condensation rate upon water injected by the sprays, and the mass fraction of steam in the mixture.

Printed next are eight columns that provide for each interconnection between cells the lower number of the two cells, higher number of the two cells, the time dependent flow area, flow resistance discharge coefficient, velocity of the steam-gas-water droplet mixture, steam-gas mixture mass flux, steam-gas mixture mass flowrate, and the liquid water droplet mass flowrate. All of the flow quantities are positive if directed from the cell number in the first column to the cell number in the second column.

The remainder of the printout for the timestep contains the same information as well as many additional variables but in a terse and compact format. There is a block that provides five lines of information across eleven columns for each cell followed by two lines across eleven columns for each interconnection. Column headings are given in terms of variable names only rather than descriptive words. Finally, there is a block with lines of tightly packed values for assorted global-type and other miscellaneous variables.

A dictionary of variables printed in the output is provided in Table 4. These are also a portion of the principal variables used in the code.

Table 4. Dictionary of Variables Output by PACER

Symbol	Description	Units
INTITL	Run identifier	
T3	Time at the end of the current timestep	s
T1	Time at the beginning of the current timestep	s
DT3	Timestep size	s
NCYC	Cycle number of current timestep	
T3SPON	Most recent time sprays were turned on	s
T3SPOF	Most recent time sprays were turned off	s
J	Cell index	
ISUPP(J)	Flag set equal to unity when cell J contains a suppression pool and zero otherwise	
ISAT3(J)	Flag set equal to unity when the suppression pool water is saturated and zero otherwise	
SPOOL(J)	Fraction of steam entering suppression pool that is condensed in the pool	
APOOL(J)	Forward elimination coefficient in equation, $\delta SPOOL(J) = APOOL(J) + BPOOL(J)^* \delta P3(J)$, where δ denotes the change over the current timestep	
PL3(J)	Saturation vapor pressure of water in suppression pool	dynes/cm^2
XMV3(J)	Mass fraction of steam in steam-gas mixture	
XMA3(J)	Mass fraction of noncondensable gas is steam-gas mixture	
DP3(J)	Incremental change in cell pressure over current timestep	dynes/cm^2

Table 4. (Contd.)

Symbol	Description	Units
TG3(J)	Temperature of steam-gas mixture in Cell J	K
P3(J)	Pressure in Cell J	dynes/cm^2
FML3(J)	Mass of water in suppression pool in Cell J	g
FMV3(J)	Mass of steam in steam-gas-water droplet mixture in Cell J	g
FMA3(J)	Mass of noncondensable gas in steam-gas-water droplet mixture in Cell J	g
CVVC(J)	Specific heat at constant volume of steam in Cell J	erg/(g·K)
CPVC(J)	Specific heat at constant pressure of steam in Cell J	erg/(g·K)
BPOOL(J)	Forward elimination coefficient in the equation, $\delta SPOOL(J) = APOOL(J) + BPOOL(J)^* \delta P3(J)$, where δ denotes the incremental change over the current timestep	
ROV3(J)	Density of steam in Cell J	g/cm^3
ROA3(J)	Density of noncondensable gas in Cell J	g/cm^3
ROG3(J)	Density of steam and gas in Cell J	g/cm^3
TL3(J)	Temperature of water in suppression pool in Cell J	K
TSAT3(J)	Saturation temperature at partial pressure exerted by steam in Cell J	K
HCOND(J)	Condensation heat transfer coefficient between bulk steam-gas mixture temperature and initial structure temperature	erg/(cm^2·s·K)

Table 4. (Contd.)

Symbol	Description	Units
HBDN(J)	Forced convection condensation heat transfer coefficient between steam-gas temperature and structure surface temperature	erg/(cm^2·s·K)
HNAT(J)	Natural convection condensation heat transfer coefficient between steam-gas temperature and structure surface temperature	erg/(cm^2·s·K)
HCONV(J)	Convective condensation heat transfer coefficient between steam-gas temperature and structure surface temperature. HCONV(J) is the maximum of HBDN(J) and HNAT(J)	erg/(cm^2·s·K)
HWALL(J)	Thermal conductance/inverse thermal resistance of structure wall between surface temperature and initial temperature	erg/(cm^2·s·K)
SCOND(J)	Steam condensation rate upon structure in Cell J evaluated at the beginning of timestep cell pressure	g/s
DSCOND(J)	Derivative of steam condensation rate upon structure in Cell J with respect to pressure in Cell J	g·cm^2/(dyne·s)
GABREK(J)	Rate of steam mass formation from break in Cell J	g/s
ZCOND(J)	Distance-from-break parameter in forced convection condensation heat transfer coefficient	cm
FLCOND(J)	Length scale in forced convection condensation heat transfer coefficient	cm
DCOND(J)	Cell diameter length scale in natural convection condensation heat transfer coefficient	cm
VOL(J)	Volume of Cell J	cm^3
ACOND(J)	Surface area for condensation upon structure in Cell J	cm^2
TV3(J)	Not used	
PV3(J)	Partial pressure of steam in Cell J	dynes/cm^2

Table 4. (Contd.)

Symbol	Description	Units
PA3(J)	Partial pressure of noncondensable gas in Cell J	dynes/cm^2
FMD3(J)	Mass of water droplets in steam-gas-water droplet mixture in Cell J	g
GADBRK(J)	Rate of water mass formation from break in Cell J	g/s
CPDC(J)	Specific heat at constant pressure of water droplets in steam-gas-water droplet mixture in Cell J	erg/(g·K)
CVDC(J)	Specific heat at constant volume of water droplets in steam-gas-water droplet mixture in Cell J	erg/(g·K)
SPRAY3(J)	Condensation rate of steam upon sprays in Cell J evaluated at beginning of timestep pressure in Cell J	g/s
DSPRAY(J)	Derivative of condensation rate of steam upon sprays in Cell J with respect to the pressure in Cell J	g·cm^2/(dyne·s)
GSPRAY(J)	Fully developed nominal mass flowrate delivered by sprays in Cell J	g/s
ISPRAY(J)	Flag set to unity when the sprays in Cell J are on and zero otherwise	
HSPRAY(J)	Specific enthalpy of water delivered by the sprays in Cell J	erg/g
UVC3(J)	Velocity of water slug blocking steam-gas entry into suppression pool	cm/s
ZVC3(J)	Displacement of water slug blocking steam-gas entry into suppression pool	cm
SVAP(J)	Net vaporization minus condensation rate of steam formation/destruction from water droplets in steam-gas-water droplet mixture in Cell J	g/s
DPVAP(J)	Incremental change in pressure in Cell J due to net vaporization minus condensation from water droplets in steam-gas-water droplet mixture	dynes/cm^2
PSTG3(J)	Saturation vapor pressure at temperature of steam-gas-water droplet mixture	dynes/cm^2
TSTG3(J)	Saturation temperature of steam-gas-water droplet mixture corresponding to PSTG3(J)	K

Table 4. (Contd.)

Symbol	Description	Units
IPSTG3(J)	Number of iterations performed in converging TSTG3(J) to TG3(J)	
IPVT(J)	Integer array used in linear solver applied to pressure equation. A value of zero indicates an error. Nonzero values indicate the sequence of pivoting during the solution procedure	
FLVC(J)	Initial depth of water column that must be cleared to initiate steam-gas flow into suppression pool in Cell J	cm
ASPOOL(J)	Flow area through suppression pool in Cell J following vent clearing of initial water column	cm^2
I	Lower index of pair of interconnected cells	
J	Higher index of pair of interconnected cells	
A(I,J)	Flow area between Cells I and J	cm^2
U3(I,J)	Velocity of steam-gas-water droplet mixture from Cell I to Cell J. Positive when directed from I to J	cm/s
G3(I,J)	Mass flux of steam-gas mixture from Cell I to J. Positive when directed from I to J	$g/(cm^2 \cdot s)$
GA3(I,J)	Mass flowrate of steam-gas mixture from Cell I to J. Positive when directed from I to J	g/s
DGAL(I,J)	Derivative of GA3(I,J) with respect to the pressure in Cell I	$g \cdot cm^2/(dyne \cdot s)$
DGAU(I,J)	Derivative of GA3(I,J) with respect to the pressure in Cell J	$g \cdot cm^2/(dyne \cdot s)$
PR(I,J)	Pressure ratio for flow between Cells I and J. $PR(I,J) = \begin{cases} P3(J)/P3(I), & \text{if } P3(J) \le P3(I) \\ P3(I)/P3(J), & \text{if } P3(J) > P3(I) \end{cases}$	
CR(I,J)	Critical pressure ratio for flow between Cells I and J	

Table 4. (Contd.)

Symbol	Description	Units
ICHECK(J,I)	Flag used to define check valve location. Equal to unity if flow from Cell J to Cell I is prevented	
CD(I,J)	Flow resistance discharge coefficient for flow between Cells I and J	
FL(I,J)	Inertial length for flow between Cells I and J	cm
Y(I,J)	Ratio of water droplet and steam-gas mass flowrates between Cells I and J	
GAD3(I,J)	Mass flowrate of water droplets from Cell I to Cell J. Positive when directed from I to J	g/s
XPT3	Not used	
PRP3	Pressure inside cell containing the break passed to routine that calculates expansion work	dynes/cm^2
XRP3	Not used	
NWORK	Number of steps with which expansion work is calculated assuming an isentropic expansion from the pressure immediately upstream of the break down to the cell pressure. The difference of the natural logarithms of the break and cell pressures is divided into NWORK increments and the logarithm of the pressure is reduced by an increment during each successive step. NWORK is internally set equal to 50 in the code.	
PPT3	Not used	
TPT3	Not used	
PRRPPT	Not used	
CRRPPT	Not used	
ROLPT3	Not used	
ROVPT3	Not used	
VFLPT3	Not used	

Table 4. (Contd.)

Symbols	Description	Units
VFVPT3	Not used	
HLPT3	Not used	
HVPT3	Not used	
VLPT3	Not used	
VVPT3	Not used	
DWRKC	Work performed during current timestep	erg
WKRKP3	Not used	
GPTRP	Not used	
UPTRP	Not used	
GAPTRP	Default break mass flowrate for very long times	g/s
DGPTRP	Not used	
DGPTPT	Not used	
HVLPT3	Not used	
VVLPT3	Not used	
FMLPT3	Not used	
FMVPT3	Not used	
FMCPT3	Not used	
ROCPT3	Not used	

Table 4. (Contd.)

Symbol	Description	Units
VOCPT3	Not used	
PET3	Not used	
TET3	Not used	
ROLCET	Not used	
RSVCET	Not used	
VFLCET	Not used	
VFVCET	Not used	
UCET	Not used	
UVET	Not used	
GFET	Not used	
GCET	Not used	
GVET	Not used	
GET	Not used	
DCRE	Not used	
DFMCPT	Not used	
VFLPT3	Not used	
VFVPT3	Not used	
ABREAK	Total break flow area	cm^2

Table 4. (Contd.)

Symbols	Description	Units
SMA3	Total noncondensable gas mass summed over all cells	g
SMV3	Total steam mass summed over all cells	g
SML3	Total suppression pool water mass summed over all cells	g
XMASS	XMASS = XMASSN/XMASSD	
SMV30	SMV30 = SMV3 - SMV0	g
SML30	SML30 = SML3 - SML0	g
SMA30	SMA30 = SMA3 - SMA0	g
XMASSN	XMASSN = SMD30 + SMV30 + SML30 + SMCOND - SMVBRK	g
XMASSD	XMASSD = SMD30 + SMV30 + SML30	g
SMVBRK	Cumulative mass of steam formation by coolant release from break	g
SMV0	Total steam mass at start of problem summed over all cells	g
SMA0	Total noncondensable gas mass at start of problem summed over all cells	g
SML0	Total suppression pool water mass at start of problem summed over all cells	g
SVOL	Total volume summed over all cells	cm^3
TWALL	Initial structure wall temperature	K
DLINER	Thickness of steel liner plate on concrete walls, floors, and ceilings	cm
FKLINR	Thermal conductivity of steel liner	erg/(cm·s·K)

Table 4. (Contd.)

Symbols	Description	Units
ALINER	Thermal diffusivity of steel liner	cm^2/s
TLINER	Liner thermal time constant, $TLINER = \frac{(DLINER)^2}{\pi^* ALINER}$	s
FKCONC	Thermal conductivity of concrete walls, floors, and ceilings	erg/(cm·s·K)
ACONC	Thermal diffusivity of concrete	cm^2/s
TBDN	Coolant blowdown/release timescale	g
SMCOND	Cumulative steam mass condensed upon structure inside containment/confinement	g
DSMCON	Total steam mass condensed upon structure inside containment/confinement during current timestep	g
GABNLI	Mass flowrate of coolant immediately upstream of inner portion of break	g/s
PBNLI	Pressure immediately upstream of inner portion of break	$dynes/cm^2$
HBNLI	Specific enthalpy of coolant immediately upstream of inner portion of break	erg/g
XBNLI	Quality immediately upstream of inner portion of break	
GABNLO	Mass flowrate of coolant immediately upstream of outer portion of break	g/s
PBNLO	Pressure immediately upstream of outer portion of break	$dynes/cm^2$
HBNLO	Specific enthalpy immediately upstream of outer portion of break	erg/g

Table 4. (Contd.)

Symbol	Description	Units
XBNLO	Quality immediately upstream of outer portion of break	
PBNLSI	Saturation vapor pressure at which coolant in equilibrium and having the quality immediately upstream of the break has a specific enthalpy equal to that immediately upstream of the break	dynes/cm^2
HBNLSI	HBNLSI = HBNLI	erg/g
XBNLSI	XBNLSI = XBNLI	
TBNLI	Nonequlibrium temperature for coolant at PBNLSI and HBNLSI	K
TBNLSI	Equilibrium saturation temperature for coolant at PBNLSI	K
XRPI3	Coolant quality after isentropic expansion from PBNLSI to cell pressure	
WRKRPI	Specific work performed in isentropic expansion from PBNLSI to cell pressure	erg/g
PBNLSO	Saturation vapor pressure at which coolant in equilibrium and having the quality immediately upstream of the break has a specific enthalpy equal to that immediately upstream of the break	dynes/cm^2
HBNLSO	HBNLSO = HBNLO	erg/g
XBNLSO	XBNLSO = XBNLO	
TBNLO	Nonequlibrium temperature for coolant at PBNLSO and HBNLSO	K
TBNLSO	Equilibrium saturation temperature for coolant at PBNLSO	K
XRPO3	Coolant quality after isentropic expansion from PBNLSO to cell pressure	
WRKPRO	Specific work performed in isentropic expansion from PBNLSO to cell pressure	erg/g
GABRKI	Rate of steam mass formation from inner portion of break	g/s

Table 4. (Contd.)

Symbol	Description	Units
GABRKO	Rate of steam mass formation from outer portion of break	g/s
IPBNLI	Number of iterations performed in determination of PBNLSI	
IPBNLO	Number of iterations performed in determination of PBNLSO	
QDECAY	Total decay heat	erg/s
SMDBRK	Cumulative mass of water droplet formation by coolant release from break	g
VTOT	Total containment/confinement volume excluding the surrounding atmosphere	cm^3
ACONDT	Total surface area for condensation upon structure inside containment/confinement excluding the surrounding atmosphere	cm^2
INFO	Integer that is set equal to zero if the pressure equation solution proceeds normally	
DSMVAP	Total net mass of steam vaporized-condensed during current timestep inside the containment/confinement due to vaporization-condensation from water droplets	g
SMVAP	Cumulative net mass of steam vaporized-condensed inside the containment/confinement due to vaporization-condensation from the water droplets	g
SMD3	Total water droplet mass at the end of the current timestep summed over all cells	g
SMD0	Total water droplet mass at the start of the problem summed over all cells	g
SMD30	SMD30 = SMD3 - SMD0	g

4.0 OUTPUT FOR PLOTTING

At the beginning of each timestep, PACER checks if it is time to write selected variables to the file, fort.11. These variables are written every TPLINC seconds beginning at the time, TPLT. The variables are written in binary format in the order, T3, P3, TG3, XRPI3, XPRO3, GABNLI, GABNLO, PBNLI, PBNLO, HBNLI, HBNLO, XBNLI, XBNLO. T3 is the current problem time. The compartment pressure, P3, and temperature, TG3, are arrays containing the number of elements dimensioned in the COMMON block, SUPCOM. The default dimension is nine.

The particular variables written out can, of course, be changed by appropriately modifying the source code.

5.0 SAMPLE PROBLEMS

Two sample problems are provided here to assist the user. The sample problems were calculated both on a HP-735 workstation as well as on a SUN SPARC workstation. Slight differences in the outputs were obtained due to intrinsic differences between the two types of computers. The results calculated on the HP-735 are presented in this chapter while the outputs obtained on the SUN SPARC are included in Appendix B.

5.1 50 centimeter Double-Ended Pipe Rupture

The first problem is the calculation of the confinement loadings following the double-ended rupture of a 50 centimeter diameter primary coolant system pipe. The default coolant release conditions which were calculated with RETRAN-03 for the assumed sequence are used. The VVER-440 Model V230 model is also that corresponding to the default features as described in Section 2.1 In particular, Figures 1 and 2 as well as Tables 1 and 2 apply. However, the nodalization as well as the behavior of the vent valves, sprays, and rupture discs are defined through user-supplied input, in order to illustrate the organization of an input file.

The input file is shown in Table 5. A problem stop time of 60 seconds is specified. A timestep of 0.01 second is used throughout the calculation; this is achieved by setting DT3I(1) equal to 0.01 and TDT3(1) equal to 10^{10} seconds, respectively. The interval spacing between printouts is varied, however. Printouts are requested every second until ten seconds, every 10 seconds up to 300 seconds, and every 300 seconds thereafter. Variables to be separately plotted are written to fort.11 every 0.02 second (i.e., every two timesteps) and a restart file is written alternately onto fort.21 or fort.22 every 10 seconds. The timescale for the primary coolant system blowdown/release is set equal to 60 seconds.

Table 6 shows selected output at times of 0, 10, and 60 seconds. This listing was generated by manually deleting the rest of the output written during the run. It is to be noted that during the problem setup and before the first call to the print routines, the code writes the input line-for-line onto the output file, fort.6, according to the formats by which the lines are read.

Figure 3 shows the time dependent total break flowrate from both sides of the rupture. The flowrate is observed to decrease to a low value at 60 seconds consistent with the value assumed for

Table 5. Input File for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe

```
     0
RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.
     0.0D 00     60.0D 00
     1.0D-02      1.0D 10      1.0D-02      1.0D 10      1.0D-02      1.0D 10
     1.0D 00      1.0D 01      1.0D 01    300.0D 00    300.0D 00      1.0D 10
     0.0D 00      0.0D 00      2.0D-02      0.0D 00     10.0D 00
    21    22
 1.01325D 06  323.15D 00 .012347D 07 .004246D 07     60.0D 00
     1     0     1     1     1     0
     9
     1 3.43017D 09 2.11573D 07 9.35569D 02     1     0
 1.01325D 06 1.23470D 05 3.23150D 02
     2 4.29017D 09 2.84785D 07 4.24115D 03     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     3 2.60848D 09 1.70016D 07 2.03000D 03     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     4 1.22807D 08     0.0D 00 2.03000D 03     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     5 1.31856D 08     0.0D 00 2.03000D 03     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     6 7.72035D 13     0.0D 00 2.03000D 03     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     7 4.27034D 08 2.21891D 06 4.67152D 02     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     8 8.60000D 08 7.32121D 06 1.16632D 03     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     9 2.00000D 08 6.98617D 06 3.62783D 02     0     0
 1.01325D 06 1.23470D 05 3.23150D 02
     1     2 3.79625D 05 7.00000D-01     0     0
     1     3 2.07505D 04 7.00000D-01     0     0
     2     3 2.07505D 04 7.00000D-01     0     0
     1     4 1.42500D 04 7.00000D-01     0     0
     1     5 3.84656D 04 7.00000D-01     0     0
     2     5 3.84656D 04 7.00000D-01     0     0
     4     5 2.00000D 03 7.00000D-01     0     0
     1     6 1.45482D 01 7.00000D-01     0     0
     2     6 1.45482D 01 7.00000D-01     0     0
     5     7     0.0D 00 7.00000D-01     0     0
     1     8 1.00000D 05 7.00000D-01     0     0
     2     9 2.83000D 03 5.70000D-01     0     1
 2.90965D 01
     1 1.80000D 05    0.11D 07    .086D 07   140.0D 00    26.0D 00     0
     2 1.80000D 05    0.11D 07    .086D 07   140.0D 00    26.0D 00     1
     2     6 5.60000D 01 1.10000D 02     1     8   0.066D 07  0.078D 07
     5     7 1.88496D 03   0.099D 07
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735

```
    0
RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.
  .00000D+00 6.00000D+01
 1.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10
 1.00000D+00 1.00000D+01 1.00000D+01 3.00000D+02 3.00000D+02 1.00000D+10
  .00000D+00  .00000D+00 2.00000D-02  .00000D+00 1.00000D+01
   21   22
 1.01325D+06 3.23150D+02 1.23470D+05 4.24600D+04 6.00000D+01
    1    0    1    1    1    0
    9
    1 3.43017D+09 2.11573D+07 9.35569D+02    1    0
 1.01325D+06 1.23470D+05 3.23150D+02
    2 4.29017D+09 2.84785D+07 4.24115D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    3 2.60848D+09 1.70016D+07 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    4 1.22807D+08  .00000D+00 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    5 1.31856D+08  .00000D+00 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    6 7.72035D+13  .00000D+00 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    7 4.27034D+08 2.21891D+06 4.67152D+02    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    8 8.60000D+08 7.32121D+06 1.16632D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    9 2.00000D+08 6.98617D+06 3.62783D+02    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    1    2 3.79625D+05 7.00000D-01    0    0
    1    3 2.07505D+04 7.00000D-01    0    0
    2    3 2.07505D+04 7.00000D-01    0    0
    1    4 1.42500D+04 7.00000D-01    0    0
    1    5 3.84656D+04 7.00000D-01    0    0
    2    5 3.84656D+04 7.00000D-01    0    0
    4    5 2.00000D+03 7.00000D-01    0    0
    1    6 1.45482D+01 7.00000D-01    0    0
    2    6 1.45482D+01 7.00000D-01    0    0
    5    7  .00000D+00 7.00000D-01    0    0
    1    8 1.00000D+05 7.00000D-01    0    0
    2    9 2.93000D+03 5.70000D-01    0    1
 2.90965D+01
    1 1.80000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01    0
    2 1.80000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01    1
    2    6 5.60000D+01 1.10000D+02    1    8 6.60000D+05 7.80000D+05
    5    7 1.83496D+03 9.90000D+05
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.

TIME =	.00000D+00	seconds
CYCLE =	0	
TIMESTEP =	1.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	.00000D+00	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	.00000D+00	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	.00000D+00	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	.00000D+00	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	.00000D+00	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	.00000D+00	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	.00000D+00	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	.00000D+00	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
2	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
3	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
4	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
5	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
6	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	00000D+00	7.94562D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
    8       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02  .00000D+00  .00000D+00  .00000D+00 7.94562D-02

