BR8915825

NOTA TÉCNICA GTT-Nº 02/88
GAC-Nº 07/88

CNEN - DR - GTT - NT -- 02 | 88

IMPLANTAÇÃO DO CÓDIGO TRAC-PF1 NO VAX-11/750

nota técnica

Departamento de Reatores

cnen
comissão nacional de energia nuclear

CNEN DR	DOCUMENTO: NOTA TÉCNICA GTT-Nº 02/88 GAC-Nº 07/88	DATA: NOVEMBRO/88
		REVISÃO: 0

TÍTULO:

IMPLANTAÇÃO DO CÓDIGO TRAC-PF1 NO VAX-11/750

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GRUPO DE TRANSITÓRIOS E TERMO-HIDRÁULICA
GRUPO DE APOIO COMPUTACIONAL

RAMAL: 324/428

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SUMÁRIO

Esta nota técnica descreve a implantação do código TRAC-PF1 - versão IBM, no VAX-11/750 da Diretoria Executiva I. Este trabalho se configura na obtenção de uma ferramenta avançada de cálculo "best-estimate", disponível no Departamento de Reatores para análise de acidentes de perda de refrigerante.

ABSTRACT

This technical note describes the implantation of TRAC-PF1 code, IBM version, in VAX-11/750. This work provides Reactor Department with an advanced best-estimate tool to perform loss-of-coolant accident analysis.

ÍNDICE

I. INTRODUÇÃO

Dentre as atribuições do Grupo de Transitórios e Termo-hidráulica (GTT) está o desenvolvimento de capacitação técnica na área de análise de acidentes por perda de refrigerante.

Neste contexto inclui-se a familiarização com ferramentas de cálculo pertinentes à área, entre elas o código TRAC-PF1 (1), utilizado na análise de acidentes, cujo aprendizado foi dividido em quatro etapas, a saber:

1ª - Implantação no VAX-11/750 do Departamento de Reatores (DR);

2ª - Simulação de experimentos;

3ª - Simulação de Angra 1;

4ª - Implantação de saída gráfica e "re-start".

Esta nota técnica descreve o trabalho efetuado para a execução da primeira etapa, que constou da implantação da versão 7.6 (2) do código, em conjunto com o Grupo de Apoio Computacional (GAC).

O código TRAC vem sendo desenvolvido no LANL (Los Alamos National Laboratory) a fim de se obter uma ferramenta avançada para o cálculo "best-estimate" na análise de acidentes postulados em reatores a água leve. O código TRAC-PF1 possui esta capacidade de análise para reatores pressurizados a água e para vários aparatos experimentais termo-hidráulicos, e é programado em linguagem FORTRAN IV para utilização em um computador CDC-7600.

O GRS (Gesellschaft für Reaktorsicherheit, Munique - Alemanha) converteu a versão 6.0 do TRAC-PF1 para o FORTRAN-IBM e a atualizou até a versão 7.6, a qual foi obtida pelo DR através do NESC (National Energy Software Center).

II. CONVERSÃO

II.1 - Descrição do Sistema Computacional

O sistema disponível no DR compõe-se de um computador ELEBRA MX-850 e periféricos. Este computador é a versão nacional do VAX-11/750 da DIGITAL, uma máquina amplamente utilizada para o cálculo científico em todo o mundo. O sistema operacional VAX-VMS é o mesmo utilizado em todas as máquinas da DIGITAL, e o compilador FORTRAN é uma extensão do FORTRAN-77.

Tendo em vista que o FORTRAN-CDC é bastante diferente do padrão FORTRAN-77, a conversão seria bastante complexa e como o GRS fez esta conversão para o FORTRAN-IBM, este mais próximo do FORTRAN-77, optou-se pela implantação desta versão que estava disponível no NESC.

II.2 - Modificações Necessárias para a Compilação e Linkedição

Nesta primeira etapa da implantação foram necessárias as seguintes modificações para compatibilizar a versão IBM ao compilador do VAX:

- nas definições de funções, sub-rotinas e "entry points" alguns argumentos que estavam entre barras, indicando a forma de passagem do argumento, tiveram estas retiradas;

- nomes de sub-rotinas e COMMON's que começavam com o caracter $ tiveram seus nomes modificados, visto que o VAX não aceita $ como primeiro caracter;

- diversos "hollerithS" foram modificados, substituindo-se o H por ' porque, no processo de buscar o fonte de fita para disco, os caracteres brancos finais de cada linha foram truncados ocasionando erro de compilação;

- algumas variáveis, que estavam definidas pelo tipo mais de uma vez na mesma rotina, ficaram definidas apenas uma vez;

- o limite de valor de números reais que podem ser utilizados com o processador de ponto flutuante é de 10^{38} e não 10^{78}, como na maioria de outros computadores, portanto as variáveis que excediam àquele limite foram reduzidas;

- alguns ajustes de sintaxe em FORMAT's foram realizados.

Na linkedição foi verificada a necessidade de troca dos nomes das funções ITIME, IXOR, DARCOS e DFLOAT para SECNDS, IEOR, ACOS e FLOAT respectivamente, pois estas são internas à máquina e portanto seus nomes dependem do sistema utilizado.

II.3 - Modificações Necessárias para a Execução

Os casos exemplos escolhidos pelo GRS foram:

1- "Four Pipe Heated Wall Blowdown
Five Nodes in Heated Wall, H = 10 Post CHF HT MOD"

2- "FLECHT Flooding Rate Test No. 04831"

3- "Zion Reactor Core Test of Reactivity Feedback from No to Full Power"

4- "Pressurized Water Reactor (PWR) - 12 kW/ft
Coarse Node Version with 2 Loops - Steady State
Based on Zion 4-Loop PWR - 5/80 - J.R.I."

Todos estes casos exemplos foram simulados na implantação, estando a saída do caso exemplo 1 no apêndice C.

Vários erros foram sendo encontrados ao longo das execuções em diversos pontos do programa, e podem ser resumidos em:

- o dimensionamento variável tem a seguinte restrição no VAX: a variável utilizada como dimensão não pode valer zero. A exe

cução é interrompida mesmo que o vetor não seja utilizado. É necessário evitar esta chamada ou modificar o dimensionamento, o que levou a modificações específicas para cada caso, como descrito a seguir:

```
...
N = Ø
...
...
CALL  SUB(A,N)
...
...
SUBROUTINE  SUB(A,N)
DIMENSION  A(N)
IF (N.LE.Ø) RETURN
...
...
```

A programação acima causa a interrupção do programa na chamada da sub-rotina por erro ADJARDIM - "adjustable array dimension error".

Foram utilizadas duas formas distintas para solucionar este problema. Caso a dimensão zero indique não ser necessário ir à sub-rotina, a modificação descrita abaixo é feita em todas as chamadas:

```
...
...
IF (N.GT.Ø)  CALL  SUB(A,N)
...
...
SUBROUTINE  SUB(A,N)
...
...
```

Como exemplo citamos a sub-rotina LOAD, que serve para inicializar vetores, e não precisa ser chamada se o número de elemen

tos a inicializar (terceiro parâmetro) é zero. Foram colocados diversos comandos IF's para evitar a chamada.

Havendo a necessidade de ir à sub-rotina, apenas esta é modificada, como a seguir:

```
...
...
CALL  SUB(A,N)
...
...
SUBROUTINE  SUB(A,N)
DIMENSION  A(*)
...
...
```

Um exemplo do caso acima está relacionado ao dimensionamento variável de matrizes, o qual é mais restrito, sendo irrelevante somente o valor da última das dimensões. É o caso da sub-rotina TF1DS, com as matrizes AOU(..., 1), TWL(..., 1) e TWV(..., 1), que ocasionalmente recebem valor zero na primeira dimensão. Neste caso estas foram transformadas em vetores de uma só dimensão, e modificado convenientemente seu índice, assim:

DIMENSION AOU(NODES, 1) substituído por DIMENSION AOU(*)

AOU(I,J) substituído por AOU((I-1) * NODES + J);

- os COMMON's foram feitos de tamanho igual em todas as rotinas em que aparecem. Por exemplo:

  A(40000), ALCM(131071);

- como no FORTRAN-77 o tratamento de caracteres é diferente do tratamento de variáveis numéricas, foi necessário colocá-las explicitamente como sendo do tipo CHARACTER, e substituir as constantes de "hollerith" (n H texto) por constantes do tipo CHARACTER ('texto').

Esta modificação pode ser ilustrada com as sub-rotinas WARRAY e WIARR que foram alteradas, sendo a variável ARRID definida como do tipo CHARACTER*8. Consequentemente em todas as chamadas a estas duas rotinas o parâmetro correspondente foi trocado de "hollerith" (n H texto), considerado constante numérica, para a forma "string" 'texto', considerada constante caracter pelo VAX.

Este mesmo procedimento foi adotado em relação ao último parâmetro da sub-rotina SCLTBL. Nas chamadas, este parâmetro deve conter sempre os oito caracteres, não sendo permitido "strings" menores.

Também nas chamadas da sub-rotina GRFPUT os parâmetros que contêm "strings" foram completados para o tamanho correto;

- o valor da variável LLAST no BLOCK DATA foi modificado para 131071, igual à dimensão do vetor ALCM no COMMON/LCMSP/;

- no padrão FORTRAN-77 um "loop" controlado pelo comando DO não é executado nenhuma vez caso o limite superior seja menor que o limite inferior. O GRS colocou um comando IF antes de cada comando DO a fim de garantir este funcionamento. Como no VAX este comando DO funciona conforme o padrão FORTRAN-77, os comandos IF's tornaram-se desnecessários e foram retirados;

- foi retirada a chamada para a sub-rotina ERRSET, que é do sistema IBM, e controla a impressão de mensagem de erro;

- compatibilizou-se o tipo da variável a ser impressa com o FORMAT correspondente, quando necessário;

- tendo em vista o limite de 10^{38} para valores reais no VAX, foi necessário modificar expressões aritméticas para evitar "overflow" no cálculo.

III. CONCLUSÕES

Com o término da primeira etapa do aprendizado da utilização do código TRAC-PF1,o GTT já possui uma ferramenta de cálculo para análises de acidentes com perda de refrigerante (APR).

A segunda etapa, que consiste na simulação de experimentos, já foi iniciada com a modelagem de um teste de despressurização em um tubo horizontal[3],sob a supervisão do Dr. G. Yadigaroglu[4], por ocasião de sua consultoria técnica ao GTT em agosto de 1988. Este trabalho se encontra em andamento e uma nota técnica será publicada.

Ainda nesta segunda etapa será analisado um problema padrão proposto pelo VII Encontro Nacional de Física de Reatores (ENFIR), a realizar-se de 26 a 28 de abril de 1989 em Recife, PE. Este problema consiste na simulação de uma experiência de despressurização, na qual foram efetuadas medidas de pressão, temperatura e fração de vazio durante a evolução do transiente.

Uma análise do tempo de CPU gasto para os quatro casos exemplos mostrou que a execução da versão do TRAC-PF1 implantada no VAX é da ordem de 12 vezes mais lenta que a versão do GRS executada no IBM. Algumas modificações para tornar o programa menor e mais rápido estão previstas, o que levará à otimização do uso do código.

IV. REFERÊNCIAS

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2 - Transient Reactor Analysis Code - Input Specifications - TRAC-PF1 7.0/EXTUPD7.6 - Safety Code Development - Energy Division - Los Alamos National Laboratory - June 1982.

3 - N. Aksan, M. Andreani, G. Analytis, G. Yadigaroglu: PROBLEM 18 - BLOWDOWN - Second International Workshop on Two-Phase Flow Fundamentals - PHYSICAL BENCHMARK EXERCISE, 16-20 March 1987, RPI, Troy, New York, USA.

4 - A.C. Pontedeiro: Missão de Perito da AIEA, Prof. Dr.G.Yadigaroglu em Serviço de Assistência Técnica ao GTT - Relatório de Atividades-GTT - Nº 021/88, Setembro/88.

APÊNDICE A

DIVISÃO DO PROGRAMA FONTE - TRAC-PF1

DIVISÃO DO PROGRAMA FONTE - TRAC-PF1

O programa fonte utilizado está na fita DRF303, arquivos 13 e 15.

O grande número de linhas do TRAC-PF1 (87954 linhas) levou à necessidade de subdividir o programa fonte em 17 módulos de aproximadamente 5000 linhas.

A seguir é fornecido o nome de cada módulo, bem como suas sub-rotinas, funções (reais (F), lógicas (LF) e inteiras (IF)) associadas:

- Módulo 1 → TRACØ1.FOR (linhas 1 a 5040)

1 - DATE	12 - RXVSLR	23 - BACIT
2 - RDCODI	13 - RXVSRR	24 - BFALOC
3 - RHSET	14 - ACCMBD	25 - BFCLOS
4 - RID (LF)	15 - ACCM1X	26 - BFIN
5 - RWRLCM	16 - ACCUM1	27 - BFOUT
6 - RXCMPR	17 - ACCUM2	28 - BKMOM
7 - RXCOMR	18 - ACCUM3	29 - BKSMOM
8 - RXCORR	19 - ALLBLK (LF)	30 - BKSSTB
9 - RXPTRS	20 - ANNSH	31 - BLOCK DATA
10 - RXREAD	21 - ASIGN	32 - BREAKX
11 - RXVSGR	22 - AXPOW	33 - BREAK1

- Módulo 2 → TRACØ2.FOR (linhas 5041 a 10079)

1 - BREAK2	10 - CHOKE	19 - COREC3
2 - BREAK3	11 - CIVSSL	20 - CORE1
3 - BREBAL	12 - CLEAN	21 - CORE3
4 - CDTHEX (F)	13 - CLEAR	22 - CPLL (F)
5 - CHBD	14 - CLOCK	23 - CPVV (F)
6 - CHEN	15 - COMPI	24 - CPVV1 (F)
7 - CHF	16 - CONSTB	25 - CTAIN1
8 - CHF1	17 - COREC1	26 - CTAIN2
9 - CHKSR	18 - COREC2	27 - CTAIN3
		28 - CWVSSL

- Módulo 3 → TRACØ3.FOR (linhas 10080 a 16106)

1 - CYLHT	10 - DPIPE	19 - ENDGRF
2 - DBRK	11 - DPUMP	20 - EOVLY
3 - DCODF	12 - DTEE	21 - ERROR
4 - DCOMP	13 - DVLVE	22 - ESTGEN
5 - DCORE	14 - DVSSL	23 - ETEE
6 - DELTAR	15 - ECOMP	24 - EVALDF
7 - DFHT	16 - EDIT	25 - EXPAND
8 - DFILL	17 - ELGR	26 - FAXPOS
9 - DMPIT	18 - ENDDMP	27 - FEMOM

- Módulo 4 → TRACØ4.FOR (linhas 16107 a 20784)

1 - FF3D	8 - FNMESH	15 - GETCRV
2 - FILLX	9 - FPROP	16 - GRAF
3 - FILL1	10 - FROD	17 - GRFGET
4 - FILL2	11 - FTHEX (F)	18 - GRFPUT
5 - FILL3	12 - FWALL	19 - GVSSL1
6 - FLUX	13 - GAPHT	20 - GVSSL2
7 - FNDLP	14 - GETBIT (IF)	21 - HLS (F)
		22 - HOUT

- Módulo 5 → TRACØ5.FOR (linhas 20785 a 25642)

1 - HTCOR
2 - HTPIPE
3 - HTVSSL
4 - HUNTS (LF)
5 - HVFILM
6 - HVS (F)
7 - IACCUM
8 - IBRK
9 - ICHL (F)
10 - ICMPR (F)
11 - ICOMP
12 - ICORE
13 - IDEL (F)
14 - IFILL
15 - IGACUM
16 - IGBRAK
17 - IGCOMP
18 - IGCORE
19 - IGFILL
20 - IGPIPE
21 - IGPRZR
22 - IGPUMP
23 - IGRAF

- Módulo 6 → TRACØ6.FOR (linhas 25643 a 31436)

1 - IGSTGN
2 - IGTEE
3 - IGVLVE
4 - IGVSSL
5 - INDEL (F)
6 - INIT
7 - INNER
8 - INPUT
9 - IOVLY
10 - IPIPE
11 - IPRIZR
12 - IPROP
13 - IPUMP
14 - ISORT
15 - ISTGEN
16 - ITEE
17 - ITR1
18 - IVLVE
19 - IVSSL

- Módulo 7 → TRACØ7.FOR (linhas 31437 a 36479)

1 - JFIND (F)
2 - JUNSOL
3 - JVALUE (F)
4 - J1D
5 - KXOR (F)
6 - LCMOVE
7 - LEVEL
8 - LININT
9 - LOAD
10 - LPCOM
11 - LPRPL
12 - LPSET
13 - MANAGE
14 - MBN
15 - MFROD
16 - MFUEL
17 - MGAP
18 - MHTR
19 - MIXPRP
20 - MPROD
21 - MSTRCT
22 - MWRX
23 - MZIRC
24 - NEWDLT
25 - NXTCMP
26 - ORIEN
27 - OUTER
28 - OUT1D
29 - OUT3D
30 - OØTIM
31 - PACKIT
32 - PATH
33 - PIPE1
34 - PIPE1X

- Módulo 8 → TRACØ8.FOR (linhas 36480 a 41645)

1 - PIPE2	7 - POST3D	13 - PRIZR1
2 - PIPE3	8 - PREINP	14 - PRIZR2
3 - PMPP	9 - PREP	15 - PRIZR3
4 - POLY (F)	10 - PREPER	16 - PRZR1X
5 - POST	11 - PREP1D	17 - PRZR3X
6 - POSTER	12 - PREP3D	18 - PSTEPQ
		19 - PUMPD

- Módulo 9 → TRACØ9.FOR (linhas 41646 a 46657)

1 - PUMPI	6 - PUMP3	11 - RCORE
2 - PUMPSR	7 - RACCUM	12 - RDCOMP
3 - PUMPX	8 - RBREAK	13 - RDCRDS
4 - PUMP1	9 - RCNTL	14 - RDCRVS
5 - PUMP2	10 - RCOMP	15 - RDDIN
		16 - RDLCM

- Módulo 10 → TRAC1Ø.FOR (linhas 46658 a 51863)

1 - RDLOOP	5 - READR	9 - RECORE
2 - RDREST	6 - REBRK	10 - REFILL
3 - REACCM	7 - RECNTL	11 - REPIPE
4 - READI	8 - RECOMP	12 - REPRZR
		13 - REPUMP

- Módulo 11 → TRAC11.FOR (linhas 51864 a 57317)

1 - RESTGN	6 - RFILL	11 - RPPH
2 - RETEE	7 - RHOLIQ	12 - RPRIZR
3 - REVLVE	8 - RKIN	13 - RPSGA
4 - REVSSL	9 - RODHT	14 - RPUMP
5 - RFDBK	10 - RPIPE	15 - RSTGEN

- Módulo 12 → TRAC12.FOR (linhas 57318 a 62546)

1 - RTEE	10 - SETBD	19 - SGTBC
2 - RVLVE	11 - SETBID	20 - SHRINK
3 - RVSSL	12 - SETLCM	21 - SIGMA (F)
4 - SAVDB	13 - SETNET	22 - SLABHT
5 - SCLTBL	14 - SETPOW	23 - SLVLP
6 - SCMLCM	15 - SETPRP	24 - SMOVE
7 - SCMOVE	16 - SETSCM	25 - SMOVEN
8 - SECOND	17 - SGEFA	26 - SOLVE
9 - SEDIT	18 - SGESL	27 - SPLIT
		28 - SREBAL

- Módulo 13 → TRAC13.FOR (linhas 62547 a 67192)

1 - SRTLP	6 - STGEN1	11 - STGNTX
2 - SSWTCH	7 - STGEN2	12 - STGN1X
3 - STBME	8 - STGEN3	13 - STGN3X
4 - STDIR	9 - STGNA	14 - SVSTET
5 - STEADY	10 - STGNP	

- Módulo 14 → TRAC14.FOR (linhas 67193 a 72515)

1 - SVSET1	5 - TEE1	9 - TEMPL
2 - SVSET3	6 - TEE1X	10 - TF1D
3 - S1DPTR	7 - TEE2	11 - TF1DS
4 - TEEP	8 - TEE3	12 - TF1DS1

