

CALCULATION COVER SHEET

CLIENT: NUSCO _____ OPS. NO. 6041.006

PROJECT: Millstone Unit 2 _____

SUBJECT: Valve 2CS-16.1 A and B Bonnet Fluid Temperature Following LOCA

CALCULATION NO. ME-TH-001 _____

NO. OF SHEETS 9 + 48 attached

80
7/1/95
1/1/95

FINAL CALC. CONTAINS ASSUMPTIONS WHICH REQUIRE CONFIRMATION YES
X NO

ASSUMPTIONS CONFIRMED ON _____ BY _____

1		<i>J. Shin</i> J. SHIN	7/26/95	<i>M. Zuzovsky</i> M. ZUZOVSKY	7/26/95	<i>V. Haramis</i> V. HARAMIS	7/26/95
		<i>M. Zuzovsky</i> M. ZUZOVSKY	2/1/95	<i>J. Shin</i> J. SHIN	2/1/95	<i>V. Haramis</i> V. HARAMIS	2/1/95
0	All						
REV NO.	SHT NOS	NAME	DATE	NAME	DATE	NAME	DATE
CALCULATION BY			CHECKED BY		VERIFIED BY		

PRELIMINARY ☐ FINAL ☒ SUPERSEDES CALC. NO. N/A

SAFETY-RELATED ☒ NONSAFETY-RELATED ☐

Prepared by : M. Zuzovsky / *M. Zuzovsky*

Date: 2/01/95

Checked by : J. Shin / *J. Shin*

Date: 2/01/95

TITLE: Valve Bonnet Fluid Temperature Following LOCA		REVISION LOG
REVISION NUMBER	DESCRIPTION OF REVISION	DATE APPROVED
0	Original issue.	2/01/95
1	<p>The same analysis was done with duration of 8 hours instead of 444 mins and upstream water elevation of -26.5' in lieu of -22'-0".</p> <p>Revised pages: cover sheet, sheet 2, 3, 4, 5, 6, 7, 8, 9</p> <p>Replaced page: Attachment A</p> <p>Added pages: attachment C</p>	<p>7/26/95</p> <p><i>820 02</i> <i>Rev 1</i> <i>7/26/95</i></p>

RAYTHEON NUCLEAR INC.

BY Mr. J. J. Hines DATE 2/01/95
 CWD. BY J. J. Hines DATE 2/01/95

SHEET 3 OF 9
 OFS NO. 6041.006

CLIENT WISCO

PROJECT Millstone Unit 2

SUBJECT Valve 2CS-16.1 A and B Borosil Fluid Temperature Following LOCA

1.0 TABLE OF CONTENTS

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ATTACHMENTS

- A. HEATING6 Computer Output 44 pages
 B. Memo from N. Patankar to M. Zuzovsky, dated 1/24/95 2 pages

C. Memo from L. Pascarelli to M. Cheskin dated
 July 25, 1995 EOC-95-179 (Attachment C) 1 page

[Handwritten initials]
 RI
 7/26/95
 #2

RAYTHEON NUCLEAR INC.

BY m2 DATE 2/01/95
 CHKD. BY J. H. H. DATE 2/01/95

SHEET 4 OF 9
 OFS NO. 6061.006

CLIENT NUSCO
 PROJECT Millstone Unit 2
 SUBJECT Valve 2CS-16.1 A and B Bonnet Fluid Temperature Following LOCA

2.0 PURPOSE

To calculate the Containment Sump Outlet Isolation Valve (2CS-16.1 A & B) bonnet temperature after LOCA considering that the piping (24-HCB-1) upstream of the valve is full of borated water up to Elevation (-)22 feet.

26.5

220
 R1
 7/26/95

3.0 APPLICABLE CODES AND STANDARDS

None

4.0 METHODOLOGY

In order to calculate the temperature of the trapped fluid in the valve bonnet, this calculation uses the HEATING6 computer code to perform a transient heat transfer analysis of the pipe filled with water. The calculation considers a duration of 44 minutes after LOCA, before the receipt of Sump Recirculation Actuation Signal (SRAS) when the valve 2CS-16.1 A and B are open.

220
 R1
 7/26/95

All of the input data is contained in References ~~1-4 (Attached)~~.

1 and 4 (Attachments)
 B and C

5.0 ASSUMPTIONS

There are no assumptions in this calculation.

220
 R1
 7/26/95

6.0 REFERENCES

- 1) Memo from N. Patankar to M. Zuzovsky, dated 1/24/95, NBP-95-001, Attached.
- 2) "Principles of Heat Transfer", F. Kreith, 3rd Ed., 1976.
- 3) Piping drawing No. 25203-24026.

- 4) Memo from L. Pascanu to M. Chesko dated July 25, 1995 EOC-95-179, attached as C.

220
 R1
 7/26/95
 m2

RAYTHEON NUCLEAR INC.

BY PM DATE 2/01/95
 CHD. BY J. Miller DATE 2/01/95

SHEET 5 OF 9
 OFS NO. 6041.006

CLIENT MUSECO

PROJECT Millstone Unit 2

SUBJECT Valve 253-16.1 A and B Borosil Fluid Temperature Following LOCA

7.0 CALCULATIONS

The calculation uses HEATING6 to model the pipe (24"-HCB-1) from elevation (-) ~~25.92~~ ^{25.92} feet to the valve. The pipe is filled with borated water and is Schedule 10S stainless steel. As depicted in Ref. 3, the pipe is embedded in concrete until it reaches the valve chamber, where the last 4.0 feet of the pipe is exposed to a chamber temperature of 88°F. The containment temperature is 120°F before LOCA and 300°F after LOCA. JRM
R1
7/26/95
ML

The water in the pipe is stagnant for ~~44 minutes~~ ^{8 hours} following LOCA when Recirculation Mode starts. JRM
R1
7/26/95
ML

The pipe outside diameter is 24" and the inside diameter is 23.5". ~~25.92~~ ^{25.92} feet of the pipe are embedded in concrete. JRM
R1
7/26/95
ML

The following properties are used in this calculation (Ref. 2):

MATERIAL	Conductivity (Btu/hr-ft-F)	Density (lb/ft ³)	Specific Heat (Btu/lb-F)	
WATER	0.353	62.2	0.998	at 80°F
	0.391	55.6	1.050	at 350°F
STAINLESS STEEL	8.7	488.	0.11	at 32°F
	9.4	-	-	at 212°F
	10.9	-	-	at 572°F
CONCRETE	0.7	140.	0.20	

The HEATING6 solves the heat conduction through the water, pipe wall and concrete with the following boundary conditions: on the containment side the water temperature, 120°F initially and then increases to 300°F for the following ~~44 minutes~~ ^{8 hours} and near the valve inlet the pipe is cooled by free convection to the chamber air at a temperature of 88°F. JRM
R1
7/26/95
ML

RAYTHEON NUCLEAR INC.

BY m2 DATE 2/01/95

SHEET 6 OF 9

CHKD. BY G. Klein DATE 2/01/95

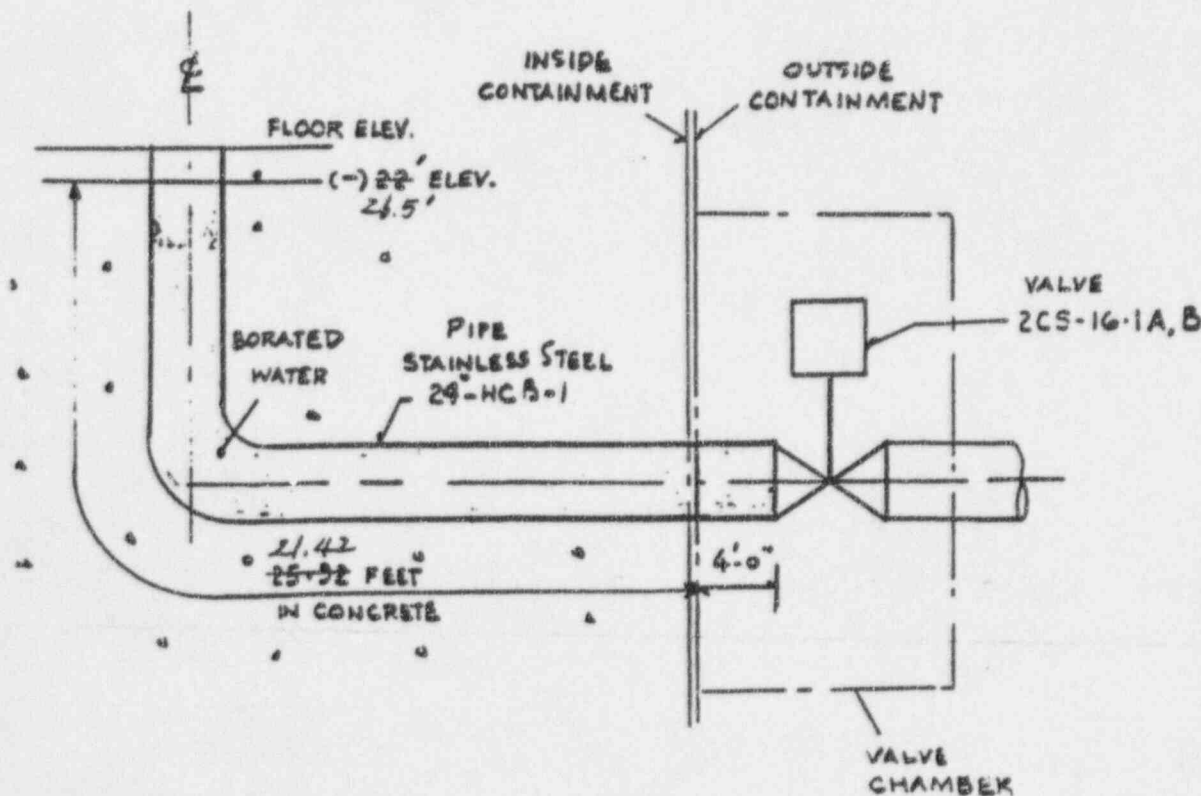
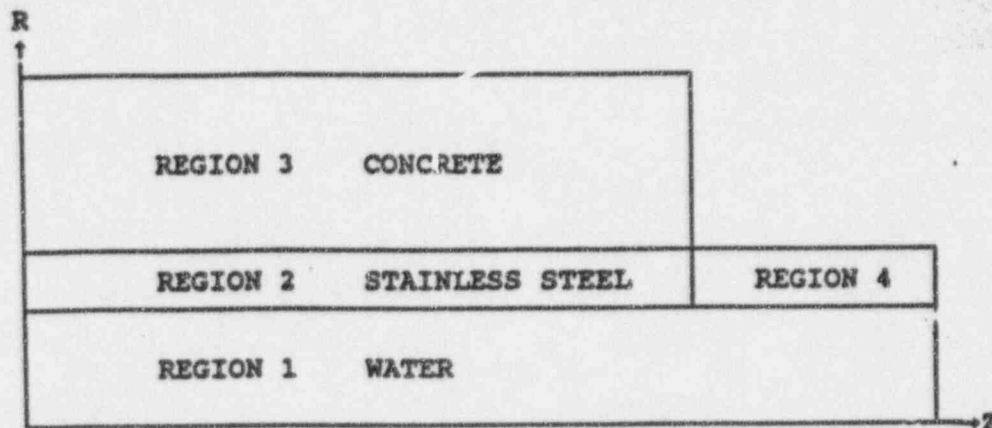
DWG NO. 6241.006

CLIENT MUSCO

PROJECT Hillstone Unit 2

SUBJECT Valve ZCS-16.1 A and B Borated Fluid Temperature Following LOCA

HEATING6 model:



RAYTHEON NUCLEAR INC.

BY FRZ DATE 2/01/95
 CARD. BY J. H. Hines DATE 2/01/95

SHEET 7 OF 9
 OPS NO. 6241.006

CLIENT NUSCO
 PROJECT Millstone Unit 2
 SUBJECT Valve ZCS-16.1 A and B Bornet Fluid Temperature Following LOCA

HEATING6 input:

nusco - millstone 2 pipe from sump to valve
 999 3 2 0 -75 g.

REGIONS

1 1 0.00 .979 0. 0. 0. 29.92 25.42
 1 0 0 0 0 0 1 0
 2 2 .979 1.00 0. 0. 0. 25.92 21.42
 1 0 0 0 0 0 1
 3 3 1.00 5.00 0. 0. 0. 25.92 21.42
 1
 4 2 .979 1.00 0. 0. 0. 25.92 29.92
 1 0 0 2

MATERIALS

1 water 0 0 1. -1 -2
 2 ssteel 0 0488. .11 -3
 3 concret .7 140. .2

INITIAL TEMPERATURES

1 100.0

BOUNDARY CONDITIONS

1 2 1.0 -4

2 1 88.0

0 0 .18 .333

XGRID

0. .979 1.0 2.0 5.0

4 2 4 6

ZGRID

0. 2.0 5.0 25.92 29.92

8 6 20 4 16

TABULAR FUNCTIONS

1 2

80. .353 350. .391

2 2

80. 62.2 350. 55.6

3 3

32. 8.7 212. 9.40 572. 10.9

4 3

0.0 120. .001 300. 100. 300.

PRINTOUT TIMES

-75 g.

STEADY STATE PARAMETERS

-20

TITLE

CARDZ

REGI

R1 R1

R2 7/26/95

R1 m2

R2

R1

R2

R1

R2

R2

MATE

M

M

M

INIT

I

BOUN

B1

B2

B1

B2

XGRI

L1

N1

ZGRI

L3 R1

N3 7/26/95

TABU m2

T1

T2

T1

T2

T1

T2

T1

T2

PRIN

STEADY STATE

SS m2

RAYTHEON NUCLEAR INC.

BY W2 DATE 2/01/95

SHEET 8 OF 9

CHGD. BY Jadhe DAY 2/01/95

OPS NO. 6041.006

CLIENT BURCO

PROJECT Hillstone Unit 2

SUBJECT Valve ZCR-10.1 A and B Downstream Fluid Temperature Following LOCA

HEATING6 input - continued:

TRANSIENT PARAMETERS

0. 0 .1 1/2. 2. 1.
* 1. 8.

TRAN
IP SP
END 1 R1
7/26/95
W2

RAYTHEON NUCLEAR INC.