    9       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02  .00000D+00  .00000D+00  .00000D+00 7.94562D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	3	2.07505E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	3	2.07505E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	4	1.42500E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	5	3.84656E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	5	3.84656E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
4	5	2.00000E+03	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	6	1.45482E+01	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	6	1.45482E+01	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
5	7	.00000E+00	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	8	1.00000E+05	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	9	2.83000E+03	5.70000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00

```
T3=  .00000E+00 T1=  .00000E+00 DT3= 1.00000E-02 NCYC=     0 T3SPON=-2.00000E+10 T3SPOF=-1.00000E+10

     J          ISUPP       ISAT3       SPOOL       APOOL       PL3         XMV3        XMA3        DP3         TG3         P3
    FML3        FMV3        FMA3        CVVC        CPVC        BPOOL       ROV3        ROA3        ROG3        TL3         TSAT3
    HCOND       HBDN        HNAT        HCONV       HWALL       SCOND       DSCOND      GABREK      ZCOND       FLCOND      DCOND
     VOL        ACOND       TV3         PV3         PA3         FMD3        GADBRK      CPDC        CVDC        SPRAY3      DSPRAY
   GSPRAY       ISPRAY      HSPRAY      UVC3        ZVC3        SVAP        DPVAP       PSTG3       TSTG3       IPSTG3      IPVT

     1          0           0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 2.83980E+05 3.29007E+06 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 9.35569E+02 9.35569E+02 1.87114E+03
3.43017E+09 2.11573E+07  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
1.80000E+05      0      1.25726E+09  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     2          0           0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 3.55179E+05 4.11494E+06 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 4.24115E+03 1.00800E+03 2.01601E+03
4.29017E+09 2.84785E+07  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
1.80000E+05      0      1.25726E+09  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     3          0           0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
 .00000E+00 2.15953E+05 2.50194E+06 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0      .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     4           0           0       .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 1.01671E+04 1.17791E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08  .00000E+00  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0      .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     5           0           0       .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 1.09162E+04 1.25470E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08  .00000E+00  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0      .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     6           0           0       .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 6.39160E+09 7.40502E+10 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13  .00000E+00  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0      .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     7           0           0       .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0      .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     8           0           0       .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 7.11985E+04 8.24874E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0      .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0

     9           0           0       .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 1.65578E+04 1.91831E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0      .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           0


     I           J           A          U3          G3          GA3         DGAL        DGAU        PR          CR          ICHECK
     CD          FL          Y          GAD3

     1           2       3.79625E+05  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00       0
 7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1           3       2.07505E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00       0
 7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2           3       2.07505E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00       0
 7.00000E-01  .00000E+00  .00000E+00  .00000E+00
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
     1          4      1.42500E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1          5      3.84656E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2          5      3.84656E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     4          5      2.00000E+03  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1          6      1.45482E+01  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2          6      1.45482E+01  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     5          7       .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1          8      1.00000E+05  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2          9      2.83000E+03  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
5.70000E-01  .00000E+00  .00000E+00  .00000E+00

PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT=  .00000E+00 CRRPPT=  .00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3=  .00000E+00 XRP3=  .00000E+00 NWORK=    50 DWRKC=  .00000E+00 WRKRP3=  .00000E+00
GPTRP=  .00000E+00 UPTRP=  .00000E+00 GAPTRP=  .00000E+00 DGPTRP=  .00000E+00 DGPTPT=  .00000E+00 GABREK(1)=  .00000E+00
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3=  .00000E+00 VOCPT3= 2.21466E+08 PET3=  .00000E+00 TET3=  .00000E+00 ROLCET=  .00000E+00
RSVCET=  .00000E+00 VFLCET=  .00000E+00 VFVCET=  .00000E+00 UCET=  .00000E+00 UVET=  .00000E+00 GFET=  .00000E+00
GCET=  .00000E+00 GVET=  .00000E+00 GET=  .00000E+00 DCRE= 1.00000E-02 DFMCPT=  .00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.39260E+09 SML3=  .00000E+00 XMASS=  .00000E+00
SMV30=  .00000E+00 SML30=  .00000E+00 SMA30=  .00000E+00 XMASSN=  .00000E+00 XMASSD=  .00000E+00 SMVBRK=  .00000E+00
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0=  .00000E+00 SVOL=  .00000E+00 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINK= 5.69032E+06 ALINER= 1.50967E-01 TLINER=  .00000E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND=  .00000E+00 DSMCON=  .00000E+00 PRP3=  .00000E+00 GABNLI=  .00000E+00 PBNLI=  .00000E+00 HBNLI=  .00000E+00
XBNLI=  .00000E+00 GABNLO=  .00000E+00 PBNLO=  .00000E+00 HBNLO=  .00000E+00 XBNLO=  .00000E+00 PBNLSI=  .00000E+00
HBNLSI=  .00000E+00 XBNLSI=  .00000E+00 TBNLI=  .00000E+00 TBNLSI=  .00000E+00 XRPI3=  .00000E+00 WRKRPI=  .00000E+00
PBNLSO=  .00000E+00 HBNLSO=  .00000E+00 XBNLSO=  .00000E+00 TBNLO=  .00000E+00 TBNLSO=  .00000E+00 XRPO3=  .00000E+00
WRKRPO=  .00000E+00 DWRKC=  .00000E+00 WRKC=  .00000E+00 GABRKI=  .00000E+00 GABRKO=  .00000E+00
GABREK(1)=  .00000E+00 GADBRK(1)=  .00000E+00 IPBNLI=   0 IPBNLO=   0 QDECAY=  .00000E+00 SMDBRK=  .00000E+00
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP=  .00000E+00 SMVAP=  .00000E+00
SMD3=  .00000E+00 SMD0=  .00000E+00 SMD30=  .00000E+00
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.

TIME =	1.00000D+01	seconds
CYCLE =	1000	
TIMESTEP =	1.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	1.58602D+06	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	3.52897D+06	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	1.88012D+07	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	4.41221D+07	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	6.22596D+05	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	7.17140D+02	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	3.61912D+06	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	2.36969D+03	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	2.25094D+06	2.24476D+06	6.18070D+03	3.97113D+02	3.97113D+02	3.35431D+04	2.26702D+03	9.95593D-01
2	2.20793D+06	2.06763D+06	1.40297D+05	3.94484D+02	3.94485D+02	1.70775D+04	2.19507D+03	9.01643D-01
3	2.22782D+06	9.24312D+05	1.30351D+06	3.70547D+02	3.70548D+02	4.46182D+03	.00000D+00	3.06072D-01
4	2.24960D+06	1.34863D+06	9.00967D+05	3.81354D+02	3.81355D+02	.00000D+00	.00000D+00	4.82157D-01
5	2.22643D+06	2.15937D+06	6.70655D+04	3.95876D+02	3.95876D+02	.00000D+00	.00000D+00	9.52444D-01
6	1.01336D+06	1.23737D+05	8.89627D+05	3.23069D+02	3.23069D+02	.00000D+00	.00000D+00	7.96272D-02
7	1.95699D+06	8.83363D+05	1.07363D+06	3.69296D+02	3.69299D+02	3.23157D+03	.00000D+00	3.38532D-01

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
    8       2.25036D+06 8.73988D+05 1.37637D+06 3.69006D+02 3.69006D+02 5.92423D+03  .00000D+00 2.83144D-01

    9       2.18841D+06 5.28153D+05 1.66026D+06 3.55762D+02 3.55762D+02 7.47622D+03  .00000D+00 1.65188D-01



CELL  CELL  FLOW AREA,     FLOW        VELOCITY,   STEAM-GAS    STEAM-GAS  LIQUID WATER
 No.   No.      cm2      RESISTANCE      cm/s      MASS FLUX,   FLOWRATE,  FLOWRATE,
                         COEFFICIENT              g/(cm2-s)       g/s        g/s

    1     2 3.79625E+05 7.00000E-01 3.46714E+03 4.26562E+00 1.61934E+06 2.99815E+06

    1     3 2.07505E+04 7.00000E-01 2.54873E+03 3.13570E+00 6.50673E+04 1.19854E+05

    2     3 2.07505E+04 7.00000E-01-2.84834E+03-5.03042E+00-1.04384E+05-3.73739E+04

    1     4 1.42500E+04 7.00000E-01 6.13485E+02 7.54769E-01 1.07555E+04 1.97013E+04

    1     5 3.84656E+04 7.00000E-01 2.62150E+03 3.22522E+00 1.24060E+05 2.28598E+05

    2     5 3.84656E+04 7.00000E-01-2.33632E+03-2.89936E+00-1.11526E+05-1.87095E+05

    4     5 2.00000E+03 7.00000E-01 2.90211E+03 4.61293E+00 9.22586E+03 6.43383E+03

    1     6 1.45482E+01 7.00000E-01 1.71473E+04 2.10963E+01 3.06913E+02 7.22170E+02

    2     6 7.85041E+04 7.00000E-01 1.88241E+04 2.37133E+01 1.86159E+06 3.02094E+06

    5     7 1.88496E+03 7.00000E-01 8.72530E+03 1.08281E+01 2.04104E+04 3.68387E+04

    1     8 1.00000E+05 7.00000E-01 4.10648E+02 5.05219E-01 5.05219E+04 9.25260E+04

    2     9 2.83000E+03 5.70000E-01 1.96475E+03 2.47506E+00 7.00441E+03 1.13666E+04



T3= 1.00000E+01 T1= 9.99000E+00 DT3= 1.00000E-02 NCYC=  1000 T3SPON= 2.10000E-01 T3SPOF=-1.00000E+10

     J          ISUPP      ISAT3      SPOOL      APOOL      PL3        XMV3       XMA3       DP3        TG3        P3
   FML3         FMV3       FMA3       CVVC       CPVC       BPOOL      ROV3       ROA3       ROG3       TL3        TSAT3
   HCOND        HBDN       HNAT       HCONV      HWALL      SCOND      DSCOND     GABREK     ZCOND      FLCOND     DCOND
    VOL         ACOND      TV3        PV3        PA3        FMD3       GADBRK     CPDC       CVDC       SPRAY3     DSPRAY
  GSPRAY        ISPRAY     HSPRAY     UVC3       ZVC3       SVAP       DPVAP      PSTG3      TSTG3      IPSTG3     IPVT

     1          0          0       .00000E+00  .00000E+00  .00000E+00 9.95593E-01 4.40703E-03-1.27350E+03 3.97113E+02 2.25094E+06
 .00000E+00 4.20130E+06 1.85972E+04 1.46047E+07 1.94682E+07  .00000E+00 1.22481E-03 5.42167E-06 1.23023E-03  .00000E+00 3.97113E+02
4.69670E+05 9.02066E+05 1.12306E+06 1.12306E+06 8.07275E+05 3.35431E+04  .00000E+00 1.58602E+06 9.35569E+02 9.35569E+02 1.87114E+03
3.43017E+09 2.11573E+07  .00000E+00 2.24476E+06 6.18070E+03 9.93001E+06 3.52897E+06 4.23847E+07  .00000E+00 2.26702E+03 3.94071E-04
1.80000E+05      1      1.25726E+09  .00000E+00  .00000E+00 2.17091E+05 1.15992E+03 2.24360E+06 3.97113E+02       3          1

     2          0          0       .00000E+00  .00000E+00  .00000E+00 9.01643E-01 9.83572E-02-1.38726E+02 3.94484E+02 2.20793E+06
 .00000E+00 4.87232E+06 5.31506E+05 1.45424E+07 1.93570E+07  .00000E+00 1.13569E-03 1.23889E-04 1.25958E-03  .00000E+00 3.94485E+02
1.84833E+05 1.23021E+04 2.39718E+05 2.39718E+05 8.07275E+05 1.70775E+04  .00000E+00  .00000E+00 4.24115E+03 1.00800E+03 2.01601E+03
4.29017E+09 2.84785E+07  .00000E+00 2.06763E+06 1.40297E+05 8.77158E+06  .00000E+00 4.23305E+07  .00000E+00 2.19507E+03 4.17708E-04
1.80000E+05      1      1.25726E+09  .00000E+00  .00000E+00 1.18044E+04 5.00936E+01 1.23470E+05 3.23025E+02       0          2

     3          0          0       .00000E+00  .00000E+00  .00000E+00 3.06072E-01 6.93928E-01-8.06050E+01 3.70547E+02 2.22782E+06
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
 .00000E+00 1.40989E+06 3.19650E+06 1.40570E+07 1.85071E+07  .00000E+00 5.40503E-04 1.22543E-03 1.76593E-03  .00000E+00 3.70548E+02
1.25353E+05 1.48396E+05 1.61349E+04 1.48396E+05 8.07275E+05 4.46182E+03 4.07868E-03  .00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07  .00000E+00 9.24312E+05 1.30351E+06 1.65019E+06  .00000E+00 4.19698E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 3.97971E+03 2.60906E+01 1.23856E+05 3.23088E+02       3           3

     4           0           0       .00000E+00  .00000E+00  .00000E+00 4.82157E-01 5.17843E-01-1.38598E+02 3.81354E+02 2.24960E+06
 .00000E+00 9.41047E+04 1.01070E+05 1.42594E+07 1.88583E+07  .00000E+00 7.66281E-04 8.22998E-04 1.58928E-03  .00000E+00 3.81355E+02
1.36128E+05 1.63738E+05 4.12430E+04 1.63738E+05 8.07275E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08  .00000E+00  .00000E+00 1.34863E+06 9.00967E+05 1.36176E+05  .00000E+00 4.21033E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.95457E+02 2.80114E+01 1.23470E+05 3.23025E+02       0           4

     5           0           0       .00000E+00  .00000E+00  .00000E+00 9.52444E-01 4.75563E-02-1.48315E+02 3.95876E+02 2.22643E+06
 .00000E+00 1.55841E+05 7.78127E+03 1.45751E+07 1.94153E+07  .00000E+00 1.18190E-03 5.90134E-05 1.24092E-03  .00000E+00 3.95876E+02
3.35210E+05 1.27232E+05 5.73239E+05 5.73239E+05 8.07275E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08  .00000E+00  .00000E+00 2.15937E+06 6.70655E+04 2.95929E+05  .00000E+00 4.23588E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 4.03574E+02 5.59201E+01 2.15931E+06 3.95876E+02       2           5

     6           0           0       .00000E+00  .00000E+00  .00000E+00 7.96272E-02 9.20373E-01 5.67407E-01 3.23069E+02 1.01336E+06
 .00000E+00 6.40705E+09 7.40561E+10 1.33689E+07 1.73351E+07  .00000E+00 8.29891E-05 9.59232E-04 1.04222E-03  .00000E+00 3.23069E+02
4.69757E+05 4.40844E+04 1.12356E+06 1.12356E+06 8.07275E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13  .00000E+00  .00000E+00 1.23737E+05 8.89627E+05 1.75537E+07  .00000E+00 4.19374E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 4.27976E+05 8.26538E-02 1.23616E+05 3.23049E+02       2           6

     7           0           0       .00000E+00  .00000E+00  .00000E+00 3.38532E-01 6.61468E-01 7.98221E+02 3.69296E+02 1.95699E+06
 .00000E+00 2.21345E+05 4.32494E+05 1.40351E+07 1.84693E+07  .00000E+00 5.18332E-04 1.01279E-03 1.53112E-03  .00000E+00 3.69299E+02
7.15826E+05 6.31903E+06 2.18712E+04 6.31903E+06 8.07275E+05 3.23157E+03 4.14810E-04  .00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06  .00000E+00 8.83363E+05 1.07363E+06 2.89253E+05  .00000E+00 4.19574E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.88475E+03 7.52183E+01 1.23470E+05 3.23025E+02       0           7

     8           0           0       .00000E+00  .00000E+00  .00000E+00 2.83144E-01 7.16856E-01-1.03000E+02 3.69006E+02 2.25036E+06
 .00000E+00 4.41348E+05 1.11739E+06 1.40300E+07 1.84605E+07  .00000E+00 5.13195E-04 1.29929E-03 1.81249E-03  .00000E+00 3.69006E+02
4.00118E+05 7.93318E+05 1.60058E+04 7.93318E+05 8.07275E+05 5.92423E+03 3.41839E-03  .00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06  .00000E+00 8.73988E+05 1.37637E+06 5.73766E+05  .00000E+00 4.19546E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 5.73608E+02 1.13590E+01 8.73977E+05 3.69006E+02       3           8

     9           0           0       .00000E+00  .00000E+00  .00000E+00 1.65188E-01 8.34812E-01-6.43568E+01 3.55762E+02 2.18841E+06
 .00000E+00 6.43346E+04 3.25129E+05 1.38146E+07 1.80917E+07  .00000E+00 3.21673E-04 1.62564E-03 1.94732E-03  .00000E+00 3.55762E+02
7.55315E+05 1.17348E+07 9.90697E+03 1.17348E+07 8.07275E+05 7.47622E+03 9.11091E-04  .00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06  .00000E+00 5.28153E+05 1.66026E+06 1.52157E+05  .00000E+00 4.18636E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.03689E+03 8.51236E+01 5.28068E+05 3.55762E+02       3           9


     I           J           A          U3          G3          GA3         DGAL        DGAU         PR          CR         ICHECK
    CD          FL          Y          GAD3

     1           2       3.79625E+05 3.46714E+03 4.26562E+00 1.61934E+06 1.88153E+01-1.88153E+01 9.80883E-01 5.43764E-01       0
 7.00000E-01  .00000E+00 1.85147E+00 2.99815E+06

     1           3       2.07505E+04 2.54873E+03 3.13570E+00 6.50673E+04 1.40371E+00-1.40371E+00 9.89704E-01 5.43764E-01       0
 7.00000E-01  .00000E+00 1.84200E+00 1.19854E+05

     2           3       2.07505E+04-2.84834E+03-5.03042E+00-1.04384E+05 2.62857E+00-2.62857E+00 9.91088E-01 5.33595E-01       0
 7.00000E-01  .00000E+00 3.58044E-01-3.73739E+04
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
     1          4      1.42500E+04 6.13485E+02 7.54769E-01 1.07555E+04 4.01932E+00-4.01932E+00 9.99406E-01 5.43764E-01      0
7.00000E-01  .00000E+00 1.83175E+00 1.97013E+04
     1          5      3.84656E+04 2.62150E+03 3.22522E+00 1.24060E+05 2.52928E+00-2.52928E+00 9.89105E-01 5.43764E-01      0
7.00000E-01  .00000E+00 1.84264E+00 2.28598E+05
     2          5      3.84656E+04-2.33632E+03-2.89936E+00-1.11526E+05 3.01294E+00-3.01294E+00 9.91688E-01 5.43225E-01      0
7.00000E-01  .00000E+00 1.67760E+00-1.87095E+05
     4          5      2.00000E+03 2.90211E+03 4.61293E+00 9.22586E+03 1.98946E-01-1.98946E-01 9.89693E-01 5.36726E-01      0
7.00000E-01  .00000E+00 6.97368E-01 6.43383E+03
     1          6      1.45482E+01 1.71473E+04 2.10963E+01 3.06913E+02 1.23987E-04-1.23987E-04 4.50174E-01 5.43764E-01      0
7.00000E-01  .00000E+00 2.35301E+00 7.22170E+02
     2          6      7.85041E+04 1.88241E+04 2.37133E+01 1.86159E+06 7.79135E-01-7.79135E-01 4.58947E-01 5.42592E-01      0
7.00000E-01  .00000E+00 1.62277E+00 3.02094E+06
     5          7      1.88496E+03 8.72530E+03 1.08281E+01 2.04104E+04 3.77399E-02-3.77399E-02 8.78551E-01 5.43225E-01      0
7.00000E-01  .00000E+00 1.80490E+00 3.68387E+04
     1          8      1.00000E+05 4.10648E+02 5.05219E-01 5.05219E+04 4.21429E+01-4.21429E+01 9.99734E-01 5.43764E-01      0
7.00000E-01  .00000E+00 1.83140E+00 9.25260E+04
     2          9      2.83000E+03 1.96475E+03 2.47506E+00 7.00441E+03 1.78430E-01-1.78430E-01 9.91111E-01 5.42592E-01      0
5.70000E-01  .00000E+00 1.62277E+00 1.13666E+04

PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT=  .00000E+00 CRRPPT=  .00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 2.25105E+06 XRP3=  .00000E+00 NWORK=    50 DWRKC= 9.02652E+13 WRKRP3=  .00000E+00
GPTRP=  .00000E+00 UPTRP=  .00000E+00 GAPTRP=  .00000E+00 DGPTRP=  .00000E+00 DGPTPT=  .00000E+00 GABREK(1)= 1.58602E+06
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3=  .00000E+00 VOCPT3= 2.21466E+08 PET3=  .00000E+00 TET3=  .00000E+00 ROLCET=  .00000E+00
RSVCET=  .00000E+00 VFLCET=  .00000E+00 VFVCET=  .00000E+00 UCET=  .00000E+00 UVET=  .00000E+00 GFET=  .00000E+00
GCET=  .00000E+00 GVET=  .00000E+00 GET=  .00000E+00 DCRE= 1.00000E-02 DFMCPT=  .00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.41851E+09 SML3=  .00000E+00 XMASS= 7.21462E-01
SMV30= 2.59116E+07 SML30=  .00000E+00 SMA30= 2.33459E-03 XMASSN= 4.70857E+07 XMASSD= 6.52643E+07 SMVBRK= 1.88012E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0=  .00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 6.22596E+05 DSMCON= 7.17140E+02 PRP3= 2.25105E+06 GABNLI= 2.85144E+06 PBNLI= 1.23355E+08 HBNLI= 1.18410E+10
XBNLI= 1.46969E-02 GABNLO= 2.26355E+06 PBNLO= 1.23395E+08 HBNLO= 1.54763E+10 XBNLO= 1.99472E-01 PBNLSI= 5.08947E+07
HBNLSI= 1.18410E+10 XBNLSI= 1.46969E-02 TBNLI= 5.42638E+02 TBNLSI= 5.37939E+02 XRPI3= 2.56625E-01 WRKRPI= 1.37982E+09
PBNLSO= 6.49359E+07 HBNLSO= 1.54763E+10 XBNLSO= 1.99472E-01 TBNLO= 6.05113E+02 TBNLSO= 5.53640E+02 XRPO3= 3.77403E-01
WRKRPO= 2.24958E+09 DWRKC= 9.02652E+13 WRKC= 1.12936E+17 GABRKI= 7.31753E+05 GABRKO= 8.54272E+05
GABREK(1)= 1.58602E+06 GADBRK(1)= 3.52897E+06 IPBNLI=   3 IPBNLO=   3 QDECAY=  .00000E+00 SMDBRK= 4.41221E+07
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 2.36969E+03 SMVAP= 3.61912E+06
SMD3= 3.93527E+07 SMD0=  .00000E+00 SMD30= 3.93527E+07
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.

TIME =	6.00000D+01	seconds
CYCLE =	6000	
TIMESTEP =	1.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	1.19819D+05	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	1.41746D+05	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	4.78414D+07	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	1.02745D+08	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	2.62529D+06	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	2.71698D+02	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	7.11035D+06	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	5.53881D+02	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.79321D+06	1.78056D+06	1.26518D+04	3.89766D+02	3.89766D+02	9.69029D+03	1.26344D+04	9.88706D-01
2	1.79310D+06	1.75981D+06	3.32918D+04	3.89405D+02	3.89405D+02	1.18817D+04	1.25753D+04	9.70484D-01
3	1.79306D+06	9.70474D+05	8.22582D+05	3.71899D+02	3.71899D+02	2.54535D+03	.00000D+00	4.23250D-01
4	1.79320D+06	1.43645D+06	3.56756D+05	3.83230D+02	3.83230D+02	.00000D+00	.00000D+00	7.14653D-01
5	1.79314D+06	1.75812D+06	3.50197D+04	3.89382D+02	3.89382D+02	.00000D+00	.00000D+00	9.68971D-01
6	1.01454D+06	1.24534D+05	8.90004D+05	3.23198D+02	3.23198D+02	.00000D+00	.00000D+00	8.00677D-02
7	1.79288D+06	8.36438D+05	9.56447D+05	3.67807D+02	3.67807D+02	7.69399D+02	.00000D+00	3.52320D-01

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
    8       1.79320D+06 5.45702D+05 1.24750D+06 3.56444D+02 3.56444D+02 1.52017D+03  .00000D+00 2.13894D-01

    9       1.79279D+06 2.44361D+05 1.54843D+06 3.37488D+02 3.37488D+02 7.62803D+02  .00000D+00 8.93877D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	1.94831E+02	1.95050E-01	7.40460E+04	1.33436E+05
1	3	2.07505E+04	7.00000E-01	2.22071E+02	2.22320E-01	4.61326E+03	8.31352E+03
2	3	2.07505E+04	7.00000E-01	1.07848E+02	1.08816E-01	2.25799E+03	3.87155E+03
1	4	1.42500E+04	7.00000E-01	4.33848E+01	4.34336E-02	6.18929E+02	1.11532E+03
1	5	3.84656E+04	7.00000E-01	1.48596E+02	1.48764E-01	5.72228E+03	1.03118E+04
2	5	3.84656E+04	7.00000E-01	-1.26434E+02	-1.27653E-01	-4.91027E+03	-8.64115E+03
4	5	2.00000E+03	7.00000E-01	1.51211E+02	1.71841E-01	3.43682E+02	4.05750E+02
1	6	1.45482E+01	7.00000E-01	1.53205E+04	1.53378E+01	2.23137E+02	5.01444E+02
2	6	2.47756E+03	7.00000E-01	1.60379E+04	1.61818E+01	4.00913E+04	7.77691E+04
5	7	1.88496E+03	7.00000E-01	2.67234E+02	2.69811E-01	5.08582E+02	8.96278E+02
1	8	1.00000E+05	7.00000E-01	3.03559E+01	3.03900E-02	3.03900E+03	5.47633E+03
2	9	2.83000E+03	5.70000E-01	2.43257E+02	2.45440E-01	6.94596E+02	1.19104E+03

```
T3= 6.00000E+01 T1= 5.99900E+01 DT3= 1.00000E-02 NCYC=  6000 T3SPON= 2.10000E-01 T3SPOF=-1.00000E+10

     J          ISUPP        ISAT3        SPOOL        APOOL         PL3          XMV3         XMA3         DP3          TG3          P3
   FML3         FMV3         FMA3         CVVC         CPVC        BPOOL         ROV3         ROA3         ROG3         TL3         TSAT3
   HCOND        HBDN         HNAT         HCONV        HWALL       SCOND        DSCOND       GABREK       ZCOND        FLCOND       DCOND
    VOL         ACOND         TV3          PV3          PA3         FMD3        GADBRK        CPDC         CVDC        SPRAY3       DSPRAY
  GSPRAY       ISPRAY       HSPRAY       UVC3         ZVC3         SVAP         DPVAP        PSTG3        TSTG3        IPSTG3       IPVT

     1           0            0        .00000E+00   .00000E+00   .00000E+00  9.88706E-01  1.12943E-02  4.99024E+01  3.89766E+02  1.79321E+06
 .00000E+00  3.39534E+06  3.87861E+04  1.44354E+07  1.91674E+07   .00000E+00  9.89845E-04  1.13073E-05  1.00115E-03   .00000E+00  3.89766E+02
1.52069E+05  7.34034E+05  9.27925E+05  9.27925E+05  1.81875E+05  9.69029E+03   .00000E+00  1.19819E+05  9.35569E+02  9.35569E+02  1.87114E+03
3.43017E+09  2.11573E+07   .00000E+00  1.78056E+06  1.26518E+04  7.71694E+06  1.41746E+05  4.22406E+07   .00000E+00  1.26344E+04  2.83859E-03
1.80000E+05       1       1.25726E+09   .00000E+00   .00000E+00  2.41164E+04  1.26476E+02  1.77996E+06  3.89766E+02       2            3

     2           0            0        .00000E+00   .00000E+00   .00000E+00  9.70484E-01  2.95159E-02  4.98617E+01  3.89405E+02  1.79310E+06
 .00000E+00  4.20101E+06  1.27768E+05  1.44275E+07  1.91534E+07   .00000E+00  9.79218E-04  2.97815E-05  1.00900E-03   .00000E+00  3.89405E+02
1.39342E+05  9.85334E+03  5.95851E+05  5.95851E+05  1.81875E+05  1.18817E+04   .00000E+00   .00000E+00  4.24115E+03  1.00800E+03  2.01601E+03
4.29017E+09  2.84785E+07   .00000E+00  1.75981E+06  3.32918E+04  8.39735E+06   .00000E+00  4.22341E+07   .00000E+00  1.25753E+04  2.86263E-03
1.80000E+05       1       1.25726E+09   .00000E+00   .00000E+00  2.98749E+04  1.25143E+02  1.75941E+06  3.89405E+02       3            5

     3           0            0        .00000E+00   .00000E+00   .00000E+00  4.23250E-01  5.76750E-01  3.95745E+01  3.71399E+02  1.79306E+06
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
 .00000E+00 1.47490E+06 2.00981E+06 1.40810E+07 1.85485E+07  .00000E+00 5.65426E-04 7.70490E-04 1.33592E-03  .00000E+00 3.71899E+02
6.94103E+04 1.12249E+05 2.64809E+04 1.12249E+05 1.81875E+05 2.54535E+03 1.62190E-03  .00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60843E+09 1.70016E+07  .00000E+00 9.70474E+05 8.22582E+05 2.27612E+06  .00000E+00 4.19838E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 4.20384E+02 2.76634E+00 9.70360E+05 3.71899E+02       3           3

     4           0           0       .00000E+00  .00000E+00  .00000E+00 7.14653E-01 2.85347E-01 5.00285E+01 3.83230E+02 1.79320E+06
 .00000E+00 9.97400E+04 3.98242E+04 1.42972E+07 1.89242E+07  .00000E+00 8.12169E-04 3.24283E-04 1.13645E-03  .00000E+00 3.83230E+02
7.12224E+04 1.17065E+05 1.06149E+05 1.17065E+05 1.81875E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08  .00000E+00  .00000E+00 1.43645E+06 3.56756E+05 1.64773E+05  .00000E+00 4.21314E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.66246E-01 2.39426E-02 1.43583E+06 3.83217E+02       3           4

     5           0           0       .00000E+00  .00000E+00  .00000E+00 9.68971E-01 3.10291E-02 5.20839E+01 3.89382E+02 1.79314E+06
 .00000E+00 1.29000E+05 4.13093E+03 1.44270E+07 1.91525E+07  .00000E+00 9.78339E-04 3.13291E-05 1.00967E-03  .00000E+00 3.89382E+02
1.47262E+05 1.03513E+05 7.73799E+05 7.73799E+05 1.81875E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08  .00000E+00  .00000E+00 1.75812E+06 3.50197E+04 2.80283E+05  .00000E+00 4.22337E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00-1.91380E+01-2.60829E+00 1.75770E+06 3.89375E+02       3           5

     6           0           0       .00000E+00  .00000E+00  .00000E+00 8.00677E-02 9.19932E-01 1.28100E-02 3.23198E+02 1.01454E+06
 .00000E+00 6.44573E+09 7.40578E+10 1.33705E+07 1.73378E+07  .00000E+00 8.34902E-05 9.59255E-04 1.04274E-03  .00000E+00 3.23198E+02
3.54979E+04 4.41066E+04 7.63289E+03 4.41066E+04 1.81875E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13  .00000E+00  .00000E+00 1.24534E+05 8.90004E+05 6.73032E+07  .00000E+00 4.19363E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 9.70682E+03 1.87540E-03 1.23616E+05 3.23049E+02       2           6

     7           0           0       .00000E+00  .00000E+00  .00000E+00 3.52320E-01 6.47680E-01-9.03839E+00 3.67807E+02 1.79288E+06
 .00000E+00 2.10422E+05 3.86825E+05 1.40093E+07 1.84250E+07  .00000E+00 4.92753E-04 9.05841E-04 1.39859E-03  .00000E+00 3.67807E+02
1.76321E+05 5.77379E+06 2.34372E+04 5.77379E+06 1.81875E+05 7.69399E+02 2.80903E-05  .00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06  .00000E+00 8.36438E+05 9.56447E+05 3.85199E+05  .00000E+00 4.19434E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 6.19209E+01 2.46138E+00 8.36435E+05 3.67807E+02       2           7

     8           0           0       .00000E+00  .00000E+00  .00000E+00 2.13894E-01 7.86106E-01 4.99668E+01 3.56444E+02 1.79320E+06
 .00000E+00 2.85288E+05 1.04849E+06 1.38250E+07 1.81095E+07  .00000E+00 3.31730E-04 1.21917E-03 1.55090E-03  .00000E+00 3.56444E+02
1.43441E+05 6.78798E+05 1.19789E+04 6.78798E+05 1.81875E+05 1.52017E+03 5.88723E-04  .00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06  .00000E+00 5.45702E+05 1.24750E+06 4.85268E+05  .00000E+00 4.18666E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 8.48491E+02 1.67928E+01 5.42518E+05 3.56444E+02       3           8

     9           0           0       .00000E+00  .00000E+00  .00000E+00 8.93877E-02 9.10612E-01-1.29844E+01 3.37488E+02 1.79279E+06
 .00000E+00 3.13777E+04 3.19652E+05 1.35544E+07 1.76500E+07  .00000E+00 1.56888E-04 1.59826E-03 1.75515E-03  .00000E+00 3.37488E+02
1.78800E+05 1.05769E+07 6.05028E+03 1.05769E+07 1.81875E+05 7.62803E+02 5.27687E-05  .00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06  .00000E+00 2.44361E+05 1.54843E+06 2.15490E+05  .00000E+00 4.18527E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 8.49551E+01 6.61603E+00 2.44354E+05 3.37488E+02       3           9



     I           J           A          U3          G3          GA3         DGAL        DGAU         PR          CR         ICHECK
    CD          FL          Y          GAD3

     1           2      3.79625E+05 1.94831E+02 1.95050E-01 7.40460E+04 3.40732E+02-3.40732E+02 9.99939E-01 5.42566E-01      0
 7.00000E-01  .00000E+00 1.80207E+00 1.33436E+05

     1           3      2.07505E+04 2.22071E+02 2.22320E-01 4.61326E+03 1.63400E+01-1.63400E+01 9.99921E-01 5.42566E-01      0
 7.00000E-01  .00000E+00 1.80209E+00 8.31352E+03

     2           3      2.07505E+04 1.07848E+02 1.08816E-01 2.25799E+03 3.47300E+01-3.47300E+01 9.99982E-01 5.42376E-01      0
 7.00000E-01  .00000E+00 1.71460E+00 3.87155E+03
```

Table 6. Output for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe Calculated on HP-735 (Contd.)