- Módulo 15 → TRAC15.FOR (linhas 72516 a 77089)

1 -,TF1DS3	3 - TF3DI	5 - THCV (F)
2 - TF3DE	4 - THCL (F)	6 - THERMO

- Módulo 16 → TRAC16.FOR (linhas 77090 a 82257)

1 - TIMCHK	8 - TRIP	15 - VISCV
2 - TIMSTB	9 - TRISLV	16 - VLVEX
3 - TLOTVO	10 - TRPSET	17 - VLVE1
4 - TMSFB	11 - UNPKIT	18 - VLVE2
5 - TRAC16$MAIN	12 - VALUE	19 - VLVE3
6 - TRANS	13 - VELCK	20 - VOLFA
7 - TRCE	14 - VISCL	21 - VOLV
		22 - VSCON

- Módulo 17 → TRAC17.FOR (linhas 82258 a 87954)

1 - VSSL1	8 - WCORE	15 - WRLCM
2 - VSSL2	9 - WFILL	16 - WRSLP
3 - VSSL3	10 - WIARR	17 - WSTGEN
4 - WACCUM	11 - WPIPE	18 - WTEE
5 - WARRAY	12 - WPRIZR	19 - WVLVE
6 - WBREAK	13 - WPUMP	20 - WVSSL
7 - WCOMP	14 - WRCOMP	21 - XACCUM

APÊNDICE B

ORGANIZAÇÃO DO PROGRAMA FONTE

B.1 - DESCRICAO DO JCL

1 - JCL para uma execucao simples :

```
$ SET DEF SYS$SYSDEVICE:[DR.REGINA]
$ DEF/USER FOR001 dados.DAT          !  TRACIN --> dados de entrada
$ DEF/USER FOR005 dados.AUX          !  TRCINP --> dados de entrada transformados
$ DEF/USER FOR006 dados.LIS          !  TRCOUT --> saida impressa
$ DEF/USER FOR007 dados.MSG          !  TRCMSG --> saida de mensagens
$ RUN TRACPF1
$ PRINT dados.LIS
$ PRINT dados.MSG
```

2 - JCL para uma execucao gravando "RESTART" :

```
$ SET DEF SYS$SYSDEVICE:[DR.REGINA]
$ DEF/USER FOR001 dados.DAT          !  TRACIN --> dados de entrada
$ DEF/USER FOR005 dados.AUX          !  TRCINP --> dados de entrada transformados
$ DEF/USER FOR006 dados.LIS          !  TRCOUT --> saida impressa
$ DEF/USER FOR007 dados.MSG          !  TRCMSG --> saida de mensagens
$ DEF/USER FOR012 arq-restart.RST    !  TRCDMP --> saida para restart
$ RUN TRACPF1
$ PRINT dados.LIS
$ PRINT dados.MSG
```

3 - JCL para uma execucao lendo "RESTART" :

```
$ SET DEF SYS$SYSDEVICE:[DR.REGINA]
$ DEF/USER FOR001 dados.DAT          !  TRACIN --> dados de entrada
$ DEF/USER FOR005 dados.AUX          !  TRCINP --> dados de entrada transformados
$ DEF/USER FOR006 dados.LIS          !  TRCOUT --> saida impressa
$ DEF/USER FOR007 dados.MSG          !  TRCMSG --> saida de mensagens
$ DEF/USER FOR013 arq-restart.RST    !  TRCRST --> dados do restart
$ RUN TRACPF1
$ PRINT dados.LIS
$ PRINT dados.MSG
```

4 - JCL para uma execucao lendo e gravando "RESTART" :

```
$ SET DEF SYS$SYSDEVICE:[DR.REGINA]
$ DEF/USER FOR001 dados.DAT          !  TRACIN --> dados de entrada
$ DEF/USER FOR005 dados.AUX          !  TRCINP --> dados de entrada transformados
$ DEF/USER FOR006 dados.LIS          !  TRCOUT --> saida impressa
$ DEF/USER FOR007 dados.MSG          !  TRCMSG --> saida de mensagens
$ DEF/USER FOR012 arq-rest-novo.RST  !  TRCDMP --> saida para novo restart
$ DEF/USER FOR013 arq-rest-ant.RST   !  TRCRST --> dados do restart anterior
$ RUN TRACPF1
$ PRINT dados.LIS
$ PRINT dados.MSG
```

5 - Saida para graficos :

Para utilizar a saida para graficos basta acrescentar a qualquer um dos JCL's anteriores a seguinte linha :

```
$ DEF/USER FOR011 arq-plot.DAT       !  TRCGRF --> dados para graficos
```

B.2 - TRACPF1 - MAPA DE CHAMADA DAS ROTINAS

Entrada	rotina	chamada por			
ACCM1X	(ACCM1X)	ACCUM1			
ACCM8D	(ACCM8D)	ACCUM1	ACCUM2	ACCUM3	IACCUM
ACCUM1	(ACCUM1)	PREP1D			
ACCUM2	(ACCUM2)	OUT1D			
ACCUM3	(ACCUM3)	POST			
ALLBLK	(ALLBLK)	FREINP			
ANNSH	(ANNSH)	FEMOM	TF3DE		
ASIGN	(ASIGN)	INPUT			
AXPOW	(AXPOW)	CORE3	CORE1	CORE3	ICORE
		IVSSL	VSSL1		
BACIT	(BACIT)	VSSL2			
BFALOC	(BFALOC)	DMPIT	IGRAF	RDREST	
BFCLOS	(BFCLOS)	ENDDMP	ENDGRF		
BFIN	(BFIN)	RDREST	REACCM	REERR	RECOMP
		RECORE	REFILL	REPIPE	REPRZR
		REPUMP	RESTGN	RETEE	REVLVE
		REVSSL			
BFOUT	(BFOUT)	DERR	DCOMP	DCORE	DFILL
		DMPIT	DPIPE	DPUMP	DTEE
		DVLVE	DVSSL	GRAF	IGRAF
BKMOM	(BKMOM)	ACCUM1	CORE1	PIPE1	PRIZR1
		PUMP1	STGEN1	TEE1	VLVE1
BKSMOM	(BKSMOM)	BKMOM			
BKSSTB	(BKSSTB)	POSTEP			
BKSUB	(SOLVE)				
BREAK1	(BREAK1)	PREP1D			
BREAK2	(BREAK2)	OUT1D			
BREAK3	(BREAK3)	POST			
BREAKX	(BREAKX)	BREAK1			
BREBAL	(BREBAL)	VSSL2			
COTHEX	(COTHEX)	DELTAR			
CHED	(CHED)	INNER			
CHEN	(CHEN)	HTCOR			
CHF	(CHF)	HTCOR			
CHF1	(CHF1)	CHF			
CHGBIT	(SETBIT)	VELCK			
CHKSR	(CHKSR)	RVSSL			
CHORE	(CHORE)	TF1DS1			
CIVSSL	(CIVSSL)	ICOMP			
CLEAN	(CLEAN)	ERROR	TRACPF1		
CLEAR	(CLEAR)	HOUT	ICOMP	INIT	INPUT
		LOAD	LPSET	OUT1D	OUT3D
		OUTER	POST	PREP1D	PREPER
		RCNTL	RCOMP	RCORE	RDCOMP
		RDDIM	RDLOOP	RECORE	REPUMP
		REVSSL	RVSSL	SIDPTR	SCMLCM
		SEDIT	TRACPF1	TRCE	VSSL1
		VSSL2			
CLOCK	(CLOCK)	SECOND			
COMP1	(COMP1)	ICORE	IPIPE	IPUMP	ISTGEN

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por			
		ITEE	IVLVE		
CONC	(CONC)	BKSSTB	FF3D		
CONSTB	(CONSTB)	ACCUM3	COREC3	PIPE3	PRIZR3
		PUMP3	STGEN3	TEE3	VLVE3
CORE1	(CORE1)	VSSL1			
CORE3	(CORE3)	VSSL3			
COREC1	(COREC1)	PREP1D			
COREC2	(COREC2)	OUT1D			
COREC3	(COREC3)	POST			
CPLL	(CPLL)	FPROP			
CPVV	(CPVV)				
CPVV1	(CPVV1)	FPROP			
CTAIN1	(CTAIN1)	PREP1D			
CTAIN2	(CTAIN2)	OUT1D			
CTAIN3	(CTAIN3)	POST			
CVVSSL	(CVVSSL)	VCOMP			
CYLHT	(CYLHT)	POSTER	STGN3X		
DATE	(DATE)				
DBRK	(DBRK)	DMPIT			
DCODF	(DCODF)	LOAD	READI	READX	
DCOMP	(DCOMP)	DCORE	DMPIT	DPIPE	DPUMP
		DTEE	DVLVE		
DCORE	(DCORE)	DMPIT			
DELTAR	(DELTAR)	GAPHT			
DFHT	(DFHT)	HTCOR			
DFILL	(DFILL)	DMPIT			
DMPIT	(DMPIT)	ERROR	PSTEP8	TIMCHK	TRACPF1
		TRANS			
DPIPE	(DPIPE)	DMPIT			
DPUMP	(DPUMP)	DMPIT			
DTEE	(DTEE)	DMPIT			
DVLVE	(DVLVE)	DMPIT			
DVSSL	(DVSSL)	DMPIT			
ECOMP	(ECOMP)	WACCUM	WBREAK	WCORE	WFILL
		WPIPE	WPRIZR	WPUMP	WSTGEN
		WTEE	WVLVE		
EDIT	(EDIT)	ERROR	HOUT	PSTEP8	STEADY
		TIMCHK	TRANS		
ELGR	(ELGR)	IACCUM	ICORE	IPIPE	IPRIZR
		IPUMP	ISTGEN	ITEE	IVLVE
ENDDMP	(ENDDMP)	CLEAN			
ENDGRF	(ENDGRF)	CLEAN			
EOVLY	(EOVLY)	CLEAN	DMPIT	EDIT	ERROR
		GRAF	INIT	INPUT	LPSET
		OUTER	POST	PREP	
ERROR	(ERROR)	BFIN	BFOUT	BREAKX	CHRD
		CHF	CHKSR	CIVSSL	CORE3
		COREC1	COREC3	CTAIN1	CTAIN2
		CTAIN3	DMPIT	ENDDMP	ENDGRF
		EOVLY	FILLX	FNDLP	GETBIT

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuação)

Entrada	rotina	chamada por			
		GRAF	GRFPUT	HOUT	ICOMP
		ICORE	IGRAF	INPUT	IOVLY
		IVLVE	IVSSL	JFIND	LOAD
		LPCON	LPSET	MANAGE	MSTRCT
		MXTCMP	ORIENT	OUT1D	OUT3D
		OUTER	PATH	PIPE1	POST
		POST3D	POSTER	PREINP	PREP1D
		PREP3D	PUMPD	PUMPSR	RBREAK
		RCNTL	RCOMP	RCORE	RDCOMP
		RDDIM	RDLOOP	RDREST	READCM
		READI	READR	REBRK	RECNTL
		RECORE	REFILL	REPIPE	REPRZR
		RIPUMP	RESTGN	RETEE	REVLVE
		REVSSL	RFILL	RKIN	RPPH
		RPUMP	RSTGEN	RVLVE	RVSSL
		SCHLCH	SETBIT	SETPOW	STEADY
		STGN3X	SVSET3	TEE1X	TEMPL
		THERMO	TIMCHK	TIMSTP	TRACPF1
		TRCE	TRIP	TRPSET	VLVEX
		VSSLL			
ESTGEN	(ESTGEN)	ISTGEN	STGEN3		
ETEE	(ETEE)	ITEE	TEE3		
EVALOF	(EVALOF)	ACCUM3	CORE3	COREC3	PIPE3
		PRIZR3	PUMP3	STGEN3	TEE3
		VLVE3	VSSL3		
EXPAND	(EXPAND)	CORE1	COREC1		
FAXPOS	(FAXPOS)	RVLVE	VLVEX		
FEMOM	(FEMOM)	PREPER			
FF3D	(FF3D)	VSSL3			
FILL1	(FILL1)	PREP1D			
FILL2	(FILL2)	OUT1D			
FILL3	(FILL3)	POST			
FILLX	(FILLX)	FILL1			
FLUX	(FLUX)	PREPER			
FNOLP	(FNOLP)	RDLOOP			
FNRESH	(FNRESH)	CORE1	COREC1		
FPROP	(FPROP)	BREAKX	FEMOM	FILLX	IBM
		IFILL	IPROP	IVSSL	POSTEP
		TF1DS1	TFSEE	VSSL3	
FROD	(FROD)	CORE3	COREC3		
FTHEX	(FTHEX)	DELTAR			
FWALL	(FWALL)	PREPER			
GAFHT	(GAFHT)	FROD			
GETBIT	(GETBIT)	BREAK1	FILL1	FLUX	ITR1
		POSTER	READI	STBME	TF1D3
		TF1DS1	TF1DS3	TF3DE	TF3D1
		VELCH	VSSL2		
GETCRV	(GETCRV)	PUMPD			
GRAF	(GRAF)	ERROR	PSTEP0	TIMCHK	
GRFGET	(GRFGET)	GRAF	IGRAF		

TRACEF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por			
GRFPUT	(GRFPUT)	IGACUM	IGBRAK	IGCOMP	IGCORE
		IGFILL	IGPIPE	IGFRZR	IGPUMP
		IGRAF	IGSTGN	IGTEE	IGVLVE
		IGVSSL			
GVSSL1	(GVSSL1)	FF30			
GVSSL2	(GVSSL2)	VSSL3			
HLS	(HLS)	FPROP	HTCOR		
HOUT	(HOUT)	STEADY	TRANS		
HTCOR	(HTCOR)	CORE1	CORE01	HTPIPE	HTVSSL
HTPIPE	(HTPIPE)	PREPER	STGN1X		
HTVSSL	(HTVSSL)	VSSL1			
HUNTS	(HUNTS)	PREINP			
HVFILM	(HVFILM)	HTCOR			
HVS	(HVS)	FPROP			
IACCUM	(IACCUM)	ICOMP			
IERR	(IERR)	ICOMP			
ICHL	(ICHL)	HUNTS	IDEL	INDEL	PREINP
		VALUE			
ICMPR	(ICMPR)	CONSTB	INNER	PREPER	SAVBD
		SETBD			
ICOMP	(ICOMP)	INIT			
ICORE	(ICORE)	ICOMP			
IDEL	(IDEL)	HUNTS	PREINP		
IFILL	(IFILL)	ICOMP			
IGACUM	(IGACUM)	IGRAF			
IGBRAK	(IGBRAK)	IGRAF			
IGCOMP	(IGCOMP)	IGACUM	IGCORE	IGPIPE	IGFRZR
		IGPUMP	IGSTGN	IGTEE	IGVLVE
IGCORE	(IGCORE)	IGRAF			
IGFILL	(IGFILL)	IGRAF			
IGPIPE	(IGPIPE)	IGRAF			
IGFRZR	(IGFRZR)	IGRAF			
IGPUMP	(IGPUMP)	IGRAF			
IGRAF	(IGRAF)	INIT			
IGSTGN	(IGSTGN)	IGRAF			
IGTEE	(IGTEE)	IGRAF			
IGVLVE	(IGVLVE)	IGRAF			
IGVSSL	(IGVSSL)	IGRAF			
INDEL	(INDEL)	ALLBLK	PREINP		
INIT	(INIT)	TRACEF1			
INNER	(INNER)	ACCUM2	CORE02	PIPE2	FRZR2
		PUMP2	STGEN2	TEE2	VLVE2
INPUT	(INPUT)	TRACEF1			
IOVLY	(IOVLY)	CLEAN	DMPIT	EDIT	GRAF
		INIT	INPUT	LPSET	OUTER
		POST	PREP		
IPIPE	(IPIPE)	ICOMP			
IPRIZR	(IPRIZR)	ICOMP			
IPROP	(IPROP)	IACCUM	ICORE	IPIPE	IPRIZR
		IPUMP	ISTGEN	ITEE	IVLVE

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por			
IPUMP	(IPUMP)	ICOMP			
ISORT	(ISORT)	INPUT			
ISTGEN	(ISTGEN)	ICOMP			
ITEE	(ITEE)	ICOMP			
ITR1	(ITR1)	VSSL2			
IVLVE	(IVLVE)	ICOMP			
IVSSL	(IVSSL)	CIVSSL			
J1D	(J1D)	ACCMBD	ACCUM1	BREAK1	BREAK2
		BREAK3	CONSTB	FILL1	FILL2
		FILL3	IBAK	IFILL	INNER
		ISTGEN	PRIZR2	SETGD	STGNTX
		TEE1X			
JFIND	(JFIND)	CIVSSL	IACCUM	IERR	ICORE
		IFILL	IPIPE	IPRIZR	IPUMP
		ISTGEN	ITEE	IVLVE	
JUNSOL	(JUNSOL)	IACCUM	ICORE	IPIPE	IPRIZR
		IPUMP	ISTGEN	ITEE	IVLVE
JVALUE	(JVALUE)	PREINP	VALUE		
KXOR	(KXOR)	READI			
LCMOVE	(LCMOVE)	RVSSL	VSSL1		
LEVEL	(LEVEL)	FEMOM			
LININT	(LININT)	BREAKX	COTHEX	CORE2	COREC1
		COREC3	FILLX	MZIRC	PIPE1
		PUMP0	PUMPOR	PUMPX	RKIN
		TEE1X	VLVEX	VSSL1	
LOAD	(LOAD)	INPUT	XBREAK	RCOMP	RCORE
		RDCRVS	RFILL	RPIPE	RPUMP
		RSTGEN	RTEE	RVLVE	RVSSL
LPCON	(LPCON)	LPSET			
LPRFL	(LPRFL)	LPSET			
LPSET	(LPSET)	STEADY			
MANAGE	(MANAGE)	CORE1	CORE3	CVSSL	GRAF
		IGRAF	IVSSL	OUTSD	PFDBK
		SUBSET	VSSL1	VSSL2	VSSL3
		WVSSL			
MBN	(MBN)	MFROD			
MFROD	(MFROD)	CORE1	COREC1	MTVSSL	
MFUEL	(MFUEL)	MFROD			
MGAP	(MGAP)	GAPNT			
MHTR	(MHTR)	MFROD			
MIXFRP	(MIXFRP)	BREAKX	FILLX	IBRK	IFILL
		IPROP			
MPROP	(MPROP)	PREPER			
MSTRCT	(MSTRCT)	MFROD	MPROP		
MWRX	(MWRX)	FROD			
MZIRC	(MZIRC)	MFROD			
NEWOLT	(NEWOLT)	LIMSTP			
NXTCMP	(NXTCMP)	RDCOMP			
OBTIM	(OBTIM)	TIMCHK	TRACPF1		
OPS123	(SETBIT)	POSTER			