BY 142 DATE 2/21/95

SHEET 9 OF 9

CHG. BY J. H. H. DATE 2/21/95

O/S NO. 6041.006

CLIENT NUREG

PROJECT Hillstone Unit 2

SUBJECT Valve 2CS-16.1 A and B Bonnet Fluid Temperature Following LOCA

8.0 RESULTS AND CONCLUSIONS

The results of the analysis show that after the ^{8 hrs} ~~44 minutes~~ following LOCA, the temperature of the borated water upstream of the valves (2CS-16.1 A and B) does ^{not} change from its initial temperature of 89.1°F. During the ^{long} ~~44 minutes~~ following LOCA the temperature increase occurs only along ^{2.5 feet} ~~one foot~~ of the pipe on the containment side.

Handwritten:
R1
7/27/95
R1
7/27/95
m

Based on the above, it is concluded the trapped fluid temperature in valve 2CS-16.1 A and B will remain the same when the valve is required to open on a SRAS. Since there is no change in the Bonnet trapped fluid temperature, it is concluded that Pressure Locking in the valve will not be experienced, as long as the pipe upstream of valves 2CS-16.1 A and B is full of water at all times.

000495

J U 0 4 9 6

```
#####
#          #          #          #
#          #          #          #
#####
#          #          #          #
#          #          #          #
#####
#          #          #          #
#          #          #          #
#####
```

Attachment: A

Configuration Management Checks:

Hardware validation confirmed!
Operating System validation confirmed!
Execution script file validation confirmed!
Heating6 Object file validation confirmed!
Aut Object file validation confirmed!
Aut_program fpcqa file validation confirmed!

```
#####
#          #          #          #
#          #          #          #
#####
#          #          #          #
#          #          #          #
#####
#          #          #          #
#          #          #          #
#####
```

By: J. SHIN Date: 7/25/95 Checked By: M Zuzovsby Date: 7/26/95

Project: MILLSTONE UNIT 2

Subject: VALVE 2GS-16.1 A AND B FLUID TEMPERATURE FOLLOWING LOSS

Calculation No. ME-TH-001 Revision No. 1 Safety Class: S

User Manual Controlled Copy No. 8

BHR RUN MILLPIAS.OUT

User Documentation for HEATING6 1985.1 on PC01696 (ap2)

User Manual: "HEATING6: A Multidimensional Heat Conduction Analysis with the Finite-Difference Formulation"; Program 2093, Applied Physics User's Manual for Safety-related Computer Programs, Volume V, Ebasco Services Incorporated, December, 1988, with the following exceptions:

- 1) Namelist input is not permitted
- 2) Input data must be contained in the file named as the first (1) argument to the h6_proc
e.g. -galib/h6_proc input.data
- 3) User-written subroutines, if any, must be contained in the file named as the second (2) argument to the h6_proc and the name MUST end in: .f
e.g. -galib/h6_proc input.data user.subroutines.f
- 4) Elapsed CPU time is not printed
- 5) Restart files must be unformatted (writes fort.49, reads fort.69)
- 6) Plot binary output file is fort.19

Software Personnel: Please consult the current corporate Software Status Report.
User Assistance: Moty Zuzovsky, ext. 3378, user-name moty

Computer System Manager: Morris J. Badrian, ext. 3337, user-name morris

DEFINITION OF INPUT/OUTPUT UNITS

NAME	NO	UNIT NUMBER DEFINITION
IBIN	95	BINARY INPUT DATA SET (OPTIONAL)
IECHO	5	INITIAL INPUT DATA SET
IERROR	9	ERROR MESSAGE DATA SET (OPTIONAL)
IMATLG	30	MATERIAL PROPERTIES LIBRARY DATA SET (OPTIONAL)
IN	4	STANDARD INPUT DATA SET
IO	6	STANDARD OUTPUT DATA SET
IPLOT	19	PLOT DATA SET (OPTIONAL)
IPLOT0	29	OLD PLOT DATA SET FOR RESTART CASES (OPTIONAL)
IRECLG	80	RECORD LENGTH IN SINGLE WORDS FOR BINARY DATA SET ON UNIT IBIN (MAXIMUM OF 80)
ITPIN	69	INITIAL TEMPERATURE DATA SET (OPTIONAL)
ITPOUT	49	FINAL TEMPERATURE DATA SET (OPTIONAL)

PRINT INPUT CARD IMAGES W/CARD COLUMNS INDICATED EVERY 10TH CARD--

CARD	NO./COL.	1.....10.....20.....30.....40.....50.....60.....70.....80	REGI
1	1	rucco - millstone 2 pipe from sup to valve,millpipe.rev.1	R1
2	2	999 3 2 0 8.	R2
3	3		R1
4	4	REGIONS	R2
5	5	1 1 0.00 .979 0. 0. 0. 25.42	R1
6	6	1 0 0 0 0 1 0	R2
7	7	2 2 .979 1.00 0. 0. 0. 21.42	R1
8	8	1 0 0 0 0 1	R2
9	9	3 3 1.00 5.00 0. 0. 0. 21.42	R1
10	10		R2
NO./COL.	1.....10.....20.....30.....40.....50.....60.....70.....80		
11	11	4 2 .979 1.00 0. 0. 21.42 25.42	R1
12	12	1 0 0 2	R2
13	13	MATERIALS	MATE
14	14	1 water 0 0 1. -1 -2	M
15	15	2 steel 0 0 488. .11 -3	M
16	16	3 concret .7 140. .2	M
17	17	INITIAL TEMPERATURES	INIT
18	18	1 100.0	I
19	19	BOUNDARY CONDITIONS	BOUND
20	20	1 2 1.0 -4	B1
NO./COL.	1.....10.....20.....30.....40.....50.....60.....70.....80		
21	21	2 1 88.0	R2
22	22	0 0 .18 .333	B1
23	23		R2
24	24	XGRID	XGR1
25	25	0. .979 1.0 2.0 5.0	L1
26	26	4 2 4 6	N1
27	27	ZGRID	
28	28	0. 2.0 5.0 21.42 25.42	
29	29	8 6 16 4	
30	30	TABULAR FUNCTIONS	TABU
NO./COL.	1.....10.....20.....30.....40.....50.....60.....70.....80		
31	31	1 2	T1
32	32	80. .353 350. .391	T2
33	33	2 2	T1
34	34	80. 62.2 350. 55.6	T2
35	35	3 3	T1
36	36	32. 8.7 212. 9.40 572. 10.9	T2
37	37	4 3	T1
38	38	0.0 120. .001 300. 100. 300.	T2
39	39	PRINTOUT TIMES	PRIN
40	40	8.	
NO./COL.	1.....10.....20.....30.....40.....50.....60.....70.....80		
41	41	STEADY STATE PARAMETERS	STE
42	42	-20	S:

43 TRANSIENT PARAMETERS
44
45 0. 1. .1 8. 2. 1.
46 %

TRAM
TP
TP
END

000501

Computer ID: PC01606 (1MB160 ; ap2) 181X 4.0.1 Tue Jul 25 11:19:41 EDT 1995 Jobname: 20369 Programs: Heating6 1985.1 Page: 6

LIMIT (DIMENSIONS FOR THE D-ARRAY) IS 5000000 WHICH USES 19532K BYTES OF CORE.
(LIMIT IS COMPUTED BY ALOCAT AND IS A FUNCTION OF THE COMPUTER CORE REQUEST.)
THE VARIABLY DIMENSIONED ARRAYS REQUIRE 4992003 SINGLE WORDS OR 19504K BYTES OF CORE.
THUS, THE CORE REQUIREMENTS MAY BE REDUCED BY 26K BYTES

CODE: HEATING6 1985.1 DATE: 7-25-95 TIME: 11:19:53 JOBNAME: 20369 COMPUTER: APnet

HEATING6, A MULTI-DIMENSIONAL HEAT CONDUCTION CODE WITH TEMPERATURE-DEPENDENT THERMAL PROPERTIES, NON-LINEAR AND SURFACE-TO-SURFACE BOUNDARY CONDITIONS, FINNED SURFACE ANALYSIS TECHNIQUES, AND CHANGE-OF-PHASE CAPABILITIES. STEADY STATE MODELS MAY BE SOLVED BY EITHER OVERRELAXATION WITH EXTRAPOLATION OR BY DIRECT SOLUTION TECHNIQUES DPTSL OR DPBFA AND DPBSL FROM LINPACK. THE DIRECT SOLUTION TECHNIQUES ARE LIMITED TO ONE AND TWO DIMENSIONAL PROBLEMS. TRANSIENT MODELS MAY BE SOLVED BY IMPLICIT TECHNIQUES (CRANK-NICOLSON OR BACKWARDS EULER), BY LEVI'S EXPLICIT PROCEDURE, OR THE CLASSICAL EXPLICIT PROCEDURE. THE TIME STEP SIZE FOR THE IMPLICIT TRANSIENT CALCULATIONS MAY BE A FUNCTION OF THE MAXIMUM TEMPERATURE CHANGE. THE IMPLICIT TECHNIQUE MAY NOT BE USED FOR PROBLEMS INVOLVING CHANGE OF PHASE CALCULATIONS. EACH ARRAY WHOSE LENGTH IS A FUNCTION OF THE INPUT DATA IS VARIABLY DIMENSIONED EXCEPT FOR THE NUMBER OF MATERIALS THAT CAN CHANGE PHASE (EQUAL TO 5) AND THE NUMBER OF PARAMETERS IN AN ANALYTICAL FUNCTION (EQUAL TO 11). HEATING6 USES THE SCALE FREE FORM READING ROUTINES TO PROCESS ITS STANDARD INPUT DATA.

HEATING6 WAS WRITTEN BY

D.C. ELROD
G.E. GILES
W.D. TURNER
COMPUTING AND TELECOMMUNICATIONS DIVISION
MARTIN MARIETTA ENERGY SYSTEMS, INC.
BUILDING K-1007, MAIL STOP NO. 38
POST OFFICE BOX P
OAK RIDGE, TENNESSEE 37831
PHONE - 615-574-8667(GARY GILES) OR FTS 624-8667
615-576-1759(KEM CHILDS) OR FTS 626-1759

THIS RUN WITH HEATING6 CAN HANDLE A MAXIMUM OF THE FOLLOWING PARAMETERS:
(CONTROLLED BY THE USER THROUGH NAMELIST /OPTION/ IN THE INPUT DATA OR THROUGH A BLOCK DATA SUBPROGRAM)

MAXPTS = 20000, LATTICE POINTS
MAXREG = 200, REGIONS
MAXMAT = 50, MATERIALS
MAXCP = 25, MATERIALS WITH PHASE CHANGE CAPABILITIES (FIXED)
MAXINT = 50, INITIAL TEMPERATURE FUNCTIONS
MAXHGN = 50, HEAT GENERATION FUNCTIONS
MAXBDC = 50, BOUNDARY CONDITION FUNCTIONS
MAXPBT = 50, POSITION DEPENDENT BOUNDARY TEMPERATURES
MAXRFG = 150, FINE GRID LINES, RADIAL (OR X)
MAXTFG = 150, FINE GRID LINES, THETA (OR Y)
MAXZFG = 150, FINE GRID LINES, AXIAL (OR Z)
MAXFGL = 150, FINE GRID LINES ALONG ANY AXIS (CALCULATED)
MAXGGL = 100, GROSS GRID LINES ALONG ANY AXIS (MAY HAVE BEEN REDUCED)
MAXANA = 50, ANALYTICAL FUNCTIONS
MAXPAR = 100, PARAMETERS PER ANALYTICAL FUNCTION (FIXED)
MAXTBL = 50, TABULAR FUNCTIONS
MAXPRB = 50, PAIRS PER TABULAR FUNCTION
MAXPRT = 100, STANDARD PRINTOUT TIMES
MAXNSM = 50, NODES FOR SPECIAL MONITORING OF TEMPERATURES
MAXSPC = 100, SPECIFIED PLANE PRINTOUT TIMES
MAXSPL = 100, PLANES PRINTED FOR THREE DIMENSIONAL MODELS
MAXSUR = 600, SURFACE-TO-SURFACE CONNECTORS

NWIDTH = 200, BAND WIDTH FOR STEADY STATE DIRECT SOLUTION TECHNIQUE
NDIMEN = 3, DIMENSIONS ALLOWED

ANALYSIS COMPONENTS ALLOWED BY BLOCKDATA,(T), NOT ALLOWED,(F):

CLASSICAL EXPLICIT	(CEP=T)
DIRECT SOLUTION (SS)	(DIRECT=T)
LEVI EXTRAPOLATION	(LEV=T)
TRANSIENT IMPLICIT	(IMPFLG=T)
HEAT GENERATION	(HGEN=T)
CHANGE OF PHASE	(MELTFG=F)
FINNED BOUNDARIES	(FIN=F)
POSITION DEPENDENT	
BOUNDARY TEMPERATURES	(LBOUND=F)

INPUT RETURN

JOB DESCRIPTION -- rusco - million 2 pipe from sump to valve, millpipe, rev.1
 THE PROBLEM WILL BE TERMINATED AFTER 999 SECONDS
 GEOMETRY TYPE NUMBER 3 (OR RZ)
 PROBLEM TYPE NUMBER 2
 INITIAL TIME 0.00000000+00
 FINAL TIME 8.00000000+00
 TIME INCREMENT 0.00000000+00
 IF RADIATION IS INVOLVED, TEMPERATURE UNITS ARE ASSUMED TO BE IN DEGREES FAHRENHEIT.
 THIS IS A NEW PROBLEM.

DEFINITION OF INPUT/OUTPUT UNITS FOR CASE NUMBER 1

NAME	NO	UNIT NUMBER DEFINITION
IBIN	95	BINARY INPUT DATA SET (OPTIONAL)
IECNO	5	INITIAL INPUT DATA SET
IERROR	9	ERROR MESSAGE DATA SET (OPTIONAL)
INATLB	39	MATERIAL PROPERTIES LIBRARY DATA SET (OPTIONAL)
IN	4	STANDARD INPUT DATA SET
IO	6	STANDARD OUTPUT DATA SET
IPLT	19	PLOT DATA SET (OPTIONAL)
IPLTD	29	OLD PLOT DATA SET FOR RESTART CASES (OPTIONAL)
IRECLG	80	RECORD LENGTH IN SINGLE WORDS FOR BINARY DATA SET ON UNIT IBIN (MAXIMUM OF 80)
ITPIN	69	INITIAL TEMPERATURE DATA SET (OPTIONAL)
ITPOUT	49	FINAL TEMPERATURE DATA SET (OPTIONAL)

NUMBER OF PARAMETERS SPECIFIED BY THE INPUT DATA.