```
     1          4      1.42500E+04 4.33848E+01 4.34336E-02 6.18929E+02 5.74385E+01-5.74385E+01 9.99997E-01 5.42566E-01      0
7.00000E-01  .00000E+00 1.80201E+00 1.11532E+03
     1          5      3.84656E+04 1.48596E+02 1.48764E-01 5.72228E+03 4.52673E+01-4.52673E+01 9.99965E-01 5.42566E-01      0
7.00000E-01  .00000E+00 1.80205E+00 1.03118E+04
     2          5      3.84656E+04-1.26434E+02-1.27653E-01-4.91027E+03 5.40162E+01-5.40162E+01 9.99975E-01 5.42362E-01      0
7.00000E-01  .00000E+00 1.75981E+00-8.64115E+03
     4          5      2.00000E+03 1.51211E+02 1.71841E-01 3.43682E+02 2.97212E+00-2.97212E+00 9.99968E-01 5.39400E-01      0
7.00000E-01  .00000E+00 1.18060E+00 4.05750E+02
     1          6      1.45482E+01 1.53205E+04 1.53378E+01 2.23137E+02 1.43290E-04-1.43290E-04 5.65783E-01 5.42566E-01      0
7.00000E-01  .00000E+00 2.24725E+00 5.01444E+02
     2          6      2.47756E+03 1.60379E+04 1.61818E+01 4.00913E+04 2.57487E-02-2.57487E-02 5.65817E-01 5.42376E-01      0
7.00000E-01  .00000E+00 1.93980E+00 7.77691E+04
     5          7      1.88496E+03 2.67234E+02 2.69811E-01 5.08582E+02 1.25122E+00-1.25122E+00 9.99887E-01 5.42362E-01      0
7.00000E-01  .00000E+00 1.76231E+00 8.96278E+02
     1          8      1.00000E+05 3.03559E+01 3.03900E-02 3.03900E+03 5.76080E+02-5.76080E+02 9.99999E-01 5.42566E-01      0
7.00000E-01  .00000E+00 1.80201E+00 5.47633E+03
     2          9      2.83000E+03 2.43257E+02 2.45440E-01 6.94596E+02 1.39234E+00-1.39234E+00 9.99861E-01 5.42376E-01      0
5.70000E-01  .00000E+00 1.71472E+00 1.19104E+03

PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT=  .00000E+00 CRRPPT=  .00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 1.79316E+06 XRP3=  .00000E+00 NWORK=    50 DWRKC= 1.98114E+12 WRKRP3=  .00000E+00
GPTRP=  .00000E+00 UPTRP=  .00000E+00 GAPTRP=  .00000E+00 DGPTRP=  .00000E+00 DGPTPT=  .00000E+00 GABREK(1)= 1.19819E+05
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3=  .00000E+00 VOCPT3= 2.21466E+08 PET3=  .00000E+00 TET3=  .00000E+00 ROLCET=  .00000E+00
RSVCET=  .00000E+00 VFLCET=  .00000E+00 VFVCET=  .00000E+00 UCET=  .00000E+00 UVET=  .00000E+00 GFET=  .00000E+00
GCET=  .00000E+00 GVET=  .00000E+00 GET=  .00000E+00 DCRE= 1.00000E-02 DFMCPT=  .00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.45556E+09 SML3=  .00000E+00 XMASS= 6.98937E-01
SMV30= 6.29638E+07 SML30=  .00000E+00 SMA30= 1.39008E-02 XMASSN= 1.04972E+08 XMASSD= 1.50188E+08 SMVBRK= 4.78414E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0=  .00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 2.62529E+06 DSMCON= 2.71698E+02 PRP3= 1.79316E+06 GABNLI= 1.16776E+05 PBNLI= 1.23355E+08 HBNLI= 1.13186E+10
XBNLI= 2.59726E-01 GABNLO= 1.44789E+05 PBNLO= 1.23395E+08 HBNLO= 1.93158E+10 XBNLO= 6.09167E-01 PBNLSI= 3.22117E+06
HBNLSI= 1.13186E+10 XBNLSI= 2.59726E-01 TBNLI= 5.32002E+02 TBNLSI= 4.09243E+02 XRPI3= 2.79161E-01 WRKRPI= 2.98711E+08
PBNLSO= 5.43670E+06 HBNLSO= 1.93158E+10 XBNLSO= 6.09167E-01 TBNLO= 6.46232E+02 TBNLSO= 4.28346E+02 XRPO3= 6.02389E-01
WRKRPO= 1.12737E+09 DWRKC= 1.98114E+12 WRKC= 2.52057E+17 GABRKI= 3.25992E+04 GABRKO= 8.72196E+04
GABREK(1)= 1.19819E+05 GADBRK(1)= 1.41746E+05 IPBNLI=   3 IPBNLO=   3 QDECAY=  .00000E+00 SMDBRK= 1.02745E+08
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 5.53881E+02 SMVAP= 7.11035E+06
SMD3= 8.72246E+07 SMD0=  .00000E+00 SMD30= 8.72246E+07
```

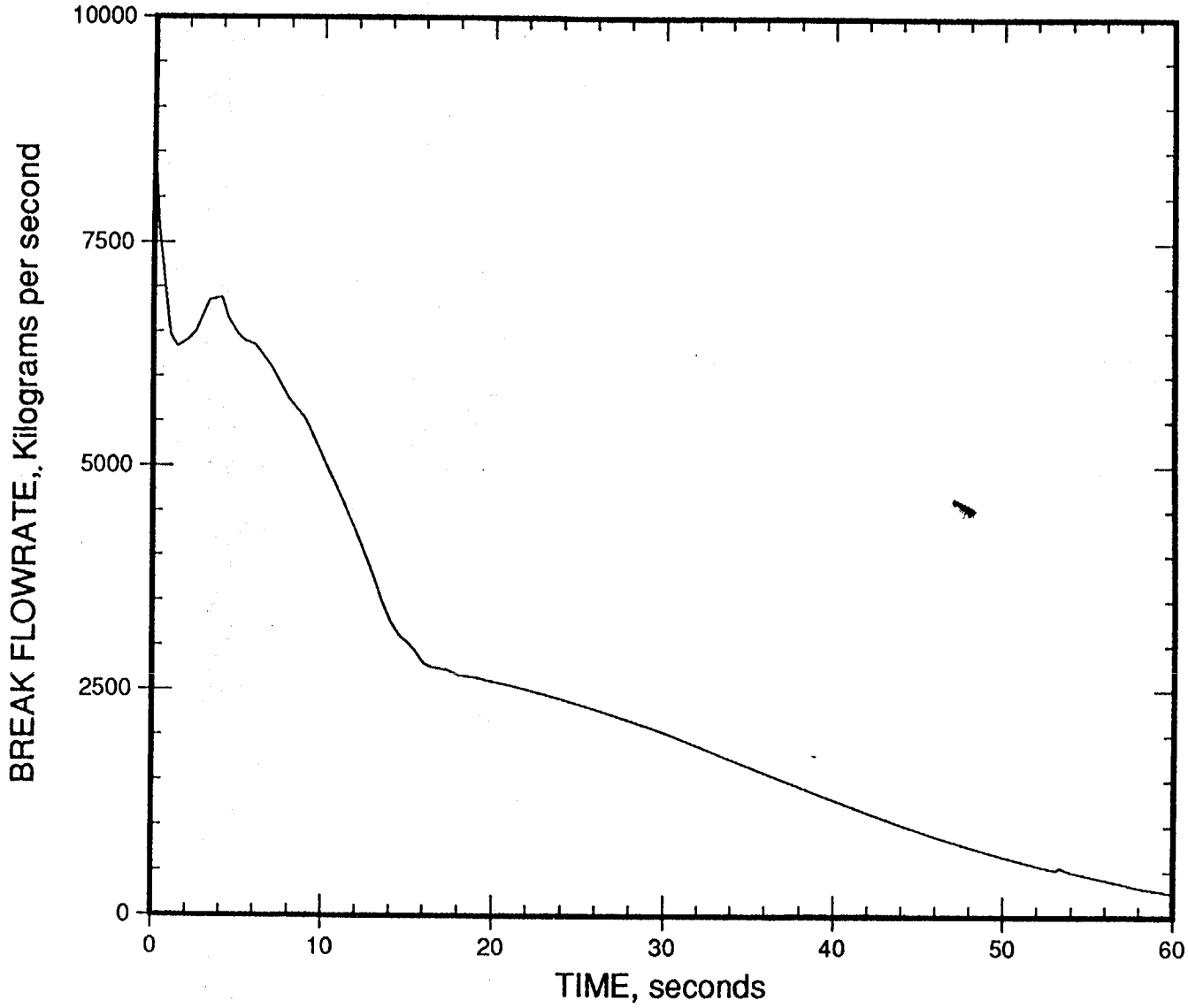

Figure 3. Break Flowrate for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe

the input variable, TBDNI. Figure 4 shows the pressures calculated inside the half of the steam generator compartment in which the break is located (Cell No. 1), the other half where the vent valves are located (Cell No. 2), the upper portion of the reactor shaft (Cell No. 7), and the gas space of the emergency water tank (Cell No. 9). The pressure inside the steam generator compartment is calculated to rise rapidly to the vent valve opening pressures in less than two seconds. The pressure rise rate decreases after this time but the pressure is calculated to exceed the 0.20 Megapascal absolute design pressure by a significant amount attaining a peak of 0.225 Megapascal absolute at about 9 seconds. The corresponding temperatures calculated for the same cells are presented in Figure 5.

5.2 20 centimeter One-Way Rupture

The second sample problem involves a one-way break having an equivalent diameter of 20 centimeters. The same confinement model is assumed as for the 50 centimeter double-ended break problem. However, the break flow conditions are user-specified by means of the input file shown in Table 7. A one-sided break is specified. Conditions are thus input for the "inner" side in each line of Cards/Groups 11 with zeroes entered for the "outer" side. The problem is calculated for a time of 2500 seconds using a timestep of 0.05 second. The blowdown timescale is set equal to 450 seconds.

Output generated at 0, 100 and 2400 seconds is shown in Table 8. The input break flowrate is shown in Figure 6 and the pressures in Cells Nos. 1, 2, 7 and 9 in Figure 7. Virtually identical pressures are calculated inside the two halves of the steam generator compartment and the emergency water tank gas space. The pressure differential across the rupture discs never exceeds the assumed threshold for breakage such that pressurization of the upper shaft region is not calculated to occur and the pressure there remains equal to one atmosphere. The pressure inside the confinement rises to the opening threshold of the larger vent valves but is prevented from exceeding the valve opening threshold by venting. As the break flowrate subsequently decreases, the steam formation rate falls below the rate of condensation upon the water droplet sprays and the sprays become the controlling agent of the confinement pressure. The cycling on and off of the sprays is observed to result in cyclic overpressurization and underpressurization of the confinement. Due to the assumed 140 second rise time of the spray flowrate, the peak pressure attained during each cycle somewhat exceeds the 0.11 Megapascal absolute value at which the sprays are activated. The corresponding temperatures calculated inside Cell Nos. 1, 2, 7, and 9 are presented in Figure 8.

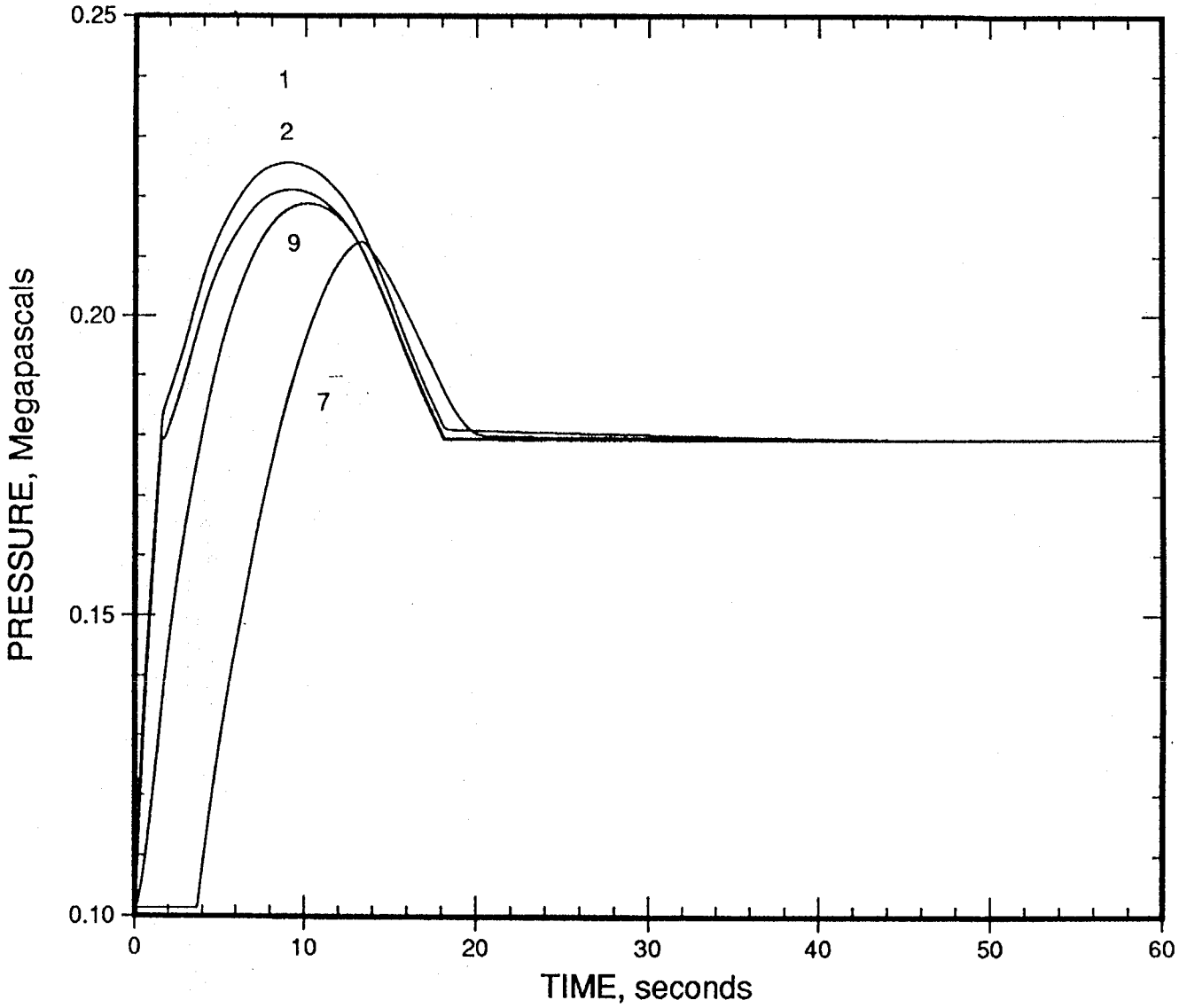

Figure 4. Pressures Inside Confinement for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe

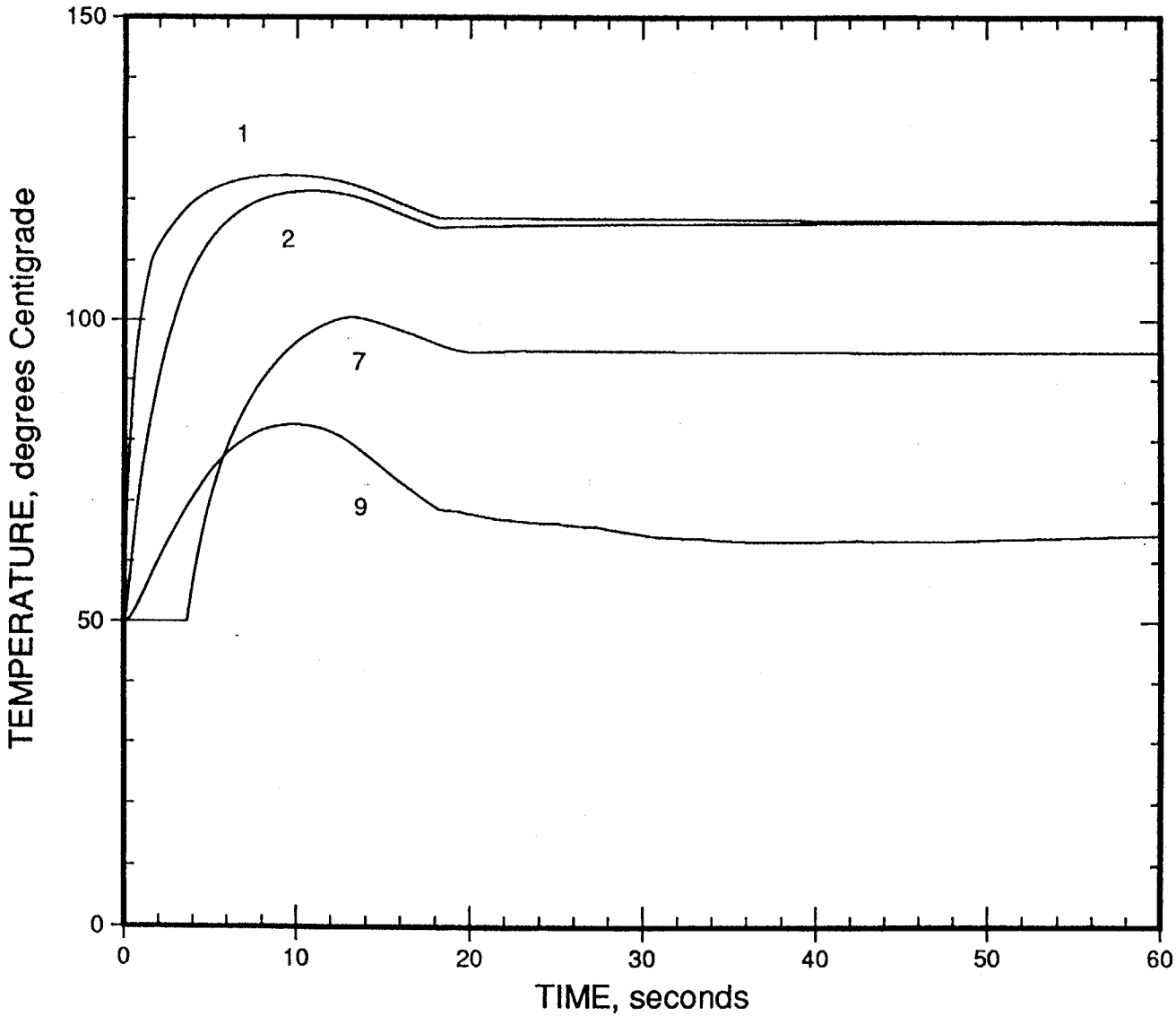

Figure 5. Temperatures Inside Confinement for Double-Ended Rupture of 50 centimeter Primary Coolant System Pipe.

Table 7. Input File for 20 centimeter One-Way Break

```
      )
RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.
     0.0D 00  2500.0D 00
     5.0D-02     1.0D 10     1.0D-02     1.0D 10     1.0D-02     1.0D 10
     1.0D 00     1.0D 01     1.0D 01   100.0D 00   100.0D 00     1.0D 10
     0.0D 00     0.0D 00     1.0D 00     0.0D 00   100.0D 00
    21    22
 1.013250D 06  323.15D 00 .0123470D 07 .004246D 07   450.0D 00
     1     1     1     1     1     0
     1
     0.0D 00  2787.7D 03   5.245D 07  1169.0D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
     1.3D 00  2787.7D 03   5.245D 07  1165.9D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
     2.5D 00  2658.0D 03   5.245D 07  1166.8D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
     3.8D 00  2445.0D 03   5.245D 07  1169.8D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
     5.0D 00  2325.7D 03   5.245D 07  1175.6D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
     6.3D 00  2151.5D 03   5.245D 07  1184.8D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
     7.5D 00  2025.8D 03   5.245D 07  1189.7D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
     8.8D 00  1889.2D 03   5.245D 07  1195.9D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    10.0D 00  1765.6D 03   5.245D 07  1200.0D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    11.3D 00  1638.7D 03   5.245D 07  1204.0D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    12.5D 00  1462.2D 03   5.245D 07  1213.1D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    13.8D 00  1388.8D 03   5.245D 07  1210.6D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    15.0D 00  1364.7D 03   5.245D 07  1207.2D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    16.3D 00  1338.4D 03   5.245D 07  1205.3D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    17.5D 00  1256.1D 03   5.245D 07  1205.1D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    18.8D 00  1254.7D 03   5.245D 07  1196.3D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    20.0D 00  1268.3D 03   5.245D 07  1188.7D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    21.3D 00  1259.0D 03   5.245D 07  1187.3D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    22.5D 00   903.8D 03   5.245D 07  1187.1D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    23.8D 00   219.1D 03   5.245D 07  1190.0D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    25.0D 00   322.1D 03   5.245D 07  1192.7D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    26.3D 00   355.3D 03   5.245D 07  1192.3D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    27.5D 00   461.3D 03   5.245D 07  1189.9D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    28.8D 00   822.1D 03   5.245D 07  1188.3D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    30.0D 00   723.6D 03   5.245D 07  1185.2D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    50.0D 00   695.1D 03   5.245D 07  1175.0D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    70.0D 00   368.7D 03   5.245D 07  1173.0D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
    90.0D 00   384.1D 03   5.245D 07  1165.4D 07     0.0D 00     0.0D 00
     0.0D 00     0.0D 00     0.0D 00
```

Table 7. Input File for 20 centimeter One-Way Break (Contd.)

```
100.0D 00   810.2D 03   5.245D 07   1156.8D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
150.0D 00   452.9D 03   5.245D 07   1284.7D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
200.0D 00   333.2D 03   5.245D 07   1353.4D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
250.0D 00   191.4D 03   5.245D 07   1104.2D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
300.0D 00   133.0D 03   5.245D 07   1159.2D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
350.0D 00   107.2D 03   5.245D 07   1250.9D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
400.0D 00   126.7D 03   5.245D 07   1204.2D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
452.5D 00    79.0D 03   5.245D 07   1474.7D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
505.0D 00    73.0D 03   5.245D 07   1243.6D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
557.5D 00    63.4D 03   5.245D 07   1179.2D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
602.5D 00    58.8D 03   5.245D 07   1117.8D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
655.0D 00    56.7D 03   5.245D 07   1055.1D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
700.0D 00    46.3D 03   5.245D 07   1125.0D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
752.5D 00    42.9D 03   5.245D 07   1118.9D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
805.0D 00    42.4D 03   5.245D 07   1077.4D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
850.0D 00    40.6D 03   5.245D 07   1077.7D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
900.0D 00    43.1D 03   5.245D 07   1063.2D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
955.0D 00    50.4D 03   5.245D 07    920.5D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1000.0D 00  138.0D 03   5.245D 07    679.4D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1105.0D 00   47.2D 03   5.245D 07    693.5D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1202.5D 00  113.1D 03   5.245D 07    620.6D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1300.0D 00   59.8D 03   5.245D 07    649.0D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1400.0D 00  104.8D 03   5.245D 07    646.0D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1510.0D 00   67.1D 03   5.245D 07    665.4D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1600.0D 00   65.3D 03   5.245D 07   1028.7D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1705.0D 00   84.6D 03   5.245D 07    782.3D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1802.5D 00  105.3D 03   5.245D 07    628.8D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
1900.0D 00   89.4D 03   5.245D 07    703.5D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
2005.0D 00   73.0D 03   5.245D 07    785.3D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
2102.5D 00   69.0D 03   5.245D 07    716.8D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
2200.0D 00   65.0D 03   5.245D 07    937.0D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
2305.0D 00   48.5D 03   5.245D 07    653.3D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
2400.0D 00   86.1D 03   5.245D 07    628.3D 07      0.0D 00      0.0D 00
  0.0D 00     0.0D 00     0.0D 00
```

Table 7. Input File for 20 centimeter One-Way Break (Contd.)

```
 2500.0D 00    61.5D 03   5.245D 07   634.0D 07     0.0D 00     0.0D 00
    0.0D 00     0.0D 00     0.0D 00
    1.0D 10    61.5D 03   5.245D 07   634.0D 07     0.0D 00     0.0D 00
    0.0D 00     0.0D 00     0.0D 00
    0.0D 00    61.5D 03   5.245D 07   634.0D 07     0.0D 00     0.0D 00
    0.0D 00     0.0D 00     0.0D 00
    9
    1 3.43017D 09 2.11573D 07 9.35569D 02     1     0
1.01325D 06 1.23470D 05 3.23150D 02
    2 4.29017D 09 2.84785D 07 4.24115D 03     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    3 2.60848D 09 1.70016D 07 2.03000D 03     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    4 1.22807D 08     0.0D 00 2.03000D 03     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    5 1.31856D 08     0.0D 00 2.03000D 03     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    6 7.72035D 13     0.0D 00 2.03000D 03     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    7 4.27034D 08 2.21891D 06 4.67152D 02     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    8 8.60000D 08 7.32121D 06 1.16632D 03     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    9 2.00000D 08 6.98617D 06 3.62783D 02     0     0
1.01325D 06 1.23470D 05 3.23150D 02
    1     2 3.79625D 05 7.00000D-01     0     0
    1     3 2.07505D 04 7.00000D-01     0     0
    2     3 2.07505D 04 7.00000D-01     0     0
    1     4 1.42500D 04 7.00000D-01     0     0
    1     5 3.84656D 04 7.00000D-01     0     0
    2     5 3.84656D 04 7.00000D-01     0     0
    4     5 2.00000D 03 7.00000D-01     0     0
    1     6 1.45482D 01 7.00000D-01     0     0
    2     6 1.45482D 01 7.00000D-01     0     0
    5     7     0.0D 00 7.00000D-01     0     0
    1     8 1.00000D 05 7.00000D-01     0     0
    2     9 2.83000D 03 5.70000D-01     0     1
2.90965D 01
    1 1.80000D 05    0.11D 07    .086D 07   140.0D 00    26.0D 00     0
    2 1.80000D 05    0.11D 07    .086D 07   140.0D 00    26.0D 00     1
    2     6 5.60000D 01 1.10000D 02     1     8   0.066D 07  0.078D 07
    5     7 1.88496D 03   0.099D 07
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735

```
    0
RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.
  .00000D+00 2.50000D+03
 5.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10
 1.00000D+00 1.00000D+01 1.00000D+01 1.00000D+02 1.00000D+02 1.00000D+10
  .00000D+00  .00000D+00 1.00000D+00  .00000D+00 1.00000D+02
    21    22
 1.01325D+06 3.23150D+02 1.23470D+05 4.24600D+04 4.50000D+02
     1     1     1     1     1     0
     1
  .00000D+00 2.78770D+06 5.24500D+07 1.16900D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.30000D+00 2.78770D+06 5.24500D+07 1.16590D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.50000D+00 2.65300D+06 5.24500D+07 1.16680D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 3.80000D+00 2.44500D+06 5.24500D+07 1.16980D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 5.00000D+00 2.32570D+06 5.24500D+07 1.17560D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 6.30000D+00 2.15150D+06 5.24500D+07 1.18480D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 7.50000D+00 2.02580D+06 5.24500D+07 1.18970D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 8.80000D+00 1.88920D+06 5.24500D+07 1.19590D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.00000D+01 1.76560D+06 5.24500D+07 1.20000D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.13000D+01 1.63870D+06 5.24500D+07 1.20400D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.25000D+01 1.46220D+06 5.24500D+07 1.21310D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.38000D+01 1.38880D+06 5.24500D+07 1.21060D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.50000D+01 1.36470D+06 5.24500D+07 1.20720D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.63000D+01 1.33840D+06 5.24500D+07 1.20530D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.75000D+01 1.25610D+06 5.24500D+07 1.20510D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 1.88000D+01 1.25470D+06 5.24500D+07 1.19630D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.00000D+01 1.26830D+06 5.24500D+07 1.18870D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.13000D+01 1.25900D+06 5.24500D+07 1.18730D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.25000D+01 9.03800D+05 5.24500D+07 1.18710D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.38000D+01 2.19100D+05 5.24500D+07 1.19000D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.50000D+01 3.22100D+05 5.24500D+07 1.19270D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.63000D+01 3.55300D+05 5.24500D+07 1.19230D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.75000D+01 4.61300D+05 5.24500D+07 1.18990D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 2.88000D+01 8.22100D+05 5.24500D+07 1.18830D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
 3.00000D+01 7.23600D+05 5.24500D+07 1.18520D+10  .00000D+00  .00000D+00
  .00000D+00  .00000D+00  .00000D+00
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
5.00000D+01 6.95100D+05 5.24500D+07 1.17500D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
7.00000D+01 3.68700D+05 5.24500D+07 1.17300D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
9.00000D+01 3.34100D+05 5.24500D+07 1.16540D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.00000D+02 5.10200D+05 5.24500D+07 1.15680D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.50000D+02 4.52900D+05 5.24500D+07 1.28470D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.00000D+02 3.33200D+05 5.24500D+07 1.35340D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.50000D+02 1.91400D+05 5.24500D+07 1.10420D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
3.00000D+02 1.33000D+05 5.24500D+07 1.15920D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
3.50000D+02 1.07200D+05 5.24500D+07 1.25090D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
4.00000D+02 1.26700D+05 5.24500D+07 1.20420D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
4.52500D+02 7.90000D+04 5.24500D+07 1.47470D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
5.05000D+02 7.30000D+04 5.24500D+07 1.24360D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
5.57500D+02 6.34000D+04 5.24500D+07 1.17920D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
6.02500D+02 5.88000D+04 5.24500D+07 1.11780D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
6.55000D+02 5.67000D+04 5.24500D+07 1.05510D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
7.00000D+02 4.63000D+04 5.24500D+07 1.12500D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
7.52500D+02 4.29000D+04 5.24500D+07 1.11890D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
8.05000D+02 4.24000D+04 5.24500D+07 1.07740D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
8.50000D+02 4.06000D+04 5.24500D+07 1.07770D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
9.00000D+02 4.31000D+04 5.24500D+07 1.06320D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
9.55000D+02 5.04000D+04 5.24500D+07 9.20500D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.00000D+03 1.38000D+05 5.24500D+07 6.79400D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.10500D+03 4.72000D+04 5.24500D+07 6.93500D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.20250D+03 1.13100D+05 5.24500D+07 6.20600D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.30000D+03 5.98000D+04 5.24500D+07 6.49000D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.40000D+03 1.04800D+05 5.24500D+07 6.46000D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.51000D+03 6.71000D+04 5.24500D+07 6.65400D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.60000D+03 6.53000D+04 5.24500D+07 1.02870D+10  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.70500D+03 8.46000D+04 5.24500D+07 7.82300D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.80250D+03 1.05300D+05 5.24500D+07 6.28800D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
1.90000D+03 8.94000D+04 5.24500D+07 7.03500D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.00500D+03 7.30000D+04 5.24500D+07 7.85300D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.10250D+03 6.90000D+04 5.24500D+07 7.16800D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.20000D+03 6.50000D+04 5.24500D+07 9.37000D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.30500D+03 4.85000D+04 5.24500D+07 6.53300D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.40000D+03 8.61000D+04 5.24500D+07 6.28300D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
2.50000D+03 6.15000D+04 5.24500D+07 6.34000D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
1.00000D+10 6.15000D+04 5.24500D+07 6.34000D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
 .00000D+00 6.15000D+04 5.24500D+07 6.34000D+09  .00000D+00  .00000D+00
 .00000D+00  .00000D+00  .00000D+00
    9
    1 3.43017D+09 2.11573D+07 9.35569D+02     1     0
1.01325D+06 1.23470D+05 3.23150D+02
    2 4.29017D+09 2.84785D+07 4.24115D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    3 2.60848D+09 1.70016D+07 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    4 1.22807D+08  .00000D+00 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    5 1.31856D+08  .00000D+00 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    6 7.72035D+13  .00000D+00 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    7 4.27034D+08 2.21891D+06 4.67152D+02     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    8 8.60000D+08 7.32121D+06 1.16632D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    9 2.00000D+08 6.98617D+06 3.62783D+02     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    1     2 3.79625D+05 7.00000D-01     0     0
    1     3 2.07505D+04 7.00000D-01     0     0
    2     3 2.07505D+04 7.00000D-01     0     0
    1     4 1.42500D+04 7.00000D-01     0     0
    1     5 3.84656D+04 7.00000D-01     0     0
    2     5 3.84656D+04 7.00000D-01     0     0
    4     5 2.00000D+03 7.00000D-01     0     0
    1     6 1.45482D+01 7.00000D-01     0     0
    2     6 1.45482D+01 7.00000D-01     0     0
    5     7  .00000D+00 7.00000D-01     0     0
    1     8 1.00000D+05 7.00000D-01     0     0
    2     9 2.83000D+03 5.70000D-01     0     1
2.90965D+01
    1 1.80000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01     0
    2 1.80000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01     1
    2     6 5.60000D+01 1.10000D+02     1     8 6.60000D+05 7.80000D+05
    5     7 1.88496D+03 9.90000D+05
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.

TIME =	.00000D+00	seconds
CYCLE =	0	
TIMESTEP =	5.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	.00000D+00	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	.00000D+00	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	.00000D+00	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	.00000D+00	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	.00000D+00	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	.00000D+00	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	.00000D+00	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	.00000D+00	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
2	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
3	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
4	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
5	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
6	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	.00000D+00	.00000D+00	.00000D+00	7.94562D-02

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
    8       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02  .00000D+00  .00000D+00  .00000D+00 7.94562D-02

    9       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02  .00000D+00  .00000D+00  .00000D+00 7.94562D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	3	2.07505E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	3	2.07505E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	4	1.42500E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	5	3.84656E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	5	3.84656E+04	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
4	5	2.00000E+03	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	6	1.45482E+01	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	6	1.45482E+01	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
5	7	.00000E+00	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
1	8	1.00000E+05	7.00000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00
2	9	2.83000E+03	5.70000E-01	.00000E+00	.00000E+00	.00000E+00	.00000E+00