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por			
OFFBIT	(SETBIT)	ITR1	TF1DS	TF1DS3	TF3DE
		VELCK			
ORIENT	(ORIENT)	STGNP	TEEP		
OUT1D	(OUT1D)	OUTER			
OUT3D	(OUT3D)	OUTER			
OUTER	(OUTER)	HOUT			
PACKIT	(PACKIT)	GRAF	IGRAF		
PATH	(PATH)	FNDLP	TRCE		
PIPE1	(PIPE1)	PREP1D			
PIPE1X	(PIPE1X)	PIPE1			
PIPE2	(PIPE2)	OUT1D			
PIPE3	(PIPE3)	POST			
PMPP	(PMPP)	LPCON			
POLY	(POLY)				
POST	(POST)	HOUT	STEADY	TRANS	
POST3D	(POST3D)	POST			
POSTER	(POSTER)	ACCUM3	COREC3	PIPE3	PRIZR3
		PUMP3	STGEN3	TEE3	VLVE3
PREINP	(PREINP)	INPUT			
PREP	(PREP)	STEADY	TRANS		
PREP1D	(PREP1D)	PPEP			
PREP3D	(PREP3D)	PREP			
PREPER	(PREPER)	ACCUM1	COREC1	PIPE1	PRIZR1
		PUMP1	STGEN1	TEE1	VLVE1
PRIZR1	(PRIZR1)	PPEP1D			
PRIZR2	(PRIZR2)	OUT1D			
PRIZR3	(PRIZR3)	POST			
PRZR1X	(PRZR1X)	PRIZR1			
PRZR3X	(PRZR3X)	PRIZR3			
PSTEP0	(PSTEP0)	STEADY	TRANS		
PUMP1	(PUMP1)	PREP1D			
PUMP2	(PUMP2)	OUT1D			
PUMP3	(PUMP3)	POST			
PUMP0	(PUMP0)	PUMPX	RPPH		
PUMP1	(PUMP1)	PDCRVS			
PUMP3P	(PUMP3P)	PREPER			
PUMPX	(PUMPX)	PUMP3P			
RACCUM	(RACCUM)	RDCOMP			
RBREAK	(RBREAK)	RDCOMP			
RCNTL	(RCNTL)	INPUT			
RCOMP	(RCOMP)	RACCUM	RCORE	RPIPE	RPRIZR
		RPUMP	RSTGEN	RTEE	RVLVE
RCORE	(RCORE)	RDCOMP			
RDCODI	(RDCODI)	LOAD			
RDCOMP	(RDCOMP)	INPUT			
RDCRDS	(RDCRDS)	STEADY			
RDCRVS	(RDCRVS)	RPUMP			
RDDIM	(RDDIM)	RPUMP			
RDLCM	(RDLCM)	BFIN	CIVSSL	CWVSSL	CSRK
		DCOMP	DFILL	DMPIT	DVSSL

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por			
		GRAF	IBRK	ICOMP	IFILL
		IGRAF	MANAGE	OUT1D	OUT3D
		PMPP	POST	POST3D	PREP1D
		PREP3D	RDLOOP	RPPH	RPSGA
		SETPOW	SETPRF	STGNA	STGNP
		SVSET	SVSET3	TEEP	VSCON
		WCOMP			
RDLOOP	(RDLOOP)	INPUT			
RDREST	(RDREST)	INPUT			
REACCM	(REACCM)	RDREST			
READI	(READI)	INPUT	RACCUM	RBREAK	RCNTL
		RCORE	RDDIM	RDLOOP	RFILL
		RPIPE	RPRIZR	RPUMP	RSTGEN
		RTEE	RVLVE	RVSSL	
READR	(READR)	INPUT	RBREAK	RCNTL	RCORE
		RDLOOP	RFILL	RPIPE	RPRIZR
		RPUMP	RSTGEN	RTEE	RVLVE
		RVSSL	TIMSTP		
REBRK	(REBRK)	RDREST			
RECNTL	(RECNTL)	RDREST			
RECOMP	(RECOMP)	REACCM	RECORE	REPIPE	REPRZR
		REPUMP	RESTGN	RETEE	REVLVE
RECORE	(RECORE)	RDREST			
REFILL	(REFILL)	RDREST			
REPIPE	(REPIPE)	RDREST			
REPRZR	(REPRZR)	RDREST			
REPUMP	(REPUMP)	RDREST			
RESTGN	(RESTGN)	RDREST			
RETEE	(RETEE)	RDREST			
REVLVE	(REVLVE)	RDREST			
REVSSL	(REVSSL)	RDREST			
RFDBK	(RFDBK)	DCREC1	VSSL1		
RFILL	(RFILL)	RDCOMP			
RHOLIG	(RHOLIG)	HLS	THERMO		
RHSET	(RHSET)	PACKIT	UNPKIT		
RID	(RID)				
RKIN	(RKIN)	DCREC1	VSSL1		
RODHT	(RODHT)	FROD			
RPIPE	(RPIPE)	RDCOMP			
RPPH	(RPPH)	LFRFL			
RPRIZR	(RPRIZR)	RDCOMP			
RPSGA	(RPSGA)	LFRPL			
RPUMP	(RPUMP)	RDCOMP			
RSTGEN	(RSTGEN)	RDCOMP			
RTEE	(RTEE)	RDCOMP			
RVLVE	(RVLVE)	RDCOMP			
RVSSL	(RVSSL)	RDCOMP			
RWRLCH	(RWRLCH)	RCORE	RVSSL		
RXCMPR	(RXCMPR)	RACCUM	RCORE	RPIPE	RPRIZR
		RPUMP	RSTGEN	RTEE	RVLVE

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por			
RXCOMR	(RXCOMR)	RDCOMP			
RXCORR	(RXCORR)	RCORE			
RXPTRS	(RXPTRS)	RDCOMP			
RXREAD	(RXREAD)	RCORE	RXCMPR	RXCOMR	RXCORR
		RXVSGR	RXVSLR	RXVSRR	
RXVSGR	(RXVSGR)	RVSSL			
RXVSLR	(RXVSLR)	RVSSL			
RXVSRR	(RXVSRR)	RVSSL			
SIOPTR	(SIOPTR)	RACCUM	RBREAK	RCORE	REACCM
		REBRK	RECORE	REFILL	REPIPE
		REPRZR	REPUMP	RESTGN	RETEE
		REVLVE	RFILL	RPIPE	RPRIZR
		RPUMP	RSTGEN	RTEE	RVLVE
SAV3D	(SAV3D)	ACCUM1	ACCUM3	COPEC1	COREC3
		PIPE1	PIPE3	PRIZR1	PRIZR3
		PUMP1	PUMP3	STGEN1	STGEN3
		TEE1	TEE3	VLVE1	VLVE3
SCLT3L	(SCLT3L)	RBREAK	RCORE	RFILL	RPIPE
		RPUMP	RTEE	RVSSL	
SCMLCM	(SCMLCM)	RACCUM	REACCM	REPIPE	REPRZR
		REPUMP	RESTGN	RETEE	REVLVE
		RPIPE	RPRIZR	RPUMP	RSTGEN
		RTEE	RVLVE		
SCMOVE	(SCMOVE)	BREAK1	COPEC1	COREC3	FILLX
		IACCUM	IBRK	ICOMP	ICORE
		IFILL	INPUT	IPIPE	IPRIZR
		IPUMP	ISTGEN	ITEE	IVLVE
		OUT3D	POSTER	RCOMP	REPUMP
		SAV3D	VSSL1	VSSL2	VSSL3
SECOND	(SECOND)	DMPIT	EDIT	ERROR	PSTEP@
		TIMCMN	TRACPF1		
SEDIT	(SEDIT)	EDIT	PSTEP@		
SET3D	(SET3D)	COREC1	COREC3	ICORE	IPIPE
		IPRIZR	IPUMP	ISTGEN	ITEE
		IVLVE	PIPE1	PIPE3	PRIZR1
		PRIZR3	PUMP1	PUMP3	STGEN1
		STGEN3	TEE1	TEE3	VLVE1
		VLVE3			
SETBIT	(SETBIT)	POSTER	TF1D3	TF1D31	TF1D33
		TF3DE	VELOK	VSSL2	
SETIME	(SECOND)	TRACPF1			
SETLCM	(SETLCM)	IGRAF	INPUT	RBREAK	RCORE
		REBRK	RECORE	REFILL	REVSSL
		RFILL	RVSSL	SCMLCM	TRACPF1
SETNET	(SETNET)	ICOMP			
SETPOW	(SETPOW)				
SETPRP	(SETPRP)	FNDLP	LPSET		
SETSCM	(SETSCM)	IOVLY			
SGEFA	(SGEFA)	BKSSTB	ITR1	OUT3D	OUTER
		POST	PREPID	TF1D3	VSSL2

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina		chamada por			
SGESL	(SGESL	)	BKSSTB	ITR1	OUT3D	OUTER
			POST	PREP1D	TF1DS	VSSL2
SGT3C	(SGT3C	)	STGEN1			
SHRINK	(SHRINK	)	CORE1	CORE2		
SIGNA	(SIGNA	)	FPROP			
SLABHT	(SLABHT	)	VSSL3			
SLVLP	(SLVLP	)	LPSET			
SMOVE	(SMOVE	)	PREINP	SMOVEN		
SMOVEN	(SMOVEN	)	PREINP			
SOLVE	(SOLVE	)	TF3D1			
SPLIT	(SPLIT	)	GETCRV			
SREBAL	(SREBAL	)	OUT3D	VSSL2		
SRTLP	(SRTLP	)	INPUT			
SSWTCH	(SSWTCH	)	TIMCHK			
STBME	(STBME	)	CONST3			
STDIR	(STDIR	)	VSSL2			
STEADY	(STEADY	)	TRACPF1			
STGEN1	(STGEN1	)	PREP1D			
STGEN2	(STGEN2	)	OUT1D			
STGEN3	(STGEN3	)	POST			
STGN1X	(STGN1X	)	STGEN1			
STGN3X	(STGN3X	)	STGEN3			
STGNA	(STGNA	)	SETFRP			
STGNP	(STGNP	)	LPCON			
STGNTX	(STGNTX	)	STGEN1			
SVSET	(SVSET	)	FREP			
SVSET1	(SVSET1	)	SVSET			
SVSET3	(SVSET3	)	SVSET			
TEE1	(TEE1	)	PREP1D			
TEE1X	(TEE1X	)	TEE1			
TEE2	(TEE2	)	OUT1D			
TEE3	(TEE3	)	POST			
TEEP	(TEEP	)	LPCON			
TEMPL	(TEMPL	)	LPCON			
TF1D	(TF1D	)	INNER			
TF1DS	(TF1DS	)	TF1D			
TF1DSL	(TF1DSL	)	TF1D			
TF1DS3	(TF1DS3	)	TF1D			
TF3DE	(TF3DE	)	VSSL2			
TF3D1	(TF3D1	)	VSSL2			
THCL	(THCL	)	FPROP			
THCV	(THCV	)	FPROP			
THERMO	(THERMO	)	BREAKX	CHOKE	FF3D	FILLX
			IBRK	IFILL	IPROP	IVSSL
			POSTER	TEMPL	TF1D	TF1DS3
			TF3D1	VSSL2	VSSL3	
TIMCHK	(TIMCHK	)	STEADY	TRANS		
TIMSTP	(TIMSTP	)	STEADY	TRANS		
TLOTV0	(TLOTV0	)	ISTGEN	STGN3X		
TMSFB	(TMSFB	)	HTCOP			

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por			
TRACPF1	(TRACPF1)				
TRANS	(TRANS)	TRACPF1			
TRCE	(TRCE)	FNDLP			
TRIP	(TRIP)	CORE1	CORE3	CORECI	CORECS
		FILLX	PUMPSR	RKIN	TIMCHK
		TIMSTP	VLVEX	VSSL1	WPUMP
TRISLV	(TRISLV)	ROOHT	SLAGHT		
TRPSET	(TRPSET)	PREP			
UNPKIT	(UNPKIT)				
VALUE	(VALUE)	PREIMP			
VELCK	(VELCK)	VSSL2			
VISCL	(VISCL)	FPROP			
VISCV	(VISCV)	FPROP			
VLVE1	(VLVE1)	PREP1D			
VLVE2	(VLVE2)	OUT1D			
VLVE3	(VLVE3)	POST			
VLVEX	(VLVEX)	VLVE1			
VOLFA	(VOLFA)	IACCUM	ICORE	IPIPE	IPRIZR
		IPUMP	ISTGEN	ITEE	IVLVE
VOLV	(VOLV)	PREPER			
VSCON	(VSCON)	LPSET			
VSSL1	(VSSL1)	PREP3D			
VSSL2	(VSSL2)	OUT3D			
VSSL3	(VSSL3)	POST3D			
WACCUM	(WACCUM)	WCOMP			
WARRAY	(WARRAY)	ELOR	IVQSL	PUMPX	RBREAK
		RCOMP	RCORE	RDCRVS	REERR
		RECORE	REFILL	REPIPE	REPUMP
		RETEE	REVLVE	REVSSL	RFILL
		RPIPE	RPUMP	RSTGEN	RTEE
		RVLVE	RVSSL	RXCORE	RXV3GR
		RXVERR	SOLTBL	WRCOMP	WVSSL
WBREAK	(WBREAK)	WCOMP			
WCOMP	(WCOMP)	EDIT			
WCORE	(WCORE)	WCOMP			
WFILL	(WFILL)	WCOMP			
WIARR	(WIARR)	RCOMP	RCORE	RDDIM	RECORE
		REVSSL	RSTGEN	RVSSL	RXCORE
		RXVSGR	RXVERR	WRCOMP	
WPIPE	(WPIPE)	WCOMP			
WPRIZR	(WPRIZR)	WCOMP			
WPUMP	(WPUMP)	WCOMP			
WRCOMP	(WRCOMP)	REACCM	RECORE	REPIPE	REPRZR
		REPUMP	RESTGN	RETEE	REVLVE
WRLCM	(WRLCM)	BFOUT	CIVSSL	IACCUM	IBRK
		ICORE	IFILL	IGPAF	IPIPE
		IPRIZR	IPUMP	ISTGEN	ITEE
		IVLVE	MANAGE	OUT1D	OUT3D
		POST	POST3D	PREP1D	PREP3D
		RACCUM	RBREAK	RCORE	REACCM

TRACPF1 - MAPA DE CHAMADA DAS ROTINAS (continuacao)

Entrada	rotina	chamada por				
		REBAR	RECOGE	REFILL	REPIPE	
		REPRZR	REPUMP	RESTGN	RETEE	
		REVLVE	REVSSL	RFILL	RPIPE	
		RPPH	RPRIZR	RPSGA	RPUMP	
		RSTGEN	RTEE	RVLVE	RVSSL	
		SCMLCK	SETPOW	SETPRP	STGNA	
WRSLP	(WRSLP	)	FNDLP			
WSTGEN	(WSTGEN	)	WCOMP			
WTEE	(WTEE	)	WCOMP			
WVLVE	(WVLVE	)	WCOMP			
WVSSL	(WVSSL	)	CWVSSL			
XACCUM	(XACCUM	)	RDREST			
XBREAK	(XACCUM	)	RDREST			
XCOGEO	(XACCUM	)	RECORE			
XCOPOO	(XACCUM	)	RECORE			
XFILL	(XACCUM	)	RDREST			
XPIPE	(XACCUM	)	RDREST			
XPRIZR	(XACCUM	)	RDREST			
XPUMP	(XACCUM	)	RDREST			
XSTGEN	(XACCUM	)	RDREST			
XTEE	(XACCUM	)	RDREST			
XVLVE	(XACCUM	)	RDREST			
XVSOWV	(XACCUM	)				
XVSGEO	(XACCUM	)	REVSSL			
XVSLEV	(XACCUM	)	REVSSL			
XVSLVL	(XACCUM	)				
XVSROO	(XACCUM	)	REVSSL			

APÊNDICE C

CASO EXEMPLO 1 - "FOUR PIPE HEATED WALL BLOWDOWN - FIVE NODES IN HEATED WALL, H = 10 POST CHF HT MOD"

```
 THIS CODE WAS CREATED ON 08/10/81 FROM TRAC VERSION 6.0
          ** CONVERTED TO IBM-FORTRAN BY GRS 10/15/81 **
          ** UPDATED  TO VERSION 6.1 BY GRS 11/02/81 **
          ** UPDATED  TO VERSION 7.0 BY GRS 01/14/82 **
          ** UPDATED  TO VERSION 7.4E - GRS 04/14/82 **
          ** UPDATED  TO VERSION 7.6 BY GRS 07/21/82 **

 EXECUTED ON :  17-NOV-8     TIME :  0

 NUMBER OF TITLE CARDS IS   2
 FOUR PIPE HEATED WALL BLOWDOWN
 FIVE NODES IN HEATED WALL, N=10 POST CHF HT MOD


 )) GRAPHIC FILE IN BOTH POLYPLOT (FT10F001) AND TRAC POST PROCESSOR FORMAT (FT11F001) REQUESTED ((



 )) TIME STEP AUGMENTATION FACTOR DOI =  1.05000E+00  COURANT FACTOR CSF =  1.00000E+00 ((



 )) CONDENSATION FACTOR CHDFC =  1.00000E+00  EVAPORATION FACTOR EVAPCF =  1.00000E+00 ((

 MAIN CONTROL CARD PARAMETERS ARE          STEADY STATE = 0     TRANSIENT = 1
                                           RESTART TIME STEP =      0     NUMBER OF COMPONENTS =  6
                                           NUMBER OF JUNCTIONS =  5
                                           START TIME =  0.00000E+00
                                           OUTER CONVERGENCE CRITERION =    1.00E-02
                                           VESSEL CONVERGENCE CRITERION =    1.00E-02
                                           STEADY STATE CONVERGENCE CRITERION =    1.00E+00
                                           PWR INITIALIZATION CONVERGENCE CRITERION =     0.00E+00
                                           VESSEL ITERATION MAXIMUM =  20     OUTER ITERATION MAXIMUM =  10
                                           STEADY STATE ITERATION MAXIMUM =  20
                                           NUMBER OF SIGNAL VARIABLES =  0
                                           NUMBER OF TRIPS =  0
                                           NUMBER OF CONTROLLERS =  0
                                           WATER PACKING OPTION =  0
                                           HOMOGENEOUS NUCLEATION THIN IS USED


                        SYSTEM COMPONENTS  1 2 3 4 5 6


 COMPONENT NO.  1     TYPE = FILL       ID =  1

   JUN1 =  1       ,  IFTY =  1       ,  IFSV =  0       ,  IFTR =  0       ,  NFTX =  0
   NFTF =  0       ,  TSTOLD = 0.00000E+00,  CONC = 0.00000E+00,  IGFF =  0.
   DXIN = 1.01634E+00,  VOLIN = 5.36400E-01,  ALPIN = 0.00000E+00,  VLIN = 0.00000E+00,  TLIN = 5.83503F+02
    PIN = 9.82000E+06,   PAIN = 0.00000E+00,  FLOSIN = 0.00000E+00,  VVIN = 0.00000E+00,  TVIN = 5.83560E+02
   CONC = 0.00000E+00 KG/M3 FLUID


 COMPONENT NO.  2     TYPE = PIPE       ID =  2

 NCELLS =  10     NODES =  2     JUN1 =  1     JUN2 =  2     MAT =  0     ICHF = 0
```

```
POWER TABLE PAIRS =  0 IACC =  0

RADIN = 1.300E-02     TIN = 2.000E-03     HOUTL = 0.000E+00 HOUTV = 0.000E+00
TOUTL = 3.000E+02 TOUTV = 3.000E+02
COMPONENT TYPE =      PIPE
COMPONENT NUM =    2
ADDITIONAL LCN REQUIRED =   1560
LAST UTILIZED LOCATION  =   6675
COMPONENT TYPE =      PIPE
COMPONENT NUM =    2
ADDITIONAL SCN REQUIRED =   1373
LAST UTILIZED LOCATION  =    441

DX        1.01030E+00 1.01030E+00 1.01030E+00 1.01030E+00 1.01030E+00 1.01030E+00 1.01030E+00 1.01030E+00
          1.01030E+00 1.01030E+00

VOL       5.36400E-04 5.36400E-04 5.36400E-04 5.36400E-04 5.36400E-04 5.36400E-04 5.36400E-04 5.36400E-04
          5.36400E-04 5.36400E-04

FA        5.30930E-04 5.30930E-04 5.30930E-04 5.30930E-04 5.30930E-04 5.30930E-04 5.30930E-04 5.30930E-04
          5.30930E-04 5.30930E-04 3.46350E-04

FRIC      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

GRAV      1.43000E-01 1.43000E-01 1.43000E-01 1.43000E-01 1.43000E-01 1.43000E-01 1.43000E-01 1.43000E-01
          1.43000E-01 1.43000E-01 1.00000E+00

HD        2.60000E-02 2.60000E-02 2.60000E-02 2.60000E-02 2.60000E-02 2.60000E-02 2.60000E-02 2.60000E-02
          2.60000E-02 2.60000E-02 2.60000E-02

NFF              4           4           4           4           4           4           4           4           4
                 4           4

ALP       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

VL       -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00
         -1.30000E+00 -1.30000E+00 -1.99300E+00

VV       -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00 -1.30000E+00
         -1.30000E+00 -1.30000E+00 -1.99300E+00

TL        5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02
          5.79000E+02 5.79000E+02

TV        5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02
          5.79000E+02 5.79000E+02

P         9.78000E+06 9.78220E+06 9.78440E+06 9.78670E+06 9.78890E+06 9.79110E+06 9.79330E+06 9.79550E+06
          9.79780E+06 9.80000E+06

PA        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

QPPP      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 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

MATID            1
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TW        5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02
          5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02
          5.79000E+02 5.79000E+02 5.79000E+02 5.79000E+02


TOTAL VOLUME IN COMPONENT SECTION= 5.364000E-03


TOTAL LENGTH OF COMPONENT SECTION= 1.010300E+01


COMPONENT NO.  3     TYPE = PIPE       ID =  3

NCELLS = 10     NODES = 5     JUN1 = 2     JUN2 = 3     MAT = 8     ICHF = 1
POWER TABLE PAIRS = 0 IAX = 0

RADIN = 1.050E-02     TH = 2.000E-03     HOUTL = 0.000E+00 HOUTV = 1.000E+01
TOUTL = 3.000E+02 TOUTV = 3.000E+02
COMPONENT TYPE =      PIPE
COMPONENT NUM =    3
ADDITIONAL LCN REQUIRED =  1752
LAST UTILIZED LOCATION =  8235
COMPONENT TYPE =      PIPE
COMPONENT NUM =    3
ADDITIONAL SCN REQUIRED =  1565
LAST UTILIZED LOCATION =   441

DX        4.00000E-01 4.00000E-01 4.00000E-01 4.00000E-01 4.00000E-01 4.00000E-01 4.00000E-01 4.00000E-01
          4.00000E-01 4.00000E-01

VOL       1.38540E-04 1.38540E-04 1.38540E-04 1.38540E-04 1.38540E-04 1.38540E-04 1.38540E-04 1.38540E-04
          1.38540E-04 1.38540E-04

FA        3.46360E-04 3.46360E-04 3.46360E-04 3.46360E-04 3.46360E-04 3.46360E-04 3.46360E-04 3.46360E-04
          3.46360E-04 3.46360E-04 2.26980E-04

FRIC      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

GRAV      1.00000E+00 1.00000E+00 1.00000E+00 1.00000E+00 1.00000E+00 1.00000E+00 1.00000E+00 1.00000E+00
          1.00000E+00 1.00000E+00 1.00000E+00

HD        2.10000E-02 2.10000E-02 2.10000E-02 2.10000E-02 2.10000E-02 2.10000E-02 2.10000E-02 2.10000E-02
          2.10000E-02 2.10000E-02 1.70000E-02

KFF              4           4           4           4           4           4           4           4           4
                 4           4

ALP       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

VL       -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00
         -1.99300E+00 -1.99300E+00 -3.04100E+00

VV       -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00 -1.99300E+00
         -1.99300E+00 -1.99300E+00 -3.04100E+00

TL        5.79000E+02 5.75000E+02 5.71000E+02 5.67000E+02 5.63000E+02 5.59000E+02 5.55000E+02 5.51000E+02
          5.47000E+02 5.43000E+02
```

