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HEMP USER'S MANUAL

E. D. Giroux

December 17, 1973

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**LAWRENCE
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HEMP USER'S MANUAL

Abstract

A computer program to solve the conservation equations of two-dimensional elastic-plastic flow has been implemented at LLL on the CDC 7600 machine. The equations are detailed in report UCRL-7322 Rev. 1, by Mark L. Wilkins.

The program, named HEMP, is written in an expanded FORTRAN IV language. This user's manual explains the operation and use of the program. A section is provided that will aid in converting the program to other machines and systems.

Introduction

The HEMP Computer Program as detailed in a report by Mark L. Wilkins¹ has been implemented at LLL, in the CHAT compiler language (LLL implementation of FORTRAN IV with extensions), for the CDC 7600 computers and associated operating system. It runs in a time-sharing environment during the day and as a "stand-alone" program at night.

The HEMP code solves the conservation equations of two-dimensional elastic-plastic flow, in plane X-Y coordinates or in X-Y coordinates with cylindrical symmetry around the X axis. The solution is by the method of finite differences and uses the Lagrangian formulation. The materials within a physical system are divided into quadrilaterals bounded by J and K grid lines. A decoupling of grid lines is allowed along K-lines and voids may open and close between K-lines.

Provisions for calculation of fixed boundaries, free surfaces, pistons, and boundary slide planes have been included as well as many other special conditions.

The input system is such that the least amount of data to describe a particular physical system need be supplied. Provision is made for describing initial conditions (zonal or nodal) in great detail if required.

The HEMP code will handle large classes of problems without alteration, but it is programmed in such a way that alteration to solve many other problems is relatively convenient.

HEMP has been previously implemented in assembly program language for the IBM 7030 (Stretch) computer at LLL. The acronym HEMP is formed from the words Hydrodynamic, Elastic, Magneto, and Plastic. The magneto portion is not presented here.

The user should be familiar with UCRL-7322 Rev. 1 (Ref. 1) before reading this manual or attempting to run problems. The user should read the "General Information and Operation" sections of this manual in their entirety before attempting to run problems. The

"Programming" section is provided both as an aid to the user in making program changes and as a description of the pro-

gram's operation. This section will greatly aid the user in finding and correcting input errors.

General Information

PROBLEM TYPES

Large classes of problems may be solved without special program alteration. These include projectile impact problems, high explosive problems, and low energy stress-strain problems. Many problems may be solved by altering the program to include conditions not included in the standard set of options. (See "Applications to problems in two-dimensional elastic-plastic flow" section of Ref. 1.)

THE HEMP GRID

The geometry of each HEMP problem is described within the computer by a number of small quadrilaterals or "zones", each containing a small quantity of mass of a particular material. The zones are separated by a segmented grid composed of two types of lines, J-lines and K-lines. The J-K system of coordinates may be oriented with respect to the X-Y coordinate system in any way. While certain J-K lines represent real material boundaries, most J-K lines represent physically artificial internal divisions within a material and are necessary for calculation by the finite difference method. J-lines and K-lines may be used interchangeably in setting up a HEMP problem with certain notable exceptions:

1. Slide-lines (uncoupled grid) must be along K-lines.

2. For some problems, input may be more conveniently written by orienting the J-K system a certain way.
3. Output is generally done K-line by K-line so that it may be desirable to set up a problem a certain way to make the printouts easier to use, or to make linkage to other problems more convenient.
4. Small calculation speed increases and storage saving may be realized by keeping the ratio of the number of K-lines to J-lines low.

J-lines are numbered in sequence from J-max at one external boundary to J-min at the opposite external boundary. J-max, along any K-line, is one greater than the number of zones along that K-line. (A problem may have several values of J-max, if slide lines are present, as is explained later.) In a problem with 10 zones along a K-line, the J-lines would be numbered from 11 to 1.

K-lines are numbered in a similar manner from K-max to k-min (=1) with one exception. Along a slide-line (decoupled grid), there are two K-lines. The K-line on the K-max side of the slide surface is assigned the K-number with a positive sign. The K-line on the K-min side of the slide surface is assigned the K-number with a negative sign. Therefore, slide-lines do not increase the size of K-max. A problem with 10 zones in the K direction and no slide-lines would be

numbered from K-max to K-min thus: 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1. If a slide-line is introduced at K=3, the lines would be numbered thus:

11, 10, 9, 8, 7, 6, 5, 4, 3, -3, 2, 1.

Problems must be set up so that the following rule is observed:

The direction of increasing J must be clockwise from the direction of increasing K.

(Note: A "left-hand rule" may serve as a mnemonic device. If the left hand is thought to be placed palm down with fingers pointing toward increasing K, the thumb will point toward increasing J).

Examples of a Two-Material Cylindrical Problem

A simple two-material cylindrical problem may be set up in four ways (Fig. 1-1) if no sliding is allowed.

If a slide line is desired between the materials, only examples (a) and (b) in Fig. 1-2 may be used because slide-lines may only be along K-lines.

If a slide-line is introduced, the number of J-lines may change from one material to the next. J-lines on either side of the slide-line need not meet.

MACHINE AND SYSTEM REQUIREMENTS

The HEMP implementation is for the CDC 7600 computers at LLL, Livermore. These computers are linked to each other, to the CDC 6600 computers, to large storage devices, and to remote teletype (TTY) stations through a time-sharing hardware

system called "OCTOPUS". The software system that links the TTY's to the computers is called "FLOE." The hardware system includes cathode ray tube plotting devices (CDC 280-C) which produce a 35 mm film output, which is later processed to hard copy by an SC 5000 printer. Most of the HEMP alpha-numeric output is written on to a magnetic tape which is later printed using the "Radiation Printer" which prints at 30,000 lines per minute.

The CDC 7600's each have $65,536_{10}$ sixty-bit words of "small core" memory (SCM) and $512,000_{10}$ sixty-bit words of a slower "large core" memory (LCM).

The HEMP main code fills the SCM with the code, working storage, library routines and system routines. This restricts the maximum number of J's in any K-line to 101. The large core memory (LCM) portion that may be utilized by the user is approximately $400,000_{10}$.

The portion of LCM that is actually used by a HEMP problem is a function of the problem size. A problem of up to about 10,000 zones may be run.

The "main" program uses about $22,500_{10}$ words of storage for coding. This does not include the generator, which has been overlaid by the main program. The generator uses about $15,000_{10}$ words.

The LLL Library routine uses about $10,000_{10}$ words. Twenty-five hundred words are used as a table record. The five K-lines that are in memory at a time use about $17,000_{10}$ words. Five thousand words are used for J-max long working storage and temporarily saved variables. The system uses about $8,500_{10}$ words. (The table record is the data that is written on and read from the restart tape, in addition to the grid variables.)

Fig. 1-1. Four different ways to orient the grid J, K coordinate system to solve a simple cylindrical problem (without slide-lines).

GEOMETRY

The program solves problems described in the X-Y coordinate system, either plane or cylindrical. The cylindrical case has a cylindrical symmetry around the x-axis.

UNITS

The units of the calculational quantities are as follows:

Time, delta-time	—	μsec
x, y	—	cm

NOTE: Slide lines need not coincide with material boundaries

Fig. 1-2. Examples of problems that include a slide-line.

$\dot{x}, \dot{y}$	— cm/ μ sec
area (zonal)	— cm ²
mass (zonal)	— g
Mu (shear modulus),	
Y_0 (yield point), P,	
$Q, S_{xx}, S_{yy}, S_{\theta\theta}$	
$T_{xy}, \Sigma_{xx}, \Sigma_{yy}, \Sigma_{\theta\theta}$	— Mbar
E (energy)	— Mbar-cm ³ /(cm ³) ₀
ρ_0	— g/cm ³
V	— Dimensionless (ρ_0/ρ)

The units of other variables on the print-outs are explained in the operational output section.

ZONING

The number of mass zones into which a HEMP problem is to be divided is influenced by a number of factors.

- The storage capacity of the machine
- The maximum number of J's allowed

in a K-line (the maximum is 101).
(There is no maximum number of K-lines)

- The calculation time
- The nature of the calculation

In general, size and time restrictions prohibit the zoning of a problem on a two-dimensional code in the same detail that would be allowed with a one-dimensional code in calculating a section of that same problem. A number of comments can be made about zoning HEMP.

Material interfaces zoned so that the zones on either side of the interface have similar shock transit times give the most satisfactory results.

Problems run best when the zonal aspect ratio is near 1 to 1. When elastic-plastic parameters are included, an aspect ratio of over 2 to 1 is to be discouraged, although much greater aspect ratios have been run successfully.

Cutting the zonal size by one-half will produce an eight-fold increase in running time.

BOUNDARY CONDITIONS

Provision is made for applying rigid wall (stonewall) and piston boundary conditions for all surfaces. Various limits may be placed on the movement of selected portions of the problem (ring and support options). External pressure may be applied to part or all of each exterior surface (K-max, K-min, J-max, J-min). Provision is made to vary this pressure as a function of X, Y or time.

ARTIFICIAL VISCOSITY (Q's)

Five Q's are available by option in the program. Unless changed by input, the

linear quadratic Q will be automatically utilized. Also available are the Navier-Stokes Q, the triangular Q and a rotational Q. Most problems need utilize only the linear-quadratic Q. An explanation of the various Q's follows:

The Linear-Quadratic Q

For the calculation of shock waves, an artificial viscosity is calculated for each zone:

$$q^{n+1/2} = \left[\frac{Q_A \rho_0 A^{n+1/2}}{v^{n+1/2}} \cdot \left(\frac{\dot{v}}{v} \right)^2 \right] + \frac{a Q_B \rho_0 \sqrt{A^{n+1/2}}}{v^{n+1/2}} \left| \frac{\dot{v}}{v} \right|$$

(calculate only for $\dot{v}/v < 0$)

where Q_A and Q_B are constants (usually $Q_A = 4$, and $Q_B = 1$.),

$$a = \sqrt{\frac{PV}{\rho_0}},$$

A = zone area.

The first term corresponds to a simple extension of the one-dimensional "Q" of von Neumann and Richtmyer into two dimensions. The second term is a linear viscosity that damps short wavelength oscillations that occur behind shocks calculated by the Q method.

Grid Distortion Q's

Fine-scale error waves of the order of zone-to-zone fluctuations can appear in finite difference hydro codes under certain boundary conditions. For example, non-physical numerical oscillations often occur when a shearing action is introduced on the boundary of a Lagrange grid. These oscillations usually grow at a slow linear

rate, and are not real instabilities, but nonetheless can lead to large grid distortions. In practical calculations, it is useful to be able to control the onset of grid distortion due to numerical sources and, in some cases, even to damp grid distortions that are describing real physical phenomena.

The addition of an artificial viscosity is a convenient way to control grid distortions, since it represents a physical process whose influence on a problem can be readily understood. This is in contrast to methods of damping spurious oscillations that are implicit in the finite difference scheme. In two-dimensional fluid flow calculations, a Navier-Stokes stress tensor, using linear rates of strain, can be used as an artificial viscosity. In 2-D Cartesian coordinates, there are three components of the tensor viscosity — one for each of the rates of strain $\dot{\epsilon}_{xx}$, $\dot{\epsilon}_{yy}$, and $\dot{\epsilon}_{xy}$. For quadrilateral zones, the average strain in a zone is calculated from the motion of the four corners. There are more degrees of freedom than there are strain components, and it is possible to have the average rates of strain zero, even though the quadrilateral zone is distorting. The hour glass distortion shown in Fig. 1-3 is an example. No component of the rate of strain tensor is activated by such a distortion.

Triangle Q

The difficulty expressed above can be overcome by using triangles in place of quadrilaterals to calculate the rates of strain. A Navier-Stokes viscosity using triangles is formulated to prevent grid distortion and is referred to as the "triangle Q". Figure 1-4 shows the grid

Fig. 1-3. Hourglass distortion.

Fig. 1-4. HEMP difference scheme for accelerating point J, K.

for calculating the acceleration of point J, K. A "triangle Q" expressed as a stress deviator is formulated for each of the triangles in the four zones surrounding point J, K. For example, the artificial viscosities for zone 1 are given by

$$q_{xx} \approx 2 \mu_1 \left[\frac{2}{3} \dot{\epsilon}_{xx} - \frac{1}{3} \dot{\epsilon}_{yy} \right],$$

$$q_{yy} \approx 2 \mu_1 \left[\frac{2}{3} \dot{\epsilon}_{yy} - \frac{1}{3} \dot{\epsilon}_{xx} \right],$$

$$q_{xy} \approx \mu_1 \dot{\epsilon}_{xy}.$$

where

$$\mu_1 = a (\rho_0/V) \sqrt{A} \quad (1)$$

A = area of triangle 0, 1, 2,

a = constant $\approx 10^{-3}$,

ρ_0 and V are the zone reference density and relative volume.

Velocity strains for triangle 0, 1, 2 are

$$\begin{aligned} \dot{\epsilon}_{xx} &= \frac{\partial \dot{X}}{\partial X} = -\frac{1}{A} \left\{ \dot{X}_{01}(Y_0 - Y_1) \right. \\ &\quad \left. + \dot{X}_{12}(Y_1 - Y_2) + \dot{X}_{20}(Y_2 - Y_0) \right\}, \\ \dot{\epsilon}_{yy} &= \frac{\partial \dot{Y}}{\partial Y} = +\frac{1}{A} \left\{ \dot{Y}_{01}(X_0 - X_1) \right. \\ &\quad \left. + \dot{Y}_{12}(X_1 - X_2) + \dot{Y}_{20}(X_2 - X_0) \right\}, \\ \dot{\epsilon}_{xy} &= \left(\frac{\partial \dot{Y}}{\partial X} + \frac{\partial \dot{X}}{\partial Y} \right) = -\frac{1}{A} \left\{ \dot{Y}_{01}(Y_0 - Y_1) \right. \\ &\quad \left. + \dot{Y}_{12}(Y_1 - Y_2) + \dot{Y}_{20}(Y_2 - Y_0) \right. \\ &\quad \left. - \left[\dot{X}_{01}(X_0 - X_1) + \dot{X}_{12}(X_1 - X_2) \right. \right. \\ &\quad \left. \left. + \dot{X}_{20}(X_2 - X_0) \right] \right\}, \end{aligned}$$

where

$$\dot{X}_{01} = \frac{1}{2} (\dot{X}_0 + \dot{X}_1), \text{ etc.}$$

and

$$\begin{aligned} A &= \text{area of triangle 0, 1, 2} \\ &= \frac{1}{2} \left[X_1(Y_2 - Y_0) + X_2(Y_0 - Y_1) \right. \\ &\quad \left. + X_0(Y_1 - Y_2) \right]. \end{aligned}$$

A "triangle Q" for zones ②, ③, and ④ is formulated in the same manner. The components of the viscosity are added to the corresponding stress in the equations of motion for point J, K. The "triangle Q" is actuated by introducing a value for the constant $\underline{a}$ which is designated in the program as CAQ. (See the "General Input Section Discussion," page 33.)

Rotational Q

The rotational Q of the TENSOR code² is also available. This Q is used for the same purpose as the "triangle Q". (See Fig. 1-5.)

$$\omega_{34} = \frac{(\dot{Y}_3 - \dot{Y}_4)(X_3 - X_4) - (\dot{X}_3 - \dot{X}_4)(Y_3 - Y_4)}{(Y_3 - Y_4)^2 + (X_3 - X_4)^2},$$

$$\omega_{41} = \frac{(\dot{Y}_4 - \dot{Y}_1)(X_4 - X_1) - (\dot{X}_4 - \dot{X}_1)(Y_4 - Y_1)}{(Y_4 - Y_1)^2 + (X_4 - X_1)^2},$$

ω_{21} is similar to ω_{34} ,

ω_{32} is similar to ω_{41} ,

$$Q_k \textcircled{1} = \frac{CAQ}{\sqrt{n}} a \frac{\rho_0}{\sqrt{n}} \left(\frac{A}{\Delta Z} \right) (\omega_{34} - \omega_{21}),$$

$$Q_j \textcircled{1} = \frac{CAQ}{\sqrt{n}} a \frac{\rho_0}{\sqrt{n}} \left(\frac{A}{\Delta Z} \right) (\omega_{41} - \omega_{32}),$$

where

a = sound speed,

ΔZ = the zone thickness from center of one side to the opposite, and is taken as the minimum of ΔZ_1 and ΔZ_2 .

Fig. 1-5. Rotation rate, ω , of a zone side.

Fig. 1-6. HEMP difference scheme for accelerating point J, K.

$$\Delta Z_1 = \left\{ \left[(Y_1 - Y_3) - (Y_4 - Y_2) \right]^2 + \left[(X_1 - X_3) - (X_4 - X_2) \right]^2 \right\}^{1/2}$$

$$\Delta Z_2 = \left\{ \left[(Y_1 - Y_3) + (Y_4 - Y_2) \right]^2 + \left[(X_1 - X_3) + (X_4 - X_2) \right]^2 \right\}^{1/2}$$

$$Q_{j(34)} = Q_j \textcircled{3} - Q_j \textcircled{4} \quad Q_{j(12)} = Q_j \textcircled{1} - Q_j \textcircled{2}$$

$$Q_{k(23)} = Q_k \textcircled{2} - Q_k \textcircled{3} \quad Q_{k(41)} = Q_k \textcircled{4} - Q_k \textcircled{1}$$

$$Q_X = -Q_{k(41)} \cdot (Y_I - Y_0) - Q_{j(12)} (Y_{II} - Y_0) \\ + Q_{k(23)} \cdot (Y_{III} - Y_0) \\ + Q_{j(34)} (Y_{IV} - Y_0)$$

$$Q_Y = -Q_{k(41)} (X_I - X_0) - Q_{j(12)} (X_{II} - X_0) \\ + Q_{k(23)} (X_{III} - X_0) + Q_{j(34)} (X_{IV} - X_0)$$

(See Fig. 1-6.)

The resulting accelerations from these terms are:

$$\frac{d\dot{X}}{dt} = \frac{1}{2\phi} Q_X \quad \text{and} \quad \frac{d\dot{Y}}{dt} = \frac{-1}{2\phi} Q_Y$$

and are included in the finite difference equation-of-motion* for point J, K.

The coefficient CAQ is normally set equal to zero in the program. The rotational Q is activated when an input number other than zero is used for the coefficient and when the rotation Q option field on the QCONTROL card is set to non-zero. A typical value is CAQ = 0.1 to 0.5.

Navier-Stokes Q

The Q referred to as the Navier-Stokes Q in Ref. 1 and in other places in this manual utilizes quadrilaterals in calculating the strain rate. It is as shown in Ref. 1 except that a limiting condition similar to the elastic yield condition has been added.

SLIDE-LINES

Sliding must be along K-lines. A slide-line should be used when 1) all the grid points on one side of a K-line do not coincide with all the grid points on the other side, or 2) when large transverse motion along a K-line is expected.

In this manual and on the HEMP printouts, the "slide surface" described in Ref. 1 has been named the "master" surface or line. The "sliding material" has been called the "slave" surface or line. This terminology is felt to be more distinctive and therefore easier to use in slide-line discussion. The master-slave pair is called a "slide-line".

As is explained in greater detail in Ref. 1, the "master" surface is advanced using the force field from the "slave" side

* See page 70 of Ref. 1.

and its own force field. The "slave" surface is advanced along the "master surface" by treating it as a fixed surface. When sliding is called for, lateral motion along the K-line is uninhibited. Friction is not included (but could be readily included).

Two types of slide-lines (master-slave pairs) are allowed. When the master surface is on the higher K number side of the slide-line, this is called an "upright" slide-line. When the master surface is on the lower K number side of the slide-line, this is called an "inverted" slide-line. "Upright" and "inverted" slides may be mixed in a problem. Any number of slide-lines may be in a problem (their placement must be consistent with minimum K-zone spacing as shown below).

When possible, the master surface should be assigned to the side of the slide-line that has the denser material. This is because after influencing the motion of the master side, the slide side must conform to it (except in the void case). In general, the lighter material is more likely to do this physically.

Certain minimum K-zone spacing between K-lines and K boundaries must be maintained.

An "upright" slide-line must be separated from:

- Any other slide-line by two zones
- K-max by one zone
- K-min by three zones.

An "inverted" slide-line must be separated from:

- Another inverted slide-line by one zone
- An upright slide-line by 2 zones
- K-max by one zone
- K-min by two zones.

Figure 1-7 illustrates these minimums. For purposes of illustration, the "master" slides are shown as longer than "slave" sides of the slide-lines.

The J-max ends of the master and slave points may join at a single point or may be offset so that the "sliding" J-max point lies on the master surface or on an extension of the master surface. The J-max ends are treated in a similar way. Rigid wall, free surface, piston, and pressure boundary conditions may be applied to one or both sides of a slide-line.

VOIDS

Provision is made for allowing a void condition between the master and slave surfaces of an "upright" slide-line. The void is treated point by point so that part of the two materials may meet while part may be in a void condition. The void may be generated open or allowed to open. It may be allowed to re-open after closing or may be forced to remain closed.

INPUT

Input is by two means, cards and teletype. The teletype is used for control and restart purposes. The generator and the restart routine use card input.

OUTPUT

Output is via five means, teletype, on-line printer, off-line printer (HSP tape), disk, and magnetic tape. The tape can contain binary output of three formats.

The disk output and part of the tape output is formatted in such a manner that

Fig. 1-7. Minimum allowable K-zones in various slide-line and boundary configurations.

it may be processed readily by an auxiliary plot routine which produces cathode ray tube output or Calcomp output. A second, flexible tape output format is provided so that selected variables for selected K-lines may be written on tape for future processing. A third tape output format is the restart dump which may also be processed by service routines.

The teletype output is restricted to supervisory type information and is under some control of sense switches. The on-line printout is also supervisory type information.

The off-line printout contains detailed zonal and nodal quantities for selected K-lines. Options are provided for calculation and printout of zonal and nodal quantities not ordinarily printed out.

SERVICE ROUTINES

A number of programs are available which process HEMP output. HEMP output is processed for three purposes.

1. Diagnostic—Provide plots of various types including configuration, with

vectors, contour and others, on both cathode ray tube and "Calcomp" plotter.

2. Grid Restructuring—There are five of these. They produce a restructured restart tape.

- J Rezone—Adds J-lines for finer zoning: each J-zone is split into two.
 - J Dezone—Removes J-lines to make zoning coarser: two J-zones are combined into one.
 - K Rezone—Adds K-lines for finer zoning: each K-zone is split into two.
 - K Dezone—Removes K-lines to make zoning coarser: two K-zones are combined into one.
 - Rezoner—Generates a nicely zoned grid for a selected trouble area in the problem. The rezoner then does a remapping of the new grid over the old grid and recalculates variables so that the new data is a reproduction of the old data but with nicely formed zones.
3. Links—The restart dump may be processed to create restart dumps of other programs so that a problem may be run to an appropriate point on HEMP, and then run further by another program. For example, HEMP could be linked to an Eulerian program.

STABILITY (DELTA-TIME)

The stability calculation is substantially as written in the one-dimensional section of Ref. 1. Provision is made for adjusting all parameters by input. Problems may be run with a maximum Delta-T or a constant Delta-T. If a minimum Delta-T is reached, the problem will terminate.

RESTART

Provision is made for the restarting of a HEMP problem after it has run for some time and then been removed from the machine. At periodic intervals, as a problem runs, restart dumps are automatically written on tape. When a problem has finished, or when it has used its allotted machine time and is terminated, a restart record is written. The problem may be restarted from any of these dumps.

Provision is made for altering the problem at restart time by the use of card input. The dump tape can be restructured by service routines and the problem started again from the restructured dump tape.

EQUATIONS OF STATE

Most HEMP hydrodynamic equations of state follow the form:

$$P = A + B\mu + C\mu^2 + D\mu^3 + (E\mu + F\mu^2 + G\mu^3)\epsilon$$

(if $\mu < 0$, μ^2 is set to 0),
where $\mu = (1/V - 1) = \eta - 1$.

If $P < P\text{-min}$, P is set to $P\text{-min}$. $P\text{-min}$ has a value of -0.01 for metals and is zero for non-metals, but can be changed by input. The general form appears in the program in a number of abbreviated forms so that machine time is not lost in calculating zero coefficient terms.

Certain high explosive equations of state are included that do not follow this general form. Equations of state of any form in which pressure is a function of compression, or of compression and energy, can be readily coded into the program. These may include table look-ups.

Elasticity parameters are ordinarily constant in the code (elastic μ , yield in

tension and in compression) but may be readily programmed to be functions of variables.

Equations of state are specified for each region in the problem by inputting an equation-of-state number. The generator then assigns the appropriate equation-of-state form to each zone in that region. The coefficient and material-related properties are read in at generation time. Some of the high explosive materials have standard coefficient and material properties included in the generator. These materials may be used without reading in data.

TIMING

The amount of machine time that a HEMP problem uses is mainly a function of the following:

1. Machine Central Processing Unit (CPU) speed.
2. Output speed and the amount of output called for.
3. The number of zones in the problem.
4. The number of problem cycles run.
5. The number of slide-lines in the problem.
6. Start-up and stop time.

The basic HEMP calculation speed on the CDC 7600 is about 5 points (or zones) per millisecond. Slide-lines take more time, as does writing output.

The number of problem cycles that are necessary to complete a problem is a function of the following:

1. The termination time (in microseconds) of the problem.
2. The Delta-T (time step).

The time step is a function of the zone size of the problem, the material in those zones, and the activity in the problem (degree of

compression, etc). Various problems may take from a few minutes to several hours to run to completion.

HIGH EXPLOSIVES (HE)

The HEMP program includes a number of high-explosive equations of state as standard materials.

The chemical energy to be released through the hydrodynamic equation of state is stored in each high-explosive zone as an initial energy E_0 . The time for the detonation front to reach a specific zone is calculated in advance from the known detonation velocity, D , and the distance from the point of detonation to the center of the zone. This quantity is also stored with each zone. A burn fraction, F , is calculated so as to spread the burn front over several zones analogous to the artificial viscosity "Q" that spreads a shock over several zones.

For one-dimensional calculations, the burn fraction can be defined as $F = (1 - V)/(1 - V_{CJ})$ and the burn calculation is started by setting $F = 1$ in the zone that corresponds to the point of detonation. The burn calculation will proceed to around three or four times the number of zones that the artificial viscosity "Q" is spread over before the detonation front is correctly established. For one-dimensional calculations, this amounts to about 16 zones. In two-dimensional calculations where there is a limit to the number of zones for a practical problem, it is usually necessary to have the correct detonation velocity established in a fewer number of zones. A convenient way to do this is to start the burn calculation at the time the detonation would reach a given zone. To allow for

the possibility of an overdriven detonation that may arise during the calculation and result in a higher than normal detonation velocity, the burn fraction $F = (1 - V)/(1 - V_{CJ})$ can be used in addition to the burn fraction that is based on the known detonation velocity. The larger of the two is then selected for the calculation.

$$\text{Burn fraction} = F_1^{n+1} = (t^{n+1} - t_b)/\Delta L$$

$$\text{For } t^{n+1} \leq t_b: F_1^{n+1} = 0.$$

$$F_2^{n+1} = (1 - V^{n+1})/(1 - V_{CJ}).$$

$$F^{n+1} = \text{maximum of } F_1^{n+1} \text{ and } F_2^{n+1}.$$

$$\text{If } F^{n+1} > 1, \text{ set } F^{n+1} = 1.$$

In the above,

$$\Delta L = r \Delta x/D$$

t = actual time

t_b = time for a zone to start burning

Δx = grid spacing

D = detonation velocity

r = constant ≈ 1.5

V_{CJ} = Chapman-Jouguet relative volume.

The equation

$$F = \frac{(1 - V)}{(1 - V_{CJ})}$$

is calculated as $F = (1 - V)\beta$ in the code, where

$$\beta = \frac{1}{1 - V_{CJ}}$$

V = relative volume

V_{CJ} = relative volume at the Chapman-Jouguet point.

The burn times are calculated in the generator. Provision is made for detonations originating from a single point, from a line, or from several points. Provision is also made for calculation of burn times around a curved HE boundary, where there

is not a "line of sight" from the detonating zone to the origin of the detonation.

The input parameters to the HEMP code are:

- β defined as: $\beta = \frac{1}{1 - V_{CJ}}$
- Detonation velocity D
- ΔL
- The type of detonation (single detonator, multiple detonators, etc)
- The location of the detonator(s).

CUTOFFS

Certain code variables have a noise cutoff test applied to them; that is, if the calculated value is lower than the cutoff test value, that variable is set to zero. The test is applied to the absolute value of the variable.

AVAILABILITY OF HEMP PROGRAM

The HEMP source program (main code and generator) is contained on over 12,000 cards. Because of its size and the length of machine time needed to compile HEMP, it is impractical to issue source cards to LLL users. A machine language version, complete with library routine, ready to use (a controllee) is available. The various subroutines that users need to have as source cards for alteration are available. The user can make alterations, compile those subroutines, and then load with the previously compiled subroutines to form a new controller. Service routines are also available.

Conversion of HEMP to another computer facility and system would require considerable programming effort because

of differences in the facilities and equipment.

Experience has shown that a program of the size and complexity of

HEMP requires continued attention by knowledgeable programmers and physicists if it is to be an effective calculational tool.

Programming

OPERATIONAL FLOW

The Overlay

Hemp combines the generator and the cycling code as a single controllee. When the generation has completed, the cycling code overlays the generator so that no unnecessary coding remains. Level 1 consists of a small "main" program and any subroutines that are used by both the generator and the cycling code. The "main" program controls the overlay process.

The initial level 2 consists of those subroutines that are used only in generating or restarting. The second level 2 consists of those subroutines that are used only in the cycling process, which is used in solving the difference equations.

LCM - SCM Transfers

The HEMP program treats large core memory (LCM) as though it were an input-output storage device. That is, it is read and written. LCM data is not directly accessed.

In the solution of the difference equations, for nonslide-line, nonboundary cases, data one point removed in four directions is needed. That is, to advance a point at (K, J) , nodal data at $(K + 1, J)$, $(K - 1, J)$, $(K, J + 1)$, $(K, J - 1)$, and zonal data at $(K + 1/2, J + 1/2)$, $(K + 1/2,$

$J - 1/2)$, $(K - 1/2, J + 1/2)$, and $(K - 1/2, J - 1/2)$ is needed. Data is accessed to and from LCM in K-line groups. That is, all the zonal and nodal variables for all the points on a K-line, and all the zones at $K + 1/2$, are transferred as a group.

Five K-lines are in SCM at a time. Three are used in the calculations, one is to be transferred to LCM, and one is to be written over by data from LCM. If a slide-line is involved, four K-lines are needed in the calculation. For K-max and K-min, only two K-lines are needed. The program rotates through these five K-slots as it sweeps through the grid, from K-max to K-min.

Table 2-1 shows the access sequencing used in solving one problem cycle on a 10 K-line (9 K-zone) problem, without sliding. The number following each letter (or pair of letters) is the K-line being operated upon. At slide-lines, an extra "read" (LCM to SCM transfer) is done to bring in the necessary extra K-line used in sliding. Later, an extra write is performed.

Sequencing

Generator

The generator first reads and interprets the "general input" cards, and stores that data away. This loop is terminated when the first "fini" card is

Table 2-1. K-cycle sequence
sequencing
K-cycle for non-slide, 10 K problem.
One problem cycle is shown

	Initial-ization										Final-ize			
SCM	A	R10	CU10	UW10		R5	U5	CU5	UW5					
K-line	B	R9	U9	CU9	UW9		R4	U4	CU4	UW4				
Storage	C		R8	U8	CU8	UW8		R3	U3	CU3	UW3			
Slot	D			R7	U7	CU7	UW7		R2	U2	CU2			
	E				R5	U6	CU6	UW6		R1	U1	CU1	W1	

A, B, C, D, and E are the five SCM areas that contain the five K-lines being operated upon.

C - Indicates this K-line is being calculated.

U - Indicates this K-line is being used in a calculation.

R - Indicates that this K-line is being read or transferred from LCM to SCM.

W - Indicates this K-line is being written or transferred from SCM to LCM.

encountered. If a restart card was encountered, or if teletype input has called for a restart, the restarting sequence is initiated and no more groups of input cards are read.

If the restart sequence was not called for, the generator reads and interprets the "block" input data for the first group of K-lines (including K-max). Reading is again terminated by a "fini" card. Some of the "block" input data is then used in developing arrays of X's and Y's that describe the K-outer (higher K-number) and K-inner (lower K-number) boundaries of the block. There are four of these arrays, X-outer, Y-outer, X-inner, and Y-inner.

Block boundary input is then read. This reading is also terminated by a "fini" card. If block boundary input is actually present, it is used to replace some or all of the values in the boundary arrays. The generator then interpolates the boundary data to create the grid X's

and Y's for each K-line, starting with the K-outer and proceeding to the K-inner. As each K-line's X's and Y's are calculated, they are used with the preceding K-line's X and Y's and with other input data to calculate the masses at $K + 1/2$. All the nodal and zonal data for K and $K + 1/2$ is calculated or gathered in one of the five SCM K-line storage sections. This is then transferred to LCM. The generator then repeats the block, block boundary reading sequences for as many blocks as have been called for by general input. If sliding has been called for in a block, special coding is entered to generate extra data for the lower K boundary of that block.

In the case of the "inverted" slide-line, the normal sequencing is changed so that the block boundary X and Y data for the following block is generated or read in before the K-lower K-line of the upper block is calculated. This is necessary because the lower block's boundary is

the master surface and its positions must be known in order to calculate the slave zones in the upper block.

If "K-line" input has been called for by input within a block, "K-line" and "K-line point by point" input is read and processed as the appropriate K-line is being calculated. The "K-line" input, if used, overrides earlier input, and the "K-line point by point" input overrides the "K-line" and earlier input. Important variables are printed out for each K-line and all card input is listed off-line and on-line.

The Cycling Program

The main or cycling code advances points in the grid (at J, K) and calculates the zonal (at $J + 1/2$, $K + 1/2$) quantities. When all the points in the problem have been advanced in time, when all the zonal quantities have been calculated, and when a new time step has been calculated, a problem cycle has been completed. The program sequences through many problem cycles until the problem has been completed. At periodic intervals, the program will write output of various types. The problem will terminate when it has reached its completion time, when it gets into certain difficulties, or when it has been removed from the machine by the operator.

The main code calculates from the K-max, J-max point to the K-min (K1), J-min (J1) point. It operates upon K-line groups. In preparation for advancing the X and Y points of a K-line, the code first calculates the zonal velocity force and mass terms for all the zones at $K - 1/2$. (The zonal quantities at $K + 1/2$ have previously been calculated and saved

before the X's and Y's at $K + 1$ had been advanced in time.) The code then saves the nodal quantities at K, J for the entire K-line, for future use. The program then loops through the K-line, calculating X-dot and Y-dot and advancing X and Y in time.

At this point, both K and $K + 1$ have been advanced in time. HEMP then calculates the zonal quantities for the $K + 1/2$ zones. The order is as indicated by the order of the equations in UCRL-7322 (see Ref. 1).

After the zonal quantities have been calculated, the code then checks to see if any type of output of that K-line is called for. If called for, it writes it out and then proceeds to the next K-line. When all the K-lines have been calculated, the program checks the input data to see if output has been called for during the next cycle. If so, it sets flags to cause output during the running of the next cycle.

If a restart dump is called for, it is done for all K's at the end of the cycle. All other K-line output is done as the program sweeps through the K-lines. The code then calculates a new time step (ΔT) to be used the next cycle, then loops to the beginning of the next cycle and the sequence is repeated.

VARIABLE LAYOUT

The Grid

This HEMP implementation carries 32 variables per point-zone. Each of these 32 variable units is associated with each J, K nodal point in the problem. Most of the variables carried with a nodal point do not refer to the J, K point but to the zone centered at $J + 1/2$, $K + 1/2$.

These point zone units are packed in memory in K-line long groups. Each K-line long group is preceded with an eight word unit that carries information about that K-line. Therefore, a 5 zone long K-line (6 J's) would use $(32 \times 6) + 8$ or 200 words of storage.

The following is a list of the K-line variables and the use(s) of each. The group of 32 after the first eight is repeated for as many J's as there are in the K-line. The first 32-variable group is associated with the J-max point, therefore it has no $J + 1/2$ or zonal quantities.

1. NZS - An integer that gives the number of zones in the K-line. (The number of J's is $NZS + 1$.)
2. MHK - A floating number that is the sum of all the zonal mass terms (MH) in the K-line. It is used in the slide-line calculation but carried for other K-lines also.
3. JMNEX - An integer, 1 through 9, that is the direction of the slide-line extension at J-min. It is carried and used only on the master side of the slide-line.
4. JMXEX - An integer that is associated with the slide-line J-max master extension in a manner similar to JMNEX above.
5. IVOIDR - An integer that indicates to the slide-line routine whether or not the void routine is called upon for that particular upright slide-line. If it is 1, the void routine will not be used, if 2, 3, or 4, the void routine will be used.
6. TPJMAX - This decimal number is the minimum spacing allowed during the problem run between J-max end

points when those points are on a vertical or horizontal fixed boundary as called by the "stone-wall" options. It is calculated at generation time and is $1/10$ th of the original point spacing. This forced spacing may be bypassed by input.

7. TPJMIN - This decimal number is used in a manner similar to TPJMAX above but for the J-min points.
8. Word 8 is not used at present.

The following 32 variables are repeated for each point.

1. KTYPE - An integer that is the point-zone type for that point-zone. It is used to control program flow.
2. EQST - An integer that is the material and equation-of-state number for the zone $J + 1/2$, $K + 1/2$.
3. BYTS - A structured word consisting of 3 integers. It is used in the slide-line calculations only.
4. X - The X coordinate.
5. Y - The Y coordinate.
6. XDOT - The X velocity.
7. YDOT - The Y velocity.
8. MH - This variable is equal to twice the mass of the zone.*
9. RO - This variable is ρ_0 or density at zero time.
10. ALAREA - This variable is used in two ways in running through the problem cycle. At one time it carries twice the zonal area. At another time it carries the zonal sub-term of the alpha used in the velocity equations.
11. V - Relative volume
12. P - Pressure
13. E - Energy

* Appendix B, Section A of Ref. 1.

14. QBET - This variable is used in two ways. It contains Q at one time and contains zonal sub-term of the beta used in the velocity equations at the other time.
15. F - This variable is the burn time, if it is an HE zone. If the value is negative, it is the burn time. If it is a positive "1", it indicates that the zone has burned. This F is sometimes used for non-HE materials as an indicator storage.
16. SSS - This variable is the sound speed squared.
17. SIGXXE - Contains S_{xx} , the elastic stress in the X direction.
18. SIGYYE - Contains S_{yy} , the elastic stress in the Y direction.
19. SIGTTE - Contains $S_{\theta\theta}$, the "Hoop" stress.
20. TXYE - Contains TAUXY, the elastic shear stress.
21. QNSXX - This variable is used in two ways. At one time it contains the Navier-Stokes Q in the X direction. It includes both the deviatoric and the scalar components.
It is also used to contain SIGMAXX, the total stress in the X direction during the velocity calculations.
22. QNSYY - This variable is used in two ways similar to QNSXX.
23. QNSXY - This variable is used in two ways, the Navier-Stokes XY term, and later the sum of that term and the elastic shear term.
24. QNSTTP - This variable is used in two ways. At one time it contains the Navier-Stokes Q, θ term. At the other time, it contains twice the value of the zonal sub-term used

in calculating the ϕ used in the velocity calculations.

Variables 25 through 32 are used to carry quantities other than those needed to solve the basic HEMP equations. Some are used for a number of purposes, depending on input options. Variables with other names are equivalent to these. These variables are very useful for coding in special routines.

- Var. 25 - Contains X at zero time unless bypassed by an option. Contains S_1 at time N if "lambda" calculation is called for.
- Var. 26 - Contains Y at zero time unless bypassed by an option. Contains S_2 at time N if "lambda" calculation is called for.
- Var. 27 - Contains OSS (octagonal shear stress) unless bypassed by an option. Contains S at time N + 1 if the "lambda" calculation is called for.
- Var. 28 - This variable is not used unless an option is called for. Contains the term (P - SMAX) if called for. P is pressure and SMAX is the maximum of S_1 , S_2 , and S_3 . If the "Lambda" calculation is called for, it contains S_2 at time N + 1. It contains E_{yy} if the thin plate option is called for.
- Var. 29 - Contains PDI (the internal plastic distortion) unless bypassed by input.
- Var. 30 - Used only for special routines.
- Var. 31 - Used only for special routines.

Var. 32 - Used only for special routines.

Common

Table Record

The labeled common "A001" is the group of non-grid variables that must be saved from problem cycle to problem cycle. It is written as the first record of any restart dump.

Other Common

Numbered common "19" is the 5 K-line SCM block. It also contains some of the K-line working storages. Numbered common "21" is the LCM grid block. It also contains those K-line long working storage blocks that are used only at slide-lines or when writing output. These variables are equivalenced to the first word of common "21" and are indexed with offsets calculated at problem generation time. The other commons contain variables used in linking subroutines. All of the variables in numbered common "19" are equivalenced to location zero and are packed in memory through the use of "offsets" which are calculated and stored at generation and restart times. The offset name is ordinarily the name of the variable with a "K" as a prefix.

THE POINT TYPE SYSTEM

As the program loops through the grid, it uses the variable KTYPE that is carried with each point to control the problem flow. In the nodal loops, the KTYPE number is used to control boundary conditions and to activate the slide-line routines. In the zonal loops, the type number is used to activate slide-line routines, and to control the general flow.

As a problem is generated, a standard set of KTYPE numbers is created and stored with the grid. Allowance in the numbering system has been made to accommodate special type numbers that can be used to control the code to do non-standard things at a point or a zone. These special numbers are read in as input.

The following system has been established as standard and should be observed when changing to non-standard point types:

- The K-max line uses types 40 through 49.
- The K-min line uses types 10 through 19.
- The "upright" master surface uses types 20 through 29.
- The "upright" slave surface uses types 60 through 69.
- The K-line immediately below (lower K number) the "sliding" surface uses types 50 through 59.
- The "inverted" master surface uses types 70 through 79.
- The "inverted" slave surface uses types 80 through 89.
- The general lines use types 30 through 39.

The standard type number uses a "2" in the "ones" place for the J-max point. It uses a "6" in the "ones" place for the J-min point. It uses a zero in the "ones" place for all the other points of a K-line.

Figure 2-1 illustrates the type numbering system. The arrow indicates the zone that is associated with each point type.

THE EQUATION-OF-STATE NUMBERING SYSTEM

Equations of state numbered 1 through

Fig. 2-1. Type numbers for points in the HEMP grid.

60 are allowed in the code. Twelve coefficients are allowed for each, and

certain material-related constants are associated with each equation of state.

These coefficients and constants are carried in the common "A001" which is the restart table record. Material numbers 1 through 9 are high explosives.

The equation-of-state number is carried for each zone. It is used twice in "computed go to's" in the zonal calculation. The first "computed go to" calculates or fetches the elastic terms, and certain other material-related properties. The second "computed go to" goes to the proper equation-of-state form for that particular equation of state. The coefficients are fetched by subscripting the various constant names with the equation-of-state number.

Equations of state of a new form can be readily added through the use of previously unused numbers. This requires recompilation of the VQPEAA subroutine. Subroutine calls to dummy entry points have been included in the zonal loops. These dummy entry points can be replaced with a new equation of state. This allows an equation of state to be added without recompiling the VQPE subroutine. This is recommended for limited use only, because of the time consumed by subroutine calls.

SUBROUTINES

The Naming System

All of the subroutines have been given six character names. The first four characters indicate the subroutine's use. The fifth and sixth character are used to identify a particular version of that subroutine. By this method, a special version of a subroutine is easily identified. The subroutines are entered at entry points so that the name changing does not

interfere with the calls. The non-special subroutines have been given the suffix letters "AA".

The "Main" Program

It is named CONTAA. This routine controls the bringing in of the first level 2 (the generator) and its overlay by the second level 2 (the cycling program). It also executes the input output unit assignments and is the channel through which the program communicates with the teletype. The following subroutines are used by the "main" program to do these things.

LEVLAA - This is the routine that actually executes the overlays.

GETSYM and SYSTAA - Are routines that initiate the system calls that are used in program control and communication.

Subroutine List

The following is the list of the regular subroutines, their purpose, and their entry point(s).

Generator Subroutines

1. GENRAA - This is the controlling subroutine of the generating process. It calls the other generator subroutines and some subroutines used by both the generator and the cycling code. Because it is the first routine entered in the first level 1, it has no entry point. The generator reads input data and sets up the "grid" for calculation by the CYCLAA subroutine.

2. INGNAA - Its entry point is INPGEN. This subroutine reads and decodes the "general input" cards.

3. INBKAA - Its entry point is INPBLK. It reads and decodes the "block input" sub-group of cards.

4. INBPAA - Its entry point is INPBPP. It reads and decodes the "block boundary" sub-group of cards.

5. INKLAA - Its entry point is INPKL. It reads and decodes the "K-by-K" input subgroup of cards.

6. INKPAA - Its entry point is INPKPP. It reads and decodes the "K-by-K point by point" subgroup of cards.

7. ENEMAA - Its entry point is ENMEMO. This subroutine expands SCM and LCM and sets up the data index offsets.

8. BRGNAA - Its entry point is BRGEN. The HEMP program branches to "common" A021 and then back to the proper point in the subroutine for the options that can be set once at generating or restart time. This subroutine sets the proper addresses in the "common" block A021.

9. REGOAA - The entry point is RESTRTRD. If it is called for by the generator, this routine restarts the problem from a restart dump on tape.

10. NZINAA - The entry point is NRZIN. If the block's K-min zoning is specified, this routine calculates the number of zones per K-line (as inputted by INBKAA for the K-min boundary of the block).

11. NZOTAA - The entry point is NRZOUT. This routine calculates the number of zones per K-line (as inputted by INPBLK) for the K-max boundary of the block. It sums the regional input to calculate this number.

12. BBOTAA - The entry point is OUTERB. This routine calculates the X and Y coordinates for the block K-max boundary from either Cartesian or Polar input.

13. BBINAA - The entry point is INNERB. This routine generates the X's and Y's for the block K-min boundary, from either Cartesian or Polar input. This subroutine is called only if the inside zoning has been specified explicitly.

14. BBISAA - The entry point is INNERBS. If the inner zoning of the block is not specified explicitly, this subroutine uses the zoning as specified for the K-max boundary of the block to generate the K-min block boundary coordinates.

15. KLINAA - The entry point is KLINIP. If "K-by-K" input is read and actually contains input (other than the "fini" card), this routine uses that data to generate the point and zone variables for the J, K points and the zones at $J + 1/2$, $K + 1/2$.

16. NOIDAA - The entry point is NODID. This routine sets the KTYPE number that is carried with each point of the grid, which is used as a "pointer" to specify the type of calculation to use for that point and for its corresponding zone.

17. CRETAA - The entry point is CREATE. This routine uses any or all of the data inputted by the various routines to create and/or store all the point by point and zone by zone variables of the HEMP grid.

The order of priority of the input is INKPAA, INKLAA, POLJAA, INBPAA, and INBKAA.

18. POLJAA - The entry point is POLARJ. If J-Polar input is specified, this routine generates X and Y values from that input. (J-Polar input is explained in the "General Input Section Discussion", page 33.)

19. GBRNAA - The entry point is GENBRN. This routine generates the

"burn time" for HE (high explosive) zones. If Huyghens burn is called for by input, this routine calls HUYGAA.

20. HUYGAA - The entry point is HUYGEN. This routine generates burn times when a "shadow" is involved.

Subroutines Used by Both the Generator and the Cycling Overlays

1. ANGJAA - The entry point is ANGADJ. It is used in the slide-line search routines to adjust the angle value so that the discontinuity in the angle value is 180° from the direction of the line.

2. EXTNA - The entry points are EXTSIX, and INVOLVE. This routine sets the coordinates of the master surface slide-line extensions according to the inputted directions.

3. VUPBAA - The entry point is UPVOLB. This routine does the slow, complete, methodical search (brute force) to set up the initial point ordering used in calculating the volume, area, and mass values of the "SLAVE" zones of an "upright" slide-line. This routine can be called by the main code.

An "upright" slide-line is defined as a master-slave pair which has the master line on the K-max (higher K number) side.

4. VUPGAA - The entry point is UPVOLG. This routine updates the ordering used in calculating the volume, area, and mass of the slave zones of the "upright" slide-line. It uses the previous ordering as a starting point.

(The "ordering" is a set of index numbers that is created by the code to specify the logical relationship between the grid points on both sides of the slide-

line. An ordering set is used in slide volume calculations.)

VUPGAA also does the final coordinate positioning and velocity calculation of the "upright" slide-line slave points.

5. VUPVAA - The entry point is UPVOL. This routine calculates the area and a volume-mass subterm that is used in calculating the mass in the generator, and the volume (V) in the main code.

6. VINBAA - The entry point is INVOLB. This routine is similar to VUPBAA but for the "inverted" slide line. An "inverted" slide-line is defined as a master-slave pair which has the master line on the K-min (lower K-number) side.

7. VINGAA - The entry point is INVOLG. This routine is similar to VUPGAA but for the "inverted" slide-line. The final X and Y positioning and velocity calculation of the "inverted" slave points is also done by this subroutine.

8. VINVAA - The entry point is INVOL. This routine is similar to VUPVAA but for the "inverted" slide-line.

Cycling Subroutines

These routines make up the second load of the second level overlay. This group of subroutines is sometimes called the "main code" because it is the portion of the HEMP program that cycles through the grid solving the HEMP difference equations. The "main code" should not be confused with the small FORTRAN program that controls the overlay process.

The CYCLAA subroutines is the controlling subroutine of the cycling process. It can be thought of as the "Main" routine, although it is actually a subroutine. It does the following principal things:

It loops through the grid from K-max to K-min, calculating and calling sub-routines to calculate the HEMP difference equations. This process is done in K-line segments. A loop advances all of the points of a K-line in time, then the VQPEAA subroutine is called to calculate the zonal quantities at $K + 1/2$.

In preparation for the point advance loop and the zonal loop, two subroutines are called which do preliminary work on the variables. One of these routines is PLPZAA which calculates and moves zonal quantities. The other pre-loop subroutine is PLPNAA which moves nodal quantities. The four subroutines CYCLAA, VQPEAA, PLPNAA, and PLPZAA do nearly all of the HEMP main equation calculations, exclusive of slide-line and boundary condition calculations.

The CYCLAA subroutine moves the grid variables to LCM from SCM and to SCM from LCM. This process is discussed in "LCM - SCM Transfers", page 15.

The CYCLAA routine also calls edit and print routines, etc. The subroutine makes no subroutine calls for general interior points, but handles the boundary and slide-line calculation by subroutine calls.

The following are cycling subroutines:

1. CYCLAA - The entry point is CYCLE. It also has an entry point within it called SUB30. It controls the cycling process as described above.

2. PLPNAA - The entry point is PLOOFN. This routine saves and moves nodal (point) variables in preparation for the velocity calculation. It is called by CYCLAA.

3. PLPZAA - The entry point is PLOOPZ. This routine calculates variables for the zones at $K - 1/2$ and moves the variables that were calculated for the previous K-line to $K + 1/2$ storage. It is called by CYCLAA.

4. PROPAA - The entry point is PROP. This routine checks to see if surface pressure (pressure profile) for the entire surface is called for. If it is, it calls entry points in PTABAA to calculate the pressure by table look-up. This pressure is applied to the entire surface (K-max, K-min, J-max, or J-min). This routine is called only once per problem cycle, therefore pressure can be a function only of time, by the use of this routine.

5. PRSPAA - The entry points are PJMX, PJMN, PKMX, and PKMN. This routine can be called by the various boundary subroutines. It checks input data to select pressure areas and then can call entry points in PTABAA to calculate pressure as a function of X, Y, or time.