```
T3=  .00000E+00 T1=  .00000E+00 DT3= 5.00000E-02 NCYC=     0 T3SPON=-2.00000E+10 T3SPOF=-1.00000E+10

     J          ISUPP          ISAT3          SPOOL          APOOL          PL3            XMV3           XMA3           DP3            TG3            P3
   FML3         FMV3           FMA3           CVVC           CPVC           BPOOL          ROV3           ROA3           ROG3           TL3            TSAT3
   HCOND        HBDN           HNAT           HCONV          HWALL          SCOND          DSCOND         GABREK         ZCOND          FLCOND         DCOND
   VOL          ACOND          TV3            PV3            PA3            FMD3           GADBRK         CPDC           CVDC           SPRAY3         DSPRAY
  GSPRAY        ISPRAY         HSPRAY         UVC3           ZVC3           SVAP           DPVAP          PSTG3          TSTG3          IPSTG3         IPVT

     1          0              0              .00000E+00     .00000E+00     .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
  .00000E+00 2.83980E+05 3.29007E+06 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 9.35569E+02 9.35569E+02 1.87114E+03
3.43017E+09 2.11573E+07  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
1.80000E+05       0      1.25726E+09  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0              0

     2          0              0              .00000E+00     .00000E+00     .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
  .00000E+00 3.55179E+05 4.11494E+06 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 4.24115E+03 1.00800E+03 2.01601E+03
4.29017E+09 2.84785E+07  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
1.80000E+05       0      1.25726E+09  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0              0

     3          0              0              .00000E+00     .00000E+00     .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
 00000E+00 2.15953E+05 2.50194E+06 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00        0        .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02        0        0

     4        0        0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 1.01671E+04 1.17791E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08  .00000E+00  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00        0        .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02        0        0

     5        0        0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 1.09162E+04 1.26470E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08  .00000E+00  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00        0        .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02        0        0

     6        0        0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 6.39160E+09 7.40502E+10 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13  .00000E+00  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00        0        .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02        0        0

     7        0        0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00        0        .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02        0        0

     8        0        0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 7.11985E+04 8.24874E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00        0        .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02        0        0

     9        0        0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01  .00000E+00 3.23150E+02 1.01325E+06
 .00000E+00 1.65578E+04 1.91831E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00  .00000E+00
 .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00        0        .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02        0        0
```

I	J	A	U3	G3	GA3	DGAL	DGAU	PR	CR	ICHECK
CD	FL	Y	GAD3							
1	2	3.79625E+05	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	0
7.00000E-01	.00000E+00	.00000E+00	.00000E+00							
1	3	2.07505E+04	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	0
7.00000E-01	.00000E+00	.00000E+00	.00000E+00							
2	3	2.07505E+04	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	0
7.00000E-01	.00000E+00	.00000E+00	.00000E+00							

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
     1          4      1.42500E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1          5      3.84656E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2          5      3.84656E+04  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     4          5      2.00000E+03  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1          6      1.45482E+01  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2          6      1.45482E+01  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     5          7       .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1          8      1.00000E+05  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2          9      2.83000E+03  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00      0
5.70000E-01  .00000E+00  .00000E+00  .00000E+00

PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT=  .00000E+00 CRRPPT=  .00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3=  .00000E+00 XRP3=  .00000E+00 NWORK=    50 DWRKC=  .00000E+00 WRKRP3=  .00000E+00
GPTRP=  .00000E+00 UPTRP=  .00000E+00 GAPTRP=  .00000E+00 DGPTRP=  .00000E+00 DGPTPT=  .00000E+00 GABREK(1)=  .00000E+00
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3=  .00000E+00 VOCPT3= 2.21466E+08 PET3=  .00000E+00 TET3=  .00000E+00 ROLCET=  .00000E+00
RSVCET=  .00000E+00 VFLCET=  .00000E+00 VFVCET=  .00000E+00 UCET=  .00000E+00 UVET=  .00000E+00 GFET=  .00000E+00
GCET=  .00000E+00 GVET=  .00000E+00 GET=  .00000E+00 DCRE= 1.00000E-02 DFMCPT=  .00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.39260E+09 SML3=  .00000E+00 XMASS=  .00000E+00
SMV30=  .00000E+00 SML30=  .00000E+00 SMA30=  .00000E+00 XMASSN=  .00000E+00 XMASSD=  .00000E+00 SMVBRK=  .00000E+00
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0=  .00000E+00 SVOL=  .00000E+00 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER=  .00000E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND=  .00000E+00 DSMCON=  .00000E+00 PRP3=  .00000E+00 GABNLI=  .00000E+00 PBNLI=  .00000E+00 HBNLI=  .00000E+00
XBNLI=  .00000E+00 GABNLO=  .00000E+00 PBNLO=  .00000E+00 HBNLO=  .00000E+00 XBNLO=  .00000E+00 PBNLSI=  .00000E+00
HBNLSI=  .00000E+00 XBNLSI=  .00000E+00 TBNLI=  .00000E+00 TBNLSI=  .00000E+00 XRPI3=  .00000E+00 WRKRPI=  .00000E+00
PBNLSO=  .00000E+00 HBNLSO=  .00000E+00 XBNLSO=  .00000E+00 TBNLO=  .00000E+00 TBNLSO=  .00000E+00 XRPO3=  .00000E+00
WRKRPO=  .00000E+00 DWRKC=  .00000E+00 WRKC=  .00000E+00 GABRKI=  .00000E+00 GABRKO=  .00000E+00
GABREK(1)=  .00000E+00 GADBRK(1)=  .00000E+00 IPBNLI=    0 IPBNLO=    0 QDECAY=  .00000E+00 SMDBRK=  .00000E+00
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP=  .00000E+00 SMVAP=  .00000E+00
SMD3=  .00000E+00 SMD0=  .00000E+00 SMD30=  .00000E+00
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.

TIME =	1.00000D+02	seconds
CYCLE =	2000	
TIMESTEP =	5.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	1.29857D+05	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	3.80343D+05	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	2.12913D+07	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	5.94263D+07	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	2.37508D+06	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	8.76804D+02	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	4.23351D+06	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	2.48531D+03	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.79295D+06	1.77447D+06	1.84731D+04	3.89663D+02	3.89670D+02	6.94935D+03	2.09845D+04	9.83539D-01
2	1.79250D+06	1.68457D+06	1.07932D+05	3.88006D+02	3.88006D+02	7.06209D+03	2.05509D+04	9.06615D-01
3	1.79236D+06	6.15213D+05	1.17715D+06	3.59659D+02	3.59661D+02	1.71408D+03	.00000D+00	2.45332D-01
4	1.79272D+06	1.19138D+06	6.01340D+05	3.77729D+02	3.77729D+02	.00000D+00	.00000D+00	5.52042D-01
5	1.79258D+06	1.72378D+06	6.88003D+04	3.88698D+02	3.88698D+02	.00000D+00	.00000D+00	9.39703D-01
6	1.01342D+06	1.23773D+05	8.89649D+05	3.23075D+02	3.23075D+02	.00000D+00	.00000D+00	7.96467D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	3.23025D+02	1.14282D-09	.00000D+00	7.94562D-02

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
    8       1.79276D+06 6.04984D+05 1.18777D+06 3.59226D+02 3.59228D+02 1.22201D+03  .00000D+00 2.40596D-01

    9       1.79172D+06 2.61159D+05 1.53056D+06 3.38975D+02 3.38979D+02 5.87890D+02  .00000D+00 9.59514D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	3.59185E+02	3.60282E-01	1.36772E+05	3.24287E+05
1	3	2.07505E+04	7.00000E-01	4.11036E+02	4.12292E-01	8.55526E+03	2.02854E+04
2	3	2.07505E+04	7.00000E-01	2.13552E+02	2.21546E-01	4.59720E+03	8.52610E+03
1	4	1.42500E+04	7.00000E-01	2.56008E+02	2.56790E-01	3.65926E+03	8.67552E+03
1	5	3.84656E+04	7.00000E-01	3.23814E+02	3.24803E-01	1.24937E+04	2.96219E+04
2	5	3.84656E+04	7.00000E-01	-1.63554E+02	-1.67213E-01	-6.43195E+03	-1.27809E+04
4	5	2.00000E+03	7.00000E-01	2.29727E+02	2.84367E-01	5.68734E+02	5.88646E+02
1	6	1.45482E+01	7.00000E-01	1.33042E+04	1.33448E+01	1.94143E+02	6.40774E+02
2	6	2.47756E+03	7.00000E-01	1.46241E+04	1.51715E+01	3.75884E+04	9.16913E+04
5	7	.00000E+00	7.00000E-01	1.40668E+04	1.43814E+01	.00000E+00	.00000E+00
1	8	1.00000E+05	7.00000E-01	2.37141E+02	2.37866E-01	2.37866E+04	5.63935E+04
2	9	2.83000E+03	5.70000E-01	4.14765E+02	4.30292E-01	1.21773E+03	2.25889E+03

```
T3= 1.00000E+02 T1= 9.99500E+01 DT3= 5.00000E-02 NCYC=  2000 T3SPON= 5.50000E-01 T3SPOF=-1.00000E+10
```

J	ISUPP	ISAT3	SPOOL	APOOL	PL3	XMV3	XMA3	DP3	TG3	P3
FML3	FMV3	FMA3	CVVC	CPVC	BPOOL	ROV3	ROA3	ROG3	TL3	TSAT3
HCOND	HBDN	HNAT	HCONV	HWALL	SCOND	DSCOND	GABREK	ZCOND	FLCOND	DCOND
VOL	ACOND	TV3	PV3	PA3	FMD3	GADBRK	CPDC	CVDC	SPRAY3	DSPRAY
GSPRAY	ISPRAY	HSPRAY	UVC3	ZVC3	SVAP	DPVAP	PSTG3	TSTG3	IPSTG3	IPVT
1	0	0	.00000E+00	.00000E+00	.00000E+00	9.83539E-01	1.64611E-02	6.61824E+01	3.89663E+02	1.79295E+06
.00000E+00	3.38469E+06	5.66481E+04	1.44333E+07	1.91636E+07	.00000E+00	9.86742E-04	1.65147E-05	1.00326E-03	.00000E+00	3.89670E+02
1.09251E+05	7.35443E+05	8.07799E+05	8.07799E+05	1.26338E+05	6.94935E+03	.00000E+00	1.29857E+05	9.35569E+02	9.35569E+02	1.87114E+03
3.43017E+09	2.11573E+07	.00000E+00	1.77447E+06	1.84731E+04	1.59023E+07	3.80343E+05	4.22388E+07	.00000E+00	2.09845E+04	4.73387E-03
1.80000E+05	1	1.25726E+09	.00000E+00	.00000E+00	1.33469E+04	3.49866E+02	1.76780E+06	3.89553E+02	3	5
2	0	0	.00000E+00	.00000E+00	.00000E+00	9.06615E-01	9.33854E-02	4.15547E+02	3.88006E+02	1.79250E+06
.00000E+00	4.03595E+06	4.15721E+05	1.43971E+07	1.90998E+07	.00000E+00	9.40743E-04	9.69008E-05	1.03764E-03	.00000E+00	3.88006E+02
8.47562E+04	1.01313E+04	2.57515E+05	2.57515E+05	1.26338E+05	7.06209E+03	.00000E+00	.00000E+00	4.24115E+03	1.00800E+03	2.01601E+03
4.29017E+09	2.84785E+07	.00000E+00	1.68457E+06	1.07932E+05	1.08623E+07	.00000E+00	4.22094E+07	.00000E+00	2.05509E+04	4.91473E-03
1.80000E+05	1	1.25726E+09	.00000E+00	.00000E+00	3.33502E+04	6.95966E+02	1.68150E+06	3.88006E+02	3	5
3	0	0	.00000E+00	.00000E+00	.00000E+00	2.45332E-01	7.54668E-01	3.77668E+02	3.59659E+02	1.79236E+06

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
 .00000E+00 9.66840E+05 2.97410E+06 1.38752E+07 1.81951E+07  .00000E+00 3.70653E-04 1.14017E-03 1.51082E-03  .00000E+00 3.59661E+02
6.33164E+04 1.26929E+05 1.27285E+04 1.26929E+05 1.26338E+05 1.71408E+03 1.39074E-03  .00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07  .00000E+00 6.15213E+05 1.17715E+06 1.55614E+06  .00000E+00 4.18831E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.12139E+03 3.56779E+01 6.12587E+05 3.59550E+02       3           3

    4           0           0        .00000E+00  .00000E+00  .00000E+00 5.52042E-01 4.47958E-01 4.02162E+02 3.77729E+02 1.79272E+06
 .00000E+00 8.39309E+04 6.81063E+04 1.41888E+07 1.87352E+07  .00000E+00 6.83437E-04 5.54580E-04 1.23802E-03  .00000E+00 3.77729E+02
6.34613E+04 1.27513E+05 5.50853E+04 1.27513E+05 1.26338E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08  .00000E+00  .00000E+00 1.19138E+06 6.01340E+05 1.57421E+05  .00000E+00 4.20532E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.87561E+01 1.33119E+01 1.18463E+06 3.77565E+02       3           4

    5           0           0        .00000E+00  .00000E+00  .00000E+00 9.39703E-01 6.02968E-02 4.15586E+02 3.88698E+02 1.79258E+06
 .00000E+00 1.26704E+05 8.13006E+03 1.44121E+07 1.91262E+07  .00000E+00 9.60927E-04 6.16586E-05 1.02259E-03  .00000E+00 3.88698E+02
1.00607E+05 1.04818E+05 4.93967E+05 4.93967E+05 1.26338E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08  .00000E+00  .00000E+00 1.72378E+06 6.88003E+04 4.00983E+05  .00000E+00 4.22215E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.35173E+03 9.19540E+02 1.71966E+06 3.88698E+02       3           8

    6           0           0        .00000E+00  .00000E+00  .00000E+00 7.96467E-02 9.20353E-01 5.88900E-02 3.23075E+02 1.01342E+06
 .00000E+00 6.40880E+09 7.40565E+10 1.33690E+07 1.73352E+07  .00000E+00 8.30118E-05 9.59238E-04 1.04225E-03  .00000E+00 3.23075E+02
1.13571E+05 4.40856E+04 1.12387E+06 1.12387E+06 1.26338E+05  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13  .00000E+00  .00000E+00 1.23773E+05 8.89649E+05 2.43301E+07  .00000E+00 4.19374E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.08445E+04 1.04721E-02 1.23610E+05 3.23048E+02       2           6

    7           0           0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01-3.15975E-10 3.23150E+02 1.01325E+06
 .00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00 3.23025E+02
1.22733E+05 4.30143E+06 3.07387E+06 4.30143E+06 1.26338E+05 1.14282E-09 2.64098E-16  .00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           7

    8           0           0        .00000E+00  .00000E+00  .00000E+00 2.40596E-01 7.59404E-01 3.81975E+02 3.59226E+02 1.79276E+06
 .00000E+00 3.13840E+05 9.90587E+05 1.38684E+07 1.81834E+07  .00000E+00 3.64930E-04 1.15185E-03 1.51678E-03  .00000E+00 3.59228E+02
1.06137E+05 6.63776E+05 1.36496E+04 6.63776E+05 1.26338E+05 1.22201E+03 3.23200E-04  .00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06  .00000E+00 6.04984E+05 1.18777E+06 7.44291E+05  .00000E+00 4.18806E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 4.02267E+02 3.87722E+01 5.99871E+05 3.59010E+02       4           8

    9           0           0        .00000E+00  .00000E+00  .00000E+00 9.59514E-02 9.04049E-01 3.69795E+02 3.38975E+02 1.79172E+06
 .00000E+00 3.33897E+04 3.14596E+05 1.35744E+07 1.76839E+07  .00000E+00 1.66949E-04 1.57298E-03 1.73993E-03  .00000E+00 3.38979E+02
1.24834E+05 1.04840E+07 6.37427E+03 1.04840E+07 1.26338E+05 5.87890E+02 2.68434E-05  .00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06  .00000E+00 2.61159E+05 1.53056E+06 1.47201E+05  .00000E+00 4.18487E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.15031E+02 4.49859E+01 2.57342E+05 3.38648E+02       3           9
```

```
     I           J           A          U3          G3          GA3         DGAL        DGAU        PR          CR          ICHECK
    CD          FL          Y          GAD3

     1           2      3.79625E+05 3.59185E+02 3.60282E-01 1.36772E+05 1.53629E+02-1.53629E+02 9.99752E-01 5.42512E-01      0
7.00000E-01  .00000E+00 2.37100E+00 3.24287E+05

     1           3      2.07505E+04 4.11036E+02 4.12292E-01 8.55526E+03 7.33790E+00-7.33790E+00 9.99675E-01 5.42512E-01      0
7.00000E-01  .00000E+00 2.37111E+00 2.02854E+04

     2           3      2.07505E+04 2.13552E+02 2.21546E-01 4.59720E+03 1.66791E+01-1.66791E+01 9.99923E-01 5.41680E-01      0
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
7.00000E-01  .00000E+00 1.85463E+00 8.52610E+03

     1          4      1.42500E+04 2.56008E+02 2.56790E-01 3.65926E+03 8.09131E+00-8.09131E+00 9.99874E-01 5.42512E-01      0

7.00000E-01  .00000E+00 2.37084E+00 8.67552E+03

     1          5      3.84656E+04 3.23814E+02 3.24803E-01 1.24937E+04 1.72672E+01-1.72672E+01 9.99798E-01 5.42512E-01      0

7.00000E-01  .00000E+00 2.37094E+00 2.96219E+04

     2          5      3.84656E+04-1.63554E+02-1.67213E-01-6.43195E+03 3.85795E+01-3.85795E+01 9.99953E-01 5.42038E-01      0

7.00000E-01  .00000E+00 1.98710E+00-1.27809E+04

     4          5      2.00000E+03 2.29727E+02 2.84367E-01 5.68734E+02 2.09627E+00-2.09627E+00 9.99924E-01 5.37161E-01      0

7.00000E-01  .00000E+00 1.03501E+00 5.88646E+02

     1          6      1.45482E+01 1.33042E+04 1.33448E+01 1.94143E+02 1.24593E-04-1.24593E-04 5.65359E-01 5.42512E-01      0

7.00000E-01  .00000E+00 3.30052E+00 6.40774E+02

     2          6      2.47756E+03 1.46241E+04 1.51715E+01 3.75884E+04 2.41365E-02-2.41365E-02 5.65499E-01 5.41680E-01      0

7.00000E-01  .00000E+00 2.43935E+00 9.16913E+04

     5          7       .00000E+00 1.40668E+04 1.43814E+01  .00000E+00  .00000E+00  .00000E+00 5.65377E-01 5.42038E-01      0

7.00000E-01  .00000E+00 2.77330E+00  .00000E+00

     1          8      1.00000E+05 2.37141E+02 2.37866E-01 2.37866E+04 6.12991E+01-6.12991E+01 9.99892E-01 5.42512E-01      0

7.00000E-01  .00000E+00 2.37081E+00 5.63935E+04

     2          9      2.83000E+03 4.14765E+02 4.30292E-01 1.21773E+03 7.76473E-01-7.76473E-01 9.99562E-01 5.41680E-01      0

5.70000E-01  .00000E+00 1.85501E+00 2.25889E+03


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT=  .00000E+00 CRRPPT=  .00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 1.79253E+06 XRP3=  .00000E+00 NWORK=    50 DWRKC= 3.62829E+13 WRKRP3=  .00000E+00
GPTRP=  .00000E+00 UPTRP=  .00000E+00 GAPTRP=  .00000E+00 DGPTRP=  .00000E+00 DGPTPT=  .00000E+00 GABREK(1)= 1.29857E+05
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3=  .00000E+00 VOCPT3= 2.21466E+08 PET3=  .00000E+00 TET3=  .00000E+00 ROLCET=  .00000E+00
RSVCET=  .00000E+00 VFLCET=  .00000E+00 VFVCET=  .00000E+00 UCET=  .00000E+00 UVET=  .00000E+00 GFET=  .00000E+00
GCET=  .00000E+00 GVET=  .00000E+00 GET=  .00000E+00 DCRE= 1.00000E-02 DFMCPT=  .00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.41778E+09 SML3=  .00000E+00 XMASS= 7.61412E-01
SMV30= 2.51834E+07 SML30=  .00000E+00 SMA30= 7.26318E-03 XMASSN= 6.03679E+07 XMASSD= 7.92342E+07 SMVBRK= 2.12913E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0=  .00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 2.37508E+06 DSMCON= 8.76804E+02 PRP3= 1.79253E+06 GABNLI= 5.10200E+05 PBNLI= 5.24500E+07 HBNLI= 1.15680E+10
XBNLI=  .00000E+00 GABNLO=  .00000E+00 PBNLO=  .00000E+00 HBNLO=  .00000E+00 XBNLO=  .00000E+00 PBNLSI= 5.03652E+07
HBNLSI= 1.15680E+10 XBNLSI=  .00000E+00 TBNLI= 5.37285E+02 TBNLSI= 5.37285E+02 XRPI3= 2.54522E-01 WRKRPI= 1.42230E+09
PBNLSO=  .00000E+00 HBNLSO=  .00000E+00 XBNLSO=  .00000E+00 TBNLO=  .00000E+00 TBNLSO=  .00000E+00 XRPO3=  .00000E+00
WRKRPO=  .00000E+00 DWRKC= 3.62829E+13 WRKC= 1.22631E+17 GABRKI= 1.29857E+05 GABRKO=  .00000E+00
GABREK(1)= 1.29857E+05 GADBRK(1)= 3.80343E+05 IPBNLI=   3 IPBNLO=   0 QDECAY=  .00000E+00 SMDBRK= 5.94263E+07
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 2.48531E+03 SMVAP= 4.23351E+06
SMD3= 5.41008E+07 SMD0=  .00000E+00 SMD30= 5.41008E+07
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.

TIME =	2.40000D+03 seconds
CYCLE =	48000
TIMESTEP =	5.00000D-02 second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10 cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07 square centimeters
STEAM FORMATION RATE FROM BREAK =	8.08990D+03 grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	7.80101D+04 grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	6.58898D+07 grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	2.38606D+08 grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	1.02334D+07 grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	6.38197D+01 grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	2.84118D+07 grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	3.98201D+02 grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	8.60654D+05	7.60303D+05	1.00351D+05	3.65230D+02	3.65231D+02	6.57165D+02	.00000D+00	8.24951D-01
2	8.60638D+05	3.17838D+05	5.42800D+05	3.63328D+02	3.43475D+02	3.82999D+02	.00000D+00	2.66984D-01
3	8.60631D+05	3.80637D+05	4.79994D+05	3.45528D+02	3.45528D+02	1.65254D+02	.00000D+00	3.30327D-01
4	8.60639D+05	7.77722D+05	8.29171D+04	3.58662D+02	3.58662D+02	.00000D+00	.00000D+00	8.53678D-01
5	8.60638D+05	8.22873D+05	3.77648D+04	3.60133D+02	3.60133D+02	.00000D+00	.00000D+00	9.31288D-01
6	1.01378D+06	1.24017D+05	8.89762D+05	3.23114D+02	3.23114D+02	.00000D+00	.00000D+00	7.97816D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	3.23025D+02	1.74200D-10	.00000D+00	7.94562D-02

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
    8       8.60639D+05 3.50239D+05 5.10400D+05 3.32552D+02 3.32552D+02 3.20959D+01  .00000D+00 2.99147D-01

    9       8.60623D+05 1.48691D+05 7.11932D+05 3.49385D+02 3.26816D+02 3.88812D+01  .00000D+00 1.14976D-01
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	1.69386E+02	9.26106E-02	3.51573E+04	.00000E+00
1	3	2.07505E+04	7.00000E-01	2.03421E+02	1.11219E-01	2.30785E+03	.00000E+00
2	3	2.07505E+04	7.00000E-01	9.88511E+01	7.01797E-02	1.45626E+03	.00000E+00
1	4	1.42500E+04	7.00000E-01	1.66587E+02	9.10799E-02	1.29789E+03	.00000E+00
1	5	3.84656E+04	7.00000E-01	1.68652E+02	9.22094E-02	3.54689E+03	.00000E+00
2	5	3.84656E+04	7.00000E-01	-1.59725E+01	-8.49088E-03	-3.26607E+02	.00000E+00
4	5	2.00000E+03	7.00000E-01	2.62295E+01	1.44355E-02	2.88710E+01	.00000E+00
1	6	1.45482E+01	7.00000E-01	-1.20012E+04	-1.25102E+01	-1.82001E+02	.00000E+00
2	6	1.45483E+01	7.00000E-01	-1.20019E+04	-1.25108E+01	-1.82011E+02	.00000E+00
5	7	.00000E+00	7.00000E-01	-1.19838E+04	-1.24864E+01	.00000E+00	.00000E+00
1	8	1.00000E+05	7.00000E-01	1.64664E+02	9.00289E-02	9.00289E+03	.00000E+00
2	9	2.83000E+03	5.70000E-01	1.15862E+02	8.22567E-02	2.32787E+02	.00000E+00

T3= 2.40000E+03 T1= 2.39995E+03 DT3= 5.00000E-02 NCYC= 48000 T3SPON= 2.22485E+03 T3SPOF= 2.34350E+03

J	ISUPP	ISAT3	SPOOL	APOOL	PL3	XMV3	XMA3	DP3	TG3	P3
FML3	FMV3	FMA3	CVVC	CPVC	BPOOL	ROV3	ROA3	ROG3	TL3	TSAT3
HCOND	HBDN	HNAT	HCONV	HWALL	SCOND	DSCOND	GABREK	ZCOND	FLCOND	DCOND
VOL	ACOND	TV3	PV3	PA3	FMD3	GADBRK	CPDC	CVDC	SPRAY3	DSPRAY
GSPRAY	ISPRAY	HSPRAY	UVC3	ZVC3	SVAP	DPVAP	PSTG3	TSTG3	IPSTG3	IPVT
1	0	0	.00000E+00	.00000E+00	.00000E+00	8.24951E-01	1.75049E-01	4.84506E+01	3.65230E+02	8.60654E+05
.00000E+00	1.54723E+06	3.28311E+05	1.39657E+07	1.83501E+07	.00000E+00	4.51065E-04	9.57128E-05	5.46778E-04	.00000E+00	3.65231E+02
1.68126E+04	1.04242E-31	1.57426E+05	1.57426E+05	1.88228E+04	6.57165E+02	.00000E+00	8.08990E+03	9.35569E+02	9.35569E+02	1.87114E+03
3.43017E+09	2.11573E+07	.00000E+00	7.60303E+05	1.00351E+05	3.84323E+03	7.80101E+04	4.19215E+07	.00000E+00	.00000E+00	.00000E+00
1.80000E+05	0	1.25726E+09	.00000E+00	.00000E+00	1.14547E+03	2.81440E+01	7.03140E+05	3.63152E+02	3	5
2	0	0	.00000E+00	.00000E+00	.00000E+00	2.66984E-01	7.33016E-01	7.65937E+01	3.63328E+02	8.60638E+05
.00000E+00	8.13221E+05	2.23273E+06	1.36359E+07	1.77881E+07	.00000E+00	1.89554E-04	5.20430E-04	7.09985E-04	.00000E+00	3.43475E+02
7.81041E+03	1.80288E-33	1.33498E+04	1.33498E+04	1.88228E+04	3.82999E+02	.00000E+00	.00000E+00	4.24115E+03	1.00800E+03	2.01601E+03
4.29017E+09	2.84785E+07	.00000E+00	3.17838E+05	5.42800E+05	.00000E+00	.00000E+00	4.18417E+07	.00000E+00	.00000E+00	.00000E+00
1.80000E+05	0	1.25726E+09	.00000E+00	.00000E+00	5.95781E+03	1.18720E+02	4.50678E+05	3.51819E+02	3	5
3	0	0	.00000E+00	.00000E+00	.00000E+00	3.30327E-01	6.69673E-01	7.65928E+01	3.45528E+02	8.60631E+05

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
 .00000E+00 6.22648E+05 1.26230E+06 1.36646E+07 1.78368E+07  .00000E+00 2.38701E-04 4.83921E-04 7.22623E-04  .00000E+00 3.45528E+02
1.00906E+04 1.57880E-32 2.17509E+04 2.17509E+04 1.88228E+04 1.65254E+02  .00000E+00  .00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07  .00000E+00 3.80637E+05 4.79994E+05  .00000E+00  .00000E+00 4.18412E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 5.14157E+02 1.64392E+01 3.46988E+05 3.45528E+02       3           3

    4           0           0        .00000E+00  .00000E+00  .00000E+00 8.53678E-01 1.46322E-01 7.65938E+01 3.58662E+02 8.60639E+05
 .00000E+00 5.77015E+04 9.89014E+03 1.38595E+07 1.81682E+07  .00000E+00 4.69855E-04 8.05340E-05 5.50389E-04  .00000E+00 3.58662E+02
1.75612E+04 1.47421E-32 2.62018E+05 2.62018E+05 1.88228E+04  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08  .00000E+00  .00000E+00 7.77722E+05 8.29171E+04  .00000E+00  .00000E+00 4.18775E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.44282E+01 1.00417E+01 5.91821E+05 3.58662E+02       3           4

    5           0           0        .00000E+00  .00000E+00  .00000E+00 9.31288E-01 6.87123E-02 7.65937E+01 3.60133E+02 8.60638E+05
 .00000E+00 6.52825E+04 4.81667E+03 1.38827E+07 1.82079E+07  .00000E+00 4.95105E-04 3.65298E-05 5.31634E-04  .00000E+00 3.60133E+02
1.81585E+04 1.41723E-32 5.14503E+05 5.14503E+05 1.88228E+04  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08  .00000E+00  .00000E+00 8.22873E+05 3.77648E+04  .00000E+00  .00000E+00 4.18859E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 6.76297E+01 4.43631E+01 6.26543E+05 3.60133E+02       3           8

    6           0           0        .00000E+00  .00000E+00  .00000E+00 7.97816E-02 9.20218E-01-3.17646E-04 3.23114E+02 1.01378E+06
 .00000E+00 6.42063E+09 7.40569E+10 1.33694E+07 1.73360E+07  .00000E+00 8.31650E-05 9.59243E-04 1.04241E-03  .00000E+00 3.23114E+02
1.85133E+04 1.14656E-32 1.12593E+06 1.12593E+06 1.88228E+04  .00000E+00  .00000E+00  .00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13  .00000E+00  .00000E+00 1.24017E+05 8.89762E+05  .00000E+00  .00000E+00 4.19371E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 3.40968E+01 3.29296E-05 1.24016E+05 3.23114E+02       2           6

    7           0           0        .00000E+00  .00000E+00  .00000E+00 7.94562E-02 9.20544E-01-3.04190E-11 3.23150E+02 1.01325E+06
 .00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07  .00000E+00 8.27890E-05 9.59156E-04 1.04195E-03  .00000E+00 3.23025E+02
1.87082E+04 1.11853E-30 3.07387E+06 3.07387E+06 1.88228E+04 1.74200E-10  .00000E+00  .00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06  .00000E+00 1.23470E+05 8.89780E+05  .00000E+00  .00000E+00 4.19378E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00  .00000E+00  .00000E+00 1.23470E+05 3.23025E+02       0           7

    8           0           0        .00000E+00  .00000E+00  .00000E+00 2.99147E-01 7.00853E-01 7.65937E+01 3.32552E+02 8.60639E+05
 .00000E+00 1.96260E+05 4.59805E+05 1.34894E+07 1.75399E+07  .00000E+00 2.28209E-04 5.34656E-04 7.62866E-04  .00000E+00 3.32552E+02
1.08625E+04 8.68204E-32 2.56855E+04 2.56855E+04 1.88228E+04 3.20959E+01  .00000E+00  .00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06  .00000E+00 3.50239E+05 5.10400E+05  .00000E+00  .00000E+00 4.18724E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 1.98114E+02 1.85643E+01 1.95109E+05 3.32552E+02       3           8

    9           0           0        .00000E+00  .00000E+00  .00000E+00 1.14976E-01 8.85024E-01 7.65911E+01 3.49385E+02 8.60623E+05
 .00000E+00 1.84433E+04 1.41967E+05 1.34159E+07 1.74151E+07  .00000E+00 9.22166E-05 7.09836E-04 8.02052E-04  .00000E+00 3.26816E+02
5.03771E+03 1.25677E-30 6.87873E+03 6.87873E+03 1.88228E+04 3.88812E+01  .00000E+00  .00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06  .00000E+00 1.48691E+05 7.11932E+05  .00000E+00  .00000E+00 4.19075E+07  .00000E+00  .00000E+00  .00000E+00
 .00000E+00       0       .00000E+00  .00000E+00  .00000E+00 6.64055E+01 2.34701E+01 2.25824E+05 3.35739E+02       3           9
```

```
     I           J           A          U3          G3          GA3         DGAL        DGAU         PR          CR         ICHECK
    CD          FL          Y          GAD3

     1           2       3.79625E+05 1.69386E+02 9.26106E-02 3.51573E+04 1.09818E+03-1.09818E+03 9.99981E-01 5.38180E-01      0
 7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1           3       2.07505E+04 2.03421E+02 1.11219E-01 2.30785E+03 4.99837E+01-4.99837E+01 9.99973E-01 5.38180E-01      0
 7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2           3       2.07505E+04 9.88511E+01 7.01797E-02 1.45626E+03 1.02859E+02-1.02859E+02 9.99992E-01 5.31655E-01      0
```