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TV       5.79000E+02  5.75000E+02  5.71000E+02  5.67000E+02  5.63000E+02  5.59000E+02  5.55000E+02  5.51000E+02
         5.47000E+02  5.43000E+02

P        9.80000E+06  9.80670E+06  9.81330E+06  9.82000E+06  9.82670E+06  9.83330E+06  9.84000E+06  9.8[illegible]70E+06
         9.85330E+06  9.86000E+06

PA       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

QPPP     1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08
         1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08
         1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08
         1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08
         1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08
         1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.89400E+08  1.39400E+08  1.89400E+08
         1.89400E+08  1.89400E+08

MATID         1            1            1            1

TW       5.96000E+02  6.01000E+02  6.06000E+02  6.11000E+02  6.16000E+02  5.95000E+02  6.00000E+02  6.05000E+02
         6.10000E+02  6.15000E+02  5.95000E+02  6.00000E+02  6.05000E+02  6.10000E+02  6.15000E+02  5.95000E+02
         6.00000E+02  6.05000E+02  6.10000E+02  6.15000E+02  5.95000E+02  6.00000E+02  6.05000E+02  6.10000E+02
         6.15000E+02  5.92000E+02  5.97000E+02  6.02000E+02  6.07000E+02  6.12000E+02  5.87000E+02  5.92000E+02
         5.97000E+02  6.02000E+02  6.07000E+02  5.81000E+02  5.86000E+02  5.91000E+02  5.96000E+02  6.01000E+02
         5.70000E+02  5.83000E+02  5.88000E+02  5.93000E+02  5.98000E+02  5.75000E+02  5.80000E+02  5.85000E+02
         5.90000E+02  5.95000E+02

TOTAL VOLUME IN COMPONENT SECTION=  1.305400E-03

TOTAL LENGTH OF COMPONENT SECTION=  4.000000E+00

COMPONENT NO.  4      TYPE = PIPE       ID =  4

NCELLS =  10     NODES =  2     JUN1 =  3     JUN2 =  4     NST =  0     ICHF = 0
POWER TABLE PAIRS =  0 IACC =  0

RADIN = 8.500E-03     TH = 1.500E-03     HOUTL = 0.000E+00 HOUTV = 0.000E+00
TOUTL = 3.000E+02 TOUTV = 3.000E+02
COMPONENT TYPE =       PIPE
COMPONENT NUM =     4
ADDITIONAL LCM REQUIRED =   1560
LAST UTILIZED LOCATION  =   9787
COMPONENT TYPE =       PIPE
COMPONENT NUM =     4
ADDITIONAL SCM REQUIRED =   1373
LAST UTILIZED LOCATION  =    441

DX       9.55700E-01  9.55700E-01  9.55700E-01  9.55700E-01  9.55700E-01  9.55700E-01  9.55700E-01  9.55700E-01
         9.55700E-01  9.55700E-01

VOL      2.16900E-04  2.16900E-04  2.16900E-04  2.16900E-04  2.16900E-04  2.16900E-04  2.16900E-04  2.16900E-04
         2.16900E-04  2.16900E-04

FA       2.26980E-04  2.26980E-04  2.26980E-04  2.26980E-04  2.26980E-04  2.26980E-04  2.26980E-04  2.26980E-04
         2.26980E-04  2.26980E-04  2.26980E-04
```

```
FRIC    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

GRAV    1.00000E+00 3.66000E-01 3.66000E-01 3.66000E-01 3.66000E-01 3.66000E-01 3.66000E-01 3.66000E-01
        3.66000E-01 3.66000E-01 3.66000E-01

HD      1.70000E-02 1.70000E-02 1.70000E-02 1.70000E-02 1.70000E-02 1.70000E-02 1.70000E-02 1.70000E-02
        1.70000E-02 1.70000E-02 1.70000E-02

HFF           4       4       4       4       4       4       4       4       4
              4       4

ALP     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

VL     -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00
       -3.04100E+00 -3.04100E+00 -3.04100E+00

VV     -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00 -3.04100E+00
       -3.04100E+00 -3.04100E+00 -3.04100E+00

TL      5.43000E+02 5.43330E+02 5.43670E+02 5.44000E+02 5.44330E+02 5.44670E+02 5.45000E+02 5.45330E+02
        5.45670E+02 5.46000E+02

TV      5.43000E+02 5.43330E+02 5.43670E+02 5.44000E+02 5.44330E+02 5.44670E+02 5.45000E+02 5.45330E+02
        5.45670E+02 5.46000E+02

P       9.86000E+06 9.86670E+06 9.87330E+06 9.88000E+06 9.88670E+06 9.89330E+06 9.90000E+06 9.90670E+06
        9.91330E+06 9.92000E+06

PA      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

QPPP    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 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

MATID         1

TW      5.44670E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02
        5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02
        5.44000E+02 5.44000E+02 5.44000E+02 5.44000E+02

TOTAL VOLUME IN COMPONENT SECTION= 2.167000E-03

TOTAL LENGTH OF COMPONENT SECTION= 9.557000E+00

COMPONENT NO.  5     TYPE = PIPE       ID =  5

NCELLS =  8     NODES =  2     JUN1 =  4     JUN2 =  5     MAT =  6     ICHF =  0
POWER TABLE PAIRS =  0 IACC =  0

RADIN = 0.500E-03     TH = 1.500E-03     HOUTL = 0.000E+00 HOUTV = 0.000E+00
TOUTL = 3.000E+02 TOUTV = 3.000E+02
COMPONENT TYPE =      PIPE
COMPONENT NUM =    5
ADDITIONAL LCM REQUIRED =   1290
```

LAST UTILIZED LOCATION = 11547
COMPONENT TYPE = PIPE
COMPONENT NUM = 5
ADDITIONAL SCN REQUIRED = 1111
LAST UTILIZED LOCATION = 441

DX	1.00000E-01	1.00000E-01	1.00000E-01	2.00000E-02	2.00000E-02	2.00000E-02	2.00000E-02	2.00000E-02
VOL	2.27000E-05	2.27000E-05	2.27000E-05	4.54000E-06	4.54000E-06	4.54000E-06	4.54000E-06	4.54000E-06
FA	2.26980E-04	2.26980E-04	2.26980E-04	2.26980E-04	2.26980E-04	2.26980E-04	2.26980E-04	2.26980E-04
	2.26980E-04							
FRIC	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							
GRAV	3.66000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
	0.00000E+00							
ND	1.70000E-02	1.70000E-02	1.70000E-02	1.70000E-02	1.70000E-02	1.70000E-02	1.70000E-02	1.70000E-02
	1.70000E-02							
NFF	4	4	4	4	4	4	4	4
ALP	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
VL	-3.04100E+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							
VV	-3.04100E+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							
TL	5.44000E+02	5.42000E+02	5.39700E+02	5.38000E+02	5.34500E+02	5.29000E+02	5.23500E+02	5.18500E+02
TV	5.44000E+02	5.42000E+02	5.39700E+02	5.38000E+02	5.34500E+02	5.29000E+02	5.23500E+02	5.18500E+02
P	9.92000E+06	9.92000E+06	9.92000E+06	9.92000E+06	9.92000E+06	9.92000E+06	9.92000E+06	9.92000E+06
PA	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
QPP	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	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
RATIO	1							
TW	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02
	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02	5.44000E+02

TOTAL VOLUME IN COMPONENT SECTION= 9.000000E-05

```
TOTAL LENGTH OF COMPONENT SECTION= 4.000000E-01


COMPONENT NO.  6     TYPE = BREAK       ID =  6

JUN1 =  3   IBROP =  0   NDTR =  0 ISAT =  0   IVOV =  0

DHIN =  2.0000E-02   VOLIN =  4.5400E-06   ALPIN =  1.00E+00   TIN =  3.73E+02   PIN =  1.00E+05
 AIR PRESSURE =  0.00E+00
COMPONENT NUM =     6
ADDITIONAL LCM REQUIRED =    326
LAST UTILIZED LOCATION =  12045
COMPONENT NUM =     6
ADDITIONAL SCM REQUIRED =    171
LAST UTILIZED LOCATION =    411


                    SYSTEM COMPONENTS   2  3  4  5  1  6

HEIGHT CHANGE ACROSS COMPONENT   2 FROM CELL  1 TO CELL 10 IS  1.3003E+00 M.

HEIGHT CHANGE ACROSS COMPONENT   3 FROM THE JOINING CELL OF COMPONENT   0 TO CELL 10 IS  4.3052E+00 M.

HEIGHT CHANGE ACROSS COMPONENT   4 FROM THE JOINING CELL OF COMPONENT   0 TO CELL 10 IS  3.8259E+00 M.

HEIGHT CHANGE ACROSS COMPONENT   5 FROM THE JOINING CELL OF COMPONENT   0 TO CELL  0 IS  1.9319E-01 M.
```

GRAPHICS PROBLEM ID IS

FOUR PIPE HEATED WALL BLOWDOWN
FIVE NODES IN HEATED WALL, N=16 POST CHF WT MOD

NO. OF COMPONENTS..... 6

NO. OF CATALOG ENTRIES..... 102

NO. OF 4 X PACKED HISTORY BLKS. 256

NO. OF 4 X PACKED GEOMETRY BLKS. 535

ICOMP= 0: NUM= 0: ITYPE= 0: NVRD= 1: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 1: TIMET : REACTOR TIME (S)
ICOMP= 0: NUM= 0: ITYPE= 0: NVRD= 1: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 2: DELT : TIME STEP SIZE (S)
ICOMP= 0: NUM= 0: ITYPE= 0: NVRD= 1: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 3: DTLMAX : MAXIMUM TL CHANGE(DEG-K)
ICOMP= 0: NUM= 0: ITYPE= 0: NVRD= 1: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 4: DTVMAX : MAXIMUM TV CHANGE(DEG-K)
ICOMP= 0: NUM= 0: ITYPE= 0: NVRD= 1: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 5: DTSMAX : MAXIMUM TS CHANGE(DEG-K)
ICOMP= 0: NUM= 0: ITYPE= 0: NVRD= 1: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 6: DTRMAX : MAXIMUM TR CHANGE(DEG-K)
ICOMP= 0: NUM= 0: ITYPE= 0: NVRD= 1: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 7: DPRMAX : MAX FRAC PRESSURE CHANGE

ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 11: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 8: MFLOW : MASS FLOW-RATE (KG/S)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 19: RHOM : MIXTURE DENSITY(KG/M**3)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 29: TSAT : SATURATION TEMP (DEG-K)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 39: ALPHA : VOID FRACTION
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 11: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 49: VL : LIQUID VELOCITY (M/S)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 11: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 60: VV : VAPOR VELOCITY (M/S)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 71: TL : LIQUID TEMP (DEG-K)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 81: TV : VAPOR TEMP (DEG-K)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 91: P : PRESSURE (PA)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 101: AM : AIR MASS (KG)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 111: ROAM : AIR DENSITY (KG/M**3)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 121: PA : PARTIAL PRESSURE (PA)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 20: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 131: TW : WALL TEMP (DEG-K)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 151: HL : HL (W/M**2/DEG-K)
ICOMP= 1: NUM= 2: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 161: HV : HV (W/M**2/DEG-K)

ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 11: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 171: MFLOW : MASS FLOW-RATE (KG/S)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 182: RHOM : MIXTURE DENSITY(KG/M**3)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 192: TSAT : SATURATION TEMP (DEG-K)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 202: ALPHA : VOID FRACTION
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 11: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 212: VL : LIQUID VELOCITY (M/S)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 11: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 223: VV : VAPOR VELOCITY (M/S)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 234: TL : LIQUID TEMP (DEG-K)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 244: TV : VAPOR TEMP (DEG-K)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 254: P : PRESSURE (PA)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 264: AM : AIR MASS (KG)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 274: ROAM : AIR DENSITY (KG/M**3)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 284: PA : PARTIAL PRESSURE (PA)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 50: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 294: TW : WALL TEMP (DEG-K)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 344: HL : HL (W/M**2/DEG-K)
ICOMP= 2: NUM= 3: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 354: HV : HV (W/M**2/DEG-K)

ICOMP= 3: NUM= 4: ITYPE= 2: NVRD= 11: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 364: MFLOW : MASS FLOW-RATE (KG/S)
ICOMP= 3: NUM= 4: ITYPE= 2: NVRD= 10: ILRN 0: POLYPLOT INDEX OF 1ST ITEM= 375: RHOM : MIXTURE DENSITY(KG/M**3)

CNEN DR	AUTOR: AAM/ LSG/ MRSG/ GTT ÓRGÃO GAC	DOCUMENTO: Nº 02/88 NOTA TÉCNICA		PÁGINA: C10/31
		PARTE: APÊNDICE C	REVISÃO: Ø	DATA: NOVEMBRO/88

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ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  385: TSAT   : SATURATION TEMP (DEG-K)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  395: ALPHA  : VOID FRACTION
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 11: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  405: VL     : LIQUID VELOCITY (M/S)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 11: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  416: VV     : VAPOR VELOCITY (M/S)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  427: TL     : LIQUID TEMP (DEG-K)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  437: TV     : VAPOR TEMP (DEG-K)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  447: P      : PRESSURE (PA)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  457: AM     : AIR MASS (KG)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  467: ROAM   : AIR DENSITY (KG/M**3)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  477: PA     : PARTIAL PRESSURE (PA)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 20: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  487: TW     : WALL TEMP (DEG-K)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  507: HL     : HL (W/M**2/DEG-K)
ICOMP=  3: NUM=  4: ITYPE=  2: NWRD= 10: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  517: HV     : HV (W/M**2/DEG-K)

ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  9: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  527: MFLOW  : MASS FLOW-RATE (KG/S)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  534: RHOM   : MIXTURE DENSITY(KG/M**3)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  544: TSAT   : SATURATION TEMP (DEG-K)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  552: ALPHA  : VOID FRACTION
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  9: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  560: VL     : LIQUID VELOCITY (M/S)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  9: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  569: VV     : VAPOR VELOCITY (M/S)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  578: TL     : LIQUID TEMP (DEG-K)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  586: TV     : VAPOR TEMP (DEG-K)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  594: P      : PRESSURE (PA)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  602: AM     : AIR MASS (KG)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  610: ROAM   : AIR DENSITY (KG/M**3)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  618: PA     : PARTIAL PRESSURE (PA)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD= 16: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  626: TW     : WALL TEMP (DEG-K)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  642: HL     : HL (W/M**2/DEG-K)
ICOMP=  4: NUM=  5: ITYPE=  2: NWRD=  8: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  654: HV     : HV (W/M**2/DEG-K)

ICOMP=  5: NUM=  1: ITYPE=  2: NWRD=  1: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  658: VM     : MIXTURE VELOCITY (M/S)

ICOMP=  6: NUM=  6: ITYPE=  1: NWRD=  1: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  659: MFLOW  : MASS FLOW-RATE (KG/S)
ICOMP=  6: NUM=  6: ITYPE=  1: NWRD=  1: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  660: INFLOW : MASS FLOW (KG)
ICOMP=  6: NUM=  6: ITYPE=  1: NWRD=  1: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  661: BXA    : AIR MASS FLOW-RATE(KG/S)
ICOMP=  6: NUM=  6: ITYPE=  1: NWRD=  1: ILRN  0: POLYPLOT INDEX OF 1ST ITEM=  662: BSA    : AIR MASS FLOW (KG)

                                  FOR POLYPLOT...........NPARM....    662

                                  .......................DATA.....    2656 BYTES

                                  .......................BLKSIZE..    2664 BYTES
```