6. PTABAA - The entry points are PTJMX, PTJMN, PTKMX, and PTKMN. This routine uses table look-up data to calculate surface pressure as a function of time, of X, or of Y. This routine is called either by PROPAA or by PRSPAA. If called by PROPAA, pressure can be a function only of time.

7. UT10AA - The entry point is SUB10. This routine calculates X, Y, $\dot{X}$ and $\dot{Y}$ for type "10" points (K-min). It applies boundary conditions according to the input. (Used for K-min points except J-max and J-min.)

8. UT12AA - The entry point is SUB12. Its use is the same as UT10AA

but for type "12". (Used for the J-max point at the end of K-min.)

9. UT16AA - The entry point is SUB16. Its use is the same as UT10AA but for type "16". (Used for the K-min, J-min point.)

10. UT20AA - The entry point is SUB20. This routine calculates the X, Y, $\dot{X}$, and $\dot{Y}$'s for type "20" slide-line points (master side). ("Upright" slide-line masters, except end points.)

11. UT22AA - The entry point is SUB22. This routine is similar to UT20AA but for type "22" points. It also applies the J-max boundary conditions.

12. UT26AA - The entry point is SUB26. This routine is similar to UT20AA but for type "26" points. It also applies to J-min boundary conditions.

13. UT32AA - The entry point is SUB32. This routine is similar to UT10AA but handles type "32" points (J-max). (J-max point of ordinary interior lines.)
(NOTE: UT30AA does not exist because the general type "30" points are calculated in CYCLAA without a subroutine call)

14. UT36AA - The entry point is SUB36. This routine is similar to UT10AA but handles type "36" points (J-min). (J-min point of ordinary interior lines.)

15. UT40AA - The entry point is SUB40. This routine is similar to UT10AA but handles type "40" points. (K-max points except J-max and J-min.)

16. UT42AA - The entry point is SUB42. This routine is similar to UT10AA but handles type "42" points. (The J-max, K-max point.)

17. UT46AA - The entry point is SUB46. This routine is similar to UT10AA but

handles type "46" points. (The J-min, K-max point.)

18. UT60AA - The entry point is SUB60. This routine advances the "upright" slave points in time but the final position and velocity is done in the VUPGAA subroutine. (The "upright" slide-line slave points, except the end points.)

19. UT62AA - The entry point is SUB62. This routine is similar to UT60AA but handles the J-max slide slave point, type "62". It also applies J-max boundary conditions.

20. UT66AA - The entry point is SUB66. This routine is similar to UT60AA but handles the J-min slide slave point, type "66". It also applies the J-min boundary conditions.

21. UT70AA - The entry point is SUB70. This routine is similar to UT20AA but calculates the type 70 "inverted" slide-line master points.

22. UT72AA - The entry point is SUB72. This routine is similar to UT20AA but for type 72 "inverted master" points. It also applies the J-max boundary conditions.

23. UT76AA - The entry point is SUB76. This routine is similar to UT20AA but for type 76 "inverted master" points. It also applies the J-min boundary conditions.

24. UT80AA - The entry point is SUB80. This routine is similar to UT60AA but calculates the type 80 "inverted slave" points. The final positioning and velocity calculation is done in VINGAA.

25. UT82AA - The entry point is SUB82. This routine is similar to UT62AA but calculates the type 82 "inverted slave", J-max points. The final positioning and velocity calculation is done in VINGAA.

26. UT86AA - The entry point is SUB86. This routine is similar to UT66AA but

calculates the type 86 "inverted slave" J-min points. The final positioning and velocity calculation is done in VINGAA.

27. U01SAA, U10SAA, U20SAA, U30SAA, U40SAA, U60SAA, U70SAA, and U80SAA. These routines are linkages between the CYCLAA routine and the SUBS__S routines listed next. These routines are called only if non-standard point types have been inputted into the problem.

28. SUBSIS, SUBS10S, SUBS20S, SUBS30S, SUBS40S, SUBS60S, SUBS70S, and SUBS80S. These subroutines contain entry points SUB__ for all of the non-standard point type numbers from 1 through 49, and from 50 through 89. They are all dummy entries. If a special treatment of a point is to be done, it can be assigned a type number and the special coding included after the appropriate entry point.

29. STNDAA - The entry point is STAND. This routine executes the "stand-off" option for both the "upright" and the "inverted" slide-lines, if called for.

30. VD60AA - The entry points are SUB60V, SUB62V, and SUB66V. If the void or tied sliding options are called for by input, this routine calculates the movement of the slave points. The void can only be used with the "upright" slide-line.

31. VQPEAA - The entry point is VQP. This routine is called once per K-line by the CYCLAA subroutine. It calculates the zonal quantities volume, Q, pressure, energy and the elastic terms for all zones. The slave zones' volumes are done by calling subroutines. The equations of state are included in this subroutine. (See "The

equation-of-state numbering system", page 20.) Preliminary time step calculations are also done in this routine.

32. CZNLAA - The entry points are CS123, COSS, CEDOT, CLAMBDA, EQSTHEA, EQSTA, EQSTB, EQSTC, EQSTD, and CALE. This subroutine is a collection of a number of zonal calculations. It can be called by VQPE or by the output routines. Entry CS123 calculates S_1 , S_2 , and S_3 . Entry COSS calculates "OSS," the octagonal shear stress. Entry CEDOT calculates E-dot-1 and E-dot-2. Entry CLAMBDA calculates Lambda-1 and Lambda-2. Entry CALE calculates E_1 and E_2 . The entries beginning with EQST are dummy entry points to allow the programmer to add equations of state without recompiling the VQPEAA routine.

33. BRHEAA - The entry point is BURNHE. This routine is called by the HE (high explosive) equations of state. It calculates the "burn fraction".

34. BINOAA - The entry point is BINO. If called for by input, this routine writes out selected variables for a K-line(s) on the "dump" tape that can later be processed by service routines. (See pages 10 and 11.)

35. CHSPAA - The entry points are CHGHSP, NMFIL and CRETFL. The entry CHGHSP is not used. The NMFIL entry is used to name the CRT disk files. The CRETFL entry is used to create the "CRT" disk file. NMFIL and CRETFL are called by the subroutine PRNTAA.

36. PRNTAA - The entry point is PRINT. This subroutine writes the "CRT" record on to tape or disk if called for, and it writes the high speed printer

output if called for. It is entered once per K-line if called for by input.

37. EDITAA - The entry point is EDIT. This routine is entered once each problem cycle. It interrogates the input in order to set up "flags" to control the output during the running of the next cycle, and to force the restart dump at the end of the present cycle.

38. DELTAA - The entry point is DELTAT. This routine is entered once each problem cycle, at the end of the cycle. It calculates the time step based on zonal information obtained during the running of the previous cycle. (That information is compiled by the VQPEAA subroutine.)

39. DUMPAA - The entry point is SAVDAT. When called upon to do so by the EDITAA routine, this routine writes a restart "dump" on the output tape. Each dump consists of a "table" record (A001) and a record for each K-line. This routine is entered once per problem cycle, if called for by input.

40. U22CAA - The entry point is U22CM. This routine is entered from UT22AA. It calculates the centers of mass for the zones on both sides of an "upright" slide-line. It also sets the

extra centers of mass for the sliding-zones according to the slide-line extension input.

41. U22BAA - The entry point is U22BF. This routine does the slow, methodical (brute force) search to set up the ordering used in the "upright" slide surface velocity calculations. It is used during the running of the first problem cycle only, or after the grid has been altered by a service routine.

42. U22GAA - The entry point is U22GS. This routine updates the ordering used in the "upright" velocity calculations. It uses the ordering from the previous cycle as a first try. During the running of the first cycle, there will be no change from the ordering set up by the U22BF sweep.

43. U72CAA - The entry point is U72CM. This routine is similar to the U22CAA, routine but is used in the "inverted" slide-line calculation.

44. U72BAA - The entry point is U72BF. This routine is similar to the U22BAA routine but is used in the "inverted" slide-line calculation.

45. U72GAA - The entry point is U72GS. This routine is similar to the U22GAA routine but is used in the "inverted" slide-line calculation.

Operation

PROBLEM INITIATION, CONTROL, AND MONITORING

HEMP problems are run in two different ways, through teletype (TTY) control, or through ORDER-ABKCON control. When running under teletype control, the user is able to monitor the progress of the problem and control some output

through the use of sense switches. The ORDER-ABKCON control system simulates the teletype input lines after reading that input from cards.

The Initiation Line

The control input line that starts or restarts a HEMP problem consists of a

series of input fields. The fields must be in the proper order, but certain ones need not be included. The fields are recognized by name and order. A space is the delimiter.

The fields, in order, are:

-Controllee Name. This field contains the file name of the HEMP controllee.

-Output Field. Output field controls all output except HSP output and has three possible forms:

- a. If a tape vault name is entered, all tape output (except HSP) will be written on that tape: CRT dumps, restart dumps, and binary output is requested by input. This is the option normally used for production runs. The tape vault name must consist of two alphabetic characters followed by three numeric characters (Example: EB644).
- b. If the name DISK is entered the CRT dumps will be written on a disk file, but no restart dump or BINARY OUTPUT will be written and restarts will be impossible. This option is often used for daytime debug and trial runs.
- c. If nothing is entered in the field, no tape or disk output is written (except HSP): no CRT dumps, no restart dumps and no binary output.

-User's Name Field. This may consist of any name of up to 10 characters that does not conflict with the output field ahead of it, and the "box" field following it. This field need not be entered. If used, this name ap-

pears as part of the label on the printed output.

-Box Field. This field is used to label the printed output so that it may be separated and placed in the user's output box. This field must always be present. It must consist of the three characters "BOX" followed immediately by three alpha-numeric characters (Example : BOXC99).

-Input Field. This field may be inputted in three ways. If it is left blank, this indicates to the HEMP program that this is a restart and that the program should read the dump tape listed in the output field and restart the problem from the last dump on that tape. If the field contains purely numeric data, this indicates to the HEMP program that this is a restart and that HEMP should read the dump tape listed in the output field and restart the problem from the dump whose cycle number is equal to the numeric data. If the field contains an alpha-numeric name, this indicates to the program that an input file is to be read. The file name must begin with an alphabetic character. The input file may be either new problem data or it may be restart file data. These fields are followed by a "T V" in the standard LLL teletype input manner.

Teletype Operation

After the initiation line has been entered, the computer will run the problem to completion, or until trouble is encountered, or until the computer time has run out. No further teletype entries need be made. When the problem has finished

generating, or when the restart dump has been read in, a message "problem generated or restarted" will be typed out on the teletype. When the run has terminated for any reason, a message "all done" will be printed. If the problem has terminated due to an error, a message will print out. If the termination is due to a standard HEMP error stop, a short stop message will be printed. These messages are listed and further explained in Appendix B. If the stop is due to a machine interrupt, an error number and location will be printed out. The trouble must be diagnosed by reference to the loading "map". Often the difficulty can be found by studying the input and the regular HEMP output.

Further problem monitoring and output control is possible through the use of the "sense switch" options (discussed in the next paragraph). If a problem is running with a tape, when that tape has been filled the program will increment the tape number by one and will request that the operator hang that tape. The problem will switch tapes and proceed.

Output can be partially controlled through the use of the "sense switch" options, during restart, generation and cycling. The letters "SW" followed immediately by a number from 1 through 6 and a period, will cause the appropriate switch to be reversed from its previous position. All six sense switches are "off" initially. After a sense switch message has been received by the computer, it will respond with a message on the teletype that tells the user which switches are on. Thus a message "on" that is not followed by numbers means that no switches are on.

The options are shown in Appendix A.

Non-Teletype Operation

HEMP runs under ABKCON control which in turn runs under ORDER control. ORDER and ABKCON are LLL job control languages that serve as communication links between the user and the operating system and the controllee program.

When the user wishes to run problems at night, he submits a card deck that contains both his input or restart data and control cards. The job control languages use many of these cards as though they were teletype input and output lines to initiate and control the job and to receive messages. The user receives an on-line print-out of all messages sent and received by ORDER and ABKCON.

GENERATOR INPUT

Input is by means of cards which have been collected into an input file on a disk. The teletype input can control certain output but cannot influence the basic HEMP calculations.

Card Flow and Input Terminology

The generator proceeds from the general to the specific. That is, the input that pertains to the whole problem or to numerous regions of the problem is read first. Then input of finer and finer detail is read. The finest detailed input overrides any previous input when there is a conflict. Input is read and processed by the generator in three groups. The three groups are called 1. General, 2. Block, and 3. K-by-K. The first and second groups are always used. The third is used only when needed. The second and third input groups are each divided into two sub-groups. The Block group's two

subgroups are the "Block Input" subgroup and the "Block Boundary" subgroup. The K-by-K group's two subgroups are: "K-Line Input," and "K-Line Point-by-Point Input." Each subgroup is separated in the input deck by a "fini" card.

A discussion of the characteristics and use of each subgroup follows.

General Input—This group includes input that applies to the whole problem or to material that may be in a number of regions of the problem. This includes such items as boundary conditions, output control and material-related input. This is the first set of cards encountered by the generator. General input reading

is terminated when the first "fini" card is encountered.

Block Input—A block is defined as a number of K-lines that have the same materials in corresponding J-zones. A region is a group of zones (within a block) that are of the same material and whose coordinates are generated from the same "corner" points. (See Fig. 3-1.) Regions always run from the higher K (K-high is the K with higher K-number) to the lower K (K-low is the K with lower K-number).

The Block in Example 1 (Fig. 3-1) has four regions. The points marked with X are the boundary points that have been specified in the Block input. The Block in Example 2 (Fig. 3-1) has two regions,

Example 1.

Example 2.

Example 3.

Fig. 3-1. Block input with more than one region.

both of the same material. (The region on the right (J-max) end was generated with K-polar input).

The zoning in Example 3 (Fig. 3-1) is uniform. The reason for generating it as two regions was because of the material change from one region to the next.

Block input includes the regional corner points (or polar data), the zoning counts, the material assignment, certain material-related properties, as well as other data.

The Block Boundary subgroup allows for the point by point input of the K-high and K-low block surfaces by either Cartesian or Polar input. If used, it overrides the surfaces generated by the Block input. Each Block subgroup is terminated by a "fini" card. Block input always contains two "fini" cards, one terminating the first Block Input subgroup, and the second terminating the Block Boundary subgroup. A problem may have as many blocks as are necessary to describe it. There may be up to eight regions within a block.

The "K-by-K" and "K-by-K Point-By-Point" subgroups are used only if this finer detailed input is needed. It is called for by an input card in the Block Input subgroup that precedes the K-by-K cards. The K-by-K and K-by-K Point-By-Point subgroups are always read in pairs. For example, if K-by-K input is called for, for the fifth K of the second block, both K-by-K and K-by-K Point-By-Point input will be read.

The K-by-K subgroup allows the user to respecify the characteristics of a particular K-line. K-line regional information is inputted much as if the user

is writing the input for a one-dimensional code. The zonal quantities that are specified are for the zones centered at $K + 1/2$.

The K-by-K Point-By-Point subgroup enables the user to respecify the coordinates and input velocities for any or all nodal points on that K-line. Likewise, the user may respecify most zonal quantities for the zones centered at $K + 1/2$.

If the user wishes to specify Point-By-Point input or zone by zone input but does not wish to use the K-by-K subgroup capability, he should supply only the "fini" card to the K-by-K subgroup. The generator will recognize that this K-by-K input is not intended and will skip the portion of the program that decodes that input. (See Figs. 3-2 and 3-3.)

Input Card Formats

Most HEMP input cards have a name in the first eight or ten columns. If these first columns are blank, the card is accepted as a continuation of the data of the previous card. Within each of the five input groups or subgroups is a card vocabulary. As a card is read, its first eight or ten columns is matched against the vocabulary of that group (or subgroup). If it matches, the input is decoded and stored in the proper places. If it does not match, the offending card and an error message is printed out and the run is terminated. All card names start in column 1. Cards within a subgroup may be in any order. Only those cards that actually contain input need be used.

Integer input must be right-adjusted. Floating point input must include a decimal point but must be right-adjusted only

The card order of a deck to generate a three block problem, with no finer input, would be as follows.

Fig. 3-2. Card order of three-block problem.

if an "E" power notation is used. The FORTRAN "F" format is used. In this write-up, if the variable to be inputted is an integer, the word "integer" will follow the column listing. If "integer" is not present, the input is floating point.

General Input Section Discussion

The input in this section is input that applies to the entire problem or to some areas or boundaries of a wider scope than that included in Block input. This includes material related input because

The card order of a deck to generate a problem similar to the example in Fig. 3-2 but with special zonal input at K-number 5 + 1/2 and nodal input at K-5 would be as follows.

- × Zones to be input point by point
- o Nodes to be input

Fig. 3-3. Three-block problem with more detailed input.

the same material may appear in more than one region and/or Block of the problem.

The card names have been selected to give indications of the general use of the input on that card. In certain cases, this

is not true, however.

Name, Geometry Card

This card is customarily the first card in the deck after the file "ID" card. The card format is as shown in Table 3-1.

Table 3-1. Name, geometry card format.

Field use	Columns	Input and explanation
Card name	1-10	GENERAL
Blocks	11-12	Integer. The number of Blocks in the problem.
K's	13-15	Integer. The number of K's in the problem. (The total number of K-zones plus one.)
Max-J	16-18	Integer. The number of J's in the longest K-line in the problem. (The total number of J-zones in the K-line, plus one.)
Geometry	19-20	Integer. Enter "1" if the problem is the plane case. Enter "+2" if problem is cylindrical in quadrants 1 or 2. Enter "-2" if the problem is cylindrical in quadrants 3 or 4. The quadrant notation automatically prevents points from crossing through the x axis. Complete control of this test is provided by use of the XYQUAD card in boundary control.
	21-24	Not used.
Problem name	25-54	The problem name is entered here. Any group of 30 characters and spaces can be entered.

These thirty spaces are printed as the problem name on the printouts. Only the first 20 columns of this group are put on the "CRT" tape.

Delta-T Control Card

The follow card allows changing of Delta-T control parameters. It also can be used to control the frequency of restart dumps. This card need not be used if "standard" numbers are to be used.* (See the card format as shown in Table 3-2.)

Cutoff Card

The normal cutoffs are 1×10^{-10} except XYCUT which is 1×10^{-8} . The card format is shown in Table 3-3.

Output Control

Certain output can be controlled in frequency and character by input cards. Sense-switch-controlled output is in addition to the card-controlled output. The types of output that are controlled by cards are CRT tape output, off-line printer output, flexibly formatted (binary) tape output, and restart dump output. Teletype and on-line output cannot be controlled by input cards.

Frequency of CRT and Off-Line Printer Output

The frequency of CRT (cathode ray tube) and off-line printer output is controlled by a card whose format is shown in Table 3-4. (Times are in microseconds.)

K-Line Selection

The selection of K-lines that are written out when off-line printouts are

* See Appendix A, Section I of Ref. 1.

Table 3-2. Delta-T control card format.

Field use	Columns	Input and explanation
Card name	1-10	DELTAT
Fixed Delta-T	11-15	If this is left blank, the time step will be calculated in the usual manner. If not zero, the value will be used to run the problem at that fixed time step. This overrides the other Delta-T input.
Initial Delta-T	16-20	If this is left blank, the initial time step will be equal to 1×10^{-4} . If not blank, the value will be used as the initial Delta-T
Delta-T max	21-25	If this is left blank, the largest value that the time step (Delta-T) will be allowed to reach will be one (1.). If not zero, the largest value will be that value.
Delta-T stop	26-30	If this is left blank, the problem will terminate when the Delta-T has reached 1×10^{-3} . If not zero, the problem will terminate when that value is reached.
Shear coefficient	31-35	If this is left blank, the sound speed calculation will include the term, 4/3 times the shear modulus. If not zero, the 4/3 will be replaced by the inputted number.
Minimum Delta-T factor	36-40	If this is left blank, the minimum factor that the time step (Delta-T) can raise from one cycle to the next (if it is to raise at all) is 1.1. If it wants to raise less than that, it will not raise at all. If not zero, the factor is the value of the inputted number.
Maximum Delta-T factor	41-45	If this is left blank, the maximum factor that the Delta-T can raise from one cycle to the next is 1.2. If it wants to raise more than that, the Delta-T at $N + 1/2$ will be set equal to the Delta-T at $N - 1/2$ times the factor. If not zero, the factor is replaced by the inputted value.
"b" coefficient	46-50	If this is left blank, the coefficient in the "b" calculation as shown in the stability calculation will be 8. If not zero, the inputted value will be used.
First dump cycle	51-56 "A"	Integer. If this is left blank, the first restart dump will be taken at cycle number 100. If not zero, the dump will be taken at that cycle number.
Second dump	57-62 "B"	Integer. If this is left blank, the second restart dump will be taken 400 cycles after the first restart dump. If not zero, the dump will be taken that number of cycles after the first dump.
Dump frequency	63-68 "C"	Integer. If this is left blank, restart dumps will be taken at 500 cycle increments after the second restart dump. If not zero, the restart dumps will be taken at the new increment.
	(NOTE)	When the program is running, "A" is counted down to zero, the "B" is put into "A" and "C" into "B". Therefore "A" always contains the number of cycles to the next dump.
Dump with CRT	69-70	If left blank, a restart dump will not be taken with each regular CRT. If set to "1.", a dump will be taken with each regular CRT. Forcing a CRT with the sense switches will not cause the dump.
Courant number	71-75	If this is left blank, 2/3 will be used as the coefficient (Courant number) in the final Delta-T calculation. If not blank, the inputted value will be used.

Table 3-3. Cutoffs card format.

Field use	Columns	Input and explanation
Card name	1-10	CUTOFFS
General cut change	11-17	If not zero, the inputted value will replace the cut-off values for Q, E, P, $\bar{X}$, $\bar{Y}$, and $\bar{V}/V$.
X-dot, Y-dot cut	18-74	If not zero, the inputted value will become the cut-off value for $\bar{X}$ and $\bar{Y}$. It overrides the column 11-17 input.
Q-cut	25-31	If not zero, the inputted value will replace the cut-off value for Q. It overrides the column 11-17 input. (Q is not allowed to be negative.)
E-cut	32-38	If not zero, the inputted value will replace the cut-off value for energy. It overrides the column 11-17 input.
P-cut	39-45	If not zero, the inputted value will replace the cut-off for pressure. It overrides column 11-17 input.
V-dot/V cut	46-52	If not zero, the inputted value will replace the cut-off value for V-dot over V. It overrides column 11-17 input.
X, Y cut	53-59	If not zero, the inputted value will replace the cut-off value for X and Y that is used in the generator.

written is controlled by a card whose format is shown in Table 3-5.

CRT Scale

Two types of cards are used to control the scale and types of the CRT plots. They are not used by HEMP but are put on the CRT output tape so that it may be conveniently plotted. This input can be altered by other input when the plotting is being done. The CRT scale card format is shown in Table 3-6.

Three scales are allowed as input at one time. The second and third cards are similar to the card above but with a scale number of 2 or 4 (not 3), and the classification fields are ignored. The card name PLOTSCALE may be left off if these cards immediately follow the number 1 scale card in the input deck.

Plot Type

The card (format is shown in Table 3-7) is used by the plot routine to determine

the nature of the plots, using the scales inputted with the PLOTSCALE cards. A number of options are available for each plot and may be called for use with any or all scales. Ten sets of options are allowed and each may apply to any or all of the three scales. Therefore, it is possible to produce as many as 30 plots per output time. Six options are available.

The option field "G", when set to "1", causes all of the J- and K-lines in the scale area to be plotted. The option "B", when set to "1", causes all of the boundary lines in the scale area to be plotted (including material boundaries). The option "V", when set to "1", causes all of the elastic vectors in the scale area to be plotted (for elastic materials only). The option "Q", when set to "1", causes zones with "Q's" above a certain value to be shaded in direct proportion to the magnitude of the "Q". The option "RX", when set to "1", causes the plot

Table 3-4. CRT and off-line printer card format.

Field use	Columns	Input and explanation
Card name	1-10	EDITFREQ
Increment 1	11-15	The problem will write CRT output at this frequency until "Time 1" is reached.
Time 1	16-20	When the problem has reached this time, it will change frequency to "Increment 2". If "increment 2" is zero, the problem will terminate.
Increment 2	21-25	After "Time 1" is reached, but before "Time 2" is reached, the problem will write CRT output at this frequency.
Time 2	26-30	After "Time 1" has been reached, the problem will run to "Time 1" + "Time 2" and write CRT output at time intervals equal to "Increment 2"; if "Increment 3" is zero, the problem will terminate.
Increment 3	31-35	After "Time 1" plus "Time 2" is reached, but before the sum of all three "times" is reached, the problem will write CRT output at this frequency.
Time 3	36-40	After the sum of "Time 1", "Time 2", and "Time 3" is reached, the problem will terminate.
(NOTE) Concerning changing output frequency or time at restart time.		<p>If changes are to be made in the CRT output frequency or time at restart time, the following explanation of how the HEMP code operates must be understood by the user.</p> <p>When the problem reaches a CRT output time point, and edits, it adds that time to "Increment 1" and then runs until it reaches that time. When "Time 1" is reached, "Time 1" is added to "Time 2" and replaces "Time 1". "Increment 2" replaces "Increment 1", "Time 3" and "Increment 3" replace "Time 2" and "Increment 2". "Time 3" and "Increment 3" are then set to zero. Therefore, the current problem time is always compared with the time in "Time 1" to see when to change edit frequencies or when to terminate the problem.</p> <p>The next time to write CRT is carried in a storage location that can be changed by input at restart time.</p> <p>When a problem has finished by reaching its termination time, it can be extended by putting the new output increment in "Increment 1", the next change time in "Time 1" etc.</p>
Prints/CRT	41-45	If this field is left blank, off-line printer output will be written each time regular CRT output is written. If a number "n" is entered, off-line printer output will be written each "nth" time. (This value "n" is put in a counter and counted down to "1", then a printout is written.)
Debug printout	46-50	If set to non-zero, the "Debug" print out will be written. This prints out the velocity sub-terms. This is described in the main code output section.
Next CRT time	51-55	(Used only at restart time.) If a number is entered here when restarting, the next CRT output will be written at that problem time. It replaces the previous value.
Print counter change	56-60	(Used only at restart time.) If a number is entered here at restart time, the current print per CRT counter will be replaced by this value. (See prints/CRT above.)

Table 3-5. K-line selection card format.

Field use	Columns	Input and explanation
Card name	1-10	PRINT-OUT
Interface option	11	Integer. If set to "1" just K-max, K-min, and the slide-lines will be printed out.
Higher K	12-14	Integer. If not zero, this is the highest K-number that will be printed out except for interfaces if called for.
Lower K	15-17	Integer. If not zero, this is the lowest K number that will be printed out except for interfaces if interface edits are called for.

Table 3-6. CRT scale card format.

Field Use	Columns	Input and explanation
Card name	1-10	PLOTSCALE
Classification	11	Integer. If left blank, the CRT output will be labeled "secret". If not zero, the CRT will not be so labeled.
Scale number	12-15	Integer. 1, 2, or 4. This is the number assigned to this scale. It must be present. See explanation below.
Xmin	16-25	The minimum value of X to be plotted.
Xmax	26-35	The maximum value of X to be plotted.
Ymin	36-45	The minimum value of Y to be plotted.
Ymax	46-55	The maximum value of Y to be plotted.
Vector length	56-65	If a vector plot of elastic zones is called for, this number must be entered. It is the length of the vector in cm. It is usually entered as 1/2 to 3/4 of the original thickness of a typical zone of the elastic regions in the problem.
Multiplier factor	66-75	If not zero, the grid points' displacement from their position at time zero will be multiplied by this number. (This exaggerates the motion. Used for very small displacement problems.)
(NOTE):		The CRT plot is linear in each scale in each direction. The difference between X-min and X-max determines the scaling in the x direction and the difference between Y-min and Y-max determines the scaling in the Y direction.

image as determined by the previously set options to be reflected across the X axis.

Allowance must be made for this reflected image when selecting the scales. The option "RY" is similar to "RX" but for the Y axis. If both are set to "1", the

image will be reflected both ways. On the input card, a seventh column in each set of options is used to determine which scales that the option set applies to. The sum of the scale numbers is entered; thus a "5" would call for that set of options to apply to scale 1 and scale 4 and would

Table 3-7. Plot type card format.

Field use	Columns	Input and explanation
Card name	1-10	PLOTTYPE
Option group 1	11	Integer. Set to 1 to call grid "G" plot
	12	Integer. Set to 1 to call Border "B" plot
	13	Integer. Set to 1 to call Vector "V" plot
	14	Integer. Set to 1 to call Q, "Q" plot
	15	Integer. Set to 1 reflect around the x axis
	16	Integer. Set to 1 reflect around the y axis
	17	Integer. Enter the sum of the scale card numbers
Option group 2	18	Integer G
	19	Integer B
	20	Integer V
	21	Integer Q
	22	Integer RX
	23	Integer RY
	24	Integer SUM
Option group 3	25	Integer. G
	26	Integer B
	27	Integer. V
	28	Integer Q
	29	Integer RX
	30	Integer RY
	31	Integer SUM
Option group 4	32	Integer G
	33	Integer B
	34	Integer V
	35	Integer Q
	36	Integer. RX
	37	Integer RY
	38	Integer SUM

produce two plots per option. The option groups may be repeated to fill the card, so that ten groups are allowed.

Flexible Formatted Tape Output
(Binary Output)

This output capability allows the user to cause any code quantity to be written

on tape or to be calculated and written on tape. This can then be processed by other programs. (The information is written in binary format.)

Two types of frequency control are provided. The one using the card REG. BIN (Table 3-8) is similar to the frequency

Table 3-8. Frequency control (regular) card format.

Field use	Columns	Input and explanation
Card name	1-10	REG.BIN
Time step 1	11-15	Write the binary tape output at these timestep intervals.
Time 1	16-20	Use the step 1 until this time.
Time step 2	21-25	When time 1 is reached, write at intervals of this time step.
Time 2	26-30	Use time step 2 until a time of time 1 plus time 2 is reached.
Time step 3	31-35	When time 1 plus time 2 is reached, then write at intervals of this time step.
Time 3	36-40	Write binary output until time 1, plus time 2, plus time 3 is reached.
High K-1	41-43	Integer. Write binary output from this K number down to the low K - 1 number. If this is blank, K-max is assumed.
Low K-1	44-46	Integer. Write binary output from the high K - 1 above down to this number. If blank, K-min assumed.
High K-2	47-49	Integer. High K number 2. This must be lower than the above numbers. If blank, just the above numbers are used.
Low K-2	50-52	Integer. Low K number 2. This must be lower than the above numbers.
High K-3	53-55	Integer. High K number 3. This must be lower than the above numbers. If blank, just the above numbers are used.
Low K-3	56-58	Integer. Low K number 3. This must be lower than the above numbers.

and K-line control of the off-line printer output. The other, using the card called SEIS.BIN (Table 3-9), puts out selected K-lines every problem cycle after starting at the selected start time. Both use the card VAR.BIN (Table 3-10) to determine which variables to write out. Both frequency control options may be used in the same problem. (The name SEIS.BIN is used because this type of output is used in analysis of seismological problems.)

A second card may be used with a format the same as in Table 3-10. Up to 40 variables may be put out at a time. Table 3-11 is the variable number list.

Walls, Pistons, Quadrant Control

A group of options are provided that allow for controlling the motion of boundary (and sometimes interior) J, K points.

The most used options are those called for on the STONEWALLS card. These options bypass the X or Y (or both) velocity calculation on the K-max, K-min, J-max and/or J-min exterior boundaries. Because the velocity calculation is bypassed, the initial velocity remains. Therefore, if the initial velocity is zero, a rigid wall condition is set up. If the initial velocity is not zero, a constant velocity or "piston" condition is set up (a constantly moving surface). This card

Table 3-9. Frequency control (SEISMO) card format.

Field use	Columns	Input and explanation
Card name	1-10	SEIS.BIN
Start time	11-15	This is the time that the cycle by cycle "seismo" binary tape output is to begin. (It must be nonzero to use this routine.)
K's to write out	16-18	Integer.
	19-21	Integer.
	22-24	Integer.
	25-27	Integer.
	28-30	Integer.
	31-33	Integer.
	34-36	Integer.
	37-39	Integer.
	40-42	Integer.
	43-45	Integer.
		List number of K's to output.

Table 3-10. Variable list card format.

(Use this card with REG.BIN card and/or SEIS.BIN card.)

Field use	Columns	Input and explanation
Card name	1-10	VAR.BIN
Output variable number	11-13	Integer. List variable numbers in any order. Leave no blanks.
	14-16	Integer. Second variable to output
	17-19	Integer. Third variable to output
	20-22	Integer. Fourth variable to output
	—	—
	68-70	Integer. Twentieth variable to output

(format shown in Table 3-12) is useful only for vertical or horizontal walls.

A rigid wall may be specified at any angle by the use of the angle-wall cards. The XYQUAD card provides for restricting the motion of all points within certain

quadrants. The RING card allows for the restriction of motion of all points between certain X, Y limits. The VARWALL card allows for the restriction of motion of points of certain K-lines between X or Y limits.

Table 3-11. Variable number list.

Number	Variable
1	X
2	Y
3	X-dot
4	Y-dot
5	V
6	P
7	E
8	Q
9	Rho-zero
10	F
11	X-zero. Original position of x coordinate.
12	Y-zero. Original position of y coordinate.
13	Zone area times 2 (ALAREA)
14	Zone mass times 2 (MH) (2π missing in cylindrical case)
15	Integer, equation-of-state number
16	$\dot{\epsilon}_{xx}$ Strain rate
17	$\dot{\epsilon}_{yy}$ Strain rate
18	$\dot{\epsilon}_{\theta\theta}$ Strain rate
19	$\dot{\epsilon}_{xy}$ Strain rate
20	$\dot{V}/V$ Rate of change of volume
21	S_{xx} Stress deviator
22	S_{yy} Stress deviator
23	$S_{\theta\theta}$ Stress deviator
24	T_{xy} Shear Stress
25	Mu Shear Modulus
26	Y_0 Yield
27	S_1 Principal stress deviator one
28	S_2 Principal stress deviator two
29	S_3 Principal stress deviator three
30	TANPHI The tangent of the maximum principal stress.
31	IPD The internal plastic distortion.
32	OSS Octagonal shear stress.
33	K The elastic yield test number.
34	$\dot{E}_1$ Principal strain rate 1.
35	$\dot{E}_2$ Principal strain rate 2.
36	Lambda-1 The Lambda option must be called CALC-OPT card
37	Lambda-2 The Lambda option must be called CALC-OPT card
38	(Integer) The "sliding" point status number 1, 2, 3, or 4 (see "Slide-Line and Void" paragraph, page 53).

Table 3-11. (Continued).

Number	Variable
39	Not used.
40	SIGMA-D The Sigma-D used in the slide calculations*
41	$\dot{X}$ (X acceleration)
42	$\dot{Y}$ (Y acceleration)
43	Not used
44	Not used
45	Not used
46	Not used
47	Not used
48	Not used
49	Not used
50	Not used
51	Q_{xx} Navier-Stokes Q
52	Q_{yy} Navier-Stokes Q
53	$Q_{\theta\theta}$ Navier-Stokes Q
54	Q_{xy} Navier-Stokes Q
55	Linear part of Navier-Stokes Q
56	DS-rate
57	Strain rate composite term. $+2 (\dot{\epsilon}_{xx}^2 + \dot{\epsilon}_{yy}^2 + \dot{\epsilon}_{\theta\theta}^2 + \dot{\epsilon}_{xy}^2)$
58	Sound Speed squared
59	Not used
60	(Integer) The number of the point type
61	Variable 25 This will put out whatever is in the variable
62	Variable 26 This will put out whatever is in the variable
63	Variable 27 This will put out whatever is in the variable
64	Variable 28 This will put out whatever is in the variable
65	Variable 29 This will put out whatever is in the variable
66	Variable 30 This will put out whatever is in the variable
67	Variable 31 This will put out whatever is in the variable
68	Variable 32 This will put out whatever is in the variable
69	$\partial \Sigma_{xx} / \partial X$
70	$\partial \Sigma_{xy} / \partial Y$
71	$ALPHA = T_{xy} / Y$
72	$\partial \Sigma_{yy} / \partial Y$
73	$\partial T_{xy} / \partial Y$
74	$BETA = \Sigma_{yy} - \Sigma_{\theta\theta} / Y$
75	The non-compression rate term of the Q equation. $= C_0^2 \rho_0 A^{n+1/2} V^{n+1/2}$

Table 3-11. (Continued).

Number	Variable
76	$1/2 \phi$
77	Not used
78	Not used
79	Not used
80	Not used
81	Not used
82	Not used
83	Not used
84	Not used
85	E_1 Principal strain 1.
86	E_2 Principal strain 2.
87	$E_3 (= E_{zz})$ Principal strain 3.
88	$E_1 - E_2$
89	Not used
90	Not used

* Appendix B, Section I of Ref. 1.

Table 3-12. Vertical and horizontal walls (or piston)*.

Field use	Columns	Input and explanation
Card name	1-10	STONEWALLS
K-max $\dot{X}$	11	Integer. If set to "1", $\dot{X}$ at K-max is not calculated.
K-max $\dot{Y}$	12	Integer. If set to "1", $\dot{Y}$ at K-max is not calculated.
K-min $\dot{X}$	13	Integer. If set to "1", $\dot{X}$ at K-min is not calculated.
K-min $\dot{Y}$	14	Integer. If set to "1", $\dot{Y}$ at K-min is not calculated.
J-max $\dot{X}$	15	Integer. If set to "1", $\dot{X}$ at J-max is not calculated.
J-max $\dot{Y}$	16	Integer. If set to "1", $\dot{Y}$ at J-max is not calculated.
J-min $\dot{X}$	17	Integer. If set to "1", $\dot{X}$ at J-min is not calculated.
J-min $\dot{Y}$	18	Integer. If set to "1", $\dot{Y}$ at J-min is not calculated.
Boundary point spacer fraction	19-26	All vertical and horizontal boundary points are forced to be spaced from their neighboring boundary points by 1/10 of the original spacing. This is to prevent crossover. If a number is entered here, the fraction will be changed to the new value. It can not be changed to zero.
Skip spacing	27-29	Any number entered here will cause the spacing routines to be skipped.

*These options apply the rigid wall condition to the entire K-max, K-min, J-max or J-min surface.

Angled Rigid Walls

Each problem exterior boundary may have applied to it an angled rigid wall. No boundary spacing is forced. Four cards may be used, one for each surface. The card format is shown in Tables 3-13 through 3-16. The slope of the surface may be inputted by two means, the angle of the slope from a zero angle to the right of the end point, or by the inputting of the end points. (See Fig. 3-4.)

Quadrant Control

Cylindrical case problems will automatically be run with the condition that a J, K grid point can not pass through Y=0. This condition can be removed by input in column 13 on the XYQUAD card. (See Table 3-17) All other quadrant controls are not exercised unless called for by input.

Ring and Support

The "ring" and "support" options (Fig. 3-5) limit the motion of the grid points in the X-Y plane by setting X or Y to zero when any point reaches specified values. In effect, these options set up stone walls of limited length that will stop the motion of any point that attempts to pass through the line segment. Table 3-13 shows the ring and support card format.

The ring option limits the horizontal motion of all grid points. It can be used in either plane or cylindrical geometry. The support option limits the vertical motion of all points. For each option, an X-min, X-max, Y-min, and Y-max must be entered on the ring card. These values must lie outside of the initial position of the grid, so that the grid is enclosed by the ring or support.

Table 3-13. K-max angle boundary wall card format.

Field use	Columns	Input and explanation
Card name	1-10	KMAX-ANG
Input option	11-12	Integer. If set to +1, take angle as inputted. If set to -1, the end points are inputted.
Angle	13-20	If columns 11-12 are set to +1, this angle (in degrees) will be used in calculating the surface velocities. The angle is measured from a line extending directly to the right of the K-max, J-min corner of the problem, around counterclockwise to the K-max line. If columns 11-12 are set to -1, the generator will calculate the angle from the end points entered below.
K-max- J-max X	21-28	X of K-max, J-max point
K-max- J-max Y	29-36	Y of K-max, J-max point
K-max- J-min X	37-44	X of K-max, J-min point
K-max- J-min Y	45-52	Y of K-max, J-min point

Table 3-14. K-min angle boundary wall card format.

Field use	Columns	Input and explanation
Card name	1-10	KMIN-ANG
Input option	11-12	Integer, if set to +1, the angle is inputted. If set to -1, the end points are inputted.
Angle	13-20	If columns 11-12 are set to +1, this angle (in degrees) will be used in calculating the surface velocities. The angle is measured from a line extending directly to the right of the K-min, J-min corner of the problem around counterclockwise to the K-min line. If columns 11-12 are set to -1, the generator will calculate the angle from the end points entered below.
K-min-J-max X	21-28	X of K-min, J-max point
K-min-J-max Y	29-36	Y of K-min, J-max point
K-min-J-min X	37-44	X of K-min, J-min point
K-min-J-min Y	45-52	Y of K-min, J-min point

Table 3-15. J-max angle boundary wall card format.

Field use	Columns	Input and explanation
Card Name	1-10	JMAX-ANG
Input Option	11-12	Integer. If set to +1, the angle is inputted. If set to -1, the end points are inputted.
Angle	13-20	If columns 11-12 are set to +1, this angle (in degrees) will be used in calculating the surface velocities. The angle is measured from a line extending directly to the right of the K-min, J-max corner of the problem, around counterclockwise to the J-max line. If columns 11-12 are set to -1, the generator will calculate the angle from the end points entered below.
K-max-J-max X	21-28	X of K-max, J-max point
K-max-J-max Y	29-36	Y of K-max, J-max point
K-min-J-max X	37-44	X of K-min, J-max point
K-min-J-max Y	45-52	Y of K-min, J-max point

Table 3-16. J-min angle boundary wall card format.

Field use	Columns	Input and explanation
Card name	1-10	JMIN-ANG
Input option	11-12	Integer. If set to +1, the angle is inputted. If set to -1, the end points are inputted.
Angle	13-20	If columns 11-12 are set to +1, this angle (in degrees) will be used in calculating the surface velocities. The angle is measured from a line extending directly to the right of the K-min, J-min corner of the problem, around counterclockwise to the J-min line. If columns 11-12 are set to -1, the generator will calculate the angle from the end points entered below.
K-max-J-min X	21-28	X of K-max, J-min point
K-max-J-min Y	29-36	Y of K-max, J-min point
K-min-J-min X	37-44	X of K-min, J-min point
K-min-J-min Y	45-52	Y of K-min, J-min point

- The example could be inputted in two ways:
- I. by a -1 in columns 11-12, 14.2265 in columns 21-28, 25.7735 in columns 29-36, 4.2265 in columns 37-44, and 20. in columns 45-52
or by
 - II. +1 in columns 11-12 and +30.0 in columns 13-20.

Fig. 3-4. Angled rigid wall example.

All four input numbers must be specified for the option that is being used. For example: If you use the ring option and you want a ring only on the left side of the grid, you should specify a large positive X-max in order to place the right hand ring far way from the grid. If you leave X-max blank, the code will use an X-max of zero which may cause difficulty (depending on the problem).

VARWALL Option

The VARWALL option resembles the ring and support options in setting up stone walls to stop motion. However, in this option the stone wall lines are of infinite length and they will stop the motion of only specified parts of the grid—the parts whose K-number corresponds to or are between the input K-numbers. (Appropriate interior points are tested in addition to the boundary points.)

Table 3-17. Quadrant control card format.

Field use	Columns	Input and explanation
Card name	1-10	XYQUAD
No - Y's	11	Integer. A "1" will restrain any grid point from getting a negative Y value. This is automatic for cylinder above X-axis problems, unless bypassed by input.
No + Y's	12	Integer. A "1" will restrain any grid point from getting a positive Y value. This is automatic for cylinder below X-axis problems, unless bypassed by input.
Allow All Y's	13	Integer. A "1" will remove the automatic restraint on Y from the cylindrical case problems.
No - X's	14	Integer. A "1" will restrain any grid point from getting a negative X value.
No + X's	15	Integer. A "1" will restrain any grid point from getting a positive X value.
Keep Y at zero	16	Integer. A "1" will restrain any grid point (except a slave point) from moving in the Y direction if its Y coordinate is equal to zero.

Fig. 3-5. Examples of ring and support options.

Table 3-18. Ring and support card format.

Field use	Columns	Input and explanation
Card input	1-10	RING
o.d. of ring	11-17	If not zero, the "ring" routine is activated. The "o.d." (outside diameter) of the limiting boundaries is this value. Any point that is below this Y and above the "i.d." will be stopped when it reaches either the maximum X input value or the minimum X input value. This is for both cylindrical case and plane case problems. This value applies to both the right ring boundary and the left ring boundary.
i.d. of ring	18-24	If the "ring" option is activated by "o.d." above, the lower edge of both the right hand and left hand ring is this value.
X-max of ring	25-31	If the ring option is called for, no point with a "Y" between the o.d. and the i.d. will be permitted to have an X value greater than this input X.
X-min of ring	32-38	If the ring option is called for, no point with a "Y" between the o.d. and the i.d. will be permitted to have an X value smaller (or more negative) than this input X.
"X" of right end of "Support"	39-45	If not zero, the "support" routine is activated. The right end (highest X value) of the limiting boundaries is this value. Any point that is to the left of this X value and to the right of the left end value will be stopped when it reaches either the maximum Y or the minimum Y. This X input value applies to both the maximum Y input value and the minimum Y input value.
"X" of left end of support	46-52	If the "support" option is activated, the left edge of both the upper and the lower support is this value.
Maximum "Y" allowed in the "support" region	53-59	No point with an X between X-left and X-right (above) will be permitted to have a Y value greater than this input Y.
Minimum "Y" allowed in the "support" region	60-67	No point with an X between X-left and X-right (above) will be permitted to have a Y value smaller than this input Y.

Table 3-19. Maximum and minimum X's and Y's for selected K's card format.

Field use	Columns	Input and explanation
Card name	1-10	VARWALL
Highest K-number to control X.	11-13	Integer. If not zero, this K-number and those of smaller value down to and including "lower K" (below) will have the maximum X and minimum X tests applied.
Lowest K-number to control X	14-16	Integer. This K-number will be the lower boundary to which the X maximum and X minimum tests will be applied.
Maximum X	17-28	Points on or between K-numbers "K-highest" and "K-lowest" will be restrained from having an X value greater than this input value.
Minimum X	29-40	Points on or between K-numbers "K-highest" and "K-lowest" will be restrained from having an X value smaller (more negative) than this input value.
Highest K-number to control Y.	41-43	Integer. If not zero, this K-number and those of smaller value down to and including "lower K" (below) will have the maximum Y and minimum Y tests applied.
Lowest K-number to control Y.	44-46	Integer. This K-number will be the lower boundary that the Y maximum tests (below) will be applied.
Maximum Y	47-58	Points on or between "K-highest" and "K-lowest" will be restrained from having a Y value greater than this input value.
Minimum Y	59-70	Points on or between "K-highest" and "K-lowest" will be restrained from having a Y value smaller (more negative) than this input value.

Table 3-19 shows the VARWALL card format.

A certain part of the grid, say from K21 to K12, can have its X-motion limited by this option while the same, or different, or overlapping part of the grid can have this Y-motion limited.

On slide surfaces whose K-number corresponds to one of the input K-numbers (highest or lowest K), only the side of the master-slave pair that is on the restricted side is held.

Pressure Profiles

Pressures may be applied on all or part of all exterior boundaries. Two

routines for each boundary (K-max, K-min, J-max, J-min) are provided.

A table look-up input system is provided for each boundary. It may be used by the routine that applies pressure as a function of time to the entire boundary, or it may be used by the more general routine. The more general routine will apply pressure to a selected region of a boundary as a function of Time, of X, or of Y.

Pressure on Entire Surface

This card (format shown in Table 3-20) activates the four routines that apply pressure as a function of time to any or

Table 3-20. Pressure on entire surface card format.

Field use	Columns	Input and explanation
Card name	1-10	PBOUNDARY
K-max pressure	11	Integer. If set to "1", the code will use the table input from cards VARPKMAX and PRESKMAX to apply pressure as a function of time to the entire K-max boundary.
K-min pressure	12	Integer. If set to "1", the code will use the table input from cards VARPKMIN and PRESKMIN to apply pressure as a function of time to the entire K-min boundary.
J-max boundary	13	Integer. If set to "1", the code will use the table input from cards VARPJMAX and PRESJMAX to apply pressure as a function of time to the entire J-max boundary.
J-min boundary	14	Integer. If set to "1", the code will use the table input from cards VARPJMIN and PRESJMIN to apply pressure as a function of time to the entire J-min boundary.
J-max "overhang" pressure	15	Integer. If set to "1", the J-max pressure profile (from all input) will be applied to the portion of the "master" surface that overhangs the J-max end of the "slave" surface.
J-min "overhang" pressure	16	Integer. If set to "1", the J-min pressure profile (from all input) will be applied to the portion of the "master" surface that overhangs the J-min end of the "slave" surface.

Fig. 3-6. Pressure applied to slide-line overhang.

all of the exterior boundaries. The pressure is constant for a particular time for every point on the boundary.

Figure 3-6 shows how the pressure is applied to the "Overhang".

Boundary Pressures with Range and Time Controls

These cards (Tables 3-21 through 3-32) allow the user to specify surface pressure as a function of time, of X, or of Y and permits the use of this pressure to be limited by J and K number restrictions, by time restrictions, by X restrictions, and by Y restrictions.

Pressure Table Input (Fig. 3-7)

This input requires three kinds of cards for each boundary that is to have a pressure applied (K-max, K-min, J-max or J-min boundaries).

EXAMPLE: To specify pressure as a function of time on the K-max boundary, with J limits, these cards are required (the PBOUNDARY card is not used).

Table 3-21. Controlled K-max boundary pressure card format.
(Values on VARPKMAX and PRESKMAX cards will be used.)

Field use	Columns	Input and explanation
Card name	1-10	PKMAX
P varies with time	11	Integer. If set to "1", the values on VARPKMAX will be problem "times". Pressure will be a function of time.
P varies with X	12	Integer. If set to "1", the values on VARPKMAX will be X's. Pressure will be a function of X.
P varies with Y	13	Integer. If set to "1", the values on VARPKMAX will be Y's. Pressure will be a function of Y.
J-upper limit	14-16	Integer. If entered, this is the upper J point boundary of the area to which the pressure will be applied. If not entered, there will be no J test.
J-lower limit	17-19	Integer. This is the lower J point boundary to which the pressure will be applied.
Time to start pressure	20-28	This is the start time of the pressure. If the "stop time" is not entered, the pressure will be on at all times.
Time to stop pressure	29-37	If not zero, the pressure will start at the time above and will be set to zero at this time, regardless of the table input data. If this is zero, the start and stop tests are not made.
Lower X	38-46	If this input is nonzero, the boundary zones with an X smaller (more negative) than this will be assigned a pressure of zero.
Upper X	47-55	If an X boundary test is called for by Lower X (above), the boundary zones with an X greater than this will be assigned a pressure of zero.
Lower Y	56-64	If this input is nonzero, the boundary zones with a Y smaller (more negative) than this will be assigned a pressure of zero.
Upper Y	65-73	If a Y boundary test is called for by Lower Y (above), the boundary zones with a Y greater than this will be assigned a pressure of zero.

- A PKMAX card to identify the independent variable (time, in this case), and the J limits.

- One or two VARPKMAX cards with a list of times.

- One or two PRESKMAX cards with a list of pressures.

As a practical matter, it is usually wise to extend the tables beyond the expected independent variable boundaries to avoid difficulty if the problem is ex-

tended in time or if X or Y exceeds its expected values.