NUMBER OF REGIONS	4
NUMBER OF MATERIALS	3
NUMBER OF INITIAL TEMPERATURE FUNCTIONS	1
NUMBER OF HEAT GENERATION FUNCTIONS	0
NUMBER OF DIFFERENT KINDS OF BOUNDARIES	2
NUMBER OF POINTS IN GROSS X OR R LATTICE	5
NUMBER OF POINTS IN GROSS Y OR THETA LATTICE	1
NUMBER OF POINTS IN GROSS Z LATTICE	5
NUMBER OF ANALYTIC FUNCTIONS	0
NUMBER OF TABULAR FUNCTIONS	4
NUMBER OF TRANSIENT PRINTOUT TIMES	1

NUMBERS AND FCM NUMBER		SUMMARY OF REGION DATA										BOUNDARY NUMBERS							
REG. NO.	MATL NO.	INIT	HEAT	TEMP	GEN.	LEFT-X-OR INNER-R	RIGHT-X-OR OUTER-R	LOWER-Y-OR LEFT-TNETHA	UPPER-Y-OR RIGHT-TNETHA	REAR-Z	FRONT-Z	LF-X IN-R	RT-X OT-R	LO-Y LF-O	UP-Y RT-O	RR-Z	FT-Z		
1	1	1	0			0.0000	0.9700	0.0000	0.0000	0.0000	25.4200	0	0	0	0	1	0		
2	2	1	0			0.9700	1.0000	0.0000	0.0000	0.0000	21.4200	0	0	0	0	1	0		
3	3	1	0			1.0000	5.0000	0.0000	0.0000	0.0000	21.4200	0	0	0	0	0	0		
4	2	1	0			0.9700	1.0000	0.0000	0.0000	21.4200	25.4200	0	2	0	0	0	0		

***** SUMMARY OF MATERIAL DATA *****

MATERIAL NUMBER	MATERIAL NAME	CONDUCTIVITY	DENSITY	SPECIFIC HEAT
1	water	0.0000000+00	0.0000000+00	1.0000000+00
2	steel	0.0000000+00	4.5500000+02	1.1000000-01
3	concret	7.0000000-01	1.4000000+02	2.0000000-01

***** SUMMARY OF INITIAL TEMPERATURE DATA *****

NUMBER	INITIAL TEMPERATURE
1	1.000000+02

-----GENERAL----- --TEMPERATURE--
 INFORMATION
 -----SUMMARY OF BOUNDARY DATA-----
 -----HEAT TRANSFER COEFFICIENTS-----
 RELATED FUNCTION NUMBERS

NO.	TYPE	FCI FLAG	TEMPERATURE T X Y Z	ASSOC. FCTS	FORCED CONV.	RADIATION	NATURAL CONV	EXPONENT	FLUX
1	2	0	1.000000+00 -4 0 0 0		0.000000+00	0.000000+00	0.000000+00	0.000000+00	0.000000+00
2	1	0	8.800000+01 0 0 0 0		0.000000+00	0.000000+00	1.800000-01	3.310000-01	0.000000+00

GROSS LATTICES AND MEMBERS OF INCREMENTS

R OR X					
0.000000	4	0.979000	1.000000	2.000000	5.600000
		2	4	6	
Z					
0.000000	8	2.000000	5.000000	21.420000	25.420000
		6	16	4	

LISTING OF TABULAR FUNCTIONS

TABLE NUMBER	1	NUMBER OF PAIRS -	2
ARGUMENT		VALUE	
8.000000000+01		3.530000000-01	
3.500000000+02		3.910000000-01	
TABLE NUMBER	2	NUMBER OF PAIRS -	2
ARGUMENT		VALUE	
8.000000000+01		6.220000000+01	
3.500000000+02		5.560000000+01	
TABLE NUMBER	3	NUMBER OF PAIRS -	3
ARGUMENT		VALUE	
3.200000000+01		8.700000000+00	
2.120000000+02		9.400000000+00	
5.720000000+02		1.090000000+01	
TABLE NUMBER	4	NUMBER OF PAIRS -	3
ARGUMENT		VALUE	
0.000000000+00		1.200000000+02	
1.000000000-03		3.000000000+02	
1.000000000+02		3.000000000+02	

TABLE OF OUTPUT TIMES

OUTPUT NO.	OUTPUT TIME	OUTPUT NO.	OUTPUT TIME	OUTPUT NO.	OUTPUT TIME
1	8.000000+00				

THE STEADY STATE MODEL WILL BE SOLVED USING A DIRECT SOLUTION TECHNIQUE FROM LIMPACT.
 MAXIMUM NUMBER OF STEADY-STATE ITERATIONS 20
 STEADY STATE CONVERGENCE CRITERION 1.000000000-05

FINE LATTICE LINES GENERATED BY HEATING6

X OR R FINE LATTICE LINES

2	0.244750	3	0.489500	4	0.734250	5	0.979000	6	0.989500
7	1.000000	8	1.250000	9	1.500000	10	1.750000	11	2.000000
12	2.500000	13	3.000000	14	3.500000	15	4.000000	16	4.500000
17	5.000000								

Z FINE LATTICE LINES

1	0.000000	2	0.250000	3	0.500000	4	0.750000	5	1.000000
6	1.250000	7	1.500000	8	1.750000	9	2.000000	10	2.500000
11	3.000000	12	3.500000	13	4.000000	14	4.500000	15	5.000000
16	6.026250	17	7.052500	18	8.078750	19	9.105000	20	10.131250
21	11.157500	22	12.183750	23	13.210000	24	14.236250	25	15.262500
26	16.288750	27	17.315000	28	18.341250	29	19.367500	30	20.393750
31	21.420000	32	22.420000	33	23.420000	34	24.420000	35	25.420000

THIS PROBLEM INVOLVES TEMPERATURE-DEPENDENT PROPERTIES.

THIS PROBLEM CONTAINS 520 NODES.

STABILITY CRITERION FOR EACH MODE									
1	2	3	4	5	6	7	8	9	10
1 0.00000+00	2 0.00000+00	3 0.00000+00	4 0.00000+00	5 0.00000+00	6 0.00000+00	7 0.00000+00	8 0.00000+00	9 0.00000+00	10 0.00000+00
7 6.25000-01	8 6.25000-01	9 6.25000-01	10 8.41840-01	11 1.00000+00	12 1.00000+00	13 1.00000+00	14 1.00000+00	15 1.00000+00	16 1.00000+00
13 1.00000+00	14 1.00000+00	15 1.00000+00	16 1.00000+00	17 3.19650+00	18 2.65240+00	19 2.65240+00	20 8.53700-03	21 3.29510-04	22 4.66780-03
19 2.65240+00	20 8.53700-03	21 3.29510-04	22 4.66780-03	23 6.25000-01	24 6.25000-01	25 6.25000-01	26 8.41840-01	27 1.00000+00	28 1.00000+00
25 6.25000-01	26 8.41840-01	27 1.00000+00	28 1.00000+00	29 1.00000+00	30 1.00000+00	31 1.00000+00	32 1.00000+00	33 3.19650+00	34 2.65240+00
31 1.00000+00	32 1.00000+00	33 3.19650+00	34 2.65240+00	35 2.65240+00	36 8.53700-03	37 3.29510-04	38 4.66780-03	39 6.25000-01	40 6.25000-01
37 3.29510-04	38 4.66780-03	39 6.25000-01	40 6.25000-01	41 6.25000-01	42 8.41840-01	43 1.00000+00	44 1.00000+00	45 1.00000+00	46 1.00000+00
43 1.00000+00	44 1.00000+00	45 1.00000+00	46 1.00000+00	47 1.00000+00	48 1.00520+00	49 3.19650+00	50 2.65240+00	51 2.65240+00	52 8.53700-03
49 3.19650+00	50 2.65240+00	51 2.65240+00	52 8.53700-03	53 3.29510-04	54 4.66780-03	55 6.25000-01	56 6.25000-01	57 6.25000-01	58 8.41840-01
55 6.25000-01	56 6.25000-01	57 6.25000-01	58 8.41840-01	59 1.00000+00	60 1.00000+00	61 1.00000+00	62 1.00000+00	63 1.00000+00	64 1.00520+00
61 1.00000+00	62 1.00000+00	63 1.00000+00	64 1.00520+00	65 3.19650+00	66 2.65240+00	67 2.65240+00	68 8.53700-03	69 3.29510-04	70 4.66780-03
67 2.65240+00	68 8.53700-03	69 3.29510-04	70 4.66780-03	71 6.25000-01	72 6.25000-01	73 6.25000-01	74 8.41840-01	75 1.00000+00	76 1.00000+00
73 6.25000-01	74 8.41840-01	75 1.00000+00	76 1.00000+00	77 1.00000+00	78 1.00000+00	79 1.00000+00	80 1.00520+00	81 3.19650+00	82 2.65240+00
79 1.00000+00	80 1.00520+00	81 3.19650+00	82 2.65240+00	83 2.65240+00	84 8.53700-03	85 3.29510-04	86 4.66780-03	87 6.25000-01	88 6.25000-01
85 3.29510-04	86 4.66780-03	87 6.25000-01	88 6.25000-01	89 6.25000-01	90 8.41840-01	91 1.00000+00	92 1.00000+00	93 1.00000+00	94 1.00000+00
91 1.00000+00	92 1.00000+00	93 1.00000+00	94 1.00000+00	95 1.00000+00	96 1.00520+00	97 3.19650+00	98 2.65240+00	99 2.65240+00	100 8.53700-03
97 3.19650+00	98 2.65240+00	99 2.65240+00	100 8.53700-03	101 3.29510-04	102 4.66780-03	103 6.25000-01	104 6.25000-01	105 6.25000-01	106 8.41840-01
103 6.25000-01	104 6.25000-01	105 6.25000-01	106 8.41840-01	107 1.00000+00	108 1.00000+00	109 1.00000+00	110 1.00000+00	111 1.00000+00	112 1.00520+00
109 1.00000+00	110 1.00000+00	111 1.00000+00	112 1.00520+00	113 3.19650+00	114 2.65240+00	115 2.65240+00	116 8.53700-03	117 3.29510-04	118 4.66780-03
115 2.65240+00	116 8.53700-03	117 3.29510-04	118 4.66780-03	119 6.25000-01	120 6.25000-01	121 6.25000-01	122 8.41840-01	123 1.00000+00	124 1.00000+00
121 6.25000-01	122 8.41840-01	123 1.00000+00	124 1.00000+00	125 1.00000+00	126 1.00000+00	127 1.00000+00	128 1.00520+00	129 4.53330-01	130 3.51170+00
127 1.00000+00	128 1.00520+00	129 4.53330-01	130 3.51170+00	131 3.51170+00	132 8.55090-03	133 3.29800+04	134 4.68000-03	135 8.33330-01	136 8.33330-01
133 3.29800+04	134 4.68000-03	135 8.33330-01	136 8.33330-01	137 8.33330-01	138 1.26920+00	139 1.66670+00	140 1.66670+00	141 1.66670+00	142 1.66670+00
139 1.66670+00	140 1.66670+00	141 1.66670+00	142 1.66670+00	143 1.66670+00	144 1.68100+00	145 5.73180+00	146 4.19050+00	147 4.19050+00	148 8.55790-03
145 5.73180+00	146 4.19050+00	147 4.19050+00	148 8.55790-03	149 3.29950-04	150 2.50000+00	151 1.00000+00	152 1.00000+00	153 1.00000+00	154 1.70100+00
151 1.00000+00	152 1.00000+00	153 1.00000+00	154 1.70100+00	155 3.29950-04	156 2.50000+00	157 2.50000+00	158 2.50000+00	159 2.50000+00	160 2.53250+00
157 2.50000+00	158 2.50000+00	159 2.50000+00	160 2.53250+00	161 5.73180+00	162 4.19050+00	163 4.19050+00	164 8.55790-03	165 3.29950-04	166 4.66610-03
163 4.19050+00	164 8.55790-03	165 3.29950-04	166 4.66610-03	167 1.00000+00	168 1.00000+00	169 1.00000+00	170 1.70100+00	171 2.50000+00	172 2.50000+00
169 1.00000+00	170 1.70100+00	171 2.50000+00	172 2.50000+00	173 2.50000+00	174 2.50000+00	175 2.50000+00	176 2.53250+00	177 5.73180+00	178 4.19050+00
175 2.50000+00	176 2.53250+00	177 5.73180+00	178 4.19050+00	179 4.19050+00	180 8.55790-03	181 3.29950-04	182 4.66610-03	183 1.00000+00	184 1.00000+00
181 3.29950-04	182 4.66610-03	183 1.00000+00	184 1.00000+00	185 1.00000+00	186 1.70100+00	187 2.50000+00	188 2.50000+00	189 2.50000+00	190 4.19050+00
187 2.50000+00	188 2.50000+00	189 2.50000+00	190 4.19050+00	191 2.50000+00	192 2.53250+00	193 5.73180+00	194 4.19050+00	195 4.19050+00	196 8.55790-03
193 5.73180+00	194 4.19050+00	195 4.19050+00	196 8.55790-03	197 3.29950-04	198 4.66610-03	199 1.00000+00	200 2.50000+00	201 1.00000+00	202 1.70100+00
199 1.00000+00	200 2.50000+00	201 1.00000+00	202 1.70100+00	203 2.50000+00	204 2.50000+00	205 2.50000+00	206 2.50000+00	207 2.50000+00	208 2.53250+00
205 2.50000+00	206 2.50000+00	207 2.50000+00	208 2.53250+00	209 5.73180+00	210 4.19050+00	211 4.19050+00	212 8.55790-03	213 3.29950-04	214 4.66610-03
211 4.19050+00	212 8.55790-03	213 3.29950-04	214 4.66610-03	215 1.00000+00	216 1.00000+00	217 1.00000+00	218 1.70100+00	219 2.50000+00	220 2.50000+00
217 1.00000+00	218 1.70100+00	219 2.50000+00	220 2.50000+00	221 2.50000+00	222 2.50000+00	223 2.50000+00	224 2.53250+00	225 6.30800+00	226 4.65160+00
223 2.50000+00	224 2.53250+00	225 6.30800+00	226 4.65160+00	227 4.65160+00	228 8.56150-03	229 3.30020-04	230 4.68930-03	231 1.11630+00	232 1.11630+00
229 3.30020-04	230 4.68930-03	231 1.11630+00	232 1.11630+00	233 1.11630+00	234 2.06050+00	235 3.36200+00	236 3.36200+00	237 3.36200+00	238 3.36200+00
235 3.36200+00	236 3.36200+00	237 3.36200+00	238 3.36200+00	239 3.36200+00	240 3.42100+00	241 7.17940+00	242 4.91510+00	243 4.91510+00	244 8.56330-03
241 7.17940+00	242 4.91510+00	243 4.91510+00	244 8.56330-03	245 3.30060-04	246 4.69080-03	247 1.80000+00	248 1.80000+00	249 1.80000+00	250 2.29700+00
247 1.80000+00	248 1.80000+00	249 1.80000+00	250 2.29700+00	251 4.04080+00	252 4.04080+00	253 4.04080+00	254 4.04080+00	255 4.04080+00	256 4.04080+00
253 4.04080+00	254 4.04080+00	255 4.04080+00	256 4.04080+00	257 7.17940+00	258 4.91510+00	259 4.91510+00	260 8.56330-03	261 3.30060-04	262 4.69080-03
259 4.91510+00	260 8.56330-03	261 3.30060-04	262 4.69080-03	263 1.80000+00	264 1.80000+00	265 1.80000+00	266 2.29700+00	267 4.04080+00	268 4.04080+00
265 1.80000+00	266 2.29700+00	267 4.04080+00	268 4.04080+00	269 4.04080+00	270 4.04080+00	271 4.04080+00	272 4.12630+00	273 7.17940+00	274 4.91510+00
271 4.04080+00	272 4.12630+00	273 7.17940+00	274 4.91510+00	275 4.91510+00	276 8.56330-03	277 3.30060-04	278 4.69080-03	279 1.80000+00	280 1.80000+00
277 3.30060-04	278 4.69080-03	279 1.80000+00	280 1.80000+00	281 1.80000+00	282 2.29700+00	283 4.04080+00	284 4.04080+00	285 4.04080+00	286 4.04080+00
283 4.04080+00	284 4.04080+00	285 4.04080+00	286 4.04080+00	287 4.91510+00	288 4.91510+00	289 7.17940+00	290 4.91510+00	291 4.91510+00	292 8.56330-03
289 7.17940+00	290 4.91510+00	291 4.91510+00	292 8.56330-03	293 3.30060-04	294 4.69080-03				