GRAPHICS PROBLEM ID IS

FOUR PIPE HEATED WALL BLOWDOWN
FIVE NODES IN HEATED WALL, N=10 POST CHF HT MOD

NO. OF COMPONENTS..... 6

NO. OF CATALOG ENTRIES..... 102

NO. OF 4 X PACKED HISTORY BLKS. 256

NO. OF 4 X PACKED GEOMETRY BLKS. 535

```
ICOMP  0: NUM  0: ITYPE  0: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TIMET  : REACTOR TIME (S)
ICOMP  0: NUM  0: ITYPE  0: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DELT   : TIME STEP SIZE (S)
ICOMP  0: NUM  0: ITYPE  0: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DTLMAX : MAXIMUM TL CHANGE(DEG-K)
ICOMP  0: NUM  0: ITYPE  0: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DTVMAX : MAXIMUM TV CHANGE(DEG-K)
ICOMP  0: NUM  0: ITYPE  0: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DTSMAX : MAXIMUM TS CHANGE(DEG-K)
ICOMP  0: NUM  0: ITYPE  0: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DTRMAX : MAXIMUM TR CHANGE(DEG-K)
ICOMP  0: NUM  0: ITYPE  0: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DPRMAX : MAX FRAC PRESSURE CHANGE

ICOMP  1: NUM  2: ITYPE 31: NWRD 50: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0:        : FIXLTAB
ICOMP  1: NUM  2: ITYPE 32: NWRD 37: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0:        : VLTAB
ICOMP  1: NUM  2: ITYPE 11: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DX     : DELTA-X (M)
ICOMP  1: NUM  2: ITYPE 14: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VOL    : VOLUME (M**3)
ICOMP  1: NUM  2: ITYPE 15: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: FLOWAREA: FLOW AREA (M**2)
ICOMP  1: NUM  2: ITYPE  2: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: WFLOW  : MASS FLOW-RATE (KG/S)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: RHOM   : MIXTURE DENSITY(KG/M**3)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TSAT   : SATURATION TEMP (DEG-K)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: ALPHA  : VOID FRACTION
ICOMP  1: NUM  2: ITYPE  2: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VL     : LIQUID VELOCITY (M/S)
ICOMP  1: NUM  2: ITYPE  2: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VV     : VAPOR VELOCITY (M/S)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TL     : LIQUID TEMP (DEG-K)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TV     : VAPOR TEMP (DEG-K)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: P      : PRESSURE (PA)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: AM     : AIR MASS (KG)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: RGAM   : AIR DENSITY (KG/M**3)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: PA     : PARTIAL PRESSURE (PA)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TW     : WALL TEMP (DEG-K)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HL     : HL (W/M**2/DEG-K)
ICOMP  1: NUM  2: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HV     : HV (W/M**2/DEG-K)

ICOMP  2: NUM  3: ITYPE 31: NWRD 50: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0:        : FIXLTAB
ICOMP  2: NUM  3: ITYPE 32: NWRD 37: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0:        : VLTAB
ICOMP  2: NUM  3: ITYPE 11: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DX     : DELTA-X (M)
ICOMP  2: NUM  3: ITYPE 14: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VOL    : VOLUME (M**3)
ICOMP  2: NUM  3: ITYPE 15: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: FLOWAREA: FLOW AREA (M**2)
ICOMP  2: NUM  3: ITYPE  2: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: WFLOW  : MASS FLOW-RATE (KG/S)
ICOMP  2: NUM  3: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: RHOM   : MIXTURE DENSITY(KG/M**3)
ICOMP  2: NUM  3: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TSAT   : SATURATION TEMP (DEG-K)
ICOMP  2: NUM  3: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: ALPHA  : VOID FRACTION
ICOMP  2: NUM  3: ITYPE  2: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VL     : LIQUID VELOCITY (M/S)
ICOMP  2: NUM  3: ITYPE  2: NWRD 11: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VV     : VAPOR VELOCITY (M/S)
ICOMP  2: NUM  3: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TL     : LIQUID TEMP (DEG-K)
ICOMP  2: NUM  3: ITYPE  2: NWRD 10: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TV     : VAPOR TEMP (DEG-K)
```

```
ICOMP  2: NUM  3: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: P     : PRESSURE (PA)
ICOMP  2: NUM  3: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: AM    : AIR MASS (KG)
ICOMP  2: NUM  3: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: ROAM  : AIR DENSITY (KG/M**3)
ICOMP  2: NUM  3: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: PA    : PARTIAL PRESSURE (PA)
ICOMP  2: NUM  3: ITYPE  2: NWRD  50: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TW    : WALL TEMP (DEG-K)
ICOMP  2: NUM  3: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HL    : HL (W/M**2/DEG-K)
ICOMP  2: NUM  3: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HV    : HV (W/M**2/DEG-K)

ICOMP  3: NUM  4: ITYPE  31: NWRD  50: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : FIXLTAB
ICOMP  3: NUM  4: ITYPE  32: NWRD  37: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : VLTAB
ICOMP  3: NUM  4: ITYPE  11: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DX    : DELTA-X (M)
ICOMP  3: NUM  4: ITYPE  14: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VOL   : VOLUME (M**3)
ICOMP  3: NUM  4: ITYPE  15: NWRD  11: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: FLOWAREA: FLOW AREA (M**2)
ICOMP  3: NUM  4: ITYPE  2: NWRD  11: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: MFLOW  : MASS FLOW-RATE (KG/S)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: RHOM  : MIXTURE DENSITY(KG/M**3)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TSAT  : SATURATION TEMP (DEG-K)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: ALPHA : VOID FRACTION
ICOMP  3: NUM  4: ITYPE  2: NWRD  11: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VL    : LIQUID VELOCITY (M/S)
ICOMP  3: NUM  4: ITYPE  2: NWRD  11: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VV    : VAPOR VELOCITY (M/S)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TL    : LIQUID TEMP (DEG-K)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TV    : VAPOR TEMP (DEG-K)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: P     : PRESSURE (PA)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: AM    : AIR MASS (KG)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: ROAM  : AIR DENSITY (KG/M**3)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: PA    : PARTIAL PRESSURE (PA)
ICOMP  3: NUM  4: ITYPE  2: NWRD  28: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TW    : WALL TEMP (DEG-K)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HL    : HL (W/M**2/DEG-K)
ICOMP  3: NUM  4: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HV    : HV (W/M**2/DEG-K)

ICOMP  4: NUM  5: ITYPE  31: NWRD  50: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : FIXLTAB
ICOMP  4: NUM  5: ITYPE  32: NWRD  37: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : VLTAB
ICOMP  4: NUM  5: ITYPE  11: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DX    : DELTA-X (M)
ICOMP  4: NUM  5: ITYPE  14: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VOL   : VOLUME (M**3)
ICOMP  4: NUM  5: ITYPE  15: NWRD  9: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: FLOWAREA: FLOW AREA (M**2)
ICOMP  4: NUM  5: ITYPE  2: NWRD  9: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: MFLOW  : MASS FLOW-RATE (KG/S)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: RHOM  : MIXTURE DENSITY(KG/M**3)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TSAT  : SATURATION TEMP (DEG-K)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: ALPHA : VOID FRACTION
ICOMP  4: NUM  5: ITYPE  2: NWRD  9: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VL    : LIQUID VELOCITY (M/S)
ICOMP  4: NUM  5: ITYPE  2: NWRD  9: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VV    : VAPOR VELOCITY (M/S)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TL    : LIQUID TEMP (DEG-K)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TV    : VAPOR TEMP (DEG-K)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: P     : PRESSURE (PA)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: AM    : AIR MASS (KG)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: ROAM  : AIR DENSITY (KG/M**3)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: PA    : PARTIAL PRESSURE (PA)
ICOMP  4: NUM  5: ITYPE  2: NWRD  10: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: TW    : WALL TEMP (DEG-K)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HL    : HL (W/M**2/DEG-K)
ICOMP  4: NUM  5: ITYPE  2: NWRD  8: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: HV    : HV (W/M**2/DEG-K)

ICOMP  5: NUM  1: ITYPE  31: NWRD  50: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : FIXLTAB
ICOMP  5: NUM  1: ITYPE  32: NWRD  18: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : VLTAB
ICOMP  5: NUM  1: ITYPE  11: NWRD  1: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DX    : DELTA-X (M)
ICOMP  5: NUM  1: ITYPE  14: NWRD  1: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VOL   : VOLUME (M**3)
ICOMP  5: NUM  1: ITYPE  15: NWRD  2: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: FLOWAREA: FLOW AREA (M**2)
ICOMP  5: NUM  1: ITYPE  2: NWRD  1: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VM    : MIXTURE VELOCITY (M/S)

ICOMP  6: NUM  6: ITYPE  31: NWRD  50: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : FIXLTAB
ICOMP  6: NUM  6: ITYPE  32: NWRD  15: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0:      : VLTAB
ICOMP  6: NUM  6: ITYPE  11: NWRD  1: ILEN  0: NSKIP  1: IPOS  1: KP/IPKG  0: DX    : DELTA-X (M)
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ICOMP  4: NUM  6: ITYPE  14: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: VOL     : VOLUME (M**3)
ICOMP  4: NUM  6: ITYPE  15: NWRD  2: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: FLOWAREA: FLOW AREA (M**2)
ICOMP  4: NUM  6: ITYPE   1: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: MFLOW   : MASS FLOW-RATE (KG/S)
ICOMP  4: NUM  6: ITYPE   1: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: IMFLOW  : MASS FLOW (KG)
ICOMP  4: NUM  6: ITYPE   1: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: BXA     : AIR MASS FLOW-RATE(KG/S)
ICOMP  4: NUM  6: ITYPE   1: NWRD  1: ILRN  0: NSKIP  1: IPOS  1: KP/IPKG  0: BSA     : AIR MASS FLOW (KG)
```

END OF COMPLETE LIST OF THE GRAPHICS CATALOG

```
 RESTART DUMP TAKEN AT TIME = 0.00000E+00 SEC, AFTER      0 TIMESTEPS.

 RESTART FROM HERE WILL RESUME COUNTING FOR.....

 MAJOR EDIT AT T=  0.00000E+00 SEC
 SMALL EDIT AT T=  0.00000E+00 SEC
 DUMP  TIME AT T=  0.00000E+00 SEC
 GRAF  TIME AT T=  0.00000E+00 SEC
```

NEW TIME DOMAIN REACHED						
MINIMUM TIME STEP	MAXIMUM TIME STEP	TIME DOMAIN END	LONG EDIT INTERVAL	SHORT EDIT INTERVAL	GRAPHICS EDIT INTERVAL	DUMP EDIT INTERVAL
1.000E-05	1.000E-05	1.000E-05	1.000E-05	1.000E-05	1.000E-05	1.000E-05

TRAC MAJOR EDIT

TIME = 0.000E+00 SECONDS   DELT = 1.000E-05 SECONDS   TIME STEPS = 0   OITNO = 0   ETIME = 0.00000E+00 SEC

TIME STEP STABILITY LIMITED BY COMPONENT 0, CELL 0, TO 1.00E+04SECONDS
AVERAGE OUTER ITERATION COUNT OVER THE LAST 0 TIME STEPS WAS 0.00E+00
TOTAL NUMBER OF TIMES THAT EACH COMPONENT WAS THE LAST TO CONVERGE SINCE THE LAST EDIT IS
0 0 0 0 0 0
THE LAST MINIMUM NUMBER OF OUTER ITERATIONS WAS 0 AT STEP 0, LIMITED BY COMPONENT 0 WITH VALUE = 0.00E+00
THE LAST MAXIMUM NUMBER OF OUTER ITERATIONS WAS 0 AT STEP 0, LIMITED BY COMPONENT 0 WITH VALUE = 0.00E+00
LAST MINIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 0
LAST MAXIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 0
CURRENT CONVERGENCE LIMITS AND LIMITATION COUNTS

DELANX	DELENX	DELRNX	DELUNX	DELCNX	DELDNX
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0	0	0	0	0	0

CPTIME =-5.532E+00

*************************************** TIME = 0.0000 DELT = 1.000E-05 ***************************************

COMPONENT TYPE = PIPE   COMPONENT NUMBER = 2   JUN1 = 1   JUN2 = 2

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.78000E+06	0.00000E+00	0.000E+00	5.825E+02	5.792E+02	5.825E+02	7.001E+02	5.380E+01	0.000E+00	0.000E+00	3.000E-02
2	9.78220E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.001E+02	5.381E+01	-1.300E+00	-1.300E+00	9.276E-03
3	9.78440E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.383E+01	-1.300E+00	-1.300E+00	9.276E-03
4	9.78670E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.384E+01	-1.300E+00	-1.300E+00	9.276E-03
5	9.78890E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.386E+01	-1.300E+00	-1.300E+00	9.276E-03
6	9.79110E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.387E+01	-1.300E+00	-1.300E+00	9.276E-03
7	9.79330E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.389E+01	-1.300E+00	-1.300E+00	9.276E-03
8	9.79560E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.002E+02	5.391E+01	-1.300E+00	-1.300E+00	9.276E-03
9	9.79780E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.002E+02	5.392E+01	-1.300E+00	-1.300E+00	9.276E-03
10	9.80000E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.002E+02	5.394E+01	-1.300E+00	-1.300E+00	9.276E-03
11									-1.993E+00	-1.993E+00	9.356E-03

CELL	IDR	HL	HV	HLV	QPPL	QPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	2.635E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
2	7	4.580E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
3	7	4.585E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
4	7	4.585E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
5	7	4.586E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
6	7	4.508E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
7	7	4.583E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
8	7	4.583E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
9	7	4.582E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00
10	7	5.652E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	579.00	579.00

TOTAL COMPONENT WATER MASS= 3.755690E+00   TOTAL COMPONENT WATER ENERGY= 5.118097E+06   WMASS= 3.755690E+00

*************************************** TIME = 0.0000 DELT = 1.000E-05 ***************************************

COMPONENT TYPE = PIPE COMPONENT NUMBER = 3 JUN1 = 2 JUN2 = 3

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.00000E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.682E+02	5.394E+01	-1.993E+00	-1.993E+00	9.356E-03
2	9.04670E+06	0.00000E+00	0.000E+00	5.827E+02	5.758E+02	5.827E+02	7.704E+02	5.398E+01	-1.993E+00	-1.993E+00	9.356E-03
3	9.01330E+06	0.00000E+00	0.000E+00	5.828E+02	5.716E+02	5.828E+02	7.702E+02	5.403E+01	-1.993E+00	-1.993E+00	9.355E-03
4	9.02000E+06	0.00000E+00	0.000E+00	5.828E+02	5.670E+02	5.828E+02	7.698E+02	5.407E+01	-1.993E+00	-1.993E+00	9.356E-03
5	9.02670E+06	0.00000E+00	0.000E+00	5.829E+02	5.636E+02	5.829E+02	7.691E+02	5.412E+01	-1.993E+00	-1.993E+00	9.357E-03
6	9.03330E+06	0.00000E+00	0.000E+00	5.829E+02	5.598E+02	5.829E+02	7.680E+02	5.417E+01	-1.993E+00	-1.993E+00	9.359E-03
7	9.04000E+06	0.00000E+00	0.000E+00	5.830E+02	5.556E+02	5.830E+02	7.564E+02	5.421E+01	-1.993E+00	-1.993E+00	9.362E-03
8	9.04670E+06	0.00000E+00	0.000E+00	5.830E+02	5.516E+02	5.830E+02	7.645E+02	5.426E+01	-1.993E+00	-1.993E+00	9.366E-03
9	9.05330E+06	0.00000E+00	0.000E+00	5.831E+02	5.470E+02	5.831E+02	7.720E+02	5.430E+01	-1.993E+00	-1.993E+00	9.370E-03
10	9.06000E+06	0.00000E+00	0.000E+00	5.831E+02	5.430E+02	5.831E+02	7.791E+02	5.435E+01	-1.993E+00	-1.993E+00	9.375E-03
11										-3.041E+00	-3.041E+00	9.518E-03

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE				
1	2	1.412E+04	0.000E+00	0.000E+00	2.400E+05	0.000E+00	6.298E+02	596.00	601.00	606.00	611.00	616.00
2	2	1.214E+04	0.000E+00	0.000E+00	2.429E+05	0.000E+00	6.208E+02	595.00	600.00	605.00	610.00	615.00
3	2	1.131E+04	0.000E+00	0.000E+00	2.714E+05	0.000E+00	6.193E+02	595.00	600.00	605.00	610.00	615.00
4	2	1.072E+04	0.000E+00	0.000E+00	3.083E+05	0.000E+00	6.186E+02	595.00	600.00	605.00	610.00	615.00
5	2	1.029E+04	0.000E+00	0.000E+00	3.293E+05	0.000E+00	6.179E+02	595.00	600.00	605.00	610.00	615.00
6	2	8.800E+03	0.000E+00	0.000E+00	2.984E+05	0.000E+00	6.153E+02	592.00	597.00	602.00	607.00	612.00
7	2	7.386E+03	0.000E+00	0.000E+00	2.364E+05	0.000E+00	6.058E+02	587.00	592.00	597.00	602.00	607.00
8	1	7.048E+03	0.000E+00	0.000E+00	2.114E+05	0.000E+00	0.000E+00	581.00	586.00	591.00	596.00	601.00
9	1	7.071E+03	0.000E+00	0.000E+00	2.192E+05	0.000E+00	0.000E+00	578.00	583.00	588.00	593.00	598.00
10	1	6.717E+03	0.000E+00	0.000E+00	2.769E+05	0.000E+00	0.000E+00	575.00	580.00	585.00	590.00	595.00

TOTAL COMPONENT WATER MASS= 1.027923E+00 TOTAL COMPONENT WATER ENERGY= 1.297301E+06 QMASS= 1.027923E+00

********** TIME = 0.0000 DELT = 1.000E-05 **********

COMPONENT TYPE = PIPE COMPONENT NUMBER = 4 JUN1 = 3 JUN2 = 4

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.06000E+06	0.00000E+00	0.000E+00	5.831E+02	5.438E+02	5.831E+02	7.791E+02	5.435E+01	-3.041E+00	-3.041E+00	9.518E-03
2	9.06670E+06	0.00000E+00	0.000E+00	5.832E+02	5.433E+02	5.832E+02	7.785E+02	5.440E+01	-3.041E+00	-3.041E+00	9.518E-03
3	9.07330E+06	0.00000E+00	0.000E+00	5.832E+02	5.427E+02	5.832E+02	7.779E+02	5.444E+01	-3.041E+00	-3.041E+00	9.517E-03
4	9.08000E+06	0.00000E+00	0.000E+00	5.833E+02	5.440E+02	5.833E+02	7.774E+02	5.449E+01	-3.041E+00	-3.041E+00	9.517E-03
5	9.08670E+06	0.00000E+00	0.000E+00	5.833E+02	5.443E+02	5.833E+02	7.769E+02	5.453E+01	-3.041E+00	-3.041E+00	9.516E-03
6	9.09330E+06	0.00000E+00	0.000E+00	5.834E+02	5.447E+02	5.834E+02	7.762E+02	5.458E+01	-3.041E+00	-3.041E+00	9.516E-03
7	9.10000E+06	0.00000E+00	0.000E+00	5.834E+02	5.450E+02	5.834E+02	7.757E+02	5.462E+01	-3.041E+00	-3.041E+00	9.516E-03
8	9.10670E+06	0.00000E+00	0.000E+00	5.835E+02	5.453E+02	5.835E+02	7.751E+02	5.467E+01	-3.041E+00	-3.041E+00	9.515E-03
9	9.11330E+06	0.00000E+00	0.000E+00	5.835E+02	5.457E+02	5.835E+02	7.745E+02	5.472E+01	-3.041E+00	-3.041E+00	9.515E-03
10	9.12000E+06	0.00000E+00	0.000E+00	5.836E+02	5.460E+02	5.836E+02	7.739E+02	5.476E+01	-3.041E+00	-3.041E+00	9.515E-03
11										-3.041E+00	-3.041E+00	9.515E-03

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	1.037E+04	0.000E+00	0.000E+00	1.037E+04	0.000E+00	0.000E+00	544.00	544.00
2	7	1.037E+04	0.000E+00	0.000E+00	6.946E+03	0.000E+00	0.000E+00	544.00	544.00
3	7	1.037E+04	0.000E+00	0.000E+00	3.421E+03	0.000E+00	0.000E+00	544.00	544.00
4	7	1.036E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	544.00	544.00
5	7	1.036E+04	0.000E+00	0.000E+00	-3.419E+03	0.000E+00	0.000E+00	544.00	544.00

6	7	1.036E+04	0.000E+00	0.000E+00	-6.941E+03	0.000E+00	0.000E+00	544.00	544.00	
7	7	1.036E+04	0.000E+00	0.000E+00	-1.036E+04	0.000E+00	0.000E+00	544.00	544.00	
8	7	1.036E+04	0.000E+00	0.000E+00	-1.377E+04	0.000E+00	0.000E+00	544.00	544.00	
9	7	1.035E+04	0.000E+00	0.000E+00	-1.720E+04	0.000E+00	0.000E+00	544.00	544.00	
10	7	1.035E+04	0.000E+00	0.000E+00	-2.070E+04	0.000E+00	0.000E+00	544.00	544.00	