Slide-Lines and Voids

The HEMP program allows the user to specify any type of boundary conditions for the ends of K-lines. This flexibility requires that some system be provided for describing the motion of the "slave" points beyond the ends of the "master" line. For this purpose, the code extends

Table 3-22. K-max table, independent variable card format.

Field use	Columns	Input and explanation
Card name	1-10	VARPKMAX
Independent variable in ascending order	11-16	List the variables X, Y, or time in ascending order. Up to 20 variables may be entered. If more than 10 are to be used, a second card with no name or with the same name VARPKMAX may be used.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

Table 3-23. K-max table, pressure card format.

Field use	Columns	Input and explanation
Card name	1-10	PRESKMAX
Pressure table	11-16	List the pressures that correspond to the independent variable. The code will interpolate between input points. List up to 20 pressures on up to two cards.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

the "master" line with a very long line segment at each end. The slave points are constrained to move along these extended lines when they are beyond the

J-max or J-min points. A similar device is used by the program to pick up zonal information from the "slave" side when advancing the "master" points in time.

Table 3-24. Controlled K-min boundary pressure card format.
(Values on VARPKMIN and PRESKMIN cards will be used.)

Field use	Columns	Input and explanation
Card name	1-10	PKMIN
P varies with time	11	Integer. If set to "1", the values on VARPKMIN will be problem "times". Pressure will be a function of time.
P varies with X	12	Integer. If set to "1", the values on VARPKMIN will be X's. Pressure will be a function of X.
P varies with Y	13	Integer. If set to "1", the values on VARPKMIN will be Y's. Pressure will be a function of Y.
J-upper limit	14-16	Integer. If entered, this is the upper J point boundary of the area to which the pressure will be applied. If not entered, there will be no J test.
J-lower limit	17-19	Integer. This is the lower J point boundary to which the pressure will be applied.
Time to start pressure	20-28	This is the start time of the pressure. If the "stop time" is not entered, the pressure will be on at all times.
Time to stop pressure	29-37	If not zero, the pressure will start at the time above and will be set to zero at this time, regardless of the table input data. If this is zero, the start and stop tests are not made.
Lower X	38-46	If this input is nonzero, the boundary zones with an X smaller (more negative) than this will be assigned a pressure of zero.
Upper X	47-55	If an X boundary test is called for by Lower X (above), the boundary zones with an X greater than this will be assigned a pressure of zero.
Lower Y	56-64	If this input is nonzero, the boundary zones with a Y smaller (more negative) than this will be assigned a pressure of zero.
Upper Y	65-73	If a Y boundary test is called for by Lower Y (above), the boundary zones with a Y greater than this will be assigned a pressure of zero.

Table 3-25. K-min table, independent variable card format.

Field use	Columns	Input and explanation.
Card name	1-10	VARPKMIN
Independent variable in ascending order	11-16	List the variables X, Y, or time in ascending order. Up to 20 variables may be entered. If more than 10 are to be used, a second card with no name or with the same name VARPKMIN may be used.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

Table 3-26. K-min table, pressure card format.

Field use	Columns	Input and explanation
Card name	1-10	PRESKMIN
Pressure table	11-16	List the pressures that correspond to the independent variables. The code will interpolate between input points. List up to 20 pressures on up to two cards.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

Table 3-27. Controlled J-max boundary pressure card format.
(Values on VARPJMAX and PRESJMAX cards will be used.)

Field use	Columns	Input and explanation
Card name	1-10	PJMAX
P varies with time	11	Integer. If set to "1", the values on VARPJMAX will be problem "times". Pressure will be a function of time.
P varies with X	12	Integer. If set to "1", the values on VARPJMAX will be X's. Pressure will be a function of X.
P varies with Y	13	Integer. If set to "1", the values on VARPJMAX will be Y's. Pressure will be a function of Y.
K-upper limit	14-16	Integer. If entered, this is the upper K point boundary of the area to which the pressure will be applied. If not entered, there will be no K test.
K-lower limit	17-19	Integer. This is the lower K point to which the pressure will be applied.
Time to start pressure	20-28	This is the start time of the pressure. If the "stop time" is not entered, the pressure will be on at all times.
Time to stop pressure	29-37	If not zero, the pressure will start at the time above and will be set to zero at this time, regardless of the table input data. If this is zero, the start and stop tests are not made.
Lower X	38-46	If this input is nonzero, the boundary zones with an X smaller (more negative) than this will be assigned a pressure of zero.
Upper X	47-55	If an X boundary test is called for by Lower X (above), the boundary zones with an X greater than this will be assigned a pressure of zero.
Lower Y	56-64	If this input is nonzero, the boundary zones with a Y smaller (more negative) than this will be assigned a pressure of zero.
Upper Y	65-73	If a Y boundary test is called for by Lower Y (above), the boundary zones with a Y greater than this will be assigned a pressure of zero.

Table 3-28. J-max table, independent variable card format.

Field use	Columns	Input and explanation
Card name	1-10	VARPJMAX
Independent variable in ascending order	11-16	List the variables X, Y, or time in ascending order. Up to 20 variables may be entered. If more than 10 are to be used, a second card with no name or with the same name VARPJMAX may be used.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

Table 3-29. J-max table, pressure card format.

Field use	Columns	Input and explanation
Card name	1-10	PRESJMAX
Pressure table	11-16	List the pressures that correspond to the independent variables. The code will interpolate between input points. List up to 20 pressures on up to two cards.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

Table 3-30. Controlled J-min boundary pressure card format.

(Values on VARPJMIN and PRESJMIN cards will be used.)

Field use	Columns	Input and explanation
Card name	1-10	PJMIN
P varies with time	11	Integer. If set to "1", the values on VARPJMIN will be problem "times". Pressure will be a function of time.
P varies with X	12	Integer. If set to "1", the values on VARPJMIN will be X's. Pressure will be a function of X.
P varies with Y	13	Integer. If set to "1", the values on VARPJMIN will be Y's. Pressure will be a function of Y.
K-upper limit	14-16	Integer. If entered, this is the upper K point boundary of the area to which the pressure will be applied. If not entered, there will be no K test.
K-lower limit	17-19	Integer. This is the lower K boundary point to which the pressure will be applied.
Time to start pressure	20-28	This is the start time of the pressure. If the "stop time" is not entered, the pressure will be on at all times.
Time to stop pressure	29-37	If not zero, the pressure will start at the time above and will be set to zero at this time, regardless of the table input data. If this is zero, the start and stop tests are not made.
Lower X	38-46	If this input is nonzero, the boundary zones with an X smaller (more negative) than this will be assigned a pressure of zero.
Upper X	47-55	If an X boundary test is called for by Lower X (above), the boundary zones with an X greater than this will be assigned a pressure of zero.
Lower Y	56-64	If this input is nonzero, the boundary zones with a Y smaller (more negative) than this will be assigned a pressure of zero.
Upper Y	65-73	If a Y boundary test is called for by Lower Y (above), the boundary zones with a Y greater than this will be assigned a pressure of zero.

Table 3-31. J-min table, independent variable card format.

Field use	Columns	Input and explanation
Card name	1-10	VARPJMIN
Independent variable in ascending order	11-16	List the variable X, Y, or time in ascending order. Up to 20 variables may be entered. If more than 10 are to be used, a second card with no name or with the same name VARPJMIN may be used.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

Table 3-32. J-min table, pressure card format.

Field use	Columns	Input and explanation
Card name	1-10	PRESJMIN
Pressure table	11-16	List the pressures that correspond to the independent variables. The code will interpolate between input points. List up to 20 pressures on up to two cards.
	17-22	
	23-28	
	29-34	
	35-40	
	41-46	
	47-52	
	53-58	
	59-64	
	65-70	

Input

X, Y, or Time	0	3.	5.	7.5	9.	10.	15	1000
Pressure	0	0	.1	.1	.4	.1	0	0

Fig. 3-7. Example of pressure profile data use.

Slide-lines are specified in "block input." However, the slide-line extension directions may be inputted in general input, and will apply to all the slide-lines

in the problem, unless overridden by block input for a particular slide-line.

The direction that is chosen is ordinarily at about a right angle to the J-max or

J-min surface. A numbering system is used to describe this direction to the code.

Direction "1" is at zero degrees, direction "2" is at 45 degrees, etc. (see Fig. 3-8).

An input number "9" allows the user to specify the extreme end points of the

Fig. 3-8. Standard slide-line extension directions.

extensions instead of the generator placing them at the standard angles. For almost all problems, the standard angle works well even though the slide-line is not quite at that angle. If type "9" is inputted, the coordinates must be supplied with a SLIDE-ANG card with the block input. (See p. 86.) If the type "9" is inputted with block input the X, Y coordinates should be placed out at distances like 10,000 or greater to avoid a twisting effect when the "master" J-max or J-min point moves. Table 3-33 shows the card format.

Fig. 3-9 illustrates the slide-line extension use.

Voids, Stand-Off, and Z-Factor

A void routine may be implemented for any or all "upright" slide-lines. No provision is made for voids in the "inverted" slide line.

The void routine is called for in "block input." The void may be generated

Table 3-33. Slide-line extension angle input card format.

Field use	Columns	Input and explanation
Card name	1-10	SLIDE-ANG
J-max direction	11	Integer. This is the direction number (1-9) that will be used by the code to set up the J-max extension. This is overridden by block input, if used.
J-min direction	12	Integer. This is the direction number (1-9) that will be used by the code to set up the J-min extension. This is overridden by block input, if used.

Columns	Input
11	1
12	5
11	5
12	7
11	9
12	5
13-24	100000.
25-36	.36000.

Fig. 3-9. Slide-line extension use.

either open or closed and may be allowed to open or restrained from opening.

On certain types of problems, a point one K-line away from the "slave" points may pass through the "master" side. This can be prevented by implementing the "stand-off" routine. When it is used, these points are forced to stay a certain distance away from the master surface.

The Z-factor^{*} is used in calculating the effective mass associated with a master J, K point. The acceleration of this point is composed of a component perpendicular to the slide-line, and a component parallel to the slide-line. The perpendicular component includes the mass of the material beneath the slide-line while the parallel

^{*}Appendix B, I, 3, e, -vi- in Ref. 1.

component does not. The Z-factor is calculated by first summing the masses of the zones in the K-line on each side of the slide surface. These sums are then used to calculate the multiplier term, Z. For the upright slide-line, the term (Z-factor) is the $K + 1/2$ mass sum. The inverted slide-line term is the same, except that the denominator is the $K - 1/2$ mass sum.

As implemented in the program, the $\bar{Y}$ (radial) terms are included in the calculation of these sums in the cylindrical case, rather than as shown in Ref. 1, without the $\bar{Y}$ terms.

For a problem with like materials and zoning on both sides of the slide-line, this Z-factor is equal to 2.

This Z-factor is calculated automatically at generation time, but may be overridden by input for special applications. Provision is made on this card for inputting these numbers. A number inputted for

the upright slide line will apply to all upright slide lines. A number inputted for the inverted slide-line will apply to all inverted slide-lines. Table 3-34 shows the card format.

Tied Sliding

Regular sliding surfaces offer no resistance to lateral motion along the slide-line. Sometimes it is desirable to have some or all points along a slide-line be treated as though they were general interior points for all time, or until certain criteria are met. This can be done with an upright slide-line by calling for tied sliding by specifying which points are tied and specifying the release criteria. These criteria are specified on the TIEBREAK card.

Tied sliding is called for in block input. It uses the void routine so void opening and closing is allowed with tied sliding. See paragraphs "Slide-Lines," page 85, and "Tied Sliding Input," page 94.

Table 3-34. Voids, stand-off and Z-factor card format.

Field use	Columns	Input and explanation
Card name	1-10	SP-SLIDE
Void opening control	11-18	Used with void routine only. If this card is not used, this number is set to 1000000, which won't allow a void to open at all. A void can close but will not reopen. If this card is used and this input is left blank or set to zero, the distance squared that a point must pull away from the slide "master" to open a void will be set to 0.00001 cm^2 . This is the normal value for void opening. If any other number is used, this will be the distance squared (in cm^2) to open a void at a point.
Stand-off distance	19-26	If not zero, the stand-off routines will be used. This number is the distance (in cm) that the next K-line will be forced to stay away from the master line. The number that is often used is about 1/10th of the usual zone thickness.
Z-factor upright	27-34	If not zero, the Z-factor for all "upright" slide-lines will be this number.
Z-factor inverted	35-42	If not zero, the Z-factor for all "inverted" slide-lines will be this number.

The points that are to be tied ("master" and "slave"), must meet at generation time.

If any points of a particular slide line are not tied at generation time, "block boundary" input must specify which points are tied. In that case, the closed void (number 2) is called for with block input, and tied sliding (number 4) is inputted for the tied points with boundary input. If part of the line is initially open, a "3" is used with the block input. The status numbers are explained in the paragraphs mentioned above. Table 3-35 shows the card format.

Material and Material-Related Input

Provision has been made in the program for 60 equations of state. The practice has been to use numbers 1 through 9 for high explosives and numbers 10 through 60 for non-HE materials.

The equation forms are listed below by letter. Then the equation-of-state numbers are listed along with its form, its coefficients (if HE) and any special information. No non-HE coefficients are included. The user must input the coefficients for all non-HE equations of state and may change the HE coefficients if desired. Longer forms may be used by leaving appropriate coefficients at zero.

Form A (HE, Wilkins Form)—

$$P = a\eta^a + b \left(1 - \frac{\omega}{R\eta}\right) e^{\frac{R}{\eta}} + \omega\eta\epsilon$$

where $\eta = \frac{1}{V}$ and ϵ is energy. In HEMP input terms the equation is written as:

$$P = C_1\eta^{C_2} + C_3 \left(1 - C_4\eta\right) e^{\frac{C_5}{\eta}}$$

$$+ C_6\eta\epsilon \text{ if } V > C_8, P^{n+1} = P^n.$$

For the sound speed calculations a representative gamma-1 is put in C_7 .

Form B (Gamma Law HE)—

$$P = (\gamma - 1) (1 + \mu)\epsilon$$

or

$$P = C_1 (1 + \mu)\epsilon$$

where

$$\mu = \frac{1}{V} - 1 \text{ and } \epsilon \text{ is energy}$$

Form C (HE, JWL Form) (see Table 3-36)—

$$P = A \left(1 - \frac{\omega}{R_1 V}\right) e^{-R_1 V} + B \left(1 - \frac{\omega}{R_2 V}\right) e^{-R_2 V} + \omega\eta\epsilon$$

where

$$\eta = \frac{1}{V} \text{ and } \epsilon \text{ is energy.}$$

In HEMP input terms,

$$P = C_1 \left(1 - \frac{C_3}{V}\right) e^{-C_2 V} + C_4 \left(1 - \frac{C_6}{V}\right) e^{-C_5 V} + C_7\eta\epsilon$$

$$\text{if } V > C_8, P^{n+1} = P^n.$$

For the sound speed calculation, a representative gamma-1 is put in C_9 .

Form D—Inputting a form D equation-of-state number causes subroutine calls to be made to entry point EQSTHE in CZNLAA. The user can supply any HE form there. (See "Equation-of-State" paragraph, page 12 and "Equation-of-State Numbering System paragraph", page 20.

Table 3-35. Tied sliding card format.

Field use	Columns	Input and explanation
Card name	1-10	TIEBREAK
OSS test	11-18	If the OSS (octagonal shear stress) is greater than this number, the point being tested will be allowed to slide. If zero or blank, this test is not made.
IPD test	19-26	The P - S-max and this test are applied in an "or" test to determine if the point is to be released. If the P - S-max input is not zero, both tests are used. If the IPD (internal plastic distortion) is greater than this value, the tied point will be released. Setting this to a large positive value will prevent a point from being released by this IPD test and, in effect, only the P - S-max test will cause release.
P - S-max	27-34	If this is not zero, both the IPD and the P - S-max tests are applied. P - S-max is not normally calculated but is automatically called for when this test on tie breaking is used. Setting this input number to a large negative value will prevent a point from being released by this P - S-max test and, in effect, only the IPD test will cause release. Setting both values large will cause the points to be tied for all time. (P minus S-max is the pressure minus the maximum of S_1 , S_2 , and S_3 .)
Time to begin release on velocity test,	35-42	If this is not zero, the routine that releases points along the slide line at a certain time determined by a velocity (below) will be activated. This is the time to start the release.
Velocity	43-50	This is the release velocity (the velocity that the crack is forming).
X or start	51-58	This is the X coordinate of the start of the release line. It is used with Y and the velocities to calculate release times for all tied points.
Y or start	59-66	This is the Y coordinate of the start of the release line.
Release fraction	67-74	If this is zero, tied points when released by any of the criteria will be released at once. If not zero, the acceleration on the sliding side will be gradually applied. The number should be about equal to 1-1/2 times the distance between tied points, divided by the release velocity. The use of this option (release fraction) allows the user to allow the velocity of a released point to build up over a period of time. By setting it as described above, the point will be fully released about the same time that the next point in the slide line is released. This option more closely simulates a continuous medium and may prevent local instabilities.

Table 3-36. JWL parameters.

	IMX ^a	ΔA	NM	ΔB	P ₀ TN ΔA	TNT	Comp B, grade A	Cyclotol	PMX 0011	ΔA	PMX 0401	ΔA	LS-04-1 ΔB	ΔC	LS- 07-0
C ₁	7.920	2.0028	1.3527	7.0653	3.71213	3.71213	3.24220	6.03414	0.31717	0.3443	6.72023	0.1004	6.11034	5.91143	6.0074
C ₄	0.07071428	0.030203	0.039204	0.19241	0.032206	0.076783	0.0092337	0.0092337	0.070082	0.204193	0.200730	0.13277	0.076072	0.030037	0.070400
C ₇	0.006430	0.007042	0.006432	0.006631	0.010427	0.010427	0.010427	0.010733	0.007370	0.00734	0.0066631	0.11353	0.0066631	0.0094713	0.0114430
C ₂	4.2	4.1	0.6	4.8	4.15	4.2	4.7	4.7	4.2	4.6	4.23	4.63	4.07	4.0	4.3
C ₅	1.0	1.2	1.0	1.2	0.95	1.10	1.1	1.1	1.0	1.25	1.45	1.20	1.00	0.8	1.0
C ₇	0.3	0.3	0.375	0.25	0.30	0.34	0.35	0.35	0.3	0.25	0.25	0.35	0.25	0.3	0.4
E ₀ (Nbar/cc)	0.105	0.051	0.031	0.101	0.07	0.005	0.002	0.002	0.009	0.102	0.102	0.003	0.003	0.003	0.006
rho ₀ (g/cc)	1.001	1.128	1.120	1.77	1.03	1.717	1.754	1.754	1.77	1.64	1.64	1.063	1.503	1.063	1.063
P _{CJ} (Nbar)	0.42 ^a	0.125 ¹⁰	0.140 ¹⁰	0.32 ¹¹	0.21 ¹²	0.203 ¹²	0.32 ¹²	0.32 ¹²	0.34 ^a	0.37 ¹¹	0.300 ⁴	0.34 ¹¹	0.36 ⁴	0.36 ⁴	0.34 ²
Gamma _{CJ}	2.7405	2.0380	2.107 ⁵	2.012	2.727	2.700	2.707	2.707	2.7611	2.85	2.630	2.9355	2.60	2.90	2.7027
U ₀ T ₀ velocity (cm/usac)	0.011	0.6287	0.6207	0.43 ¹¹	0.095	0.700	0.035	0.035	0.05	0.08	0.50	0.047	0.047	0.046	0.064

^aP_{CJ} assumed from $P = \frac{10^7}{1 + \Gamma_{CJ}}$; $2.7 < \Gamma_{CJ} < 2.8$, $C_3 \cdot \frac{1}{\Gamma_1}$, $C_0 \cdot \frac{1}{\Gamma_2}$, $C_7 \cdot 2$, $C_0 \cdot 300$

Form E—

$$P = C_1 \mu + C_2 \mu^2 + (C_3 + C_4 \mu) \epsilon;$$

if $\mu < 0$, $C_2 \mu^2$ is set to zero.

Here,

$$\mu = \frac{1}{V} - 1, \epsilon \text{ is energy.}$$

Form F—

$$P = C_1 \mu + C_2 \mu^2;$$

if $\mu < 0$, $C_2 \mu^2$ is set to zero.

Form G—

$$P = C_1 \mu + C_2 \mu^2 + C_3 \mu^3 + (C_4 + C_5 \mu) \epsilon;$$

if $\mu < 0$, $C_2 \mu^2$ is set to zero.

Form H—

$$P = C_1 \mu + C_2 \mu^2 + C_3 \mu^3;$$

if $\mu < 0$, $C_2 \mu^2$ is set to zero.

Form J—

$$P = C_1 (1 + \mu) \epsilon.$$

Form K—

$$P = C_1 + C_2 \mu + C_3 \mu^2 + C_4 \mu^3$$

$$+ (C_5 + C_6 \mu + C_7 \mu^2) \epsilon;$$

if $\mu < 0$, $C_2 \mu^2$ and $C_7 \mu^2$ are set to zero.

Form L— These equations of state call dummy entry points in the CZNLAA subroutine. See the write-up of form D.

Form M— Multiphase. See the write-up of equation-of-state 59.

Table 3-37 lists the 60 equations of state, their form, material (for some

HE's), the coefficients in the code, and the material-related properties. The burn velocity for HE's is not carried or used with material input but is listed as a convenience to the user. It is needed in "block input" for most HE burn schemes.

C_1 through C_{12} are the various coefficients. ELMU is the shear modulus. YELT is the yield in tension, YELC is the yield in compression. RHO is the density. E is the initial energy. V is the initial relative volume. PMIN is the minimum pressure that will be allowed. Q_A and Q_B are the Q coefficients. CANS is the C_a of the Navier-Stokes Q. CSNS is the C_s of the Navier-Stokes Q. YNS is the Navier-Stokes "yield" number.

BETA is the number used in calculating the burn for HE's (for Gamma-Law HE's, it is set to Gamma + 1). CAQ is the coefficient for the triangle or rotational Q. The units of ELMU, YELT and YELC are megabars.

Equations of state 10 through 60 have coefficients of zero; V, Q_B , and RHO for these equations are set to 1. PMIN is set to -0.01 and Q_A is set to 4. All of the other input numbers are preset to zero. Table 3-38 lists the form numbers.

Equation-of-state number 59 is a five-part multiphase equation of state. It uses the five general equations of state 35 through 39. All material-related properties are inputted using the number "59" except the coefficients to be used for the five phases and PMIN, which must be inputted for numbers 35 through 39 but need not be inputted for 59. The phase change is a function of μ which is equal to $1/V - 1$.

Table 3-37. HE equation of state.

Number	HE material								
	1	2	3	4	5	6	7	8	9
Form	A	B	B	C(JWL)	C(JWL)	A	D	D	D
Material	9404	Cyclotol	Comp B	—	—	LX-04	—	—	—
C1	-0.0034844	1.85	1.77	0*	0*	-0.0008335			
C2	4.					4.			
C3	6.43536					5.943			
C4	0.0875					0.1			
C5	4.					4.			
C6	0.35					0.4			
C7	2.					2.			
C8	100.					100.			
C9	2.					2.			
C10									
C11									
C12									
ELMU	0	0	0	0	0	0	0	0	0
YELC	0	0	0	0	0	0	0	0	0
YELT	0	0	0	0	0	0	0	0	0
RHO	1.84	1.755	1.715	1.	1.	1.865	1.	1.	1.
E	0.139852	0.0836	0.082	0	0	0.1126	0	0	0
V	1.	1.	1.	1.	1.	1.	1.	1.	1.
PMIN	0	0	0	0	0	0	0	0	0
Q _A	4.	4.	4.	4.	4.	4.	4.	4.	4.
Q _B	1.	1.	1.	1.	1.	1.	1.	1.	1.
CANS	0	0	0	0	0	0	0	0	0
CSNS	0	0	0	0	0	0	0	0	0
YNS	0	0	0	0	0	0	0	0	0
CAQ	0	0	0	0	0	0	0	0	0
BETA	3.658	3.85	3.77	0	0	3.726	0	0	0
Burn velocity	0.88	0.83	0.8			0.848			

Material-related input names.

* See Table 3-36 (JWL materials).

μ is tested against the equation-of-state input values for number 50.

If $\mu < C_1$, use equation-of-state number 35.

If $C_1 < \mu < C_2$, use equation-of-state number 36.

If $C_2 < \mu < C_3$, use equation-of-state number 37.

If $C_3 < \mu < C_4$, use equation-of-state number 38.

If $\mu > C_4$, use equation-of-state number 39.

Table 3-38. Non-HE material form number table.

Form	Number
E	10, 11, 12, 13, 14, 15
F	16, 17, 18, 19, 20
G	21, 22, 23, 24, 25
H	26, 27, 28, 29, 30
J	31, 32, 33, 34
K	35, 36, 37, 38, 39, and 40 (40 allows an energy leak or sink term, see below)
L	Dummy equation-of-state calls 52 calls EQSTA in CZNLA 53 calls EQSTB in CZNLA 54 calls EQSTC in CZNLA 55 calls EQSTD in CZNLA
M	59. See the write-up on 59, above. Number 60 can be used at present time to make a form "inert." See the write-in below.
All other numbers are not used.	

Table 3-39. Material-related input cards.

Field use	Columns	Input and explanation
Card name	1-8	MATINPUT
Material number	9-10	Integer. The material number of the values that are to be inputted or changed (right-adjusted).
Variable name	11-14	Any of the names in the vocabulary list. it <u>must be</u> left-adjusted.
Value	15-24	The value of the input.
Name	25-28	
Value	29-38	
Name	39-42	
Value	43-52	
Name	53-56	
Value	57-66	
Name	67-70	
Value	71-80	

The current equation-of-state number for the various phases is printed out in the "F" column.

Equation of state 60 sets all calculated zonal quantities to zero except V. It may be used occasionally in an active problem

to make a zone "inert." Equation of state 40 is of the general form and may be used just like the other general equations of state 35 through 39. To implement the leak-sink term, put a nonzero start time in C_8 . After that time energy will be leaked or added according to the equation $E_{leak-sink} = ((C_9 + C_{10} * Time) * Delta-T)$.

Material-Related Input Cards (see Table 3-39)

The following is the material input vocabulary:

C1	Coefficient input of the equations of state
C2	
C3	
C4	
C5	
C6	
C7	
C8	
C9	
C10	
C11	
C12	

ELMU - Shear modulus
 YELT - Yield in tension
 YELC - Yield in compression
 Q_A - A term of Q calculations
 Q_B - B term of Q calculations
 CAQ - Angle Q coefficient
 V - Volume (relative)
 E - Energy
 RHO - Reference density
 PMIN - Minimum pressure
 CANS - C_a Navier-Stokes Q coefficient
 CSNS - C_s Navier-Stokes Q coefficient
 YNS - Yield Navier-Stokes Q.
 BETA - Equivalent to $\gamma + 1$.

The vocabulary can be entered in any order and blank fields are allowed.

Cards may be added with or without the card name but all cards must include a material number in columns 9-10.

"Q" Input (Artificial Viscosity)

Unless otherwise changed by input, the HEMP program will automatically utilize the linear-quadratic Q for all zones. The standard numbers for Q_A and Q_B will be used unless changed by material-related input cards. (The standard numbers for Q_A and Q_B are 4. and 1. respectively.)

The Navier-Stokes Q is as written in Ref. 1 except that a limiting condition similar to the elastic yield condition has been added. If no limit is desired, putting a one (1.) in YNS will effectively remove the test. C_a is entered as CANS and C_s is entered as CSNS. The values to be used may depend on the problem but a CANS of .125 and a CSNS of .25 have been utilized. Experience with a particular problem may dictate adjustments of these values.

The triangular Q input is material-related. To use this Q, the input value for the term "a" is entered as CAQ on a material-related input card. A value of about .001 has been used; however, the user may find that other values may be used to advantage in certain cases.

The rotational Q uses the same input name CAQ to input the material-related constant. A value of about .1 to .5 has been employed. In addition, the rotational Q flag word on the QCONTROL card must be set to non-zero. The rotational Q and the triangular Q may not both be used in the same problem.

An upper limit of the value of the Linear-Quadratic Q is used to stop a problem that has become unstable. This

Table 3-40. Q input card format.

Field use	Columns	Input and explanation
Card name	1-10	QCONTROL
Rotational Q flag	11-18	If set to non-zero, the Rotational Q will be used for any material for which a CAQ has been entered (instead of the Triangular Q).
Q-stop	19-26	If zero or blank, the problem will terminate when the Q reaches 100. If not zero, the problem will stop when the Q reaches that value.
Q-max	27-34	If zero or blank, the maximum Q that will be allowed will be 100,000. If not zero the maximum will be that number. The Q-stop and Q-max tests are applied only on the linear-quadratic Q.

Table 3-41. Special calculations card format.

Field use	Columns	Input and explanation
Card name	1-10	CALC-OPT
OSS	11-13	If not zero, the OSS (Octagonal Shear Stress) calculation will be bypassed. If zero or blank, the calculation will be done. (OSS is stored in variable 27).
P - S-max	14-16	If not zero, pressure minus the maximum of S_1 , S_2 , and S_3 is stored in variable 28. If zero or blank, it will not be calculated unless "tied sliding" has been called for.
IPD	17-19	If not zero the IPD (Internal Plastic Distortion) calculation will be bypassed. If zero, the IPD calculation will be done. (Uses variable 29.)
S_1, S_2, S_3	20-22	If not zero, the S_1, S_2, S_3 calculation will be bypassed. If zero, the S_1, S_2, S_3 will be done. These terms are needed to calculate P-S-max. The only reason to bypass this calculation would be to save computer time because no grid variable storage is used.
Lambda	23-25	If not zero, the Lambda calculation will be done. Lambda is a scalar plastic flow-rate parameter (Ref. 1 equations of state, plastic flow region). If zero, the calculation will not be done. This calculation uses variables 25 through 28.
X-zero and Y-zero	26-28	If zero, the initial X and Y coordinate values for all J, K points will be saved in variables 25 and 26. If not zero, they will not be saved.

prevents wasted machine time and usually stops a problem shortly after it has gotten into trouble. The standard number that it is automatically set to is 100 (arbitrarily). It may be changed by input (QCONTROL card). Some problems

may have legitimate Q's this high, so the value must be raised by input. (See Table 3-40.)

In certain cases, the user may wish to set an upper limit that the Linear-Quadratic Q may reach (but continue

running). The Q-max option on the QCONTROL card allows this. Unless inputted, it is automatically set to a huge value (larger than Q stop) so that it has no effect. To have an effect, it must be set lower than the value in Q stop, and the Q must reach that value. Care should be exercised in employing this technique.

Special Calculations (see Table 3-41)

A number of special calculations are optional. In general, these are not used in the usual problem but have been included because of their usefulness for special purposes or for outputting. Because some of these calculations use the same storage location, there are restrictions on their concurrent use. The "tied sliding" routine, if used, does require certain of these calculations. If used, certain of these options store quantities

in variables 25 through 29 of the HEMP grid.

Table 3-42 shows the uses of grid variables 25 through 32. An "X" means the variable is used unless bypassed by input. A "O" means that it is used if called for.

Gravity (see Table 3-43)

The gravity routine not only applies the gravity force to the grid but calculates

Table 3-42. Uses of grid variables 25 through 32.

	X, Y zero	OSS	IPD	P-S-max	Lambda
Variable 25	X				O
Variable 26	X				O
Variable 27		X			O
Variable 28				O	O
Variable 29			X		
Variable 30					
Variable 31					
Variable 32					

Table 3-43. Gravity card format.

Field use	Columns	Input and explanation
Card name	1-10	GRAVITY
Gravity	11-17	The acceleration in $\text{cm}/\mu\text{sec}^2$.
Sin ϕ	18-24	The sin of the angle between a line running directly to the right and the line representing a flat "water plane" surface. This should be zero if the gravity is directed in the -Y direction.
Cos ϕ	25-31	The cos of the above described angle. This should be one (1.), if the gravity is directly in the -Y direction
Bulk Modulus	32-38	The equation of state used for the material must be $P = K\mu$. The K is also entered here.
X1	39-45	Enter the X of one end of the "water plane surface" line.
Y1	46-52	Enter the Y that goes with X1.
X2	53-59	Enter the X of the other end of the surface line.
Y2	60-66	Enter the Y that goes with X2.
Delta-Z	67-73	Enter the zone thickness in the gravity direction.
Y offset	74-80	Enter the distance of offset negative Y's below the X axis. Zones below will be assigned equation of state 60 and a density of 1×10^{-6} .

the initial V so that the gravity is in balance with the pressure at start time. A rectangular grid (plane case) is generated. It must have equal thickness zoning in the downward direction. The grid can be oriented at any angle. Provision is also made to offset any negative Y 's by an additional distance so that sloping boundaries can be set up. The negative zones are offset, the equation of state is automatically changed to

number 60 (inert) and their density is set at 1×10^{-6} . These zones are, in effect, removed from the problem so that a boundary sloping through the original grid is established. If this sloping boundary is utilized, the user should also call for the XYQUAD option that keeps Y at zero if it is at zero.

Two examples are shown in Fig. 3-10 following the card format explanation.

Field	Columns	Input Example 1	Input Example 2
Card name	1 - 10	Gravity	Gravity
Gravity	11 - 17	9.8 E-10	9.8 E-10
Sin ϕ	18 - 24	0.	.707
Cos ϕ	19 - 31	1.	.707
Bulk modulus	32 - 38	.5	.5
X1	39 - 45	0.	0.
Y1	46 - 52	5.	0.
X2	53 - 59	10.	7.071
Y2	60 - 66	5.	7.071
Delta Z	67 - 73	1.25	1.25
Y OFF	74 - 80	--	100.

Fig. 3-10. Examples of gravity input.

Fini Card (see Table 3-44)

This card must be the last card in the general input group.

Block Input Section Discussion

Block input includes those items that are related to the regions within the block. These items include boundary coordinates (Cartesian or Polar), zone counts, material selection, volume, energy, density, velocity, and HE parameters.

Block input also is used to call for and describe slide-lines and to call for K-by-K and point-by-point input for the K's within the block.

K-Zoning Input

A card that must be included in every block is the K-zone count card. (See Table 3-45.)

J-Zone Input (see Tables 3-46 through 3-49)

The number of zones in the J direction for each region must be inputted. If the lower-K boundary of the block is zoned in the same manner as the higher-K boundary, the lower-K input need not be specified; the generator will accept the higher-K zoning for both surfaces. Cards with blank data need not be included in the block.

If both the higher-K and lower-K zoning is specified, the sum of all zones in the regions of each must be equal.

The total number of J-zones in a K-line of a block must be less than (by one or more) the number entered in the Max-J field on the GENERAL card..

There can be up to eight regions in a block. Each region requires a J-zone

Table 3-44. Fini card format.

Field use	Columns	Input and explanation
Card name	1-10	FINI
Comments	11-80	The user may put anything in these columns. They are ignored by the generator. It is useful in card handling to have the words "Of General" in these columns.

Table 3-45. K-zone count card format.

Field use	Columns	Input and Explanation
Card name	1-10	NKZONESBLK
Number of K-zones	11-13	Integer. Enter the number of K-zones in the block.

The block shown would have a K-zone count of 3.

Table 3-46. J-zoning Cartesian, higher-K boundary card format.

Field use	Columns	Input and Explanation
Card name	1-10	JZOUTC
J-min region zoning Cartesian (higher-K)	11-13	Integer. The number of Cartesian zones in the region of the higher-K boundary at the J-min end of the block. If zero, the first region is polar. If the JZINNC or the JZINNP cards are not used, this zoning applies to the lower-K boundary also. The corner card's values are interpolated.
Second region	14-16	Integer. The second region Cartesian zone count.
Third region	17-19	Integer. The third region Cartesian zone count.
Fourth region	20-22	Integer. The fourth region Cartesian zone count.
Fifth region	23-25	Integer. The fifth region Cartesian zone count.
Sixth region	26-28	Integer. The sixth region Cartesian zone count.
Seventh region	29-31	Integer. The seventh region Cartesian zone count.
Eighth region	32-34	Integer. The eighth region Cartesian zone count.

Table 3-47. J-zoning Polar, higher-K boundary card format.

Field use	Columns	Input and Explanation
Card name	1-10	JZOUTP
First region Polar	11-13	Integer. The number of Polar zones in the region of the higher-K boundary at the J-min end of the block. Must not be zero if the first region of the JZOUTC card is blank or zero. This will apply to the lower-K boundary also if the JZINNC or JZINNP cards are not used.
Second region	14-16	Integer. The second region Polar zone count.
Third region	17-19	Integer. The third region Polar zone count.
Fourth region	20-22	Integer. The fourth region Polar zone count.
Fifth region	23-25	Integer. The fifth region Polar zone count.
Sixth region	26-28	Integer. The sixth region Polar zone count.
Seventh region	29-31	Integer. The seventh region Polar zone count.
Eighth region	32-34	Integer. The eighth region Polar zone count.

input number that specifies the number of J-zones in that region.

If that number is entered on a Cartesian card, that segment of the boundary (or boundaries) will be generated using the

Cartesian corner points and interpolating linearly. If that number is entered on a polar card, that segment of the boundary (or boundaries) will be generated using the polar input data and interpolating

Table 3-48. J-zoning Cartesian, lower-K boundary card format.

Field use	Columns	Input and explanation
Card name	1-10	JZINNC
J-min region zoning Cartesian (lower-K)	11-13	Integer. If zero, the JZINNP input is used, or the higher-K input is used.
Second region	14-16	Integer. The second region lower-K Cartesian zone count.
Third region	17-19	Integer. The third region low-K Cartesian zone count.
Fourth region	20-22	Integer. The fourth region low-K Cartesian zone count.
Fifth region	23-25	Integer. The fifth region low-K Cartesian zone count.
Sixth region	26-28	Integer. The sixth region low-K Cartesian zone count.
Seventh region	29-31	Integer. The seventh region low-K Cartesian zone count.
Eighth region	32-34	Integer. The eighth region low-K Cartesian zone count.

Table 3-49. J-zoning Polar, lower-K boundary card format.

Field use	Columns	Input and explanation
Card name	1-10	JZINNP
J-min region zoning Polar (lower-K)	11-13	Integer. If zero, the JZINNC input is used, or the higher-K input is used.
Second region	14-16	Integer. The second region low-K Polar zone count.
Third region	17-19	Integer. The third region low-K Polar zone count.
Fourth region	20-22	Integer. The fourth region low-K Polar zone count.
Fifth region	23-25	Integer. The fifth region low-K Polar zone count.
Sixth region	26-28	Integer. The sixth region low-K Polar zone count.
Seventh region	29-31	Integer. The seventh region low-K Polar zone count.
Eighth region	32-34	Integer. The eighth region low-K Polar zone count.

Fig. 3-11. Examples of regional mixed Polar and Cartesian inputs.

equally along the arc.

Figure 3-11 and Table 3-50 show the use of these cards. (The other boundary data is not shown.)

Material Number and Material-Related Input (See Tables 3-51 through 3-54)

The material regions are associated with the J-zoning high-K cards. An equation-of-state number must be entered for each higher-K region.

Energy, volume and density may be entered by region. These numbers will override the general input numbers only for the region of input.

Cartesian Corner Cards (See Table 3-55)

If there are more than four regions in the block, and the additional regions are Cartesian input, follow the above card with another card, with or without

Table 3-50. J-zonal input used to generate examples.

Example	Cards	Regions and columns							
		1 11-13	2 14-16	3 17-19	4 20-22	5 23-25	6 26-28	7 29-31	8 32-34
I	JZOUTC	4							
	JZOUTP								*
	JZINNC								*
	JZINNP								*
II	JZOUTC	4	3						
	JZOUTP								*
	JZINNC								*
	JZINNP								*
III	JZOUTC	7							
	JZOUTP								*
	JZINNC	2	3	2					
	JZINNP								*
IV	JZOUTC	2	3	2	2	2			
	JZOUTP								*
	JZINNC	2	6	3					
	JZINNP								*
V	JZOUTC			3					
	JZOUTP	4	3						
	JZINNC	1							
	JZINNP		9						

* Don't need the card.

Table 3-51. Material card format.

Field use	Columns	Input and explanation
Card name	1-10	MATNO
Material number	11-13	Integer. Equation-of-state number (1-60) of material in region at J-min end.
Material number	14-16	Integer. Equation-of-state, region 2.
Material number	17-19	Integer. Equation-of-state, region 3.
Material number	20-22	Integer. Equation-of-state, region 4.
Material number	23-25	Integer. Equation-of-state, region 5.
Material number	26-28	Integer. Equation-of-state, region 6.
Material number	29-31	Integer. Equation-of-state, region 7.
Material number	32-34	Integer. Equation-of-state, region 8.

Table 3-52. Volume card format.

Field use	Columns	Input and explanation
Card name	1-10	VOLUME
Volume, J-min region	11-18	If not zero, the relative volume (V) of the J-min region will be this number.
Region 2V	19-26	V, region 2.
Region 3V	27-34	V, region 3.
Region 4V	35-42	V, region 4.
Region 5V	43-50	V, region 5.
Region 6V	51-58	V, region 6.
Region 7V	59-66	V, region 7.
Region 8V	67-74	V, region 8.

Table 3-53. Energy card format.

Field use	Columns	Input and explanation
Card name	1-10	ENERGY
Energy J-min region	11-18	If not zero, the initial energy (ϵ) of the J-min region will be this quantity.
Region 2 ϵ	19-26	ϵ , region 2.
Region 3 ϵ	27-34	ϵ , region 3.
Region 4 ϵ	35-42	ϵ , region 4.
Region 5 ϵ	43-50	ϵ , region 5.
Region 6 ϵ	51-58	ϵ , region 6.
Region 7 ϵ	59-66	ϵ , region 7.
Region 8 ϵ	67-74	ϵ , region 8.

Table 3-54. Density card format.

Field use	Columns	Input and explanation
Card name	1-10	DENSITY
Density J-min region	11-18	If not zero, the density (Rho-Zero) of the J-min region will be this quantity.
Region 2 Rho	19-26	Rho-Zero, region 2.
Region 3 Rho	27-34	Rho-Zero, region 3.
Region 4 Rho	35-42	Rho-Zero, region 4.
Region 5 Rho	43-50	Rho-Zero, region 5.
Region 6 Rho	51-58	Rho-Zero, region 6.
Region 7 Rho	59-66	Rho-Zero, region 7.
Region 8 Rho	67-74	Rho-Zero, region 8.

Table 3-55. K-max (K-outer) of block card format.

Field use	Columns	Input and explanation
Card name	1-10	CORNRMAX
J-min K-max X	11-17	Enter the J-min, K-outer X if the J-min region has K-outer Cartesian input.
J-min K-max Y	18-24	J-min - K-max Y
Second X	25-31	Input the second X (the X of the J-max end of the K-outer Cartesian segment). The X, Y pairs must be inputted for both ends of each Cartesian segment. This input is unnecessary if the point is bounded by Polar regions or if block boundary input is to be used for the regions on either side of the point.
Second Y	32-38	Second Y.
Third X	39-45	X of third point. J-max end of region 2.
Third Y	46-52	Y of third point. J-max end of region 2.
Fourth X	53-59	X of fourth point. J-max end of region 3.
Fourth Y	60-66	Y of fourth point. J-max end of region 3.
Fifth X	67-73	X of fifth point. J-max end of region 4.
Fifth Y	74-80	Y of fifth point. J-max end of region 4.

Table 3-56. Additions to K-max (K-outer) of block card format.

Field use	Columns	Input and explanation
Card name	1-10	CORNRMAX or blank
Sixth X	11-17	X of sixth point. J-max end of region 5.
Sixth Y	18-24	Y of sixth point. J-max end of region 5.
Seventh X	25-31	X of seventh point. J-max end of region 6.
Seventh Y	32-38	Y of seventh point. J-max end of region 6.
Eighth X	39-45	X of eighth point. J-max end of region 7.
Eighth Y	46-52	Y of eighth point. J-max end of region 7.
Ninth X	53-58	X of ninth point. J-max end of region 8.
Ninth Y	59-66	Y of ninth point. J-max end of region 8.

the name, with the additional point. (See Table 3-56.)

K-min of Block, Second Card
(See Table 3-57)

This card is the same format as the second card of the K-outer input. Use only if there is Cartesian input for the fifth, sixth, seventh, or eighth regions.

Table 3-57. K-min (K-Inner) of block card format.

Field use	Columns	Input and explanation
Card name	1-10	CORNRMIN
J-min K-min X	11-17	Enter the J-min, K-inner X if the J-min region has K-inner Cartesian input.
J-min K-min Y	18-24	J-min - K-min Y
Second X	25-31	X of second point, K-inner boundary.
Second Y	32-38	Y of second point, K-inner boundary.
Third X	39-45	X of third point, K-inner boundary.
Third Y	46-52	Y of third point, K-inner boundary.
Fourth X	53-58	X of fourth point, K-inner boundary.
Fourth Y	59-66	Y of fourth point, K-inner boundary.
Fifth X	67-73	X of fifth point, K-inner boundary.
Fifth Y	74-80	Y of fifth point, K-inner boundary.

Table 3-58. K-Polar radius, outer K card format.

Field use	Columns	Input and explanation
Card name	1-10	RADIUSOUTR
Radius of first region	11-18	Enter the radius of the arc centered at XKMAXSHIFT, YKMAXSHIFT, for the first region.
R region 2	19-26	Radius of arc, region 2.
R region 3	27-34	Radius of arc, region 3.
R region 4	35-42	Radius of arc, region 4.
R region 5	43-50	Radius of arc, region 5.
R region 6	51-58	Radius of arc, region 6.
R region 7	59-66	Radius of arc, region 7.
R region 8	67-74	Radius of arc, region 8.

Polar Input Cards

K-Polar input is input that causes a region (or regions) within a block to have its K-outer or K-inner boundary generated as points on an arc.

J-Polar input is input that causes a J-boundary between regions to be generated as points on an arc.

J-Polar and K-Polar can not be used in the same block.

To generate the desired arc, the user specifies radius, x and y of the center, and beginning and ending angles (deg).

Points that are common to both Cartesian and K-Polar input must be described in both ways.

Table 3-59. K-Polar angle, outer K, J-min end of arc card format.

Field use	Columns	Input and explanation
Card name	1-10	JMN-KX-ANG
J-min angle first region	11-18	Enter the angle (in degrees) for the J-min end of the first region arc. The angle is measured counterclockwise from a line directly to the right of the center.
J-min angle 2	19-26	Angle of J-min end of arc, region 2.
J-min angle 3	27-34	Angle of J-min end of arc, region 3.
J-min angle 4	35-42	Angle of J-min end of arc, region 4.
J-min angle 5	43-50	Angle of J-min end of arc, region 5.
J-min angle 6	51-58	Angle of J-min end of arc, region 6.
J-min angle 7	59-66	Angle of J-min end of arc, region 7.
J-min angle 8	67-74	Angle of J-min end of arc, region 8.

Table 3-60. K-Polar angle, outer K, J-max end of arc card format.

Field use	Columns	Input and explanation
Card name	1-10	JMX-KX-ANG
J-max angle first region	11-18	Enter the angle (in degrees) of the J-max end of the first region arc.
J-max angle 2	19-26	Angle of J-max end of arc, region 2.
J-max angle 3	27-34	Angle of J-max end of arc, region 3.
J-max angle 4	35-42	Angle of J-max end of arc, region 4.
J-max angle 5	43-50	Angle of J-max end of arc, region 5.
J-max angle 6	51-58	Angle of J-max end of arc, region 6.
J-max angle 7	59-66	Angle of J-max end of arc, region 7.
J-max angle 8	67-74	Angle of J-max end of arc, region 8.

K-Polar Input

To describe the arc of the K-Polar regions, five cards are used for each K-boundary. Three of these cards are normally used for all arcs. Two cards describe the angles of the J-min and the J-max ends of the arc, and one card describes the radius of the arc. Two of the cards describe the X and Y of the center of the arc. If the center is at zero, these cards need not be used.

Following is a description of the five cards used to describe K-Polar input for the K-outer boundary. The K-inner boundary cards are the same except that the card names are changed. These names will be given following the K-outer card descriptions. (See Tables 3-58 through 3-61.)

The Y of the center of the outer region is inputted in a similar manner using the card name YKMAXSHIFT.

Table 3-61. K-Polar, X - center, outer K card format.

Field use	Columns	Input and explanation
Card name	1-10	XKMAXSHIFT
X of center first region	11-18	X of center of the arc. If zero, X equals zero will be the center.
X region 2	19-26	X of the center of region 2.
X region 3	27-34	X of the center of region 3.
X region 4	35-42	X of the center of region 4.
X region 5	43-50	X of the center of region 5.
X region 6	51-58	X of the center of region 6.
X region 7	59-66	X of the center of region 7.
X region 8	67-74	X of the center of region 8.

Table 3-62. K-Polar example.

CORNRMAX					X_C	Y_C	Y_D	Y_D	X_E	Y_E
CORNRMIN	X_F	Y_F	X_G	Y_G	X_H	Y_H	X_J	Y_J		
NZONESBLK	1									
JZINNC			3	2						
JZINNP	8	4								
JZOUTC	5		6							
JZOUTP		6								
MATNO	17	17	20	20						
XKMAXSHIFT	X_I	X_{II}								
YKMAXSHIFT	Y_I	Y_{II}								
RADIUSOUT	R_I	R_{II}								
JMN-KX-ANG	ϕ_I J-min	ϕ_{II} J-min								
JMX-KX-ANG	ϕ_I J-max	ϕ_{II} J-max								
XKMINSHIFT		X_{III}								
YKMINSHIFT		Y_{III}								
RADIUSIN		R_{III}								
JMN-KN-ANG		ϕ_{III} J-min								
JMX-KN-ANG		ϕ_{III} J-max								

The five cards that describe the K-inner boundary in a manner similar to the K-outer boundary are called XKMINSHIFT, YKMINSHIFT, RADIUSIN, JMN-KN-ANG, and JMX-KN-ANG.

Figure 3-12 illustrates the input of a block of mixed K Polar and Cartesian input. The various fields are shown as columns (see Table 3-62).

Fig. 3-12. Block of mixed Polar and Cartesian inputs.

J-Polar Input (See Tables 3-63 through 3-65)

The J-Polar input uses some of the same cards as the K-Polar input so that the card names are not meaningful. To use J-Polar input, a card called JPOLAR is included in the block. This signals to the generator that the data on the cards is to be used in J-Polar generation.

The data is inputted by regional boundaries. If J-Polar data is not specified for a particular J-boundary, Cartesian input is used to generate the points.

J-Polar Angle—K-min End

The format is the same as the K-max end but the card is called JMN-KN-ANG.

Table 3-63. J-Polar flag card format.

Field use	Columns	Input and explanation
Card name	1-10	JPOLAR
Signal	11	Integer. A "1" signals to the generator that this is a J-Polar input block.

Table 3-64. J-Polar radius card format.

Field use	Columns	Input and explanation
Card name	1-10	RADIUSOUTR
J-min radius	11-18	Radius of the J-min boundary of the block. If zero, the J-min, K-max, and the J-min, K-min Cartesian points will be used to linearly interpolate a straight line.
Radius	19-26	Radius of the J-max end of region 1.
Radius	27-34	Radius of the J-max end of region 2.
Radius	35-42	Radius of the J-max end of region 3.
Radius	43-50	Radius of the J-max end of region 4.
Radius	51-58	Radius of the J-max end of region 5.
Radius	59-66	Radius of the J-max end of region 6.
Radius	67-74	Radius of the J-max end of region 7.
Radius	11-18 (next card)	Radius of the J-max end of region 8.

Table 3-65. J-Polar angle, K-max end card format..