Table 8. Output for 20 centimeter One-Way Break Calculated on HP-735 (Contd.)

```
7.90000E-01  .00000E+00  .00000E+00  .00000E+00

     1           4      1.42500E+04 1.66587E+02 9.10799E-02 1.29789E+03 4.19152E+01-4.19152E+01 9.99982E-01 5.38180E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1           5      3.84656E+04 1.68652E+02 9.22094E-02 3.54689E+03 1.11757E+02-1.11757E+02 9.99982E-01 5.38180E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2           5      3.84656E+04-1.59725E+01-8.49088E-03-3.26607E+02 1.18004E+03-1.18004E+03 1.00000E+00 5.38285E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     4           5      2.00000E+03 2.62295E+01 1.44355E-02 2.88710E+01 3.73625E+01-3.73625E+01 1.00000E+00 5.37641E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1           6      1.45482E+01-1.20012E+04-1.25102E+01-1.82001E+02 5.93990E-04-5.93990E-04 8.48881E-01 5.29118E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2           6      1.45483E+01-1.20019E+04-1.25108E+01-1.82011E+02 5.93961E-04-5.93961E-04 8.48865E-01 5.29118E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     5           7       .00000E+00-1.19838E+04-1.24864E+01  .00000E+00  .00000E+00  .00000E+00 8.49308E-01 5.29113E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     1           8      1.00000E+05 1.64664E+02 9.00289E-02 9.00289E+03 2.97575E+02-2.97575E+02 9.99982E-01 5.38180E-01      0

7.00000E-01  .00000E+00  .00000E+00  .00000E+00

     2           9      2.83000E+03 1.15862E+02 8.22567E-02 2.32787E+02 7.93587E+00-7.93587E+00 9.99983E-01 5.31655E-01      0

5.70000E-01  .00000E+00  .00000E+00  .00000E+00


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PKRPPT=  .00000E+00 CRRPPT=  .00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 8.60578E+05 XRP3=  .00000E+00 NWORK=    50 DWRKC= 1.30773E+12 WRKRP3=  .00000E+00
GPTRP=  .00000E+00 UPTRP=  .00000E+00 GAPTRP=  .00000E+00 DGPTRP=  .00000E+00 DGPTPT=  .00000E+00 GABREK(1)= 8.08990E+03
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3=  .00000E+00 VOCPT3= 2.21466E+08 PET3=  .00000E+00 TET3=  .00000E+00 ROLCET=  .00000E+00
RGVCET=  .00000E+00 VFLCET=  .00000E+00 VFVCET=  .00000E+00 UCET=  .00000E+00 UVET=  .00000E+00 GFET=  .00000E+00
GCET=  .00000E+00 GVET=  .00000E+00 GET=  .00000E+00 DCRE= 1.00000E-02 DFMCPT=  .00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.42399E+09 SML3=  .00000E+00 XMASS=-7.72911E-01
SMV30= 3.13888E+07 SML30=  .00000E+00 SMA30= 1.73325E-01 XMASSN=-2.42637E+07 XMASSD= 3.13927E+07 SMVBRK= 6.58898E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0=  .00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 4.50000E+02
SMCOND= 1.02334E+07 DSMCON= 6.38197E+01 PRP3= 8.60578E+05 GABNLI= 8.61000E+04 PBNLI= 5.24500E+07 HBNLI= 6.28300E+09
XBNLI=  .00000E+00 GABNLO=  .00000E+00 PBNLO=  .00000E+00 HBNLO=  .00000E+00 XBNLO=  .00000E+00 PBNLSI= 4.64644E+06
HBNLSI= 6.28300E+09 XBNLSI=  .00000E+00 TBNLI= 4.22409E+02 TBNLSI= 4.22409E+02 XRPI3= 9.39594E-02 WRKRPI= 3.03771E+08
PBNLSO=  .00000E+00 HBNLSO=  .00000E+00 XBNLSO=  .00000E+00 TBNLO=  .00000E+00 TBNLSO=  .00000E+00 XRPO3=  .00000E+00
WRKRPO=  .00000E+00 DWRKC= 1.30773E+12 WRKC= 3.64392E+17 GABRKI= 8.08990E+03 GABRKO=  .00000E+00
GABREK(1)= 8.08990E+03 GADBRK(1)= 7.80101E+04 IPBNLI=   3 IPBNLO=   0 QDECAY=  .00000E+00 SMDBRK= 2.38606E+08
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 3.98201E+02 SMVAP= 2.84118E+07
SMD3= 3.84323E+03 SMD0=  .00000E+00 SMD30= 3.84323E+03
```

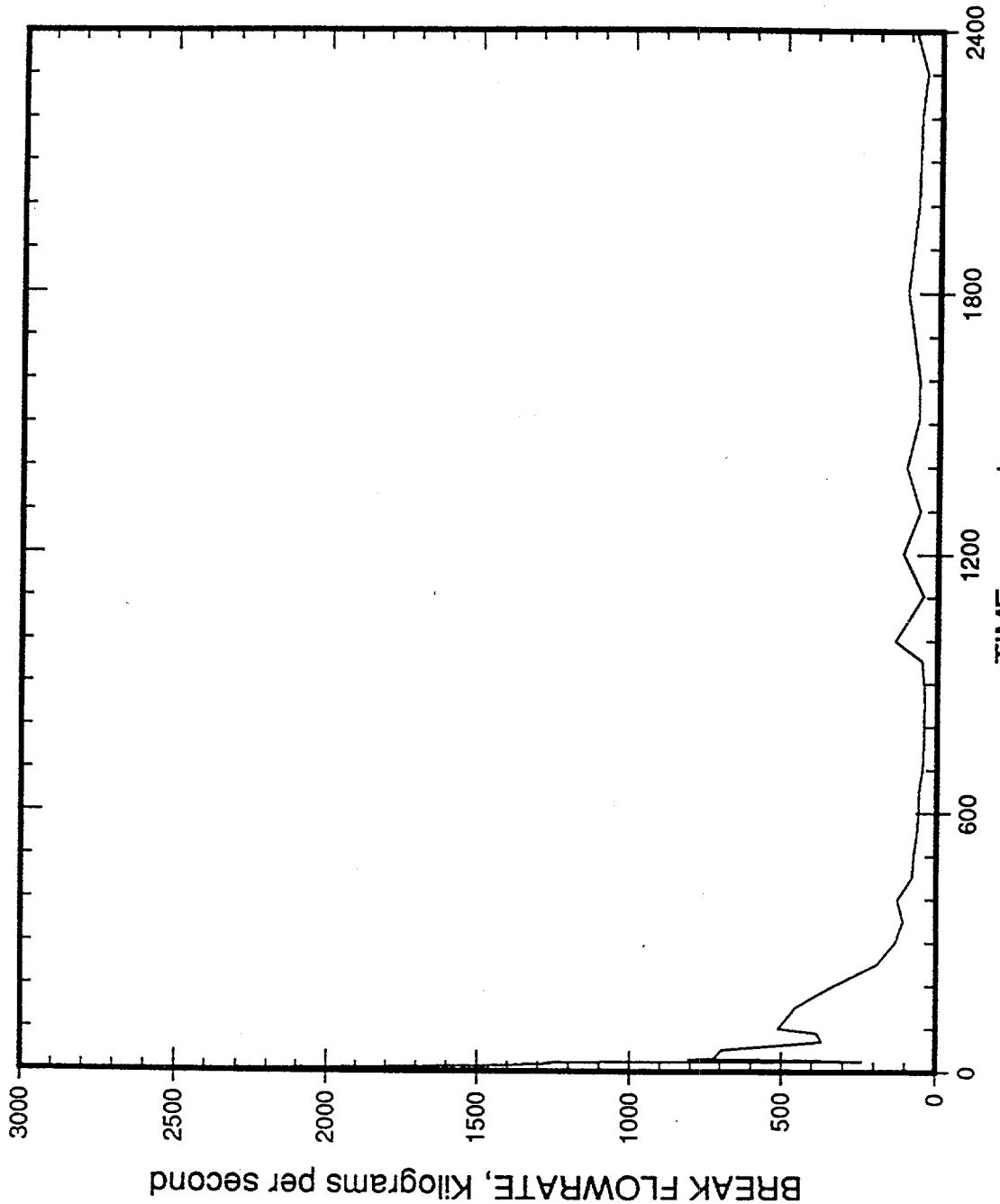

Figure 6. Break Flowrate for 20 centimeter One-Way Break

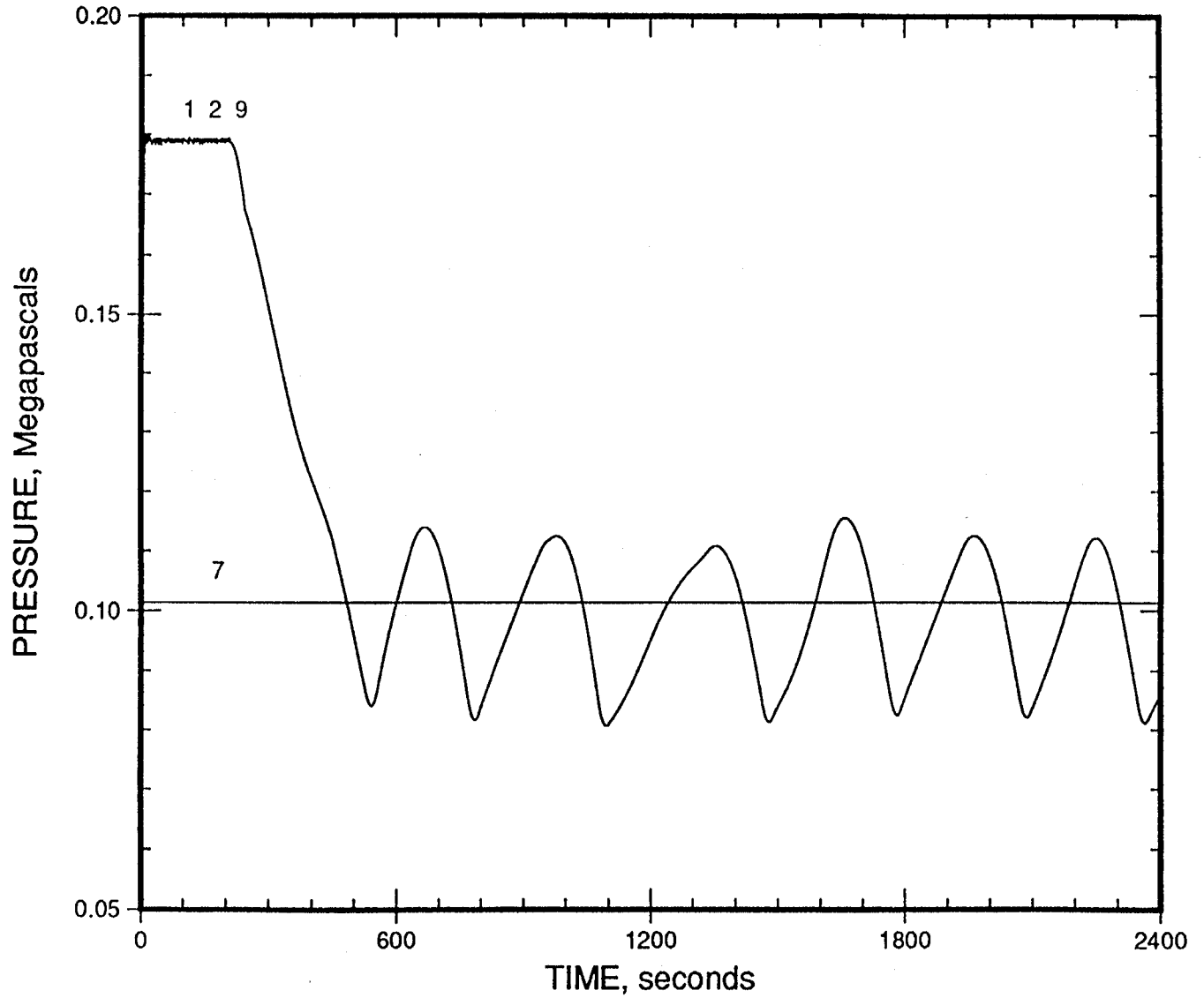

Figure 7. Pressures Inside Confinement for 20 centimeter One-Way Break

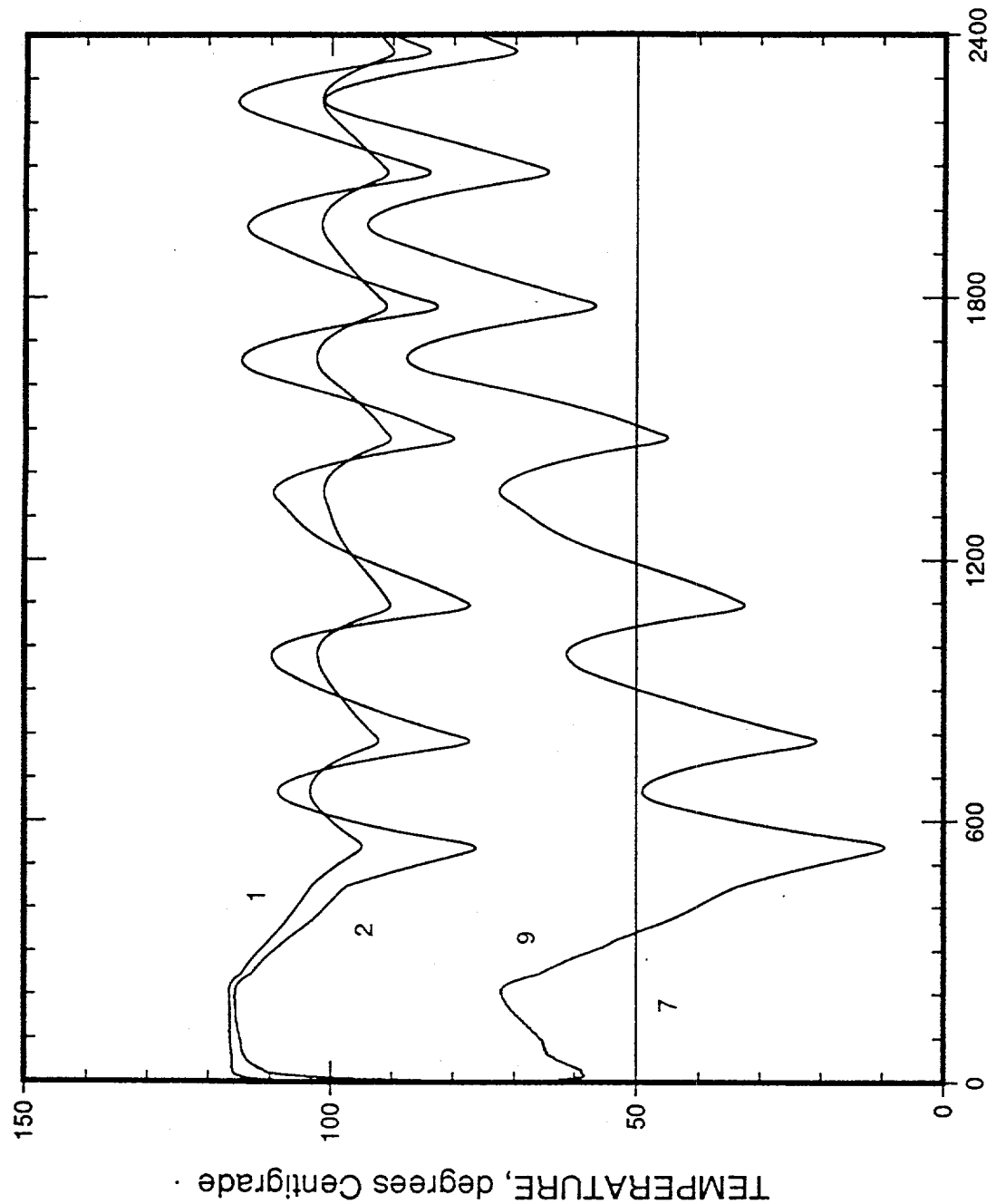

Figure 8. Temperatures Inside Confinement for 20 centimeter One-Way Break

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APPENDIX A

LIST OF PACER SUBROUTINES

Table A1. List of PACER Subroutines

V230	Driver program that reads input, sets up the problem, performs the transient calculations, manages printouts and restarts, calculates global quantities, and stops the calculation when completed
GFLOW	Calculates the beginning of timestep flowrates between interconnected cells and the derivatives of the flowrates with respect to the pressures in the two cells
CONDNS	Calculates the mass rate of condensation upon structure at the beginning of the timestep and the derivative of the condensation rate with respect to the pressure for all cells
SPRAYS	Calculates the mass rate of condensation induced by water droplet sprays and the derivative of the condensation rate with respect to the pressure for all cells
SPRAON	Provides the fraction of the fully developed spray flowrate attained at a time following turning on of a spray
SPRAOF	Provides the fraction of the fully developed spray flowrate attained at a time following turning off of a spray
PRESS	Calculates forward elimination coefficients for the suppression pool condensation factors, forward eliminates the incremental changes in the steam and air masses in terms of pressure, sets up and solves the linear problem for the incremental changes in pressure over the current timestep, determines the end of timestep pressures and suppression pool condensation factors
MASTEM	Given the incremental pressure changes, solves the steam, air, and water droplet mass equations, solves the steam-air-water droplet energy equation for all cells
PRINTO	Performs concise printouts of major variables
PRINT	Performs large printouts of major and minor variables in compact form
BREAKI	Calculates rates of formation of steam and liquid water resulting from coolant release when the release conditions are specified through the input file
BREAK	Calculates rates of formation of steam and liquid water resulting from coolant release when the hardwired default release conditions are selected
BRKINP	Table lookup routine that determines the current coolant conditions immediately upstream of the break from user-supplied input
BNL1	Default hardwired coolant conditions immediately upstream of break for double-ended rupture of 50 centimeter primary coolant system pipe from zero to 66 seconds

Table A1. List of PACER Subroutines (Contd.)

BNL2	Default hardwired coolant conditions immediately upstream of break for double-ended rupture of 50 centimeter primary coolant system pipe from 66 to 111.78 seconds
BNLD	Calculates coolant conditions upstream of rupture, assuming decay heating of coolant at a constant flowrate and inlet specific enthalpy after 111.78 seconds
WATRF	Given the pressure, calculates the coolant temperature, liquid specific enthalpy, vapor specific enthalpy, and derivatives with respect to pressure along the saturation line. This subroutine is a shortened version of WATRS
WORKC	Calculates the thermodynamic mechanical work potential when saturated coolant expands from an initial pressure down to a final pressure
DECAYH	Time dependent decay heat for VVER-440
POLY	Evaluates a polynomial in one variable
POLY2	Evaluates a polynomial in two variables
BLOCK DATA	Defines BLOCK DATA constants and coefficients used by steam/water properties subroutines
WATRI	Defines constants and coefficients used by steam/water properties subroutines
WATRS	Given the pressure, calculates the coolant temperature, liquid and vapor specific enthalpies, liquid and vapor specific volumes, and selected derivatives along the saturation line
WATR1P	Given the pressure and specific enthalpy, calculates nonequilibrium coolant temperature, specific volume, as well as derivatives with respect to pressure and specific enthalpy
WTHCON	Given the coolant temperature and density, calculates the thermal conductivity. Not used in PACER but retained for possible future use
WVISC	Given the coolant temperature and density, calculates the dynamic viscosity. Not used in PACER but retained for possible future use
sgeco	LINPACK routine that performs LU factorization of a matrix and estimates the condition number. Not used in PACER but retained for possible future use
sgefa	LINPACK routine that performs LU factorization of a matrix
sgesl	LINPACK routine that solves a linear problem after application of either sgefa or sgeco

Table A1. List of PACER Subroutines (Contd.)

sgedi	LINPACK routine that computes inverse of a matrix after application of sgefa or sgeco. Not used in PACER
sswap	LINPACK routine not used in PACER
saxpy	Supporting LINPACK routine
sscal	Supporting LINPACK routine
sdot	Supporting LINPACK function
isamax	Supporting LINPACK function
sasum	Supporting LINPACK function

APPENDIX B

SAMPLE PROBLEM OUTPUT CALCULATED ON SUN SPARC WORKSTATION

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC

```
    0
RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.
 0.00000D+00 6.00000D+01
 1.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10
 1.00000D+00 1.00000D+01 1.00000D+01 3.00000D+02 3.00000D+02 1.00000D+10
 0.00000D+00 0.00000D+00 2.00000D-02 0.00000D+00 1.00000D+01
   21   22
 1.01325D+06 3.23150D+02 1.23470D+05 4.24600D+04 6.00000D+01
    1    0    1    1    1    0
    9
    1 3.43017D+09 2.11573D+07 9.35569D+02    1    0
 1.01325D+06 1.23470D+05 3.23150D+02
    2 4.29017D+09 2.84785D+07 4.24115D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    3 2.60848D+09 1.70016D+07 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    4 1.22807D+08 0.00000D+00 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    5 1.31856D+08 0.00000D+00 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    6 7.72035D+13 0.00000D+00 2.03000D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    7 4.27034D+08 2.21891D+06 4.67152D+02    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    8 8.60000D+08 7.32121D+06 1.16632D+03    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    9 2.00000D+08 6.98617D+06 3.62783D+02    0    0
 1.01325D+06 1.23470D+05 3.23150D+02
    1    2 3.79625D+05 7.00000D-01    0    0
    1    3 2.07505D+04 7.00000D-01    0    0
    2    3 2.07505D+04 7.00000D-01    0    0
    1    4 1.42500D+04 7.00000D-01    0    0
    1    5 3.84656D+04 7.00000D-01    0    0
    2    5 3.84656D+04 7.00000D-01    0    0
    4    5 2.00000D+03 7.00000D-01    0    0
    1    6 1.45482D+01 7.00000D-01    0    0
    2    6 1.45482D+01 7.00000D-01    0    0
    5    7 0.00000D+00 7.00000D-01    0    0
    1    8 1.00000D+05 7.00000D-01    0    0
    2    9 2.83000D+03 5.70000D-01    0    1
 2.90965D+01
    1 1.80000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01    0
    2 1.80000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01    1
    2    6 5.60000D+01 1.10000D+02    1    8 6.60000D+05 7.80000D+05
    5    7 1.88496D+03 9.90000D+05
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.

TIME =	0.00000D+00	seconds
CYCLE =	0	
TIMESTEP =	1.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	0.00000D+00	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	0.00000D+00	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	0.00000D+00	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	0.00000D+00	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	0.00000D+00	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	0.00000D+00	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	0.00000D+00	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	0.00000D+00	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
2	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
3	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
4	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
5	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
6	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
    8       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02 0.00000D+00 0.00000D+00 0.00000D+00 7.94562D-02

    9       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02 0.00000D+00 0.00000D+00 0.00000D+00 7.94562D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	3	2.07505E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	3	2.07505E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	4	1.42500E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	5	3.84656E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	5	3.84656E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4	5	2.00000E+03	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	6	1.45482E+01	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	6	1.45482E+01	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5	7	0.00000E+00	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	8	1.00000E+05	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	9	2.83000E+03	5.70000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

```
T3= 0.00000E+00 T1= 0.00000E+00 DT3= 1.00000E-02 NCYC=     0 T3SPON=-2.00000E+10 T3SPOF=-1.00000E+10

     J          ISUPP         ISAT3         SPOOL         APOOL          PL3           XMV3          XMA3          DP3           TG3           P3
   FML3         FMV3          FMA3          CVVC          CPVC         BPOOL          ROV3          ROA3          ROG3          TL3          TSAT3
   HCOND        HBDN          HNAT          HCONV         HWALL        SCOND          DSCOND        GABREK        ZCOND         FLCOND       DCOND
   VOL          ACOND         TV3           PV3           PA3          FMD3           GADBRK        CPDC          CVDC          SPRAY3       DSPRAY
  GSPRAY       ISPRAY        HSPRAY        UVC3          ZVC3          SVAP           DPVAP         PSTG3         TSTG3         IPSTG3       IPVT

     1          0             0        0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 2.83980E+05 3.29007E+06 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 9.35569E+02 9.35569E+02 1.87114E+03
3.43017E+09 2.11573E+07 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
1.80000E+05       0       1.25726E+09 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0             0

     2          0             0        0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 3.55179E+05 4.11494E+06 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 4.24115E+03 1.00800E+03 2.01601E+03
4.29017E+09 2.84785E+07 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
1.80000E+05       0       1.25726E+09 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0             0

     3          0             0        0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
0.00000E+00 2.15953E+05 2.50194E+06 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     4            0           0      0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 1.01671E+04 1.17791E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08 0.00000E+00 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     5            0           0      0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 1.09162E+04 1.26470E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08 0.00000E+00 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     6            0           0      0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 6.39160E+09 7.40502E+10 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13 0.00000E+00 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     7            0           0      0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     8            0           0      0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 7.11985E+04 8.24874E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     9            0           0      0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 1.65578E+04 1.91831E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0


     I            J           A          U3          G3          GA3         DGAL        DGAU         PR          CR         ICHECK

    CD           FL           Y         GAD3

     1            2      3.79625E+05 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            3      2.07505E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2            3      2.07505E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            4      1.42500E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            5      3.84656E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          5      3.84656E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     4          5      2.00000E+03 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1          6      1.45482E+01 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          6      1.45482E+01 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     5          7      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1          8      1.00000E+05 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          9      2.83000E+03 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
5.70000E-01 0.00000E+00 0.00000E+00 0.00000E+00


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT= 0.00000E+00 CRRPPT= 0.00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51203E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 0.00000E+00 XRP3= 0.00000E+00 NWORK=     50 DWRKC= 0.00000E+00 WRKRP3= 0.00000E+00
GPTRP= 0.00000E+00 UPTRP= 0.00000E+00 GAPTRP= 0.00000E+00 DGPTRP= 0.00000E+00 DGPTPT= 0.00000E+00 GABREK(1)= 0.00000E+00
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31°54E+08 ROCPT3= 0.00000E+00 VOCPT3= 2.21466E+08 PET3= 0.00000E+00 TET3= 0.00000E+00 ROLCET= 0.00000E+00
KSVCET= 0.00000E+00 VFLCET= 0.00000E+00 VFVCET= 0.00000E+00 UCET= 0.00000E+00 UVET= 0.00000E+00 GFET= 0.00000E+00
GCET= 0.00000E+00 GVET= 0.00000E+00 GET= 0.00000E+00 DCRE= 1.00000E-02 DFMCPT= 0.00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.39260E+09 SML3= 0.00000E+00 XMASS= 0.00000E+00
SMV30= 0.00000E+00 SML30= 0.00000E+00 SMA30= 0.00000E+00 XMASSN= 0.00000E+00 XMASSD= 0.00000E+00 SMVBRK= 0.00000E+00
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0= 0.00000E+00 SVOL= 0.00000E+00 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 0.00000E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 0.00000E+00 DSMCON= 0.00000E+00 PRP3= 0.00000E+00 GABNLI= 0.00000E+00 PBNLI= 0.00000E+00 HBNLI= 0.00000E+00
XBNLI= 0.00000E+00 GABNLO= 0.00000E+00 PBNLO= 0.00000E+00 HBNLO= 0.00000E+00 XBNLO= 0.00000E+00 PBNLSI= 0.00000E+00
HBNLSI= 0.00000E+00 XBNLSI= 0.00000E+00 TBNLI= 0.00000E+00 TBNLSI= 0.00000E+00 XRPI3= 0.00000E+00 WRKRPI= 0.00000E+00
PBNLSO= 0.00000E+00 HBNLSO= 0.00000E+00 XBNLSO= 0.00000E+00 TBNLO= 0.00000E+00 TBNLSO= 0.00000E+00 XRPO3= 0.00000E+00
WRKRPO= 0.00000E+00 DWRKC= 0.00000E+00 WRKC= 0.00000E+00 GABRKI= 0.00000E+00 GABRKO= 0.00000E+00
GABREK(1)= 0.00000E+00 GADBRK(1)= 0.00000E+00 IPBNLI=    0 IPBNLO=    0 QDECAY= 0.00000E+00 SMDBRK= 0.00000E+00
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 0.00000E+00 SMVAP= 0.00000E+00
SMD3= 0.00000E+00 SMD0= 0.00000E+00 SMD30= 0.00000E+00
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.