TOTAL COMPONENT WATER MASS= 1.684272E+00 TOTAL COMPONENT WATER ENERGY= 1.983470E+06 ΔMASS= 1.684272E+00

TIME = 0.0000 DELT = 1.000E-05

COMPONENT TYPE = PIPE COMPONENT NUMBER = 5 JUN1 = 4 JUN2 = 5

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.920000E+06	0.000000E+00	0.000E+00	5.836E+02	5.446E+02	5.836E+02	7.764E+02	5.476E+01	-3.041E+00	-3.041E+00	9.515E-03
2	9.920900E+06	0.000000E+00	0.000E+00	5.836E+02	5.420E+02	5.836E+02	7.808E+02	5.476E+01	0.000E+00	0.000E+00	3.000E-02
3	9.920900E+06	0.000000E+00	0.000E+00	5.836E+02	5.397E+02	5.836E+02	7.845E+02	5.476E+01	0.000E+00	0.000E+00	3.000E-02
4	9.920900E+06	0.000000E+00	0.000E+00	5.836E+02	5.368E+02	5.836E+02	7.872E+02	5.476E+01	0.000E+00	0.000E+00	3.000E-02
5	9.920900E+06	0.000000E+00	0.000E+00	5.836E+02	5.345E+02	5.836E+02	7.922E+02	5.476E+01	0.000E+00	0.000E+00	3.000E-02
6	9.920900E+06	0.000000E+00	0.000E+00	5.836E+02	5.298E+02	5.836E+02	7.992E+02	5.476E+01	0.000E+00	0.000E+00	3.000E-02
7	9.920900E+06	0.000000E+00	0.000E+00	5.836E+02	5.235E+02	5.836E+02	8.057E+02	5.476E+01	0.000E+00	0.000E+00	3.000E-02
8	9.920900E+06	0.000000E+00	0.000E+00	5.836E+02	5.185E+02	5.836E+02	8.129E+02	5.476E+01	0.000E+00	0.000E+00	3.000E-02
9									0.000E+00	0.000E+00	2.311E-02

CELL	IDR	HL	HV	HLV	QPPL	QPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	5.951E+03	0.000E+00	0.000E+00	-3.576E+03	0.000E+00	0.000E+00	544.00	544.00
2	7	6.415E+01	0.000E+00	0.000E+00	1.283E+02	0.000E+00	0.000E+00	544.00	544.00
3	7	6.458E+01	0.000E+00	0.000E+00	2.773E+02	0.000E+00	0.000E+00	544.00	544.00
4	7	6.474E+01	0.000E+00	0.000E+00	3.825E+02	0.000E+00	0.000E+00	544.00	544.00
5	7	6.524E+01	0.000E+00	0.000E+00	6.195E+02	0.000E+00	0.000E+00	544.00	544.00
6	7	6.595E+01	0.000E+00	0.000E+00	9.899E+02	0.000E+00	0.000E+00	544.00	544.00
7	7	6.670E+01	0.000E+00	0.000E+00	1.367E+03	0.000E+00	0.000E+00	544.00	544.00
8	7	6.732E+01	0.000E+00	0.000E+00	1.717E+03	0.000E+00	0.000E+00	544.00	544.00

TOTAL COMPONENT WATER MASS= 7.136594E-02 TOTAL COMPONENT WATER ENERGY= 8.192644E+04 ΔMASS= 7.136594E-02

TIME = 0.0000 DELT = 1.000E-05

COMPONENT TYPE = FILL COMPONENT NUMBER = 1 JUN1 = 1

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.920000E+06	0.000000E+00	0.000E+00	5.836E+02	5.835E+02	5.836E+02	6.885E+02	5.487E+01	0.000E+00	0.000E+00	0.000E+00
2									0.000E+00	0.000E+00	0.000E+00

MASS FLOW RATE = 0.000E+00 TOTAL MASS IN = 0.0000E+00

TIME = 0.0000 DELT = 1.000E-05

COMPONENT TYPE = BREAK COMPONENT NUMBER = 6 JUN1 = 5

	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
CELL 1	1.00000E+05	0.00000E+00	1.000E+00	3.730E+02	3.730E+02	3.730E+02	9.547E+02	5.900E-01	0.000E+00	0.000E+00	0.000E+00
2									0.000E+00	0.000E+00	0.000E+00

MASS FLOW RATE = 0.0000E+00 TOTAL MASS OUT = 0.0000E+00

AIR MASS FLOW RATE = 0.0000E+00 TOTAL AIR MASS OUT = 0.0000E+00

TOTAL SYSTEM WATER MASS = 6.539191E+00 TOTAL SYSTEM WATER ENERGY= 8.480795E+06

TOTAL MASS DISCHARGED AT BREAKS = 0.000000E+00

TOTAL MASS INJECTED AT FILLS = 0.000000E+00

COMPUTED SYSTEM INITIAL MASS = 6.539191E+00

TRAC MAJOR EDIT

TIME = 1.000E-05 SECONDS DELT = 1.000E-05 SECONDS TIME STEPS = 1 OITNO = 2 ETIME = 1.00000E-05 SEC

TIME STEP STABILITY LIMITED BY COMPONENT 5, CELL 9, TO 1.22E+02SECONDS
AVERAGE OUTER ITERATION COUNT OVER THER LAST .1 TIME STEPS WAS 2.00E+00
TOTAL NUMBER OF TIMES THAT EACH COMPONENT WAS THE LAST TO CONVERGE SINCE THE LAST EDIT IS
0 0 0 1 0 0
THE LAST MINIMUM NUMBER OF OUTER ITERATIONS WAS 2 AT STEP 0, LIMITED BY COMPONENT 5 WITH VARER = 3.57E-04
THE LAST MAXIMUM NUMBER OF OUTER ITERATIONS WAS 2 AT STEP 0, LIMITED BY COMPONENT 5 WITH VARER = 3.57E-04
LAST MINIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 0
LAST MAXIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 0
CURRENT CONVERGENCE LIMITS AND LIMITATION COUNTS

DELAVX	DELEVX	DELRVX	DELVVX	DELCVX	DELDVX
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0	0	0	0	0	0

CPTIME =-5.70SE+00

********** TIME = 0.0000 DELT = 1.000E-05 **********

COMPONENT TYPE = PIPE COMPONENT NUMBER = 2 JUN1 = 1 JUN2 = 2

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.78089E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.385E+01	0.000E+00	0.000E+00	3.000E-02
2	9.78220E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.001E+02	5.381E+01	-1.300E+00	-1.299E+00	9.276E-03
3	9.78444E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.383E+01	-1.300E+00	-1.300E+00	9.276E-03
4	9.78670E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.384E+01	-1.300E+00	-1.300E+00	9.276E-03
5	9.78890E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.386E+01	-1.300E+00	-1.300E+00	9.276E-03
6	9.79116E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.387E+01	-1.300E+00	-1.300E+00	9.276E-03
7	9.79330E+06	0.00000E+00	0.000E+00	5.826E+02	5.790E+02	5.826E+02	7.002E+02	5.389E+01	-1.300E+00	-1.300E+00	9.276E-03
8	9.79560E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.002E+02	5.391E+01	-1.300E+00	-1.300E+00	9.276E-03
9	9.79780E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.002E+02	5.392E+01	-1.300E+00	-1.300E+00	9.276E-03
10	9.80000E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.002E+02	5.394E+01	-1.300E+00	-1.300E+00	9.276E-03
11									-1.993E+00	-1.993E+00	9.356E-03

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	2.635E+03	0.000E+00	0.000E+00	-1.022E+01	0.000E+00	0.000E+00	579.00	579.00
2	7	4.588E+03	0.000E+00	0.000E+00	-1.566E-03	0.000E+00	0.000E+00	579.00	579.00
3	7	4.588E+03	0.000E+00	0.000E+00	-1.948E-05	0.000E+00	0.000E+00	579.00	579.00
4	7	4.588E+03	0.000E+00	0.000E+00	1.935E-05	0.000E+00	0.000E+00	579.00	579.00
5	7	4.588E+03	0.000E+00	0.000E+00	3.667E-09	0.000E+00	0.000E+00	579.00	579.00
6	7	4.588E+03	0.000E+00	0.000E+00	2.673E-09	0.000E+00	0.000E+00	579.00	579.00
7	7	4.588E+03	0.000E+00	0.000E+00	-1.934E-05	0.000E+00	0.000E+00	579.00	579.00
8	7	4.588E+03	0.000E+00	0.000E+00	1.934E-05	0.000E+00	0.000E+00	579.00	579.00
9	7	4.568E+03	0.000E+00	0.000E+00	-1.223E-04	0.000E+00	0.000E+00	579.00	579.00
10	7	5.656E+03	0.000E+00	0.000E+00	-2.880E-03	0.000E+00	0.000E+00	579.00	579.00

TOTAL COMPONENT WATER MASS= 3.755690E+00 TOTAL COMPONENT WATER ENERGY= 5.118097E+06 GMASS= 3.755690E+00

TOTAL COMPONENT HEAT LOSS: INSIDE= 0.437E-01 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0000 DELT = 1.000E-05 **********

COMPONENT TYPE = PIPE COMPONENT NUMBER = 3 JUN1 = 2 JUN2 = 3

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.84025E+06	0.00000E+00	0.000E+00	5.827E+02	5.790E+02	5.827E+02	7.002E+02	5.394E+01	-1.993E+00	-1.993E+00	9.356E-03
2	9.88694E+06	0.00000E+00	0.000E+00	5.827E+02	5.756E+02	5.827E+02	7.104E+02	5.398E+01	-1.993E+00	-1.996E+00	9.354E-03
3	9.91355E+06	0.00000E+00	0.000E+00	5.828E+02	5.710E+02	5.828E+02	7.202E+02	5.403E+01	-1.993E+00	-1.996E+00	9.355E-03
4	9.82026E+06	0.00000E+00	0.000E+00	5.828E+02	5.670E+02	5.828E+02	7.298E+02	5.408E+01	-1.993E+00	-1.996E+00	9.356E-03
5	9.82697E+06	0.00000E+00	0.000E+00	5.829E+02	5.639E+02	5.829E+02	7.391E+02	5.412E+01	-1.993E+00	-1.996E+00	9.357E-03
6	9.83353E+06	0.00000E+00	0.000E+00	5.829E+02	5.590E+02	5.829E+02	7.480E+02	5.417E+01	-1.993E+00	-1.996E+00	9.359E-03
7	9.84017E+06	0.00000E+00	0.000E+00	5.830E+02	5.550E+02	5.830E+02	7.564E+02	5.421E+01	-1.993E+00	-1.996E+00	9.362E-03
8	9.84685E+06	0.00000E+00	0.000E+00	5.830E+02	5.510E+02	5.830E+02	7.645E+02	5.426E+01	-1.993E+00	-1.996E+00	9.366E-03
9	9.85345E+06	0.00000E+00	0.000E+00	5.831E+02	5.470E+02	5.831E+02	7.720E+02	5.430E+01	-1.993E+00	-1.996E+00	9.370E-03
10	9.85018E+06	0.00000E+00	0.000E+00	5.831E+02	5.430E+02	5.831E+02	7.791E+02	5.435E+01	-1.993E+00	-1.996E+00	9.375E-03
11									-3.041E+00	-3.041E+00	9.518E-03

CELL	IOR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE				
1	2	1.412E+04	0.000E+00	0.000E+00	2.409E+05	0.000E+00	6.208E+02	596.00	601.00	606.00	611.00	616.00
2	2	1.214E+04	0.000E+00	0.000E+00	2.429E+05	0.000E+00	6.204E+02	595.00	600.00	605.00	610.00	615.00
3	2	1.131E+04	0.000E+00	0.000E+00	2.714E+05	0.000E+00	6.193E+02	595.00	600.00	605.00	610.00	615.00
4	2	1.072E+04	0.000E+00	0.000E+00	3.003E+05	0.000E+00	6.184E+02	595.00	600.00	605.00	610.00	615.00
5	2	1.029E+04	0.000E+00	0.000E+00	3.293E+05	0.000E+00	6.179E+02	595.00	600.00	605.00	610.00	615.00
6	2	8.880E+03	0.000E+00	0.000E+00	2.904E+05	0.000E+00	6.153E+02	592.00	597.00	602.00	607.00	612.00
7	2	7.386E+03	0.000E+00	0.000E+00	2.344E+05	0.000E+00	6.058E+02	587.00	592.00	597.00	602.00	607.00
8	1	7.048E+03	0.000E+00	0.000E+00	2.114E+05	0.000E+00	0.000E+00	581.00	586.00	591.00	596.00	601.00
9	1	7.071E+03	0.000E+00	0.000E+00	2.192E+05	0.000E+00	0.000E+00	578.00	583.00	588.00	593.00	598.00
10	1	8.717E+03	0.000E+00	0.000E+00	2.789E+05	0.000E+00	0.000E+00	575.00	580.00	585.00	590.00	595.00

TOTAL COMPONENT WATER MASS= 1.027923E+00 TOTAL COMPONENT WATER ENERGY = 1.297301E+06 QMASS= 1.027923E+00

TOTAL COMPONENT HEAT LOSS: - INSIDE= -6.915E+04 WATTS OUTSIDE= 0.000E+00 WATTS

########## TIME = 0.0000 DELT = 1.000E-05 ##########

COMPONENT TYPE = PIPE COMPONENT NUMBER = 4 JUN1 = 3 JUN2 = 4

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.86001E+06	0.00000E+00	0.000E+00	5.831E+02	5.439E+02	5.831E+02	7.791E+02	5.435E+01	-3.041E+00	-3.041E+00	9.518E-03
2	9.86671E+06	0.00000E+00	0.000E+00	5.832E+02	5.433E+02	5.832E+02	7.785E+02	5.440E+01	-3.041E+00	-3.042E+00	9.518E-03
3	9.87339E+06	0.00000E+00	0.000E+00	5.832E+02	5.437E+02	5.832E+02	7.779E+02	5.444E+01	-3.041E+00	-3.042E+00	9.517E-03
4	9.88006E+06	0.00000E+00	0.000E+00	5.833E+02	5.440E+02	5.833E+02	7.774E+02	5.449E+01	-3.041E+00	-3.042E+00	9.517E-03
5	9.88676E+06	0.00000E+00	0.000E+00	5.833E+02	5.443E+02	5.833E+02	7.768E+02	5.453E+01	-3.041E+00	-3.042E+00	9.516E-03
6	9.89329E+06	0.00000E+00	0.000E+00	5.834E+02	5.447E+02	5.834E+02	7.762E+02	5.458E+01	-3.041E+00	-3.042E+00	9.516E-03
7	9.89999E+06	0.00000E+00	0.000E+00	5.834E+02	5.450E+02	5.834E+02	7.757E+02	5.463E+01	-3.041E+00	-3.042E+00	9.516E-03
8	9.90669E+06	0.00000E+00	0.000E+00	5.835E+02	5.453E+02	5.835E+02	7.751E+02	5.467E+01	-3.041E+00	-3.042E+00	9.515E-03
9	9.91329E+06	0.00000E+00	0.000E+00	5.835E+02	5.457E+02	5.835E+02	7.745E+02	5.472E+01	-3.041E+00	-3.042E+00	9.515E-03
10	9.91995E+06	0.00000E+00	0.000E+00	5.836E+02	5.460E+02	5.836E+02	7.739E+02	5.476E+01	-3.041E+00	-3.042E+00	9.515E-03
11									-3.036E+00	-2.976E+00	9.515E-03

CELL	IOR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	1.037E+04	0.000E+00	0.000E+00	1.037E+04	0.000E+00	0.000E+00	544.00	544.00

2	7	1.037E+04	0.000E+00	0.000E+00	6.944E+03	0.000E+00	0.000E+00	544.00	544.00	
3	7	1.037E+04	0.000E+00	0.000E+00	3.420E+03	0.000E+00	0.000E+00	544.00	544.00	
4	7	1.036E+04	0.000E+00	0.000E+00	-1.086E-01	0.000E+00	0.000E+00	544.00	544.00	
5	7	1.036E+04	0.000E+00	0.000E+00	-3.419E+03	0.000E+00	0.000E+00	544.00	544.00	
6	7	1.036E+04	0.000E+00	0.000E+00	-6.941E+03	0.000E+00	0.000E+00	544.00	544.00	
7	7	1.036E+04	0.000E+00	0.000E+00	-1.035E+04	0.000E+00	0.000E+00	544.00	544.00	
8	7	1.034E+04	0.000E+00	0.000E+00	-1.377E+04	0.000E+00	0.000E+00	544.00	544.00	
9	7	1.035E+04	0.000E+00	0.000E+00	-1.729E+04	0.000E+00	0.000E+00	544.00	544.00	
10	7	1.035E+04	0.000E+00	0.000E+00	-2.070E+04	0.000E+00	0.000E+00	544.00	544.00	

TOTAL COMPONENT WATER MASS= 1.684272E+00 TOTAL COMPONENT WATER ENERGY= 1.983470E+06 GMASS= 1.684272E+00

TOTAL COMPONENT HEAT LOSS: INSIDE= 2.641E+03 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0000 DELT = 1.000E-05 **********

COMPONENT TYPE = PIPE COMPONENT NUMBER = 5 JUN1 = 4 JUN2 = 5

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.73120E+06	0.00000E+00	0.000E+00	5.822E+02	5.445E+02	5.822E+02	7.762E+02	5.346E+01	-3.036E+00	-2.976E+00	9.515E-03
2	9.91847E+06	0.00000E+00	0.000E+00	5.836E+02	5.420E+02	5.836E+02	7.698E+02	5.475E+01	-2.485E-02	-3.419E-01	3.000E-02
3	9.91997E+06	0.00000E+00	0.000E+00	5.836E+02	5.397E+02	5.836E+02	7.845E+02	5.476E+01	-1.914E-04	-2.735E-03	3.000E-02
4	9.91850E+06	0.00000E+00	0.000E+00	5.835E+02	5.380E+02	5.836E+02	7.872E+02	5.475E+01	3.119E-04	4.475E-03	3.000E-02
5	9.91097E+06	0.00000E+00	0.000E+00	5.835E+02	5.345E+02	5.835E+02	7.922E+02	5.470E+01	4.853E-03	6.967E-02	3.000E-02
6	9.86116E+06	0.00000E+00	0.000E+00	5.831E+02	5.298E+02	5.831E+02	7.992E+02	5.436E+01	3.127E-02	4.544E-01	3.003E-02
7	9.56425E+06	0.00000E+00	0.000E+00	5.808E+02	5.234E+02	5.808E+02	8.054E+02	5.227E+01	1.879E-01	2.783E+00	3.000E-02
8	8.08115E+06	0.00000E+00	0.000E+00	5.689E+02	5.181E+02	5.689E+02	8.115E+02	4.266E+01	9.113E-01	1.347E+01	3.000E-02
9									4.560E+00	1.292E+02	2.311E-02

CELL	IDR	ML	MV	MLV	QPPL	QPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	5.951E+03	0.000E+00	0.000E+00	-3.218E+03	0.000E+00	0.000E+00	544.00	544.00
2	7	6.415E+01	0.000E+00	0.000E+00	1.293E+02	0.000E+00	0.000E+00	544.00	544.00
3	7	6.450E+01	0.000E+00	0.000E+00	2.773E+02	0.000E+00	0.000E+00	544.00	544.00
4	7	6.474E+01	0.000E+00	0.000E+00	3.835E+02	0.000E+00	0.000E+00	544.00	544.00
5	7	6.524E+01	0.000E+00	0.000E+00	6.206E+02	0.000E+00	0.000E+00	544.00	544.00
6	7	6.599E+01	0.000E+00	0.000E+00	9.909E+02	0.000E+00	0.000E+00	544.00	544.00
7	7	6.670E+01	0.000E+00	0.000E+00	1.374E+03	0.000E+00	0.000E+00	544.00	544.00
8	7	6.732E+01	0.000E+00	0.000E+00	1.747E+03	0.000E+00	0.000E+00	544.00	544.00

TOTAL COMPONENT WATER MASS= 7.130594E-02 TOTAL COMPONENT WATER ENERGY= 8.192644E+04 GMASS= 7.130594E-02

TOTAL COMPONENT HEAT LOSS: INSIDE= 9.553E+00 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0000 DELT = 1.000E-05 **********

COMPONENT TYPE = FILL COMPONENT NUMBER = 1 JUN1 = 1

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.82000E+06	0.00000E+00	0.000E+00	5.828E+02	5.835E+02	5.828E+02	6.885E+02	5.407E+01	0.000E+00	0.000E+00	0.000E+00
2									0.000E+00	0.000E+00	0.000E+00

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   MASS FLOW RATE =  0.0000E+00        TOTAL MASS IN =  0.0000E+00

**********************************  TIME =   0.0000  DELT = 1.000E-05  **********************************

COMPONENT TYPE = BREAK      COMPONENT NUMBER =  6     JUN1 =  5

      PRESSURE    AIR P     VAPOR FRAC  T SAT     T LIQ     T VAP     DEN LIQ   DEN VAP    LIQ VEL   VAP VEL     FF
CELL
  1  1.00000E+05 0.0000E+00  1.000E+00 3.730E+02 3.730E+02 3.730E+02 9.547E+02 5.908E-01  4.500E+00 1.292E+02 0.000E+00
  2                                                                                       0.000E+00 0.000E+00 0.000E+00

MASS FLOW RATE =  0.0000E+00        TOTAL MASS OUT =  0.0000E+00

AIR MASS FLOW RATE =  0.0000E+00    TOTAL AIR MASS OUT =  0.0000E+00

 TOTAL SYSTEM WATER MASS       =  6.539191E+00      TOTAL SYSTEM WATER ENERGY=  8.480795E+06

 TOTAL HEAT LOSSES BY 1-D COMPONENTS:   INSIDE= -6.649E+04 WATTS    OUTSIDE=  9.704E+02 WATTS

 TOTAL MASS DISCHARGED AT BREAKS =  0.000000E+00

 TOTAL MASS INJECTED AT FILLS    =  0.000000E+00

 COMPUTED SYSTEM INITIAL MASS    =  6.539191E+00


RESTART DUMP TAKEN AT TIME = 1.00000E-05 SEC. AFTER     1 TIMESTEPS.