Field use	Columns	Input and explanation
Card name	1-10	JMN-KX-ANG
Angle of K-max and J-min line	11-18	The angle measured counter clockwise from 0 degrees to the K-max end of the arc.
Angle K-max	19-26	Angle to K-max end of arc, J-max of region 1.
Angle K-max	27-34	Angle to K-max end of arc, J-max of region 2.
Angle K-max	35-42	Angle to K-max end of arc, J-max of region 3.
Angle K-max	43-50	Angle to K-max end of arc, J-max of region 4.
Angle K-max	51-58	Angle to K-max end of arc, J-max of region 5.
Angle K-max	59-66	Angle to K-max end of arc, J-max of region 6.
Angle K-max	67-74	Angle to K-max end of arc, J-max of region 7.
Angle K-max	11-18 (next card)	Angle to K-max end of arc, J-max of region 8.

JPOLAR	1							
CORNRMAX	X_A	Y_A					X_D	Y_D
CORNRMIN	X_E	Y_E					X_H	Y_H
NKZONBLK	4							
JZOUTC	1	1	1					
MATNO	20	20	20					
RADIUSOUTR		R_I	R_{II}					
JMN-KX-ANG		ϕ_X	ϕ_X					
JMN-KN-ANG		0	0					
XKMAXSHIFT		X_I	X_{II}					
YKMAXSHIFT		Y_I	Y_{II}					

Fig. 3-13. Block of combined J-Polar and Cartesian inputs.

The centers of the arcs are given on the XKMAXSHIFT and the YKMAXSHIFT cards using the formats as used in K-polar input.

Figure 3-13 shows a block generated by combined J-Polar and Cartesian input.

Slide-Lines (See Tables 3-66 and 3-67)

A card called SLIDE-TYPE is used to call for sliding at the K-min boundary of

the block. The slide extension angle may also be inputted with block input if desired.

Velocity Input (See Tables 3-68 through 3-71)

Seven cards enable users to input velocities by regions, at boundaries between regions, and at boundaries between blocks. There is a hierarchy of card use whereby the regional boundary

Table 3-66. Slide-type card format.

Field use	Columns	Input and explanation
Card name	1-10	SLIDE-TYPE (See footnote to this table. *)
"Upright" sliding	11	Integer. If 1, 2, 3, or 4 the K-min boundary of this block will have "upright" sliding. (The "master" surface will be the K-high side of the line; the "slave" surface will be the K-lower side of the line.) If set to "1", the non-void routine will be used. If set to 2, 3, or 4, the void routine will be used. If set to "2", all points will be generated in the closed position. The generator will place the "slave" point exactly on the "master" line. If set to "3", the points are assumed to be open and the "slave" points are not extrapolated to the surface. If set to "4", all points are "tied". (See the "Slide-Lines and Voids," page 53, and "Tied Sliding Input," page 94.)
"Inverted" sliding	12	If set to "1" the K-min boundary of this block will have "inverted" sliding. (The "master" surface will be the K-lower side of the line; the "slave" surface will be the K-high side.)

* This card goes in the block on the K-max side of the slide.

Table 3-67. Slide line extension direction card format. (See Fig. 3-8 for directions.)

Field use	Columns	Input and explanation
Card name	1-10	SLIDE-ANG (Note: This card goes with the block that has the master surface as a boundary.)
J-max ext	11	Integer. If 1 through 9, this slide-line direction will override the J-max direction inputted with the general input.
J-min ext	12	Integer. If 1 through 9, this slide-line direction will override the J-min direction in general input (see p. 60).
J-max X (direction 9 only)	13-24	If direction "9" has been called for at J-max, this X will be used.
J-max Y (direction 9 only)	25-36	J-max Y, direction "9".
J-min X	37-48	If direction "9" has been called for at J-min, this X will be used.
J-min Y	49-60	J-min Y, direction "9".

cards override all other cards, and the block boundary card overrides the region input cards. Specifically the hierarchy is this:

- First priority - Lower J of region
- Second priority - J-max end of block
- Third priority - Lower K of region

Fourth priority - K-max of block
Fifth priority - Velocity of region
Point-by-point input will, of course, override all of these.

To input a zero to override previous input, put in 1E-30. This will be recognized as an input number and stored,

Table 3-68. Regional X-dot card format.

Field use	Columns	Input and explanation
Card name	1-10	XVELMAT
X-dot region 1	11-18	If not zero, this velocity will be assigned to all the points in, and all boundary points of, the first region. Where a boundary conflict occurs, the J-min end region will override the next higher region and the K-min end region will override the K-max end region.
X-dot of region 2	19-26	X-dot of region 2.
X-dot of region 3	27-34	X-dot of region 3.
X-dot of region 4	35-42	X-dot of region 4.
X-dot of region 5	43-50	X-dot of region 5.
X-dot of region 6	51-58	X-dot of region 6.
X-dot of region 7	59-66	X-dot of region 7.
X-dot of region 8	67-74	X-dot of region 8.

Table 3-69. X-dot at J-min of the regions card format.

Field use	Columns	Input and explanation
Card name	1-10	XVELMATJ
J-min of block	11-18	If non-zero, this velocity will be assigned to the J-min end of the block.
J-min of region 2	19-26	X-dot of the J-min end region 2.
J-min of region 3	27-34	X-dot of the J-min end region 3.
J-min of region 4	35-42	X-dot of the J-min end region 4.
J-min of region 5	43-50	X-dot of the J-min end region 5.
J-min of region 6	51-58	X-dot of the J-min end region 6.
J-min of region 7	59-66	X-dot of the J-min end region 7.
J-min of region 8	67-74	X-dot of the J-min end region 8.

Table 3-70. X-dot at the K-min of the regions card format.

Field use	Columns	Input and explanation
Card name	1-10	XVELMATK
X-dot, first region, K-min	11-18	If non-zero this X-dot will be assigned to the K-min boundary of this region.
X-dot, K-min region 2	19-26	X-dot of the K-min boundary of region 2.
X-dot, K-min region 3	27-34	X-dot of the K-min boundary of region 3.
X-dot, K-min region 4	35-42	X-dot of the K-min boundary of region 4.
X-dot, K-min region 5	43-50	X-dot of the K-min boundary of region 5.
X-dot, K-min region 6	51-58	X-dot of the K-min boundary of region 6.
X-dot, K-min region 7	59-66	X-dot of the K-min boundary of region 7.
X-dot, K-min region 8	67-74	X-dot of the K-min boundary of region 8.

Table 3-71. Velocities at J-max and K-max of the block card format.

Field use	Columns	Input and explanation
Card Name	1-10	VELBLOCK
X-dot at J-max of block	11-18	If not zero, this X-dot will be assigned to all J-max points of this block.
Y-dot at J-max of block	19-26	Y-dot at J-max end of block.
X-dot at K-max	27-34	If not zero, this X-dot will be assigned to the entire K-max boundary of this block.
Y-dot at K-max	35-42	Y-dot for entire K-max of block.

then set to zero by the cutoff during the running of the first cycle. If a rigid wall boundary condition has been called for at the boundary where the $1E-30$ has been read in, the number will not be cut off but is so small that its use will not adversely affect the running of the problem.

The regional Y-dot is inputted in an identical fashion to the X-dot except that

the card is called YVELMAT. See Table 3-68.

The Y-dot at the J-min end of the regions is inputted in a manner similar to XVELMATJ except that the card is called YVELMATJ. See Table 3-69.

The Y-dot of the K-min boundary of the regions in the block is inputted in a manner similar to the X-dot except that

Table 3-72. Burn type card format.

Field use	Columns	Input and explanation
Card name	1-10	HEBURN
J-min end burn type, region 1	11-13	Integer. Enter numbers 1 through 5 to indicate the appropriate burn time calculating routine for the zones in this region.
Burn type, region 2	14-16	Integer. Regional burn type, region 2.
Burn type, region 3	17-19	Integer. Regional burn type, region 3.
Burn type, region 4	20-22	Integer. Regional burn type, region 4.
Burn type, region 5	23-25	Integer. Regional burn type, region 5.
Burn type, region 6	26-28	Integer. Regional burn type, region 6.
Burn type, region 7	29-31	Integer. Regional burn type, region 7.
Burn type, region 8	32-34	Integer. Regional burn type, region 8.

the card name YVELMATK is used. See Table 3-70.

HE Input (See Tables 3-72 through 3-74)

Five types of burn time generating routines are available. Some of the input is for the entire block (not by region) so that some restriction on the multiple use of burn types and different HE's within a block may be found. Burn times can be read in as zonal input with the "point-by-point" input subgroup.

The five burn types are as follows:

Number 1. Burned HE—The burn fraction for all zones in the region is set to "1" so that all of the energy is released at once. No HEPARAM input is necessary.

Number 2. Simple Single-Point Detonation—The HE in the region is detonated from a single point and the burn time is calculated directly, without reference to boundaries. The velocity, burn constant and the detonation point must be entered on the HEPARAM card. The burn may be offset in time by entering a time increment in "time subtract." A positive entry will make the burn time sooner. A negative burn time will make the burn time later (delay). Figure 3-14 shows a simple single-point detonation.

Number 3. Line Detonation—The burn time is calculated from the zone center to the nearest point on a line running through the input points 1 and 2 as entered on the HEPARAM card. The line is infinitely long and does

Table 3-73. HE input parameters card format.

Field use	Columns	Input and explanation
Card name	1-10	HEPARAM
Detonation velocity	11-18	Enter the detonation velocity for the HE in all the regions of this block.
Burn constant	19-26	Enter the burn constant. This number is used in calculating the burn fraction from the burn time. Its value is quite noncritical. It is about equal to one and one-half times the average zone thickness, divided by the detonation velocity.
X_1	27-34	X of the detonation point of all single detonator burns. X of one end of the detonation line for line detonation burns.
Y_1	35-42	Y corresponding to X_1 .
X_2	43-50	The X of the second end of the type 3 line.
Y_2	51-58	The Y of the second end of the type 3 line.
Time subtract	59-66	This time increment will be subtracted from the calculated burn time for type 2, 3, and 4 burns.
Number of multiple points	67-69	Integer. Number of detonation points in multiple point detonation.

Table 3-74. Shadow card format.

Field use	Columns	Input and explanation
Card name	1-10	SHADOW
K-max-shadow	11	Integer. Set to "1" if the K-max boundary of the block is Huyghens shadow surface.
K-min-shadow	12	Integer. Set to "1" if the K-min boundary of the block is the Huyghens shadow surface.
J-max-end	13	Integer. Set to "1" if the J-max end of the shadow surface is the nearest to the detonation point.
J-min-end	14	Integer. Set to "1" if the J-min end of the shadow surface is nearest to the detonation point.
Read shadow	15	Integer. Set to "1" if the shadow points and delay times are to be read in with block boundary input.

Fig. 3-14. Simple single-point detonation.

Fig. 3-15. Line detonation.

not terminate at the end points. (See Fig. 3-15.)

Number 4. Huyghens Detonation—The Huyghens routine enables the user to run HE burns from a single point that is not in "line of sight" of all zones. The intruding "shadow boundary" (Fig. 3-16) ordinarily is the K-max or K-min boundary of the block. Only a simple curve is allowed, no "s" shadow lines, and only one shadow. The SHADOW card must be used. If the K-max or K-min boundary are not the shadow, the shadow points may be read in with block boundary input. If read in, as many points must be read in as there are J's in a K-line of that

block. Delay time may be read in also.

Number 5. Multiple Point Detonation

Many detonators can be used at once in simple detonations. (See Fig. 3-17.) The code calculates the "line-of-sight" burn time from each zone to all of the detonators and keeps the minimum time. A "subtract time" can be entered with each detonator. The points and delay times are entered with block boundary input. A burn velocity may be supplied with each detonator.

K-by-K Input (See Table 3-75)

The following card is used to call for

Fig. 3-16. Example of Huyghens detonation.

Fig. 3-17. Multiple point detonation.

the reading in and interpretation of K-by-K and point-by-point input. This input is always read in pairs.

Finis Card (See Table 3-76)

This card must be the last card in the block input subgroup.

Block Boundary Input Section Discussion

Coordinate Input (See Table 3-77)

The following cards may be used, if desired, to modify the block generated arrays of X's and Y's for the higher-K and lower-K boundaries of the block. They also may be used to input certain Huyghens burn data, burn delay data, and tied sliding data.

Block boundary coordinates may be inputted either as Cartesian data or as radius-angle data. The points in a line may be mixed Cartesian and Polar input.

This is also true for the Huyghens shadow line input.

All point-by-point and zone-by-zone input starts at the J-max end of the K-lines.

This card may be followed by similar cards with or without the card name for all X's to be inputted at K-outer.

All boundary input uses a similar format. Table 3-78 shows the cards' names and uses.

Burn Input

Huyghens Shadow Input - If the "shadow" boundary of the block does not coincide with the K-max or K-min block boundary, the shadow points may be read in as input, with either Cartesian or radius-angle coordinates. The format is the same as that for the boundary point data. The first point listed should be the end nearest

Table 3-75. K-by-K input card format.

Field use	Columns	Input and explanation
Card name	1-10	KTOK
Higher K-number	11-13	Integer. Enter the number of the upper K (in the block) for which K-by-K input is to be read. <u>This is the number of the K in the block not in the entire problem.</u>
Lower K-number	14-16	Integer. Enter the number of the lower K (in the block) for which K-by-K input is to be read.

Table 3-76. Finis card format.

Field use	Columns	Input and explanation
Card name	1-10	FINI
Comments	11-80	The user may put anything in these columns. They are ignored by the generator. It is useful in card handling to have the words "of block number ___ input" in these columns.

Table 3-77. Higher-K boundary input card format.

Field use	Columns	Input and explanation
Card name	1-8	BBPPXOUT
J-max X	9-16	List the X for the J-max point of K-outer boundary. If this is radius-angle input, this is the radius. If zero is to be inputted, use a very small number, such as 1E-10.
Second X	17-24	X-value at J-max - 1
Third X	25-32	X-value at J-max - 2
Fourth X	33-40	X-value at J-max - 3
Fifth X	41-48	X-value at J-max - 4
Sixth X	49-56	X-value at J-max - 5
Seventh X	57-64	X-value at J-max - 6
Eighth X	65-72	X-value at J-max - 7
Label	73-80	This field is not used by the generator so may be used for labeling.

Table 3-78. Boundary input cards.

	Cartesian input use	Polar input use	Card name
Outer K	X	Radius	BBPPXOUT
	Y	X-shift	BBPPYOUT
	—	Angle	BBPPANGO
	—	Y-shift	BBPPSFTO
Inner K	X	Radius	BBPPXIN
	Y	X-shift	BBPPYIN
	—	Angle	BBPPANGI
	—	Y-shift	BBPPSFTI

Table 3-79. Huyghens shadow input cards.

Cartesian coordinates	Polar coordinates	Card name
X coordinates	Radius	BBPPXHYG
Y coordinates	X-shift	BBPPYHYG
—	Angle	BBPPANGH
—	Y-shift	BBPPDELY

to the detonator. Table 3-79 shows the names and uses of the cards.

Multiple Point Data Input—If multiple point input is used, the cards BBPPXHYG,

BBPPYHYG, and BBPPDELY are used to input the X, Y, and delay times for each detonator. The card BBPPBRNV may be used with each burn time and each detonator. If a velocity is not entered for a point, the block detonation velocity will be used. This card is therefore not necessary if all velocities are the same.

The number of detonators must be entered on the HEPARAM card in block input. The maximum number of detonators that may be used is equal to the number of J's in the longest (in J count) K-line in the problem.

Tied Sliding Input (See Table 3-80)

If all points are not tied at generation time, or any special status is desired for some points, the status (2, 3, or 4) may be inputted point-by-point at input time. (See "Slide-Lines and Voids," p. 53, and "Tied Sliding," p. 62.)

Follow this card with similar cards, with or without the name, until the status of all points has been described. The status of a point need not be redescribed if it is the same as that entered on the SLIDE-TYPE card of block input.

This card is put in the block boundary input of the block whose K-max slave nodes are to be tied.

Finl Card

This card is similar in format to the previously shown fini cards. Columns 11 - 80 could contain the message "of block _____ boundary input."

This card must be present for all blocks, whether or not block boundary input is actually present.

K-Line Input

Data Input (See Table 3-81)

This data input should be present only if the KTOK input card in block input is present. As noted previously, if "K-by-K" input is called for, both "K-by-K" and "point-by-point" input is read for the appropriate K-lines.

This input generates J, K points at K, and zonal data at $K + 1/2$. If no zoning data is present in this sub-section, this input will not be used (except for the FINI card). This input overrides previous input.

The material number card is the same format as the KLINENZ card but is called KLINEMN.

The X and Y coordinates are read in using cards of the same format as the

Table 3-80. Tied sliding input card format.

Field use	Columns	Input and explanation
Card name	1-8	BBTIED
Status J-max sliding point	9	Integer. List the status number (2, 3, or 4) for the J-max sliding point.
	10	J-max-1 point status.
	11	J-max-2 point status
	—	—
	—	—
	72	J-max-63 point status.

Table 3-81. K-line zoning card format.

Field use	Columns	Input and explanation
Card name	1-10	KLINENZ
Zones region 1	11-13	Integer. If zero or blank, K-line input will not be used, even though the KTOK card in block input called for this K number. If not zero, this integer is the number of zones in the first region.
Zones region 2	14-16	Second regional zoning, Cartesian or Polar.
Zones region 3	17-19	Third regional zoning, Cartesian or Polar.
Zones region 4	20-22	Fourth regional zoning, Cartesian or Polar.
Zones region 5	23-25	Fifth regional zoning, Cartesian or Polar.
Zones region 6	26-28	Sixth regional zoning, Cartesian or Polar.
Zones region 7	29-31	Seventh regional zoning, Cartesian or Polar.
Zones region 8	32-34	Eighth regional zoning, Cartesian or Polar.

Table 3-82. K-line input cards.

	Card name	Use
	KLINEDEN	Density
	KLINEE	Energy
	KLINEVOL	Volume
Velocity	KLINEXVE	X-dot for points in K-region.
	KLINYYVE	Y-dot for points in K-region.
	KLINER	Radius (if Polar input).
Polar	KLINEINC	The angle increment (in degrees) in this region. (One increment per zone.)
	KLINEANG	Angle (in degrees) of the J-min end of the region.
	KLINEXS	X shift or offset from zero.
	KLINEYS	Y shift or offset from zero.

Cartesian corner cards (CORNRMAS and CORNRMIN) in block input. The card name to use is KLINEXY. This card specifies the points J, K on the K-line being generated. The points at J, K+1 are accepted from the previously generated K-line.

All of the other cards (except the Fini card) use the same format as the energy, volume, density cards (and others) in

block input. Table 3-82 shows the uses and card names.

The Fini Card

The Fini card is the same format as the other Fini cards. It may be convenient to include a message "of K-line number ____" on the card.

If K-by-K input is called upon for a K-line, this card must be present, even

Table 3-83. X input card format.

Field use	Columns	Input and explanation
Card name	1-8	KLPPX
J-max X	9-16	X of the J-max point. Radius if Polar. (Use 1E-10 to read in a zero. A blank will leave the previously generated X's.)
J-max - 1 X	17-24	X of the J-max - 1 point.
J-max - 2 X	25-32	X of the J-max - 2 point.
J-max - 3 X	33-40	X of the J-max - 3 point.
J-max - 4 X	41-48	X of the J-max - 4 point.
J-max - 5 X	49-56	X of the J-max - 5 point.
J-max - 6 X	57-64	X of the J-max - 6 point.
J-max - 7 X	65-72	X of the J-max - 7 point.

though no K-line data cards precede it. The point-by-point input subgroup must follow this.

K-Line Point-by-Point Input

This option allows the user to input detailed data for specific nodes and/or zones of the problem. Data is inputted in K-line groups, i.e., if nodal data for a J, K point, or zonal data for a $J+1/2$, $K+1/2$ zone is to be inputted; the appropriate K-line is called for on the KTOK input card in Block Input. The data is then listed on the appropriately labeled card (below). The data is listed with the J-max end data first, the zonal data is listed with the $K+1/2$, J-max - $1/2$ zone first.

Only the zones or nodes whose values are to be different than that described by previous input need be entered. A blank field will leave the previously generated value, a zero must be entered by inputting an extremely small value such as 1E-30.

Data Input (See Table 3-83)

If K-by-K input was called for with the KTOK card in block input, this input must be present. It need only consist of a Fini card, if no nodal or zonal quantities are to be read in. This input overrides all other input.

If more than the first 8 X's are to be read in, this card is followed by similar cards, with or without the card name.

Table 3-84 shows all of the point-by-point cards that use this same format.

Table 3-84. Point-by-point input cards, decimal format.

Card name	Use
KLPPX	X if Cartesian, radius if Polar. Start at J-max point.
KLPPY	Y if Cartesian input.
KLPPXVEL	X-dot
KLPPYVEL	Y-dot
KLPPE	Initial energy in the zone. Starts at J-max - $1/2$ zone.
KLPPVOL	Volume
KLPPDEN	Rho-zero
KLPPANGL	Angle of point if Polar input.
KLPPXSFT	X-shift if Polar input.
KLPPYSFT	Y-shift if Polar input.
KLPPBURN	Burn times.

Table 3-85. Point-by-point input cards, integer format.

Card name	Use
KLPPMAT	Integer. The material number starts with J-max - 1/2 zone.
KBKTYP	Integer. The point type number starts with J-max point.

Two card types use the same columns as those shown in Table 3-85 but require integer input. The material number may be specified zone by zone. The first data field applies to the J-max - 1/2 zone.

The calculation type number may be assigned point-by-point using a card of the same format but with integer input.

Fini Card

A Fini card must follow the point-by-point input. (If the K-by-K input was called for by the KTOK card in block input, two Fini cards must be present for each K-line for which data is to be read. The first terminates the reading of the "K-line" input, and the second terminates the reading of the "point-by-point" input.)

GENERATOR OUTPUT

Teletype

When the problem has finished generating, the message "problem generated or restarted" will be sent to the teletype. If sense switches 3 or 4 are on, the program will send a message to the teletype after each block is generated, informing the user that the block has been generated. For this purpose, the blocks are numbered in order of input so that the first block encountered will be number one.

Trouble messages print out on the teletype. If a card name does not match

a vocabulary name, it is printed out. The error messages are shown in Appendix B along with further explanation.

On-Line Printer

All of the above teletype messages are automatically printed on the on-line printout. In addition, all cards are printed out. A sequence of column numbers is periodically printed out between card printouts as an aid in card column checking.

Off-Line Printer

Everything that is printed on the on-line listing also appears on the off-line listing. In addition, important zonal and nodal data is printed in K-line groups. The columns are labeled with headings that are largely self-explanatory. The quantity in the MH column is equal to twice the mass at $J + 1/2$, $K + 1-1/2$ (as shown in the equation write-up in Ref. 1). MH does not include the 2π term for cylindrical problems.

The last column (I-J) is the index value used to fetch and store the quantities in the 5-K storage. It is useful in program debugging.

Trouble Stops

The trouble stops are listed and explained in Appendix B.

MAIN CODE

Input to Main Code

Teletype, Sense Switch Control

Certain modifications in frequency and type of output can be made while running through the use of the "sense switch" options. These are tabulated in Appendix A.

Data Alteration

Service routines are required if alteration of the grid data is required (see "Service Routines," page 11. The data that is read in and processed by the "general input" section of the generator can be altered by those cards at restart time. The restart procedure is described in "Problem Restarting," page 103.

Tape Changing

As the problem runs, it may fill the tape with the various types of output records. When it does, it adds one to the tape vault. A tape can be changed immediately after the restart dump is read in by setting that option on the restart card; see "Problem Restarting," page 103.

Output

Teletype Output

After the problem has generated or restarted, the program will send teletype messages to the user under the following conditions.

- (1) The problem has finished. An "all done" will be sent.
- (2) The problem has terminated due to an error condition. Error stops are of two types, programmed stops and system interrupts. The program stops occur when certain tests show that the problem is in difficulty. An error message prints out, followed by an "all done." These error messages tell the nature of the difficulty. They are further explained in Appendix B. The system interrupts occur when the computer has difficulty in executing the instructions.

This may be due to faulty data, or machine error. An interrupt of this type will occur, for example, when division by zero is attempted. These errors are listed in LTSS (Livermore Time Sharing System) publications as Refs. 3 and 4.

The On-Line Printer

Certain key data is sent to the on-line printer to be printed out every problem cycle. This print-out can be studied after the problem has run to ascertain the problem's history.

In addition to the every cycle line, lines are printed whenever other types of output are written, when a pressure profile is used, and when a programmed interrupt occurs.

The eight columns of the every cycle line contain these numbers.

- Column 1. The cycle number
- Column 2. The problem time
- Column 3. The delta-t (at $N + 1/2$)
- Column 4. The K-number of the zone ($K + 1/2$) that is controlling the time step.
- Column 5. The J-number ($J + 1/2$) of the time step zone.
- Column 6. The sound speed in the zone that was used in time step calculation.
- Column 7. The characteristic zone thickness of the zone that was used in calculating the time step.
- Column 8. The actual calculation time of the previous problem cycle (in microseconds).

This line is printed at the beginning of the problem cycle. The delta-T zonal information is the result of the running of the previous cycle.

Every 50 cycles, a problem name line is written (which includes the controller name and the load (map) name). This is followed by a line listing the headings of the every cycle line.

The programmed interrupts are listed in Appendix B.

The pressure profile line lists a pressure value for each surface if there is a pressure on any boundary. Only one number is listed for each boundary. It is the last nonzero pressure on each boundary (in order of calculation). Thus the K-max and K-min pressure listed will be at the *J-max end of the pressure surface*. The J-max and J-min pressures listed will be at the K-min end of the pressure surface.

The Off-Line Printout

The frequency and K-number of the on-line printout is controlled by input, see "General Input Section Discussion," page 33. Certain extra printouts can also be called for by input.

The on-line supervisory line is also printed off-line.

For a K-line, the following types of off-line output may occur. The output is listed, in general, in the order that it would occur, along with an explanation. The zonal data that is listed with a J, K number is centered at $J + 1/2$, $K + 1/2$.

Name Line—For each K-line printed, the paper is restored, and the problem name line is printed out. If the problem name begins with a "1", it is a plane case problem. If it begins with a "2" or "-2", it is a cylindrical case problem.

The name of the code file that was used to run the problem is listed, and the name that was assigned to the controllee at load time is listed.

Slide Z-Factor and Slide Labeling—If the K-line to be printed is a "master" surface, a number labeled "Z-factor" will be printed out. This is the Z described in Ref. 1.*

If the K-line to be printed is either surface of a decoupled boundary (slide-line), the message "slave surface(n)" or "master surface(n)" will be printed out. The message is bounded by asterisks. The number "n" in the message is the calculational type number of the J-max point of that K-line. For an "upright" slide surface, the "master" line will be printed out before the "slave" line. For in "inverted" slide surface, the "slave" line will be printed out before the "master" line.

Heading and Data Line —The heading and data line is similar to the supervisory line. It includes the K-number of the K-line to be printed, but it does not include the machine running time.

Hydro Nodal and Zonal Listing—For all of the K-lines called for, the following columns for the entire K-line are labeled and listed.

Column 1. J. The J number. Nodal variables on this line are centered at this J and the K number of this K-line. Zonal variables on this line are centered at $J + 1/2$,

* Appendix B, Section I, 3, e, vi of Ref. 1.

$K + 1/2$. The zonal variables are listed as zero for those nodes for which there is no associated zone at $J + 1/2$, $K + 1/2$.

- Column 2. RHO. The rho-zero of the material in the zone.
- Column 3. X. The X coordinate.
- Column 4. Y. The Y coordinate.
- Column 5. X-DOT. The velocity in the X direction. A positive X-dot indicates that a point X is increasing in value (moving to the right). A negative X-dot indicates that the X is decreasing in value.
- Column 6. Y-DOT. The velocity in the Y direction. A positive Y-dot indicates that a point Y is increasing in value (moving up). A negative Y-dot indicates that the Y is decreasing in value.
- Column 7. V. The relative volume. It is equal to one over the compression.
- Column 8. P. Pressure (megabars).
- Column 9. E. Energy (megabar-cc per original cubic centimeter).
- Column 10. Q. The artificial viscosity term.
- Column 11. F. The burn column. If the zone is HE, and the quantity is negative, F is the burn time. If it is a plus one, the zone was burned. This column is sometimes used for special purposes for non-HE zones.

Elastic Listings — If the K-line being printed has zones associated with it, and if it includes a zone(s) of elastic material, two sets of zonal quantities will be printed out. The first set of columns contain the following data.

- Column 1. J. The J number.
- Column 2. RHO. The density.
- Column 3. EDXX. E-dot-xx. The velocity strain in the X direction.
- Column 4. EDYY. E-dot-yy. The velocity strain in the Y direction.
- Column 5. EDTT. E-dot-theta-theta. The velocity "hoop" strain.
- Column 6. EDXY. E-dot-xy. The velocity shear strain.
- Column 7. VDOT/V. V-dot over V. The rate of change of the volume.
- Column 8. SXXE. The elastic stress in the X direction (stress deviator).
- Column 9. SYYE. The elastic stress in the Y direction (stress deviator).
- Column 10. STTE. The elastic hoop stress deviator.
- Column 11. TXYE. The elastic shear stress deviator.

The second zonal elastic printout has the following columns.

- Column 1. J
- Column 2. RHO
- Column 3. MU. The shear modulus.
- Column 4. Y-ZERO. The yield number.
- Column 5. S1. Principal stress deviator one.
- Column 6. S2. Principal stress deviator two.

- Column 7. S3. Principal stress deviator three.
- Column 8. IPD. Internal plastic distortion.
- Column 9. OSS. Octagonal shear stress.
- Column 10. Not used.
- Column 11. K-ELASTIC. The K used in the Von Mises yield condition. If it is negative, the zone has not yielded. If it is positive, the zone has yielded.
- Column 12. TANPHI. The tangent of the angle of the vector of the maximum principal stress. (This number is used to plot the vector on the CRT plot output.)

Navier-Stokes Printout—If the K-line includes any zone that is using the Navier-Stokes Q, the following printout will be written.

The first seven columns are identical to the first seven columns of the first elastic printout. The last four columns are as follows:

- Column 8. QXX. The Navier-Stokes deviatoric component in the X direction, plus the scalar component.
- Column 9. QYY. The Navier-Stokes deviatoric component in the Y direction, plus the scalar component.
- Column 10. QXY. The Navier-Stokes "theta" deviatoric component, plus the scalar component.
- Column 11. QXY. The Navier-Stokes shear deviatoric component, plus the scalar component.

Debug Printout—If the debug printout has been called for by input, the following columns will be written for all K-lines.

- Column 1. J
- Column 2. RHO
- Column 3. P-SIGX/X. The sum of the sigma-x's times the Y arms.
- Column 4. P-TXY/Y. The sum of the T-xy's times the X arms.
- Column 5. ALPHA. The sum of the alpha zonal subterms divided by four.
- Column 6. P-SIGY/Y. The sum of the sigma-y's times the X arms.
- Column 7. P-TXY/X. The sum of the T-xy's times the Y arms.
- Column 8. BETA. The sum of the beta zonal sub-terms, divided by four.
- Column 9. AREA. Twice the area at time $n + 1$ of the zone.
- Column 10. QCOEF. The Q_A , rho, area, V terms used in the quadratic portion of the Q. (All terms except the V-dot/V term of the quadratic portion.)
- Column 11. 1/TWOPHL. One divided by two phi used in the velocity calculations.
- Column 12. SOUND-SPD. The sound speed squared in the zone.

Energy-Mass Summation—At the end of each cycle for which printouts have been called, an energy-mass summation for the entire problem will be written.

Problem name and cycle links will be written. These will be followed by a line with the following data.

- Column 1. (TOTAL E.) The total energy in the problem at this time. In cylindrical problems,

is the total energy with the zones rotated completely around the X axis.

Column 2. (E-ZERO) The total energy at time zero.

Column 3. (E-CHANGE) The percent of change in the total energy from time zero to the present. If it is negative, energy has been lost. If it is positive, energy has been gained.

Column 4. (KE SUM) The total kinetic energy in the problem.

Column 5. (IE SUM) The total internal energy in the problem.

Column 6. (MASS-SUM) The total mass (in grams) in the problem. In cylindrical problems, this is the rotated mass, including the Pi terms.

The problem total line is followed by lines that list mass and energy by material numbers. If a material number in a problem is separated by at least one K-zone, it is listed separately (see Fig. 3-18a). If a material number appears in two consecutive K-lines, it is treated as one material even though the zones may not actually touch (see Fig. 3-18b). The following columns are printed.

Column 1. (MATERIAL) The material number.

Column 2. (MASS) The mass of the material (rotated around the X axis and including Pi terms if cylindrical).

Column 3. (TOTAL E) The total energy in the material.

Column 4. (KINETIC E) The total kinetic energy in the material.

Example a.

Material A will be listed twice

Example b.

Both material A and material B will be listed only once

Fig. 3-18. Examples of mass energy summation.

Column 5. (INTERNAL E) The total internal energy in the material.

Tape Output

If a tape vault number is entered in the output field of the initiation line, tape output will be written. If a tape number is not entered, no tape output will be written.

Three types of binary output are written on the tape. They are identified on the tape by identification words at the start of certain records, and by the record order. The last HEMP record on a tape is a short "end sentinel" record that is used to indicate that the preceding record was the last record written. The first word of the end sentinel record is the ASCII representation of the alpha-numeric characters "END SENTIN." This end sentinel record is always preceded immediately by an "end of file" mark.

Restart Dumps - The restart dump consists of a group of records, one for each K-line, plus a control or "Table" record. The control record is first, followed by the K records in a descending K order. For each slide boundary, two records are

written. The first word of the Table record is the problem cycle number in fixed format. The Table record is all of the common block "A001". The K-line format is identical to the grid layout for a K-line ("The Grid", page 17). The restart dump is always preceded and followed by an "end-of-file" mark. Other types of records are never mixed in with the restart records between "end-of-file" marks.

CRT Output - The cathode ray tube records are written in K descending order in a manner similar to the restart records. They are preceded by a control record. The first word of the control record is the octal word 27777777777777777777.

The first word of each K record is the number of zones in that K-line (an integer). The second word is the K-type of the J-max node of the K-line (an integer). The nodal data follows in groups of five for each node (or zone) in the K-line. The five words of data in the group are: X, Y, Q, TANPHI, and the equation-of-state number.

The CRT records may be mixed with "binary output" records if both are called for at the same cycle.

The CRT records are preceded and followed by "end-of-file" marks.

Binary-Output - The flexibly formatted output is referred to as "binary-output" although all of the tape data is in binary format. The nature of the content of this output is described in "Output Control," page 35.

Each K-line of output called for produces two or more records. The first record is a control record of which the first word is the octal word 00000000000007654321.

Each group of ten output variables produces a record consisting of the ten variables for all the J's of the K-line, plus an initial identification word (octal 000000000000001234567).

The K-lines from this binary-output will be intermixed with CRT K-lines if both are written the same cycle. These records are preceded and followed by an "end-of-file" mark.

Disk Output

Disk output is written only for CRT output, and only when called for by the word "disk" in the output field of the initiation line. It produces a group of files named "CRTHM-----". The dashes represent the right-adjusted cycle number of the first cycle written in that file. About 20 output cycles are contained in each file.

These files can be plotted later by the plot routine. This disk output is very useful for the initial trial runs of a problem because no tape need be mounted but plots can be produced.

Trouble Stops—The trouble stops are listed and explained in Appendix B.

PROBLEM RESTARTING

"The Overlay", page 15, explains the ways in which a problem may be restarted from a dump on the dump tape.

If data is to be changed, or if a tape is to be changed immediately after restarting, a restart file must be used.

The Restart Deck

The file's I.D. card is followed by a group of general input cards that make

Table 3-86. Restart card format.

Field use	Columns	Input and explanation
Card name	1-10	RESTART
Cycle number	11-15	Integer. Enter the cycle number of the dump to be restarted. Leave blank if the last dump on the tape is to be restarted.
Tape change	16-20	Integer or tape number. Set not zero to cause an immediate tape change after restarting. If set to 1 (column 20), the tape number will be upped by one (1). If a tape formatted name is entered (example AB401), the code will switch to that tape number.

the desired changes, if any, and includes a "restart" card of the following format (see Table 3-86).

A "fini" card must terminate the deck.

General Data Changing

All general data cards may be used at restart time to change data.

Edit Change

Frequently output frequency and termination time are changed at restart time. The card input and procedure to do this is explained in "Output Control", page 35.

Dump Frequency Change

Dump frequency changing is explained in "Output Control", page 35.

Grid Changes

The data of the HEMP grid may be changed by "service routines" which read a dump, alter the grid data, and write a new dump. This new dump is then read and restarted by the HEMP program. A number of types of service routines are discussed in "Service Routines 2. Grid Restructuring", pages 11, 12.

Acknowledgments

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Mark L. Wilkins originated HEMP and has directed all HEMP activities.

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Appendix A

HEMP Teletype Sense Switch Controls

Table A1. HEMP teletype sense switch controls.

Control	Switch	Use	Explanation
Restart dump control	SW1.	Dump and terminate	Dump a restart file and terminate the run as soon as this switch is detected on.
	SW2.	Dump and go.	Dump a restart file and run in a tight loop until SW2. is taken off. Then proceed with the run. (The tight loop wastes time.)
Teletype supervisory control	SW3.	Cycle by cycle and messages when editing	Write on TTY a cycle by cycle message giving cycle, time, etc. Write a special message on TTY (Teletype) when a dump, printout or CRT is written.
	SW4.	Messages when editing	Write a special message on TTY when a restart dump, off-line printout or CRT output is written.
Printout and CRT control	SW5.	Write CRT	Write CRT output every cycle as long as this switch is on.
	SW6.	Write print- out and CRT	Write off-line output and CRT output every cycle as long as this switch is on.

Appendix B

Trouble Stops and Interrupts

System interrupts occur when the computer has difficulty in executing the instructions of the program. These difficulties may occur due to faulty data, due to machine error, or due to programming error. These errors are of two types and are listed in Refs. 3 and 4. A common error is "202" which occurs when division by zero is attempted. It usually occurs at generation time and is usually due to faulty input.

The system interrupts are printed out on the teletype along with the addresses where they occurred. If the trouble can not be found by a study of the input, the address can be used with the load map to ascertain the exact nature of the difficulty.

The programmed trouble stops list out a message on the teletype, on the on-line printout and on the off-line printout. The message may be somewhat briefer on the TTY than on the other output devices.

Listed below are the messages and a further explanation of the difficulty. Where two messages are listed, the shorter one is the teletype message. The name of the subroutine that sends the message is listed.

TROUBLE MESSAGES FROM THE GENERATOR

- "Number of K-zones in a block is zero." The user failed to correctly provide a NKZONESBLK card in each block. GENRAA.

- "Sum of block K-zones greater than input NL - 1." The sum of the values on all of the NKZONESBLK cards is greater than the number of K-lines entered on the GENERAL card minus one. GENRAA.

- "Number of J-zones in a block is zero." The JZOUTC and/or JZOUTP card is missing or incorrect. GENRAA.

- "Too many zones in this block." The sum of the J-zones called for in a block is greater than the number entered in the "Max-J" field or the GENERAL card minus one. GENRAA.

- "V=0 at mass calculation time. Material number ____." V=0 has been inputted for material number _____. GENRAA.

- "Sum of block K-zone input less than NL - 1." The sum of the values on all of the NKZONESBLK cards is less than the number of K-lines entered on the GENERAL card minus one. GENRAA.

- "Error - card not found in GEN input vocabulary." A card in the general input group is not in the vocabulary list. The card is printed out. INGNAA.

- "Error - card not found in block input vocabulary." A card in the block input subgroup is not in the vocabulary list. The card is printed. INBKAA.

- "Error - card not found in block boundary PT-BY-PT." A card in the block boundary subgroup is not in the vocabulary list. The card is printed. INBPAA.

"Error - card not found in K-line input vocabulary." A card in the K-BY-K input subgroup is not in the vocabulary list. The card is printed. INKLAA.

"Error - card not found in K-line PT-BY-PT vocabulary." A card in the K-BY-K, PT-BY-PT input subgroup is not in the vocabulary list. The card is printed. INKPAA.

"First call trouble." Machine error, try again. ENEMAA.

"Second call trouble." Machine error, try again. ENEMAA.

"Third call trouble." Machine error, try again. ENEMAA.

"THEMP to THEMPA." Machine error, try again. ENEMAA.

"THEMPA to THEMPB." Machine error, try again. ENEMAA.

"THEMPB to THEMPA." Machine error, try again. ENEMAA.

"SCM goof." Machine error, try again. ENEMAA.

"Number of zones inner edge of block does not equal number of zones in outer edge." "Inner zone number does not match outer." NZINAA.

"Input for a region specifies zone count for both Cartesian and Polar." "Inner block input has both Cartesian and Polar for a region." NZINAA.

"Input for a region specifies zone count for both Cartesian and Polar." This message refers to the K-higher input. NZOTAA.

"Block I/P. A block has too many J-zones per K-line." This message refers to the K-higher input. NZOTAA.

"Input error—number of zones in a specified K-line does not equal number zones per K in this block zone." "Zone count in a K-line does not match block count." KLINAA.

"Equation-of-state input number is zero or over 60." A material number is missing or faulty. CRETAA.

"Huyghens shadow surface is not properly described to the generator." The SHADOW card in general input is missing or incorrect. HUYGAA.

"Unable to create a tape file." Machine error. Try again. CONTAA.

"Lab error." Machine error. Try again. CONTAA.

"Trouble in brute force sweep, upright volume VUPB." This stop indicates that the initial, methodical search to determine which line (from the "slave" point to K-1) intersects which slide "master" segment has not been able to find a solution. This is usually due to input error. (The line from the sliding point to K-1 must not be of zero length.) VUPBAA.

"Trouble in brute force sweep, inverted volume. VINB." This message is similar to the one for VUPB but for inverted slide-line. VINBAA.

"J-min upright slide-line extension input is faulty." The user did not correctly specify the J-min upright extension direction. U22CAA.

"J-max upright slide-line extension input is faulty." The user did not correctly specify the J-max upright extension direction. U22CAA.

"J-min inverted slide-line extension input is faulty." Similar to above but for inverted slide-line. U72CAA.

- "J-max inverted slide-line extension input is faulty." Similar to above but for inverted slide-line. U72CAA.

THE FOLLOWING MESSAGES MAY BE PRINTED OUT DURING GENERATION,
OR WHILE RUNNING THE CYCLING CODE

- "General upright U search trouble. No intersection." The line from an upright "slave" point to K-1 does not intersect a "master" segment. Usually indicates a scrambled grid. VUPBAA.

- "General inverted V search trouble. No intersection." VING. The line from an inverted "slave" point to K-1 does not intersect a "master" segment. Usually indicates a scrambled grid. VINBAA.

THE FOLLOWING STOPS MAY OCCUR DURING THE RUNNING OF
THE CYCLING "MAIN" PROGRAM

- "Upright slide-line velocity brute force failure." The line that must intersect the line segment from "slave" zone center to "slave" zone center fails to find a solution. If this stop occurs during the running of the first cycle, input is faulty. U22BAA.

- "Inverted slide-line brute force search failure." Similar to above but for inverted slide-line. U72BAA.

- "General upright slide velocity search failure." The intersection used in the upright slide-line calculation can not be found. Usually indicates scrambled slide-line. U22GAA.

- "Slide-line velocity search failed. Inverted general sweep." Similar to above but for inverted slide-line. U72GAA.

- Record length error. PRNT. Machine or tape trouble. PRNTAA.

- Tape trouble ICRT = ____ PRNT. Tape trouble. PRNTAA.

- "No output types specified for binary output." Binary output was called for but no type numbers were inputted. An input error, but it will not be evident until the first time that "Binary" output is to be written. BINOAA.

- (EOF ICRT). Tape trouble or machine trouble. BINOAA.

- "Tape trouble ICRT = ____ Binary." Tape trouble or machine trouble. BINOAA.

- "Binary output list number too big." A number called for as a binary output type is too big. BINOAA.

- "Q has reached limit at K=__, J=__, QSTOP." The Q at the zone listed has reached 100 or the value inputted as the Q stop value. EDITAA.

- "Minimum Delta-T has been reached." The Delta-T (Time Step) has gone below the lower value permitted. DELTAA.

- "Tape trouble ICRT = ____ Dump." Tape trouble during the restart dumping procedure. DUMPAA.

Appendix C

Adaptation to Other Machines and Systems

SPECIAL CHARACTERISTICS OF LLL FORTRAN (CHAT)

CHAT is an extension of Fortran IV. It includes a number of capabilities that are not available in Fortran IV.

The "cliche" capability (macro) allows the user to define and assign a name to a block of coding. Whenever that name appears in the program, the compiler inserts that block of coding. In HEMP it is used only to set aside the "common" blocks as a cliche (named HEMP). Each subroutine includes a card "use HEMP" which inserts the commons in each subroutine. This enables the user to compile many or all of the subroutines at once with only one set of common cards. A user at a facility without this feature will have to provide a common for each subroutine.

Shift instructions are provided in CHAT. These are used by HEMP in decoding the teletype input. Because other computer facilities do not have identical TTY hardware and interfaces, this section will have to be removed; therefore, the shift instructions will not be needed.

Many "system calls" are used by HEMP in teletype communication (CONTAA), in memory expansion (ENEMAA) and in changing high speed output tape (CHSPAA). As the HEMP program generates or restarts a problem, it calls for more and more of the large core memory (LCM). For a machine without an LCM (extended core) the expansion will not be necessary. The ENEMAA subroutine also sets up the index increments for the various K-line long arrays of variables.

CHAT has a "logical if" test that is an extension of the FORTRAN IV logical if test. The Statement:

IF (NUMBER1) NUMBER2 = NUMBER1

will leave "NUMBER2" unaltered if NUMBER1 is equal to zero, but will set NUMBER2 equal to NUMBER1 if NUMBER1 is not equal to zero. These tests are used in the subroutine "INGNAA."

CHAT allows the use of a "parameter" card which defines the value of the named parameter. Whenever the name is encountered, the assigned value is substituted.

TO CONVERT TO RUN ON DISK, DRUM OR TAPE

The HEMP program treats the LCM (large core memory) much as if it were an external storage device. The LCM is read and written, but no calculations are done directly with the grid as it resides in LCM. LCM is read and written a K-line at a time. Data is transferred between LCM and the area laid out for the five K-lines in SCM (small core memory). The K-line that is being read in is not used by the K-line being calculated at that time. The LCM reads and writes may therefore be converted

to disk, drum, or tape reads and writes and be fully buffered. Conversion to tapes is not desirable because of the high frequency of tape reading and writing errors. If tapes are used, four working (scratch) tapes must be provided with the code reading and writing a pair on alternate cycles. Four are used so that the first half of the K-lines may be written on and read from two tapes and those tapes rewound, while the second half of the K-lines are being read and written on the other two tapes. The first-half tapes are then ready to be read and written at the start of the next cycle while the second-half tapes are being rewound. Reads and writes and calculations are done simultaneously.

If conversion to disk or drum is to be done, two independent units and exchanges should be utilized. Then the reads, writes, and calculations can be done simultaneously. Read-write heads should have to be repositioned only once per cycle per disk. If only one disk or drum is available, the K-lines should be arranged in the file in such a manner that after each access, the proper K-line follows immediately. This requires a rotation of K-line through the various K-line slots on the unit so that a particular K-line is moved from position to position as the problem cycles through its run.

LCM read-writes are done in the generation (GENRAA), the cycling routine (CYCLAA), the dump (DUMPAA), and the restart (REGOAA) routines.

THE OVERLAY

The overlays can be combined into a single load if space is available and the overlay system is not available. The generator overlay can be separated from the cycling overlay and each treated as a separate program. If so, a restart tape could be written by the generator, and the main code would read this and run, just as if it were restarting from a running dump. Subroutines used by both the generator and the cycling code must be provided to both. This would include those routines now in level one, except the present control (CONTAA) routine.

CONVERSION PROCEDURE

A method to proceed with a conversion to another machine would be to make the necessary decisions on methods based on the above information, convert the CLI routine to commons, then compile all routines. The incompatible statements will appear as errors on the compilations. These can then be corrected individually.

Appendix D: Input Sheets

The input sheets serve as a convenient means of inputting much of the most common input.

Several block input sheets are shown because all of the types of input could not be included on one sheet. These block input sheets can be combined in any way to run problems.

K-Line

No input sheet for K-line input has been made because of the infrequency of its use.

No. 7201

HEMP

BLOCK INPUT CARTESIAN

INCLUDING **K** POLAR

☒ Right adjust input

		JMIN Y										JMIN Y										X										Y										X										Y										X										Y																													
		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	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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		CORRHRMIN																																																																																																			
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JMIN	JMINES	JZOUTC																																																																																																			
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[illegible]

(RIGHT ADJUST INLC 2 INPUT)

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[illegible]

N	X	Z	O	F	E	N	L	K	←NUMBER OF X TONES IN THIS CLOCK										
J	Z	U	T	C															
S	A	T	H	O															
S	L	I	D	E	-	T	Y	P	E										
S	L	I	D	E	-	A	N	D											

Notes:

I means integer input.
All other numbers need a decimal point.

SLIDE LINE EXTENSION ANGLE

RADIUS OF
MATERIAL
INTERFACE
ANGLE OF
EMIS POINT
ANGLE OF
KMIN POINT
X-SHIFT
OF CENTER
Y-SHIFT
OF CENTER

P	A	D	I	U	S	O	U	T	R
J	N	H	-	K	K	-	A	N	D
J	N	H	-	K	K	-	A	N	D
X	M	A	X	S	H	I	F	T	
X	M	A	X	S	H	I	F	T	

FILED IN [] OF [] AT []

F	I	N	I		O	F	B	L	C	K		N	O	V	A	R	Y	
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[illegible]

K-LINE POINT BY POINT (OR ZONE BY ZONE) INPUT

To input more than 8 variables, use same label or leave blank.

VARIABLE 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POINT BY POINT INPUT VOCABULARY

CARTESIAN	POLAR	GENERAL
KLPR - X	KLPR - RADIUS	KLPR - ENERGY
KLPPY - Y	KLPA - ANGLE	KLPPV - VOLUME
	KLPPSYPT - R-SHIFT OF CENTER	KLPPDEN - DENSITY (G/CM)
	KLPPSYPT - T-SHIFT OF CENTER	KLPPVEL - VELOCITY
		KLPPVVEL - VELOCITY
		KLPPSWT - SWIRL TIME
		KLPPMAT - MATERIAL NUMBER
		KLPPTP - POINT TYPE

Appendix E:

Sample Problem Description and Output

The sample problem is the problem named LIP 0.01 that is shown in Ref. 1*. That problem was run on an earlier version of HEMP (assembly language coded) on the IBM 7030 (Stretch) computer. This is why the cycle count and time do not correlate exactly.

Equations of state:

Copper	$P = 1.88 \mu$	Shear modulus = .46
(Use Form E, No. 10)		Yield = .01
		$P_0 = 7.85$
		$P_{\text{-min}} = -.01$

HE #1	Standard	Det velocity = .88
		Burn constant = .17

Initial $\Delta T = .025$

Output: Write CRT output every 5 microseconds for 5 microseconds.
Get printout of alternate CRT's.

Fig. E-1. Specifications of example problem LIP .01.

*Page 49 of Ref. 1.