TIME =	1.00000D+01	seconds
CYCLE =	1000	
TIMESTEP =	1.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	1.58602D+06	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	3.52897D+06	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	1.88012D+07	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	4.41221D+07	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	6.22596D+05	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	7.17140D+02	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	3.61912D+06	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	2.36969D+03	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	2.25094D+06	2.24476D+06	6.18070D+03	3.97113D+02	3.97113D+02	3.35431D+04	2.26702D+03	9.95593D-01
2	2.20793D+06	2.06763D+06	1.40297D+05	3.94484D+02	3.94485D+02	1.70775D+04	2.19507D+03	9.01643D-01
3	2.22782D+06	9.24312D+05	1.30351D+06	3.70547D+02	3.70548D+02	4.46182D+03	0.00000D+00	3.06072D-01
4	2.24960D+06	1.34863D+06	9.00967D+05	3.81354D+02	3.81355D+02	0.00000D+00	0.00000D+00	4.82157D-01
5	2.22643D+06	2.15937D+06	6.70655D+04	3.95876D+02	3.95876D+02	0.00000D+00	0.00000D+00	9.52444D-01
6	1.01336D+06	1.23737D+05	8.89627D+05	3.23069D+02	3.23069D+02	0.00000D+00	0.00000D+00	7.96272D-02
7	1.95699D+06	8.83363D+05	1.07363D+06	3.69296D+02	3.69299D+02	3.23157D+03	0.00000D+00	3.38532D-01

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
    8       2.25036D+06 8.73988D+05 1.37637D+06 3.69006D+02 3.69006D+02 5.92423D+03 0.00000D+00 2.83144D-01

    9       2.18841D+06 5.28153D+05 1.66026D+06 3.55762D+02 3.55762D+02 7.47622D+03 0.00000D+00 1.65188D-01
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	3.46714E+03	4.26562E+00	1.61934E+06	2.99815E+06
1	3	2.07505E+04	7.00000E-01	2.54873E+03	3.13570E+00	6.50673E+04	1.19854E+05
2	3	2.07505E+04	7.00000E-01	-2.84834E+03	-5.03042E+00	-1.04384E+05	-3.73739E+04
1	4	1.42500E+04	7.00000E-01	6.13485E+02	7.54769E-01	1.07555E+04	1.97013E+04
1	5	3.84656E+04	7.00000E-01	2.62150E+03	3.22522E+00	1.24060E+05	2.28598E+05
2	5	3.84656E+04	7.00000E-01	-2.33632E+03	-2.89936E+00	-1.11526E+05	-1.87095E+05
4	5	2.00000E+03	7.00000E-01	2.90211E+03	4.61293E+00	9.22586E+03	6.43383E+03
1	6	1.45482E+01	7.00000E-01	1.71473E+04	2.10963E+01	3.06913E+02	7.22170E+02
2	6	7.85041E+04	7.00000E-01	1.88241E+04	2.37133E+01	1.86159E+06	3.02094E+06
5	7	1.88496E+03	7.00000E-01	8.72530E+03	1.08281E+01	2.04104E+04	3.68387E+04
1	8	1.00000E+05	7.00000E-01	4.10648E+02	5.05219E-01	5.05219E+04	9.25260E+04
2	9	2.83000E+03	5.70000E-01	1.96475E+03	2.47506E+00	7.00441E+03	1.13666E+04

```
T3= 1.00000E+01 T1= 9.99000E+00 DT3= 1.00000E-02 NCYC=  1000 T3SPON= 2.10000E-01 T3SPOF=-1.00000E+10

     J          ISUPP         ISAT3         SPOOL         APOOL          PL3           XMV3          XMA3          DP3           TG3           P3
   FML3         FMV3          FMA3          CVVC          CPVC         BPOOL          ROV3          ROA3          ROG3          TL3          TSAT3
   HCOND        HBDN          HNAT          HCONV         HWALL        SCOND          DSCOND        GABREK        ZCOND         FLCOND       DCOND
    VOL         ACOND          TV3           PV3           PA3          FMD3           GADBRK        CPDC          CVDC          SPRAY3       DSPRAY
  GSPRAY        ISPRAY        HSPRAY         UVC3          ZVC3         SVAP           DPVAP         PSTG3         TSTG3         IPSTG3       IPVT

     1          0             0       0.00000E+00 0.00000E+00 0.00000E+00 9.95593E-01 4.40703E-03-1.27350E+03 3.97113E+02 2.25094E+06
0.00000E+00 4.20130E+06 1.85972E+04 1.46047E+07 1.94682E+07 0.00000E+00 1.22481E-03 5.42167E-06 1.23023E-03 0.00000E+00 3.97113E+02
4.69670E+05 9.02066E+05 1.12306E+06 1.12306E+06 8.07275E+05 3.35431E+04 0.00000E+00 1.58602E+06 9.35569E+02 9.35569E+02 1.87114E+03
3.43017E+09 2.11573E+07 0.00000E+00 2.24476E+06 6.18070E+03 9.93001E+06 3.52897E+06 4.23847E+07 0.00000E+00 2.26702E+03 3.94071E-04
1.80000E+05      1      1.25726E+09 0.00000E+00 0.00000E+00 2.17091E+05 1.15992E+03 2.24360E+06 3.97113E+02      3             1

     2          0             0       0.00000E+00 0.00000E+00 0.00000E+00 9.01643E-01 9.83572E-02-1.38726E+02 3.94484E+02 2.20793E+06
0.00000E+00 4.87232E+06 5.31506E+05 1.45424E+07 1.93570E+07 0.00000E+00 1.13569E-03 1.23889E-04 1.25958E-03 0.00000E+00 3.94485E+02
1.84833E+05 1.23021E+04 2.39718E+05 2.39718E+05 8.07275E+05 1.70775E+04 0.00000E+00 0.00000E+00 4.24115E+03 1.00800E+03 2.01601E+03
4.29017E+09 2.84785E+07 0.00000E+00 2.06763E+06 1.40297E+05 8.77158E+06 0.00000E+00 4.23305E+07 0.00000E+00 2.19507E+03 4.17708E-04
1.80000E+05      1      1.25726E+09 0.00000E+00 0.00000E+00 1.18044E+04 5.00936E+01 1.23470E+05 3.23025E+02      0             2

     3          0             0       0.00000E+00 0.00000E+00 0.00000E+00 3.06072E-01 6.93928E-01-8.06050E+01 3.70547E+02 2.22782E+06
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
0.00000E+00 1.40989E+06 3.19650E+06 1.40570E+07 1.85071E+07 0.00000E+00 5.40503E-04 1.22543E-03 1.76593E-03 0.00000E+00 3.70548E+02
1.25353E+05 1.48396E+05 1.61349E+04 1.48396E+05 8.07275E+05 4.46182E+03 4.07868E-03 0.00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07 0.00000E+00 9.24312E+05 1.30351E+06 1.65019E+06 0.00000E+00 4.19698E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 3.97971E+03 2.60906E+01 1.23856E+05 3.23088E+02       3           3

     4            0           0       0.00000E+00 0.00000E+00 0.00000E+00 4.82157E-01 5.17843E-01-1.38598E+02 3.81354E+02 2.24960E+06
0.00000E+00 9.41047E+04 1.01070E+05 1.42594E+07 1.88583E+07 0.00000E+00 7.66281E-04 8.22998E-04 1.58928E-03 0.00000E+00 3.81355E+02
1.36128E+05 1.63738E+05 4.12430E+04 1.63738E+05 8.07275E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08 0.00000E+00 0.00000E+00 1.34863E+06 9.00967E+05 1.36176E+05 0.00000E+00 4.21033E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.95457E+02 2.80114E+01 1.23470E+05 3.23025E+02       0           4

     5            0           0       0.00000E+00 0.00000E+00 0.00000E+00 9.52444E-01 4.75563E-02-1.48315E+02 3.95876E+02 2.22643E+06
0.00000E+00 1.55841E+05 7.78127E+03 1.45751E+07 1.94153E+07 0.00000E+00 1.18190E-03 5.90134E-05 1.24092E-03 0.00000E+00 3.95876E+02
3.35210E+05 1.27232E+05 5.73239E+05 5.73239E+05 8.07275E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08 0.00000E+00 0.00000E+00 2.15937E+06 6.70655E+04 2.95929E+05 0.00000E+00 4.23588E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 4.03574E+02 5.59201E+01 2.15931E+06 3.95876E+02       2           5

     6            0           0       0.00000E+00 0.00000E+00 0.00000E+00 7.96272E-02 9.20373E-01 5.67407E-01 3.23069E+02 1.01336E+06
0.00000E+00 6.40705E+09 7.40561E+10 1.33689E+07 1.73351E+07 0.00000E+00 8.29891E-05 9.59232E-04 1.04222E-03 0.00000E+00 3.23069E+02
4.69757E+05 4.40844E+04 1.12356E+06 1.12356E+06 8.07275E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13 0.00000E+00 0.00000E+00 1.23737E+05 8.89627E+05 1.75537E+07 0.00000E+00 4.19374E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 4.27976E+05 8.26538E-02 1.23616E+05 3.23049E+02       2           6

     7            0           0       0.00000E+00 0.00000E+00 0.00000E+00 3.38532E-01 6.61468E-01 7.98221E+02 3.69296E+02 1.95699E+06
0.00000E+00 2.21345E+05 4.32494E+05 1.40351E+07 1.84693E+07 0.00000E+00 5.18332E-04 1.01279E-03 1.53112E-03 0.00000E+00 3.69299E+02
7.15826E+05 6.31903E+06 2.18712E+04 6.31903E+06 8.07275E+05 3.23157E+03 4.14810E-04 0.00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06 0.00000E+00 8.83363E+05 1.07363E+06 2.89253E+05 0.00000E+00 4.19574E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.88475E+03 7.52183E+01 1.23470E+05 3.23025E+02       0           7

     8            0           0       0.00000E+00 0.00000E+00 0.00000E+00 2.83144E-01 7.16856E-01-1.03000E+02 3.69006E+02 2.25036E+06
0.00000E+00 4.41348E+05 1.11739E+06 1.40300E+07 1.84605E+07 0.00000E+00 5.13195E-04 1.29929E-03 1.81249E-03 0.00000E+00 3.69006E+02
4.00118E+05 7.93318E+05 1.60058E+04 7.93318E+05 8.07275E+05 5.92423E+03 3.41839E-03 0.00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06 0.00000E+00 8.73988E+05 1.37637E+06 5.73766E+05 0.00000E+00 4.19546E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 5.73608E+02 1.13590E+01 8.73977E+05 3.69006E+02       3           8

     9            0           0       0.00000E+00 0.00000E+00 0.00000E+00 1.65188E-01 8.34812E-01-6.43568E+01 3.55762E+02 2.18841E+06
0.00000E+00 6.43346E+04 3.25129E+05 1.38146E+07 1.80917E+07 0.00000E+00 3.21673E-04 1.62564E-03 1.94732E-03 0.00000E+00 3.55762E+02
7.55315E+05 1.17348E+07 9.90697E+03 1.17348E+07 8.07275E+05 7.47622E+03 9.11091E-04 0.00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06 0.00000E+00 5.28153E+05 1.66026E+06 1.52157E+05 0.00000E+00 4.18636E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.03689E+03 8.51236E+01 5.28068E+05 3.55762E+02       3           9


     I            J           A          U3          G3          GA3         DGAL        DGAU         PR          CR         ICHECK

    CD           FL           Y         GAD3

     1            2      3.79625E+05 3.46714E+03 4.26562E+00 1.61934E+06 1.88153E+01-1.88153E+01 9.80883E-01 5.43764E-01       0
7.00000E-01 0.00000E+00 1.85147E+00 2.99815E+06

     1            3      2.07505E+04 2.54873E+03 3.13570E+00 6.50673E+04 1.40371E+00-1.40371E+00 9.89704E-01 5.43764E-01       0
7.00000E-01 0.00000E+00 1.84200E+00 1.19854E+05

     2            3      2.07505E+04-2.84834E+03-5.03042E+00-1.04384E+05 2.62857E+00-2.62857E+00 9.91088E-01 5.33595E-01       0
7.00000E-01 0.00000E+00 3.58044E-01-3.73739E+04

     1            4      1.42500E+04 6.13485E+02 7.54769E-01 1.07555E+04 4.01932E+00-4.01932E+00 9.99406E-01 5.43764E-01       0
7.00000E-01 0.00000E+00 1.83175E+00 1.97013E+04

     1            5      3.84656E+04 2.62150E+03 3.22522E+00 1.24060E+05 2.52928E+00-2.52928E+00 9.89105E-01 5.43764E-01       0
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
7.00000E-01 0.00000E+00 1.84264E+00 2.28598E+05

     2          5      3.84656E+04-2.33632E+03-2.89936E+00-1.11526E+05 3.01294E+00-3.01294E+00 9.91688E-01 5.43225E-01      0
7.00000E-01 0.00000E+00 1.67760E+00-1.87095E+05

     4          5      2.00000E+03 2.90211E+03 4.61293E+00 9.22586E+03 1.98946E-01-1.98946E-01 9.89693E-01 5.36726E-01      0
7.00000E-01 0.00000E+00 6.97368E-01 6.43383E+03

     1          6      1.45482E+01 1.71473E+04 2.10963E+01 3.06913E+02 1.23987E-04-1.23987E-04 4.50174E-01 5.43764E-01      0
7.00000E-01 0.00000E+00 2.35301E+00 7.22170E+02

     2          6      7.85041E+04 1.88241E+04 2.37133E+01 1.86159E+06 7.79135E-01-7.79135E-01 4.58947E-01 5.42592E-01      0
7.00000E-01 0.00000E+00 1.62277E+00 3.02094E+06

     5          7      1.88496E+03 8.72530E+03 1.08281E+01 2.04104E+04 3.77399E-02-3.77399E-02 8.78551E-01 5.43225E-01      0
7.00000E-01 0.00000E+00 1.80490E+00 3.68387E+04

     1          8      1.00000E+05 4.10648E+02 5.05219E-01 5.05219E+04 4.21429E+01-4.21429E+01 9.99734E-01 5.43764E-01      0
7.00000E-01 0.00000E+00 1.83140E+00 9.25260E+04

     2          9      2.83000E+03 1.96475E+03 2.47506E+00 7.00441E+03 1.78430E-01-1.78430E-01 9.91111E-01 5.42592E-01      0
5.70000E-01 0.00000E+00 1.62277E+00 1.13666E+04


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT= 0.00000E+00 CRRPPT= 0.00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 2.25105E+06 XRP3= 0.00000E+00 NWORK=     50 DWRKC= 9.02652E+13 WRKRP3= 0.00000E+00
GPTRP= 0.00000E+00 UPTRP= 0.00000E+00 GAPTRP= 0.00000E+00 DGPTRP= 0.00000E+00 DGPTPT= 0.00000E+00 GABREK(1)= 1.58602E+06
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3= 0.00000E+00 VOCPT3= 2.21466E+08 PET3= 0.00000E+00 TET3= 0.00000E+00 ROLCET= 0.00000E+00
RSVCET= 0.00000E+00 VFLCET= 0.00000E+00 VFVCET= 0.00000E+00 UCET= 0.00000E+00 UVET= 0.00000E+00 GFET= 0.00000E+00
GCET= 0.00000E+00 GVET= 0.00000E+00 GET= 0.00000E+00 DCRE= 1.00000E-02 DFMCPT= 0.00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.41851E+09 SML3= 0.00000E+00 XMASS= 7.21462E-01
SMV30= 2.59116E+07 SML30= 0.00000E+00 SMA30= 2.33459E-03 XMASSN= 4.70857E+07 XMASSD= 6.52643E+07 SMVBRK= 1.88012E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0= 0.00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 6.22596E+05 DSMCON= 7.17140E+02 PRP3= 2.25105E+06 GABNLI= 2.85144E+06 PBNLI= 1.23355E+08 HBNLI= 1.18410E+10
XBNLI= 1.46969E-02 GABNLO= 2.26355E+06 PBNLO= 1.23395E+08 HBNLO= 1.54763E+10 XBNLO= 1.99472E-01 PBNLSI= 5.08947E+07
HBNLSI= 1.18410E+10 XBNLSI= 1.46969E-02 TBNLI= 5.42638E+02 TBNLSI= 5.37939E+02 XRPI3= 2.56625E-01 WRKRPI= 1.37982E+09
PBNLSO= 6.49359E+07 HBNLSO= 1.54763E+10 XBNLSO= 1.99472E-01 TBNLO= 6.05113E+02 TBNLSO= 5.53640E+02 XRPO3= 3.77403E-01
WRKRPO= 2.24958E+09 DWRKC= 9.02652E+13 WRKC= 1.12936E+17 GABRKI= 7.31753E+05 GABRKO= 8.54272E+05
GABREK(1)= 1.58602E+06 GADBRK(1)= 3.52897E+06 IPBNLI=   3 IPBNLO=   3 QDECAY= 0.00000E+00 SMDBRK= 4.41221E+07
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 2.36969E+03 SMVAP= 3.61912E+06
SMD3= 3.93527E+07 SMD0= 0.00000E+00 SMD30= 3.93527E+07
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

RUPTURE OF 50 cm MAIN COOLANT PIPE WITH DEFAULT BREAK CONDITIONS.

TIME =	6.00000D+01	seconds
CYCLE =	6000	
TIMESTEP =	1.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	1.19819D+05	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	1.41746D+05	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	4.78414D+07	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	1.02745D+08	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	2.62535D+06	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	2.71619D+02	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	7.10775D+06	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	2.78971D+02	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.79323D+06	1.78027D+06	1.29643D+04	3.89761D+02	3.89761D+02	9.67696D+03	1.26336D+04	9.88428D-01
2	1.79312D+06	1.75981D+06	3.33153D+04	3.89412D+02	3.89412D+02	1.18817D+04	1.25753D+04	9.70464D-01
3	1.79308D+06	9.70552D+05	8.22526D+05	3.71902D+02	3.71902D+02	2.54546D+03	0.00000D+00	4.23286D-01
4	1.79323D+06	1.43640D+06	3.56830D+05	3.83229D+02	3.83229D+02	0.00000D+00	0.00000D+00	7.14604D-01
5	1.79317D+06	1.75816D+06	3.50037D+04	3.89383D+02	3.89383D+02	0.00000D+00	0.00000D+00	9.68985D-01
6	1.01454D+06	1.24534D+05	8.90004D+05	3.23198D+02	3.23198D+02	0.00000D+00	0.00000D+00	8.00677D-02
7	1.79289D+06	8.36468D+05	9.56425D+05	3.67808D+02	3.67808D+02	7.69416D+02	0.00000D+00	3.52334D-01

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
    8       1.79323D+06 5.46637D+05 1.24659D+06 3.56518D+02 3.56518D+02 1.52346D+03 0.00000D+00 2.14305D-01

    9       1.79281D+06 2.44772D+05 1.54804D+06 3.37525D+02 3.37525D+02 7.64824D+02 0.00000D+00 8.95453D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	1.96967E+02	1.97215E-01	7.48676E+04	1.34905E+05
1	3	2.07505E+04	7.00000E-01	2.25552E+02	2.25836E-01	4.68621E+03	8.44423E+03
2	3	2.07505E+04	7.00000E-01	1.11227E+02	1.12225E-01	2.32873E+03	3.99286E+03
1	4	1.42500E+04	7.00000E-01	4.31071E+01	4.31613E-02	6.15048E+02	1.10823E+03
1	5	3.84656E+04	7.00000E-01	1.48828E+02	1.49016E-01	5.73198E+03	1.03284E+04
2	5	3.84656E+04	7.00000E-01	-1.29459E+02	-1.30708E-01	-5.02777E+03	-8.84804E+03
4	5	2.00000E+03	7.00000E-01	1.51566E+02	1.72250E-01	3.44500E+02	4.06679E+02
1	6	1.45482E+01	7.00000E-01	1.53212E+04	1.53404E+01	2.23176E+02	5.01399E+02
2	6	2.47756E+03	7.00000E-01	1.60380E+04	1.61820E+01	4.00918E+04	7.77710E+04
5	7	1.88496E+03	7.00000E-01	2.78883E+02	2.81574E-01	5.30756E+02	9.35351E+02
1	8	1.00000E+05	7.00000E-01	3.01533E+01	3.01912E-02	3.01912E+03	5.44000E+03
2	9	2.83000E+03	5.70000E-01	2.46167E+02	2.48377E-01	7.02907E+02	1.20530E+03

```
T3= 6.00000E+01 T1= 5.99900E+01 DT3= 1.00000E-02 NCYC=  6000 T3SPON= 2.10000E-01 T3SPOF=-1.00000E+10

     J          ISUPP       ISAT3       SPOOL       APOOL       PL3         XMV3        XMA3        DP3         TG3         P3
   FML3         FMV3        FMA3        CVVC        CPVC        BPOOL       ROV3        ROA3        ROG3        TL3         TSAT3
   HCOND        HBDN        HNAT        HCONV       HWALL       SCOND       DSCOND      GABREK      ZCOND       FLCOND      DCOND
    VOL         ACOND       TV3         PV3         PA3         FMD3        GADBRK      CPDC        CVDC        SPRAY3      DSPRAY
  GSPRAY        ISPRAY      HSPRAY      UVC3        ZVC3        SVAP        DPVAP       RSTG3       TSTG3       IPSTG3      IPVT

     1          0           0       0.00000E+00 0.00000E+00 0.00000E+00 9.88428E-01 1.15719E-02 4.92609E+01 3.89761E+02 1.79323E+06
0.00000E+00 3.39483E+06 3.97444E+04 1.44353E+07 1.91672E+07 0.00000E+00 9.89697E-04 1.15867E-05 1.00128E-03 0.00000E+00 3.89761E+02
1.51872E+05 7.34131E+05 9.20634E+05 9.20634E+05 1.81875E+05 9.67696E+03 0.00000E+00 1.19819E+05 9.35569E+02 9.35569E+02 1.87114E+03
3.43017E+09 2.11573E+07 0.00000E+00 1.78027E+06 1.29643E+04 7.71592E+06 1.41746E+05 4.22405E+07 0.00000E+00 1.26336E+04 2.83892E-03
1.80000E+05       1     1.25726E+09 0.00000E+00 0.00000E+00 2.70043E+04 1.41621E+02 1.77968E+06 3.89761E+02       2           8

     2          0           0       0.00000E+00 0.00000E+00 0.00000E+00 9.70464E-01 2.95362E-02 5.13400E+01 3.89412E+02 1.79312E+06
0.00000E+00 4.20094E+06 1.27856E+05 1.44277E+07 1.91537E+07 0.00000E+00 9.79200E-04 2.98021E-05 1.00900E-03 0.00000E+00 3.89412E+02
1.39329E+05 9.85338E+03 5.95603E+05 5.95603E+05 1.81875E+05 1.18817E+04 0.00000E+00 0.00000E+00 4.24115E+03 1.00800E+03 2.01601E+03
4.29017E+09 2.84785E+07 0.00000E+00 1.75981E+06 3.33153E+04 8.39748E+06 0.00000E+00 4.22342E+07 0.00000E+00 1.25753E+04 2.86263E-03
1.80000E+05       1     1.25726E+09 0.00000E+00 0.00000E+00-5.01291E+02-2.09995E+00 1.75963E+06 3.89409E+02       3           5

     3          0           0       0.00000E+00 0.00000E+00 0.00000E+00 4.23286E-01 5.76714E-01 4.06031E+01 3.71902E+02 1.79308E+06
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
0.00000E+00 1.47501E+06 2.00966E+06 1.40811E+07 1.85486E+07 0.00000E+00 5.65468E-04 7.70432E-04 1.33590E-03 0.00000E+00 3.71902E+02
6.94098E+04 1.12247E+05 2.64844E+04 1.12247E+05 1.81875E+05 2.54546E+03 1.62185E-03 0.00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07 0.00000E+00 9.70552E+05 8.22526E+05 2.27632E+06 0.00000E+00 4.19839E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 4.16635E+02 2.74168E+00 9.70440E+05 3.71902E+02       3           3

     4          0          0       0.00000E+00 0.00000E+00 0.00000E+00 7.14604E-01 2.85396E-01 4.93744E+01 3.83229E+02 1.79323E+06
0.00000E+00 9.97369E+04 3.98325E+04 1.42971E+07 1.89242E+07 0.00000E+00 8.12143E-04 3.24351E-04 1.13649E-03 0.00000E+00 3.83229E+02
7.12240E+04 1.17070E+05 1.06126E+05 1.17070E+05 1.81875E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08 0.00000E+00 0.00000E+00 1.43640E+06 3.56830E+05 1.64764E+05 0.00000E+00 4.21314E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 2.10046E-01 3.02506E-02 1.43579E+06 3.83216E+02       3           4

     5          0          0       0.00000E+00 0.00000E+00 0.00000E+00 9.68985E-01 3.10147E-02 5.13882E+01 3.89383E+02 1.79317E+06
0.00000E+00 1.29003E+05 4.12904E+03 1.44270E+07 1.91525E+07 0.00000E+00 9.78360E-04 3.13148E-05 1.00967E-03 0.00000E+00 3.89383E+02
1.47270E+05 1.03514E+05 7.74010E+05 7.74010E+05 1.81875E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08 0.00000E+00 0.00000E+00 1.75816E+06 3.50037E+04 2.80278E+05 0.00000E+00 4.22337E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00-1.88770E+01-2.57273E+00 1.75772E+06 3.89375E+02       3           5

     6          0          0       0.00000E+00 0.00000E+00 0.00000E+00 8.00677E-02 9.19932E-01 1.28102E-02 3.23198E+02 1.01454E+06
0.00000E+00 6.44573E+09 7.40578E+10 1.33705E+07 1.73378E+07 0.00000E+00 8.34902E-05 9.59255E-04 1.04274E-03 0.00000E+00 3.23198E+02
3.54979E+04 4.41066E+04 7.63291E+03 4.41066E+04 1.81875E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13 0.00000E+00 0.00000E+00 1.24534E+05 8.90004E+05 6.73030E+07 0.00000E+00 4.19363E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 9.70833E+03 1.87569E-03 1.23616E+05 3.23049E+02       2           6

     7          0          0       0.00000E+00 0.00000E+00 0.00000E+00 3.52334E-01 6.47666E-01-8.22337E+00 3.67808E+02 1.79289E+06
0.00000E+00 2.10429E+05 3.86815E+05 1.40093E+07 1.84250E+07 0.00000E+00 4.92769E-04 9.05818E-04 1.39859E-03 0.00000E+00 3.67808E+02
1.76321E+05 5.77376E+06 2.34385E+04 5.77376E+06 1.81875E+05 7.69416E+02 2.80901E-05 0.00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06 0.00000E+00 8.36468E+05 9.56425E+05 3.85212E+05 0.00000E+00 4.19434E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 6.25492E+01 2.48637E+00 8.36465E+05 3.67808E+02       2           7

     8          0          0       0.00000E+00 0.00000E+00 0.00000E+00 2.14305E-01 7.85695E-01 4.93212E+01 3.56518E+02 1.79323E+06
0.00000E+00 2.85717E+05 1.04751E+06 1.38262E+07 1.81114E+07 0.00000E+00 3.32230E-04 1.21803E-03 1.55026E-03 0.00000E+00 3.56518E+02
1.43429E+05 6.78518E+05 1.20014E+04 6.78518E+05 1.81875E+05 1.52346E+03 5.89177E-04 0.00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06 0.00000E+00 5.46637E+05 1.24659E+06 4.86083E+05 0.00000E+00 4.18669E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 8.48491E+02 1.67928E+01 5.44088E+05 3.56518E+02       3           8

     9          0          0       0.00000E+00 0.00000E+00 0.00000E+00 8.95453E-02 9.10455E-01-1.21029E+01 3.37525E+02 1.79281E+06
0.00000E+00 3.14270E+04 3.19535E+05 1.35549E+07 1.76509E+07 0.00000E+00 1.57135E-04 1.59767E-03 1.75481E-03 0.00000E+00 3.37525E+02
1.78800E+05 1.05749E+07 6.05799E+03 1.05749E+07 1.81875E+05 7.64824E+02 5.28298E-05 0.00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06 0.00000E+00 2.44772E+05 1.54804E+06 2.15681E+05 0.00000E+00 4.18526E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 8.50393E+01 6.62337E+00 2.44766E+05 3.37525E+02       3           9


     I          J          A          U3         G3         GA3        DGAL       DGAU       PR         CR        ICHECK

    CD         FL          Y         GAD3

     1          2      3.79625E+05 1.96967E+02 1.97215E-01 7.48676E+04 3.37057E+02-3.37057E+02 9.99938E-01 5.42563E-01      0
7.00000E-01 0.00000E+00 1.80191E+00 1.34905E+05

     1          3      2.07505E+04 2.25552E+02 2.25836E-01 4.68621E+03 1.60887E+01-1.60887E+01 9.99919E-01 5.42563E-01      0
7.00000E-01 0.00000E+00 1.80193E+00 8.44423E+03

     2          3      2.07505E+04 1.11227E+02 1.12225E-01 2.32873E+03 3.36751E+01-3.36751E+01 9.99981E-01 5.42377E-01      0
7.00000E-01 0.00000E+00 1.71461E+00 3.99286E+03

     1          4      1.42500E+04 4.31071E+01 4.31613E-02 6.15048E+02 5.78119E+01-5.78119E+01 9.99997E-01 5.42563E-01      0
7.00000E-01 0.00000E+00 1.80185E+00 1.10823E+03

     1          5      3.84656E+04 1.48828E+02 1.49016E-01 5.73198E+03 4.51994E+01-4.51994E+01 9.99965E-01 5.42563E-01      0
```

Table B1. Output for Double-End Rupture of 50 centimeter Primary Coolant System Pipe Calculated on SUN SPARC (Contd.)