RESTART FROM HERE WILL RESUME COUNTING FOR.....

MAJOR EDIT AT T=  1.000000E-05 SEC
SMALL EDIT AT T=  0.000000E+00 SEC
DUMP  TIME AT T=  1.000000E-05 SEC
GRAF  TIME AT T=  1.000000E-05 SEC

*****************************************************************
*                    NEW TIME DOMAIN REACHED                    *
*  MINIMUM   MAXIMUM    TIME      LONG      SHORT    GRAPHICS    DUMP  *
*   TIME      TIME     DOMAIN     EDIT      EDIT      EDIT       EDIT  *
*   STEP      STEP      END     INTERVAL  INTERVAL  INTERVAL   INTERVAL *
*                                                               *
* 1.000E-05 2.000E-04 2.000E-02 1.000E-02 1.000E-02 1.000E-05 1.000E-02 *
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TRAC MAJOR EDIT

TIME = 1.012E-02 SECONDS DELT = 2.000E-04 SECONDS TIME STEPS = 93 OITNO = 2 ETIME = 1.01100E-02 SEC

TIME STEP STABILITY LIMITED BY COMPONENT 5, CELL 9, TO 1.02E+02SECONDS
AVERAGE OUTER ITERATION COUNT OVER THE LAST 92 TIME STEPS WAS 1.97E+00
TOTAL NUMBER OF TIMES THAT EACH COMPONENT WAS THE LAST TO CONVERGE SINCE THE LAST EDIT IS
0 0 11 81 0 0
THE LAST MINIMUM NUMBER OF OUTER ITERATIONS WAS 1 AT STEP 27, LIMITED BY COMPONENT 4 WITH VAERR = 9.48E-03
THE LAST MAXIMUM NUMBER OF OUTER ITERATIONS WAS 2 AT STEP 92, LIMITED BY COMPONENT 5 WITH VAERR = 4.17E-04
LAST MINIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 92
LAST MAXIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 92
CURRENT CONVERGENCE LIMITS AND LIMITATION COUNTS

DELAMX	DELEMX	DELRMX	DELVMX	DELCMX	DELOMX
1.000E+00	1.000E+00	1.000E+00	7.570E+01	1.000E+00	1.000E+03
0	0	0	0	0	0

CPTIME =-1.584E+01

************************************ TIME = 0.0101 DELT = 2.000E-04 ************************************

COMPONENT TYPE = PIPE COMPONENT NUMBER = 2 JUN1 = 1 JUN2 = 2

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	1.06905E+07	0.00000E+00	0.000E+00	5.891E+02	5.794E+02	5.891E+02	7.012E+02	6.028E+01	0.000E+00	0.000E+00	3.000E-02
2	1.07013E+07	0.00000E+00	0.000E+00	5.892E+02	5.794E+02	5.892E+02	7.012E+02	6.035E+01	-2.774E-02	-1.473E-01	2.031E-02
3	1.07195E+07	0.00000E+00	0.000E+00	5.893E+02	5.795E+02	5.893E+02	7.012E+02	6.049E+01	-6.961E-02	-4.046E-01	1.535E-02
4	1.07506E+07	0.00000E+00	0.000E+00	5.895E+02	5.795E+02	5.895E+02	7.012E+02	6.072E+01	-1.029E-01	-4.817E-01	1.392E-02
5	1.07521E+07	0.00000E+00	0.000E+00	5.895E+02	5.795E+02	5.895E+02	7.012E+02	6.074E+01	-1.479E-01	-3.917E-01	1.267E-02
6	1.07735E+07	0.00000E+00	0.000E+00	5.897E+02	5.795E+02	5.897E+02	7.013E+02	6.089E+01	-1.934E-01	-5.543E-01	1.203E-02
7	1.08185E+07	0.00000E+00	0.000E+00	5.900E+02	5.795E+02	5.900E+02	7.013E+02	6.123E+01	-1.546E-01	-2.278E-01	1.284E-02
8	1.07571E+07	0.00000E+00	0.000E+00	5.896E+02	5.795E+02	5.896E+02	7.012E+02	6.077E+01	-1.562E-01	2.919E-01	1.226E-02
9	1.05547E+07	0.00000E+00	0.000E+00	5.881E+02	5.794E+02	5.881E+02	7.010E+02	5.928E+01	-3.912E-01	2.147E-01	1.047E-02
10	1.03243E+07	0.00000E+00	0.000E+00	5.865E+02	5.793E+02	5.865E+02	7.008E+02	5.762E+01	-7.970E-01	-1.583E-01	9.661E-03
11									-1.853E+00	-1.179E+00	9.398E-03

CELL	IDR	HL	HV	HLV	QPPL	QPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	2.220E+02	0.000E+00	1.394E+04	-9.742E+01	0.000E+00	0.000E+00	579.00	579.00
2	7	6.199E+02	0.000E+00	1.396E+04	-2.745E+02	0.000E+00	0.000E+00	579.00	579.00
3	7	9.950E+02	0.000E+00	1.400E+04	-4.480E+02	0.000E+00	0.000E+00	579.00	579.00
4	7	1.465E+03	0.000E+00	1.405E+04	-6.800E+02	0.000E+00	0.000E+00	579.00	579.00
5	7	1.894E+03	0.000E+00	1.406E+04	-6.779E+02	0.000E+00	0.000E+00	579.00	579.00
6	7	1.820E+03	0.000E+00	1.415E+04	-8.639E+02	0.000E+00	0.000E+00	579.00	579.00
7	7	2.033E+03	0.000E+00	1.421E+04	-1.003E+03	0.000E+00	0.000E+00	579.00	579.00
8	7	3.746E+03	0.000E+00	1.396E+04	-1.732E+03	0.000E+00	0.000E+00	579.00	579.00
9	7	6.449E+02	0.000E+00	1.348E+04	-2.341E+03	0.000E+00	0.000E+00	579.00	579.00
10	7	1.136E+04	0.000E+00	1.366E+04	-2.843E+03	0.000E+00	0.000E+00	579.00	579.00

TOTAL COMPONENT WATER MASS= 3.760920E+00 TOTAL COMPONENT WATER ENERGY= 5.125296E+06 OMASS= 3.755490E+00

TOTAL COMPONENT HEAT LOSS: INSIDE= 9.210E+02 WATTS OUTSIDE=. 0.000E+00 WATTS

************************************ TIME = 0.0101 DELT = 2.000E-04 ************************************

COMPONENT TYPE = PIPE COMPONENT NUMBER = 3 JUN1 = 2 JUN2 = 3

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	1.01587E+07	0.00000E+00	0.000E+00	5.853E+02	5.792E+02	5.853E+02	7.006E+02	5.644E+01	-1.833E+00	-1.179E+00	9.390E-03
2	1.04780E+07	0.00000E+00	0.000E+00	5.847E+02	5.751E+02	5.847E+02	7.107E+02	5.587E+01	-1.920E+00	-1.288E+00	9.362E-03
3	1.08088E+07	0.00000E+00	0.000E+00	5.842E+02	5.711E+02	5.842E+02	7.204E+02	5.538E+01	-1.978E+00	-1.371E+00	9.344E-03
4	9.94745E+06	0.00000E+00	0.000E+00	5.838E+02	5.671E+02	5.838E+02	7.298E+02	5.496E+01	-2.003E+00	-1.416E+00	9.338E-03
5	9.88818E+06	0.00000E+00	0.000E+00	5.833E+02	5.631E+02	5.833E+02	7.390E+02	5.454E+01	-1.993E+00	-1.412E+00	9.343E-03
6	9.82329E+06	0.00000E+00	0.000E+00	5.829E+02	5.591E+02	5.829E+02	7.478E+02	5.410E+01	-1.945E+00	-1.352E+00	9.361E-03
7	9.74388E+06	0.00000E+00	0.000E+00	5.823E+02	5.550E+02	5.823E+02	7.562E+02	5.355E+01	-1.860E+00	-1.238E+00	9.393E-03
8	9.64832E+06	0.00000E+00	0.000E+00	5.815E+02	5.510E+02	5.815E+02	7.642E+02	5.284E+01	-1.734E+00	-1.071E+00	9.441E-03
9	9.58394E+06	0.00000E+00	0.000E+00	5.805E+02	5.469E+02	5.805E+02	7.715E+02	5.192E+01	-1.559E+00	-8.507E-01	9.515E-03
10	9.32678E+06	0.00000E+00	0.000E+00	5.791E+02	5.431E+02	5.791E+02	7.779E+02	5.074E+01	-1.328E+00	-5.722E-01	9.630E-03
11									-1.579E+00	-6.814E-01	9.885E-03

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE				
1	2	2.453E+04	0.000E+00	3.389E+03	3.710E+05	0.000E+00	6.213E+02	594.29	601.31	606.48	611.36	614.98
2	2	2.222E+04	0.000E+00	3.328E+03	4.007E+05	0.000E+00	6.199E+02	593.16	600.30	605.48	610.36	613.98
3	2	2.127E+04	0.000E+00	3.350E+03	4.592E+05	0.000E+00	6.185E+02	592.71	600.26	605.47	610.36	613.99
4	2	2.048E+04	0.000E+00	3.374E+03	5.151E+05	0.000E+00	6.171E+02	592.27	600.23	605.47	610.36	613.98
5	2	1.975E+04	0.000E+00	3.398E+03	5.675E+05	0.000E+00	6.160E+02	591.84	600.17	605.47	610.36	613.98
6	2	1.758E+04	0.000E+00	3.418E+03	5.310E+05	0.000E+00	6.124E+02	589.27	597.23	602.47	607.37	610.98
7	2	1.534E+04	0.000E+00	3.431E+03	4.589E+05	0.000E+00	6.085E+02	584.92	592.29	597.48	602.37	605.99
8	1	1.437E+04	0.000E+00	3.433E+03	4.065E+05	0.000E+00	0.000E+00	579.25	586.32	591.43	596.37	599.99
9	1	1.339E+04	0.000E+00	3.419E+03	3.915E+05	0.000E+00	0.000E+00	576.16	583.31	588.48	593.37	597.00
10	1	1.468E+04	0.000E+00	3.384E+03	4.263E+05	0.000E+00	0.000E+00	572.32	580.24	585.47	590.37	594.04

TOTAL COMPONENT WATER MASS= 1.027735E+00 TOTAL COMPONENT WATER ENERGY= 1.297439E+06 QMASS= 1.027923E+00

TOTAL COMPONENT HEAT LOSS: INSIDE= -1.195E+05 WATTS OUTSIDE= 0.000E+00 WATTS

########## TIME = 0.0101 DELT = 2.000E-04 ##########

COMPONENT TYPE = PIPE COMPONENT NUMBER = 4 JUN1 = 3 JUN2 = 4

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	8.74219E+06	0.00000E+00	0.000E+00	5.746E+02	5.427E+02	5.746E+02	7.776E+02	4.706E+01	-1.579E+00	-6.814E-01	9.885E-03
2	7.69323E+06	0.00000E+00	0.000E+00	5.655E+02	5.427E+02	5.655E+02	7.757E+02	4.044E+01	-4.770E-01	5.173E-01	1.075E-02
3	6.54809E+06	0.00000E+00	0.000E+00	5.545E+02	5.427E+02	5.545E+02	7.736E+02	3.391E+01	1.119E+00	2.173E+00	1.019E-02
4	5.75220E+06	0.00000E+00	0.000E+00	5.468E+02	5.427E+02	5.468E+02	7.720E+02	2.941E+01	2.653E+00	3.592E+00	9.667E-03
5	5.55138E+06	0.00000E+00	0.000E+00	5.447E+02	5.439E+02	5.447E+02	7.711E+02	2.832E+01	3.438E+00	4.837E+00	9.481E-03
6	5.61244E+06	0.00000E+00	0.000E+00	5.444E+02	5.434E+02	5.444E+02	7.706E+02	2.835E+01	3.431E+00	2.677E+00	9.474E-03
7	5.59363E+06	0.00000E+00	3.076E-05	5.442E+02	5.437E+02	5.442E+02	7.700E+02	2.855E+01	3.366E+00	3.335E+00	9.464E-03
8	5.57036E+06	0.00000E+00	6.719E-04	5.439E+02	5.440E+02	5.439E+02	7.694E+02	2.842E+01	3.255E+00	3.781E+00	9.469E-03
9	5.53933E+06	0.00000E+00	7.618E-03	5.436E+02	5.442E+02	5.436E+02	7.689E+02	2.826E+01	3.483E+00	2.927E+00	9.481E-03
10	5.35081E+06	0.00000E+00	5.541E-02	5.413E+02	5.439E+02	5.413E+02	7.691E+02	2.724E+01	5.105E+00	5.888E+00	9.529E-03
11									1.271E+01	1.444E+01	9.514E-03

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	1.327E+04	0.000E+00	4.982E+03	1.658E+04	0.000E+00	0.000E+00	543.94	544.00

2	7	3.526E+03	0.000E+00	4.385E+03	4.502E+03	0.000E+00	0.000E+00	543.96	544.00
3	7	1.153E+04	0.000E+00	3.763E+03	1.512E+04	0.000E+00	0.000E+00	543.92	544.00
4	7	2.055E+04	0.000E+00	3.311E+03	2.566E+04	0.000E+00	0.000E+00	543.99	544.00
5	7	2.469E+04	0.000E+00	3.143E+03	2.446E+04	0.000E+00	0.000E+00	544.00	544.00
6	7	2.595E+04	0.000E+00	3.155E+03	1.634E+04	0.000E+00	0.000E+00	544.00	544.00
7	7	2.472E+04	0.000E+00	3.151E+03	8.603E+03	0.000E+00	0.000E+00	544.01	544.00
8	7	2.501E+04	0.000E+00	3.141E+03	1.334E+03	0.000E+00	0.000E+00	544.02	544.00
9	7	2.986E+04	0.000E+00	3.142E+03	-5.172E+03	0.000E+00	0.000E+00	544.03	544.00
10	7	5.369E+04	0.000E+00	3.875E+03	7.260E+03	0.000E+00	0.000E+00	544.03	544.00

TOTAL COMPONENT WATER MASS= 1.664286E+00. TOTAL COMPONENT WATER ENERGY= 1.959685E+06 ΔMASS= 1.684272E+00

TOTAL COMPONENT HEAT LOSS: INSIDE= -5.854E+03 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0101 DELT = 2.000E-04 **********

COMPONENT TYPE = PIPE COMPONENT NUMBER = 5 JUN1 = 4 JUN2 = 5

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	5.01911E+06	0.000000E+00	1.854E-01	5.373E+02	5.416E+02	5.373E+02	7.727E+02	2.547E+01	1.371E+01	1.464E+01	9.514E-03
2	4.99516E+06	0.000000E+00	3.112E-01	5.357E+02	5.392E+02	5.357E+02	7.783E+02	2.482E+01	1.813E+01	1.925E+01	1.157E-02
3	4.76326E+06	0.000000E+00	4.165E-01	5.332E+02	5.346E+02	5.331E+02	7.839E+02	2.382E+01	2.546E+01	2.670E+01	1.343E-02
4	4.47617E+06	0.000000E+00	4.878E-01	5.302E+02	5.323E+02	5.296E+02	7.871E+02	2.267E+01	3.485E+01	3.633E+01	1.476E-02
5	4.34277E+06	0.000000E+00	5.421E-01	5.283E+02	5.301E+02	5.278E+02	7.901E+02	2.198E+01	4.065E+01	4.256E+01	1.771E-02
6	4.23693E+06	0.000000E+00	5.868E-01	5.264E+02	5.267E+02	5.258E+02	7.946E+02	2.127E+01	4.612E+01	4.963E+01	1.895E-02
7	4.04432E+06	0.000000E+00	6.374E-01	5.240E+02	5.240E+02	5.236E+02	7.934E+02	2.042E+01	5.217E+01	6.264E+01	2.106E-02
8	3.85218E+06	0.000000E+00	7.475E-01	5.211E+02	5.235E+02	5.186E+02	7.991E+02	1.961E+01	6.042E+01	7.197E+01	2.576E-02
9									9.284E+01	6.713E+01	6.643E-02

CELL	ICR	ML	MV	MLV	QPPL	QPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	7.446E+04	0.000E+00	1.123E+02	1.630E+05	0.000E+00	0.000E+00	543.74	544.00
2	7	8.693E+04	0.000E+00	2.468E+03	4.316E+05	0.000E+00	0.000E+00	543.18	543.99
3	7	1.019E+05	0.000E+00	4.420E+03	7.807E+05	0.000E+00	0.000E+00	542.24	543.97
4	7	1.126E+05	0.000E+00	1.295E+03	1.044E+06	0.000E+00	0.000E+00	541.56	543.96
5	7	1.193E+05	0.000E+00	1.288E+03	1.282E+06	0.000E+00	0.000E+00	540.94	543.95
6	7	1.254E+05	0.000E+00	1.435E+03	1.685E+06	0.000E+00	0.000E+00	540.22	543.94
7	7	1.312E+05	0.000E+00	3.658E+03	2.015E+06	0.000E+00	0.000E+00	539.40	543.92
8	7	1.352E+05	0.000E+00	6.637E+01	2.088E+06	0.000E+00	0.000E+00	538.57	543.90

TOTAL COMPONENT WATER MASS= 4.525928E-02 TOTAL COMPONENT WATER ENERGY= 5.304803E+04 ΔMASS= 7.139576E-02

TOTAL COMPONENT HEAT LOSS: INSIDE= -1.593E+04 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0101 DELT = 2.000E-04 **********

COMPONENT TYPE = FILL COMPONENT NUMBER = 1 JUN1 = 1

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.82468E+06	0.000000E+00	0.000E+00	5.828E+02	5.835E+02	5.828E+02	6.885E+02	5.407E+01	0.000E+00	0.000E+00	0.000E+00
2									0.000E+00	0.000E+00	0.000E+00

MASS FLOW RATE = 0.0000E+00 TOTAL MASS IN = 0.0000E+00

TIME = 0.0101 DELT = 2.000E-04

COMPONENT TYPE = BREAK COMPONENT NUMBER = 6 JUNI = 5

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	1.00000E+05	0.00000E+00	1.000E+00	3.730E+02	3.730E+02	3.730E+02	9.547E+02	5.908E-01	9.204E+01	6.713E+01	0.000E+00
2									0.000E+00	0.000E+00	0.000E+00

MASS FLOW RATE = 4.4507E+00 TOTAL MASS OUT = 4.0997E-02

AIR MASS FLOW RATE = 0.0000E+00 TOTAL AIR MASS OUT = 0.0000E+00

TOTAL SYSTEM WATER MASS = 6.498194E+00 TOTAL SYSTEM WATER ENERGY= 8.435468E+06

TOTAL HEAT LOSSES BY 1-D COMPONENTS: INSIDE= -1.403E+05 WATTS OUTSIDE= 9.672E+02 WATTS

TOTAL MASS DISCHARGED AT BREAKS = 4.099720E-02

TOTAL MASS INJECTED AT FILLS = 0.000000E+00

COMPUTED SYSTEM INITIAL MASS = 6.539191E+00

RESTART DUMP TAKEN AT TIME = 1.011582E-02 SEC, AFTER 93 TIMESTEPS.