1.3

HEMP BLOCK INPUT, CARTESIAN (RIGHT ADJUST INTEGER INPUT)

PAGE 2 OF 4

	MIN X	MIN Y	X	Y	X	Y	X	Y	X	Y	X	Y	
CORRUPTAK	0.	1.4	4.	1.4									
CONRMITH	0.	1.	4.	1.									
KSOVSLK	4	NUMBER OF A POINT IN THIS BLOCK.											
SEUTC	40												
HATHO	10												
SLIDE-TYPE	2												
SLIDE-ANG	2												
<div style="display: flex; justify-content: space-between;"> <div> <p>Notes</p> <p>☐ means integer input.</p> <p><u>All other numbers need a decimal point.</u></p> </div> <div> <p>SLIDE LINE EXPANSION ANGLES</p> </div> </div>													
FLIHI	2	BLGCR											
FLIHI	2	BLGCR	ROUWDARF										

SLC1

(RIGHT ADJUST INTEGER INPUT)

PAGE 3 OF 4

[illegible]

BT,C1

4 of 4

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	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80										
HEBURN								3																																																																																	
								DETONATION VELOCITY				BURN CONSTANT R/S ZONE/DET VEL				DETONATION X 1				DETONATION Y 1				DETONATION X 2				DETONATION Y 2				TIME SUBTRACT																																																									
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								HYDGEN ONLY				A B C D E																																																																													
SHADOW																																																																																									

ENTER TYPE OF BURN FOR MATERIAL IN "HEBURN"

1. BURNED N.E.
 2. DETONATE FROM POINT (X1, Y1)
 3. DETONATE FROM LINE (X1, Y1), (X2, Y2)
 4. HYDGEN BURN FROM (X1, Y1)
 5. DETONATE FROM MULTIPLE POINTS

BURN CONSTANTS
1 1/2 CHARACTERS IN 1/2 INCH
 DETONATION VELOCITY

TIME SUBTRACT IS A TIME OFFSET
 TO SUBTRACT FROM THE CALCULATED
 BURN TIME FOR EACH ZONE

HYDGEN INPUT

A OUTER H OF BLOCK IS SHADOW LINE
 B INNER " " BLOCK IS SHADOW LINE
 C JH " " OF SHADOW LINE CLOSEST TO DET.
 D JH " " OF SHADOW LINE CLOSEST TO DET.
 E SHADOW LINE WILL BE READ IN WITH BLOCK
 BOUNDARY INPUT

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	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80		
FINI																																																																																	
FINI

Sample problem CRT output, cycle = 1, time $\approx$ 0.

Sample problem CRT output, cycle = 198, time = 5.

234567890123456789012345678901234567890123456789012345678901234567890
 GENERAL 2 15 +1+2 LIP.01
 DELTAT .025
 PLOTSCALE 1 1 -.01 +4.5 -2.26 +2.25 .05
 PLOTSCALE 2 +2.5 +4.5 +0. +2.0 .05
 234567890123456789012345678901234567890123456789012345678901234567890
 PLOTTYPE 1 111 1 1 11 11 11 2 1 1 2
 EDITFREQ 5. 5.
 STONEWALLS 1 1
 MATINPUTLOC1 1.88C2 0.C3 0.C4 0.
 234567890123456789012345678901234567890123456789012345678901234567890
 MATINPUTLOELMU .46YELC .01YELT .01RHO 7.85
 SLIDE-ANG 15
 FINI OF GENERAL
 234567890123456789012345678901234567890123456789012345678901234567890
 CORNRMAX 0. 1.4 4. 1.4
 CORNRMIN 0. 1. 4. 1.
 NKZONESBLK 4
 JZOUTC 40
 234567890123456789012345678901234567890123456789012345678901234567890
 MATNO 10
 SLIDE-TYPE1
 FINI OF BLOCK
 234567890123456789012345678901234567890123456789012345678901234567890
 FINI OF BLOCK BOUNDARY

2HENP LIP-01
/ K-LINE NUMBER 15 FROM GENERATOR

CODE FILE

HEMPDG MAP

HEMPDG

Q	J	X	Y	X-COT	Y-DOT	V	E	F	MH	RD	EQST	IJ
41	4.00000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1
40	3.90000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	33
39	3.80000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	65
38	3.70000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	97
37	3.60000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	129
36	3.50000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	161
35	3.40000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	193
34	3.30000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	225
33	3.20000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	257
32	3.10000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	289
31	3.00000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	321
30	2.90000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	353
29	2.80000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	385
28	2.70000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	417
27	2.60000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	449
26	2.50000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	481
25	2.40000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	513
24	2.30000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	545
23	2.20000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	577
22	2.10000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	609
21	2.00000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	641
20	1.90000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	673
19	1.80000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	705
18	1.70000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	737
17	1.60000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	769
16	1.50000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	801
15	1.40000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	833
14	1.30000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	865
13	1.20000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	897
12	1.10000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	929
11	1.00000E+00	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	961
10	9.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	993
9	8.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1025
8	7.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1057
7	6.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1089
6	5.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1121
5	4.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1153
4	3.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1185
3	2.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1217
2	1.00000E-01	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1249
1	0.	1.40000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	1281

2HEMP LIP.01

/ K-LINE NUMBER 14 FROM GENERATOR

CODE FILE

HEMPDG MAP

HEMPDG

U	J	X	Y	X-COI	Y-DOT	V	E	F	MH	RO	EOST	IJ
41	4.00000E+00	1.30000E+00-0.	-0.	0.	0.	0.	0.	0.	2.11950E-01	7.85000E+00	0	1321
40	3.90000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1353
39	3.80000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1385
38	3.70000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1417
37	3.60000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1449
36	3.50000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1481
35	3.40000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1513
34	3.30000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1545
33	3.20000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1577
32	3.10000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1609
31	3.00000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1641
30	2.90000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1673
29	2.80000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1705
28	2.70000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1737
27	2.60000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1769
26	2.50000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1801
25	2.40000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1833
24	2.30000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1865
23	2.20000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1897
22	2.10000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1929
21	2.00000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1961
20	1.90000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	1993
19	1.80000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2025
18	1.70000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2057
17	1.60000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2089
16	1.50000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2121
15	1.40000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2153
14	1.30000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2185
13	1.20000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2217
12	1.10000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2249
11	1.00000E+00	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2281
10	9.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2313
9	8.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2345
8	7.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2377
7	6.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2409
6	5.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2441
5	4.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2473
4	3.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2505
3	2.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2537
2	1.00000E-01	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2569
1	0.	1.30000E+00-0.	-0.	1.000E+00	0.	0.	0.	0.	2.11950E-01	7.85000E+00	10	2601

2HEMP LIP.01
/ K-LINE NUMBER 13 FROM GENERATOR
U J X Y X-DOT

41	4.00000E+00	1.20000E+00-0.	-0.
40	3.90000E+00	1.20000E+00-0.	-0.
39	3.80000E+00	1.20000E+00-0.	-0.
38	3.70000E+00	1.20000E+00-0.	-0.
37	3.60000E+00	1.20000E+00-0.	-0.
36	3.50000E+00	1.20000E+00-0.	-0.
35	3.40000E+00	1.20000E+00-0.	-0.
34	3.30000E+00	1.20000E+00-0.	-0.
33	3.20000E+00	1.20000E+00-0.	-0.
32	3.10000E+00	1.20000E+00-0.	-0.
31	3.00000E+00	1.20000E+00-0.	-0.
30	2.90000E+00	1.20000E+00-0.	-0.
29	2.80000E+00	1.20000E+00-0.	-0.
28	2.70000E+00	1.20000E+00-0.	-0.
27	2.60000E+00	1.20000E+00-0.	-0.
26	2.50000E+00	1.20000E+00-0.	-0.
25	2.40000E+00	1.20000E+00-0.	-0.
24	2.30000E+00	1.20000E+00-0.	-0.
23	2.20000E+00	1.20000E+00-0.	-0.
22	2.10000E+00	1.20000E+00-0.	-0.
21	2.00000E+00	1.20000E+00-0.	-0.
20	1.90000E+00	1.20000E+00-0.	-0.
19	1.80000E+00	1.20000E+00-0.	-0.
18	1.70000E+00	1.20000E+00-0.	-0.
17	1.60000E+00	1.20000E+00-0.	-0.
16	1.50000E+00	1.20000E+00-0.	-0.
15	1.40000E+00	1.20000E+00-0.	-0.
14	1.30000E+00	1.20000E+00-0.	-0.
13	1.20000E+00	1.20000E+00-0.	-0.
12	1.10000E+00	1.20000E+00-0.	-0.
11	1.00000E+00	1.20000E+00-0.	-0.
10	9.00000E-01	1.20000E+00-0.	-0.
9	8.00000E-01	1.20000E+00-0.	-0.
8	7.00000E-01	1.20000E+00-0.	-0.
7	6.00000E-01	1.20000E+00-0.	-0.
6	5.00000E-01	1.20000E+00-0.	-0.
5	4.00000E-01	1.20000E+00-0.	-0.
4	3.00000E-01	1.20000E+00-0.	-0.
3	2.00000E-01	1.20000E+00-0.	-0.
2	1.00000E-01	1.20000E+00-0.	-0.
1	0.	1.20000E+00-0.	-0.

Y-DOT

U.

V

E

CODE FILE

HEMPDG MAP

HEMPDG

F

MH

RD

EQST

IJ

0.	0.	0.	0	2641
1.96250E-01	7.85000E+00	10	2673	
1.96250E-01	7.85000E+00	10	2705	
1.96250E-01	7.85000E+00	10	2737	
1.96250E-01	7.85000E+00	10	2769	
1.96250E-01	7.85000E+00	10	2801	
1.96250E-01	7.85000E+00	10	2833	
1.96250E-01	7.85000E+00	10	2865	
1.96250E-01	7.85000E+00	10	2897	
1.96250E-01	7.85000E+00	10	2929	
1.96250E-01	7.85000E+00	10	2961	
1.96250E-01	7.85000E+00	10	2993	
1.96250E-01	7.85000E+00	10	3025	
1.96250E-01	7.85000E+00	10	3057	
1.96250E-01	7.85000E+00	10	3089	
1.96250E-01	7.85000E+00	10	3121	
1.96250E-01	7.85000E+00	10	3153	
1.96250E-01	7.85000E+00	10	3185	
1.96250E-01	7.85000E+00	10	3217	
1.96250E-01	7.85000E+00	10	3249	
1.96250E-01	7.85000E+00	10	3281	
1.96250E-01	7.85000E+00	10	3313	
1.96250E-01	7.85000E+00	10	3345	
1.96250E-01	7.85000E+00	10	3377	
1.96250E-01	7.85000E+00	10	3409	
1.96250E-01	7.85000E+00	10	3441	
1.96250E-01	7.85000E+00	10	3473	
1.96250E-01	7.85000E+00	10	3505	
1.96250E-01	7.85000E+00	10	3537	
1.96250E-01	7.85000E+00	10	3569	
1.96250E-01	7.85000E+00	10	3601	
1.96250E-01	7.85000E+00	10	3633	
1.96250E-01	7.85000E+00	10	3665	
1.96250E-01	7.85000E+00	10	3697	
1.96250E-01	7.85000E+00	10	3729	
1.96250E-01	7.85000E+00	10	3761	
1.96250E-01	7.85000E+00	10	3793	
1.96250E-01	7.85000E+00	10	3825	
1.96250E-01	7.85000E+00	10	3857	
1.96250E-01	7.85000E+00	10	3889	
1.96250E-01	7.85000E+00	10	3921	

2HENP LIP-01

/ K-LINE NUMBER 12 FROM GENERATOR

CODE FILE

HENPDG MAP

HENPDG

0 J	X	Y	X-DOT	Y-DOT	V	E	F	MM	RO	EQST	IJ
41	4.00000E+00	1.10000E+00-0.	-0.	-0.	0.	0.	0.	0.	0.	0	3961
40	3.90000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	3993
39	3.80000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4025
38	3.70000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4057
37	3.60000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4089
36	3.50000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4121
35	3.40000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4153
34	3.30000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4185
33	3.20000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4217
32	3.10000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4249
31	3.00000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4281
30	2.90000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4313
29	2.80000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4345
28	2.70000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4377
27	2.60000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4409
26	2.50000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4441
25	2.40000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4473
24	2.30000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4505
23	2.20000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4537
22	2.10000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4569
21	2.00000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4601
20	1.90000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4633
19	1.80000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4665
18	1.70000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4697
17	1.60000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4729
16	1.50000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4761
15	1.40000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4793
14	1.30000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4825
13	1.20000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4857
12	1.10000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4889
11	1.00000E+00	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4921
10	9.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4953
9	8.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	4985
8	7.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5017
7	6.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5049
6	5.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5081
5	4.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5113
4	3.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5145
3	2.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5177
2	1.00000E-01	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5209
1	0.	1.10000E+00-0.	-0.	-0.	1.000E+00 0.	0.	0.	1.80550E-01	7.85000E+00	10	5241

2HEMP LIP-01
/ K-LINE NUMBER 11 FROM GENERATOR

CGCE FILE HEMPDG MAP HEMPDG

O	J	X	Y	X-CDT	Y-DOF	V	E	F	MH	RD	EQST	IJ
41	4.00000E+00	1.00000E+00-0.	-0.		0.	0.	0.	0.	0.	0.	0	5281
40	3.90000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5313	
39	3.80000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5345	
38	3.70000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5377	
37	3.60000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5409	
36	3.50000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5441	
35	3.40000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5473	
34	3.30000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5505	
33	3.20000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5537	
32	3.10000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5569	
31	3.00000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5601	
30	2.90000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5633	
29	2.80000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5665	
28	2.70000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5697	
27	2.60000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5729	
26	2.50000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5761	
25	2.40000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5793	
24	2.30000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5825	
23	2.20000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5857	
22	2.10000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5889	
21	2.00000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5921	
20	1.90000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5953	
19	1.80000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	5985	
18	1.70000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6017	
17	1.60000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6049	
16	1.50000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6081	
15	1.40000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6113	
14	1.30000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6145	
13	1.20000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6177	
12	1.10000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6209	
11	1.00000E+00	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6241	
10	9.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6273	
9	8.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6305	
8	7.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6337	
7	6.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6369	
6	5.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6401	
5	4.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6433	
4	3.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6465	
3	2.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6497	
2	1.00000E-01	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6529	
1	0.	1.00000E+00-0.	-0.		1.000E+00 0.	0.	0.	1.64850E-01	7.85000E+00	10	6561	

BLOCK 2 DONE

234567890123456789012345678901234567890123456789012345678901234567890

CORNRMAX 0. 1. 4. 1.

CORNRMIN 0. 0. 4. 0.

AKZONESBLK 10

JZDUTC 40

234567890123456789012345678901234567890123456789012345678901234567890

MATND 1

HEBURN 3

HEPARAM .88 .17 4. 1. 4. 0.

FINI OF BLOCK

234567890123456789012345678901234567890123456789012345678901234567890

FINI OF BLOCK 60UNCARY

ZHEMP LIP-01
/ K-LINE NUMBER -11 FROM GENERATUR
U J K Y X-COT

CODE FILE HEMPDG MAP HEMPDG

U	J	K	Y	X-COT	Y-DCT	V	E	F	MH	RD	EQST	IJ
41	4.00000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6601
40	3.90000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6633
39	1.80000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6665
38	3.70000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6697
37	3.60000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6729
36	3.50000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6761
35	3.40000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6793
34	3.30000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6825
33	3.20000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6857
32	3.10000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6889
31	3.00000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6921
30	2.90000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6953
29	2.80000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	6985
28	2.70000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7017
27	2.60000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7049
26	2.50000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7081
25	2.40000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7113
24	2.30000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7145
23	2.20000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7177
22	2.10000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7209
21	2.00000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7241
20	1.90000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7273
19	1.80000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7305
18	1.70000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7337
17	1.60000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7369
16	1.50000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7401
15	1.40000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7433
14	1.30000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7465
13	1.20000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7497
12	1.10000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7529
11	1.00000E+00	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7561
10	9.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7593
9	8.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7625
8	7.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7657
7	6.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7689
6	5.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7721
5	4.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7753
4	3.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7785
3	2.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7817
2	1.00000E-01	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7849
1	0.	1.00000E+00-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0	7881

ZHEMP LTP-01				CODE FILE		HEMPOG MAP		HEMPOG	
/ K-LINE NUMBER	IO FROM GENERATOR								
0 J	X	Y	X-COT	Y-DOT	D.	V	E	F	MH
					D.	V	E	F	MH
41	4.00000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.68182E-02	3.49600E-02	1.84000E+00	1 7921
40	3.90000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.70455E-01	3.49600E-02	1.84000E+00	1 7953
39	3.80000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.84091E-01	3.49600E-02	1.84000E+00	1 8017
38	3.70000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.97727E-01	3.49600E-02	1.84000E+00	1 8049
37	3.60000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.11364E-01	3.49600E-02	1.84000E+00	1 8081
36	3.50000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-6.25000E-01	3.49600E-02	1.84000E+00	1 8113
35	3.40000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-7.38636E-01	3.49600E-02	1.84000E+00	1 8145
34	3.30000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-8.52273E-01	3.49600E-02	1.84000E+00	1 8177
33	3.20000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-9.65909E-01	3.49600E-02	1.84000E+00	1 8209
32	3.10000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.07955E+00	3.49600E-02	1.84000E+00	1 8241
31	3.00000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.19318E+00	3.49600E-02	1.84000E+00	1 8273
30	2.90000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.30682E+00	3.49600E-02	1.84000E+00	1 8305
29	2.80000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.42045E+00	3.49600E-02	1.84000E+00	1 8337
28	2.70000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.53409E+00	3.49600E-02	1.84000E+00	1 8369
27	2.60000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.64773E+00	3.49600E-02	1.84000E+00	1 8401
26	2.50000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.76136E+00	3.49600E-02	1.84000E+00	1 8433
25	2.40000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.87500E+00	3.49600E-02	1.84000E+00	1 8465
24	2.30000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.98864E+00	3.49600E-02	1.84000E+00	1 8497
23	2.20000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.10227E+00	3.49600E-02	1.84000E+00	1 8529
22	2.10000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.21591E+00	3.49600E-02	1.84000E+00	1 8561
21	2.00000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.32955E+00	3.49600E-02	1.84000E+00	1 8593
20	1.90000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.44318E+00	3.49600E-02	1.84000E+00	1 8625
19	1.80000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.55682E+00	3.49600E-02	1.84000E+00	1 8657
18	1.70000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.67045E+00	3.49600E-02	1.84000E+00	1 8689
17	1.60000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.78409E+00	3.49600E-02	1.84000E+00	1 8721
16	1.50000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.89773E+00	3.49600E-02	1.84000E+00	1 8753
15	1.40000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.01136E+00	3.49600E-02	1.84000E+00	1 8785
14	1.30000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.12500E+00	3.49600E-02	1.84000E+00	1 8817
13	1.20000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.23864E+00	3.49600E-02	1.84000E+00	1 8849
12	1.10000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.35227E+00	3.49600E-02	1.84000E+00	1 8881
11	1.00000E+00	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.46591E+00	3.49600E-02	1.84000E+00	1 8913
10	9.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.57955E+00	3.49600E-02	1.84000E+00	1 8945
9	8.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.69318E+00	3.49600E-02	1.84000E+00	1 8977
8	7.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.80682E+00	3.49600E-02	1.84000E+00	1 9009
7	6.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.92045E+00	3.49600E-02	1.84000E+00	1 9041
6	5.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.03409E+00	3.49600E-02	1.84000E+00	1 9073
5	4.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.14773E+00	3.49600E-02	1.84000E+00	1 9105
4	3.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.26136E+00	3.49600E-02	1.84000E+00	1 9137
3	2.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.37500E+00	3.49600E-02	1.84000E+00	1 9169
2	1.00000E-01	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.48864E+00	3.49600E-02	1.84000E+00	1 9201
1	0.	9.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.60227E+00	3.49600E-02	1.84000E+00	1 9233

ZHEMP LIP-01
/ K-LINE NUMBER 9 FROM GENERATOR
Q J X Y X-DOT Y-DOT

CCGE FILE HEMPOG MAP HEMPOG

Q	J	X	Y	X-DOT	Y-DOT	Q.	V	E	F	Q.	MH	RO	EQST	IJ
41	4.00000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-5.68182E-02	3.12800E-02	1.84000E+00	0	9241			
40	3.90000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.70455E-01	3.12800E-02	1.84000E+00	1	9273			
39	3.80000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.84091E-01	3.12800E-02	1.84000E+00	1	9305			
38	3.70000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.97727E-01	3.12800E-02	1.84000E+00	1	9337			
37	3.60000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-5.11364E-01	3.12800E-02	1.84000E+00	1	9369			
36	3.50000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-6.25000E-01	3.12800E-02	1.84000E+00	1	9401			
35	3.40000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-7.38636E-01	3.12800E-02	1.84000E+00	1	9433			
34	3.30000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-8.52273E-01	3.12800E-02	1.84000E+00	1	9465			
33	3.20000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-9.65909E-01	3.12800E-02	1.84000E+00	1	9497			
32	3.10000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.07955E+00	3.12800E-02	1.84000E+00	1	9529			
31	3.00000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.19318E+00	3.12800E-02	1.84000E+00	1	9561			
30	2.90000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.30662E+00	3.12800E-02	1.84000E+00	1	9593			
29	2.80000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.42045E+00	3.12800E-02	1.84000E+00	1	9625			
28	2.70000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.53409E+00	3.12800E-02	1.84000E+00	1	9657			
27	2.60000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.64773E+00	3.12800E-02	1.84000E+00	1	9689			
26	2.50000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.76136E+00	3.12800E-02	1.84000E+00	1	9721			
25	2.40000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.87500E+00	3.12800E-02	1.84000E+00	1	9753			
24	2.30000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-1.98864E+00	3.12800E-02	1.84000E+00	1	9785			
23	2.20000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.10227E+00	3.12800E-02	1.84000E+00	1	9817			
22	2.10000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.21591E+00	3.12800E-02	1.84000E+00	1	9849			
21	2.00000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.32955E+00	3.12800E-02	1.84000E+00	1	9881			
20	1.90000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.44318E+00	3.12800E-02	1.84000E+00	1	9913			
19	1.80000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.55682E+00	3.12800E-02	1.84000E+00	1	9945			
18	1.70000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.67045E+00	3.12800E-02	1.84000E+00	1	9977			
17	1.60000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.78409E+00	3.12800E-02	1.84000E+00	1	10009			
16	1.50000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-2.89773E+00	3.12800E-02	1.84000E+00	1	10041			
15	1.40000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.01136E+00	3.12800E-02	1.84000E+00	1	10073			
14	1.30000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.12500E+00	3.12800E-02	1.84000E+00	1	10105			
13	1.20000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.23864E+00	3.12800E-02	1.84000E+00	1	10137			
12	1.10000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.35227E+00	3.12800E-02	1.84000E+00	1	10169			
11	1.00000E+00	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.46591E+00	3.12800E-02	1.84000E+00	1	10201			
10	9.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.57955E+00	3.12800E-02	1.84000E+00	1	10233			
9	8.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.69318E+00	3.12800E-02	1.84000E+00	1	10265			
8	7.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.80682E+00	3.12800E-02	1.84000E+00	1	10297			
7	6.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-3.92045E+00	3.12800E-02	1.84000E+00	1	10329			
6	5.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-4.03409E+00	3.12800E-02	1.84000E+00	1	10361			
5	4.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-4.14773E+00	3.12800E-02	1.84000E+00	1	10393			
4	3.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-4.26136E+00	3.12800E-02	1.84000E+00	1	10425			
3	2.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-4.37500E+00	3.12800E-02	1.84000E+00	1	10457			
2	1.00000E-01	8.00000E-01-0.	-0.			1.000E+00	1.39852E-01-4.48864E+00	3.12800E-02	1.84000E+00	1	10489			
1	0.	8.00000E-01-0.	-0.			1.000E+00				1	10521			

ZHEMP LIP-01				CCCE FILE				HEMPDG MAP				HEMPDG	
K-LINE NUMBER		S FROM GENERATOR											
O	J	X	Y	X-DOT	Y-DOT	V	U	E	F	MH	RO	EWST	IJ
41	4.00000E+00	7.00000E-01-0.	-0.	-0.	0.	0.	0.	0.	0.	0.	0.	010561	
40	3.90000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.68182E-02	2.76000E-02	1.84000E+00	110593				
39	3.80000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.70455E-01	2.76000E-02	1.84000E+00	110625				
38	3.70000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.84091E-01	2.76000E-02	1.84000E+00	110657				
37	3.60000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.97727E-01	2.76000E-02	1.84000E+00	110689				
36	3.50000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.11364E-01	2.76000E-02	1.84000E+00	110721				
35	3.40000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-6.25000E-01	2.76000E-02	1.84000E+00	110753				
34	3.30000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-7.38636E-01	2.76000E-02	1.84000E+00	110785				
33	3.20000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-8.52273E-01	2.76000E-02	1.84000E+00	110817				
32	3.10000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-9.65909E-01	2.76000E-02	1.84000E+00	110849				
31	3.00000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.07955E+00	2.76000E-02	1.84000E+00	110881				
30	2.90000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.19318E+00	2.76000E-02	1.84000E+00	110913				
29	2.80000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.30682E+00	2.76000E-02	1.84000E+00	110945				
28	2.70000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.42045E+00	2.76000E-02	1.84000E+00	110977				
27	2.60000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.53409E+00	2.76000E-02	1.84000E+00	111009				
26	2.50000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.64773E+00	2.76000E-02	1.84000E+00	111041				
25	2.40000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.76136E+00	2.76000E-02	1.84000E+00	111073				
24	2.30000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.87500E+00	2.76000E-02	1.84000E+00	111105				
23	2.20000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.98864E+00	2.76000E-02	1.84000E+00	111137				
22	2.10000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.10227E+00	2.76000E-02	1.84000E+00	111169				
21	2.00000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.21591E+00	2.76000E-02	1.84000E+00	111201				
20	1.90000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.32955E+00	2.76000E-02	1.84000E+00	111233				
19	1.80000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.44318E+00	2.76000E-02	1.84000E+00	111265				
18	1.70000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.55682E+00	2.76000E-02	1.84000E+00	111297				
17	1.60000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.67045E+00	2.76000E-02	1.84000E+00	111329				
16	1.50000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.78409E+00	2.76000E-02	1.84000E+00	111361				
15	1.40000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.89773E+00	2.76000E-02	1.84000E+00	111393				
14	1.30000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.01136E+00	2.76000E-02	1.84000E+00	111425				
13	1.20000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.12500E+00	2.76000E-02	1.84000E+00	111457				
12	1.10000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.23864E+00	2.76000E-02	1.84000E+00	111489				
11	1.00000E+00	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.35227E+00	2.76000E-02	1.84000E+00	111521				
10	9.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.46591E+00	2.76000E-02	1.84000E+00	111553				
9	8.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.57955E+00	2.76000E-02	1.84000E+00	111585				
8	7.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.69318E+00	2.76000E-02	1.84000E+00	111617				
7	6.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.80682E+00	2.76000E-02	1.84000E+00	111649				
6	5.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.92045E+00	2.76000E-02	1.84000E+00	111681				
5	4.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.03409E+00	2.76000E-02	1.84000E+00	111713				
4	3.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.14773E+00	2.76000E-02	1.84000E+00	111745				
3	2.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.26136E+00	2.76000E-02	1.84000E+00	111777				
2	1.00000E-01	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.37500E+00	2.76000E-02	1.84000E+00	111809				
1	0.	7.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.48864E+00	2.76000E-02	1.84000E+00	111841				

2HEPP LIP.01				CODE FILE HEMPOG MAP HEMPOG											
/ K-LINE NUMBER		7 FROM GENERATOR													
0	J	X	Y	X-DOT	Y-DOT	V	E	F	MH	RD	EQST	IJ			
41	4.00000E+00	6.00000E-01-0.	-0.	-0.	0.	0.	0.	0.	0.	0.	011881				
40	3.90000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.68182E-02	2.39200E-02	1.84000E+00			111913				
39	3.80000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.70455E-01	2.39200E-02	1.84000E+00			111945				
38	3.70000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.84091E-01	2.39200E-02	1.84000E+00			111977				
37	3.60000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.97727E-01	2.39200E-02	1.84000E+00			112009				
36	3.50000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.11364E-01	2.39200E-02	1.84000E+00			112041				
35	3.40000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-6.25000E-01	2.39200E-02	1.84000E+00			112073				
34	3.30000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-7.38636E-01	2.39200E-02	1.84000E+00			112105				
33	3.20000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-8.52273E-01	2.39200E-02	1.84000E+00			112137				
32	3.10000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-9.65909E-01	2.39200E-02	1.84000E+00			112169				
31	3.00000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.07955E+00	2.39200E-02	1.84000E+00			112201				
30	2.90000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.19318E+00	2.39200E-02	1.84000E+00			112233				
29	2.80000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.30682E+00	2.39200E-02	1.84000E+00			112265				
28	2.70000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.42045E+00	2.39200E-02	1.84000E+00			112297				
27	2.60000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.53409E+00	2.39200E-02	1.84000E+00			112329				
26	2.50000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.64773E+00	2.39200E-02	1.84000E+00			112361				
25	2.40000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.76136E+00	2.39200E-02	1.84000E+00			112393				
24	2.30000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.87500E+00	2.39200E-02	1.84000E+00			112425				
23	2.20000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.98864E+00	2.39200E-02	1.84000E+00			112457				
22	2.10000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.10227E+00	2.39200E-02	1.84000E+00			112489				
21	2.00000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.21591E+00	2.39200E-02	1.84000E+00			112521				
20	1.90000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.32955E+00	2.39200E-02	1.84000E+00			112553				
19	1.80000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.44318E+00	2.39200E-02	1.84000E+00			112585				
18	1.70000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.55682E+00	2.39200E-02	1.84000E+00			112617				
17	1.60000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.67045E+00	2.39200E-02	1.84000E+00			112649				
16	1.50000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.78409E+00	2.39200E-02	1.84000E+00			112681				
15	1.40000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.89773E+00	2.39200E-02	1.84000E+00			112713				
14	1.30000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.01136E+00	2.39200E-02	1.84000E+00			112745				
13	1.20000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.12500E+00	2.39200E-02	1.84000E+00			112777				
12	1.10000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.23864E+00	2.39200E-02	1.84000E+00			112809				
11	1.00000E+00	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.35227E+00	2.39200E-02	1.84000E+00			112841				
10	9.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.46591E+00	2.39200E-02	1.84000E+00			112873				
9	8.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.57955E+00	2.39200E-02	1.84000E+00			112905				
8	7.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.69318E+00	2.39200E-02	1.84000E+00			112937				
7	6.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.80682E+00	2.39200E-02	1.84000E+00			112969				
6	5.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.92045E+00	2.39200E-02	1.84000E+00			113001				
5	4.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.03409E+00	2.39200E-02	1.84000E+00			113033				
4	3.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.14773E+00	2.39200E-02	1.84000E+00			113065				
3	2.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.26136E+00	2.39200E-02	1.84000E+00			113097				
2	1.00000E-01	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.37500E+00	2.39200E-02	1.84000E+00			113129				
1	0.	6.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.48864E+00	2.39200E-02	1.84000E+00			113161				

2HEMP LIP.01

/ K-LINE NUMBER

6 FROM GENERATOR

CGDE FILE

HEMPDG MAP

HEMPDG

O	J	X	Y	X-DOT	Y-DOT	V	E	F	MH	RD	EQST	IJ
41	4.00000E+00	5.00000E-01-0.	-0.	-0.	0.	0.	0.	0.	0.	0.	013201	
40	3.90000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.68182E-02	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113233	
39	3.80000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.70455E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113265	
38	3.70000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.84091E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113297	
37	3.60000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.97727E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113329	
36	3.50000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.11364E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113361	
35	3.40000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-6.25000E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113393	
34	3.30000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-7.38636E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113425	
33	3.20000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-8.52273E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113457	
32	3.10000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-9.65909E-01	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113489	
31	3.00000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.07955E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113521	
30	2.90000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.19318E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113553	
29	2.80000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.30682E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113585	
28	2.70000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.42045E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113617	
27	2.60000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.53409E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113649	
26	2.50000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.64773E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113681	
25	2.40000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.76136E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113713	
24	2.30000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.87500E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113745	
23	2.20000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.98864E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113777	
22	2.10000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.10227E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113809	
21	2.00000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.21591E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113841	
20	1.90000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.32955E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113873	
19	1.80000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.44318E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113905	
18	1.70000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.55682E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113937	
17	1.60000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.67045E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	113969	
16	1.50000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.78409E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114001	
15	1.40000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.89773E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114033	
14	1.30000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.01136E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114065	
13	1.20000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.12500E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114097	
12	1.10000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.23864E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114129	
11	1.00000E+00	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.35227E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114161	
10	9.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.46591E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114193	
9	8.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.57955E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114225	
8	7.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.69318E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114257	
7	6.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.80682E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114289	
6	5.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.92045E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114321	
5	4.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.03409E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114353	
4	3.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.14773E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114385	
3	2.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.26136E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114417	
2	1.00000E-01	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.37500E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114449	
1	0.	5.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.48864E+00	2.02400E-02	1.84000E+00	1.84000E+00	1.84000E+00	114481	

ZHEMP LIP.01				CODE FILE				HEMPDG MAP		HEMPDG	
5 FROM GENERATOR											
K-LINE	NUMBER	Y	X-DOT	Y-DOT	V	E	F	MH	RO	EQST	IJ
41	4.00000E+00	4.00000E-01-0.	-0.	0.	0.	0.	0.	0.	0.	014521	
40	3.90000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-5.68182E-02	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114553	
39	3.80000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.70455E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114585	
38	3.70000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.84091E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114617	
37	3.60000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.97727E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114649	
36	3.50000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-5.11364E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114681	
35	3.40000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-6.25000E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114713	
34	3.30000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-7.38636E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114745	
33	3.20000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-8.52273E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114777	
32	3.10000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-9.65909E-01	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114809	
31	3.00000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.07955E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114841	
30	2.90000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.19318E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114873	
29	2.80000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.30682E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114905	
28	2.70000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.42045E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114937	
27	2.60000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.53409E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	114969	
26	2.50000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.64773E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115001	
25	2.40000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.76136E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115033	
24	2.30000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.87500E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115065	
23	2.20000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.98864E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115097	
22	2.10000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.10227E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115129	
21	2.00000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.21591E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115161	
20	1.90000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.32955E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115193	
19	1.80000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.44318E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115225	
18	1.70000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.55682E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115257	
17	1.60000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.67045E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115289	
16	1.50000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.78409E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115321	
15	1.40000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.89773E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115353	
14	1.30000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.01136E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115385	
13	1.20000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.12500E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115417	
12	1.10000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.23864E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115449	
11	1.00000E+00	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.35227E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115481	
10	9.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.46591E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115513	
9	8.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.57955E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115545	
8	7.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.69318E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115577	
7	6.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.80682E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115609	
6	5.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.92045E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115641	
5	4.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.03409E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115673	
4	3.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.14773E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115705	
3	2.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.26136E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115737	
2	1.00000E-01	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.37500E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115769	
1	0.	4.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.48864E+00	1.65600E-02	1.84000E+00	1.84000E+00	1.84000E+00	115801	

2HEMP LIP.01

/ K-LINE NUMBER

4 FROM GENERATOR

CODE FILE

HEMPDG MAP

HEMPDG

0 J	X	Y	X-DOT	Y-DOT	0.	V	0.	E	0.	F	0.	MH	0.	RD	EQST	IJ
41	4.00000E+00	3.00000E-01-0.	-0.	-0.	0.	1.000E+00	1.39852E-01	-5.68182E-02	1.28800E-02	1.84000E+00	115841					
40	3.90000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.70455E-01	1.28800E-02	1.84000E+00	115905						
39	3.80000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.84091E-01	1.28800E-02	1.84000E+00	115937						
38	3.70000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.97727E-01	1.28800E-02	1.84000E+00	115969						
37	3.60000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-5.11364E-01	1.28800E-02	1.84000E+00	116001						
36	3.50000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-6.25000E-01	1.28800E-02	1.84000E+00	116033						
35	3.40000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-7.38636E-01	1.28800E-02	1.84000E+00	116065						
34	3.30000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-8.52273E-01	1.28800E-02	1.84000E+00	116097						
33	3.20000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-9.65909E-01	1.28800E-02	1.84000E+00	116129						
32	3.10000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.07955E+00	1.28800E-02	1.84000E+00	116161						
31	3.00000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.19318E+00	1.28800E-02	1.84000E+00	116193						
30	2.90000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.30682E+00	1.28800E-02	1.84000E+00	116225						
29	2.80000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.42045E+00	1.28800E-02	1.84000E+00	116257						
28	2.70000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.53409E+00	1.28800E-02	1.84000E+00	116289						
27	2.60000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.64773E+00	1.28800E-02	1.84000E+00	116321						
26	2.50000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.76136E+00	1.28800E-02	1.84000E+00	116353						
25	2.40000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.87500E+00	1.28800E-02	1.84000E+00	116385						
24	2.30000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-1.98864E+00	1.28800E-02	1.84000E+00	116417						
23	2.20000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.10227E+00	1.28800E-02	1.84000E+00	116449						
22	2.10000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.21591E+00	1.28800E-02	1.84000E+00	116481						
21	2.00000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.32955E+00	1.28800E-02	1.84000E+00	116513						
20	1.90000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.44318E+00	1.28800E-02	1.84000E+00	116545						
19	1.80000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.55682E+00	1.28800E-02	1.84000E+00	116577						
18	1.70000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.67045E+00	1.28800E-02	1.84000E+00	116609						
17	1.60000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.78409E+00	1.28800E-02	1.84000E+00	116641						
16	1.50000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-2.89773E+00	1.28800E-02	1.84000E+00	116673						
15	1.40000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.01136E+00	1.28800E-02	1.84000E+00	116705						
14	1.30000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.12500E+00	1.28800E-02	1.84000E+00	116737						
13	1.20000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.23864E+00	1.28800E-02	1.84000E+00	116769						
12	1.10000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.35227E+00	1.28800E-02	1.84000E+00	116801						
11	1.00000E+00	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.46591E+00	1.28800E-02	1.84000E+00	116833						
10	9.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.57955E+00	1.28800E-02	1.84000E+00	116865						
9	8.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.69318E+00	1.28800E-02	1.84000E+00	116897						
8	7.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.80682E+00	1.28800E-02	1.84000E+00	116929						
7	6.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-3.92045E+00	1.28800E-02	1.84000E+00	116961						
6	5.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-4.03409E+00	1.28800E-02	1.84000E+00	117025						
5	4.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-4.14773E+00	1.28800E-02	1.84000E+00	117057						
4	3.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-4.26136E+00	1.28800E-02	1.84000E+00	117089						
3	2.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-4.37500E+00	1.28800E-02	1.84000E+00	117121						
2	1.00000E-01	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-4.48864E+00	1.28800E-02	1.84000E+00							
1	0.	3.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01	-4.60227E+00	1.28800E-02	1.84000E+00							

2HEMP LIP.01				CODE FILE				HEMPDG MAP		HEMPDG	
/ K-LINE NUMBER		3 FROM GENERATOR									
J	X	Y	X-DOT	Y-DOT	V	E	F	MH	RD	EQST	IJ
41	4.00000E+00	2.00000E-01-0.	-0.	-0.	0.	0.	0.	0.	0.	017161	
40	3.90000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.68182E-02	9.20000E-03	1.84000E+00	1.84000E+00	117193	
39	3.80000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.70455E-01	9.20000E-03	1.84000E+00	1.84000E+00	117225	
38	3.70000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.84091E-01	9.20000E-03	1.84000E+00	1.84000E+00	117257	
37	3.60000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.97727E-01	9.20000E-03	1.84000E+00	1.84000E+00	117289	
36	3.50000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-5.11364E-01	9.20000E-03	1.84000E+00	1.84000E+00	117321	
35	3.40000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-6.25000E-01	9.20000E-03	1.84000E+00	1.84000E+00	117353	
34	3.30000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-7.38636E-01	9.20000E-03	1.84000E+00	1.84000E+00	117385	
33	3.20000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-8.52273E-01	9.20000E-03	1.84000E+00	1.84000E+00	117417	
32	3.10000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-9.65409E-01	9.20000E-03	1.84000E+00	1.84000E+00	117449	
31	3.00000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.07955E+00	9.20000E-03	1.84000E+00	1.84000E+00	117481	
30	2.90000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.19318E+00	9.20000E-03	1.84000E+00	1.84000E+00	117513	
29	2.80000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.30682E+00	9.20000E-03	1.84000E+00	1.84000E+00	117545	
28	2.70000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.42045E+00	9.20000E-03	1.84000E+00	1.84000E+00	117577	
27	2.60000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.53409E+00	9.20000E-03	1.84000E+00	1.84000E+00	117609	
26	2.50000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.64773E+00	9.20000E-03	1.84000E+00	1.84000E+00	117641	
25	2.40000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.76136E+00	9.20000E-03	1.84000E+00	1.84000E+00	117673	
24	2.30000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.87500E+00	9.20000E-03	1.84000E+00	1.84000E+00	117705	
23	2.20000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-1.98864E+00	9.20000E-03	1.84000E+00	1.84000E+00	117737	
22	2.10000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.10227E+00	9.20000E-03	1.84000E+00	1.84000E+00	117769	
21	2.00000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.21591E+00	9.20000E-03	1.84000E+00	1.84000E+00	117801	
20	1.90000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.32955E+00	9.20000E-03	1.84000E+00	1.84000E+00	117833	
19	1.80000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.44318E+00	9.20000E-03	1.84000E+00	1.84000E+00	117865	
18	1.70000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.55682E+00	9.20000E-03	1.84000E+00	1.84000E+00	117897	
17	1.60000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.67045E+00	9.20000E-03	1.84000E+00	1.84000E+00	117929	
16	1.50000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.78409E+00	9.20000E-03	1.84000E+00	1.84000E+00	117961	
15	1.40000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-2.89773E+00	9.20000E-03	1.84000E+00	1.84000E+00	117993	
14	1.30000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.01136E+00	9.20000E-03	1.84000E+00	1.84000E+00	118025	
13	1.20000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.12500E+00	9.20000E-03	1.84000E+00	1.84000E+00	118057	
12	1.10000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.23864E+00	9.20000E-03	1.84000E+00	1.84000E+00	118089	
11	1.00000E+00	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.35227E+00	9.20000E-03	1.84000E+00	1.84000E+00	118121	
10	9.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.46591E+00	9.20000E-03	1.84000E+00	1.84000E+00	118153	
9	8.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.57955E+00	9.20000E-03	1.84000E+00	1.84000E+00	118185	
8	7.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.69318E+00	9.20000E-03	1.84000E+00	1.84000E+00	118217	
7	6.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.80682E+00	9.20000E-03	1.84000E+00	1.84000E+00	118249	
6	5.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-3.92045E+00	9.20000E-03	1.84000E+00	1.84000E+00	118281	
5	4.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.03409E+00	9.20000E-03	1.84000E+00	1.84000E+00	118313	
4	3.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.14773E+00	9.20000E-03	1.84000E+00	1.84000E+00	118345	
3	2.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.26136E+00	9.20000E-03	1.84000E+00	1.84000E+00	118377	
2	1.00000E-01	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.37500E+00	9.20000E-03	1.84000E+00	1.84000E+00	118409	
1	0.	2.00000E-01-0.	-0.	-0.	1.000E+00	1.39852E-01-4.48864E+00	9.20000E-03	1.84000E+00	1.84000E+00	118441	

2HEMP LIP.01				CODE FILE				HEMPOG MAP		HEMPOG	
/ K-LINE NUMBER		2 FROM GENERATOR									
Q	J	X	Y	X-CDT	Y-DDT	V	E	F	MH	RO	EQST IJ
41	4.00000E+00	1.00000E-01-0.	-0.	0.	0.	0.	0.	0.	0.	0.	018481
40	3.90000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-5.68182E-02	5.52000E-03	1.84000E+00	118513			
39	3.80000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.70455E-01	5.52000E-03	1.84000E+00	118545			
38	3.70000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.84091E-01	5.52000E-03	1.84000E+00	118577			
37	3.60000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.97727E-01	5.52000E-03	1.84000E+00	118609			
36	3.50000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-5.11364E-01	5.52000E-03	1.84000E+00	118641			
35	3.40000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-6.25000E-01	5.52000E-03	1.84000E+00	118673			
34	3.30000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-7.38636E-01	5.52000E-03	1.84000E+00	118705			
33	3.20000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-8.52273E-01	5.52000E-03	1.84000E+00	118737			
32	3.10000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-9.65909E-01	5.52000E-03	1.84000E+00	118769			
31	3.00000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.07955E+00	5.52000E-03	1.84000E+00	118801			
30	2.90000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.19318E+00	5.52000E-03	1.84000E+00	118833			
29	2.80000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.30682E+00	5.52000E-03	1.84000E+00	118865			
28	2.70000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.42045E+00	5.52000E-03	1.84000E+00	118897			
27	2.60000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.53409E+00	5.52000E-03	1.84000E+00	118929			
26	2.50000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.64773E+00	5.52000E-03	1.84000E+00	118961			
25	2.40000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.76136E+00	5.52000E-03	1.84000E+00	118993			
24	2.30000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.87500E+00	5.52000E-03	1.84000E+00	119025			
23	2.20000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-1.98864E+00	5.52000E-03	1.84000E+00	119057			
22	2.10000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.10227E+00	5.52000E-03	1.84000E+00	119089			
21	2.00000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.21591E+00	5.52000E-03	1.84000E+00	119121			
20	1.90000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.32955E+00	5.52000E-03	1.84000E+00	119153			
19	1.80000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.44318E+00	5.52000E-03	1.84000E+00	119185			
18	1.70000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.55682E+00	5.52000E-03	1.84000E+00	119217			
17	1.60000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.67045E+00	5.52000E-03	1.84000E+00	119249			
16	1.50000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.78409E+00	5.52000E-03	1.84000E+00	119281			
15	1.40000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-2.89773E+00	5.52000E-03	1.84000E+00	119313			
14	1.30000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.01136E+00	5.52000E-03	1.84000E+00	119345			
13	1.20000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.12500E+00	5.52000E-03	1.84000E+00	119377			
12	1.10000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.23864E+00	5.52000E-03	1.84000E+00	119409			
11	1.00000E+00	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.35227E+00	5.52000E-03	1.84000E+00	119441			
10	9.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.46591E+00	5.52000E-03	1.84000E+00	119473			
9	8.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.57955E+00	5.52000E-03	1.84000E+00	119505			
8	7.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.69318E+00	5.52000E-03	1.84000E+00	119537			
7	6.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.80682E+00	5.52000E-03	1.84000E+00	119569			
6	5.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-3.92045E+00	5.52000E-03	1.84000E+00	119601			
5	4.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.03409E+00	5.52000E-03	1.84000E+00	119633			
4	3.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.14773E+00	5.52000E-03	1.84000E+00	119665			
3	2.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.26136E+00	5.52000E-03	1.84000E+00	119697			
2	1.00000E-01	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.37500E+00	5.52000E-03	1.84000E+00	119729			
1	0.	1.00000E-01-0.	-0.	1.000E+00	1.39852E-01-4.48864E+00	5.52000E-03	1.84000E+00	119761			

2HEMP LIP-01				CCCE FILE HEMPDG MAP HEMPDG											
/ K-LINE NUMBER		1 FROM GENERATOR													
0 J	X	Y	X-COT	Y-DDT	V	E	F	MH	RO	EQST	IJ				
41	4.00000E+00	0.	-0.	-0.	0.	0.	0.	0.	0.	019801					
40	3.90000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-5.68182E-02	1.84000E-03	1.84000E+00	119833					
39	3.80000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.70455E-01	1.84000E-03	1.84000E+00	119865					
38	3.70000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.84091E-01	1.84000E-03	1.84000E+00	119897					
37	3.60000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.47727E-01	1.84000E-03	1.84000E+00	119929					
36	3.50000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-5.11364E-01	1.84000E-03	1.84000E+00	119961					
35	3.40000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-6.25000E-01	1.84000E-03	1.84000E+00	119993					
34	3.30000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-7.38636E-01	1.84000E-03	1.84000E+00	120025					
33	3.20000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-8.52273E-01	1.84000E-03	1.84000E+00	120057					
32	3.10000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-9.65909E-01	1.84000E-03	1.84000E+00	120089					
31	3.00000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.07955E+00	1.84000E-03	1.84000E+00	120121					
30	2.90000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.19318E+00	1.84000E-03	1.84000E+00	120153					
29	2.80000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.30682E+00	1.84000E-03	1.84000E+00	120185					
28	2.70000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.42045E+00	1.84000E-03	1.84000E+00	120217					
27	2.60000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.53409E+00	1.84000E-03	1.84000E+00	120249					
26	2.50000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.64773E+00	1.84000E-03	1.84000E+00	120281					
25	2.40000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.76136E+00	1.84000E-03	1.84000E+00	120313					
24	2.30000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.87500E+00	1.84000E-03	1.84000E+00	120345					
23	2.20000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-1.98864E+00	1.84000E-03	1.84000E+00	120377					
22	2.10000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.10227E+00	1.84000E-03	1.84000E+00	120409					
21	2.00000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.21591E+00	1.84000E-03	1.84000E+00	120441					
20	1.90000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.32955E+00	1.84000E-03	1.84000E+00	120473					
19	1.80000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.44318E+00	1.84000E-03	1.84000E+00	120505					
18	1.70000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.55682E+00	1.84000E-03	1.84000E+00	120537					
17	1.60000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.67045E+00	1.84000E-03	1.84000E+00	120569					
16	1.50000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.78409E+00	1.84000E-03	1.84000E+00	120601					
15	1.40000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-2.89773E+00	1.84000E-03	1.84000E+00	120633					
14	1.30000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.01136E+00	1.84000E-03	1.84000E+00	120665					
13	1.20000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.12500E+00	1.84000E-03	1.84000E+00	120697					
12	1.10000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.23864E+00	1.84000E-03	1.84000E+00	120729					
11	1.00000E+00	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.35227E+00	1.84000E-03	1.84000E+00	120761					
10	9.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.46591E+00	1.84000E-03	1.84000E+00	120793					
9	8.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.57955E+00	1.84000E-03	1.84000E+00	120825					
8	7.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.69318E+00	1.84000E-03	1.84000E+00	120857					
7	6.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.80682E+00	1.84000E-03	1.84000E+00	120889					
6	5.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-3.92045E+00	1.84000E-03	1.84000E+00	120921					
5	4.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-4.03409E+00	1.84000E-03	1.84000E+00	120953					
4	3.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-4.14773E+00	1.84000E-03	1.84000E+00	120985					
3	2.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-4.26136E+00	1.84000E-03	1.84000E+00	121017					
2	1.00000E-01	0.	-0.	-0.	1.000E+00	1.39852E-01	-4.37500E+00	1.84000E-03	1.84000E+00	121049					
1	0.	0.	-0.	-0.	1.000E+00	1.39852E-01	-4.48864E+00	1.84000E-03	1.84000E+00	121081					

HLOCK 1 DONE

PROBLEM GENERATED OR RESTARTED

2HEMP LIP-01

(CYCLE)	(TIME)	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)	(CYCLE TIME MS)
1	2.500000E-02	2.500000E-02	0	0	0.	0.	0

ZHEMP LIP.01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 15 2.500000E-02 2.500000E-02 0. 0. 0. 0.

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41 0.		4.0000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
40 0.		3.9000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
39 0.		3.8000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
38 0.		3.7000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
37 0.		3.6000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
36 0.		3.5000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
35 0.		3.4000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
34 0.		3.3000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
33 0.		3.2000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
32 0.		3.1000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
31 0.		3.0000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
30 0.		2.9000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
29 0.		2.8000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
28 0.		2.7000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
27 0.		2.6000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
26 0.		2.5000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
25 0.		2.4000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
24 0.		2.3000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
23 0.		2.2000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
22 0.		2.1000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
21 0.		2.0000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
20 0.		1.9000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
19 0.		1.8000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
18 0.		1.7000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
17 0.		1.6000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
16 0.		1.5000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
15 0.		1.4000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
14 0.		1.3000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
13 0.		1.2000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
12 0.		1.1000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
11 0.		1.0000E+00	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
10 0.		9.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
9 0.		8.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
8 0.		7.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
7 0.		6.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
6 0.		5.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
5 0.		4.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
4 0.		3.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
3 0.		2.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
2 0.		1.0000E-01	1.4000E+00	0.	0.	0.	0.	0.	0.	0.
1 0.		0.	1.4000E+00	0.	0.	0.	0.	0.	0.	0.