295	1.18000+00	296	1.18000+00	297	1.18000+00	298	2.29700+00	299	4.04080+00	300	4.04080+00
301	4.04080+00	302	4.04080+00	303	4.04080+00	304	4.12630+00	305	7.17940+00	306	4.91510+00
307	4.91510+00	308	8.56330-03	309	3.30060-04	310	4.69080-03	311	1.18000+00	312	1.18000+00
313	1.18000+00	314	2.29700+00	315	4.04080+00	316	4.04080+00	317	4.04080+00	318	4.04080+00
319	4.04080+00	320	4.12630+00	321	7.17940+00	322	4.91510+00	323	4.91510+00	324	8.56330-03
325	3.30060-04	326	4.69080-03	327	1.18000+00	328	1.18000+00	329	1.18000+00	330	2.29700+00
331	4.04080+00	332	4.04080+00	333	4.04080+00	334	4.04080+00	335	4.04080+00	336	4.12630+00
337	7.17940+00	338	4.91510+00	339	4.91510-00	340	8.56330-03	341	3.30060-04	342	4.69080-03
343	1.18000+00	344	1.18000+00	345	1.18000+00	346	2.29700+00	347	4.04080+00	348	4.04080+00
349	4.04080+00	350	4.04080+00	351	4.04080+00	352	4.12630+00	353	7.17940+00	354	4.91510+00
355	4.91510+00	356	8.56330-03	357	3.30060-04	358	4.69080-03	359	1.18000+00	360	1.18000+00
361	1.18000+00	362	2.29700+00	363	4.04080+00	364	4.04080+00	365	4.04080+00	366	4.04080+00
367	4.04080+00	368	4.12630+00	369	7.17940+00	370	4.91510+00	371	4.91510+00	372	8.56330-03
373	3.30060-04	374	4.69080-03	375	1.18000+00	376	1.18000+00	377	1.18000+00	378	2.29700+00
379	4.04080+00	380	4.04080+00	381	4.04080+00	382	4.04080+00	383	4.04080+00	384	4.12630+00
385	7.17940+00	386	4.91510+00	387	4.91510+00	388	8.56330-03	389	3.30060-04	390	4.69080-03
391	1.18000+00	392	1.18000+00	393	1.18000+00	394	2.29700+00	395	4.04080+00	396	4.04080+00
397	4.04080+00	398	4.04080+00	399	4.04080+00	400	4.12630+00	401	7.17940+00	402	4.91510+00
403	4.91510+00	404	8.56330-03	405	3.30060-04	406	4.69080-03	407	1.18000+00	408	1.18000+00
409	1.18000+00	410	2.29700+00	411	4.04080+00	412	4.04080+00	413	4.04080+00	414	4.04080+00
415	4.04080+00	416	4.12630+00	417	7.17940+00	418	4.91510+00	419	4.91510+00	420	8.56330-03
421	3.30060-04	422	4.69080-03	423	1.18000+00	424	1.18000+00	425	1.18000+00	426	2.29700+00
427	4.04080+00	428	4.04080+00	429	4.04080+00	430	4.04080+00	431	4.04080+00	432	4.12630+00
433	7.17940+00	434	4.91510+00	435	4.91510+00	436	8.56330-03	437	3.30060-04	438	4.69080-03
439	1.18000+00	440	1.18000+00	441	1.18000+00	442	2.29700+00	443	4.04080+00	444	4.04080+00
445	4.04080+00	446	4.04080+00	447	4.04080+00	448	4.12630+00	449	7.17940+00	450	4.91510+00
451	4.91510+00	452	8.56330-03	453	3.30060-04	454	4.69080-03	455	1.18000+00	456	1.18000+00
457	1.18000+00	458	2.29700+00	459	4.04080+00	460	4.04080+00	461	4.04080+00	462	4.04080+00
463	4.04080+00	464	4.12630+00	465	7.17940+00	466	4.91510+00	467	4.91510+00	468	8.56330-03
469	3.30060-04	470	4.69080-03	471	1.18000+00	472	1.18000+00	473	1.18000+00	474	2.29700+00
475	4.04080+00	476	4.04080+00	477	4.04080+00	478	4.04080+00	479	4.04080+00	480	4.12630+00
481	7.17940+00	482	4.90810+00	483	4.90810+00	484	8.56330-03	485	3.30060-04	486	2.54280-03
487	1.18000+00	488	1.18000+00	489	1.18000+00	490	2.29700+00	491	4.04080+00	492	4.04080+00
493	4.04080+00	494	4.04080+00	495	4.04080+00	496	4.12630+00	497	7.14950+00	498	4.90100+00
499	4.90100+00	500	8.56330-03	501	3.30060-04	502	3.30770-04	503	7.14950+00	504	4.90100+00
505	4.90100+00	506	8.56330-03	507	3.30060-04	508	3.30770-04	509	7.14950+00	510	4.90100+00
511	4.90100+00	512	8.56330-03	513	3.30060-04	514	3.30770-04	515	7.14950+00	516	4.90100+00
517	4.90100+00	518	8.56330-03	519	3.30060-04	520	3.30770-04				

THE STABILITY CRITERION IS 3.2951281D-04 FOR POINT 117

THE TIME STEP IS SET TO THE STABILITY CRITERION FOR THE IMPLICIT TECHNIQUE UNTIL RESET
BY A NONZERO DELTAT (FIRST ENTRY) ON THE TP CARDS.

HEATING6 1985.1
JOBNAME: 20369

rusco - millstone 2 pipe from sump to valve, millpipe, rev.1

APnet
11:19:56 7-25-95

		MAP OF THE NODE NUMBERS												
GROSS GRID		1	2	3	4	5	6	7	8	9	10	11	12	13
FINE GRID		1	2	3	4	5	6	7	8	9	10	11	12	13
DISTANCE		-0.24	0.24	0.49	0.73	0.98	1.23	1.48	1.73	1.98	2.23	2.48	2.73	2.98
1	1	0.00	01	17	34	51	68	85	102	119	136	153	170	187
	2	0.25	01	18	35	52	69	86	103	120	137	154	171	188
	3	0.50	01	33	50	67	84	101	118	135	152	169	186	203
	4	0.75	01	49	66	83	100	117	134	151	168	185	202	219
	5	1.00	01	65	82	99	116	133	150	167	184	201	218	235
	6	1.25	01	81	98	115	132	149	166	183	200	217	234	251
	7	1.50	01	97	114	131	148	165	182	199	216	233	250	267
	8	1.75	01	113	130	147	164	181	198	215	232	249	266	283
2	9	2.00	01	129	146	163	180	197	214	231	248	265	282	299
	10	2.50	01	145	162	179	196	213	230	247	264	281	298	315
	11	3.00	01	161	178	195	212	229	246	263	280	297	314	331
	12	3.50	01	177	194	211	228	245	262	279	296	313	330	347
	13	4.00	01	193	210	227	244	261	278	295	312	329	346	363
	14	4.50	01	209	226	243	260	277	294	311	328	345	362	379
3	15	5.00	01	225	242	259	276	293	310	327	344	361	378	395
	16	6.03	01	241	258	275	292	309	326	343	360	377	394	411
	17	7.05	01	257	274	291	308	325	342	359	376	393	410	427
	18	8.08	01	273	290	307	324	341	358	375	392	409	426	443
	19	9.11	01	289	306	323	340	357	374	391	408	425	442	459
	20	10.13	01	305	322	339	356	373	390	407	424	441	458	475
	21	11.16	01	321	338	355	372	389	406	423	440	457	474	491
	22	12.18	01	337	354	371	388	405	422	439	456	473	490	507
	23	13.21	01	353	370	387	404	421	438	455	472	489	506	523
	24	14.24	01	369	386	403	420	437	454	471	488	505	522	539
	25	15.26	01	385	402	419	436	453	470	487	504	521	538	555
	26	16.29	01	401	418	435	452	469	486	503	520	537	554	571
	27	17.32	01	417	434	451	468	485	502	519	536	553	570	587
	28	18.34	01	433	450	467	484	501	518	535	552	569	586	603
	29	19.37	01	449	466	483	500	517	534	551	568	585	602	619
	30	20.39	01	465	482	499	516	533	550	567	584	601	618	635
4	31	21.42	01	481	498	515	532	549	566	583	600	617	634	651
	32	22.42	01	497	514	531	548	565	582	599	616	633	650	667
	33	23.42	01	503	520	537	554	571	588	605	622	639	656	673
	34	24.42	01	509	526	543	560	577	594	611	628	645	662	679
5	35	25.42	01	515	532	549	566	583	600	617	634	651	668	685

January 24, 1995

NBP-95-001

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- p 2/2
- (v) Maximum Temp in Containment: 300°F (conservative) after LOCA
 - (vi) Initial Fluid Temperature in pipe 24"-HCB-1: 120°F before LOCA
 - (vii) Initial Temperature in the Valve Chamber: 88°F before LOCA
 - (viii) Maximum Temperature in the Valve Chamber after LOCA: 88°F
4. Calculation must follow all QA documentation requirements per Procedure E-30 (latest revision)
 5. Schedule for completion is Tuesday, January 31, 1995.
 6. Your budget including preparation and checking is 40 hours: Charge No. 6041.006

If you have any questions, please contact me.

cc: M. G. Gagliardi
L. Pascariu
V. Haramis
File C-8

HEATING6 1985.1
JOBNAME: 20369

rusco - millstone 2 pipe from sump to valve, millpipe, rev.1

APnet
11:19:56 7-25-95

NAP OF THE NODE NUMBERS

GROSS GRID		5			
		1			
		17			
		5.00			
		4.50			
		4.00			
		3.50			
		DISTANCE			
		FINE GRID			
1	1	0.00	13	14	15
	2	0.25	29	30	31
	3	0.50	45	46	47
	4	0.75	61	62	63
	5	1.00	77	78	79
	6	1.25	93	94	95
	7	1.50	109	110	111
	8	1.75	125	126	127
	9	2.00	141	142	143
	10	2.50	157	158	159
	11	3.00	173	174	175
	12	3.50	189	190	191
	13	4.00	205	206	207
	14	4.50	221	222	223
3	15	5.00	237	238	239
	16	6.03	253	254	255
	17	7.05	269	270	271
	18	8.08	285	286	287
	19	9.11	301	302	303
	20	10.13	317	318	319
	21	11.16	333	334	335
	22	12.18	349	350	351
	23	13.21	365	366	367
	24	14.24	381	382	383
	25	15.26	397	398	399
	26	16.29	413	414	415
	27	17.32	429	430	431
	28	18.34	445	446	447
	29	19.37	461	462	463
	30	20.39	477	478	479
4	31	21.42	493	494	495
	32	22.42	0	0	0
	33	23.42	0	0	0
	34	24.42	0	0	0
	35	25.42	0	0	0

HEATING6 1985.1
JOBNAME: 20369

nasco - millstone 2 pipe from sump to valve, millpipe, rev.1

APnet
11:19:57 7-25-95

STEADY STATE TEMPERATURE DISTRIBUTION AFTER 0 ITERATIONS, TIME = 0.000000+00

GROSS GRID

	FINE GRID				
	14	15	16	17	
1	0.00	4.00	4.50	5.00	
2	0.25	100.00	100.00	100.00	100.00
3	0.50	100.00	100.00	100.00	100.00
4	0.75	100.00	100.00	100.00	100.00
5	1.00	100.00	100.00	100.00	100.00
6	1.25	100.00	100.00	100.00	100.00
7	1.50	100.00	100.00	100.00	100.00
8	1.75	100.00	100.00	100.00	100.00
9	2.00	100.00	100.00	100.00	100.00
10	2.50	100.00	100.00	100.00	100.00
11	3.00	100.00	100.00	100.00	100.00
12	3.50	100.00	100.00	100.00	100.00
13	4.00	100.00	100.00	100.00	100.00
14	4.50	100.00	100.00	100.00	100.00
15	5.00	100.00	100.00	100.00	100.00
16	6.03	100.00	100.00	100.00	100.00
17	7.05	100.00	100.00	100.00	100.00
18	8.08	100.00	100.00	100.00	100.00
19	9.11	100.00	100.00	100.00	100.00
20	10.13	100.00	100.00	100.00	100.00
21	11.16	100.00	100.00	100.00	100.00
22	12.18	100.00	100.00	100.00	100.00
23	13.21	100.00	100.00	100.00	100.00
24	14.24	100.00	100.00	100.00	100.00
25	15.26	100.00	100.00	100.00	100.00
26	16.29	100.00	100.00	100.00	100.00
27	17.32	100.00	100.00	100.00	100.00
28	18.34	100.00	100.00	100.00	100.00
29	19.37	100.00	100.00	100.00	100.00
30	20.39	100.00	100.00	100.00	100.00
31	21.42	100.00	100.00	100.00	100.00
32	22.42	0.00	0.00	0.00	0.00
33	23.42	0.00	0.00	0.00	0.00
34	24.42	0.00	0.00	0.00	0.00
35	25.42	0.00	0.00	0.00	0.00

TEMPERATURES ON NUMBERED BOUNDARIES

BOUNDARY NUMBER	TEMPERATURE
1	120.000000
2	88.000000

ELAPSED CPU TIME IS 0.00 SECONDS

THE MAXIMUM TEMPERATURE IS - 1.000000+02 (+-0.1 PERCENT)

MAX. TEMP. APPEARS AT NODES	1	2	3	4	5
	6	7	8	9	10
	11	12	13	14	15
	16	17	18	19	20
	21	22	23	24	25
	26	27	28	29	30
	31	32	33	34	35
	36	37	38	39	40
	41	42	43	44	45
	46	47	48	49	50

THE MINIMUM TEMPERATURE IS - .000000+02 (+-0.1 PERCENT)

MIN. TEMP. APPEARS AT NODES	1	2	3	4	5
	6	7	8	9	10
	11	12	13	14	15
	16	17	18	19	20
	21	22	23	24	25
	26	27	28	29	30
	31	32	33	34	35
	36	37	38	39	40
	41	42	43	44	45
	46	47	48	49	50

BEGINNING OF STEADY STATE CALCULATIONS USING DIRECT SOLUTION TECHNIQUES FROM LINPACK.