RESTART FROM HERE WILL RESUME COUNTING FOR.....

MAJOR EDIT AT T= 1.60200E-02 SEC
SMALL EDIT AT T= 2.00000E-05 SEC
DUMP TIME AT T= 1.01003E-02 SEC
GRAF TIME AT T= 1.01183E-02 SEC

TRAC MAJOR EDIT

TIME = 2.012E-02 SECONDS DELT = 2.000E-04 SECONDS TIME STEPS = 143 OITNO = 1 ETIME = 2.0118E-02 SEC

TIME STEP STABILITY LIMITED BY COMPONENT 5, CELL 8, TO 8.75E+01SECONDS
AVERAGE OUTER ITERATION COUNT OVER THER LAST 50 TIME STEPS WAS 1.56E+00
TOTAL NUMBER OF TIMES THAT EACH COMPONENT WAS THE LAST TO CONVERGE SINCE THE LAST EDIT IS
0 10 13 27 0 0
THE LAST MINIMUM NUMBER OF OUTER ITERATIONS WAS 1 AT STEP 142, LIMITED BY COMPONENT 3 WITH VARER = 8.50E-03
THE LAST MAXIMUM NUMBER OF OUTER ITERATIONS WAS 2 AT STEP 124, LIMITED BY COMPONENT 3 WITH VARER = 1.76E-05
LAST MINIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 142
LAST MAXIMUM NUMBER OF VESSEL ITERATIONS WAS 0 AT STEP 142
CURRENT CONVERGENCE LIMITS AND LIMITATION COUNTS

DELAMX	DELHMX	DELRMX	DELVMX	DELCMX	DELDMX
1.000E+00	1.00E+00	1.000E+00	8.829E+01	1.000E+00	1.000E+00
0	0	0	0	0	0

CPTIME =-2.289E+01

[illegible] TIME = 0.0201 DELT = 2.000E-04 [illegible]

COMPONENT TYPE = PIPE COMPONENT NUMBER = 2 JUN1 = 1 JUN2 = 2

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	1.09960E+07	0.00000E+00	0.000E+00	5.912E+02	5.796E+02	5.912E+02	7.015E+02	6.256E+01	0.000E+00	0.000E+00	0.000E-02
2	1.09832E+07	0.00000E+00	0.000E+00	5.911E+02	5.795E+02	5.911E+02	7.015E+02	6.247E+01	-4.275E-02	5.840E-02	1.478E-02
3	1.07342E+07	0.00000E+00	0.000E+00	5.908E+02	5.793E+02	5.908E+02	7.014E+02	6.210E+01	-4.475E-02	3.690E-01	1.573E-02
4	1.08066E+07	0.00000E+00	0.000E+00	5.899E+02	5.795E+02	5.899E+02	7.013E+02	6.114E+01	4.511E-02	5.900E-01	2.836E-02
5	1.05607E+07	0.00000E+00	0.000E+00	5.882E+02	5.794E+02	5.882E+02	7.010E+02	5.933E+01	2.819E-01	9.256E-01	1.188E-02
6	1.01907E+07	0.00000E+00	0.000E+00	5.856E+02	5.792E+02	5.856E+02	7.006E+02	5.646E+01	6.984E-01	1.413E+00	1.039E-02
7	9.75638E+06	0.00000E+00	0.000E+00	5.824E+02	5.790E+02	5.824E+02	7.001E+02	5.364E+01	1.258E+00	2.008E+00	9.393E-03
8	9.39511E+06	0.00000E+00	0.000E+00	5.796E+02	5.789E+02	5.796E+02	6.997E+02	5.119E+01	1.824E+00	2.544E+00	9.055E-03
9	9.26974E+06	0.00000E+00	2.442E-04	5.786E+02	5.787E+02	5.786E+02	6.996E+02	5.036E+01	2.155E+00	2.767E+00	8.917E-03
10	9.10929E+06	0.00000E+00	1.624E-05	5.774E+02	5.787E+02	5.774E+02	6.994E+02	4.930E+01	2.433E+00	3.039E+00	8.837E-03
11									3.766E+00	4.336E+00	9.002E-03

CELL	IOR	NN	HV	HLV	QFPL	QFPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	4.121E+02	0.000E+00	1.457E+04	-2.419E+02	0.000E+00	0.000E+00	579.00	579.00
2	7	8.392E+02	0.000E+00	1.456E+04	-4.857E+02	0.000E+00	0.000E+00	579.00	579.00
3	7	6.734E+02	0.000E+00	1.456E+04	-3.724E+02	0.000E+00	0.000E+00	579.00	579.00
4	7	1.635E+03	0.000E+00	1.431E+04	-5.461E+02	0.000E+00	0.000E+00	579.00	579.00
5	7	3.256E+03	0.000E+00	1.390E+04	-1.198E+03	0.000E+00	0.000E+00	579.00	579.00
6	7	6.454E+03	0.000E+00	1.325E+04	-1.203E+03	0.000E+00	0.000E+00	579.00	579.00
7	7	1.009E+04	0.000E+00	1.247E+04	2.297E+02	0.000E+00	0.000E+00	579.00	579.00
8	7	1.328E+04	0.000E+00	1.178E+04	2.660E+03	0.000E+00	0.000E+00	579.00	579.00
9	7	1.545E+04	0.000E+00	1.143E+04	4.002E+03	0.000E+00	0.000E+00	579.00	579.00
10	7	2.037E+04	0.000E+00	1.119E+04	6.737E+03	0.000E+00	0.000E+00	579.00	579.00

TOTAL COMPONENT WATER MASS= 3.758225E+00 TOTAL COMPONENT WATER ENERGY= 5.121578E+06 GMASS= 3.755691E+00

TOTAL COMPONENT HEAT LOSS: INSIDE= -7.897E+02 WATTS OUTSIDE= 0.000E+00 WATTS

[illegible] TIME = 0.0201 DELT = 2.000E-04 [illegible]

COMPONENT TYPE = PIPE COMPONENT NUMBER = 3 JUN1 = 2 JUN2 = 3

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.02451E+06	0.00000E+00	1.447E-02	5.767E+02	5.786E+02	5.767E+02	6.995E+02	4.875E+01	3.766E+00	4.336E+00	9.002E-03
2	8.98883E+06	0.00000E+00	3.365E-04	5.764E+02	5.756E+02	5.764E+02	7.083E+02	4.851E+01	5.824E+00	6.340E+00	8.835E-03
3	8.95276E+06	0.00000E+00	4.363E-06	5.761E+02	5.711E+02	5.761E+02	7.179E+02	4.829E+01	5.827E+00	6.339E+00	8.766E-03
4	8.91245E+06	0.00000E+00	0.000E+00	5.757E+02	5.672E+02	5.757E+02	7.272E+02	4.796E+01	5.769E+00	6.326E+00	8.784E-03
5	8.82587E+06	0.00000E+00	0.000E+00	5.751E+02	5.633E+02	5.751E+02	7.362E+02	4.747E+01	5.661E+00	6.288E+00	8.794E-03
6	8.71579E+06	0.00000E+00	0.000E+00	5.742E+02	5.593E+02	5.742E+02	7.456E+02	4.676E+01	5.504E+00	6.184E+00	8.807E-03
7	8.58825E+06	0.00000E+00	0.000E+00	5.731E+02	5.552E+02	5.731E+02	7.554E+02	4.590E+01	5.305E+00	6.028E+00	8.828E-03
8	8.44147E+06	0.00000E+00	0.000E+00	5.720E+02	5.511E+02	5.720E+02	7.615E+02	4.503E+01	5.093E+00	5.827E+00	8.849E-03
9	8.32099E+06	0.00000E+00	0.000E+00	5.710E+02	5.471E+02	5.710E+02	7.699E+02	4.428E+01	4.902E+00	5.615E+00	8.867E-03
10	8.22910E+06	0.00000E+00	0.000E+00	5.702E+02	5.434E+02	5.702E+02	7.755E+02	4.371E+01	4.753E+00	5.420E+00	8.882E-03
11									7.090E+00	7.784E+00	9.118E-03

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE				
1	2	4.398E+04	5.698E+00	2.900E+01	6.371E+05	9.326E+01	6.156E+02	593.88	601.45	606.88	611.56	614.33
2	2	4.781E+04	0.000E+00	2.866E+03	7.778E+05	0.000E+00	6.101E+02	591.36	600.40	605.87	610.56	613.33
3	2	4.536E+04	0.000E+00	2.877E+03	8.643E+05	0.000E+00	6.076E+02	590.20	600.26	605.86	610.56	613.33
4	2	4.324E+04	0.000E+00	2.883E+03	9.413E+05	0.000E+00	6.054E+02	589.00	600.12	605.85	610.56	613.33
5	2	4.131E+04	0.000E+00	2.878E+03	1.010E+06	0.000E+00	6.034E+02	587.77	599.97	605.83	610.56	613.33
6	2	3.956E+04	0.000E+00	2.863E+03	9.948E+05	0.000E+00	6.004E+02	585.10	597.05	602.85	607.56	610.34
7	2	3.552E+04	0.000E+00	2.844E+03	9.245E+05	0.000E+00	5.962E+02	581.24	592.23	597.87	602.57	605.35
8	2	3.202E+04	0.000E+00	2.829E+03	8.292E+05	0.000E+00	5.851E+02	576.41	586.56	591.89	596.57	599.36
9	2	3.152E+04	0.000E+00	2.822E+03	8.278E+05	0.000E+00	5.809E+02	573.37	583.35	588.89	593.57	596.36
10	1	3.771E+04	0.000E+00	2.819E+03	9.645E+05	0.000E+00	0.000E+00	568.78	580.16	585.86	590.57	593.37

TOTAL COMPONENT WATER MASS= 1.023028E+00 TOTAL COMPONENT WATER ENERGY= 1.294153E+06 QMASS= 1.027922E+06

TOTAL COMPONENT HEAT LOSS: INSIDE= -2.316E+05 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0201 DELT = 2.000E-04 **********

COMPONENT TYPE = PIPE COMPONENT NUMBER = 4 JUN1 = 3 JUN2 = 4

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	8.04552E+06	0.00000E+00	0.000E+00	5.685E+02	5.425E+02	5.686E+02	7.765E+02	4.259E+01	7.090E+00	7.784E+00	9.115E-03
2	7.86614E+06	0.00000E+00	0.000E+00	5.670E+02	5.427E+02	5.670E+02	7.759E+02	4.156E+01	6.071E+00	7.499E+00	9.129E-03
3	7.62799E+06	0.00000E+00	0.000E+00	5.649E+02	5.429E+02	5.649E+02	7.752E+02	4.007E+01	6.024E+00	7.297E+00	9.147E-03
4	7.38307E+06	0.00000E+00	0.000E+00	5.615E+02	5.433E+02	5.615E+02	7.741E+02	3.815E+01	6.261E+00	6.998E+00	9.143E-03
5	6.79463E+06	0.00000E+00	0.000E+00	5.581E+02	5.424E+02	5.581E+02	7.734E+02	3.533E+01	5.791E+00	6.579E+00	9.204E-03
6	6.47335E+06	0.00000E+00	0.000E+00	5.539E+02	5.434E+02	5.538E+02	7.716E+02	3.329E+01	5.316E+00	6.101E+00	9.243E-03
7	6.03456E+06	0.00000E+00	2.654E-05	5.491E+02	5.436E+02	5.491E+02	7.706E+02	3.095E+01	4.913E+00	5.750E+00	9.286E-03
8	5.64505E+06	0.00000E+00	2.784E-03	5.448E+02	5.440E+02	5.448E+02	7.696E+02	2.893E+01	4.654E+00	5.474E+00	9.318E-03
9	5.47379E+06	0.00000E+00	3.420E-02	5.429E+02	5.429E+02	5.428E+02	7.694E+02	2.790E+01	4.284E+00	4.982E+00	9.567E-03
10	5.29179E+06	0.00000E+00	1.637E-01	5.406E+02	5.424E+02	5.406E+02	7.717E+02	2.693E+01	7.342E+00	8.033E+00	1.007E-02
11									2.221E+01	2.321E+01	1.069E-02

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE
1	7	4.410E+04	0.000E+00	4.231E+03	5.642E+04	0.000E+00	0.000E+00	543.80 543.99

2	7	4.281E+04	0.000E+00	4.221E+03	4.661E+04	0.000E+00	0.000E+00	543.83	544.00
3	7	4.096E+04	0.000E+00	4.073E+03	3.558E+04	0.000E+00	0.000E+00	543.87	544.00
4	7	3.854E+04	0.000E+00	3.888E+03	2.618E+04	0.000E+00	0.000E+00	543.90	544.00
5	7	3.579E+04	0.000E+00	3.690E+03	1.834E+04	0.000E+00	0.000E+00	543.93	544.00
6	7	3.333E+04	0.000E+00	3.495E+03	1.164E+04	0.000E+00	0.000E+00	543.96	544.00
7	7	3.155E+04	0.000E+00	3.314E+03	6.207E+03	0.000E+00	0.000E+00	543.99	544.00
8	7	3.017E+04	0.000E+00	3.155E+03	1.809E+03	0.000E+00	0.000E+00	544.02	544.00
9	7	3.709E+04	0.000E+00	3.438E+03	6.473E+03	0.000E+00	0.000E+00	544.03	544.00
10	7	7.166E+04	0.000E+00	9.637E+03	1.069E+05	0.000E+00	0.000E+00	543.88	544.00

TOTAL COMPONENT WATER MASS= 1.644144E+00 TOTAL COMPONENT WATER ENERGY= 1.935721E+06 GMASS= 1.684270E+00

TOTAL COMPONENT HEAT LOSS: INSIDE= -1.614E+04 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0201 DELT = 2.000E-04 **********

COMPONENT TYPE = PIPE COMPONENT NUMBER = 5 JUN1 = 4 JUN2 = 5

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	4.84958E+06	0.00000E+00	3.917E-01	5.350E+02	5.279E+02	5.349E+02	7.707E+02	2.455E+01	2.221E+01	2.321E+01	1.069E-02
2	4.64865E+06	0.00000E+00	5.327E-01	5.324E+02	5.253E+02	5.323E+02	7.859E+02	2.349E+01	3.161E+01	3.290E+01	1.576E-02
3	4.36262E+06	0.00000E+00	6.071E-01	5.286E+02	5.207E+02	5.283E+02	7.921E+02	2.206E+01	4.283E+01	4.493E+01	1.939E-02
4	4.14155E+06	0.00000E+00	6.564E-01	5.255E+02	5.255E+02	5.249E+02	7.962E+02	2.094E+01	5.166E+01	5.958E+01	2.149E-02
5	3.99684E+06	0.00000E+00	6.895E-01	5.233E+02	5.233E+02	5.228E+02	7.975E+02	2.017E+01	5.855E+01	6.963E+01	2.504E-02
6	3.89268E+06	0.00000E+00	7.168E-01	5.213E+02	5.213E+02	5.203E+02	8.026E+02	1.948E+01	6.445E+01	7.532E+01	2.743E-02
7	3.72935E+06	0.00000E+00	7.579E-01	5.197E+02	5.152E+02	5.181E+02	8.051E+02	1.885E+01	7.015E+01	8.170E+01	3.067E-02
8	2.85496E+06	0.00000E+00	9.122E-01	5.035E+02	5.033E+02	5.031E+02	8.234E+02	1.437E+01	8.126E+01	8.654E+01	4.737E-02
9									2.118E+02	1.418E+02	7.956E-02

CELL	IDR	ML	MV	MLV	GPPL	GPPV	TCHF	WALL TEMPERATURES BY NODE	
1	7	9.589E+04	0.000E+00	2.983E+03	4.734E+05	0.000E+00	0.000E+00	542.81	543.97
2	7	1.074E+05	0.000E+00	6.757E+03	8.552E+05	0.000E+00	0.000E+00	541.74	543.93
3	7	1.191E+05	0.000E+00	5.918E+03	1.238E+06	0.000E+00	0.000E+00	537.14	543.86
4	7	1.269E+05	0.000E+00	2.551E+03	1.517E+06	0.000E+00	0.000E+00	537.44	543.81
5	7	1.316E+05	0.000E+00	3.673E+03	1.683E+06	0.000E+00	0.000E+00	536.11	543.77
6	7	1.348E+05	0.000E+00	3.711E+03	1.823E+06	0.000E+00	0.000E+00	534.82	543.72
7	7	1.259E+05	0.000E+00	1.104E+03	1.948E+06	0.000E+00	0.000E+00	533.52	543.66
8	7	1.266E+05	0.000E+00	1.520E+04	3.275E+06	0.000E+00	0.000E+00	529.74	543.53

TOTAL COMPONENT WATER MASS= 3.201311E-02 TOTAL COMPONENT WATER ENERGY= 3.762461E+04 GMASS= 7.130207E-02

TOTAL COMPONENT HEAT LOSS: INSIDE= -2.464E+04 WATTS OUTSIDE= 0.000E+00 WATTS

********** TIME = 0.0261 DELT = 2.000E-04 **********

COMPONENT TYPE = FILL COMPONENT NUMBER = 1 JUN1 = 1

CELL	PRESSURE	AIR P	VAPOR FRAC	T SAT	T LIQ	T VAP	DEN LIQ	DEN VAP	LIQ VEL	VAP VEL	FF
1	9.82600E+06	0.00000E+00	0.000E+00	5.828E+02	5.835E+02	5.828E+02	6.805E+02	5.407E+01	0.000E+00	0.000E+00	0.000E+00
2									0.000E+00	0.000E+00	0.000E+00

```
   MASS FLOW RATE =  0.0000E+00      TOTAL MASS IN  =  0.0000E+00

**********  TIME =   0.0201  DELT = 2.000E-04  **********

COMPONENT TYPE = BREAK      COMPONENT NUMBER =  6     JUN1 =  5

      PRESSURE    AIR P     VAPOR FRAC  T SAT     T LIQ     T VAP     DEN LIQ   DEN VAP   LIQ VEL   VAP VEL     FF
CELL
  1  1.00000E+05 0.00000E+00  1.000E+00  3.730E+02  3.730E+02  3.730E+02  9.547E+02  5.908E-01  2.118E+02  1.410E+02  0.000E+00
  2                                                                                    0.000E+00  0.000E+00  0.000E+00

MASS FLOW RATE =  3.8761E+00        TOTAL MASS OUT =  8.1781E-02

AIR MASS FLOW RATE =  0.0000E+00    TOTAL AIR MASS OUT =  0.0000E+00

  TOTAL SYSTEM WATER MASS       =  6.457404E+00      TOTAL SYSTEM WATER ENERGY=  8.389058E+06

  TOTAL HEAT LOSSES BY 1-D COMPONENTS:    INSIDE= -2.731E+05 WATTS    OUTSIDE=  9.652E+02 WATTS

  TOTAL MASS DISCHARGED AT BREAKS =  8.178967E-02

  TOTAL MASS INJECTED AT FILLS    =  0.000000E+00

  COMPUTED SYSTEM INITIAL MASS    =  6.539184E+00


RESTART DUMP TAKEN AT TIME = 2.01189E-02 SEC, AFTER   143 TIMESTEPS.

RESTART FROM HERE WILL RESUME COUNTING FOR.....

MAJOR EDIT AT T=  2.00200E-02 SEC
SMALL EDIT AT T=  2.00400E-05 SEC
DUMP  TIME AT T=  2.01183E-02 SEC
GRAF  TIME AT T=  2.01165E-02 SEC



PROBLEM TIMING STATISTICS
    CPU =     -2.3674E+01
```

```
+++++ MAIN +++++ FINAL STOP +++++
FORTRAN STOP
  REGINA      job terminated at 17-NOV-1988 11:14:59.32

  Accounting information:
  Buffered I/O count:          731     Peak working set size:  1000
  Direct I/O count:           5689     Peak page file size:    4855
  Page faults:               32192     Mounted volumes:           0
  Charged CPU time:     0 00:15:48.40  Elapsed time:     0 00:40:08.69
```