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ZHEP LP#01      14      2.50000E-02      0.0      0.0      0.0
(CYCLES) (K-NUMBER) TIME ) DELTA-1 ) DELTA-T-K ) DELTA-T-J ) SOUND SPEED ) Z WIDTH
MEMPOC MAP MEMPOC FILE CCCE FILE MEMPOC MAP MEMPOC

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Address	Disassembly	Comment
00000000	44000000	1.3000E+00
00000001	34000000	1.3000E+00
00000002	24000000	1.3000E+00
00000003	14000000	1.3000E+00
00000004	04000000	1.3000E+00
00000005	00000000	1.3000E+00
00000006	00000000	1.3000E+00
00000007	00000000	1.3000E+00
00000008	00000000	1.3000E+00
00000009	00000000	1.3000E+00
0000000A	00000000	1.3000E+00
0000000B	00000000	1.3000E+00
0000000C	00000000	1.3000E+00
0000000D	00000000	1.3000E+00
0000000E	00000000	1.3000E+00
0000000F	00000000	1.3000E+00
00000010	00000000	1.3000E+00
00000011	00000000	1.3000E+00
00000012	00000000	1.3000E+00
00000013	00000000	1.3000E+00
00000014	00000000	1.3000E+00
00000015	00000000	1.3000E+00
00000016	00000000	1.3000E+00
00000017	00000000	1.3000E+00
00000018	00000000	1.3000E+00
00000019	00000000	1.3000E+00
0000001A	00000000	1.3000E+00
0000001B	00000000	1.3000E+00
0000001C	00000000	1.3000E+00
0000001D	00000000	1.3000E+00
0000001E	00000000	1.3000E+00
0000001F	00000000	1.3000E+00
00000020	00000000	1.3000E+00
00000021	00000000	1.3000E+00
00000022	00000000	1.3000E+00
00000023	00000000	1.3000E+00
00000024	00000000	1.3000E+00
00000025	00000000	1.3000E+00
00000026	00000000	1.3000E+00
00000027	00000000	1.3000E+00
00000028	00000000	1.3000E+00
00000029	00000000	1.3000E+00
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0000002B	00000000	1.3000E+00
0000002C	00000000	1.3000E+00
0000002D	00000000	1.3000E+00
0000002E	00000000	1.3000E+00
0000002F	00000000	1.3000E+00
00000030	00000000	1.3000E+00
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00000033	00000000	1.3000E+00
00000034	00000000	1.3000E+00
00000035	00000000	1.3000E+00
00000036	00000000	1.3000E+00
00000037	00000000	1.3000E+00
00000038	00000000	1.3000E+00
00000039	00000000	1.3000E+00
0000003A	00000000	1.3000E+00
0000003B	00000000	1.3000E+00
0000003C	00000000	1.3000E+00
0000003D	00000000	1.3000E+00
0000003E	00000000	1.3000E+00
0000003F	00000000	1.3000E+00
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00000048	00000000	1.3000E+00
00000049	00000000	1.3000E+00
0000004A	00000000	1.3000E+00
0000004B	00000000	1.3000E+00
0000004C	00000000	1.3000E+00
0000004D	00000000	1.3000E+00
0000004E	00000000	1.3000E+00
0000004F	00000000	1.3000E+00
00000050	00000000	1.3000E+00
00000051	00000000	1.3000E+00
00000052	00000000	1.3000E+00
00000053	00000000	1.3000E+00
00000054	00000000	1.3000E+00
00000055	00000000	1.3000E+00
00000056	00000000	1.3000E+00
00000057	00000000	1.3000E+00

J	RHO	EDXX	EDYY	EDTT	EDXY	VOOT/V	SXXE	SYYE	STTE	TXYE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
39	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
38	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
37	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
36	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
35	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
34	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
33	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
32	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
31	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
30	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
29	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
28	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
27	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
26	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
25	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
24	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
23	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
22	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
21	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
20	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
19	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
18	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
17	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
16	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
15	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
14	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
13	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
12	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
11	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
10	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
9	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
8	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
7	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
6	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
5	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
4	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
3	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
2	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
1	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.

J	RHO	MU	Y-ZERO	S1	S2	S3	IPC	USS	K-ELASTIC	TANPHI
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168
39	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168
38	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168
37	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168
36	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168
35	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168
34	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168
33	7.8500E+00	4.600E-01	1.000E-02	0.	0.	0.	0.	0.	-6.667E-05	1.887+168

2HEPP LIP-01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 13 2.500000E-02 2.500000E-02 0. 0. 0. 0.

J	RHO	X(Z)	Y(R)	X-DDT	Y-DDT	V	P	E	Q	F
41	0.	4.0000E+00	1.2000E+00	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	3.9000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8749E-10	0.	0.	0.	0.
39	7.8500E+00	3.8000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
38	7.8500E+00	3.7000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
37	7.8500E+00	3.6000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8794E-10	0.	0.	0.	0.
36	7.8500E+00	3.5000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8793E-10	0.	0.	0.	0.
35	7.8500E+00	3.4000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
34	7.8500E+00	3.3000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
33	7.8500E+00	3.2000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
32	7.8500E+00	3.1000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
31	7.8500E+00	3.0000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8794E-10	0.	0.	0.	0.
30	7.8500E+00	2.9000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
29	7.8500E+00	2.8000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
28	7.8500E+00	2.7000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8749E-10	0.	0.	0.	0.
27	7.8500E+00	2.6000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
26	7.8500E+00	2.5000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
25	7.8500E+00	2.4000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8749E-10	0.	0.	0.	0.
24	7.8500E+00	2.3000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8749E-10	0.	0.	0.	0.
23	7.8500E+00	2.2000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
22	7.8500E+00	2.1000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
21	7.8500E+00	2.0000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
20	7.8500E+00	1.9000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
19	7.8500E+00	1.8000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
18	7.8500E+00	1.7000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
17	7.8500E+00	1.6000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
16	7.8500E+00	1.5000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
15	7.8500E+00	1.4000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8749E-10	0.	0.	0.	0.
14	7.8500E+00	1.3000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
13	7.8500E+00	1.2000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
12	7.8500E+00	1.1000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
11	7.8500E+00	1.0000E+00	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
10	7.8500E+00	9.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
9	7.8500E+00	8.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8749E-10	0.	0.	0.	0.
8	7.8500E+00	7.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
7	7.8500E+00	6.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
6	7.8500E+00	5.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
5	7.8500E+00	4.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
4	7.8500E+00	3.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8748E-10	0.	0.	0.	0.
3	7.8500E+00	2.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
2	7.8500E+00	1.0000E-01	1.2000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
1	7.8500E+00	0.	1.2000E+00-0.	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.

J	RHO	EDXX	EDY	EDTT	EDXY	VDOT/V	SXSE	SYSE	STSE	TXSE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
39	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
38	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
37	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
36	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
35	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
34	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
33	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
32	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
31	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
30	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
29	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
28	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
27	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
26	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
25	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
24	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
23	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
22	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
21	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
20	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
19	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
18	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
17	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
16	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
15	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
14	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
13	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
12	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
11	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
10	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
9	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
8	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
7	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
6	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
5	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
4	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
3	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
2	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
1	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.

ZHEMP LIP.01 CGCE FILE HEMPDG MAP HEMPDG
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 12 2.500000E-02 2.500000E-02 0. 0. 0. 0.

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	4.0000E+00	1.1000E+00	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	3.9000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
39	7.8500E+00	3.8000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
38	7.8500E+00	3.7000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
37	7.8500E+00	3.6000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
36	7.8500E+00	3.5000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
35	7.8500E+00	3.4000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
34	7.8500E+00	3.3000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
33	7.8500E+00	3.2000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
32	7.8500E+00	3.1000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
31	7.8500E+00	3.0000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
30	7.8500E+00	2.9000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
29	7.8500E+00	2.8000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
28	7.8500E+00	2.7000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
27	7.8500E+00	2.6000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
26	7.8500E+00	2.5000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
25	7.8500E+00	2.4000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
24	7.8500E+00	2.3000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
23	7.8500E+00	2.2000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
22	7.8500E+00	2.1000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
21	7.8500E+00	2.0000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
20	7.8500E+00	1.9000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
19	7.8500E+00	1.8000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
18	7.8500E+00	1.7000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
17	7.8500E+00	1.6000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
16	7.8500E+00	1.5000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
15	7.8500E+00	1.4000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
14	7.8500E+00	1.3000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
13	7.8500E+00	1.2000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
12	7.8500E+00	1.1000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
11	7.8500E+00	1.0000E+00	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
10	7.8500E+00	9.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
9	7.8500E+00	8.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
8	7.8500E+00	7.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
7	7.8500E+00	6.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
6	7.8500E+00	5.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
5	7.8500E+00	4.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
4	7.8500E+00	3.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
3	7.8500E+00	2.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8798E-10	0.	0.	0.	0.
2	7.8500E+00	1.0000E-01	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.
1	7.8500E+00	0.	1.1000E+00	0.	0.	1.0000E+00-1.8799E-10	0.	0.	0.	0.

J	RHD	EDXX	EDYY	EDTT	EDXY	VOOT/V	SXXE	SYYE	STTE	TXYE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
39	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
38	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
37	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
36	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
35	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
34	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
33	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
32	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
31	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
30	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
29	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
28	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
27	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
26	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
25	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
24	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
23	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
22	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
21	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
20	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
19	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
18	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
17	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
16	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
15	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
14	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
13	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
12	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
11	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
10	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
9	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
8	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
7	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
6	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
5	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
4	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
3	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
2	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
1	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.

ZHEMP LIP.01
0(2-FACTOR)

CCCE FILE HEMPDG MAP HEMPDG

1.21207E+00

* MASTER (UPRIGHT) *

(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
1 11 2.500000E-02 2.500000E-02 C. 0. 0. 0.

J	RHU	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	4.0000E+00	1.0000E+00	C.	C.	0.	0.	0.	0.	0.
40	7.8500E+00	3.9000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
39	7.8500E+00	3.8000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
38	7.8500E+00	3.7000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
37	7.8500E+00	3.6000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
36	7.8500E+00	3.5000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
35	7.8500E+00	3.4000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
34	7.8500E+00	3.3000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
33	7.8500E+00	3.2000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
32	7.8500E+00	3.1000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
31	7.8500E+00	3.0000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
30	7.8500E+00	2.9000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
29	7.8500E+00	2.8000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
28	7.8500E+00	2.7000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
27	7.8500E+00	2.6000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
26	7.8500E+00	2.5000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
25	7.8500E+00	2.4000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
24	7.8500E+00	2.3000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
23	7.8500E+00	2.2000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
22	7.8500E+00	2.1000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
21	7.8500E+00	2.0000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
20	7.8500E+00	1.9000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
19	7.8500E+00	1.8000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
18	7.8500E+00	1.7000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
17	7.8500E+00	1.6000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
16	7.8500E+00	1.5000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
15	7.8500E+00	1.4000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
14	7.8500E+00	1.3000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
13	7.8500E+00	1.2000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
12	7.8500E+00	1.1000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
11	7.8500E+00	1.0000E+00	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
10	7.8500E+00	9.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
9	7.8500E+00	8.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
8	7.8500E+00	7.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
7	7.8500E+00	6.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
6	7.8500E+00	5.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
5	7.8500E+00	4.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
4	7.8500E+00	3.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	C.	0.	0.
3	7.8500E+00	2.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
2	7.8500E+00	1.0000E-01	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.
1	7.8500E+00	0.	1.0000E+00	C.	C.	1.0000E+00	1.8798E-10	0.	0.	0.

J	RHD	EDXX	EDYY	EDTT	EDXY	VGCT/V	SXAE	SYYE	SITE	TXYE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
39	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
38	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
37	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
36	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
35	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
34	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
33	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
32	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
31	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
30	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
29	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
28	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
27	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
26	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
25	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
24	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
23	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
22	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
21	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
20	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
19	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
18	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
17	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
16	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
15	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
14	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
13	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
12	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
11	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
10	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
9	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
8	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
7	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
6	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
5	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
4	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
3	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
2	7.8500E+00	0.	-0.	0.	0.	0.	0.	0.	0.	0.
1	7.8500E+00	0.	-0.	4.0001E-09	0.	4.0001E-09	3.0667E-11	3.0667E-11	6.1334E-11	0.

2HEMP LIP.01

CCCE FILE

HEMPDG MAP

HEMPDG

* SLAVE (UPRIGHT) *

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(CYCLE) (K-NUMBER) ( TIME ) ( DELTA-T ) ( DELTA-T-K ) ( DELTA-T-J ) ( SOUND SPEED ) ( Z WIDTH )
1 -11 2.500000E-02 2.500000E-02 0. 0. 0.

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J	RHO	X(Z)	Y(R)	X-OGT	Y-OGT	VCIL STATUS
41 0.		4.0000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
40 0.		3.9000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
39 0.		3.8000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
38 0.		3.7000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
37 0.		3.6000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
36 0.		3.5000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
35 0.		3.4000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
34 0.		3.3000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
33 0.		3.2000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
32 0.		3.1000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
31 0.		3.0000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
30 0.		2.9000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
29 0.		2.8000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
28 0.		2.7000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
27 0.		2.6000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
26 0.		2.5000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
25 0.		2.4000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
24 0.		2.3000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
23 0.		2.2000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
22 0.		2.1000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
21 0.		2.0000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
20 0.		1.9000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
19 0.		1.8000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
18 0.		1.7000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
17 0.		1.6000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
16 0.		1.5000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
15 0.		1.4000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
14 0.		1.3000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
13 0.		1.2000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
12 0.		1.1000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
11 0.		1.0000E+00	1.0000E+00	C.	C.	NO VCIL ROUTINE
10 0.		9.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
9 0.		8.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
8 0.		7.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
7 0.		6.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
6 0.		5.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
5 0.		4.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
4 0.		3.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
3 0.		2.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
2 0.		1.0000E-01	1.0000E+00	C.	C.	NO VCIL ROUTINE
1 0.		0.	1.0000E+00	C.	C.	NO VCIL ROUTINE

2HEPP LIP-01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 10 2.500000E-02 2.500000E-02 0. 0. 0.

J	RHG	X(Z)	Y(R)	X-OUT	Y-OUT	V	P	E	Q	F
41	0.	4.0000E+00	9.0000E-01	C.	C.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	9.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	9.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

2HEMP LIP-01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 9 2.500000E-02 2.500000E-02 C. C. O. O.

J	RHO	X(Z)	Y(R)	X-DDT	Y-DDT	V	P	E	Q	F
41	0.	4.0000E+00	8.0000E-01	C.	C.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	8.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

2HEMP LIP-01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SCUNC SPEED) (Z WIDTH)
 1 8 2.500000E-02 2.500000E-02 0. 0. 0.

J	RHL	X(Z)	Y(R)	X-DDT	Y-ECT	V	P	E	Q	F
41	0.	4.0000E+00	7.0000E-01	C.	C.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	7.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	7.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

ZHEMP LIP.OI
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-I-K) (DELTA-I-J) (SCUNC SPEED) (Z WIDTH)
1 7 2.500000E-02 2.500000E-02 C. C. 0. 0.

CODE FILE HEMPDG MAP HEMPDG

J	RHG	XIZ)	Y(IR)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	4.0000E+00	6.0000E-01	C.	C.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	6.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	6.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	6.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	6.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	6.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	6.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	6.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	6.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	6.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

2HEMP LIP-01
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
1 6 2.500000E-02 2.500000E-02 0. 0. 0. 0.

CCDE FILE HEMPDG MAP HEMPDG

J	RHC	X(Z)	Y(R)	X-DOT	Y-CCT	V	P	E	Q	F
41	0.	4.0000E+00	5.0000E-01	0.	0.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	5.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

ZHEMP LIP.01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 5 2.500000E-02 2.500000E-02 C. C. 0. 0.

CCCE FILE HEMPDG MAP HEMPDG

J	RHG	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	4.0000E+00	4.0000E-01	C.	C.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	4.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	4.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

ZHEPP LIP-01
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
1 4 2.500000E-02 2.500000E-02 0. 0. 0. 0.

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	4.0000E+00	3.0000E-01	0.	0.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	3.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

ZHEMP LIP.01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 3 2.500000E-02 2.500000E-02 C. G. 0. 0.

CODE FILE HEMPDG MAP HEMPDG

J	RHU	XIZ)	Y(R)	X-DUT	Y-LCT	V	P	E	Q	F
41	0.	4.0000E+00	2.0000E-01	C.	C.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	2.0000E-01	C.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	2.0000E-01	0.	C.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

2HEMP LIP.01
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
1 2 2.500000E-02 2.500000E-02 0. 0. 0. 0.

CGCE FILE HEMPDG MAP HEMPDG

J	RHQ	X(Z)	Y(R)	X-DCT	Y-DCT	V	P	t	Q	F
41	0.	4.0000E+00	1.0000E-01	0.	0.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	1.0000E-01	0.	0.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

2HEMP LIP.01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 1 1 2.500000E-02 2.500000E-02 0. 0. 0.

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	4.0000E+00	0.	0.	-0.	0.	0.	0.	0.	0.
40	1.8400E+00	3.9000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-5.6818E-02
39	1.8400E+00	3.8000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.7045E-01
38	1.8400E+00	3.7000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.8409E-01
37	1.8400E+00	3.6000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.9773E-01
36	1.8400E+00	3.5000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-5.1136E-01
35	1.8400E+00	3.4000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-6.2500E-01
34	1.8400E+00	3.3000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-7.3864E-01
33	1.8400E+00	3.2000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-8.5227E-01
32	1.8400E+00	3.1000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-9.6591E-01
31	1.8400E+00	3.0000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.0795E+00
30	1.8400E+00	2.9000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.1932E+00
29	1.8400E+00	2.8000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.3068E+00
28	1.8400E+00	2.7000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.4205E+00
27	1.8400E+00	2.6000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.5341E+00
26	1.8400E+00	2.5000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.6477E+00
25	1.8400E+00	2.4000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.7614E+00
24	1.8400E+00	2.3000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.8750E+00
23	1.8400E+00	2.2000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-1.9886E+00
22	1.8400E+00	2.1000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.1023E+00
21	1.8400E+00	2.0000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.2159E+00
20	1.8400E+00	1.9000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.3295E+00
19	1.8400E+00	1.8000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.4432E+00
18	1.8400E+00	1.7000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.5568E+00
17	1.8400E+00	1.6000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.6705E+00
16	1.8400E+00	1.5000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.7841E+00
15	1.8400E+00	1.4000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-2.8977E+00
14	1.8400E+00	1.3000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.0114E+00
13	1.8400E+00	1.2000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.1250E+00
12	1.8400E+00	1.1000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.2386E+00
11	1.8400E+00	1.0000E+00	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.3523E+00
10	1.8400E+00	9.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.4659E+00
9	1.8400E+00	8.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.5795E+00
8	1.8400E+00	7.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.6932E+00
7	1.8400E+00	6.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.8068E+00
6	1.8400E+00	5.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-3.9205E+00
5	1.8400E+00	4.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-4.0341E+00
4	1.8400E+00	3.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-4.1477E+00
3	1.8400E+00	2.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-4.2614E+00
2	1.8400E+00	1.0000E-01	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-4.3750E+00
1	1.8400E+00	0.	0.	0.	-0.	1.0000E+00	0.	1.3985E-01	0.	-4.4886E+00

(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)

ZHEMP LIP.01		CGDE FILE						HEMPDG MAP	HEMPDG
(CYCLE)	(K-NUMBER)	(TIME)	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)		
1	1	2.500000E-02	2.500000E-02	1.100000E+01	1.000000E+00	0.	0.		

(TOTAL E)	(E-ZERO)	(E-CHANGE)	(K.E.SUM)	(I.E.SUM)	(MASS-SUM)
1.757432E+00	1.757432E+00	0.	0.	1.757432E+00	1.178223E+02

(MATERIAL)	(MASS)	(TOTAL E)	(KINETIC E)	(INTERNAL E)
10	9.470017E+01	0.	C.	0.
1	2.312212E+01	1.757432E+00	C.	1.757432E+00

2	5.500000E-02	3.000000E-02	11	1	5.635797E-01	7.071068E-02	2516926
3	9.100000E-02	3.600000E-02	11	1	5.635797E-01	7.071068E-02	164564
4	1.342000E-01	4.320000E-02	11	1	5.635797E-01	7.071068E-02	195085
5	1.860400E-01	5.184000E-02	11	40	5.635797E-01	7.067155E-02	167337
6	2.482480E-01	6.220800E-02	7	39	3.935831E-01	7.017951E-02	166031
7	2.924960E-01	4.424796E-02	4	39	4.103289E-01	6.921443E-02	168136
8	3.455935E-01	5.309755E-02	6	38	3.928957E-01	7.001665E-02	168321
9	3.789910E-01	3.339753E-02	5	38	4.073290E-01	6.887926E-02	168101
10	4.123866E-01	3.339753E-02	3	38	4.185979E-01	6.822204E-02	168844
11	4.513798E-01	3.899125E-02	1	37	3.950110E-01	6.962644E-02	169357
12	4.806917E-01	2.931189E-02	3	37	4.062056E-01	6.866078E-02	171304
13	5.100036E-01	2.931189E-02	1	37	4.170078E-01	6.793487E-02	171360
14	5.451779E-01	3.517427E-02	1	37	4.278475E-01	6.736629E-02	169820
15	5.751380E-01	2.996015E-02	1	36	4.006168E-01	6.883255E-02	170573
16	6.013580E-01	2.621999E-02	1	36	4.115006E-01	6.799109E-02	172499
17	6.275780E-01	2.621999E-02	1	36	4.220349E-01	6.731028E-02	170424
18	6.590420E-01	3.146399E-02	1	35	3.966160E-01	6.935579E-02	170055
19	6.870742E-01	2.803217E-02	1	35	4.023002E-01	6.853611E-02	170294
20	7.122582E-01	2.518407E-02	1	35	4.123242E-01	6.771220E-02	170432
21	7.374423E-01	2.518407E-02	1	35	4.229148E-01	6.700751E-02	171467
22	7.676632E-01	3.022088E-02	1	35	4.334166E-01	6.642736E-02	173979
23	7.951743E-01	2.791110E-02	1	34	4.031826E-01	6.841654E-02	172290
24	8.199800E-01	2.480569E-02	1	34	4.114086E-01	6.759386E-02	170873
25	8.447857E-01	2.480569E-02	1	34	4.221186E-01	6.684861E-02	208129

CODE FILE

HEMPOG MAP

HEMPDGG

(CYCLE)	TIME	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)	(CYCLE TIME MS)
26	8.734706E-01	2.868492E-02	1	34	4.330138E-01	6.620751E-02	175917
27	9.010321E-01	2.756148E-02	1	33	4.032161E-01	6.840641E-02	170888
28	9.257564E-01	2.472431E-02	1	33	4.101598E-01	6.757912E-02	172621
29	9.497622E-01	2.400586E-02	1	33	4.200913E-01	6.680881E-02	171149
30	9.737681E-01	2.400586E-02	1	33	4.309535E-01	6.612883E-02	206947
31	1.002413E+00	2.864493E-02	1	32	4.018366E-01	6.858241E-02	171560
32	1.027772E+00	2.535853E-02	1	32	4.086326E-01	6.774644E-02	171592
33	1.051705E+00	2.393353E-02	1	32	4.160729E-01	6.695450E-02	173342
34	1.075639E+00	2.393353E-02	1	32	4.270259E-01	6.621220E-02	176170
35	1.103406E+00	2.776777E-02	1	32	4.380941E-01	6.556901E-02	172458
36	1.129463E+00	2.605691E-02	1	31	4.069245E-01	6.793649E-02	172372
37	1.153533E+00	2.406921E-02	1	31	4.141764E-01	6.712862E-02	172565
38	1.177161E+00	2.362809E-02	1	31	4.227878E-01	6.636322E-02	173024
39	1.200789E+00	2.362809E-02	1	31	4.339212E-01	6.566294E-02	172619
40	1.228226E+00	2.743714E-02	1	30	4.043954E-01	6.824014E-02	173322
41	1.253055E+00	2.482887E-02	1	30	4.114227E-01	6.741871E-02	172886
42	1.276715E+00	2.366002E-02	1	30	4.189489E-01	6.663157E-02	173352
43	1.300375E+00	2.366002E-02	1	30	4.284410E-01	6.588165E-02	172682
44	1.326851E+00	2.647634E-02	1	30	4.397543E-01	6.521048E-02	206492
45	1.352624E+00	2.577343E-02	1	29	4.087273E-01	6.771368E-02	173517
46	1.376613E+00	2.398817E-02	1	29	4.161239E-01	6.690990E-02	173263
47	1.400103E+00	2.349014E-02	1	29	4.238840E-01	6.614058E-02	173124
48	1.423593E+00	2.349014E-02	1	29	4.342427E-01	6.541599E-02	173446
49	1.450822E+00	2.122869E-02	1	28	4.057310E-01	6.806374E-02	174206
50	1.475635E+00	2.481382E-02	1	28	4.128615E-01	6.724627E-02	174059

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2HEMP LIP.O1	TIME	()	DELTA-T	()	DELTA-T-K	()	DELTA-T-J	()	SOUND SPEED	()	2 WIDTH	()	CYCLE TIME MS
51	1.4992425E+00	1	2.346094E-02	1	28	1	4.2059352E-01	1	6.6456169E-02	1	180370	1	178114
52	1.5224971E+00	1	2.345244E-02	1	28	1	4.2853304E-01	1	6.569509E-02	1	17957	1	173955
53	1.546149E+00	1	2.345244E-02	1	28	1	4.3972259E-01	1	6.4992233E-02	1	173955	1	173633
54	1.572143E+00	1	2.599344E-02	1	27	1	4.094844E-01	1	6.766528E-02	1	173800	1	173806
55	1.596394E+00	1	2.425147E-02	1	27	1	4.164334E-01	1	6.686289E-02	1	173800	1	173806
56	1.618669E+00	1	2.347457E-02	1	27	1	4.347302E-01	1	6.608335E-02	1	173800	1	173806
57	1.644334E+00	1	2.347457E-02	1	27	1	4.325545E-01	1	6.533804E-02	1	173891	1	173891
58	1.669408E+00	1	2.60459E-02	1	27	1	4.441225E-01	1	6.465770E-02	1	174503	1	174503
59	1.694598E+00	1	2.519042E-02	1	26	1	4.127500E-01	1	6.724449E-02	1	174615	1	174615
60	1.718393E+00	1	2.379494E-02	1	26	1	4.204426E-01	1	6.644819E-02	1	174472	1	174472
61	1.741801E+00	1	2.340762E-02	1	26	1	4.285131E-01	1	6.567861E-02	1	174956	1	174956
62	1.765209E+00	1	2.340762E-02	1	26	1	4.375050E-01	1	6.495456E-02	1	174668	1	174668
63	1.791343E+00	1	2.641343E-02	1	25	1	4.090319E-01	1	6.765685E-02	1	174960	1	174960
64	1.816230E+00	1	2.460782E-02	1	25	1	4.163174E-01	1	6.685306E-02	1	217893	1	217893
65	1.839824E+00	1	2.359423E-02	1	25	1	4.242939E-01	1	6.606553E-02	1	175888	1	175888
66	1.863266E+00	1	2.344176E-02	1	25	1	4.325562E-01	1	6.530313E-02	1	175962	1	175962
67	1.886708E+00	1	2.344176E-02	1	25	1	4.422305E-01	1	6.459719E-02	1	175529	1	175529
68	1.910149E+00	1	2.344176E-02	1	24	1	4.121054E-01	1	6.730565E-02	1	175335	1	175335
69	1.933591E+00	1	2.344176E-02	1	24	1	4.189961E-01	1	6.655802E-02	1	176220	1	176220
70	1.957033E+00	1	2.344176E-02	1	24	1	4.267330E-01	1	6.582950E-02	1	202009	1	202009
71	1.980475E+00	1	2.344176E-02	1	24	1	4.349809E-01	1	6.507651E-02	1	176272	1	176272
72	2.003916E+00	1	2.344176E-02	1	24	1	4.449304E-01	1	6.438404E-02	1	176156	1	176156
73	2.027358E+00	1	2.344176E-02	1	23	1	4.140342E-01	1	6.709172E-02	1	176429	1	176429
74	2.050800E+00	1	2.344176E-02	1	23	1	4.211304E-01	1	6.636089E-02	1	176761	1	176761
75	2.074242E+00	1	2.344176E-02	1	23	1	4.290211E-01	1	6.560795E-02	1	176044	1	176044
76	2.097683E+00	1	2.34716E-02	1	23	1	4.372949E-01	1	6.486308E-02	1	180370	1	180370
77	2.123864E+00	1	2.618082E-02	1	23	1	4.474233E-01	1	6.418291E-02	1	177752	1	177752
78	2.148889E+00	1	2.502472E-02	1	22	1	4.167755E-01	1	6.679561E-02	1	177914	1	177914
79	2.172789E+00	1	2.389922E-02	1	22	1	4.268873E-01	1	6.600360E-02	1	176439	1	176439
80	2.196330E+00	1	2.354111E-02	1	22	1	4.330300E-01	1	6.523091E-02	1	176287	1	176287
81	2.219871E+00	1	2.354111E-02	1	22	1	4.412604E-01	1	6.450443E-02	1	176446	1	176446
82	2.243412E+00	1	2.354111E-02	1	21	1	4.126721E-01	1	6.723076E-02	1	176813	1	176813
83	2.266933E+00	1	2.354111E-02	1	21	1	4.194348E-01	1	6.651308E-02	1	203458	1	203458
84	2.290494E+00	1	2.354111E-02	1	21	1	4.270471E-01	1	6.576628E-02	1	176465	1	176465
85	2.314036E+00	1	2.354111E-02	1	21	1	4.354249E-01	1	6.500679E-02	1	176590	1	176590
86	2.337577E+00	1	2.354111E-02	1	21	1	4.436005E-01	1	6.429277E-02	1	176594	1	176594
87	2.361118E+00	1	2.354111E-02	1	20	1	4.144946E-01	1	6.702496E-02	1	178100	1	178100
88	2.384659E+00	1	2.354111E-02	1	20	1	4.215032E-01	1	6.630103E-02	1	177841	1	177841
89	2.408200E+00	1	2.354111E-02	1	20	1	4.293415E-01	1	6.555061E-02	1	177188	1	177188
90	2.431741E+00	1	2.354111E-02	1	20	1	4.378066E-01	1	6.479031E-02	1	177926	1	177926
91	2.455282E+00	1	2.354111E-02	1	20	1	4.459491E-01	1	6.408829E-02	1	181138	1	181138
92	2.478823E+00	1	2.354111E-02	1	19	1	4.164047E-01	1	6.681748E-02	1	177974	1	177974
93	2.502364E+00	1	2.354111E-02	1	19	1	4.2436094E-01	1	6.608811E-02	1	177553	1	177553
94	2.525906E+00	1	2.354111E-02	1	19	1	4.316126E-01	1	6.533503E-02	1	179278	1	179278
95	2.549447E+00	1	2.354111E-02	1	19	1	4.401064E-01	1	6.458160E-02	1	179550	1	179550
96	2.575493E+00	1	2.605223E-02	1	18	1	4.117826E-01	1	6.731494E-02	1	177974	1	177974
97	2.600693E+00	1	2.516367E-02	1	18	1	4.190762E-01	1	6.653522E-02	1	178817	1	178817
98	2.624816E+00	1	2.415280E-02	1	18	1	4.271178E-01	1	6.574441E-02	1	178817	1	178817

99	2.648533E+00	2.371753E-02	1	18	4.356237E-01	6.496606E-02	179066
100	2.672251E+00	2.371753E-02	1	18	4.440659E-01	6.423069E-02	178465
ZHEMP	LIP.01				CODE FILE	HEMPDG MAP	HEMPDG
(CYCLE)	(TIME)	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)	(CYCLE TIME MS)
101	2.695968E+00	2.371753E-02	1	17	4.149478E-01	6.696284E-02	184866
102	2.719686E+00	2.371753E-02	1	17	4.219384E-01	6.624145E-02	212558
103	2.743403E+00	2.371753E-02	1	17	4.297211E-01	6.549420E-02	178613
104	2.767121E+00	2.371753E-02	1	17	4.381747E-01	6.473308E-02	179635
105	2.790838E+00	2.371753E-02	6	17	4.455221E-01	6.389993E-02	180510
106	2.814556E+00	2.371753E-02	1	16	4.169643E-01	6.674704E-02	179314
107	2.838273E+00	2.371753E-02	1	16	4.241556E-01	6.601988E-02	180104
108	2.861991E+00	2.371753E-02	6	16	4.292851E-01	6.522063E-02	180681
109	2.885708E+00	2.371753E-02	6	16	4.377002E-01	6.442040E-02	205603
110	2.909426E+00	2.371753E-02	6	16	4.457777E-01	6.367775E-02	179420
111	2.933143E+00	2.371753E-02	1	15	4.190227E-01	6.652933E-02	180454
112	2.956861E+00	2.371753E-02	1	15	4.264104E-01	6.579687E-02	179850
113	2.980579E+00	2.371753E-02	6	15	4.315511E-01	6.448752E-02	180354
114	3.004296E+00	2.371753E-02	6	15	4.399971E-01	6.419333E-02	181102
115	3.028014E+00	2.371753E-02	1	14	4.142641E-01	6.702774E-02	180431
116	3.051731E+00	2.371753E-02	1	14	4.210825E-01	6.631516E-02	180103
117	3.075449E+00	2.371753E-02	5	14	4.267980E-01	6.553774E-02	182471
118	3.099166E+00	2.371753E-02	6	14	4.338068E-01	6.475871E-02	180542
119	3.122884E+00	2.371753E-02	6	14	4.421876E-01	6.391699E-02	180682
120	3.146601E+00	2.371753E-02	1	13	4.161559E-01	6.682069E-02	180773
121	3.170319E+00	2.371753E-02	2	13	4.229722E-01	6.608281E-02	180652
122	3.194036E+00	2.371753E-02	7	13	4.262325E-01	6.536268E-02	180613
123	3.217754E+00	2.371753E-02	6	13	4.360468E-01	6.453268E-02	181144
124	3.241471E+00	2.371753E-02	6	13	4.443349E-01	6.376502E-02	222142
125	3.265189E+00	2.371753E-02	1	12	4.180604E-01	6.661707E-02	181583
ZHEMP	LIP.01				CODE FILE	HEMPDG MAP	HEMPDG
(CYCLE)	(TIME)	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)	(CYCLE TIME MS)
126	3.288906E+00	2.371753E-02	4	12	4.241401E-01	6.585669E-02	189008
127	3.312624E+00	2.371753E-02	8	12	4.260696E-01	6.519655E-02	182733
128	3.336341E+00	2.371753E-02	8	12	4.342019E-01	6.435363E-02	181356
129	3.360059E+00	2.371753E-02	7	12	4.446481E-01	6.355046E-02	181196
130	3.383777E+00	2.371753E-02	1	11	4.200013E-01	6.641407E-02	181362
131	3.407494E+00	2.371753E-02	5	11	4.253426E-01	6.565234E-02	180889
132	3.431212E+00	2.371753E-02	8	11	4.280848E-01	6.497373E-02	181759
133	3.454929E+00	2.371753E-02	7	11	4.387315E-01	6.409825E-02	181807
134	3.478647E+00	2.371753E-02	1	10	4.150832E-01	6.692717E-02	185440
135	3.502364E+00	2.371753E-02	1	10	4.219858E-01	6.621106E-02	181461
136	3.526082E+00	2.371753E-02	7	10	4.245112E-01	6.550894E-02	182195
137	3.549799E+00	2.371753E-02	8	10	4.301320E-01	6.475133E-02	181676
138	3.573517E+00	2.371753E-02	8	10	4.383685E-01	6.391600E-02	181417
139	3.597234E+00	2.371753E-02	1	9	4.169167E-01	6.672901E-02	182142
140	3.620952E+00	2.371753E-02	1	9	4.239519E-01	6.601200E-02	182336
141	3.644669E+00	2.371753E-02	8	9	4.242133E-01	6.536992E-02	181596
142	3.668387E+00	2.371753E-02	8	9	4.321707E-01	6.452956E-02	181825
143	3.692104E+00	2.371753E-02	7	9	4.428412E-01	6.368731E-02	233439
144	3.715822E+00	2.371753E-02	1	8	4.187463E-01	6.653469E-02	182390
145	3.739539E+00	2.371753E-02	1	8	4.258849E-01	6.581858E-02	182159
146	3.763257E+00	2.371753E-02	8	8	4.261044E-01	6.515457E-02	181885

147	3.786774E+00	2.371753E-02	8	8	4.341904E-01	6.431207E-02	182140
148	3.610692E+00	2.371753E-02	8	8	4.422649E-01	6.350303E-02	182093
149	3.834410E+00	2.371753E-02	1	7	4.205702E-01	6.634361E-02	222304
150	3.858127E+00	2.371753E-02	7	7	4.226832E-01	6.567875E-02	182912
2HEMP	LIP.01				CODE FILE	HEMPDG MAP	HEMPDG
(CYCLE)	(TIME)	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)	(CYCLE TIME MS)
151	3.881845E+00	2.371753E-02	8	7	4.280121E-01	6.493965E-02	187113
152	3.905562E+00	2.371753E-02	8	7	4.362184E-01	6.409535E-02	183492
153	3.929280E+00	2.371753E-02	1	6	4.155030E-01	6.687105E-02	182811
154	3.952997E+00	2.371753E-02	1	6	4.224275E-01	6.613410E-02	182836
155	3.976715E+00	2.371753E-02	7	6	4.245233E-01	6.547155E-02	182749
156	4.000432E+00	2.371753E-02	8	6	4.299707E-01	6.472746E-02	182827
157	4.024150E+00	2.371753E-02	8	6	4.362828E-01	6.388266E-02	182264
158	4.047867E+00	2.371753E-02	1	5	4.172667E-01	6.668199E-02	182678
159	4.071585E+00	2.371753E-02	1	5	4.243461E-01	6.596227E-02	182587
160	4.095302E+00	2.371753E-02	8	5	4.240783E-01	6.535365E-02	182366
161	4.119020E+00	2.371753E-02	8	5	4.319699E-01	6.451472E-02	182454
162	4.142737E+00	2.371753E-02	8	5	4.402249E-01	6.368196E-02	216403
163	4.166455E+00	2.371753E-02	1	4	4.190529E-01	6.649413E-02	182667
164	4.190172E+00	2.371753E-02	1	4	4.262340E-01	6.577528E-02	182495
165	4.213890E+00	2.371753E-02	8	4	4.258947E-01	6.514820E-02	182475
166	4.237608E+00	2.371753E-02	8	4	4.339179E-01	6.430701E-02	182306
167	4.261325E+00	2.371753E-02	9	4	4.383765E-01	6.354713E-02	182112
168	4.285043E+00	2.371753E-02	1	3	4.208282E-01	6.630928E-02	182283
169	4.308760E+00	2.371753E-02	1	3	4.280907E-01	6.559234E-02	182405
170	4.332478E+00	2.371753E-02	8	3	4.277432E-01	6.494070E-02	182206
171	4.356195E+00	2.371753E-02	8	3	4.358886E-01	6.409766E-02	182406
172	4.379913E+00	2.371753E-02	9	3	4.401972E-01	6.334624E-02	182378
173	4.403630E+00	2.371753E-02	1	2	4.228463E-01	6.610785E-02	183226
174	4.427348E+00	2.371753E-02	1	2	4.305261E-01	6.536889E-02	184255
175	4.449629E+00	2.228127E-02	1	1	4.108274E-01	6.749223E-02	184962
2HEMP	LIP.01				CODE FILE	HEMPDG MAP	HEMPDG
(CYCLE)	(TIME)	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)	(CYCLE TIME MS)
176	4.469089E+00	1.945991E-02	1	1	4.197262E-01	6.661793E-02	186670
177	4.486654E+00	1.756479E-02	1	1	4.296538E-01	6.576283E-02	182439
178	4.503117E+00	1.646282E-02	1	1	4.403239E-01	6.493223E-02	182100
179	4.518969E+00	1.585270E-02	1	1	4.515781E-01	6.411807E-02	182583
180	4.534528E+00	1.555913E-02	1	1	4.632910E-01	6.331459E-02	182552
181	4.549834E+00	1.530554E-02	1	1	4.755510E-01	6.250910E-02	182188
182	4.564982E+00	1.514769E-02	3	1	4.863310E-01	6.176394E-02	232988
183	4.580129E+00	1.514769E-02	6	1	4.903251E-01	6.136642E-02	182931
184	4.595277E+00	1.514769E-02	7	1	4.974776E-01	6.083674E-02	181885
185	4.610425E+00	1.514769E-02	1	1	5.091340E-01	6.010807E-02	183335
186	4.628384E+00	1.795946E-02	8	1	5.124872E-01	5.974518E-02	181668
187	4.648254E+00	1.986969E-02	8	1	5.236733E-01	5.901586E-02	185171
188	4.671160E+00	2.290584E-02	8	1	5.341470E-01	5.831529E-02	207791
189	4.697306E+00	2.614672E-02	1	1	5.617553E-01	5.672236E-02	181822
190	4.727565E+00	3.025856E-02	1	1	5.669846E-01	5.606734E-02	182780
191	4.761950E+00	3.43847E-02	14	17	5.635797E-01	5.728330E-02	182420
192	4.803212E+00	4.126185E-02	1	3	5.146235E-01	5.851283E-02	182380
193	4.841113E+00	3.790176E-02	14	16	5.635797E-01	6.746647E-02	182865
194	4.874981E+00	3.386741E-02	14	16	5.635797E-01	6.715559E-02	182895

195	4.915622E+00	4.064089E-02	13	31	5.635797E-01	6.473698E-02	182803
196	4.952775E+00	3.715291E-02	14	15	5.635797E-01	6.737087E-02	182830
197	4.996268E+00	4.349386E-02	13	30	5.635797E-01	6.523595E-02	184613
198	5.035029E+00	3.876095E-02	13	30	5.635797E-01	6.493454E-02	183285

2HEMP LIP.01
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (2 WIDTH)
198 15 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DDT	Y-DDT	V	P	E	Q	F
41 0.		4.0241E+00	1.5033E+00	7.4660E-03	3.6372E-02	0.	0.	0.	0.	0.
40 0.		3.9334E+00	1.4941E+00	9.8527E-03	3.3508E-02	0.	0.	0.	0.	0.
39 0.		3.8396E+00	1.4883E+00	1.1759E-02	3.3662E-02	0.	0.	0.	0.	0.
38 0.		3.7406E+00	1.5150E+00	1.3951E-02	3.5148E-02	0.	0.	0.	0.	0.
37 0.		3.6337E+00	1.5328E+00	1.4918E-02	4.1263E-02	0.	0.	0.	0.	0.
36 0.		3.5261E+00	1.5460E+00	1.3095E-02	4.6668E-02	0.	0.	0.	0.	0.
35 0.		3.4186E+00	1.5567E+00	1.1969E-02	5.1983E-02	0.	0.	0.	0.	0.
34 0.		3.3116E+00	1.5644E+00	8.5250E-03	5.5480E-02	0.	0.	0.	0.	0.
33 0.		3.2064E+00	1.5700E+00	7.3528E-03	5.7771E-02	0.	0.	0.	0.	0.
32 0.		3.1011E+00	1.5739E+00	7.1066E-03	6.0878E-02	0.	0.	0.	0.	0.
31 0.		2.9968E+00	1.5758E+00	4.1813E-03	6.2260E-02	0.	0.	0.	0.	0.
30 0.		2.8927E+00	1.5766E+00	3.8881E-03	6.2914E-02	0.	0.	0.	0.	0.
29 0.		2.7891E+00	1.5763E+00	2.1799E-03	6.4046E-02	0.	0.	0.	0.	0.
28 0.		2.6864E+00	1.5748E+00	5.8495E-04	6.4446E-02	0.	0.	0.	0.	0.
27 0.		2.5840E+00	1.5726E+00	1.5705E-04	6.5395E-02	0.	0.	0.	0.	0.
26 0.		2.4821E+00	1.5696E+00	-5.5627E-04	6.7564E-02	0.	0.	0.	0.	0.
25 0.		2.3805E+00	1.5658E+00	-1.6151E-03	7.0149E-02	0.	0.	0.	0.	0.
24 0.		2.2793E+00	1.5612E+00	-2.7311E-03	7.2687E-02	0.	0.	0.	0.	0.
23 0.		2.1785E+00	1.5559E+00	-3.9463E-03	7.5280E-02	0.	0.	0.	0.	0.
22 0.		2.0780E+00	1.5499E+00	-5.3042E-03	7.7963E-02	0.	0.	0.	0.	0.
21 0.		1.9777E+00	1.5432E+00	-6.7297E-03	8.0626E-02	0.	0.	0.	0.	0.
20 0.		1.8778E+00	1.5360E+00	-7.7878E-03	8.3347E-02	0.	0.	0.	0.	0.
19 0.		1.7782E+00	1.5281E+00	-8.4138E-03	8.5886E-02	0.	0.	0.	0.	0.
18 0.		1.6787E+00	1.5199E+00	-1.0770E-02	8.8116E-02	0.	0.	0.	0.	0.
17 0.		1.5796E+00	1.5117E+00	-1.2318E-02	7.8861E-02	0.	0.	0.	0.	0.
16 0.		1.4806E+00	1.5041E+00	-1.1978E-02	6.9512E-02	0.	0.	0.	0.	0.
15 0.		1.3816E+00	1.4973E+00	-8.2375E-03	6.2451E-02	0.	0.	0.	0.	0.
14 0.		1.2822E+00	1.4909E+00	-8.0015E-03	6.1710E-02	0.	0.	0.	0.	0.
13 0.		1.1828E+00	1.4843E+00	-6.0386E-03	6.2738E-02	0.	0.	0.	0.	0.
12 0.		1.0833E+00	1.4776E+00	-6.6920E-03	6.4180E-02	0.	0.	0.	0.	0.
11 0.		9.8402E-01	1.4706E+00	-7.7620E-03	6.5999E-02	0.	0.	0.	0.	0.
10 0.		8.8486E-01	1.4634E+00	-9.1738E-03	6.8080E-02	0.	0.	0.	0.	0.
9 0.		7.8588E-01	1.4559E+00	-1.0684E-02	7.0433E-02	0.	0.	0.	0.	0.
8 0.		6.8709E-01	1.4480E+00	-1.2023E-02	7.2818E-02	0.	0.	0.	0.	0.
7 0.		5.8843E-01	1.4398E+00	-1.2402E-02	7.5008E-02	0.	0.	0.	0.	0.
6 0.		4.8995E-01	1.4314E+00	-1.5050E-02	7.4225E-02	0.	0.	0.	0.	0.
5 0.		3.9174E-01	1.4234E+00	-1.6027E-02	6.8120E-02	0.	0.	0.	0.	0.
4 0.		2.9370E-01	1.4164E+00	-1.4739E-02	5.8666E-02	0.	0.	0.	0.	0.
3 0.		1.9571E-01	1.4111E+00	-1.1473E-02	4.9308E-02	0.	0.	0.	0.	0.
2 0.		9.7809E-02	1.4079E+00	-6.4156E-03	4.3220E-02	0.	0.	0.	0.	0.
1 0.		0.	1.4070E+00	0.	4.1740E-02	0.	0.	0.	0.	0.

2HEMP LIP-01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 14 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635747E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DGT	Y-DGT	V	P	E	Q	F
41	0.	4.0424E+00	1.4111E+00	1.0849E-02	3.8136E-02	0.	0.	0.	0.	0.
40	7.8500E+00	3.4389E+00	1.3473E+00	1.1424E-02	3.6070E-02	1.0007E+00	-1.2879E-03	7.6282E-04	4.6488E-06	0.
39	7.8500E+00	3.8355E+00	1.4059E+00	1.1992E-02	3.5621E-02	9.9963E-01	6.8762E-04	9.8268E-04	5.0501E-05	0.
38	7.8500E+00	3.7309E+00	1.4283E+00	1.0375E-02	3.9879E-02	1.0010E+00	-1.9283E-03	1.4432E-03	2.5940E-05	0.
37	7.8500E+00	3.6282E+00	1.4474E+00	1.2023E-02	4.4881E-02	1.0041E+00	-7.6923E-03	1.7739E-03	1.3508E-04	0.
36	7.8500E+00	3.5234E+00	1.4620E+00	1.0664E-02	5.0278E-02	1.0041E+00	-7.6346E-03	1.9791E-03	0.	0.
35	7.8500E+00	3.4178E+00	1.4726E+00	9.4237E-03	5.4089E-02	1.0035E+00	-6.5901E-03	2.0759E-03	0.	0.
34	7.8500E+00	3.3126E+00	1.4805E+00	9.0457E-03	5.9178E-02	1.0028E+00	-5.3137E-03	2.1278E-03	0.	0.
33	7.8500E+00	3.2076E+00	1.4858E+00	6.2432E-03	6.4283E-02	9.9654E-01	6.5211E-03	2.1759E-03	7.1914E-05	0.
32	7.8500E+00	3.1032E+00	1.4889E+00	3.2255E-03	6.3693E-02	1.0048E+00	-9.0676E-03	2.2177E-03	0.	0.
31	7.8500E+00	2.9997E+00	1.4912E+00	2.2421E-03	6.2448E-02	9.9985E-01	2.7948E-04	2.2353E-03	0.	0.
30	7.8500E+00	2.8960E+00	1.4919E+00	3.1922E-03	6.4673E-02	9.9973E-01	5.0350E-04	2.2841E-03	0.	0.
29	7.8500E+00	2.7926E+00	1.4911E+00	2.0457E-03	6.8070E-02	9.9949E-01	9.5059E-04	2.2839E-03	0.	0.
28	7.8500E+00	2.6897E+00	1.4891E+00	7.6472E-04	7.1601E-02	9.9860E-01	2.6281E-03	2.2509E-03	1.1639E-04	0.
27	7.8500E+00	2.5875E+00	1.4860E+00	8.3274E-05	7.4718E-02	1.0005E+00	-9.8658E-04	2.1963E-03	5.7352E-04	0.
26	7.8500E+00	2.4857E+00	1.4820E+00	-7.2442E-04	7.6997E-02	1.0050E+00	-9.3600E-03	2.1385E-03	8.1319E-04	0.
25	7.8500E+00	2.3845E+00	1.4772E+00	-1.5732E-03	7.8889E-02	1.0101E+00	-1.0000E-02	2.0939E-03	5.9125E-04	0.
24	7.8500E+00	2.2835E+00	1.4717E+00	-2.3204E-03	8.0668E-02	1.0151E+00	-1.0000E-02	2.0546E-03	3.4795E-04	0.
23	7.8500E+00	2.1828E+00	1.4656E+00	-2.9377E-03	8.2280E-02	1.0182E+00	-1.0000E-02	2.0024E-03	1.4812E-04	0.
22	7.8500E+00	2.0823E+00	1.4589E+00	-3.4337E-03	8.3763E-02	1.0204E+00	-1.0000E-02	1.9468E-03	1.8110E-05	0.
21	7.8500E+00	1.9819E+00	1.4517E+00	-4.1408E-03	8.4901E-02	1.0206E+00	-1.0000E-02	1.8822E-03	0.	0.
20	7.8500E+00	1.8818E+00	1.4441E+00	-5.2095E-03	8.4872E-02	1.0179E+00	-1.0000E-02	1.7886E-03	0.	0.
19	7.8500E+00	1.7820E+00	1.4363E+00	-6.3510E-03	8.3156E-02	1.0124E+00	-1.0000E-02	1.7037E-03	0.	0.
18	7.8500E+00	1.6824E+00	1.4283E+00	-8.7381E-03	8.1170E-02	1.0029E+00	-3.4915E-03	1.5751E-03	0.	0.
17	7.8500E+00	1.5831E+00	1.4204E+00	-1.0927E-02	8.0508E-02	9.9070E-01	1.7642E-02	1.6341E-03	0.	0.
16	7.8500E+00	1.4841E+00	1.4123E+00	-1.1982E-02	8.0645E-02	9.8437E-01	2.9857E-02	1.7415E-03	5.1785E-04	0.
15	7.8500E+00	1.3852E+00	1.4040E+00	-1.0659E-02	7.9118E-02	9.8919E-01	2.0557E-02	1.4934E-03	7.8490E-03	0.
14	7.8500E+00	1.2861E+00	1.3959E+00	-9.0002E-03	7.8366E-02	1.0036E+00	-6.7037E-03	1.1804E-03	4.9608E-03	0.
13	7.8500E+00	1.1869E+00	1.3881E+00	-7.5311E-03	7.1913E-02	1.0159E+00	-1.0000E-02	1.1220E-03	1.8738E-03	0.
12	7.8500E+00	1.0876E+00	1.3805E+00	-6.2328E-03	7.0643E-02	1.0229E+00	-1.0000E-02	1.0868E-03	4.0924E-04	0.
11	7.8500E+00	9.8818E-01	1.3729E+00	-5.8631E-03	7.0708E-02	1.0255E+00	-1.0000E-02	1.0417E-03	8.5497E-06	0.
10	7.8500E+00	8.8876E-01	1.3652E+00	-5.4493E-03	7.1116E-02	1.0251E+00	-1.0000E-02	9.7607E-04	0.	0.
9	7.8500E+00	7.8927E-01	1.3574E+00	-4.7434E-03	7.1903E-02	1.0226E+00	-1.0000E-02	9.8927E-04	0.	0.
8	7.8500E+00	6.8970E-01	1.3494E+00	-3.6167E-03	7.3156E-02	1.0179E+00	-1.0000E-02	7.9251E-04	0.	0.
7	7.8500E+00	5.9004E-01	1.3412E+00	-3.8038E-03	7.4030E-02	1.0115E+00	-1.0000E-02	6.5050E-04	0.	0.
6	7.8500E+00	4.9057E-01	1.3330E+00	-7.2935E-03	7.2349E-02	1.0021E+00	-4.0284E-03	5.3132E-04	0.	0.
5	7.8500E+00	3.9163E-01	1.3252E+00	-1.0508E-02	6.7056E-02	9.9985E-01	1.9277E-02	6.2185E-04	0.	0.
4	7.8500E+00	2.9324E-01	1.3183E+00	-1.0923E-02	5.9615E-02	9.7903E-01	4.0277E-02	9.1169E-04	0.	0.
3	7.8500E+00	1.9526E-01	1.3100E+00	-8.5270E-03	5.2593E-02	9.7176E-01	5.4643E-02	1.1929E-03	5.9167E-04	0.
2	7.8500E+00	9.7590E-02	1.3098E+00	-4.5525E-03	4.8128E-02	9.6712E-01	6.3907E-02	1.4212E-03	4.3726E-03	0.
1	7.8500E+00	0.	1.3089E+00	-0.	4.7220E-02	9.6494E-01	6.8309E-02	1.5413E-03	7.0789E-03	0.