THE MAXIMUM BAND WIDTH FOR THE DIRECT SOLUTION TECHNIQUE FOR STEADY STATE PROBLEMS IS CURRENTLY 200
 YOU CAN SAVE APPROXIMATELY 12968K BYTES OF CORE BY REDUCING MWIDTH TO 33
 IN LABELED COMMON /WIDTH/ BY USING NAMELIST /OPTION/ IN THE INPUT DATA OR BY USING A BLOCK DATA SUBPROGRAM.
 NUMBER OF ITERATIONS= 0 MAX RELATIVE RESIDUAL OCCURS AT NODE 486
 MAX RELATIVE RESIDUAL= 5.000000+00 TOTAL HEAT FLOW AT THIS NODE= 1.552280+01
 RESIDUAL AT THIS NODE= -1.552280+01 AVERAGE HEAT FLOW AT THIS NODE= 3.104570+00 NODAL TEMPERATURE= 1.000000+02

NUMBER OF ITERATIONS= 0 MAX RESIDUAL OCCURS AT NODE 229
 MAX RESIDUAL= 1.164150-10 TOTAL HEAT FLOW AT THIS NODE= 1.151760-10
 NODAL TEMPERATURE= 1.000000+02 AVERAGE HEAT FLOW AT THIS NODE= 2.879400-11

NUMBER OF ITERATIONS= 1 MAX RELATIVE RESIDUAL OCCURS AT NODE 508
 MAX RELATIVE RESIDUAL= 1.289910+00 TOTAL HEAT FLOW AT THIS NODE= 5.414160+00
 RESIDUAL AT THIS NODE= 1.745950+00 AVERAGE HEAT FLOW AT THIS NODE= 1.353540+00 NODAL TEMPERATURE= 8.930260+01

NUMBER OF ITERATIONS= 1 MAX RESIDUAL OCCURS AT NODE 514
 MAX RESIDUAL= 8.858360-01 TOTAL HEAT FLOW AT THIS NODE= 1.978140+00
 NODAL TEMPERATURE= 8.853490+01 AVERAGE HEAT FLOW AT THIS NODE= 4.945350-01

NUMBER OF ITERATIONS= 2 MAX RELATIVE RESIDUAL OCCURS AT NODE 508
 MAX RELATIVE RESIDUAL= 4.030670-01 TOTAL HEAT FLOW AT THIS NODE= 7.459780+00
 RESIDUAL AT THIS NODE= -7.516770-01 AVERAGE HEAT FLOW AT THIS NODE= 1.664890+00 NODAL TEMPERATURE= 9.050580+01

NUMBER OF ITERATIONS= 2	MAX RESIDUAL OCCURS AT NODE 134
MAX RESIDUAL= 4.89471D-05	TOTAL HEAT FLOW AT THIS NODE= 3.04654D+00
MODAL TEMPERATURE= 1.13863D+02	AVERAGE HEAT FLOW AT THIS NODE= 7.61635D-01
NUMBER OF ITERATIONS= 3	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 1.16816D-01	TOTAL HEAT FLOW AT THIS NODE= 6.69347D+00
RESIDUAL AT THIS NODE= 1.95476D-01	AVERAGE HEAT FLOW AT THIS NODE= 1.67337D+00 MODAL TEMPERATURE= 9.00697D+01
NUMBER OF ITERATIONS= 3	MAX RESIDUAL OCCURS AT NODE 514
MAX RESIDUAL= 1.64291D-01	TOTAL HEAT FLOW AT THIS NODE= 3.07020D+00
MODAL TEMPERATURE= 8.91612D+01	AVERAGE HEAT FLOW AT THIS NODE= 7.67551D-01
NUMBER OF ITERATIONS= 4	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 3.44699D-02	TOTAL HEAT FLOW AT THIS NODE= 6.89820D+00
RESIDUAL AT THIS NODE= -5.94450D-02	AVERAGE HEAT FLOW AT THIS NODE= 1.72455D+00 MODAL TEMPERATURE= 9.01893D+01
NUMBER OF ITERATIONS= 4	MAX RESIDUAL OCCURS AT NODE 134
MAX RESIDUAL= 4.43009D-06	TOTAL HEAT FLOW AT THIS NODE= 3.07071D+00
MODAL TEMPERATURE= 1.13814D+02	AVERAGE HEAT FLOW AT THIS NODE= 7.67677D-01
NUMBER OF ITERATIONS= 5	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 1.02077D-02	TOTAL HEAT FLOW AT THIS NODE= 6.83584D+00
RESIDUAL AT THIS NODE= 1.74446D-02	AVERAGE HEAT FLOW AT THIS NODE= 1.70896D+00 MODAL TEMPERATURE= 9.01532D+01
NUMBER OF ITERATIONS= 5	MAX RESIDUAL OCCURS AT NODE 514
MAX RESIDUAL= 1.58544D-02	TOTAL HEAT FLOW AT THIS NODE= 3.20265D+00
MODAL TEMPERATURE= 8.92489D+01	AVERAGE HEAT FLOW AT THIS NODE= 8.00662D-01
NUMBER OF ITERATIONS= 6	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 3.02840D-03	TOTAL HEAT FLOW AT THIS NODE= 6.85416D+00
RESIDUAL AT THIS NODE= -5.18941D-03	AVERAGE HEAT FLOW AT THIS NODE= 1.71354D+00 MODAL TEMPERATURE= 9.01638D+01
NUMBER OF ITERATIONS= 6	MAX RESIDUAL OCCURS AT NODE 134
MAX RESIDUAL= 3.82977D-07	TOTAL HEAT FLOW AT THIS NODE= 3.07275D+00
MODAL TEMPERATURE= 1.13810D+02	AVERAGE HEAT FLOW AT THIS NODE= 7.68186D-01
NUMBER OF ITERATIONS= 7	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 8.99012D-04	TOTAL HEAT FLOW AT THIS NODE= 6.84871D+00
RESIDUAL AT THIS NODE= 1.53930D-03	AVERAGE HEAT FLOW AT THIS NODE= 1.71218D+00 MODAL TEMPERATURE= 9.01606D+01
NUMBER OF ITERATIONS= 7	MAX RESIDUAL OCCURS AT NODE 514
MAX RESIDUAL= 1.41863D-03	TOTAL HEAT FLOW AT THIS NODE= 3.21476D+00
MODAL TEMPERATURE= 8.92571D+01	AVERAGE HEAT FLOW AT THIS NODE= 8.03691D-01
NUMBER OF ITERATIONS= 8	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 2.66935D-04	TOTAL HEAT FLOW AT THIS NODE= 6.85033D+00
RESIDUAL AT THIS NODE= -6.57149D-04	AVERAGE HEAT FLOW AT THIS NODE= 1.71259D+00 MODAL TEMPERATURE= 9.01616D+01
NUMBER OF ITERATIONS= 8	MAX RESIDUAL OCCURS AT NODE 134

MAX RESIDUAL= 3.34112D-08	TOTAL HEAT FLOW AT THIS NODE= 3.07292D+00
NODAL TEMPERATURE= 1.13810D+02	AVERAGE HEAT FLOW AT THIS NODE= 7.68230D-01
NUMBER OF ITERATIONS= 9	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 7.92621D-05	TOTAL HEAT FLOW AT THIS NODE= 6.84985D+00
RESIDUAL AT THIS NODE= 1.35733D-04	AVERAGE HEAT FLOW AT THIS NODE= 1.71246D+00 NODAL TEMPERATURE= 9.01613D+01
NUMBER OF ITERATIONS= 9	MAX RESIDUAL OCCURS AT NODE 514
MAX RESIDUAL= 1.25494D-04	TOTAL HEAT FLOW AT THIS NODE= 3.21584D+00
NODAL TEMPERATURE= 8.92578D+01	AVERAGE HEAT FLOW AT THIS NODE= 8.03959D-01
NUMBER OF ITERATIONS= 10	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 2.35361D-05	TOTAL HEAT FLOW AT THIS NODE= 6.84999D+00
RESIDUAL AT THIS NODE= -4.03056D-05	AVERAGE HEAT FLOW AT THIS NODE= 1.71250D+00 NODAL TEMPERATURE= 9.01614D+01
NUMBER OF ITERATIONS= 10	MAX RESIDUAL OCCURS AT NODE 134
MAX RESIDUAL= 2.93949D-09	TOTAL HEAT FLOW AT THIS NODE= 3.07294D+00
NODAL TEMPERATURE= 1.13810D+02	AVERAGE HEAT FLOW AT THIS NODE= 7.68234D-01
NUMBER OF ITERATIONS= 11	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 6.98883D-06	TOTAL HEAT FLOW AT THIS NODE= 6.84995D+00
RESIDUAL AT THIS NODE= 1.19683D-05	AVERAGE HEAT FLOW AT THIS NODE= 1.71249D+00 NODAL TEMPERATURE= 9.01614D+01
NUMBER OF ITERATIONS= 11	MAX RESIDUAL OCCURS AT NODE 514
MAX RESIDUAL= 1.10748D-05	TOTAL HEAT FLOW AT THIS NODE= 3.21593D+00
NODAL TEMPERATURE= 8.92579D+01	AVERAGE HEAT FLOW AT THIS NODE= 8.03982D-01
NUMBER OF ITERATIONS= 12	MAX RELATIVE RESIDUAL OCCURS AT NODE 508
MAX RELATIVE RESIDUAL= 2.07539D-06	TOTAL HEAT FLOW AT THIS NODE= 6.84996D+00
RESIDUAL AT THIS NODE= -3.55409D-06	AVERAGE HEAT FLOW AT THIS NODE= 1.71249D+00 NODAL TEMPERATURE= 9.01614D+01
NUMBER OF ITERATIONS= 12	MAX RESIDUAL OCCURS AT NODE 134
MAX RESIDUAL= 2.61934D-10	TOTAL HEAT FLOW AT THIS NODE= 3.07294D+00
NODAL TEMPERATURE= 1.13810D+02	AVERAGE HEAT FLOW AT THIS NODE= 7.68235D-01

musco - millstone 2 pipe from pump to valve, millpipe, rev.1
APnet
11:20:00 7-25-95

STEADY STATE TEMPERATURE DISTRIBUTION AFTER 12 ITERATIONS, TIME = 0.000000+00

GROSS GRID

		14	15	16	17
	FINE GRID	3.50	4.00	4.50	5.00
	DISTANCE	0.00	113.48	113.26	113.18
1	1	0.00	113.48	113.26	113.18
	2	0.25	113.39	113.25	113.15
	3	0.50	113.37	113.23	113.13
	4	0.75	113.33	113.20	113.11
	5	1.00	113.28	113.15	113.09
	6	1.25	113.21	113.10	113.04
	7	1.50	113.13	113.03	112.98
	8	1.75	113.05	112.96	112.91
	9	2.00	112.96	112.88	112.83
	10	2.50	112.76	112.70	112.66
	11	3.00	112.54	112.50	112.47
	12	3.50	112.31	112.28	112.26
	13	4.00	112.08	112.06	112.05
	14	4.50	111.84	111.83	111.82
	15	5.00	111.60	111.59	111.59
	16	6.03	111.11	111.10	111.10
	17	7.05	110.61	110.61	110.61
	18	8.08	110.11	110.11	110.11
	19	9.11	109.61	109.61	109.61
	20	10.13	109.11	109.11	109.11
	21	11.16	108.60	108.60	108.60
	22	12.18	108.10	108.10	108.10
	23	13.21	107.60	107.60	107.60
	24	14.24	107.10	107.10	107.10
	25	15.26	106.60	106.61	106.61
	26	16.29	106.10	106.11	106.12
	27	17.32	105.62	105.64	105.65
	28	18.34	105.14	105.18	105.20
	29	19.37	104.71	104.78	104.82
	30	20.39	104.36	104.48	104.54
	31	21.42	104.00	104.16	104.24
	32	22.42	0.00	0.00	0.00
	33	23.42	0.00	0.00	0.00
	34	24.42	0.00	0.00	0.00
	35	25.42	0.00	0.00	0.00

TEMPERATURES ON NUMBERED BOUNDARIES

BOUNDARY NUMBER	TEMPERATURE
1	120.000000
2	88.000000

ELAPSED CPU TIME IS 0.00 SECONDS

THE MAXIMUM TEMPERATURE IS - 1.200000-02 (+-0.1 PERCENT)

MAX. TEMP. APPEARS AT NODES - 1 2 3 4 5
6

THE MINIMUM TEMPERATURE IS - 8.901140-01 (+-0.1 PERCENT)

MIN. TEMP. APPEARS AT NODES - 517 518 519 520

THE STEADY STATE CALCULATIONS HAVE BEEN COMPLETED.