```
7.00000E-01 0.00000E+00 1.80188E+00 1.03284E+04

     2          5      3.84656E+04-1.29459E+02-1.30708E-01-5.02777E+03 5.27538E+01-5.27538E+01 9.99973E-01 5.42362E-01      0
7.00000E-01 0.00000E+00 1.75984E+00-8.84804E+03

     4          5      2.00000E+03 1.51566E+02 1.72250E-01 3.44500E+02 2.96532E+00-2.96532E+00 9.99968E-01 5.39400E-01      0
7.00000E-01 0.00000E+00 1.18049E+00 4.06679E+02

     1          6      1.45482E+01 1.53212E+04 1.53404E+01 2.23176E+02 1.43310E-04-1.43310E-04 5.65775E-01 5.42563E-01      0
7.00000E-01 0.00000E+00 2.24665E+00 5.01399E+02

     2          6      2.47756E+03 1.60380E+04 1.61820E+01 4.00918E+04 2.57483E-02-2.57483E-02 5.65810E-01 5.42377E-01      0
7.00000E-01 0.00000E+00 1.93982E+00 7.77710E+04

     5          7      1.88496E+03 2.78883E+02 2.81574E-01 5.30756E+02 1.19896E+00-1.19896E+00 9.99877E-01 5.42362E-01      0
7.00000E-01 0.00000E+00 1.76230E+00 9.35351E+02

     1          8      1.00000E+05 3.01533E+01 3.01912E-02 3.01912E+03 5.79985E+02-5.79985E+02 9.99999E-01 5.42563E-01      0
7.00000E-01 0.00000E+00 1.80185E+00 5.44000E+03

     2          9      2.83000E+03 2.46167E+02 2.48377E-01 7.02907E+02 1.37588E+00-1.37588E+00 9.99858E-01 5.42377E-01      0
5.70000E-01 0.00000E+00 1.71473E+00 1.20530E+03


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT= 0.00000E+00 CRRPPT= 0.00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 1.79318E+06 XRP3= 0.00000E+00 NWORK=     50 DWRKC= 1.98111E+12 WRKRP3= 0.00000E+00
GPTRP= 0.00000E+00 UPTRP= 0.00000E+00 GAPTRP= 0.00000E+00 DGPTRP= 0.00000E+00 DGPTPT= 0.00000E+00 GABREK(1)= 1.19819E+05
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3= 0.00000E+00 VOCPT3= 2.21466E+08 PET3= 0.00000E+00 TET3= 0.00000E+00 ROLCET= 0.00000E+00
RSVCET= 0.00000E+00 VFLCET= 0.00000E+00 VFVCET= 0.00000E+00 UCET= 0.00000E+00 UVET= 0.00000E+00 GFET= 0.00000E+00
GCET= 0.00000E+00 GVET= 0.00000E+00 GET= 0.00000E+00 DCRE= 1.00000E-02 DFMCPT= 0.00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.45556E+09 SML3= 0.00000E+00 XMASS= 6.98938E-01
SMV30= 6.29637E+07 SML30= 0.00000E+00 SMA30= 1.46027E-02 XMASSN= 1.04972E+08 XMASSD= 1.50188E+08 SMVBRK= 4.78414E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0= 0.00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 2.62535E+06 DSMCON= 2.71619E+02 PRP3= 1.79318E+06 GABNLI= 1.16776E+05 PBNLI= 1.23355E+08 HBNLI= 1.13186E+10
XBNLI= 2.59726E-01 GABNLO= 1.44789E+05 PBNLO= 1.23395E+08 HBNLO= 1.93158E+10 XBNLO= 6.09167E-01 PBNLSI= 3.22117E+06
HBNLSI= 1.13186E+10 XBNLSI= 2.59726E-01 TBNLI= 5.32002E+02 TBNLSI= 4.09243E+02 XRPI3= 2.79161E-01 WRKRPI= 2.98704E+08
PBNLSO= 5.43670E+06 HBNLSO= 1.93158E+10 XBNLSO= 6.09167E-01 TBNLO= 6.46232E+02 TBNLSO= 4.28346E+02 XRPO3= 6.02389E-01
WRKRPO= 1.12736E+09 DWRKC= 1.98111E+12 WRKC= 2.52057E+17 GABRKI= 3.25991E+04 GABRKO= 8.72196E+04
GABREK(1)= 1.19819E+05 GADBRK(1)= 1.41746E+05 IPBNLI=   3 IPBNLO=   3 QDECAY= 0.00000E+00 SMDBRK= 1.02745E+08
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 2.78971E+02 SMVAP= 7.10775E+06
SMD3= 8.72248E+07 SMD0= 0.00000E+00 SMD30= 8.72248E+07
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC

```
    0
RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.
 0.00000D+00 2.50000D+03
 5.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10 1.00000D-02 1.00000D+10
 1.00000D+00 1.00000D+01 1.00000D+01 1.00000D+02 1.00000D+02 1.00000D+10
 0.00000D+00 0.00000D+00 1.00000D+00 0.00000D+00 1.00000D+02
    21    22
 1.01325D+06 3.23150D+02 1.23470D+05 4.24600D+04 4.50000D+02
     1     1     1     1     1     0
     1
 0.00000D+00 2.78770D+06 5.24500D+07 1.16900D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.30000D+00 2.78770D+06 5.24500D+07 1.16590D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.50000D+00 2.65800D+06 5.24500D+07 1.16680D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 3.80000D+00 2.44500D+06 5.24500D+07 1.16980D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 5.00000D+00 2.32570D+06 5.24500D+07 1.17560D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 6.30000D+00 2.15150D+06 5.24500D+07 1.18480D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 7.50000D+00 2.02580D+06 5.24500D+07 1.18970D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 8.80000D+00 1.88920D+06 5.24500D+07 1.19590D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.00000D+01 1.76560D+06 5.24500D+07 1.20000D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.13000D+01 1.63870D+06 5.24500D+07 1.20400D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.25000D+01 1.46220D+06 5.24500D+07 1.21310D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.38000D+01 1.38880D+06 5.24500D+07 1.21060D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.50000D+01 1.36470D+06 5.24500D+07 1.20720D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.63000D+01 1.33840D+06 5.24500D+07 1.20530D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.75000D+01 1.25610D+06 5.24500D+07 1.20510D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 1.88000D+01 1.25470D+06 5.24500D+07 1.19630D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.00000D+01 1.26830D+06 5.24500D+07 1.18870D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.13000D+01 1.25900D+06 5.24500D+07 1.18730D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.25000D+01 9.03800D+05 5.24500D+07 1.18710D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.38000D+01 2.19100D+05 5.24500D+07 1.19000D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.50000D+01 3.22100D+05 5.24500D+07 1.19270D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.63000D+01 3.55300D+05 5.24500D+07 1.19230D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.75000D+01 4.61300D+05 5.24500D+07 1.18990D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 2.88000D+01 8.22100D+05 5.24500D+07 1.18830D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
 3.00000D+01 7.23600D+05 5.24500D+07 1.18520D+10 0.00000D+00 0.00000D+00
 0.00000D+00 0.00000D+00 0.00000D+00
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
5.00000D+01 6.95100D+05 5.24500D+07 1.17500D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
7.00000D+01 3.68700D+05 5.24500D+07 1.17300D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
9.00000D+01 3.84100D+05 5.24500D+07 1.16540D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.00000D+02 5.10200D+05 5.24500D+07 1.15680D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.50000D+02 4.52900D+05 5.24500D+07 1.28470D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.00000D+02 3.33200D+05 5.24500D+07 1.35340D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.50000D+02 1.91400D+05 5.24500D+07 1.10420D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
3.00000D+02 1.33000D+05 5.24500D+07 1.15920D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
3.50000D+02 1.07200D+05 5.24500D+07 1.25090D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
4.00000D+02 1.26700D+05 5.24500D+07 1.20420D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
4.52500D+02 7.90000D+04 5.24500D+07 1.47470D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
5.05000D+02 7.30000D+04 5.24500D+07 1.24360D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
5.57500D+02 6.34000D+04 5.24500D+07 1.17920D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
6.02500D+02 5.88000D+04 5.24500D+07 1.11780D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
6.55000D+02 5.67000D+04 5.24500D+07 1.05510D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
7.00000D+02 4.63000D+04 5.24500D+07 1.12500D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
7.52500D+02 4.29000D+04 5.24500D+07 1.11890D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
8.05000D+02 4.24000D+04 5.24500D+07 1.07740D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
8.50000D+02 4.06000D+04 5.24500D+07 1.07770D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
9.00000D+02 4.31000D+04 5.24500D+07 1.06320D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
9.55000D+02 5.04000D+04 5.24500D+07 9.20500D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.00000D+03 1.38000D+05 5.24500D+07 6.79400D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.10500D+03 4.72000D+04 5.24500D+07 6.93500D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.20250D+03 1.13100D+05 5.24500D+07 6.20600D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.30000D+03 5.98000D+04 5.24500D+07 6.49000D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.40000D+03 1.04800D+05 5.24500D+07 6.46000D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.51000D+03 6.71000D+04 5.24500D+07 6.65400D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.60000D+03 6.53000D+04 5.24500D+07 1.02370D+10 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.70500D+03 8.46000D+04 5.24500D+07 7.82300D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.80250D+03 1.05300D+05 5.24500D+07 6.28800D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
1.90000D+03 8.94000D+04 5.24500D+07 7.03500D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.00500D+03 7.30000D+04 5.24500D+07 7.85300D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.10250D+03 6.90000D+04 5.24500D+07 7.16800D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.20000D+03 6.50000D+04 5.24500D+07 9.37000D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.30500D+03 4.85000D+04 5.24500D+07 6.53300D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.40000D+03 8.61000D+04 5.24500D+07 6.28300D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
2.50000D+03 6.15000D+04 5.24500D+07 6.34000D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
1.00000D+10 6.15000D+04 5.24500D+07 6.34000D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
0.00000D+00 6.15000D+04 5.24500D+07 6.34000D+09 0.00000D+00 0.00000D+00
0.00000D+00 0.00000D+00 0.00000D+00
    9
    1 3.43017D+09 2.11573D+07 9.35569D+02     1     0
1.01325D+06 1.23470D+05 3.23150D+02
    2 4.29017D+09 2.84785D+07 4.24115D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    3 2.60848D+09 1.70016D+07 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    4 1.22807D+08 0.00000D+00 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    5 1.31856D+08 0.00000D+00 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    6 7.72035D+13 0.00000D+00 2.03000D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    7 4.27034D+08 2.21891D+06 4.67152D+02     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    8 8.60000D+08 7.32121D+06 1.16632D+03     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    9 2.00000D+08 6.98617D+06 3.62783D+02     0     0
1.01325D+06 1.23470D+05 3.23150D+02
    1     2 3.79625D+05 7.00000D-01     0     0
    1     3 2.07505D+04 7.00000D-01     0     0
    2     3 2.07505D+04 7.00000D-01     0     0
    1     4 1.42500D+04 7.00000D-01     0     0
    1     5 3.84656D+04 7.00000D-01     0     0
    2     5 3.84656D+04 7.00000D-01     0     0
    4     5 2.00000D+03 7.00000D-01     0     0
    1     6 1.45482D+01 7.00000D-01     0     0
    2     6 1.45482D+01 7.00000D-01     0     0
    5     7 0.00000D+00 7.00000D-01     0     0
    1     8 1.00000D+05 7.00000D-01     0     0
    2     9 2.83000D+03 5.70000D-01     0     1
2.90965D+01
    1 1.90000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01     0
    2 1.80000D+05 1.10000D+06 8.60000D+05 1.40000D+02 2.60000D+01     1
    2     6 5.60000D+01 1.10000D+02     1     8 6.60000D+05 7.80000D+05
    5     7 1.88496D+03 9.90000D+05
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.

TIME =	0.00000D+00	seconds
CYCLE =	0	
TIMESTEP =	5.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	0.00000D+00	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	0.00000D+00	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	0.00000D+00	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	0.00000D+00	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	0.00000D+00	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	0.00000D+00	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	0.00000D+00	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	0.00000D+00	grams

CELL NUMBER	PRESSURE, , dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
2	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
3	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
4	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
5	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
6	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	0.00000D+00	0.00000D+00	0.00000D+00	7.94562D-02

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
    8       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02 0.00000D+00 0.00000D+00 0.00000D+00 7.94562D-02

    9       1.01325D+06 1.23470D+05 8.89780D+05 3.23150D+02 0.00000D+00 0.00000D+00 0.00000D+00 7.94562D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	3	2.07505E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	3	2.07505E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	4	1.42500E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	5	3.84656E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	5	3.84656E+04	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4	5	2.00000E+03	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	6	1.45482E+01	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	6	1.45482E+01	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5	7	0.00000E+00	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1	8	1.00000E+05	7.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	9	2.83000E+03	5.70000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

```
T3= 0.00000E+00 T1= 0.00000E+00 DT3= 5.00000E-02 NCYC=     0 T3SPON=-2.00000E+10 T3SPOF=-1.00000E+10

     J          ISUPP          ISAT3          SPOOL          APOOL          PL3            XMV3           XMA3           DP3            TG3            P3
   FML3         FMV3           FMA3           CVVC           CPVC           BPOOL          ROV3           ROA3           ROG3           TL3            TSAT3
   HCOND        HBDN           HNAT           HCONV          HWALL          SCOND          DSCOND         GABREK         ZCOND          FLCOND         DCOND
    VOL         ACOND          TV3            PV3            PA3            FMD3           GADBRK         CPDC           CVDC           SPRAY3         DSPRAY
  GSPRAY        ISPRAY         HSPRAY         UVC3           ZVC3           SVAP           DPVAP          PSTG3          TSTG3          IPSTG3         IPVT

     1             0              0       0.00000E+00    0.00000E+00    0.00000E+00    7.94562E-02    9.20544E-01    0.00000E+00    3.23150E+02    1.01325E+06
0.00000E+00    2.83980E+05    3.29007E+06    1.33683E+07    1.73342E+07    0.00000E+00    8.27890E-05    9.59156E-04    1.04195E-03    0.00000E+00    0.00000E+00
0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    9.35569E+02    9.35569E+02    1.87114E+03
3.43017E+09    2.11573E+07    0.00000E+00    1.23470E+05    8.89780E+05    0.00000E+00    0.00000E+00    4.19378E+07    0.00000E+00    0.00000E+00    0.00000E+00
1.80000E+05          0        1.25726E+09    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    1.23470E+05    3.23025E+02          0              0

     2             0              0       0.00000E+00    0.00000E+00    0.00000E+00    7.94562E-02    9.20544E-01    0.00000E+00    3.23150E+02    1.01325E+06
0.00000E+00    3.55179E+05    4.11494E+06    1.33683E+07    1.73342E+07    0.00000E+00    8.27890E-05    9.59156E-04    1.04195E-03    0.00000E+00    0.00000E+00
0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    4.24115E+03    1.00800E+03    2.01601E+03
4.29017E+09    2.84785E+07    0.00000E+00    1.23470E+05    8.89780E+05    0.00000E+00    0.00000E+00    4.19378E+07    0.00000E+00    0.00000E+00    0.00000E+00
1.80000E+05          0        1.25726E+09    0.00000E+00    0.00000E+00    0.00000E+00    0.00000E+00    1.23470E+05    3.23025E+02          0              0

     3             0              0       0.00000E+00    0.00000E+00    0.00000E+00    7.94562E-02    9.20544E-01    0.00000E+00    3.23150E+02    1.01325E+06
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
0.00000E+00 2.15953E+05 2.50194E+06 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     4            0           0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 1.01671E+04 1.17791E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08 0.00000E+00 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     5            0           0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 1.09162E+04 1.26470E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08 0.00000E+00 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     6            0           0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 6.39160E+09 7.40502E+10 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13 0.00000E+00 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     7            0           0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     8            0           0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 7.11985E+04 8.24874E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0

     9            0           0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01 0.00000E+00 3.23150E+02 1.01325E+06
0.00000E+00 1.65578E+04 1.91831E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 0.00000E+00
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           0


     I            J           A          U3          G3          GA3         DGAL        DGAU        PR          CR          ICHECK
    CD           FL           Y         GAD3

     1            2       3.79625E+05 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            3       2.07505E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2            3       2.07505E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            4       1.42500E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            5       3.84656E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00       0
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          5      3.84656E+04 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     4          5      2.00000E+03 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1          6      1.45482E+01 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          6      1.45482E+01 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     5          7      0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1          8      1.00000E+05 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          9      2.83000E+03 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00      0
5.70000E-01 0.00000E+00 0.00000E+00 0.00000E+00


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT= 0.00000E+00 CRRPPT= 0.00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 0.00000E+00 XRP3= 0.00000E+00 NWORK=     50 DWRKC= 0.00000E+00 WRKRP3= 0.00000E+00
GPTRP= 0.00000E+00 UPTRP= 0.00000E+00 GAPTRP= 0.00000E+00 DGPTRP= 0.00000E+00 DGPTPT= 0.00000E+00 GABREK(1)= 0.00000E+00
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3= 0.00000E+00 VOCPT3= 2.21466E+08 PET3= 0.00000E+00 TET3= 0.00000E+00 ROLCET= 0.00000E+00
RSVCET= 0.00000E+00 VFLCET= 0.00000E+00 VFVCET= 0.00000E+00 UCET= 0.00000E+00 UVET= 0.00000E+00 GFET= 0.00000E+00
GCET= 0.00000E+00 GVET= 0.00000E+00 GET= 0.00000E+00 DCRE= 1.00000E-02 DFMCPT= 0.00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.39260E+09 SML3= 0.00000E+00 XMASS= 0.00000E+00
SMV30= 0.00000E+00 SML30= 0.00000E+00 SMA30= 0.00000E+00 XMASSN= 0.00000E+00 XMASSD= 0.00000E+00 SMVBRK= 0.00000E+00
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0= 0.00000E+00 SVOL= 0.00000E+00 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 0.00000E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 0.00000E+00 DSMCON= 0.00000E+00 PRP3= 0.00000E+00 GABNLI= 0.00000E+00 PBNLI= 0.00000E+00 HBNLI= 0.00000E+00
XBNLI= 0.00000E+00 GABNLO= 0.00000E+00 PBNLO= 0.00000E+00 HBNLO= 0.00000E+00 XBNLO= 0.00000E+00 PBNLSI= 0.00000E+00
HBNLSI= 0.00000E+00 XBNLSI= 0.00000E+00 TBNLI= 0.00000E+00 TBNLSI= 0.00000E+00 XRPI3= 0.00000E+00 WRKRPI= 0.00000E+00
PBNLSO= 0.00000E+00 HBNLSO= 0.00000E+00 XBNLSO= 0.00000E+00 TBNLO= 0.00000E+00 TBNLSO= 0.00000E+00 XRPO3= 0.00000E+00
WRKRPO= 0.00000E+00 DWRKC= 0.00000E+00 WRKC= 0.00000E+00 GABRKI= 0.00000E+00 GABRKO= 0.00000E+00
GABREK(1)= 0.00000E+00 GADBRK(1)= 0.00000E+00 IPBNLI=   0 IPBNLO=   0 QDECAY= 0.00000E+00 SMDBRK= 0.00000E+00
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 0.00000E+00 SMVAP= 0.00000E+00
SMD3= 0.00000E+00 SMD0= 0.00000E+00 SMD30= 0.00000E+00
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.

TIME =	1.00000D+02	seconds
CYCLE =	2000	
TIMESTEP =	5.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	1.29852D+05	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	3.80348D+05	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	2.12913D+07	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	5.94263D+07	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	2.37432D+06	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	8.73118D+02	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	4.16902D+06	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	2.48069D+03	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	1.79351D+06	1.77472D+06	1.87968D+04	3.89668D+02	3.89674D+02	6.94316D+03	2.09856D+04	9.83258D-01
2	1.79307D+06	1.68094D+06	1.12132D+05	3.87938D+02	3.87938D+02	6.97821D+03	2.05330D+04	9.03143D-01
3	1.79292D+06	6.22458D+05	1.17047D+06	3.59962D+02	3.59964D+02	1.72697D+03	0.00000D+00	2.48568D-01
4	1.79329D+06	1.19182D+06	6.01467D+05	3.77740D+02	3.77740D+02	0.00000D+00	0.00000D+00	5.52081D-01
5	1.79315D+06	1.72432D+06	6.88256D+04	3.88704D+02	3.88704D+02	0.00000D+00	0.00000D+00	9.39700D-01
6	1.01342D+06	1.23773D+05	8.89649D+05	3.23075D+02	3.23075D+02	0.00000D+00	0.00000D+00	7.96467D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	3.23025D+02	1.14282D-09	0.00000D+00	7.94562D-02

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
    8       1.79332D+06 6.06038D+05 1.18728D+06 3.59271D+02 3.59273D+02 1.22359D+03 0.00000D+00 2.40989D-01

    9       1.79228D+06 2.61735D+05 1.53054D+06 3.39025D+02 3.39029D+02 5.89774D+02 0.00000D+00 9.61434D-02
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	3.59025E+02	3.60270E-01	1.36767E+05	3.24226E+05
1	3	2.07505E+04	7.00000E-01	4.12147E+02	4.13576E-01	8.58192E+03	2.03455E+04
2	3	2.07505E+04	7.00000E-01	2.16222E+02	2.24733E-01	4.66332E+03	8.63601E+03
1	4	1.42500E+04	7.00000E-01	2.56141E+02	2.57029E-01	3.66267E+03	8.68226E+03
1	5	3.84656E+04	7.00000E-01	3.23728E+02	3.24850E-01	1.24956E+04	2.96217E+04
2	5	3.84656E+04	7.00000E-01	-1.63363E+02	-1.67068E-01	-6.42637E+03	-1.27679E+04
4	5	2.00000E+03	7.00000E-01	2.29361E+02	2.83991E-01	5.67981E+02	5.87945E+02
1	6	1.45482E+01	7.00000E-01	1.33061E+04	1.33523E+01	1.94252E+02	6.41151E+02
2	6	2.47756E+03	7.00000E-01	1.46374E+04	1.52135E+01	3.76924E+04	9.15637E+04
5	7	0.00000E+00	7.00000E-01	1.40697E+04	1.43887E+01	0.00000E+00	0.00000E+00
1	8	1.00000E+05	7.00000E-01	2.34108E+02	2.34920E-01	2.34920E+04	5.56865E+04
2	9	2.83000E+03	5.70000E-01	4.14921E+02	4.31253E-01	1.22045E+03	2.26061E+03

```
T3= 1.00000E+02 T1= 9.99500E+01 DT3= 5.00000E-02 NCYC=  2000 T3SPON= 5.50000E-01 T3SPOF=-1.00000E+10
```

J	ISUPP	ISAT3	SPOOL	APOOL	PL3	XMV3	XMA3	DP3	TG3	P3
FML3	FMV3	FMA3	CVVC	CPVC	BPOOL	ROV3	ROA3	ROG3	TL3	TSAT3
HCOND	HBDN	HNAT	HCONV	HWALL	SCOND	DSCOND	GABREK	ZCOND	FLCOND	DCOND
VOL	ACOND	TV3	PV3	PA3	FMD3	GADBRK	CPDC	CVDC	SPRAY3	DSPRAY
GSPRAY	ISPRAY	HSPRAY	UVC3	2VC3	SVAP	DPVAP	PSTG3	TSTG3	IPSTG3	IPVT
1	0	0	0.00000E+00	0.00000E+00	0.00000E+00	9.83258E-01	1.67424E-02	6.72470E+01	3.89668E+02	1.79351E+06
0.00000E+00	3.38512E+06	5.76400E+04	1.44334E+07	1.91638E+07	0.00000E+00	9.86866E-04	1.68038E-05	1.00367E-03	0.00000E+00	3.89674E+02
1.09146E+05	7.35751E+05	8.02103E+05	8.02103E+05	1.26338E+05	6.94316E+03	0.00000E+00	1.29852E+05	9.35569E+02	9.35569E+02	1.87114E+03
3.43017E+09	2.11573E+07	0.00000E+00	1.77472E+06	1.87968E+04	1.59029E+07	3.80348E+05	4.22389E+07	0.00000E+00	2.09856E+04	4.73341E-03
1.80000E+05	1	1.25726E+09	0.00000E+00	0.00000E+00	1.33361E+04	3.49587E+02	1.76760E+06	3.89549E+02	3	5
2	0	0	0.00000E+00	0.00000E+00	0.00000E+00	9.03143E-01	9.68570E-02	4.16289E+02	3.87938E+02	1.79307E+06
0.00000E+00	4.02795E+06	4.31975E+05	1.43957E+07	1.90972E+07	0.00000E+00	9.38879E-04	1.00689E-04	1.03957E-03	0.00000E+00	3.87938E+02
8.38448E+04	1.01501E+04	2.49282E+05	2.49282E+05	1.26338E+05	6.97821E+03	0.00000E+00	0.00000E+00	4.24115E+03	1.00800E+03	2.01601E+03
4.29017E+09	2.84785E+07	0.00000E+00	1.68094E+06	1.12132E+05	1.08374E+07	0.00000E+00	4.22083E+07	0.00000E+00	2.05330E+04	4.92241E-03
1.80000E+05	1	1.25726E+09	0.00000E+00	0.00000E+00	3.32873E+04	6.94519E+02	1.67778E+06	3.87938E+02	3	5
3	0	0	0.00000E+00	0.00000E+00	0.00000E+00	2.48568E-01	7.51432E-01	3.79234E+02	3.59962E+02	1.79292E+06

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
0.00000E+00 9.77403E+05 2.95473E+06 1.38800E+07 1.82033E+07 0.00000E+00 3.74702E-04 1.13274E-03 1.50744E-03 0.00000E+00 3.59964E+02
6.32457E+04 1.26645E+05 1.29235E+04 1.26645E+05 1.26338E+05 1.72697E+03 1.38643E-03 0.00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07 0.00000E+00 6.22453E+05 1.17047E+06 1.58054E+06 0.00000E+00 4.18848E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.11194E+03 3.54070E+01 6.19500E+05 3.59840E+02       3             3