J	RHO	EDXX	EDYY	EDTT	EDXY	VDCT/V	SXXE	SYXE	STTE	TXYE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	7.8500E+00	-1.1091E-02	-1.9428E-02	2.4773E-02	1.1123E-03	-5.7460E-03	-2.7598E-03	-3.8740E-03	6.6339E-03	-1.3016E-04
39	7.8500E+00	-1.3165E-02	-2.3891E-02	2.3920E-02	-5.6767E-03	-1.3136E-02	-2.0107E-03	-4.3997E-03	6.4104E-03	-1.0425E-03
38	7.8500E+00	7.3531E-04	-3.4667E-02	2.4474E-02	-1.0247E-02	-9.4574E-03	-9.9817E-04	-4.8704E-03	5.8686E-03	-1.9376E-03
37	7.8500E+00	-5.8034E-03	-4.3169E-02	2.7243E-02	-2.2532E-02	-2.1779E-02	8.7777E-04	-5.6976E-03	4.8199E-03	-2.2586E-03
36	7.8500E+00	1.8943E-02	-3.9956E-02	3.0593E-02	-2.5924E-02	9.5801E-03	1.6372E-03	-6.0001E-03	4.3629E-03	-2.1154E-03
35	7.8500E+00	1.4016E-02	-3.3014E-02	3.3648E-02	-1.6827E-02	1.4650E-02	1.8865E-03	-6.2855E-03	4.3969E-03	-1.4594E-03
34	7.8500E+00	1.8685E-02	-3.4576E-02	3.6480E-02	-3.0887E-02	2.0790E-02	2.4858E-03	-6.3946E-03	3.9088E-03	-1.4695E-03
33	7.8500E+00	1.9126E-02	-6.1174E-02	3.8750E-02	-3.4648E-02	-3.2982E-03	1.5434E-03	-6.2971E-03	4.7537E-03	-1.0082E-03
32	7.8500E+00	1.6548E-02	-5.5342E-02	4.0218E-02	-1.5961E-02	1.4237E-03	2.6456E-03	-6.4931E-03	3.8475E-03	-1.1626E-03
31	7.8500E+00	1.9506E-02	-1.7727E-02	4.0781E-02	3.3878E-02	4.2560E-02	1.9324E-04	-5.7753E-03	5.5820E-03	-1.0287E-03
30	7.8500E+00	-3.0513E-03	-1.1997E-02	4.1210E-02	-1.4925E-03	2.6161E-02	6.6582E-04	-6.0255E-03	5.3597E-03	-7.7149E-04
29	7.8500E+00	1.3764E-02	-3.4062E-02	4.2390E-02	-1.6256E-02	2.1293E-02	1.7597E-03	-6.3642E-03	4.6045E-03	-9.6596E-04
28	7.8500E+00	1.3983E-02	-6.6028E-02	4.3799E-02	-1.7684E-02	-8.2464E-03	1.8724E-03	-6.4177E-03	4.5553E-03	-8.1047E-04
27	7.8500E+00	5.4338E-03	-9.6102E-02	4.5142E-02	-1.7770E-02	-4.5527E-02	1.7756E-03	-6.4074E-03	4.6317E-03	-7.0929E-04
26	7.8500E+00	7.4095E-03	-1.0820E-01	4.6627E-02	-1.6389E-02	-5.4162E-02	1.8185E-03	-6.4234E-03	4.6051E-03	-6.6726E-04
25	7.8500E+00	9.3583E-03	-1.0370E-01	4.8224E-02	-1.6494E-02	-4.6121E-02	1.6587E-03	-6.3708E-03	4.7121E-03	-7.4970E-04
24	7.8500E+00	9.3236E-03	-9.4477E-02	4.9831E-02	-1.6716E-02	-3.5033E-02	1.4030E-03	-6.2662E-03	4.8632E-03	-9.4393E-04
23	7.8500E+00	9.5184E-03	-8.3949E-02	5.1428E-02	-2.3518E-02	-2.3003E-02	1.0387E-03	-6.0846E-03	5.0460E-03	-1.2456E-03
22	7.8500E+00	1.0200E-02	-7.1263E-02	5.3037E-02	-3.1593E-02	-8.0260E-03	5.1816E-04	-5.7930E-03	5.2748E-03	-1.5836E-03
21	7.8500E+00	1.2291E-02	-5.5634E-02	5.4542E-02	-3.8926E-02	1.1050E-02	-1.9832E-04	-5.4242E-03	5.6226E-03	-1.6721E-03
20	7.8500E+00	1.2696E-02	-3.2102E-02	5.5899E-02	-3.8664E-02	3.6493E-02	-1.2324E-03	-4.9317E-03	6.1645E-03	-1.1883E-03
19	7.8500E+00	1.0811E-02	6.3030E-03	5.6742E-02	-2.9433E-02	7.3916E-02	-1.7599E-03	-4.6887E-03	6.4486E-03	-2.6010E-05
18	7.8500E+00	2.5565E-02	3.6663E-02	5.6767E-02	-1.0450E-02	1.1919E-01	-8.7295E-04	-5.1079E-03	5.9809E-03	-1.4219E-03
17	7.8500E+00	2.0293E-02	1.3895E-02	5.5447E-02	1.5818E-02	8.9635E-02	1.5660E-04	-5.5199E-03	5.3633E-03	-1.9245E-03
16	7.8500E+00	4.1933E-03	-6.7739E-02	5.2969E-02	4.4451E-02	-1.0577E-02	8.8094E-04	-5.8642E-03	4.9833E-03	-1.8259E-03
15	7.8500E+00	-2.6481E-02	-1.4554E-01	5.0192E-02	6.3500E-02	-1.2183E-01	9.1416E-04	-5.9286E-03	5.0144E-03	-1.6641E-03
14	7.8500E+00	-2.1643E-02	-1.5688E-01	4.8232E-02	6.4761E-02	-1.3036E-01	1.1602E-03	-6.9091E-03	4.9300E-03	-1.4011E-03
13	7.8500E+00	-8.8636E-03	-1.1825E-01	4.7276E-02	4.3754E-02	-7.9839E-02	4.0410E-04	-6.1445E-03	5.2404E-03	-5.6250E-04
12	7.8500E+00	-3.8333E-03	-8.0526E-02	4.7156E-02	1.0313E-02	-3.7203E-02	5.3001E-04	-5.9505E-03	5.4205E-03	-8.9294E-04
11	7.8500E+00	4.5862E-03	-5.7682E-02	4.7734E-02	-1.0771E-02	-5.3621E-03	1.6311E-04	-5.3804E-03	5.2173E-03	-2.2881E-03
10	7.8500E+00	7.1658E-03	-4.0684E-02	4.8776E-02	-3.8092E-02	1.5897E-02	-3.5955E-04	-4.4654E-03	4.8249E-03	-3.3414E-03
9	7.8500E+00	7.8469E-03	-2.3396E-02	5.0070E-02	-6.2835E-02	3.4521E-02	-7.7750E-04	-3.6376E-03	4.4151E-03	-4.0827E-03
8	7.8500E+00	6.8921E-03	-9.6777E-03	5.1578E-02	-5.0151E-02	4.8792E-02	-1.6175E-03	-3.5179E-03	4.5355E-03	-4.0426E-03
7	7.8500E+00	1.2702E-02	2.9381E-03	5.2975E-02	-1.0422E-01	8.8615E-02	-9.2644E-04	-4.6661E-03	5.5952E-03	-2.5257E-03
6	7.8500E+00	3.5626E-02	1.4599E-02	5.3282E-02	-1.0601E-02	1.0531E-01	-8.2653E-04	-5.0808E-03	5.9073E-03	-1.6237E-03
5	7.8500E+00	2.6635E-02	1.5020E-02	5.1031E-02	-1.0843E-02	9.2686E-02	-1.2989E-03	-3.0940E-03	4.3925E-03	-4.2493E-03
4	7.8500E+00	-1.1767E-03	2.4517E-04	4.6172E-02	3.8453E-02	4.5240E-02	-1.6756E-03	-2.2531E-03	1.9287E-03	-4.6556E-03
3	7.8500E+00	-2.7076E-02	-2.2015E-02	4.0320E-02	5.0394E-02	-8.7707E-03	-1.9885E-03	-2.3460E-03	4.3345E-03	-4.3824E-03
2	7.8500E+00	-4.5351E-02	-4.1915E-02	3.5472E-02	3.6911E-02	-5.1794E-02	-2.7621E-03	-2.6029E-03	5.3650E-03	-3.4263E-03
1	7.8500E+00	-5.6004E-02	-5.2882E-02	3.3090E-02	3.2733E-03	-7.5746E-02	-3.7144E-03	-2.7459E-03	6.4608E-03	-1.3389E-03

J	RHD	MU	Y-ZERU	S1	S2	S3	IPC	CSS	K-ELASTIC	TANPHI
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.850E+00	4.600E-01	1.000E-02	2.745E-03	3.885E-03	6.634E-03	1.024E-01	4.714E-03	2.064E-05	1.153E-01
39	7.850E+00	4.600E-01	1.000E-02	1.620E-03	4.791E-03	6.410E-03	1.334E-01	4.714E-03	2.270E-05	3.750E-01
38	7.850E+00	4.600E-01	1.000E-02	1.492E-04	5.673E-03	5.869E-03	1.959E-01	4.714E-03	2.652E-05	4.144E-01
37	7.850E+00	4.600E-01	1.000E-02	1.579E-03	6.395E-03	4.820E-03	2.383E-01	4.714E-03	3.351E-05	3.104E-01
36	7.850E+00	4.600E-01	1.000E-02	2.184E-03	6.547E-03	4.363E-03	2.671E-01	4.714E-03	3.663E-05	2.585E-01
35	7.850E+00	4.600E-01	1.000E-02	2.141E-03	6.538E-03	4.397E-03	2.819E-01	4.714E-03	3.213E-05	1.732E-01
34	7.850E+00	4.600E-01	1.000E-02	2.723E-03	6.631E-03	3.909E-03	2.876E-01	4.714E-03	3.634E-05	1.612E-01
33	7.850E+00	4.600E-01	1.000E-02	1.671E-03	6.425E-03	4.754E-03	2.889E-01	4.714E-03	5.257E-05	1.265E-01
32	7.850E+00	4.600E-01	1.000E-02	2.791E-03	6.635E-03	3.848E-03	2.854E-01	4.714E-03	4.729E-05	1.252E-01
31	7.850E+00	4.600E-01	1.000E-02	3.656E-04	5.948E-03	5.982E-03	2.821E-01	4.714E-03	2.844E-05	1.675E-01
30	7.850E+00	4.600E-01	1.000E-02	7.536E-04	6.113E-03	5.360E-03	2.836E-01	4.714E-03	2.175E-05	1.138E-01
29	7.850E+00	4.600E-01	1.000E-02	1.873E-03	6.477E-03	4.605E-03	2.807E-01	4.714E-03	3.650E-05	1.173E-01
28	7.850E+00	4.600E-01	1.000E-02	1.951E-03	6.446E-03	4.545E-03	2.739E-01	4.714E-03	5.569E-05	9.685E-02
27	7.850E+00	4.600E-01	1.000E-02	1.837E-03	6.468E-03	4.632E-03	2.649E-01	4.714E-03	7.409E-05	8.604E-02
26	7.850E+00	4.600E-01	1.000E-02	1.872E-03	6.477E-03	4.605E-03	2.542E-01	4.714E-03	8.326E-05	8.043E-02
25	7.850E+00	4.600E-01	1.000E-02	1.728E-03	6.440E-03	4.712E-03	2.422E-01	4.714E-03	8.129E-05	9.257E-02
24	7.850E+00	4.600E-01	1.000E-02	1.517E-03	6.381E-03	4.863E-03	2.306E-01	4.714E-03	7.952E-05	1.213E-01
23	7.850E+00	4.600E-01	1.000E-02	1.250E-03	6.296E-03	5.046E-03	2.197E-01	4.714E-03	7.013E-05	1.698E-01
22	7.850E+00	4.600E-01	1.000E-02	8.932E-04	6.168E-03	5.275E-03	2.093E-01	4.714E-03	6.386E-05	2.368E-01
21	7.850E+00	4.600E-01	1.000E-02	2.909E-04	5.913E-03	5.623E-03	2.000E-01	4.714E-03	5.627E-05	2.926E-01
20	7.850E+00	4.600E-01	1.000E-02	8.840E-04	5.281E-03	6.145E-03	1.920E-01	4.714E-03	4.287E-05	2.936E-01
19	7.850E+00	4.600E-01	1.000E-02	1.760E-03	6.689E-03	6.469E-03	1.861E-01	4.714E-03	2.314E-05	8.880E-03
18	7.850E+00	4.600E-01	1.000E-02	4.399E-04	5.541E-03	5.981E-03	1.832E-01	4.714E-03	7.898E-06	3.046E-01
17	7.850E+00	4.600E-01	1.000E-02	7.475E-04	6.111E-03	5.363E-03	1.817E-01	4.714E-03	1.914E-05	3.071E-01
16	7.850E+00	4.600E-01	1.000E-02	1.343E-03	6.327E-03	4.983E-03	1.762E-01	4.714E-03	6.380E-05	2.533E-01
15	7.850E+00	4.600E-01	1.000E-02	1.297E-03	6.312E-03	5.014E-03	1.628E-01	4.714E-03	1.125E-04	2.303E-01
14	7.850E+00	4.600E-01	1.000E-02	1.422E-03	6.351E-03	4.930E-03	1.442E-01	4.714E-03	1.199E-04	1.865E-01
13	7.850E+00	4.600E-01	1.000E-02	9.487E-04	6.185E-03	5.240E-03	1.264E-01	4.714E-03	8.843E-05	7.930E-02
12	7.850E+00	4.600E-01	1.000E-02	6.508E-04	6.071E-03	5.421E-03	1.132E-01	4.714E-03	6.077E-05	1.353E-01
11	7.850E+00	4.600E-01	1.000E-02	9.855E-04	6.203E-03	5.217E-03	1.034E-01	4.714E-03	4.886E-05	3.594E-01
10	7.850E+00	4.600E-01	1.000E-02	1.572E-03	6.397E-03	4.825E-03	9.499E-02	4.714E-03	4.379E-05	5.656E-01
9	7.850E+00	4.600E-01	1.000E-02	2.118E-03	6.533E-03	4.415E-03	8.686E-02	4.714E-03	4.553E-05	7.093E-01
8	7.850E+00	4.600E-01	1.000E-02	1.964E-03	6.499E-03	4.335E-03	7.801E-02	4.714E-03	5.172E-05	7.375E-01
7	7.850E+00	4.600E-01	1.000E-02	3.463E-04	5.935E-03	5.593E-03	6.865E-02	4.714E-03	3.933E-05	5.039E-01
6	7.850E+00	4.600E-01	1.000E-02	2.776E-04	5.630E-03	5.907E-03	6.364E-02	4.714E-03	1.211E-04	3.381E-01
5	7.850E+00	4.600E-01	1.000E-02	2.147E-03	6.539E-03	4.393E-03	6.317E-02	4.714E-03	6.305E-06	8.108E-01
4	7.850E+00	4.600E-01	1.000E-02	2.700E-03	6.629E-03	3.929E-03	5.821E-02	4.714E-03	2.796E-05	9.399E-01
3	7.850E+00	4.600E-01	1.000E-02	2.219E-03	6.554E-03	4.335E-03	4.635E-02	4.714E-03	4.001E-05	9.600E-01
2	7.850E+00	4.600E-01	1.000E-02	7.447E-04	6.110E-03	5.365E-03	3.032E-02	4.714E-03	4.250E-05	1.024E+00
1	7.850E+00	4.600E-01	1.000E-02	1.807E-03	6.654E-03	6.461E-03	1.732E-02	4.714E-03	4.662E-05	1.425E+00

ZHEMP LIP-01
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
198 13 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

CCCE FILE HEMPOG MAP HEMPOG

J	RHO	X(Z)	Y(R)	X-DDT	Y-DDT	V	P	E	Q	F
41	0.	4.0646E+00	1.3304E+00	1.3005E-02	4.2112E-02	0.	0.	0.	0.	0.
40	7.8500E+00	3.9664E+00	1.3058E+00	1.3697E-02	3.8125E-02	9.9772E-01	4.2963E-03	1.4774E-03	0.	0.
39	7.8500E+00	3.8535E+00	1.3215E+00	1.4538E-02	3.7526E-02	1.0023E+00	4.3656E-03	2.7331E-03	6.0285E-06	0.
38	7.8500E+00	3.7375E+00	1.3428E+00	9.6575E-03	4.2196E-02	1.0011E+00	2.0903E-03	3.0291E-03	0.	0.
37	7.8500E+00	3.6281E+00	1.3628E+00	9.6602E-03	4.7450E-02	9.9950E-01	9.4084E-04	2.6509E-03	3.1852E-05	0.
36	7.8500E+00	3.5225E+00	1.3783E+00	9.0999E-03	5.3222E-02	1.0019E+00	3.6207E-03	2.5772E-03	0.	0.
35	7.8500E+00	3.4174E+00	1.3822E+00	7.7834E-03	5.8896E-02	1.0044E+00	8.1758E-03	2.7011E-03	0.	0.
34	7.8500E+00	3.3124E+00	1.3976E+00	7.9359E-03	6.1655E-02	1.0036E+00	6.6867E-03	2.7942E-03	6.7708E-08	0.
33	7.8500E+00	3.2076E+00	1.4032E+00	5.6135E-03	6.4106E-02	1.0017E+00	3.2670E-03	2.8438E-03	0.	0.
32	7.8500E+00	3.1035E+00	1.4068E+00	1.5794E-03	7.0567E-02	9.9389E-01	1.1564E-02	2.9239E-03	0.	0.
31	7.8500E+00	3.0005E+00	1.4080E+00	1.4251E-03	7.6258E-02	9.8872E-01	2.1451E-02	3.0484E-03	3.7860E-03	0.
30	7.8500E+00	2.8973E+00	1.4075E+00	2.6976E-03	7.8764E-02	1.0047E+00	6.8541E-03	2.8633E-03	4.4495E-03	0.
29	7.8500E+00	2.7944E+00	1.4059E+00	2.0010E-03	7.9809E-02	1.0141E+00	1.0000E-02	2.8562E-03	2.3397E-03	0.
28	7.8500E+00	2.6920E+00	1.4032E+00	1.2662E-03	8.0523E-02	1.0173E+00	1.0000E-02	2.8332E-03	9.4783E-04	0.
27	7.8500E+00	2.5898E+00	1.3997E+00	8.4284E-04	8.1042E-02	1.0178E+00	1.0000E-02	2.8019E-03	2.4114E-04	0.
26	7.8500E+00	2.4879E+00	1.3952E+00	6.9064E-04	8.1755E-02	1.0173E+00	1.0000E-02	2.7790E-03	5.1441E-06	0.
25	7.8500E+00	2.3862E+00	1.3901E+00	7.2795E-04	8.3003E-02	1.0152E+00	1.0000E-02	2.7466E-03	0.	0.
24	7.8500E+00	2.2847E+00	1.3841E+00	5.4002E-04	8.4618E-02	1.0133E+00	1.0000E-02	2.7081E-03	0.	0.
23	7.8500E+00	2.1833E+00	1.3776E+00	1.4752E-04	8.6152E-02	1.0115E+00	1.0000E-02	2.6630E-03	0.	0.
22	7.8500E+00	2.0823E+00	1.3704E+00	5.4440E-04	8.6920E-02	1.0094E+00	1.0000E-02	2.6108E-03	0.	0.
21	7.8500E+00	1.9814E+00	1.3629E+00	1.5812E-03	8.6596E-02	1.0066E+00	1.0000E-02	2.5448E-03	0.	0.
20	7.8500E+00	1.8807E+00	1.3551E+00	3.0307E-03	8.5765E-02	1.0016E+00	3.0857E-03	2.4878E-03	0.	0.
19	7.8500E+00	1.7804E+00	1.3470E+00	4.4228E-03	8.5375E-02	9.9530E-01	8.8694E-03	2.4834E-03	0.	0.
18	7.8500E+00	1.6802E+00	1.3388E+00	5.7613E-03	8.5600E-02	9.8940E-01	2.0145E-02	2.5420E-03	0.	0.
17	7.8500E+00	1.5804E+00	1.3303E+00	6.9559E-03	8.6127E-02	9.8490E-01	2.8820E-02	2.6097E-03	0.	0.
16	7.8500E+00	1.4807E+00	1.3215E+00	7.8201E-03	8.6525E-02	9.8244E-01	3.3608E-02	2.6295E-03	0.	0.
15	7.8500E+00	1.3812E+00	1.3126E+00	8.2767E-03	8.6527E-02	9.8164E-01	3.5161E-02	2.5925E-03	7.0734E-04	0.
14	7.8500E+00	1.2817E+00	1.3035E+00	7.7370E-03	8.5817E-02	9.8414E-01	3.0298E-02	2.4362E-03	2.7140E-03	0.
13	7.8500E+00	1.1823E+00	1.2945E+00	5.6988E-03	8.4094E-02	9.9030E-01	1.8409E-02	2.1820E-03	4.3092E-03	0.
12	7.8500E+00	1.0825E+00	1.2855E+00	3.1138E-03	8.1786E-02	9.9449E-01	9.5634E-04	1.9590E-03	2.0903E-03	0.
11	7.8500E+00	9.8263E-01	1.2768E+00	1.8742E-03	8.0079E-02	1.0075E+00	1.0000E-02	1.8892E-03	9.2479E-04	0.
10	7.8500E+00	8.8266E-01	1.2681E+00	1.7607E-03	7.8812E-02	1.0127E+00	1.0000E-02	1.8452E-03	2.9080E-04	0.
9	7.8500E+00	7.8272E-01	1.2595E+00	2.3883E-03	7.6361E-02	1.0156E+00	1.0000E-02	1.8181E-03	5.2488E-06	0.
8	7.8500E+00	6.8289E-01	1.2512E+00	3.0233E-03	7.1526E-02	1.0146E+00	1.0000E-02	1.7905E-03	0.	0.
7	7.8500E+00	5.8318E-01	1.2435E+00	4.8426E-03	6.5377E-02	1.0075E+00	1.0000E-02	1.7073E-03	0.	0.
6	7.8500E+00	4.8385E-01	1.2364E+00	8.9661E-03	6.0731E-02	9.9058E-01	1.7876E-02	1.7094E-03	0.	0.
5	7.8500E+00	3.8526E-01	1.2298E+00	1.3013E-02	5.8363E-02	9.6689E-01	6.4372E-02	2.6362E-03	0.	0.
4	7.8500E+00	2.8780E-01	1.2238E+00	1.3668E-02	5.7525E-02	9.4373E-01	1.1210E-01	4.6296E-03	0.	0.
3	7.8500E+00	1.9136E-01	1.2191E+00	1.0016E-02	5.8457E-02	9.2684E-01	1.4840E-01	6.9097E-03	9.6967E-04	0.
2	7.8500E+00	9.5566E-02	1.2162E+00	5.2774E-03	6.0965E-02	9.1637E-01	1.7157E-01	9.1314E-03	1.4653E-02	0.
1	7.8500E+00	0.	1.2155E+00	0C-C.	6.2994E-02	9.1162E-01	1.8227E-01	1.0579E-02	2.6192E-02	0.

J	RHO	EDXX	EDYY	EDTT	EDXY	VCC1/V	SXXE	SYXE	STTE	TXYE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	-1.3359E-03	-2.5013E-02	2.8283E-02	8.6513E-03	1.9337E-03	-5.5089E-04	-5.4556E-03	6.0065E-03	5.1107E-04
39	7.8500E+00	9.8726E-03	-2.1883E-02	2.7190E-02	-2.7533E-02	-4.5656E-03	-4.7086E-05	-5.2306E-03	5.2776E-03	-2.3929E-03
38	7.8500E+00	2.8131E-02	-3.1584E-02	2.8153E-02	-5.3397E-02	2.4700E-02	1.9436E-03	-5.0992E-03	3.1556E-03	-3.6694E-03
37	7.8500E+00	-4.4967E-03	-3.0758E-02	3.1212E-02	-3.6091E-02	-4.6427E-03	5.6637E-04	-5.1210E-03	4.5547E-03	-3.1126E-03
36	7.8500E+00	1.2427E-02	-3.2394E-02	3.4712E-02	-3.4438E-02	1.4745E-02	1.0993E-03	-5.6456E-03	4.5463E-03	-2.5413E-03
35	7.8500E+00	1.4067E-02	-4.5990E-02	3.7972E-02	-3.6626E-02	6.0487E-03	1.3784E-03	-6.0013E-03	4.6224E-03	-1.9209E-03
34	7.8500E+00	2.3325E-03	-4.3633E-02	4.0803E-02	-2.4156E-02	-4.9754E-04	6.7966E-04	-5.6554E-03	4.9758E-03	-2.1751E-03
33	7.8500E+00	2.4982E-02	-1.3836E-02	4.3282E-02	-2.6284E-02	5.4428E-02	1.6839E-03	-6.1996E-03	4.5157E-03	-1.5819E-03
32	7.8500E+00	3.4286E-02	-4.0659E-02	4.5378E-02	-1.5620E-02	3.9006E-02	2.6825E-03	-6.5949E-03	3.9125E-03	-5.7894E-04
31	7.8500E+00	5.7510E-03	-1.2501E-01	4.7179E-02	-6.6352E-03	-7.2080E-02	1.4922E-03	-6.3545E-03	4.8627E-03	-4.5768E-04
30	7.8500E+00	-1.0736E-02	-1.6633E-01	4.8716E-02	-1.5295E-02	-1.2835E-01	1.6962E-03	-6.4101E-03	4.7139E-03	-4.8945E-04
29	7.8500E+00	8.8957E-03	-1.5224E-01	5.0321E-02	-1.6363E-02	-9.3027E-02	1.8383E-03	-6.4338E-03	4.5956E-03	-6.2211E-04
28	7.8500E+00	9.8755E-03	-1.2092E-01	5.1889E-02	-2.0290E-02	-5.9153E-02	1.3751E-03	-6.2548E-03	4.8797E-03	-9.5938E-04
27	7.8500E+00	5.6386E-03	-8.8781E-02	5.3344E-02	-2.2056E-02	-2.9799E-02	7.0524E-04	-5.9322E-03	5.2269E-03	-1.3522E-03
26	7.8500E+00	5.2291E-03	-6.4234E-02	5.4660E-02	-2.4430E-02	-4.3455E-03	2.7416E-04	-5.6284E-03	5.3542E-03	-1.7672E-03
25	7.8500E+00	5.0531E-03	-5.1237E-02	5.5921E-02	-3.4158E-02	9.7178E-03	5.1077E-05	-5.3772E-03	5.3461E-03	-2.1414E-03
24	7.8500E+00	6.2839E-03	-4.6334E-02	5.7261E-02	-4.3556E-02	1.7212E-02	-3.3182E-05	-5.2834E-03	5.3166E-03	-2.2896E-03
23	7.8500E+00	7.1241E-03	-4.4624E-02	5.8638E-02	-4.6518E-02	2.1143E-02	-1.0567E-04	-5.2882E-03	5.3939E-03	-2.1905E-03
22	7.8500E+00	8.2190E-03	-3.9814E-02	5.9841E-02	-4.2223E-02	2.8246E-02	-2.4387E-04	-5.3175E-03	5.5614E-03	-1.9238E-03
21	7.8500E+00	1.0924E-02	-2.7112E-02	6.0670E-02	-3.2618E-02	4.4482E-02	-2.8585E-04	-5.3953E-03	5.6811E-03	-1.6125E-03
20	7.8500E+00	1.4603E-02	-1.4367E-02	6.0989E-02	-2.1580E-02	6.1225E-02	-1.3668E-04	-5.5528E-03	5.6895E-03	-1.3123E-03
19	7.8500E+00	1.4496E-02	-1.7635E-02	6.0822E-02	-1.1340E-02	5.7683E-02	3.6717E-04	-5.8265E-03	5.4553E-03	-1.1790E-03
18	7.8500E+00	2.0912E-02	-3.7417E-02	6.0549E-02	-1.6008E-02	4.4044E-02	9.1895E-04	-6.0088E-03	5.0898E-03	-1.3803E-03
17	7.8500E+00	2.0237E-02	-5.6020E-02	6.0557E-02	-3.3874E-02	2.4774E-02	8.9433E-04	-5.9592E-03	5.0649E-03	-1.5332E-03
16	7.8500E+00	1.3519E-02	-6.3608E-02	6.0951E-02	-4.2683E-02	1.0862E-02	6.1648E-04	-5.9388E-03	5.3223E-03	-1.1598E-03
15	7.8500E+00	-1.2741E-03	-7.3024E-02	6.1055E-02	-2.2172E-02	-1.3243E-02	3.9612E-04	-5.4579E-03	5.5618E-03	-2.0009E-04
14	7.8500E+00	-9.4049E-03	-9.8028E-02	6.0374E-02	-1.1909E-02	-4.7058E-02	6.0186E-04	-6.0315E-03	5.4296E-03	-4.7156E-04
13	7.8500E+00	-1.6314E-02	-1.2316E-01	5.9039E-02	-2.0627E-02	-8.0435E-02	6.5558E-04	-6.0647E-03	5.4091E-03	-3.1429E-04
12	7.8500E+00	-1.7412E-02	-1.2485E-01	5.7804E-02	-2.9997E-03	-8.4454E-02	6.4568E-04	-6.0639E-03	5.4182E-03	-2.4639E-04
11	7.8500E+00	-5.0494E-03	-1.0809E-01	5.7155E-02	-1.9735E-02	-5.5866E-02	3.5565E-04	-5.9141E-03	5.5585E-03	-5.7755E-04
10	7.8500E+00	6.1517E-04	-8.8871E-02	5.6966E-02	-2.8091E-02	-3.1290E-02	-9.4029E-04	-5.2454E-03	6.1857E-03	-4.9910E-05
9	7.8500E+00	2.1609E-03	-6.3125E-02	5.6774E-02	-1.7562E-02	-4.1896E-03	-3.5506E-03	-2.6467E-03	6.1973E-03	-2.0794E-03
8	7.8500E+00	-1.2520E-03	-1.7727E-02	5.6093E-02	-4.2934E-03	3.9114E-02	-5.0327E-03	2.0480E-03	2.9847E-03	-3.7574E-03
7	7.8500E+00	9.9398E-03	5.0957E-02	5.4738E-02	-2.4013E-02	1.1563E-01	-3.9480E-03	4.2300E-03	-2.8204E-04	4.0868E-03
6	7.8500E+00	3.7457E-02	1.0281E-01	5.2881E-02	3.5356E-02	1.9315E-01	-2.7761E-03	3.9328E-03	-1.1567E-03	4.5911E-03
5	7.8500E+00	3.5380E-02	1.0388E-01	5.0445E-02	5.0687E-02	1.8971E-01	-2.1194E-03	1.9975E-03	1.2181E-04	5.3930E-03
4	7.8500E+00	3.6905E-03	5.4477E-02	4.7621E-02	6.6211E-02	1.0579E-01	-1.8913E-03	-6.4098E-04	2.5323E-03	5.3041E-03
3	7.8500E+00	-3.2317E-02	-2.1619E-02	4.5089E-02	5.6464E-02	-8.8472E-01	-1.3296E-03	-3.3472E-03	4.6768E-03	3.9889E-03
2	7.8500E+00	-4.5410E-02	-9.9987E-02	4.3598E-02	2.6446E-02	-1.0180E-01	-4.3539E-04	-5.1935E-03	5.6289E-03	1.9773E-03
1	7.8500E+00	-5.0878E-02	-1.5238E-01	4.3480E-02	1.0157E-04	-1.5977E-01	1.0855E-04	-5.8147E-03	5.7061E-03	3.7705E-04

J	RHO	MU	Y-ZERO	S1	S2	S3	IPC	OSS	K-ELASTIC	TANPHI
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.850E+00	4.600E-01	1.000E-02	4.982E-04	5.508E-03	6.006E-03	2.025E-01	4.714E-03	2.406E-05	1.031E-01
39	7.850E+00	4.600E-01	1.000E-02	8.887E-04	6.166E-03	5.278E-03	3.759E-01	4.714E-03	2.497E-05	3.910E-01
38	7.850E+00	4.600E-01	1.000E-02	3.508E-03	6.664E-03	3.156E-03	4.115E-01	4.714E-03	4.040E-05	4.263E-01
37	7.850E+00	4.600E-01	1.000E-02	1.939E-03	6.493E-03	4.555E-03	3.485E-01	4.714E-03	3.229E-05	4.409E-01
36	7.850E+00	4.600E-01	1.000E-02	1.950E-03	6.496E-03	4.546E-03	3.233E-01	4.714E-03	3.524E-05	3.346E-01
35	7.850E+00	4.600E-01	1.000E-02	1.848E-03	6.471E-03	4.623E-03	3.217E-01	4.714E-03	4.313E-05	2.447E-01
34	7.850E+00	4.600E-01	1.000E-02	1.355E-03	6.330E-03	4.976E-03	3.244E-01	4.714E-03	4.069E-05	3.103E-01
33	7.850E+00	4.600E-01	1.000E-02	1.989E-03	6.505E-03	4.516E-03	3.276E-01	4.714E-03	2.849E-05	1.932E-01
32	7.850E+00	4.600E-01	1.000E-02	2.718E-03	6.631E-03	3.912E-03	3.316E-01	4.714E-03	4.466E-05	6.216E-02
31	7.850E+00	4.600E-01	1.000E-02	1.519E-03	6.381E-03	4.862E-03	3.263E-01	4.714E-03	9.423E-05	5.813E-02
30	7.850E+00	4.600E-01	1.000E-02	1.726E-03	6.44CE-03	4.714E-03	3.155E-01	4.714E-03	1.231E-04	6.016E-02
29	7.850E+00	4.600E-01	1.000E-02	1.885E-03	6.48CE-03	4.594E-03	3.648E-01	4.714E-03	1.173E-04	7.479E-02
28	7.850E+00	4.600E-01	1.000E-02	1.494E-03	6.374E-03	4.88CE-03	2.463E-01	4.714E-03	9.480E-05	1.238E-01
27	7.850E+00	4.600E-01	1.000E-02	9.702E-04	6.197E-03	5.227E-03	2.696E-01	4.714E-03	7.304E-05	1.959E-01
26	7.850E+00	4.600E-01	1.000E-02	7.628E-04	6.117E-03	5.354E-03	2.846E-01	4.714E-03	5.896E-05	2.765E-01
25	7.850E+00	4.600E-01	1.000E-02	7.763E-04	6.122E-03	5.346E-03	2.804E-01	4.714E-03	5.414E-05	3.480E-01
24	7.850E+00	4.600E-01	1.000E-02	8.250E-04	6.142E-03	5.317E-03	2.756E-01	4.714E-03	5.429E-05	3.748E-01
23	7.850E+00	4.600E-01	1.000E-02	6.961E-04	6.09CE-03	5.394E-03	2.697E-01	4.714E-03	5.473E-05	3.660E-01
22	7.850E+00	4.600E-01	1.000E-02	4.031E-04	5.964E-03	5.561E-03	2.633E-01	4.714E-03	5.187E-05	3.363E-01
21	7.850E+00	4.600E-01	1.000E-02	1.805E-04	5.862E-03	5.681E-03	2.571E-01	4.714E-03	4.407E-05	2.892E-01
20	7.850E+00	4.600E-01	1.000E-02	1.645E-04	5.854E-03	5.689E-03	2.517E-01	4.714E-03	3.616E-05	2.295E-01
19	7.850E+00	4.600E-01	1.000E-02	5.840E-04	6.043E-03	5.459E-03	2.473E-01	4.714E-03	3.612E-05	1.839E-01
18	7.850E+00	4.600E-01	1.000E-02	1.184E-03	6.274E-03	5.090E-03	2.423E-01	4.714E-03	4.719E-05	1.919E-01
17	7.850E+00	4.600E-01	1.000E-02	1.222E-03	6.287E-03	5.065E-03	2.352E-01	4.714E-03	6.029E-05	2.135E-01
16	7.850E+00	4.600E-01	1.000E-02	8.156E-04	6.138E-03	5.322E-03	2.261E-01	4.714E-03	6.495E-05	1.717E-01
15	7.850E+00	4.600E-01	1.000E-02	4.024E-04	5.964E-03	5.562E-03	2.163E-01	4.714E-03	6.681E-05	3.146E-02
14	7.850E+00	4.600E-01	1.000E-02	6.352E-04	6.065E-03	5.430E-03	2.054E-01	4.714E-03	8.164E-05	7.073E-02
13	7.850E+00	4.600E-01	1.000E-02	6.702E-04	6.075E-03	5.469E-03	1.919E-01	4.714E-03	9.715E-05	4.667E-02
12	7.850E+00	4.600E-01	1.000E-02	6.547E-04	6.073E-03	5.418E-03	1.706E-01	4.714E-03	9.672E-05	3.667E-02
11	7.850E+00	4.600E-01	1.000E-02	4.084E-04	5.967E-03	5.558E-03	1.618E-01	4.714E-03	8.654E-05	9.135E-02
10	7.850E+00	4.600E-01	1.000E-02	9.397E-04	5.246E-03	6.186E-03	1.484E-01	4.714E-03	6.874E-05	1.159E-02
9	7.850E+00	4.600E-01	1.000E-02	9.707E-04	5.227E-03	6.197E-03	1.385E-01	4.714E-03	3.178E-05	1.241E+00
8	7.850E+00	4.600E-01	1.000E-02	3.670E-03	6.655E-03	2.985E-03	1.353E-01	4.714E-03	8.237E-06	2.316E+00
7	7.850E+00	4.600E-01	1.000E-02	5.909E-03	5.627E-03	2.82CE-04	1.339E-01	4.714E-03	1.896E-05	2.423E+00
6	7.850E+00	4.600E-01	1.000E-02	6.264E-03	5.108E-03	1.157E-03	1.296E-01	4.714E-03	3.087E-05	1.969E+00
5	7.850E+00	4.600E-01	1.000E-02	5.712E-03	5.833E-03	1.218E-04	1.227E-01	4.714E-03	3.056E-05	1.452E+00
4	7.850E+00	4.600E-01	1.000E-02	4.075E-03	6.607E-03	2.532E-03	1.119E-01	4.714E-03	3.271E-05	1.125E+00
3	7.850E+00	4.600E-01	1.000E-02	1.776E-03	6.453E-03	4.677E-03	9.456E-02	4.714E-03	4.422E-05	7.786E-01
2	7.850E+00	4.600E-01	1.000E-02	2.790E-04	5.906E-03	5.629E-03	7.418E-02	4.714E-03	7.238E-05	3.613E-01
1	7.850E+00	4.600E-01	1.000E-02	1.325E-04	5.835E-03	5.706E-03	5.716E-02	4.714E-03	1.046E-04	6.340E-02

2HEMP LIP.01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 12 5.035029E+00 3.876C95E-C2 1.300C00E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHC	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	4.1081E+00	1.2596E+00	1.7133E-02	5.0348E-02	0.	U.	0.	0.	0.
40	7.8500E+00	3.9929E+00	1.2268E+00	1.7992E-02	4.0158E-02	1.0018E+00	-3.4681E-03	2.4890E-03	0.	0.
39	7.8500E+00	3.8644E+00	1.2451E+00	1.5021E-02	4.0368E-02	1.0026E+00	-4.8211E-03	3.7182E-03	0.	0.
38	7.8500E+00	3.7459E+00	1.2642E+00	1.0639E-02	4.5693E-02	9.9968E-01	6.1052E-04	3.7669E-03	0.	0.
37	7.8500E+00	3.6316E+00	1.2827E+00	8.6409E-03	5.2614E-02	9.9993E-01	1.3904E-04	3.5672E-03	5.8261E-05	0.
36	7.8500E+00	3.5219E+00	1.2972E+00	7.3922E-03	5.7487E-02	1.0012E+00	-2.2508E-03	3.3460E-03	2.2127E-05	0.
35	7.8500E+00	3.4158E+00	1.3087E+00	6.3943E-03	6.2350E-02	9.9811E-01	3.5658E-03	3.3050E-03	0.	0.
34	7.8500E+00	3.3106E+00	1.3169E+00	5.1445E-03	6.7050E-02	9.9767E-01	4.3823E-03	3.3903E-03	1.1662E-05	0.
33	7.8500E+00	3.2063E+00	1.3225E+00	5.2407E-03	7.1194E-02	9.9865E-01	2.5360E-03	3.5050E-03	2.2413E-04	0.
32	7.8500E+00	3.1026E+00	1.3256E+00	3.8316E-03	7.5141E-02	9.9794E-01	3.8866E-03	3.5811E-03	0.	0.
31	7.8500E+00	2.9995E+00	1.3266E+00	2.7606E-03	7.9417E-02	9.9591E-01	7.7184E-03	3.6291E-03	0.	0.
30	7.8500E+00	2.8967E+00	1.3259E+00	3.0248E-03	8.2406E-02	9.9826E-01	3.2456E-03	3.6598E-03	0.	0.
29	7.8500E+00	2.7939E+00	1.3239E+00	2.5464E-03	8.4250E-02	9.9845E-01	2.9267E-03	3.7021E-03	0.	0.
28	7.8500E+00	2.6914E+00	1.3209E+00	2.2106E-03	8.6069E-02	9.9774E-01	4.2583E-03	3.7305E-03	0.	0.
27	7.8500E+00	2.5892E+00	1.3168E+00	2.2051E-03	8.8197E-02	9.9787E-01	4.0152E-03	3.7420E-03	2.1604E-04	0.
26	7.8500E+00	2.4872E+00	1.3117E+00	2.2412E-03	9.0148E-02	9.9950E-01	9.4027E-04	3.7365E-03	2.2151E-04	0.
25	7.8500E+00	2.3854E+00	1.3057E+00	2.2360E-03	9.0977E-02	1.0026E+00	-4.7910E-03	3.7182E-03	2.7987E-04	0.
24	7.8500E+00	2.2837E+00	1.2991E+00	2.1268E-03	9.0492E-02	1.0055E+00	-1.0000E-02	3.7015E-03	5.3033E-05	0.
23	7.8500E+00	2.1821E+00	1.2920E+00	2.0959E-03	8.9407E-02	1.0062E+00	-1.0060E-02	3.6790E-03	0.	0.
22	7.8500E+00	2.0807E+00	1.2845E+00	1.7199E-03	8.6760E-02	1.0038E+00	-7.0251E-03	3.6379E-03	0.	0.
21	7.8500E+00	1.9795E+00	1.2768E+00	8.7013E-04	8.9065E-02	9.9894E-01	2.0022E-03	3.6127E-03	0.	0.
20	7.8500E+00	1.8784E+00	1.2686E+00	-3.5786E-04	8.9865E-02	9.9361E-01	1.2088E-02	3.6303E-03	0.	0.
19	7.8500E+00	1.7777E+00	1.2601E+00	-1.5499E-03	9.0418E-02	9.8935E-01	2.0231E-02	3.6648E-03	0.	0.
18	7.8500E+00	1.6771E+00	1.2512E+00	-2.4398E-03	9.0622E-02	9.8629E-01	2.6124E-02	3.6940E-03	0.	0.
17	7.8500E+00	1.5768E+00	1.2422E+00	-3.0639E-03	9.1137E-02	9.8337E-01	3.1796E-02	3.7328E-03	0.	0.
16	7.8500E+00	1.4765E+00	1.2329E+00	-3.4705E-03	9.2565E-02	9.8090E-01	3.7394E-02	3.7811E-03	0.	0.
15	7.8500E+00	1.3765E+00	1.2232E+00	-4.0842E-03	9.4657E-02	9.7867E-01	4.0980E-02	3.7901E-03	0.	0.
14	7.8500E+00	1.2765E+00	1.2131E+00	-4.7339E-03	9.6170E-02	9.7906E-01	4.0204E-02	3.6958E-03	1.5910E-03	0.
13	7.8500E+00	1.1767E+00	1.2028E+00	-4.6681E-03	9.5600E-02	9.8289E-01	3.2723E-02	3.4547E-03	3.5550E-03	0.
12	7.8500E+00	1.0769E+00	1.1926E+00	-3.6165E-03	9.2213E-02	9.8982E-01	1.9333E-02	3.1462E-03	3.5304E-03	0.
11	7.8500E+00	9.7697E-01	1.1828E+00	-2.2057E-03	8.7073E-02	9.9656E-01	6.4821E-03	2.9411E-03	1.1196E-03	0.
10	7.8500E+00	8.7696E-01	1.1734E+00	-1.6379E-03	8.2175E-02	9.9931E-01	1.2972E-03	2.8456E-03	0.	0.
9	7.8500E+00	7.7699E-01	1.1645E+00	-2.8443E-03	7.7699E-02	9.9681E-01	6.0231E-03	2.7983E-03	0.	0.
8	7.8500E+00	6.7724E-01	1.1561E+00	-5.3197E-03	7.2083E-02	9.9050E-01	1.8028E-02	2.8310E-03	0.	0.
7	7.8500E+00	5.7782E-01	1.1484E+00	-8.2178E-03	6.4298E-02	9.8280E-01	3.2909E-02	2.9766E-03	0.	0.
6	7.8500E+00	4.7884E-01	1.1416E+00	-1.0600E-02	5.5932E-02	9.7216E-01	5.3835E-02	3.3795E-03	0.	0.
5	7.8500E+00	3.8055E-01	1.1358E+00	-1.0945E-02	5.1411E-02	9.5501E-01	8.8561E-02	4.5526E-03	0.	0.
4	7.8500E+00	2.8354E-01	1.1309E+00	-8.2873E-03	5.4306E-02	9.2976E-01	1.4202E-01	7.4780E-03	0.	0.
3	7.8500E+00	1.8839E-01	1.1274E+00	-3.6599E-03	6.2927E-02	9.0220E-01	2.0319E-01	1.2573E-02	0.	0.
2	7.8500E+00	9.4211E-02	1.1258E+00	-3.6439E-04	7.2918E-02	8.8108E-01	2.5375E-01	1.9050E-02	1.2036E-02	0.
1	7.8500E+00	0.	1.1258E+00	-0.	7.8217E-02	8.6992E-01	2.8111E-01	2.4253E-02	2.2068E-02	0.