NUMBER OF ITERATIONS COMPLETED = 12

THE INITIAL TIME STEP = 3.2951280-04

AFTER EACH TIME STEP THE TIME STEP SIZE WILL BE MULTIPLIED BY A FACTOR OF 1.000000+00 SUBJECT TO ANY CONDITIONS WHICH MAY FOLLOW.

THE MAXIMUM TIME STEP ALLOWED IS 1.000000-01

NEW TIME STEP PARAMETERS WILL BE READ IN AT TIME = 8.000000+00

IF THE MAXIMUM TEMPERATURE CHANGE AT A NODE EXCEEDS 2.000000+00 DEGREES OVER A TIME STEP, THEN THE TIME STEP SIZE WILL BE DECREASED ACCORDINGLY.

IF THE MAXIMUM TEMPERATURE CHANGE AT A NODE EXCEEDS 1.000000+00 PER CENT OVER A TIME STEP, THEN THE TIME STEP SIZE WILL BE DECREASED ACCORDINGLY.

THE MINIMUM TIME STEP ALLOWED IS 3.2951280-05

THE IMPLICIT PROCEDURE WILL BE USED TO CALCULATE THE TRANSIENT TEMPERATURE DISTRIBUTION.

MAXIMUM NORMALIZED HEAT RESIDUAL CONVERGENCE CRITERION = 1.000000-05

(CORRESPONDS TO EPSILON SUB 1, DEFAULT=1.00-5)

NUMBER-OF-ITERATIONS BETWEEN TESTS FOR CONVERGENCE, LINEAR LOOP (DEFAULT = 1) = 1

AVERAGE L1 NORM OF RELATIVE TEMPERATURE DIFFERENCE CONVERGENCE CRITERION

FOR TEMPERATURE DEPENDENT PROPERTIES = 1.000000-05

(CORRESPONDS TO EPSILON SUB 3, DEFAULT=1.00-5)

THETA (0.5 FOR CRANK-NICOLSON, 1.0 FOR CLASSICAL IMPLICIT) = 5.000000-01

THE SOR ACCELERATION PARAMETER (BETA) WILL BE OPTIMIZED EMPIRICALLY.

BETA = 1.000000+00

A BETA UPDATE WILL BE ATTEMPTED EVERY 1 TIME STEPS (DEFAULT=1).

NUMBER-OF-ITERATIONS TOLERANCE FOR BETA UPDATE CALCULATIONS, OUTER LOOP (DEFAULT=5) = 5

NUMBER-OF-ITERATIONS TOLERANCE FOR BETA UPDATE CALCULATIONS, INNER LOOP (DEFAULT=2) = 2

PER CENT CHANGE IN BETA UPDATE CALCULATIONS (DEFAULT=10) = 10

THE FOLLOWING TABLE IS PRINTED OUT FOR INFORMATION PURPOSES DURING THE IMPLICIT TRANSIENT CALCULATIONS.
A LINE IS PRINTED EACH TIME THE INNER LOOP CONVERGES. A LINE IS ALSO PRINTED AFTER THE VERY FIRST ITERATION FOR EACH TIME STEP. THUS, ONE CAN DETERMINE HOW MUCH THE MAXIMUM NORMALIZED HEAT RESIDUAL DECREASES DURING THE ITERATIVE PROCESS. ENTRIES IN EACH COLUMN ARE DESCRIBED BELOW:

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NO TIME      -- NUMBER OF TIME STEPS.
TIME         -- TIME AT WHICH TEMPERATURE DISTRIBUTION IS BEING CALCULATED.
TIME STEP   -- CURRENT TIME STEP SIZE.
NO ITER      -- NUMBER OF ITERATIONS REQUIRED FOR INNER(LINEAR) LOOP TO CONVERGE.
MAX HEAT RESIDUAL -- THE MAXIMUM NORMALIZED HEAT RESIDUAL AFTER THE NUMBER OF ITERATIONS
                    INDICATED IN THE PREVIOUS COLUMN(COMPARES TO EPSILON SUB 1).
BETA         -- CURRENT VALUE OF THE SOR ACCELERATION PARAMETER.
L1 NORM OF TEMP DIFF -- THE L1 NORM OF THE TEMPERATURE DIFFERENCE OVER THE CURRENT ITERATION FOR INNER
                    (LINEAR) LOOP. THIS COLUMN AND THE NEXT TWO ARE USED ONLY WHEN THE OPTIMUM
                    ACCELERATION PARAMETER IS BEING ESTIMATED USING CAHNE'S TECHNIQUE.
RHO(ITER)    -- SPECTRAL RADIUS FOR THE SOR ITERATION MATRIX.
RHO(JACOBI)  -- SQUARE OF SPECTRAL RADIUS FOR THE JACOBI ITERATION MATRIX.
NO TEN      -- NUMBER OF ITERATIONS COMPLETED FOR OUTER (NON-LINEAR) LOOP.
L1 NORM OF TEMP DIFF -- THE AVERAGE L1 NORM OF THE RELATIVE TEMPERATURE DIFFERENCE OVER THE CURRENT
                    ITERATION FOR OUTER (NON-LINEAR) LOOP. NON-ZERO FOR NON-LINEAR PROBLEMS ONLY.
                    (COMPARES TO EPSILON SUB 3)
MODE         -- MODE NUMBER.
MAX TEMP CHANGE -- MAXIMUM TEMPERATURE CHANGE AT A NODE OVER THE CURRENT TIME STEP. THIS CHANGE
                    OCCURRED AT THE NODE SHOWN IN THE PREVIOUS COLUMN.
MODE         -- MODE NUMBER.
MAX PERCENT TEMP CHANGE -- MAXIMUM PERCENTAGE OF RELATIVE CHANGE IN TEMPERATURE AT A NODE OVER THE CURRENT
                    TIME STEP. THIS CHANGE OCCURRED AT THE NODE SHOWN IN THE PREVIOUS COLUMN.

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NO	TIME	TIME	STEP	ITER	NO MAX HEAT	BETA	L1 NORM OF	RHO	NO L1 NORM OF	ITER TEMP DIFF	MAX TEMP	MAX PERCENT
TIME					RESIDUAL		TEMP DIFF (ITER)	(JACOBI)	TEMP DIFF	CHANGE	CHANGE	TEMP CHANGE
1	3.29510-04	3.29510-04	0	1	1.2670-05	1.0000+00	0.0000+00	0.0000+00	0.0000+00			
1	3.29510-04	3.29510-04	1	1	1.7370-07	1.0000+00	0.0000+00	0.0000+00	0.0000+00			
1	3.29510-04	3.29510-04	1	1	1.7370-07	1.0000+00	0.0000+00	0.0000+00	0.0000+00			
1	3.29510-04	3.29510-04	1	1	1.5500-09	1.0000+00	0.0000+00	0.0000+00	0.0000+00			
2	1.97870-02	1.94580-02	1	9	0.0640-02	1.1000+00	0.0000+00	0.0000+00	0.0000+00	1 3.8170-03	21 1.9000-02	21 1.6090-02
2	1.97870-02	1.94580-02	12	9	3.3620-06	1.1000+00	0.0000+00	0.0000+00	0.0000+00	2 4.8620-10		
2	1.97870-02	1.94580-02	1	9	0.0250-06	1.1000+00	0.0000+00	0.0000+00	0.0000+00	1 1.3010-01	22 1.2580+00	22 1.0650+00
2	1.97870-02	1.94580-02	1	8	4.190-04	1.1000+00	0.0000+00	0.0000+00	0.0000+00	2 7.3400-09		
2	1.97870-02	1.94580-02	7	5	6.610-06	1.1000+00	0.0000+00	0.0000+00	0.0000+00	1 5.0320-04	22 1.1380+00	22 9.6360-01
3	3.50320-02	1.73510-02	1	2	5.600-06	1.1000+00	0.0000+00	0.0000+00	0.0000+00	2 2.4310-09		
3	3.50320-02	1.73510-02	12	5	6.630-06	1.0550+00	0.0000+00	0.0000+00	0.0000+00	1 4.6710-03	22 1.4440+00	22 1.2110+00
3	3.50320-02	1.73510-02	1	5	7.470-06	1.0550+00	0.0000+00	0.0000+00	0.0000+00	2 5.7960-09		
3	3.50320-02	1.73510-02	5	9	9350-06	1.0550+00	0.0000+00	0.0000+00	0.0000+00	1 4.1500-07	22 1.1450+00	22 9.6010-01
4	4.49020-02	1.36100-02	1	4	2990-06	1.0550+00	0.0000+00	0.0000+00	0.0000+00	2 4.8670-09		
4	4.49020-02	1.36100-02	9	6	2280-06	1.0080+00	0.0000+00	0.0000+00	0.0000+00	1 3.4570-06	21 1.0920+00	21 9.0850-01
5	5.85120-02	1.36100-02	1	7	6980-04	1.0330+00	0.0000+00	0.0000+00	0.0000+00	2 2.5910-09		
5	5.85120-02	1.36100-02	7	9	3410-06	1.0330+00	0.0000+00	0.0000+00	0.0000+00	1 2.5690-06	20 1.0470+00	20 6.6590-01
6	7.21220-02	1.36100-02	1	4	3350-06	1.0330+00	0.0000+00	0.0000+00	0.0000+00	2 4.8550-09		
6	7.21220-02	1.36100-02	5	6	6590-06	1.0570+00	0.0000+00	0.0000+00	0.0000+00	1 2.1800-06	21 1.0540+00	21 8.6120-01
7	8.57330-02	1.36100-02	1	2	8580-06	1.0570+00	0.0000+00	0.0000+00	0.0000+00	2 4.8810-09		
7	8.57330-02	1.36100-02	6	8	5240-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.3520-06	20 1.0140+00	20 8.2420-01
8	1.01420-01	1.56880-02	1	3	4480-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	2 5.2300-09		
8	1.01420-01	1.56880-02	1	2	8220-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.2320-06	21 1.1660+00	21 9.3770-01
9	1.17310-01	1.58940-02	1	4	6990-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	2 8.5000-09		
9	1.17310-01	1.58940-02	7	8	6180-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.6480-06	20 1.1420+00	20 9.1230-01
10	1.33870-01	1.65550-02	1	2	7170-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	2 4.7170-09		
10	1.33870-01	1.65550-02	6	8	2610-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.1510-06	21 1.1810+00	21 9.3250-01
11	1.50730-01	1.68660-02	1	3	9050-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	2 5.9010-09		
11	1.50730-01	1.68660-02	8	5	2770-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.6440-06	20 1.1660+00	20 9.1430-01
12	1.68240-01	1.75180-02	1	2	6940-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	2 2.8280-09		
12	1.68240-01	1.75180-02	7	5	8740-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.0970-06	21 1.1990+00	21 9.2940-01
13	1.86150-01	1.79070-02	1	4	700-04	1.0800+00	0.0000+00	0.0000+00	0.0000+00	2 3.8100-09		
13	1.86150-01	1.79070-02	8	7	2200-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.6610-06	20 1.1850+00	20 9.1570-01
14	2.04730-01	1.85770-02	1	3	6500-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	2 3.6460-09		
14	2.04730-01	1.85770-02	7	8	7770-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	1 2.1460-06		

14	2.04730-01	1.85770-02	1	4.4800-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
15	2.23770-01	1.90450-02	1	5.0260-04	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
15	2.23770-01	1.90450-02	8	9.8820-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
15	2.23770-01	1.90450-02	1	5.1480-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
16	2.43510-01	1.97400-02	1	2.7580-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
16	2.43510-01	1.97400-02	8	6.5500-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
16	2.43510-01	1.97400-02	1	3.5330-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
17	2.63800-01	2.02910-02	1	5.3220-04	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
17	2.63800-01	2.02910-02	9	7.0390-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
17	2.63800-01	2.02910-02	1	3.8850-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
18	2.84830-01	2.10220-02	1	2.8330-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
18	2.84830-01	2.10220-02	8	9.6910-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
18	2.84830-01	2.10220-02	1	5.3510-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
19	3.06490-01	2.16600-02	1	7.2820-04	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
19	3.06490-01	2.16600-02	9	9.9750-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
19	3.06490-01	2.16600-02	1	5.6410-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
20	3.28920-01	2.24390-02	1	2.9400-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
20	3.28920-01	2.24390-02	9	7.7820-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
20	3.28920-01	2.24390-02	1	4.5210-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
21	3.52100-01	2.31710-02	10	7.8940-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
21	3.52100-01	2.31710-02	1	4.7120-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
22	3.76110-01	2.40120-02	1	3.0750-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
22	3.76110-01	2.40120-02	10	6.6070-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
23	4.00960-01	2.48480-02	1	1.1300-03	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
23	4.00960-01	2.48480-02	11	6.6820-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
23	4.00960-01	2.48480-02	1	4.2140-06	1.0800+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
24	4.26720-01	2.57650-02	1	3.6920-03	1.1720+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
24	4.26720-01	2.57650-02	8	7.6120-06	1.1720+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
24	4.26720-01	2.57650-02	1	1.0540-03	1.2550+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
25	4.53440-01	2.67170-02	6	5.8210-06	1.2550+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
25	4.53440-01	2.67170-02	1	2.1910-06	1.2550+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
26	4.81170-01	2.77290-02	1	4.6490-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
26	4.81170-01	2.77290-02	7	2.6550-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
26	4.81170-01	2.77290-02	1	8.9030-07	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
27	5.09980-01	2.88130-02	1	1.2810-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
27	5.09980-01	2.88130-02	6	5.3120-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
27	5.09980-01	2.88130-02	1	8.1600-07	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
28	5.39920-01	2.99400-02	1	4.9150-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
28	5.39920-01	2.99400-02	7	2.0310-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
28	5.39920-01	2.99400-02	1	1.2530-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
29	5.71080-01	3.11620-02	1	1.5820-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
29	5.71080-01	3.11620-02	6	6.5930-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
29	5.71080-01	3.11620-02	1	1.5680-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
30	6.03520-01	3.24370-02	1	5.2360-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
30	6.03520-01	3.24370-02	7	1.9210-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
30	6.03520-01	3.24370-02	1	1.5580-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
31	6.37340-01	3.58230-02	1	1.9070-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00