     4            0            0       0.00000E+00 0.00000E+00 0.00000E+00 5.52081E-01 4.47919E-01 4.03489E+02 3.77740E+02 1.79329E+06
0.00000E+00 8.39595E+04 6.81188E+04 1.41890E+07 1.87355E+07 0.00000E+00 6.83670E-04 5.54682E-04 1.23835E-03 0.00000E+00 3.77740E+02
6.34698E+04 1.27547E+05 5.50910E+04 1.27547E+05 1.26338E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08 0.00000E+00 0.00000E+00 1.19182E+06 6.01467E+05 1.57485E+05 0.00000E+00 4.20533E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.88345E+01 1.33679E+01 1.18459E+06 3.77564E+02       3             4

     5            0            0       0.00000E+00 0.00000E+00 0.00000E+00 9.39700E-01 6.02998E-02 4.16484E+02 3.88704E+02 1.79315E+06
0.00000E+00 1.26742E+05 8.13291E+03 1.44122E+07 1.91264E+07 0.00000E+00 9.61213E-04 6.16802E-05 1.02289E-03 0.00000E+00 3.88704E+02
1.00605E+05 1.04849E+05 4.93940E+05 4.93940E+05 1.26338E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08 0.00000E+00 0.00000E+00 1.72432E+06 6.88256E+04 4.00921E+05 0.00000E+00 4.22216E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.35284E+03 9.20300E+02 1.72001E+06 3.88704E+02       3             8

     6            0            0       0.00000E+00 0.00000E+00 0.00000E+00 7.96467E-02 9.20353E-01 5.89094E-02 3.23075E+02 1.01342E+06
0.00000E+00 6.40880E+09 7.40565E+10 1.33690E+07 1.73352E+07 0.00000E+00 8.30118E-05 9.59238E-04 1.04225E-03 0.00000E+00 3.23075E+02
1.13571E+05 4.40856E+04 1.12387E+06 1.12387E+06 1.26338E+05 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13 0.00000E+00 0.00000E+00 1.23773E+05 8.89649E+05 2.43274E+07 0.00000E+00 4.19374E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.08244E+04 1.04526E-02 1.23610E+05 3.23048E+02       2             6

     7            0            0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01-3.15975E-10 3.23150E+02 1.01325E+06
0.00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 3.23025E+02
1.22733E+05 4.30143E+06 3.07387E+06 4.30143E+06 1.26338E+05 1.14282E-09 2.64098E-16 0.00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0             7

     8            0            0       0.00000E+00 0.00000E+00 0.00000E+00 2.40989E-01 7.59011E-01 3.75572E+02 3.59271E+02 1.79332E+06
0.00000E+00 3.14347E+05 9.90054E+05 1.38691E+07 1.81846E+07 0.00000E+00 3.65520E-04 1.15123E-03 1.51675E-03 0.00000E+00 3.59273E+02
1.06136E+05 6.63765E+05 1.36747E+04 6.63765E+05 1.26338E+05 1.22359E+03 3.23058E-04 0.00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06 0.00000E+00 6.06038E+05 1.18728E+06 7.45423E+05 0.00000E+00 4.18809E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 3.91252E+02 3.77153E+01 6.00581E+05 3.59040E+02       4             8

     9            0            0       0.00000E+00 0.00000E+00 0.00000E+00 9.61434E-02 9.03857E-01 3.69091E+02 3.39025E+02 1.79228E+06
0.00000E+00 3.34584E+04 3.14547E+05 1.35751E+07 1.76851E+07 0.00000E+00 1.67292E-04 1.57274E-03 1.74003E-03 0.00000E+00 3.39029E+02
1.24834E+05 1.04847E+07 6.38338E+03 1.04847E+07 1.26338E+05 5.89774E+02 2.68683E-05 0.00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06 0.00000E+00 2.61735E+05 1.53054E+06 1.47394E+05 0.00000E+00 4.18485E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.15467E+02 4.51631E+01 2.57661E+05 3.38676E+02       3             9


     I            J            A          U3          G3          GA3         DGAL        DGAU         PR          CR         ICHECK
    CD           FL            Y         GAD3

     1            2      3.79625E+05 3.59025E+02 3.60270E-01 1.36767E+05 1.53714E+02-1.53714E+02 9.99752E-01 5.42510E-01       0
7.00000E-01 0.00000E+00 2.37064E+00 3.24226E+05

     1            3      2.07505E+04 4.12147E+02 4.13576E-01 8.58192E+03 7.31891E+00-7.31891E+00 9.99673E-01 5.42510E-01       0
7.00000E-01 0.00000E+00 2.37074E+00 2.03455E+04

     2            3      2.07505E+04 2.16222E+02 2.24733E-01 4.66332E+03 1.64888E+01-1.64888E+01 9.99921E-01 5.41643E-01       0
7.00000E-01 0.00000E+00 1.85190E+00 8.63601E+03

     1            4      1.42500E+04 2.56141E+02 2.57029E-01 3.66267E+03 8.08799E+00-8.08799E+00 9.99874E-01 5.42510E-01       0
7.00000E-01 0.00000E+00 2.37047E+00 8.68226E+03

     1            5      3.84656E+04 3.23728E+02 3.24850E-01 1.24956E+04 1.72737E+01-1.72737E+01 9.99798E-01 5.42510E-01       0
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
7.00000E-01 0.00000E+00 2.37057E+00 2.96217E+04

     2          5      3.84656E+04-1.63363E+02-1.67068E-01-6.42637E+03 3.86286E+01-3.86286E+01 9.99954E-01 5.42039E-01      0
7.00000E-01 0.00000E+00 1.98680E+00-1.27679E+04

     4          5      2.00000E+03 2.29361E+02 2.83991E-01 5.67981E+02 2.09947E+00-2.09947E+00 9.99925E-01 5.37162E-01      0
7.00000E-01 0.00000E+00 1.03515E+00 5.87945E+02

     1          6      1.45482E+01 1.33061E+04 1.33523E+01 1.94252E+02 1.24572E-04-1.24572E-04 5.65180E-01 5.42510E-01      0
7.00000E-01 0.00000E+00 3.30062E+00 6.41151E+02

     2          6      2.47756E+03 1.46374E+04 1.52135E+01 3.76924E+04 2.41857E-02-2.41857E-02 5.65321E-01 5.41643E-01      0
7.00000E-01 0.00000E+00 2.42924E+00 9.15637E+04

     5          7      0.00000E+00 1.40697E+04 1.43887E+01 0.00000E+00 0.00000E+00 0.00000E+00 5.65198E-01 5.42039E-01      0
7.00000E-01 0.00000E+00 2.77335E+00 0.00000E+00

     1          8      1.00000E+05 2.34108E+02 2.34920E-01 2.34920E+04 6.21000E+01-6.21000E+01 9.99895E-01 5.42510E-01      0
7.00000E-01 0.00000E+00 2.37045E+00 5.56865E+04

     2          9      2.83000E+03 4.14921E+02 4.31253E-01 1.22045E+03 7.76924E-01-7.76924E-01 9.99562E-01 5.41643E-01      0
5.70000E-01 0.00000E+00 1.85228E+00 2.26061E+03


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT= 0.00000E+00 CRRPPT= 0.00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 1.79310E+06 XRP3= 0.00000E+00 NWORK=     50 DWRKC= 3.62793E+13 WRKRP3= 0.00000E+00
GPTRP= 0.00000E+00 UPTRP= 0.00000E+00 GAPTRP= 0.00000E+00 DGPTRP= 0.00000E+00 DGPTPT= 0.00000E+00 GABREK(1)= 1.29852E+05
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3= 0.00000E+00 VOCPT3= 2.21466E+08 PET3= 0.00000E+00 TET3= 0.00000E+00 ROLCET= 0.00000E+00
RSVCET= 0.00000E+00 VFLCET= 0.00000E+00 VFVCET= 0.00000E+00 UCET= 0.00000E+00 UVET= 0.00000E+00 GFET= 0.00000E+00
GCET= 0.00000E+00 GVET= 0.00000E+00 GET= 0.00000E+00 DCRE= 1.00000E-02 DFMCPT= 0.00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.41778E+09 SML3= 0.00000E+00 XMASS= 7.61406E-01
SMV30= 2.51857E+07 SML30= 0.00000E+00 SMA30= 7.18689E-03 XMASSN= 6.03682E+07 XMASSD= 7.92851E+07 SMVBRK= 2.12913E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0= 0.00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 1.00000E+10
SMCOND= 2.37432E+06 DSMCON= 8.73118E+02 PRP3= 1.79310E+06 GABNLI= 5.10200E+05 PBNLI= 5.24500E+07 HBNLI= 1.15680E+10
XBNLI= 0.00000E+00 GABNLO= 0.00000E+00 PBNLO= 0.00000E+00 HBNLO= 0.00000E+00 XBNLO= 0.00000E+00 PBNLSI= 5.03652E+07
HBNLSI= 1.15680E+10 XBNLSI= 0.00000E+00 TBNLI= 5.37285E+02 TBNLSI= 5.37285E+02 XRPI3= 2.54512E-01 WRKRPI= 1.42216E+09
PBNLSO= 0.00000E+00 HBNLSO= 0.00000E+00 XBNLSO= 0.00000E+00 TBNLO= 0.00000E+00 TBNLSO= 0.00000E+00 XRPO3= 0.00000E+00
WRKRPO= 0.00000E+00 DWRKC= 3.62793E+13 WRKC= 1.22631E+17 GABRKI= 1.29852E+05 GABRKO= 0.00000E+00
GABREK(1)= 1.29852E+05 GADBRK(1)= 3.80348E+05 IPBNLI=   3 IPBNLO=   0 QDECAY= 0.00000E+00 SMDBRK= 5.94263E+07
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 2.48069E+03 SMVAP= 4.16902E+06
SMD3= 5.40995E+07 SMD0= 0.00000E+00 SMD30= 5.40995E+07
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

RUPTURE OF 20 cm PIPE WITH USER SUPPLIED BREAK CONDITIONS.

TIME =	2.40000D+03	seconds
CYCLE =	48000	
TIMESTEP =	5.00000D-02	second
TOTAL ACCIDENT LOCALIZATION VOLUME =	1.20705D+10	cubic centimeters
TOTAL ACCIDENT LOCALIZATION = CONDENSATION SURFACE AREA	8.31637D+07	square centimeters
STEAM FORMATION RATE FROM BREAK =	8.09468D+03	grams per second
LIQUID WATER FORMATION RATE FROM = BREAK	7.80053D+04	grams per second
CUMULATIVE STEAM MASS FORMED FROM = BREAK	6.58902D+07	grams
CUMULATIVE LIQUID WATER MASS = FORMED FROM BREAK	2.38605D+08	grams
CUMULATIVE MASS OF STEAM CONDENSED = ON STRUCTURE	1.02535D+07	grams
TOTAL MASS OF STEAM CONDENSED ON = STRUCTURE DURING CURRENT TIMESTEP	6.42821D+01	grams
CUMULATIVE MASS OF STEAM VAPORIZED = AND CONDENSED FROM LIQUID WATER	2.81824D+07	grams
TOTAL MASS OF STEAM VAPORIZED AND = CONDENSED FROM LIQUID WATER DURING THE CURRENT TIMESTEP	3.98351D+02	grams

CELL NUMBER	PRESSURE, dynes/cm2	STEAM PARTIAL PRESSURE, dynes/cm2	NC GAS PARTIAL PRESSURE, dynes/cm2	STEAM-GAS TEMPERATURE, K	SATURATION TEMPERATURE, K	CONDENSATION RATE ON STRUCTURE, g/s	CONDENSATION RATE FROM SPRAYS, g/s	STEAM MASS FRACTION
1	8.59486D+05	7.59796D+05	9.96901D+04	3.65212D+02	3.65213D+02	6.57253D+02	0.00000D+00	8.25808D-01
2	8.59470D+05	3.19988D+05	5.39483D+05	3.63317D+02	3.43631D+02	3.85833D+02	0.00000D+00	2.69510D-01
3	8.59463D+05	3.83412D+05	4.76051D+05	3.46238D+02	3.46238D+02	1.71124D+02	0.00000D+00	3.33767D-01
4	8.59471D+05	7.76965D+05	8.25058D+04	3.58542D+02	3.58542D+02	0.00000D+00	0.00000D+00	8.54177D-01
5	8.59470D+05	8.22541D+05	3.69289D+04	3.60033D+02	3.60033D+02	0.00000D+00	0.00000D+00	9.32631D-01
6	1.01378D+06	1.24017D+05	8.89763D+05	3.23114D+02	3.23114D+02	0.00000D+00	0.00000D+00	7.97818D-02
7	1.01325D+06	1.23470D+05	8.89780D+05	3.23150D+02	3.23025D+02	1.74200D-10	0.00000D+00	7.94562D-02

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
    8       8.59471D+05 3.50643D+05 5.08828D+05 3.32631D+02 3.32631D+02 3.23937D+01 0.00000D+00 3.00037D-01

    9       8.59455D+05 1.48370D+05 7.11085D+05 3.49539D+02 3.26772D+02 3.90388D+01 0.00000D+00 1.14877D-01
```

CELL No.	CELL No.	FLOW AREA, cm2	FLOW RESISTANCE COEFFICIENT	VELOCITY, cm/s	STEAM-GAS MASS FLUX, g/(cm2-s)	STEAM-GAS FLOWRATE, g/s	LIQUID WATER FLOWRATE, g/s
1	2	3.79625E+05	7.00000E-01	1.69381E+02	9.24545E-02	3.50980E+04	0.00000E+00
1	3	2.07505E+04	7.00000E-01	2.03620E+02	1.11144E-01	2.30629E+03	0.00000E+00
2	3	2.07505E+04	7.00000E-01	9.92226E+01	7.02572E-02	1.45787E+03	0.00000E+00
1	4	1.42500E+04	7.00000E-01	1.66566E+02	9.09178E-02	1.29558E+03	0.00000E+00
1	5	3.84656E+04	7.00000E-01	1.68644E+02	9.20520E-02	3.54084E+03	0.00000E+00
2	5	3.84656E+04	7.00000E-01	-1.60111E+01	-8.49768E-03	-3.26868E+02	0.00000E+00
4	5	2.00000E+03	7.00000E-01	2.62993E+01	1.44562E-02	2.89124E+01	0.00000E+00
1	6	1.45482E+01	7.00000E-01	-1.20469E+04	-1.25578E+01	-1.82694E+02	0.00000E+00
2	6	1.45482E+01	7.00000E-01	-1.20475E+04	-1.25585E+01	-1.82704E+02	0.00000E+00
5	7	0.00000E+00	7.00000E-01	-1.20295E+04	-1.25341E+01	0.00000E+00	0.00000E+00
1	8	1.00000E+05	7.00000E-01	1.64643E+02	8.98683E-02	8.98683E+03	0.00000E+00
2	9	2.83000E+03	5.70000E-01	1.16026E+02	8.21556E-02	2.32500E+02	0.00000E+00

```
T3= 2.40000E+03 T1= 2.39995E+03 DT3= 5.00000E-02 NCYC= 48000 T3SPON= 2.22585E+03 T3SPOF= 2.34415E+03

     J          ISUPP       ISAT3       SPOOL       APOOL       PL3         XMV3        XMA3        DP3         TG3         P3
   FML3         FMV3        FMA3        CVVC        CPVC        BPOOL       ROV3        ROA3        ROG3        TL3         TSAT3
   HCOND        HBDN        HNAT        HCONV       HWALL       SCOND       DSCOND      GABREK      ZCOND       FLCOND      DCOND
    VOL         ACOND       TV3         PV3         PA3         FMD3        GADBRK      CPDC        CVDC        SPRAY3      DSPRAY
  GSPRAY        ISPRAY      HSPRAY      UVC3        ZVC3        SVAP        DPVAP       PSTG3       TSTG3       IPSTG3      IPVT

     1          0           0       0.00000E+00 0.00000E+00 0.00000E+00 8.25808E-01 1.74192E-01 4.84247E+01 3.65212E+02 8.59486E+05
0.00000E+00 1.54627E+06 3.26165E+05 1.39654E+07 1.83496E+07 0.00000E+00 4.50787E-04 9.50871E-05 5.45874E-04 0.00000E+00 3.65213E+02
1.68223E+04 1.04070E-31 1.58283E+05 1.58283E+05 1.88228E+04 6.57253E+02 0.00000E+00 8.09468E+03 9.35569E+02 9.35569E+02 1.87114E+03
3.43017E+09 2.11573E+07 0.00000E+00 7.59796E+05 9.96901E+04 3.84310E+03 7.80053E+04 4.19213E+07 0.00000E+00 0.00000E+00 0.00000E+00
1.80000E+05       0     1.25726E+09 0.00000E+00 0.00000E+00 1.14324E+03 2.80879E+01 7.03825E+05 3.63178E+02       3           5

     2          0           0       0.00000E+00 0.00000E+00 0.00000E+00 2.69510E-01 7.30490E-01 7.65117E+01 3.63317E+02 8.59470E+05
0.00000E+00 8.18745E+05 2.21916E+06 1.36381E+07 1.77918E+07 0.00000E+00 1.90842E-04 5.17266E-04 7.08108E-04 0.00000E+00 3.43631E+02
7.86908E+03 1.79811E-33 1.35222E+04 1.35222E+04 1.88228E+04 3.85833E+02 0.00000E+00 0.00000E+00 4.24115E+03 1.00800E+03 2.01601E+03
4.29017E+09 2.84785E+07 0.00000E+00 3.19988E+05 5.39483E+05 0.00000E+00 0.00000E+00 4.18416E+07 0.00000E+00 0.00000E+00 0.00000E+00
1.80000E+05       0     1.25726E+09 0.00000E+00 0.00000E+00 5.94820E+03 1.18505E+02 4.50282E+05 3.51798E+02       3           5

     3          0           0       0.00000E+00 0.00000E+00 0.00000E+00 3.33767E-01 6.66233E-01 7.65108E+01 3.46238E+02 8.59463E+05
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
0.00000E+00 6.25902E+05 1.24936E+06 1.36746E+07 1.78538E+07 0.00000E+00 2.39949E-04 4.78962E-04 7.18911E-04 0.00000E+00 3.46238E+02
1.01258E+04 1.57069E-32 2.19150E+04 2.19150E+04 1.88228E+04 1.71124E+02 0.00000E+00 0.00000E+00 2.03000E+03 8.53951E+02 1.70790E+03
2.60848E+09 1.70016E+07 0.00000E+00 3.83412E+05 4.76051E+05 0.00000E+00 0.00000E+00 4.18414E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 5.37829E+02 1.72193E+01 3.57572E+05 3.46238E+02       3           3

     4            0            0       0.00000E+00 0.00000E+00 0.00000E+00 8.54177E-01 1.45823E-01 7.65117E+01 3.58542E+02 8.59471E+05
0.00000E+00 5.76647E+04 9.84439E+03 1.38576E+07 1.81650E+07 0.00000E+00 4.69556E-04 8.01614E-05 5.49717E-04 0.00000E+00 3.58542E+02
1.75663E+04 1.47241E-32 2.63160E+05 2.63160E+05 1.88228E+04 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.08351E+02 6.16701E+02
1.22807E+08 0.00000E+00 0.00000E+00 7.76965E+05 8.25058E+04 0.00000E+00 0.00000E+00 4.18769E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.43921E+01 1.00169E+01 5.89053E+05 3.58542E+02       3           4

     5            0            0       0.00000E+00 0.00000E+00 0.00000E+00 9.32681E-01 6.73190E-02 7.65117E+01 3.60033E+02 8.59470E+05
0.00000E+00 6.52744E+04 4.71137E+03 1.38811E+07 1.82052E+07 0.00000E+00 4.95043E-04 3.57312E-05 5.30774E-04 0.00000E+00 3.60033E+02
1.81694E+04 1.41494E-32 5.23412E+05 5.23412E+05 1.88228E+04 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 3.15745E+02 6.31491E+02
1.31856E+08 0.00000E+00 0.00000E+00 8.22541E+05 3.69289E+04 0.00000E+00 0.00000E+00 4.18853E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 6.73727E+01 4.41939E+01 6.24114E+05 3.60033E+02       3           8

     6            0            0       0.00000E+00 0.00000E+00 0.00000E+00 7.97818E-02 9.20218E-01-3.18857E-04 3.23114E+02 1.01378E+06
0.00000E+00 6.42065E+09 7.40570E+10 1.33694E+07 1.73360E+07 0.00000E+00 8.31653E-05 9.59244E-04 1.04241E-03 0.00000E+00 3.23114E+02
1.85133E+04 1.14656E-32 1.12594E+06 1.12594E+06 1.88228E+04 0.00000E+00 0.00000E+00 0.00000E+00 2.03000E+03 2.64149E+04 5.28299E+04
7.72035E+13 0.00000E+00 0.00000E+00 1.24017E+05 8.89763E+05 0.00000E+00 0.00000E+00 4.19371E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 3.42263E+01 3.30547E-05 1.24017E+05 3.23114E+02       2           6

     7            0            0       0.00000E+00 0.00000E+00 0.00000E+00 7.94562E-02 9.20544E-01-3.04190E-11 3.23150E+02 1.01325E+06
0.00000E+00 3.53537E+04 4.09592E+05 1.33683E+07 1.73342E+07 0.00000E+00 8.27890E-05 9.59156E-04 1.04195E-03 0.00000E+00 3.23025E+02
1.87082E+04 1.11853E-30 3.07387E+06 3.07387E+06 1.88228E+04 1.74200E-10 0.00000E+00 0.00000E+00 4.67152E+02 4.67152E+02 9.34303E+02
4.27034E+08 2.21891E+06 0.00000E+00 1.23470E+05 8.89780E+05 0.00000E+00 0.00000E+00 4.19378E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 1.23470E+05 3.23025E+02       0           7

     8            0            0       0.00000E+00 0.00000E+00 0.00000E+00 3.00037E-01 6.99963E-01 7.65117E+01 3.32631E+02 8.59471E+05
0.00000E+00 1.96440E+05 4.58280E+05 1.34905E+07 1.75416E+07 0.00000E+00 2.28419E-04 5.32884E-04 7.61303E-04 0.00000E+00 3.32631E+02
1.08723E+04 8.66425E-32 2.57399E+04 2.57399E+04 1.88228E+04 3.23937E+01 0.00000E+00 0.00000E+00 1.16632E+03 5.89934E+02 1.17987E+03
8.60000E+08 7.32121E+06 0.00000E+00 3.50643E+05 5.08828E+05 0.00000E+00 0.00000E+00 4.18721E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 1.91539E+02 1.79396E+01 1.95820E+05 3.32631E+02       3           8

     9            0            0       0.00000E+00 0.00000E+00 0.00000E+00 1.14877E-01 8.85123E-01 7.65091E+01 3.49539E+02 8.59455E+05
0.00000E+00 1.83954E+04 1.41736E+05 1.34154E+07 1.74141E+07 0.00000E+00 9.19768E-05 7.08678E-04 8.00654E-04 0.00000E+00 3.26772E+02
5.02872E+03 1.25458E-30 6.86197E+03 6.86197E+03 1.88228E+04 3.90388E+01 0.00000E+00 0.00000E+00 3.62783E+02 3.62783E+02 7.25566E+02
2.00000E+08 6.98617E+06 0.00000E+00 1.48370E+05 7.11085E+05 0.00000E+00 0.00000E+00 4.19078E+07 0.00000E+00 0.00000E+00 0.00000E+00
0.00000E+00       0       0.00000E+00 0.00000E+00 0.00000E+00 6.44383E+01 2.28084E+01 2.24183E+05 3.35578E+02       3           9


     I            J            A          U3          G3          GA3         DGAL        DGAU        PR          CR          ICHECK
    CD           FL           Y          GAD3

     1            2       3.79625E+05 1.69381E+02 9.24545E-02 3.50980E+04 1.09821E+03-1.09821E+03 9.99981E-01 5.38183E-01       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            3       2.07505E+04 2.03620E+02 1.11144E-01 2.30629E+03 4.99348E+01-4.99348E+01 9.99973E-01 5.38183E-01       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2            3       2.07505E+04 9.92226E+01 7.02572E-02 1.45787E+03 1.02474E+02-1.02474E+02 9.99992E-01 5.31689E-01       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            4       1.42500E+04 1.66566E+02 9.09178E-02 1.29558E+03 4.19204E+01-4.19204E+01 9.99982E-01 5.38183E-01       0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1            5       3.84656E+04 1.68644E+02 9.20520E-02 3.54084E+03 1.11763E+02-1.11763E+02 9.99982E-01 5.38183E-01       0
```

Table B2. Output for 20 centimeter One-Way Break Calculated on SUN SPARC (Contd.)

```
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          5      3.84656E+04-1.60111E+01-8.49768E-03-3.26868E+02 1.17719E+03-1.17719E+03 1.00000E+00 5.38282E-01      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     4          5      2.00000E+03 2.62993E+01 1.44562E-02 2.89124E+01 3.72634E+01-3.72634E+01 1.00000E+00 5.37631E-01      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1          6      1.45482E+01-1.20469E+04-1.25578E+01-1.82694E+02 5.91738E-04-5.91738E-04 8.47728E-01 5.29118E-01      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          6      1.45482E+01-1.20475E+04-1.25585E+01-1.82704E+02 5.91709E-04-5.91709E-04 8.47712E-01 5.29118E-01      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     5          7      0.00000E+00-1.20295E+04-1.25341E+01 0.00000E+00 0.00000E+00 0.00000E+00 8.48156E-01 5.29113E-01      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     1          8      1.00000E+05 1.64643E+02 8.98683E-02 8.98683E+03 2.97614E+02-2.97614E+02 9.99982E-01 5.38183E-01      0
7.00000E-01 0.00000E+00 0.00000E+00 0.00000E+00

     2          9      2.83000E+03 1.16026E+02 8.21556E-02 2.32500E+02 7.92464E+00-7.92464E+00 9.99983E-01 5.31689E-01      0
5.70000E-01 0.00000E+00 0.00000E+00 0.00000E+00


PPT3= 1.25000E+08 TPT3= 6.01313E+02 PRRPPT= 0.00000E+00 CRRPPT= 0.00000E+00 ROLPT3= 6.42082E-01 ROVPT3= 7.28954E-02
VFLPT3= 9.18723E-01 VFVPT3= 8.12766E-02 HLPT3= 1.51208E+10 HVPT3= 2.67828E+10 VLPT3= 1.55743E+00 VVPT3= 1.37183E+01
XPT3= 9.94375E-03 PRP3= 8.59410E+05 XRP3= 0.00000E+00 NWORK=     50 DWRKC= 1.30896E+12 WRKRP3= 0.00000E+00
GPTRP= 0.00000E+00 UPTRP= 0.00000E+00 GAPTRP= 0.00000E+00 DGPTRP= 0.00000E+00 DGPTPT= 0.00000E+00 GABREK(1)= 8.09468E+03
HVLPT3= 1.16619E+10 VVLPT3= 1.21609E+01 HXPT3= 1.52368E+10 VXPT3= 1.67836E+00 FMLPT3= 1.30642E+08 FMVPT3= 1.31212E+06
FMCPT3= 1.31954E+08 ROCPT3= 0.00000E+00 VOCPT3= 2.21466E+08 PET3= 0.00000E+00 TET3= 0.00000E+00 ROLCET= 0.00000E+00
RSVCET= 0.00000E+00 VFLCET= 0.00000E+00 VFVCET= 0.00000E+00 UCET= 0.00000E+00 UVET= 0.00000E+00 GFET= 0.00000E+00
GCET= 0.00000E+00 GVET= 0.00000E+00 GET= 0.00000E+00 DCRE= 1.00000E-02 DFMCPT= 0.00000E+00 VFLPT3= 9.18723E-01
VFVPT3= 8.12766E-02 ABREAK= 3.92699E+03 SMA3= 7.40618E+10 SMV3= 6.42401E+09 SML3= 0.00000E+00 XMASS=-7.70813E-01
SMV30= 3.14149E+07 SML30= 0.00000E+00 SMA30= 1.72623E-01 XMASSN=-2.42180E+07 XMASSD= 3.14188E+07 SMVBRK= 6.58902E+07
SMV0= 6.39260E+09 SMA0= 7.40618E+10 SML0= 0.00000E+00 SVOL= 7.72156E+13 TWALL= 3.23150E+02 DLINER= 8.00000E-01
FKLINR= 5.69032E+06 ALINER= 1.50967E-01 TLINER= 1.34942E+00 FKCONC= 1.62711E+05 ACONC= 1.16944E-02 TBDN= 4.50000E+02
SMCOND= 1.02535E+07 DSMCON= 6.42821E+01 PRP3= 8.59410E+05 GABNLI= 8.61000E+04 PBNLI= 5.24500E+07 HBNLI= 6.28300E+09
XBNLI= 0.00000E+00 GABNLO= 0.00000E+00 PBNLO= 0.00000E+00 HBNLO= 0.00000E+00 XBNLO= 0.00000E+00 PBNLSI= 4.64644E+06
HBNLSI= 6.28300E+09 XBNLSI= 0.00000E+00 TBNLI= 4.22409E+02 TBNLSI= 4.22409E+02 XRPI3= 9.40149E-02 WRKRPI= 3.04055E+08
PBNLSO= 0.00000E+00 HBNLSO= 0.00000E+00 XBNLSO= 0.00000E+00 TBNLO= 0.00000E+00 TBNLSO= 0.00000E+00 XRPO3= 0.00000E+00
WRKRPO= 0.00000E+00 DWRKC= 1.30896E+12 WRKC= 3.64405E+17 GABRKI= 8.09468E+03 GABRKO= 0.00000E+00
GABREK(1)= 8.09468E+03 GADBRK(1)= 7.80053E+04 IPBNLI=   3 IPBNLO=   0 QDECAY= 0.00000E+00 SMDBRK= 2.38605E+08
VTOT= 1.20705E+10 ACONDT= 8.31637E+07 INFO=     0 DSMVAP= 3.98351E+02 SMVAP= 2.81824E+07
SMD3= 3.84310E+03 SMD0= 0.00000E+00 SMD30= 3.84310E+03
```