2	5.1650-09	21	1.2170+00	21	9.2660-01
1	2.7000-06	20	1.2120+00	20	9.1660-01
2	4.7070-09				
1	2.0600-06	21	1.2360+00	21	9.2420-01
2	3.5880-09				
1	2.7590-06	20	1.2350+00	20	9.1700-01
2	3.2350-09				
1	2.1250-06	21	1.2560+00	21	9.2200-01
2	4.8670-09				
1	2.8310-06	20	1.2580+00	20	9.1700-01
2	4.2870-09				
1	2.2900-06	21	1.2760+00	21	9.2000-01
2	3.6540-09				
1	2.9210-06	20	1.2810+00	20	9.1670-01
2	3.2430-09				
1	2.4530-06	21	1.2970+00	21	9.1800-01
2	2.9070-09				
1	3.0230-06	20	1.3040+00	20	9.1620-01
2	2.6160-09				
1	2.6160-06	21	1.3180+00	21	9.1620-01
2	4.1440-09				
1	3.1350-06	20	1.3260+00	20	9.1530-01
2	6.0060-09				
1	2.7930-06	21	1.3390+00	21	9.1430-01
2	2.0880-09				
1	3.2720-06	20	1.3490+00	20	9.1430-01
2	4.5160-09				
1	2.9670-06	21	1.3610+00	21	9.1270-01
2	1.9810-09				
1	3.4170-06	20	1.3720+00	20	9.1270-01
2	3.0060-09				
1	3.1570-06	21	1.3820+00	21	9.1110-01
2	1.3570-09				

31	6.37340-01	3.38230-02	5	6.7150-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	3.5720-06	20	1.3940+00	20	9.1090-01
31	6.37340-01	3.38230-02	1	4.5130-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	1.6680-08	20	1.3940+00	20	9.1090-01
32	6.72620-01	3.52740-02	1	5.5990-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00						
32	6.72620-01	3.52740-02	7	3.1150-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	3.3600-06	20	1.4040+00	20	9.0720-01
32	6.72620-01	3.52740-02	1	1.4270-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	1.4940-09	21	1.4040+00	20	9.0720-01
33	7.09470-01	3.68580-02	1	2.2670-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00						
33	7.09470-01	3.68580-02	6	3.7520-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	3.7530-06	20	1.4160+00	20	9.0900-01
33	7.09470-01	3.68580-02	1	1.0630-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	9.4430-09	20	1.4160+00	20	9.0900-01
34	7.48000-01	3.85210-02	1	6.0340-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00						
34	7.48000-01	3.85210-02	6	6.9680-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	3.5560-06	21	1.4270+00	20	9.0720-01
34	7.48000-01	3.85210-02	1	2.6210-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	1.4810-08	21	1.4270+00	20	9.0720-01
35	7.88330-01	4.03370-02	7	5.6510-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	3.9590-06	20	1.4390+00	20	9.0500-01
35	7.88330-01	4.03370-02	1	2.8540-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.4490-09	20	1.4390+00	20	9.0500-01
36	8.30590-01	4.22610-02	1	6.5720-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	3.8030-06	20	1.4490+00	20	9.0500-01
36	8.30590-01	4.22610-02	8	2.6930-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	4.1270-09	20	1.4490+00	20	9.0500-01
36	8.30590-01	4.22610-02	1	3.3930-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.1760-06	20	1.4610+00	20	9.0450-01
37	8.76950-01	4.43620-02	1	3.0150-03	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	5.8120-09	20	1.4610+00	20	9.0450-01
37	8.76950-01	4.43620-02	8	7.9360-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.0860-06	20	1.4710+00	20	9.0260-01
38	9.21550-01	4.65950-02	9	6.8140-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	3.8620-09	20	1.4710+00	20	9.0260-01
38	9.21550-01	4.65950-02	1	4.0610-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.5060-06	20	1.4830+00	20	9.0190-01
39	9.70590-01	4.90430-02	10	5.4710-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	3.2260-09	20	1.4830+00	20	9.0190-01
39	9.70590-01	4.90430-02	1	4.2490-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.4550-06	20	1.4940+00	20	9.0000-01
40	1.02230+00	5.16620-02	10	8.4100-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	4.4480-09	20	1.5060+00	20	8.9900-01
40	1.02230+00	5.16620-02	1	6.1460-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.8840-06	20	1.5060+00	20	8.9900-01
41	1.07680+00	5.45330-02	11	8.0630-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	3.9160-09	20	1.5160+00	20	8.9700-01
41	1.07680+00	5.45330-02	1	6.2090-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.9680-06	20	1.5160+00	20	8.9700-01
42	1.13440+00	5.76250-02	12	7.0020-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	3.3360-09	20	1.5280+00	20	8.9590-01
42	1.13440+00	5.76250-02	1	5.8450-06	1.3300+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	5.5630-06	20	1.5370+00	20	8.9370-01
43	1.19540+00	6.10280-02	9	5.7660-06	1.3970+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.1130-09	20	1.5370+00	20	8.9370-01
43	1.19540+00	6.10280-02	1	4.6680-06	1.3970+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	5.7980-06	20	1.5490+00	20	8.9260-01
44	1.26020+00	6.47100-02	1	1.0780-02	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	6.4540-06	20	1.5490+00	20	8.9260-01
44	1.26020+00	6.47100-02	9	4.3980-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	4.0700-09	20	1.5590+00	20	8.9030-01
45	1.32890+00	6.87870-02	1	5.7600-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	6.7600-06	20	1.5590+00	20	8.9030-01
45	1.32890+00	6.87870-02	1	5.4490-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	4.7140-09	20	1.5700+00	19	9.0960-01
46	1.40210+00	7.32110-02	9	7.0770-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	7.4960-06	20	1.5700+00	19	9.0960-01
46	1.40210+00	7.32110-02	1	1.1930-02	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	9.5000-09	20	1.5700+00	19	9.0960-01
47	1.48030+00	7.81180-02	9	6.2650-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00						
47	1.48030+00	7.81180-02	1	6.0830-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00						
47	1.48030+00	7.81180-02	9	4.0150-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00						
47	1.48030+00	7.81180-02	1	1.6610-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00						

48	1.56190+00	8.15900-02	1	1.2760-02	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
48	1.56190+00	8.15900-02	10	4.3450-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
49	1.56190+00	8.15900-02	1	6.1890-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
49	1.64520+00	8.33740-02	1	5.8560-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
49	1.64520+00	8.33740-02	9	8.9310-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
49	1.64520+00	8.33740-02	1	6.3830-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
50	1.73050+00	8.52850-02	1	1.1940-02	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
50	1.73050+00	8.52850-02	10	4.8510-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
50	1.73050+00	8.52850-02	1	8.0660-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
51	1.81780+00	8.73040-02	1	5.0370-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
51	1.81780+00	8.73040-02	10	9.8120-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
51	1.81780+00	8.73040-02	1	6.9810-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
52	1.90730+00	8.94340-02	1	1.1260-02	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
52	1.90730+00	8.94340-02	10	6.6360-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
52	1.90730+00	8.94340-02	2	2.2270-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
53	1.99890+00	9.16800-02	1	4.2940-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
53	1.99890+00	9.16800-02	11	8.2890-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
53	1.99890+00	9.16800-02	1	7.3000-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
54	2.09300+00	9.40520-02	1	1.0680-02	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
54	2.09300+00	9.40520-02	12	5.2420-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
54	2.09300+00	9.40520-02	1	6.1320-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
55	2.18950+00	9.65560-02	1	3.6280-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
55	2.18950+00	9.65560-02	12	8.5620-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
55	2.18950+00	9.65560-02	1	6.9250-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
56	2.28870+00	9.91980-02	1	1.0220-02	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
56	2.28870+00	9.91980-02	12	9.2800-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
56	2.28870+00	9.91980-02	1	8.4850-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
57	2.38870+00	1.00000-01	1	3.4370-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
57	2.38870+00	1.00000-01	13	6.4370-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
57	2.38870+00	1.00000-01	1	5.8800-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
58	2.48870+00	1.00000-01	1	9.1050-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
58	2.48870+00	1.00000-01	12	8.7670-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
58	2.48870+00	1.00000-01	1	7.7250-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
59	2.58870+00	1.00000-01	1	3.2460-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
59	2.58870+00	1.00000-01	12	9.5490-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
59	2.58870+00	1.00000-01	1	6.8720-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
60	2.68870+00	1.00000-01	1	8.0380-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
60	2.68870+00	1.00000-01	12	7.4260-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
60	2.68870+00	1.00000-01	1	6.4860-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
61	2.78870+00	1.00000-01	1	3.0270-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
61	2.78870+00	1.00000-01	12	8.2770-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
61	2.78870+00	1.00000-01	1	5.7640-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
62	2.88870+00	1.00000-01	1	7.1660-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
62	2.88870+00	1.00000-01	12	6.3150-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
62	2.88870+00	1.00000-01	1	5.4910-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
63	2.98870+00	1.00000-01	1	2.7980-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
63	2.98870+00	1.00000-01	12	7.2290-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
63	2.98870+00	1.00000-01	1	4.8810-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
64	3.08870+00	1.00000-01	1	6.4540-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00
64	3.08870+00	1.00000-01	12	5.4020-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00

64	3.08870+00	1.000000-01	1	4.6940-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	9.0000+00	2	5.1030-09	19	1.2390+00	19	7.4370-01
65	3.18870+00	1.000000-01	1	2.5740-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.9710-06	19	1.2140+00	19	7.2340-01
65	3.18870+00	1.000000-01	1	8.9460-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	7.5620-09	19	1.2140+00	19	7.2340-01
65	3.18870+00	1.000000-01	1	7.0420-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	4.6590-06	19	1.1900+00	19	7.0390-01
66	3.28870+00	1.000000-01	1	5.8580-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	4.6230-09	19	1.1900+00	19	7.0390-01
12	4.6450-06	1.4570+00	0.0000+00	1	4.0470-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	4.5830-06	19	1.1660+00	19	6.8690-01
11	7.7510-06	1.4570+00	0.0000+00	1	2.3720-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	6.8690-09	19	1.1660+00	19	6.8690-01
11	7.7510-06	1.4570+00	0.0000+00	1	6.2020-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	4.2740-06	19	1.1430+00	19	6.6660-01
1	5.3520-03	1.4570+00	0.0000+00	1	9.2950-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	2.1.1090-08	19	1.1200+00	19	6.4890-01
10	9.2750-06	1.4570+00	0.0000+00	1	2.1670-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	4.2360-06	19	1.0970+00	19	6.3180-01
11	6.7560-06	1.4570+00	0.0000+00	1	6.7560-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	6.2810-09	19	1.0750+00	19	6.1520-01
1	5.4990-06	1.4570+00	0.0000+00	1	4.9650-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.9460-06	19	1.0540+00	19	5.9920-01
10	8.5660-06	1.4570+00	0.0000+00	1	8.2790-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	2.1.0180-08	19	1.0330+00	19	5.8180-01
1	9.6440-03	1.4570+00	0.0000+00	1	1.9640-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.9270-06	19	1.0200+00	19	5.6800-01
11	5.8380-06	1.4570+00	0.0000+00	1	5.8380-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.6640-06	19	1.0120+00	19	5.5430-01
1	4.8810-06	1.4570+00	0.0000+00	1	4.8810-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	5.7080-09	19	0.9190-01	19	5.4030-01
1	4.6280-03	1.4570+00	0.0000+00	1	7.9010-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.6210-06	19	0.9190-01	19	5.4030-01
10	7.9010-06	1.4570+00	0.0000+00	1	7.4100-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.9540-09	19	0.9190-01	19	5.4030-01
1	1.7850-03	1.4570+00	0.0000+00	1	4.3670-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.4240-06	19	0.9190-01	19	5.4030-01
11	5.1320-06	1.4570+00	0.0000+00	1	5.1320-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.9200-09	19	0.9190-01	19	5.4030-01
1	4.3670-06	1.4570+00	0.0000+00	1	7.2860-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.1960-06	19	0.9190-01	19	5.4030-01
10	7.2860-06	1.4570+00	0.0000+00	1	6.6660-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	8.6020-09	19	0.9190-01	19	5.4030-01
1	6.6660-06	1.4570+00	0.0000+00	1	1.6250-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.4240-06	19	0.9190-01	19	5.4030-01
1	6.6660-06	1.4570+00	0.0000+00	1	4.0750-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.9200-09	19	0.9190-01	19	5.4030-01
10	6.7200-06	1.4570+00	0.0000+00	1	6.0250-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.1960-06	19	0.9190-01	19	5.4030-01
1	6.0250-06	1.4570+00	0.0000+00	1	1.4820-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.9200-09	19	0.9190-01	19	5.4030-01
1	1.4820-03	1.4570+00	0.0000+00	1	9.5830-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.1970-06	19	0.9190-01	19	5.4030-01
10	9.5830-06	1.4570+00	0.0000+00	1	4.7940-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.5880-09	19	0.9190-01	19	5.4030-01
1	4.7940-06	1.4570+00	0.0000+00	1	3.8410-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.1970-06	19	0.9190-01	19	5.4030-01
1	3.8410-03	1.4570+00	0.0000+00	1	6.2010-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.2970-09	19	0.9190-01	19	5.4030-01
10	6.2010-06	1.4570+00	0.0000+00	1	5.4670-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.0100-06	19	0.9190-01	19	5.4030-01
1	5.4670-06	1.4570+00	0.0000+00	1	3.6800-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.0310-09	19	0.9190-01	19	5.4030-01
1	3.6800-03	1.4570+00	0.0000+00	1	8.8520-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.0100-06	19	0.9190-01	19	5.4030-01
10	8.8520-06	1.4570+00	0.0000+00	1	4.4320-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.0310-09	19	0.9190-01	19	5.4030-01
1	4.4320-06	1.4570+00	0.0000+00	1	3.6370-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.0100-06	19	0.9190-01	19	5.4030-01
1	3.6370-03	1.4570+00	0.0000+00	1	5.7110-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	7.0310-09	19	0.9190-01	19	5.4030-01
10	5.7110-06	1.4570+00	0.0000+00	1	4.9640-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1	3.0100-06	19	0.9190-01	19	5.4030-01
1	4.9640-06	1.4570+00	0.0000+00	1	1.7880-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
1	1.7880-03	1.4570+00	0.0000+00	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
70	4.58870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
79	4.58870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	2	6.7150-09	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000000-01	1	3.8870+00	1.000000-01	0.0000+00	0.0000+00	0.0000+00	0.0000+00	1	2.8220-06	19	0.9190-01	19	5.4030-01
80	4.68870+00	1.000													

81	4.78870+00	1.00000-01	10 8.2050-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.8390-06	19 8.8020-01	18 4.8380-01
82	4.78870+00	1.00000-01	1 4.1010-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 6.5220-09		
83	4.78870+00	1.00000-01	1 3.4390-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.6590-06	19 8.6300-01	18 4.7450-01
84	4.78870+00	1.00000-01	10 5.2730-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 6.2270-09		
85	4.78870+00	1.00000-01	1 4.5320-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.6720-06	19 8.6630-01	18 4.6540-01
86	4.78870+00	1.00000-01	1 1.3310-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 9.9680-09		
87	4.78870+00	1.00000-01	9 9.6420-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.5120-06	19 8.2990-01	18 4.5660-01
88	4.78870+00	1.00000-01	1 7.7850-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 5.8240-09		
89	4.78870+00	1.00000-01	10 4.8780-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.5290-06	19 8.1400-01	18 4.4790-01
90	4.78870+00	1.00000-01	1 4.1530-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 9.4640-09		
91	4.78870+00	1.00000-01	1 1.3430-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.3830-06	19 7.9840-01	18 4.3950-01
92	4.78870+00	1.00000-01	9 9.0500-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 5.4320-09		
93	4.78870+00	1.00000-01	1 7.2880-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.4030-06	18 7.8420-01	18 4.3130-01
94	4.78870+00	1.00000-01	1 3.0930-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 8.9760-09		
95	4.78870+00	1.00000-01	10 4.4980-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.2610-06	18 7.7290-01	18 4.2330-01
96	4.78870+00	1.00000-01	1 1.3510-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 5.0840-09		
97	4.78870+00	1.00000-01	9 8.4830-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.2840-06	18 7.6180-01	18 4.1540-01
98	4.78870+00	1.00000-01	1 6.8310-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 8.5090-09		
99	4.78870+00	1.00000-01	10 4.1650-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.1320-06	18 7.5090-01	18 4.0780-01
100	4.78870+00	1.00000-01	1 3.4980-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 1.8780-08		
101	4.78870+00	1.00000-01	1 1.3550-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.1800-06	18 7.4020-01	18 4.0030-01
102	4.78870+00	1.00000-01	9 7.9490-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 8.0570-09		
103	4.78870+00	1.00000-01	1 6.4140-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.0300-06	18 7.2940-01	18 3.9300-01
104	4.78870+00	1.00000-01	1 2.8090-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 1.3320-08		
105	4.78870+00	1.00000-01	8 6.8690-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 2.0830-06	18 7.1930-01	18 3.8590-01
106	4.78870+00	1.00000-01	2 3.8760-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 7.5910-09		
107	4.78870+00	1.00000-01	1 1.3550-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 1.9360-06	18 7.0900-01	18 3.7900-01
108	4.78870+00	1.00000-01	9 7.4360-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 1.2760-08		
109	4.78870+00	1.00000-01	1 6.0260-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 1.9880-06	18 6.9900-01	18 3.7220-01
110	4.78870+00	1.00000-01	1 2.6930-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 7.1250-09		
111	4.78870+00	1.00000-01	8 9.2650-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 1.8470-06	18 6.8910-01	18 3.6560-01
112	4.78870+00	1.00000-01	1 9.7320-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 1.2190-08		
113	4.78870+00	1.00000-01	1 1.3690-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00	1 1.890-06	18 6.7940-01	18 3.5910-01
114	4.78870+00	1.00000-01	9 6.8980-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00	2 6.7160-09		
115	4.78870+00	1.00000-01	1 5.6680-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
116	4.78870+00	1.00000-01	1 2.6070-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
117	4.78870+00	1.00000-01	8 8.7720-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
118	4.78870+00	1.00000-01	1 9.2660-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
119	4.78870+00	1.00000-01	1 1.3840-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
120	4.78870+00	1.00000-01	9 6.3680-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
121	4.78870+00	1.00000-01	1 5.5210-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
122	4.78870+00	1.00000-01	1 2.5240-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
123	4.78870+00	1.00000-01	8 8.2790-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
124	4.78870+00	1.00000-01	1 8.8130-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
125	4.78870+00	1.00000-01	1 1.3900-03	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
126	4.78870+00	1.00000-01	9 5.8980-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			
127	4.78870+00	1.00000-01	1 5.0170-06	1.4570+00	0.0000+00	0.0000+00	0.0000+00			

98 6.48870+00 1.00000-01	1 2.4430-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.7650-06	18 6.6980-01	18 3.5280-01
98 6.48870+00 1.00000-01	8 7.8020-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 1.1650-08		
98 6.48870+00 1.00000-01	1 8.3850-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
99 6.58870+00 1.00000-01	1 1.3910-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.8160-06	18 6.6050-01	18 3.4660-01
99 6.58870+00 1.00000-01	9 5.4950-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 6.3520-09		
99 6.58870+00 1.00000-01	1 4.7480-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
100 6.68870+00 1.00000-01	1 2.3650-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.6860-06	18 6.5120-01	18 3.4060-01
100 6.68870+00 1.00000-01	8 7.3480-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 1.1120-08		
100 6.68870+00 1.00000-01	1 7.9780-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.7390-06	18 6.4220-01	18 3.3470-01
101 6.78870+00 1.00000-01	9 5.1400-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 6.0240-09		
101 6.78870+00 1.00000-01	1 4.5070-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.6160-06	18 6.3320-01	35 3.3090-01
102 6.88870+00 1.00000-01	1 2.2900-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 1.0620-09		
102 6.88870+00 1.00000-01	8 6.9190-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.6690-06	18 6.2440-01	35 3.2760-01
103 6.98870+00 1.00000-01	1 7.5970-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 5.7250-09		
103 6.98870+00 1.00000-01	1 3.7780-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.5500-06	18 6.1580-01	35 3.2440-01
104 7.08870+00 1.00000-01	9 4.8230-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 1.0140-08		
104 7.08870+00 1.00000-01	1 4.2900-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.6030-06	18 6.0730-01	35 3.2120-01
105 7.18870+00 1.00000-01	1 2.2190-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 5.4500-09		
105 7.18870+00 1.00000-01	8 6.5180-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.4880-06	18 5.9900-01	35 3.1790-01
106 7.28870+00 1.00000-01	1 7.2420-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 9.6860-09		
106 7.28870+00 1.00000-01	9 4.5390-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.5400-06	18 5.9080-01	35 3.1470-01
107 7.38870+00 1.00000-01	1 4.0930-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 5.1990-09		
107 7.38870+00 1.00000-01	8 6.1430-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.4320-06	18 5.8270-01	35 3.1150-01
107 7.38870+00 1.00000-01	1 6.9110-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 9.2560-09		
108 7.48870+00 1.00000-01	9 4.2810-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.4800-06	18 5.7480-01	35 3.0840-01
108 7.48870+00 1.00000-01	1 3.9120-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 4.9700-09		
108 7.48870+00 1.00000-01	1 2.0870-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.3800-06	18 5.6700-01	35 3.0520-01
109 7.58870+00 1.00000-01	8 5.7940-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 8.8530-09		
109 7.58870+00 1.00000-01	1 6.6010-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.4260-06	18 5.5930-01	35 3.0200-01
109 7.58870+00 1.00000-01	1 1.3380-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 4.7580-09		
110 7.68870+00 1.00000-01	9 4.0460-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 1.3310-06	18 5.5180-01	34 2.9950-01
110 7.68870+00 1.00000-01	1 3.7450-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 8.6720-09		
110 7.68870+00 1.00000-01	1 2.0250-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 6.1330-07	18 3.0370-01	34 1.6580-01
111 7.78870+00 1.00000-01	8 5.6700-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	2 6.4190-09		
111 7.78870+00 1.00000-01	1 6.3130-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00	1 4.3210-07		
111 7.78870+00 1.00000-01	1 1.3210-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
112 7.88870+00 1.00000-01	9 3.8310-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
112 7.88870+00 1.00000-01	1 3.5910-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
112 7.88870+00 1.00000-01	1 1.9660-03 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
112 7.88870+00 1.00000-01	8 5.1690-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
113 7.94440+00 5.56290-02	1 6.0430-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
113 7.94440+00 5.56290-02	1 5.2050-04 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
113 7.94440+00 5.56290-02	6 9.7520-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
114 8.00000+00 5.56290-02	1 5.8990-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
114 8.00000+00 5.56290-02	1 9.0390-04 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			
114 8.00000+00 5.56290-02	7 7.2260-06 1.4570+00 0.0000+00 0.0000+00 0.0000+00 0.0000+00			

Computer ID: PC01606 (180100 ; mp2) 181X 4.0.1 Tue Jul 25 11:19:41 EDT 1995 Jobname: 20369 Program: Meeting6 1985.1 Pages: 39

114 8.00000+00 5.56290-02 1 3.8630-06 1.4570-00 0.0000+00 0.0000+00 0.0000+00 0.0000+00 2 2.2060-09 16 3.0150-01 34 1.6530-01

HEATING6 1985.1
JOBNAME: 20369

musco - millstone 2 pipe from sump to valve, millpipe, rev.1

APnet
11:20:30 7-25-95

TRANSIENT TEMPERATURE DISTRIBUTION AFTER 114 TIME STEPS, TIME = 8.000000+00

GROSS GRID

	14	15	16	17
1	0.00	113.41	113.26	113.18
2	0.25	113.40	113.25	113.18
3	0.50	113.38	113.23	113.16
4	0.75	113.35	113.20	113.13
5	1.00	113.28	113.15	113.09
6	1.25	113.21	113.10	113.04
7	1.50	113.13	113.03	112.98
8	1.75	113.05	112.96	112.91
9	2.00	112.96	112.88	112.83
10	2.50	112.76	112.70	112.66
11	3.00	112.54	112.50	112.47
12	3.50	112.31	112.28	112.26
13	4.00	112.08	112.06	112.05
14	4.50	111.84	111.83	111.82
15	5.00	111.60	111.59	111.59
16	6.03	111.11	111.10	111.10
17	7.05	110.61	110.61	110.61
18	8.08	110.11	110.11	110.11
19	9.11	109.61	109.61	109.61
20	10.13	109.11	109.11	109.11
21	11.16	108.60	108.60	108.60
22	12.18	108.10	108.10	108.10
23	13.21	107.60	107.60	107.60
24	14.24	107.10	107.10	107.10
25	15.26	106.60	106.61	106.61
26	16.29	106.10	106.11	106.12
27	17.32	105.62	105.64	105.65
28	18.34	105.14	105.18	105.20
29	19.37	104.71	104.78	104.82
30	20.39	104.36	104.48	104.54
31	21.42	104.29	104.56	104.64
32	22.42	0.00	0.00	0.00
33	23.42	0.00	0.00	0.00
34	24.42	0.00	0.00	0.00
35	25.42	0.00	0.00	0.00

TEMPERATURES ON NUMBERED BOUNDARIES

BOUNDARY NUMBER	TEMPERATURE
1	300.000000
2	88.000000

THE CURRENT TIME STEP (DELTA T) = 5.562925670-02

ELAPSED CPU TIME IS 0.00 SECONDS

THE MAXIMUM TEMPERATURE IS - 3.000000+02 (+-0.1 PERCENT)

MAX. TEMP. APPEARS AT MODES - 1 2 3 4 5
6

THE MINIMUM TEMPERATURE IS - 8.901140+01 (+-0.1 PERCENT)

MIN. TEMP. APPEARS AT MODES - 517 518 519 520

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THE TRANSIENT CALCULATIONS HAVE BEEN COMPLETED.

FINAL TIME IS 8.000000+00

NUMBER OF TIME STEPS COMPLETED = 114

***** CASE NUMBER 1
***** JOB DESCRIPTION ***** musco - millstone 2 pipe from sump to valve, millpipe, rev.1
***** THE CALCULATIONS FOR THIS CASE HAVE BEEN COMPLETED.
***** NUMBER OF ERRORS ENCOUNTERED IN THE INPUT DATA FOR THIS CASE WAS -- 0
***** AN ATTEMPT WILL BE MADE TO READ DATA FOR A NEW CASE.

***** THE CALCULATIONS USING THE HEATING6 CODE HAVE BEEN COMPLETED.
***** NUMBER OF CASES ENCOUNTERED IN THE INPUT DATA -- 1
***** NUMBER OF ERRORS ENCOUNTERED IN THE INPUT DATA ... 0

Raytheon
Engineers & Constructors
EBASCO Division

INTEROFFICE CORRESPONDENCE

January 24, 1995
NBP-95-001

TO: M. Zuzovsky *Patankar*
FROM: N. B. Patankar
SUBJECT: NUSCO - MILLSTONE UNIT 2
CALCULATION TO ALLEVIATE PRESSURE LOCKING IN
VALVE 2CS-16.1 A AND B

Based on our discussion, please perform a calculation to determine the valve (2CS-16.1 A and B) bonnet temperature, after LOCA, considering that the piping (24"-HCB-1) upstream of the valve is full of borated water upto Elevation (-) 22 feet. The following input is provided for this calculation:

1. Valve 2CS-16.1 A and B Data:

- (i) Size: 24 inches, parallel wedge type gate valve, 150# ANSI rating
- (ii) Details of Valve: See Drawing No. 25203-29050, Sheet 15, Rev. 0
- (iii) Maximum Bonnet Internal Pressure to Open Valve = 150 psig
- (iv) Maximum Differential Pressure Across Both Discs = 150 psig

2. Piping Data (24"-HCB-1):

- (i) 24 inch diameter, Schedule 10s, Stainless Steel (ASTM A312, Type 304)
- (ii) Piping Classification: HCB per Spec. No. 7064-MS-3, Rev. 6
- (iii) Piping Configuration: See Drawings Nos. 25203-24030, 25203-24026, FSK-M-010, 25203-20150 Sheets 1 and 2

3. MOV Program Design Basis Information (Ref. Cal No. 89-078-870ES, Rev. 03 dated 7/26/93, Appendix "O" page O-3 of O-5)

- (i) MOV 2CS-16.1 A and B Elevation: (-) 28.77 feet [28 feet 9 1/4 inch]
- (ii) MOV 2CS-16.1 A and B End to End Dimension: 2'-8"
- (iii) Valve Upstream Pressure after LOCA: 42.2 psig
Valve Downstream Pressure after LOCA: 19.6 psig
- (iv) Sump Recirculation Actuation Signal: 44 minutes after LOCA
(when valve is required to open)