J	RHO	EDXX	EDYY	EDTT	EDXY	VDQT/V	SXXE	SYXE	STTE	TXYE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	6.8864E-03	3.3545E-02	3.3208E-02	2.2320E-02	6.5492E-03	7.7213E-05	5.5833E-03	5.5061E-03	1.6079E-03
39	7.8500E+00	4.6673E-03	3.2035E-02	3.0530E-02	3.2515E-02	3.1620E-03	1.4414E-03	5.6674E-03	4.2260E-03	2.7029E-03
38	7.8500E+00	3.8727E-02	4.7179E-02	3.2101E-02	5.5410E-02	2.3649E-02	2.7177E-03	5.5569E-03	2.8392E-03	3.1891E-03
37	7.8500E+00	9.0782E-03	5.9375E-02	3.5741E-02	6.3637E-02	1.4556E-02	1.5019E-03	5.3710E-03	3.8691E-03	3.2089E-03
36	7.8500E+00	1.0778E-02	5.9458E-02	3.9651E-02	4.6621E-02	9.6285E-03	1.6425E-03	5.9793E-03	4.3368E-03	2.1690E-03
35	7.8500E+00	1.2960E-02	4.6592E-02	4.3227E-02	3.5882E-02	9.1953E-03	1.0217E-03	5.9046E-03	4.8829E-03	1.8596E-03
34	7.8500E+00	7.2232E-03	5.4047E-02	4.6145E-02	1.3935E-02	6.7867E-04	9.6419E-04	6.0281E-03	5.0639E-03	1.3704E-03
33	7.8500E+00	1.1674E-02	7.6618E-02	4.8678E-02	1.6231E-02	1.6267E-02	1.5449E-03	6.1849E-03	4.6400E-03	1.4996E-03
32	7.8500E+00	2.5838E-02	7.1252E-02	5.1669E-02	6.4310E-02	6.2553E-03	1.3579E-03	5.5642E-03	4.2063E-03	2.8434E-03
31	7.8500E+00	5.7326E-03	4.6924E-02	5.5145E-02	7.0928E-02	1.3954E-02	5.5844E-04	4.7891E-03	5.3476E-03	2.7223E-03
30	7.8500E+00	7.3939E-03	4.1420E-02	5.7960E-02	3.6524E-02	9.1464E-03	3.5506E-04	5.4275E-03	5.7826E-03	1.3498E-03
29	7.8500E+00	5.8101E-03	4.9285E-02	5.9610E-02	1.8541E-02	1.6135E-02	4.1473E-04	5.8900E-03	5.4752E-03	9.5527E-04
28	7.8500E+00	5.4803E-03	6.0651E-02	6.0720E-02	1.9752E-02	5.5490E-03	5.9144E-04	5.9631E-03	5.3717E-03	9.7564E-04
27	7.8500E+00	2.6225E-03	7.6696E-02	6.1826E-02	2.4037E-02	1.2247E-02	6.9578E-04	6.0005E-03	5.3047E-03	1.0093E-03
26	7.8500E+00	1.3877E-03	9.3227E-02	6.2991E-02	2.6194E-02	2.8848E-02	7.5070E-04	6.0300E-03	5.2793E-03	9.6754E-04
25	7.8500E+00	8.4695E-04	9.7408E-02	6.4096E-02	2.3031E-02	3.2365E-02	5.6196E-04	5.9589E-03	5.3969E-03	9.2618E-04
24	7.8500E+00	2.5456E-03	8.1628E-02	6.4977E-02	1.8769E-02	1.4055E-02	1.0419E-04	5.7319E-03	5.6277E-03	1.0319E-03
23	7.8500E+00	3.4864E-03	5.3452E-02	6.5604E-02	1.9347E-02	1.5639E-02	4.0379E-04	5.4059E-03	5.8096E-03	1.3282E-03
22	7.8500E+00	7.0494E-03	2.9713E-02	6.6063E-02	2.3125E-02	4.3399E-02	4.8377E-04	5.3007E-03	5.7844E-03	1.5614E-03
21	7.8500E+00	1.1429E-02	2.5317E-02	6.6451E-02	2.5436E-02	5.2563E-02	5.9757E-05	5.5272E-03	5.5870E-03	1.5649E-03
20	7.8500E+00	1.5664E-02	3.8345E-02	6.6844E-02	2.7063E-02	4.4162E-02	3.8801E-04	5.7616E-03	5.3736E-03	1.4908E-03
19	7.8500E+00	1.5520E-02	5.2768E-02	6.7289E-02	2.8867E-02	3.6041E-02	5.3724E-04	5.8212E-03	5.2839E-03	1.5120E-03
18	7.8500E+00	1.4169E-02	5.7707E-02	6.7849E-02	3.3158E-02	2.4311E-02	5.1019E-04	5.7553E-03	5.2451E-03	1.6987E-03
17	7.8500E+00	1.2729E-02	5.7056E-02	6.8598E-02	4.1718E-02	2.4271E-02	4.6818E-04	5.6723E-03	5.2042E-03	1.8959E-03
16	7.8500E+00	1.0623E-02	6.2284E-02	6.9635E-02	5.0542E-02	1.7974E-02	5.5756E-04	5.7336E-03	5.1760E-03	1.8290E-03
15	7.8500E+00	9.8906E-03	7.9291E-02	7.0879E-02	5.1466E-02	1.4784E-03	7.5258E-04	5.9540E-03	5.2014E-03	1.3409E-03
14	7.8500E+00	4.4068E-03	1.0241E-01	7.1921E-02	3.4339E-02	2.6587E-02	7.3203E-04	6.0864E-03	5.3544E-03	4.5620E-04
13	7.8500E+00	8.4632E-03	1.2120E-01	7.2120E-02	1.6245E-03	5.7546E-02	4.3588E-04	5.9474E-03	5.5115E-03	6.0334E-04
12	7.8500E+00	1.8032E-02	1.2102E-01	7.1084E-02	3.8318E-02	6.7991E-02	6.9215E-05	5.6349E-03	5.5457E-03	1.4407E-03
11	7.8500E+00	1.3750E-02	9.5647E-02	6.9182E-02	4.8399E-02	4.0214E-02	2.9451E-04	5.2866E-03	5.5811E-03	1.9344E-03
10	7.8500E+00	3.5251E-03	5.7011E-02	6.7059E-02	3.7250E-02	6.5227E-03	6.5430E-04	4.7910E-03	5.4454E-03	2.6108E-03
9	7.8500E+00	9.0705E-03	2.7024E-02	6.4790E-02	3.8214E-02	4.6837E-02	7.1242E-04	3.9485E-04	4.6613E-03	3.7974E-03
8	7.8500E+00	1.4446E-02	1.3169E-02	6.1563E-02	6.7072E-02	6.2840E-02	6.2089E-04	2.7917E-03	3.4125E-03	4.8395E-03
7	7.8500E+00	2.1543E-02	1.2771E-03	5.6930E-02	9.8690E-02	7.7196E-02	5.5217E-04	1.6958E-03	2.2480E-03	5.4052E-03
6	7.8500E+00	3.1128E-02	2.7534E-02	5.1807E-02	8.8480E-02	1.1047E-01	1.1185E-03	5.5180E-04	1.6703E-03	5.5822E-03
5	7.8500E+00	2.2530E-02	6.0721E-02	4.8028E-02	2.7768E-02	1.3128E-01	2.7928E-03	3.2019E-04	3.1130E-03	4.6461E-03
4	7.8500E+00	8.0852E-03	5.5155E-02	4.7219E-02	5.3170E-02	9.4286E-02	4.6327E-03	1.8197E-03	6.4524E-03	3.6080E-04
3	7.8500E+00	4.0448E-02	4.7770E-03	4.9725E-02	1.1155E-01	4.4995E-03	3.0783E-03	2.8405E-03	5.9188E-03	2.6542E-03
2	7.8500E+00	4.0755E-02	8.8446E-02	5.4393E-02	1.2431E-01	1.4808E-02	8.7942E-04	4.5651E-03	5.4445E-03	2.7758E-03
1	7.8500E+00	2.4959E-02	1.5038E-01	5.8444E-02	6.4646E-02	1.2153E-01	4.5080E-04	5.8303E-03	5.3795E-03	1.3290E-03

J	RHO	MU	Y-ZERO	S1	S2	S3	IPC	QSS	K-ELASTIC	TANPHI	
41 0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
40	7.850E+00	4.600E-01	1.000E-02	5.021E-04	-6.008E-03	5.506E-03	3.374E-01	4.714E-03	0.	3.210E-05	2.642E-01
39	7.850E+00	4.600E-01	1.000E-02	2.352E-03	-6.578E-03	4.226E-03	5.069E-01	4.714E-03	0.	3.196E-05	-3.370E-01
38	7.850E+00	4.600E-01	1.000E-02	3.804E-03	-6.643E-03	2.839E-03	4.903E-01	4.714E-03	0.	5.292E-05	-3.407E-01
37	7.850E+00	4.600E-01	1.000E-02	2.767E-03	-6.636E-03	3.869E-03	4.434E-01	4.714E-03	0.	5.683E-05	-3.943E-01
36	7.850E+00	4.600E-01	1.000E-02	2.217E-03	-6.553E-03	4.337E-03	3.895E-01	4.714E-03	0.	5.281E-05	-2.646E-01
35	7.850E+00	4.600E-01	1.000E-02	1.409E-03	-6.372E-03	4.883E-03	3.656E-01	4.714E-03	0.	4.669E-05	-2.515E-01
34	7.850E+00	4.600E-01	1.000E-02	1.223E-03	-6.287E-03	5.064E-03	3.612E-01	4.714E-03	0.	4.821E-05	-1.890E-01
33	7.850E+00	4.600E-01	1.000E-02	1.826E-03	-6.466E-03	4.640E-03	3.509E-01	4.714E-03	0.	6.315E-05	-1.872E-01
32	7.850E+00	4.600E-01	1.000E-02	2.376E-03	-6.582E-03	4.206E-03	3.568E-01	4.714E-03	0.	7.235E-05	-3.581E-01
31	7.850E+00	4.600E-01	1.000E-02	7.738E-04	-6.121E-03	5.348E-03	3.524E-01	4.714E-03	0.	5.990E-05	-4.894E-01
30	7.850E+00	4.600E-01	1.000E-02	1.825E-05	-5.764E-03	5.783E-03	3.505E-01	4.714E-03	0.	5.052E-05	-2.495E-01
29	7.850E+00	4.600E-01	1.000E-02	5.563E-04	-6.032E-03	5.475E-03	3.485E-01	4.714E-03	0.	5.312E-05	-1.482E-01
28	7.850E+00	4.600E-01	1.000E-02	7.336E-04	-6.105E-03	5.372E-03	3.445E-01	4.714E-03	0.	6.027E-05	-1.457E-01
27	7.850E+00	4.600E-01	1.000E-02	8.446E-04	-6.149E-03	5.305E-03	3.390E-01	4.714E-03	0.	7.071E-05	-1.475E-01
26	7.850E+00	4.600E-01	1.000E-02	8.861E-04	-6.165E-03	5.279E-03	3.317E-01	4.714E-03	0.	8.187E-05	-1.399E-01
25	7.850E+00	4.600E-01	1.000E-02	6.910E-04	-6.088E-03	5.397E-03	3.221E-01	4.714E-03	0.	8.466E-05	-1.393E-01
24	7.850E+00	4.600E-01	1.000E-02	2.813E-04	-5.909E-03	5.628E-03	3.116E-01	4.714E-03	0.	7.458E-05	-1.716E-01
23	7.850E+00	4.600E-01	1.000E-02	7.297E-05	-5.737E-03	5.810E-03	3.023E-01	4.714E-03	0.	5.864E-05	-2.491E-01
22	7.850E+00	4.600E-01	1.000E-02	2.192E-05	-5.763E-03	5.784E-03	2.950E-01	4.714E-03	0.	4.703E-05	-2.958E-01
21	7.850E+00	4.600E-01	1.000E-02	3.565E-04	-5.943E-03	5.587E-03	2.887E-01	4.714E-03	0.	4.495E-05	-2.660E-01
20	7.850E+00	4.600E-01	1.000E-02	7.303E-04	-6.104E-03	5.374E-03	2.820E-01	4.714E-03	0.	5.215E-05	-2.296E-01
19	7.850E+00	4.600E-01	1.000E-02	8.785E-04	-6.162E-03	5.284E-03	2.738E-01	4.714E-03	0.	6.070E-05	-2.257E-01
18	7.850E+00	4.600E-01	1.000E-02	9.411E-04	-6.186E-03	5.245E-03	2.643E-01	4.714E-03	0.	6.435E-05	-2.537E-01
17	7.850E+00	4.600E-01	1.000E-02	1.006E-03	-6.211E-03	5.204E-03	2.543E-01	4.714E-03	0.	6.579E-05	-2.839E-01
16	7.850E+00	4.600E-01	1.000E-02	1.051E-03	-6.227E-03	5.176E-03	2.439E-01	4.714E-03	0.	7.084E-05	-2.696E-01
15	7.850E+00	4.600E-01	1.000E-02	1.011E-03	-6.212E-03	5.201E-03	2.322E-01	4.714E-03	0.	8.125E-05	-1.925E-01
14	7.850E+00	4.600E-01	1.000E-02	7.624E-04	-6.117E-03	5.354E-03	2.187E-01	4.714E-03	0.	9.332E-05	-6.661E-02
13	7.850E+00	4.600E-01	1.000E-02	4.924E-04	-6.004E-03	5.512E-03	2.034E-01	4.714E-03	0.	1.029E-04	9.369E-02
12	7.850E+00	4.600E-01	1.000E-02	4.314E-04	-5.977E-03	5.546E-03	1.867E-01	4.714E-03	0.	1.048E-04	2.375E-01
11	7.850E+00	4.600E-01	1.000E-02	3.673E-04	-5.948E-03	5.581E-03	1.703E-01	4.714E-03	0.	8.910E-05	3.421E-01
10	7.850E+00	4.600E-01	1.000E-02	6.081E-04	-6.053E-03	5.445E-03	1.567E-01	4.714E-03	0.	6.253E-05	4.836E-01
9	7.850E+00	4.600E-01	1.000E-02	1.797E-03	-6.458E-03	4.661E-03	1.471E-01	4.714E-03	0.	4.390E-05	6.609E-01
8	7.850E+00	4.600E-01	1.000E-02	3.253E-03	-6.666E-03	3.413E-03	1.394E-01	4.714E-03	0.	4.556E-05	8.006E-01
7	7.850E+00	4.600E-01	1.000E-02	4.311E-03	-6.559E-03	2.248E-03	1.307E-01	4.714E-03	0.	5.420E-05	8.998E-01
6	7.850E+00	4.600E-01	1.000E-02	4.754E-03	-6.429E-03	1.670E-03	1.209E-01	4.714E-03	0.	4.314E-05	1.052E+00
5	7.850E+00	4.600E-01	1.000E-02	3.251E-03	-6.364E-03	3.113E-03	1.139E-01	4.714E-03	0.	-5.901E-06	1.301E+00
4	7.850E+00	4.600E-01	1.000E-02	1.774E-03	-4.678E-03	6.452E-03	1.131E-01	4.714E-03	0.	9.777E-06	7.922E+00
3	7.850E+00	4.600E-01	1.000E-02	3.025E-04	-5.616E-03	5.919E-03	1.149E-01	4.714E-03	0.	5.785E-05	-1.046E+00
2	7.850E+00	4.600E-01	1.000E-02	6.096E-04	-6.054E-03	5.445E-03	1.091E-01	4.714E-03	0.	9.780E-05	-5.364E-01
1	7.850E+00	4.600E-01	1.000E-02	7.204E-04	-6.100E-03	5.379E-03	9.716E-02	4.714E-03	0.	1.203E-04	-2.029E-01

ZHEMP LIP.01

(Z-FACTOR)

1.21207E+00

* MASTER (UPRIGHT) *

(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)

198 11 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

CODE FILE

HEMPDG MAP

HEMPDG

J	RHQ	X(Z)	Y(R)	X-DGT	Y-DGT	V	P	E	Q	F
41	0.	4.1501E+00	1.2012E+00	2.2475E-02	5.3315E-02	0.	0.	0.	0.	0.
40	7.8500E+00	4.0029E+00	1.1663E+00	2.0638E-02	4.5132E-02	1.0046E+00	-8.6042E-03	5.0000E-03	0.	0.
39	7.8500E+00	3.8637E+00	1.1747E+00	1.4802E-02	4.8478E-02	9.9562E-01	8.2752E-03	5.1975E-03	9.9123E-04	0.
38	7.8500E+00	3.7421E+00	1.1922E+00	1.0646E-02	5.2336E-02	9.9702E-01	5.6138E-03	4.7505E-03	6.3611E-04	0.
37	7.8500E+00	3.6278E+00	1.2075E+00	6.6735E-03	5.7064E-02	9.9920E-01	1.5014E-03	4.6768E-03	2.2332E-05	0.
36	7.8500E+00	3.5183E+00	1.2200E+00	4.9656E-03	6.1670E-02	1.0018E+00	-3.3034E-03	4.7087E-03	0.	0.
35	7.8500E+00	3.4119E+00	1.2305E+00	3.2935E-03	6.6376E-02	9.9918E-01	1.5342E-03	4.8174E-03	0.	0.
34	7.8500E+00	3.3078E+00	1.2384E+00	2.8842E-03	7.1307E-02	9.9800E-01	3.7682E-03	4.9701E-03	0.	0.
33	7.8500E+00	3.2044E+00	1.2437E+00	2.8677E-03	7.5236E-02	9.9765E-01	4.4262E-03	5.1369E-03	0.	0.
32	7.8500E+00	3.1014E+00	1.2467E+00	2.6376E-03	7.8780E-02	9.9722E-01	5.2414E-03	5.2824E-03	0.	0.
31	7.8500E+00	2.9985E+00	1.2477E+00	2.1785E-03	8.2768E-02	9.9518E-01	9.1125E-03	5.4334E-03	0.	0.
30	7.8500E+00	2.8958E+00	1.2470E+00	2.3052E-03	8.7028E-02	9.9383E-01	1.1680E-02	5.5580E-03	0.	0.
29	7.8500E+00	2.7932E+00	1.2447E+00	2.1220E-03	9.0894E-02	9.9365E-01	1.2005E-02	5.6458E-03	1.2395E-05	0.
28	7.8500E+00	2.6909E+00	1.2411E+00	2.2200E-03	9.3961E-02	9.9421E-01	1.0956E-02	5.6886E-03	6.1111E-04	0.
27	7.8500E+00	2.5888E+00	1.2364E+00	2.6793E-03	9.6610E-02	9.9640E-01	6.7891E-03	5.6867E-03	6.3842E-04	0.
26	7.8500E+00	2.4869E+00	1.2307E+00	2.7668E-03	9.9591E-02	9.9851E-01	2.8106E-03	5.6867E-03	1.2829E-04	0.
25	7.8500E+00	2.3852E+00	1.2243E+00	2.3413E-03	9.5803E-02	9.9848E-01	2.8578E-03	5.6945E-03	0.	0.
24	7.8500E+00	2.2836E+00	1.2172E+00	1.7913E-03	9.5814E-02	9.9885E-01	5.9384E-03	5.7047E-03	0.	0.
23	7.8500E+00	2.1821E+00	1.2096E+00	1.9829E-03	9.5671E-02	9.9546E-01	8.5714E-03	5.6992E-03	0.	0.
22	7.8500E+00	2.0808E+00	1.2015E+00	1.5718E-03	9.4891E-02	9.9526E-01	8.9530E-03	5.6762E-03	0.	0.
21	7.8500E+00	1.9797E+00	1.1932E+00	1.3243E-03	9.3769E-02	9.9480E-01	9.8286E-03	5.6571E-03	0.	0.
20	7.8500E+00	1.8786E+00	1.1846E+00	5.5053E-04	9.3352E-02	9.9429E-01	1.4610E-02	5.6572E-03	0.	0.
19	7.8500E+00	1.7778E+00	1.1757E+00	4.8121E-04	9.4499E-02	9.8775E-01	2.3314E-02	5.7097E-03	0.	0.
18	7.8500E+00	1.6772E+00	1.1664E+00	1.1724E-03	9.6953E-02	9.8334E-01	3.1860E-02	5.7948E-03	0.	0.
17	7.8500E+00	1.5767E+00	1.1566E+00	1.2134E-03	9.9544E-02	9.8136E-01	3.5701E-02	5.8173E-03	1.2935E-04	0.
16	7.8500E+00	1.4763E+00	1.1463E+00	6.0938E-04	1.0107E-01	9.8195E-01	3.4552E-02	5.7257E-03	8.2531E-04	0.
15	7.8500E+00	1.3759E+00	1.1358E+00	2.6330E-04	1.0140E-01	9.8279E-01	3.2613E-02	5.6096E-03	0.	0.
14	7.8500E+00	1.2755E+00	1.1251E+00	6.5261E-04	1.0145E-01	9.8164E-01	3.5164E-02	5.5771E-03	0.	0.
13	7.8500E+00	1.1753E+00	1.1142E+00	1.3348E-03	1.0164E-01	9.7824E-01	4.1827E-02	5.6403E-03	0.	0.
12	7.8500E+00	1.0751E+00	1.1032E+00	1.6863E-03	1.0098E-01	9.7574E-01	4.6766E-02	5.6827E-03	0.	0.
11	7.8500E+00	9.7506E-01	1.0923E+00	1.0678E-03	9.7300E-02	9.7681E-01	4.4633E-02	5.5457E-03	2.0743E-03	0.
10	7.8500E+00	8.7494E-01	1.0819E+00	5.8839E-04	9.4058E-02	9.8031E-01	3.7765E-02	5.2951E-03	1.2023E-03	0.
9	7.8500E+00	7.7487E-01	1.0725E+00	2.6926E-03	7.7881E-02	9.8004E-01	3.8264E-02	5.2223E-03	0.	0.
8	7.8500E+00	6.7475E-01	1.0643E+00	7.1780E-03	6.7704E-02	9.7145E-01	5.5248E-02	5.5724E-03	0.	0.
7	7.8500E+00	5.7604E-01	1.0571E+00	1.2266E-02	6.1344E-02	9.5679E-01	8.4909E-02	6.5613E-03	0.	0.
6	7.8500E+00	4.7758E-01	1.0504E+00	1.5023E-02	5.6462E-02	9.4247E-01	1.1476E-01	7.9424E-03	0.	0.
5	7.8500E+00	3.7984E-01	1.0445E+00	1.2355E-02	5.8369E-02	9.3085E-01	1.3966E-01	9.3674E-03	1.5325E-03	0.
4	7.8500E+00	2.8314E-01	1.0402E+00	5.2950E-03	6.1572E-02	9.1347E-01	1.7808E-01	1.2177E-02	1.0302E-02	0.
3	7.8500E+00	1.8835E-01	1.0378E+00	6.8504E-04	6.7806E-02	8.8398E-01	2.4675E-01	1.8684E-02	9.9858E-03	0.
2	7.8500E+00	9.4361E-02	1.0382E+00	2.8273E-03	7.8125E-02	8.5923E-01	3.0801E-01	2.8019E-02	3.2229E-03	0.
1	7.8500E+00	0.	1.0395E+00	0.	8.5034E-02	8.4512E-01	3.4453E-01	3.8584E-02	0.	0.

J	RHG	EDXX	EDYY	EDTT	EDXY	VGCT/V	SXXE	SYXE	STTE	TXYE
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.8500E+00	1.8820E-02	3.2366E-02	3.9268E-02	1.9389E-02	2.5722E-02	1.7102E-03	6.2171E-03	4.5069E-03	1.5457E-03
39	7.8500E+00	3.1341E-02	1.0145E-01	3.6167E-02	3.9603E-02	3.3939E-02	3.0588E-03	6.4114E-03	3.3526E-03	1.5755E-03
38	7.8500E+00	3.5655E-02	1.0168E-01	3.8424E-02	5.3384E-02	2.7597E-02	3.0543E-03	6.3100E-03	3.2558E-03	1.8603E-03
37	7.8500E+00	2.7860E-02	7.2085E-02	4.2001E-02	4.9642E-02	2.2243E-03	2.4753E-03	6.2365E-03	3.7613E-03	1.9363E-03
36	7.8500E+00	1.6922E-02	5.4190E-02	4.5733E-02	2.1915E-02	8.4653E-03	1.8906E-03	6.2813E-03	4.3907E-03	1.4763E-03
35	7.8500E+00	1.6145E-02	5.0362E-02	4.9048E-02	1.5491E-02	1.4831E-02	7.7429E-04	6.0054E-03	5.2311E-03	1.1484E-03
34	7.8500E+00	1.0489E-02	5.0687E-02	5.2513E-02	1.6161E-02	1.2314E-02	5.8990E-04	5.9873E-03	5.3974E-03	8.1840E-04
33	7.8500E+00	1.1453E-03	5.1471E-02	5.5659E-02	1.2134E-02	5.3326E-03	3.3137E-04	5.8678E-03	5.5365E-03	8.5827E-04
32	7.8500E+00	8.5802E-03	4.7926E-02	5.8573E-02	1.5194E-02	1.9227E-02	3.5625E-04	5.8234E-03	5.4671E-03	1.1702E-03
31	7.8500E+00	7.5283E-03	4.3697E-02	6.1522E-02	2.9370E-02	2.5354E-02	2.1436E-05	5.5861E-03	5.6075E-03	1.4174E-03
30	7.8500E+00	1.9636E-03	5.0054E-02	6.4500E-02	2.6616E-02	1.2482E-02	7.6046E-05	5.6395E-03	5.7155E-03	1.0464E-03
29	7.8500E+00	3.0695E-03	1.0629E-02	6.7114E-02	1.8917E-02	4.4553E-04	4.4735E-04	5.9404E-03	5.4931E-03	7.0858E-04
28	7.8500E+00	1.0754E-03	9.0851E-02	6.9336E-02	1.8450E-02	2.0440E-02	4.8259E-04	5.9696E-03	5.4871E-03	5.8703E-04
27	7.8500E+00	2.0911E-03	9.5264E-02	7.1249E-02	1.7352E-02	2.6106E-02	2.8926E-04	5.8941E-03	5.6048E-03	4.6294E-04
26	7.8500E+00	2.8021E-04	8.1479E-02	7.2684E-02	1.2962E-02	9.0752E-03	4.9469E-05	5.7934E-03	5.7439E-03	2.3354E-04
25	7.8500E+00	2.3524E-03	6.5136E-02	7.3581E-02	3.4201E-03	1.0798E-02	1.1346E-04	5.7147E-03	5.8282E-03	1.1800E-04
24	7.8500E+00	3.1486E-03	6.2090E-02	7.4017E-02	7.9285E-03	1.5075E-02	7.5780E-05	5.7204E-03	5.7962E-03	4.1312E-04
23	7.8500E+00	8.0599E-04	7.0467E-02	7.4114E-02	1.6329E-02	4.4529E-03	1.4644E-05	5.7606E-03	5.7459E-03	4.8282E-04
22	7.8500E+00	1.6028E-03	7.4838E-02	7.4052E-02	1.6743E-02	8.1681E-04	5.9769E-05	5.7968E-03	5.7370E-03	2.7084E-04
21	7.8500E+00	5.5665E-03	6.4495E-02	7.4076E-02	1.3718E-03	1.4691E-02	2.8580E-05	5.7567E-03	5.7852E-03	1.6997E-04
20	7.8500E+00	1.0581E-02	4.8832E-02	7.4477E-02	5.9410E-03	3.6226E-02	9.3357E-05	5.6915E-03	5.7849E-03	6.3250E-04
19	7.8500E+00	1.2048E-02	4.4922E-02	7.5423E-02	1.6249E-02	4.2549E-02	2.2125E-05	5.7180E-03	5.6959E-03	8.7408E-04
18	7.8500E+00	9.1071E-03	6.1470E-02	7.6892E-02	1.4433E-02	2.4529E-02	2.6653E-04	5.8291E-03	5.5606E-03	9.2095E-04
17	7.8500E+00	5.0316E-03	8.6324E-02	7.8706E-02	2.5596E-02	2.5865E-03	4.2776E-04	5.8895E-03	5.4617E-03	9.9167E-04
16	7.8500E+00	1.6927E-03	9.8087E-02	8.0624E-02	3.2469E-02	1.5770E-02	3.6930E-04	5.8259E-03	5.4566E-03	1.1864E-03
15	7.8500E+00	5.2206E-03	8.7543E-02	8.2425E-02	4.1585E-02	1.0212E-04	2.1693E-04	5.7077E-03	5.4908E-03	1.3951E-03
14	7.8500E+00	9.8702E-03	6.8451E-02	8.3957E-02	4.5779E-02	2.5377E-02	5.3554E-06	5.6408E-03	5.6355E-03	1.2428E-03
13	7.8500E+00	7.5208E-03	6.4108E-02	8.4923E-02	3.3316E-02	2.8335E-02	7.4834E-05	5.7196E-03	5.7944E-03	4.3102E-04
12	7.8500E+00	3.8389E-04	8.3511E-02	8.4709E-02	4.3085E-04	8.1351E-04	4.8374E-05	5.7527E-03	5.7043E-03	7.1848E-04
11	7.8500E+00	8.4098E-03	1.0647E-01	8.2689E-02	3.8203E-02	3.2189E-02	1.1715E-04	5.5532E-03	5.4360E-03	1.7698E-03
10	7.8500E+00	4.0724E-03	9.5452E-02	7.8582E-02	6.3037E-02	2.0943E-02	4.3453E-05	4.9852E-03	4.9418E-03	2.9488E-03
9	7.8500E+00	1.7178E-02	4.0300E-02	7.2751E-02	7.4971E-02	4.9629E-02	2.6292E-04	3.5495E-03	3.8124E-03	4.4421E-03
8	7.8500E+00	3.4205E-02	2.1083E-02	6.6189E-02	8.6048E-02	1.2148E-01	4.4071E-04	2.1440E-03	2.5847E-03	5.2533E-03
7	7.8500E+00	3.7943E-02	3.8659E-02	5.9897E-02	9.9949E-02	1.3650E-01	2.0499E-05	2.7095E-03	2.6890E-03	5.1036E-03
6	7.8500E+00	2.2952E-02	1.4212E-03	5.4638E-02	1.0294E-01	7.9011E-02	5.2340E-04	4.3696E-03	3.8462E-03	4.0315E-03
5	7.8500E+00	1.3749E-02	5.2189E-02	5.1551E-02	5.8685E-02	1.4387E-02	3.7234E-05	5.5951E-03	5.5578E-03	1.4952E-03
4	7.8500E+00	4.9719E-02	7.7812E-02	5.2226E-02	3.6108E-02	7.5305E-02	1.6457E-03	4.3397E-03	5.9854E-03	2.1564E-03
3	7.8500E+00	5.4468E-02	6.7019E-02	5.7021E-02	1.1641E-01	6.4466E-02	2.4373E-03	2.6023E-03	5.0397E-03	3.7786E-03
2	7.8500E+00	2.8523E-02	5.6840E-02	6.5073E-02	1.4987E-01	2.0290E-02	1.3815E-03	3.0512E-03	4.4328E-03	4.2307E-03
1	7.8500E+00	1.2955E-02	6.9082E-02	7.2465E-02	8.3490E-02	1.6338E-02	3.0578E-04	5.3043E-03	4.9985E-03	2.5935E-03

J	RHC	MU	Y-ZERO	S1	S2,	S3	IPC	GSS	K-ELASTIC	TANPHI
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
40	7.850E+00	4.600E-01	1.000E-02	2.001E-03	-6.508E-03	4.507E-03	6.628E-01	4.714E-03	0.	3.510E-05 1.881E-01
39	7.850E+00	4.600E-01	1.000E-02	3.314E-03	-6.667E-03	3.353E-03	6.453E-01	4.714E-03	0.	8.280E-05 1.620E-01
48	7.850E+00	4.600E-01	1.000E-02	3.410E-03	-6.666E-03	3.256E-03	5.120E-01	4.714E-03	0.	8.766E-05 1.914E-01
37	7.850E+00	4.600E-01	1.000E-02	2.886E-03	-6.647E-03	3.761E-03	4.632E-01	4.714E-03	0.	6.647E-05 2.122E-01
36	7.850E+00	4.600E-01	1.000E-02	2.149E-03	-6.546E-03	4.491E-03	4.210E-01	4.714E-03	0.	5.013E-05 1.751E-01
35	7.850E+00	4.600E-01	1.000E-02	9.635E-04	-6.195E-03	5.231E-03	3.987E-01	4.714E-03	0.	4.859E-05 1.648E-01
34	7.850E+00	4.600E-01	1.000E-02	6.902E-04	-6.068E-03	5.397E-03	3.902E-01	4.714E-03	0.	5.025E-05 1.226E-01
33	7.850E+00	4.600E-01	1.000E-02	4.480E-04	-5.984E-03	5.536E-03	3.885E-01	4.714E-03	0.	5.159E-05 1.359E-01
32	7.850E+00	4.600E-01	1.000E-02	5.704E-04	-6.036E-03	5.467E-03	3.872E-01	4.714E-03	0.	5.152E-05 1.830E-01
31	7.850E+00	4.600E-01	1.000E-02	3.188E-04	-5.926E-03	5.607E-03	3.868E-01	4.714E-03	0.	5.255E-05 2.400E-01
30	7.850E+00	4.600E-01	1.000E-02	1.143E-04	-5.830E-03	5.716E-03	3.860E-01	4.714E-03	0.	5.711E-05 1.819E-01
29	7.850E+00	4.600E-01	1.000E-02	5.250E-04	-6.018E-03	5.493E-03	3.835E-01	4.714E-03	0.	6.955E-05 1.096E-01
28	7.850E+00	4.600E-01	1.000E-02	5.356E-04	-6.023E-03	5.487E-03	3.781E-01	4.714E-03	0.	8.326E-05 9.024E-02
27	7.850E+00	4.600E-01	1.000E-02	3.237E-04	-5.925E-03	5.605E-03	3.700E-01	4.714E-03	0.	8.691E-05 7.445E-02
26	7.850E+00	4.600E-01	1.000E-02	5.879E-05	-5.803E-03	5.744E-03	3.612E-01	4.714E-03	0.	7.880E-05 3.991E-02
25	7.850E+00	4.600E-01	1.000E-02	1.110E-04	-5.717E-03	5.828E-03	3.535E-01	4.714E-03	0.	6.927E-05 2.106E-02
24	7.850E+00	4.600E-01	1.000E-02	4.570E-05	-5.751E-03	5.796E-03	3.459E-01	4.714E-03	0.	6.796E-05 1.280E-02
23	7.850E+00	4.600E-01	1.000E-02	5.473E-05	-5.801E-03	5.746E-03	3.373E-01	4.714E-03	0.	7.332E-05 8.303E-02
22	7.850E+00	4.600E-01	1.000E-02	7.227E-05	-5.809E-03	5.737E-03	3.271E-01	4.714E-03	0.	7.570E-05 4.615E-02
21	7.850E+00	4.600E-01	1.000E-02	2.354E-05	-5.762E-03	5.789E-03	3.163E-01	4.714E-03	0.	6.925E-05 2.965E-02
20	7.850E+00	4.600E-01	1.000E-02	2.279E-05	-5.762E-03	5.785E-03	3.066E-01	4.714E-03	0.	6.035E-05 1.116E-01
19	7.850E+00	4.600E-01	1.000E-02	1.523E-04	-5.646E-03	5.696E-03	2.976E-01	4.714E-03	0.	5.934E-05 1.489E-01
18	7.850E+00	4.600E-01	1.000E-02	4.046E-04	-5.965E-03	5.561E-03	2.877E-01	4.714E-03	0.	7.007E-05 1.477E-01
17	7.850E+00	4.600E-01	1.000E-02	5.798E-04	-6.042E-03	5.462E-03	2.756E-01	4.714E-03	0.	8.666E-05 1.533E-01
16	7.850E+00	4.600E-01	1.000E-02	5.887E-04	-6.045E-03	5.457E-03	2.612E-01	4.714E-03	0.	9.595E-05 1.849E-01
15	7.850E+00	4.600E-01	1.000E-02	5.290E-04	-6.020E-03	5.491E-03	2.458E-01	4.714E-03	0.	9.163E-05 2.237E-01
14	7.850E+00	4.600E-01	1.000E-02	2.668E-04	-5.902E-03	5.639E-03	2.313E-01	4.714E-03	0.	8.122E-05 2.104E-01
13	7.850E+00	4.600E-01	1.000E-02	4.211E-05	-5.752E-03	5.794E-03	2.180E-01	4.714E-03	0.	7.629E-05 7.592E-02
12	7.850E+00	4.600E-01	1.000E-02	1.360E-04	-5.840E-03	5.704E-03	2.044E-01	4.714E-03	0.	8.596E-05 1.220E-01
11	7.850E+00	4.600E-01	1.000E-02	6.242E-04	-6.060E-03	5.430E-03	1.889E-01	4.714E-03	0.	1.019E-04 2.865E-01
10	7.850E+00	4.600E-01	1.000E-02	1.404E-03	-6.346E-03	4.942E-03	1.716E-01	4.714E-03	0.	9.469E-05 4.615E-01
9	7.850E+00	4.600E-01	1.000E-02	2.830E-03	-6.643E-03	3.812E-03	1.573E-01	4.714E-03	0.	6.271E-05 6.943E-01
8	7.850E+00	4.600E-01	1.000E-02	4.030E-03	-6.614E-03	2.589E-03	1.472E-01	4.714E-03	0.	4.614E-05 8.509E-01
7	7.850E+00	4.600E-01	1.000E-02	3.939E-03	-6.622E-03	2.689E-03	1.387E-01	4.714E-03	0.	4.579E-05 7.677E-01
6	7.850E+00	4.600E-01	1.000E-02	2.793E-03	-6.635E-03	3.840E-03	1.295E-01	4.714E-03	0.	5.130E-05 5.629E-01
5	7.850E+00	4.600E-01	1.000E-02	4.095E-04	-5.967E-03	5.558E-03	1.193E-01	4.714E-03	0.	5.494E-05 2.490E-01
4	7.850E+00	4.600E-01	1.000E-02	4.502E-04	-5.535E-03	5.985E-03	1.201E-01	4.714E-03	0.	6.996E-05 5.544E-01
3	7.850E+00	4.600E-01	1.000E-02	1.260E-03	-6.295E-03	5.040E-03	1.345E-01	4.714E-03	0.	9.408E-05 9.784E-01
2	7.850E+00	4.600E-01	1.000E-02	2.096E-03	-6.525E-03	4.433E-03	1.431E-01	4.714E-03	0.	1.055E-04 8.220E-01
1	7.850E+00	4.600E-01	1.000E-02	1.321E-03	-6.320E-03	4.998E-03	1.359E-01	4.714E-03	0.	8.471E-05 3.915E-01

ZHEMP LIP-01

CCCE FILE

HEMPDG MAP

HEMPDG

* SLAVE (UPRIGHT) *

(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 -11 5.035024) 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	VCIC STATUS
41 0.		6.0831E+00	1.2012E+00	5.1088E-01	5.3315E-02	NO VCIC ROUTINE
40 0.		4.9701E+00	1.2012E+00	3.0815E-01	5.3315E-02	NO VCIC ROUTINE
39 0.		4.5562E+00	1.2012E+00	2.3432E-01	5.3315E-02	NO VCIC ROUTINE
38 0.		4.2704E+00	1.2012E+00	1.9859E-01	5.3315E-02	NO VCIC ROUTINE
37 0.		4.0241E+00	1.1713E+00	1.6579E-01	8.0445E-02	NO VCIC ROUTINE
36 0.		3.8178E+00	1.1813E+00	1.2820E-01	3.3499E-02	NO VCIC ROUTINE
35 0.		3.6433E+00	1.2054E+00	1.1122E-01	4.2663E-02	NO VCIC ROUTINE
34 0.		3.4832E+00	1.2234E+00	1.0018E-01	5.3946E-02	NO VCIC ROUTINE
33 0.		3.3331E+00	1.2365E+00	9.1281E-02	6.3543E-02	NO VCIC ROUTINE
32 0.		3.1904E+00	1.2441E+00	8.4125E-02	7.3435E-02	NO VCIC ROUTINE
31 0.		3.0533E+00	1.2472E+00	7.7342E-02	8.0035E-02	NO VCIC ROUTINE
30 0.		2.9207E+00	1.2472E+00	7.0873E-02	8.6604E-02	NO VCIC ROUTINE
29 0.		2.7921E+00	1.2447E+00	6.4897E-02	9.3184E-02	NO VCIC ROUTINE
28 0.		2.6667E+00	1.2400E+00	5.9121E-02	9.7025E-02	NO VCIC ROUTINE
27 0.		2.5444E+00	1.2339E+00	5.3500E-02	9.8557E-02	NO VCIC ROUTINE
26 0.		2.4249E+00	1.2268E+00	4.8057E-02	9.8717E-02	NO VCIC ROUTINE
25 0.		2.3077E+00	1.2189E+00	4.2847E-02	9.8660E-02	NO VCIC ROUTINE
24 0.		2.1925E+00	1.2104E+00	3.7631E-02	9.8395E-02	NO VCIC ROUTINE
23 0.		2.0792E+00	1.2014E+00	3.2561E-02	9.7415E-02	NO VCIC ROUTINE
22 0.		1.9677E+00	1.1922E+00	2.7549E-02	9.5953E-02	NO VCIC ROUTINE
21 0.		1.8578E+00	1.1828E+00	2.2679E-02	9.5572E-02	NO VCIC ROUTINE
20 0.		1.7493E+00	1.1731E+00	1.7674E-02	9.6911E-02	NO VCIC ROUTINE
19 0.		1.6422E+00	1.1630E+00	1.2494E-02	9.9204E-02	NO VCIC ROUTINE
18 0.		1.5364E+00	1.1525E+00	7.0146E-03	1.0098E-01	NO VCIC ROUTINE
17 0.		1.4318E+00	1.1417E+00	1.4162E-03	1.0142E-01	NO VCIC ROUTINE
16 0.		1.3284E+00	1.1307E+00	4.7802E-03	1.0096E-01	NO VCIC ROUTINE
15 0.		1.2263E+00	1.1197E+00	1.1547E-02	1.0040E-01	NO VCIC ROUTINE
14 0.		1.1254E+00	1.1087E+00	1.8768E-02	9.9419E-02	NO VCIC ROUTINE
13 0.		1.0257E+00	1.0978E+00	2.6752E-02	9.6429E-02	NO VCIC ROUTINE
12 0.		9.2729E-01	1.0873E+00	3.6112E-02	8.9814E-02	NO VCIC ROUTINE
11 0.		8.3018E-01	1.0777E+00	4.5908E-02	8.081E-02	NO VCIC ROUTINE
10 0.		7.3447E-01	1.0692E+00	5.6248E-02	6.9701E-02	NO VCIC ROUTINE
9 0.		6.4021E-01	1.0617E+00	6.6591E-02	6.1397E-02	NO VCIC ROUTINE
8 0.		5.4732E-01	1.0551E+00	7.4932E-02	5.6385E-02	NO VCIC ROUTINE
7 0.		4.5613E-01	1.0491E+00	7.5531E-02	5.4733E-02	NO VCIC ROUTINE
6 0.		3.6913E-01	1.0440E+00	5.3401E-02	5.6829E-02	NO VCIC ROUTINE
5 0.		2.8727E-01	1.0404E+00	2.3211E-02	6.0637E-02	NO VCIC ROUTINE
4 0.		2.1058E-01	1.0384E+00	3.9682E-03	6.6472E-02	NO VCIC ROUTINE
3 0.		1.3850E-01	1.0340E+00	1.7864E-02	7.3285E-02	NO VCIC ROUTINE
2 0.		6.9264E-02	1.0366E+00	1.3796E-02	7.9827E-02	NO VCIC ROUTINE
1 0.		0.	1.0395E+00	0.	8.5034E-02	NO VCIC ROUTINE

2HEPP LIP-01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 10 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	6.0836E+00	1.0610E+00	5.1089E-01	4.464CE-02	0.	0.	0.	0.	0.
40	1.8400E+00	4.9702E+00	1.0642E+00	3.0814E-01	4.4077E-02	1.8385E+01	7.9960E-04	4.2005E-02	0.	1.0000E+00
39	1.8400E+00	4.5562E+00	1.0654E+00	2.3440E-01	5.5246E-02	6.7342E+00	2.8674E-03	5.5203E-02	0.	1.0000E+00
38	1.8400E+00	4.2701E+00	1.0581E+00	1.9920E-01	5.4449E-02	4.7508E+00	4.4726E-03	6.0802E-02	0.	1.0000E+00
37	1.8400E+00	4.0243E+00	1.0525E+00	1.6378E-01	3.8890E-02	4.0291E+00	5.5242E-03	6.3738E-02	0.	1.0000E+00
36	1.8400E+00	3.8180E+00	1.0700E+00	1.2860E-01	3.6507E-02	2.6851E+00	9.5609E-03	7.2828E-02	0.	1.0000E+00
35	1.8400E+00	3.6434E+00	1.0883E+00	1.1135E-01	4.5103E-02	2.3894E+00	1.1377E-02	7.5404E-02	0.	1.0000E+00
34	1.8400E+00	3.4833E+00	1.1015E+00	1.0020E-01	5.4679E-02	2.3323E+00	1.1789E-02	7.5675E-02	0.	1.0000E+00
33	1.8400E+00	3.3333E+00	1.1107E+00	9.1399E-02	6.2246E-02	2.2936E+00	1.2084E-02	7.5809E-02	0.	1.0000E+00
32	1.8400E+00	3.1905E+00	1.1153E+00	8.4099E-02	6.7980E-02	2.2576E+00	1.2389E-02	7.5996E-02	0.	1.0000E+00
31	1.8400E+00	3.0534E+00	1.1173E+00	7.7362E-02	7.2405E-02	2.2112E+00	1.2826E-02	7.6326E-02	0.	1.0000E+00
30	1.8400E+00	2.9207E+00	1.1166E+00	7.0912E-02	7.5645E-02	2.1538E+00	1.3458E-02	7.6924E-02	0.	1.0000E+00
29	1.8400E+00	2.7921E+00	1.1144E+00	6.4809E-02	7.8358E-02	2.0870E+00	1.4302E-02	7.7668E-02	0.	1.0000E+00
28	1.8400E+00	2.6668E+00	1.1106E+00	5.9056E-02	8.0477E-02	2.0178E+00	1.5335E-02	7.8529E-02	0.	1.0000E+00
27	1.8400E+00	2.5445E+00	1.1057E+00	5.3443E-02	8.2364E-02	1.9458E+00	1.6630E-02	7.9565E-02	0.	1.0000E+00
26	1.8400E+00	2.4249E+00	1.0998E+00	4.8006E-02	8.4062E-02	1.8747E+00	1.8178E-02	8.0679E-02	0.	1.0000E+00
25	1.8400E+00	2.3077E+00	1.0931E+00	4.2799E-02	8.5804E-02	1.8098E+00	1.9892E-02	8.1799E-02	0.	1.0000E+00
24	1.8400E+00	2.1925E+00	1.0857E+00	3.7603E-02	8.7647E-02	1.7500E+00	2.1794E-02	8.2953E-02	0.	1.0000E+00
23	1.8400E+00	2.0793E+00	1.0777E+00	3.2536E-02	8.9688E-02	1.6934E+00	2.3950E-02	8.4167E-02	0.	1.0000E+00
22	1.8400E+00	1.9678E+00	1.0691E+00	2.7590E-02	9.1861E-02	1.6439E+00	2.6173E-02	8.5282E-02	0.	1.0000E+00
21	1.8400E+00	1.8578E+00	1.0600E+00	2.2782E-02	9.3966E-02	1.6018E+00	2.8378E-02	8.6366E-02	0.	1.0000E+00
20	1.8400E+00	1.7493E+00	1.0505E+00	1.7827E-02	9.5709E-02	1.5650E+00	3.0576E-02	8.7394E-02	0.	1.0000E+00
19	1.8400E+00	1.6422E+00	1.0405E+00	1.2687E-02	9.6795E-02	1.5100E+00	3.2940E-02	8.8450E-02	0.	1.0000E+00
18	1.8400E+00	1.5364E+00	1.0303E+00	7.2475E-03	9.6890E-02	1.4445E+00	3.5633E-02	8.9575E-02	0.	1.0000E+00
17	1.8400E+00	1.4318E+00	1.0200E+00	1.6790E-03	9.5664E-02	1.4576E+00	3.8816E-02	9.0882E-02	0.	1.0000E+00
16	1.8400E+00	1.3284E+00	1.0098E+00	4.5346E-03	9.2740E-02	1.4196E+00	4.2562E-02	9.2378E-02	0.	1.0000E+00
15	1.8400E+00	1.2263E+00	9.9989E-01	1.1440E-02	8.7940E-02	1.3785E+00	4.7240E-02	9.4183E-02	0.	1.0000E+00
14	1.8400E+00	1.1253E+00	9.9050E-01	1.8928E-02	8.1528E-02	1.3333E+00	5.3237E-02	9.6409E-02	0.	1.0000E+00
13	1.8400E+00	1.0256E+00	9.8182E-01	2.7189E-02	7.4375E-02	1.2838E+00	6.1062E-02	9.9188E-02	0.	1.0000E+00
12	1.8400E+00	9.276E-01	9.7390E-01	3.6625E-02	6.7644E-02	1.2293E+00	7.1475E-02	1.0274E-01	0.	1.0000E+00
11	1.8400E+00	8.3023E-01	9.6665E-01	4.6184E-02	6.2127E-02	1.1755E+00	8.4056E-02	1.0686E-01	0.	1.0000E+00
10	1.8400E+00	7.3454E-01	9.5994E-01	5.6144E-02	5.7651E-02	1.1282E+00	9.7419E-02	1.1110E-01	0.	1.0000E+00
9	1.8400E+00	6.4022E-01	9.5370E-01	6.6344E-02	5.3014E-02	1.0891E+00	1.1043E-01	1.1514E-01	0.	1.0000E+00
8	1.8400E+00	5.6475E-01	9.4802E-01	7.4987E-02	4.7408E-02	1.0565E+00	1.2282E-01	1.1890E-01	0.	1.0000E+00
7	1.8400E+00	4.5616E-01	9.4316E-01	7.5045E-02	4.3970E-02	1.0201E+00	1.3863E-01	1.2362E-01	0.	1.0000E+00
6	1.8400E+00	3.6932E-01	9.3920E-01	5.3144E-02	4.5720E-02	9.5740E-01	1.7158E-01	1.3328E-01	6.2239E-03	1.0000E+00
5	1.8400E+00	2.8745E-01	9.3571E-01	2.4041E-02	5.2365E-02	8.9322E-01	2.1474E-01	1.4605E-01	1.6061E-02	1.0000E+00
4	1.8400E+00	2.1074E-01	9.3288E-01	2.6919E-03	6.2670E-02	8.3694E-01	2.6272E-01	1.6064E-01	1.9130E-02	1.0000E+00
3	1.8400E+00	1.3871E-01	9.3172E-01	1.7867E-02	7.3852E-02	7.8962E-01	3.1132E-01	1.7400E-01	9.7763E-03	1.0000E+00
2	1.8400E+00	6.9578E-02	9.3196E-01	1.3563E-02	8.1281E-02	7.6301E-01	3.4300E-01	1.8308E-01	0.	1.0000E+00
1	1.8400E+00	0.	9.3220E-01	0.	8.3276E-02	7.7039E-01	3.3877E-01	1.9123E-01	0.	1.0000E+00

2HEMP LIP.01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 4 5.035029E+00 3.876095E-02 1.366600E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DDT	Y-DDT	V	P	E	Q	F
41	0.	6.1210E+00	9.2423E-01	5.1991E-01	4.7898E-02	0.	0.	0.	0.	0.
40	1.8400E+00	4.9852E+00	9.2618E-01	3.1054E-01	4.7710E-02	1.7934E+01	8.2420E-04	4.2235E-02	0.	1.0000E+00
39	1.8400E+00	4.5584E+00	9.2633E-01	2.3819E-01	4.4619E-02	6.7746E+00	2.8222E-03	5.4659E-02	0.	1.0000E+00
38	1.8400E+00	4.2679E+00	9.3312E-01	1.9184E-01	4.1817E-02	4.4481E+00	4.8598E-03	6.1874E-02	0.	1.0000E+00
37	1.8400E+00	4.0345E+00	9.4141E-01	1.6205E-01	3.6227E-02	3.3070E+00	7.1777E-03	6.7488E-02	0.	1.0000E+00
36	1.8400E+00	3.8328E+00	9.5362E-01	1.3560E-01	3.6567E-02	2.7197E+00	9.3472E-03	7.2214E-02	0.	1.0000E+00
35	1.8400E+00	3.6544E+00	9.6859E-01	1.1854E-01	4.6643E-02	2.4747E+00	1.0714E-02	7.4207E-02	0.	1.0000E+00
34	1.8400E+00	3.4913E+00	9.7908E-01	1.0681E-01	5.3152E-02	2.3659E+00	1.1480E-02	7.5102E-02	0.	1.0000E+00
33	1.8400E+00	3.3380E+00	9.8553E-01	9.6845E-02	5.9232E-02	2.2996E+00	1.2003E-02	7.5563E-02	0.	1.0000E+00
32	1.8400E+00	3.1926E+00	9.8948E-01	8.8539E-02	6.4226E-02	2.2319E+00	1.2629E-02	7.6198E-02	0.	1.0000E+00
31	1.8400E+00	3.0532E+00	9.9050E-01	8.1025E-02	6.8261E-02	2.1635E+00	1.3353E-02	7.6866E-02	0.	1.0000E+00
30	1.8400E+00	2.9189E+00	9.8975E-01	7.4050E-02	7.1847E-02	2.0977E+00	1.4168E-02	7.7603E-02	0.	1.0000E+00
29	1.8400E+00	2.7888E+00	9.8716E-01	6.7499E-02	7.4841E-02	2.0335E+00	1.5099E-02	7.8405E-02	0.	1.0000E+00
28	1.8400E+00	2.6623E+00	9.8344E-01	6.1481E-02	7.7597E-02	1.9747E+00	1.6090E-02	7.9194E-02	0.	1.0000E+00
27	1.8400E+00	2.5390E+00	9.7848E-01	5.5657E-02	8.0662E-02	1.9166E+00	1.7236E-02	8.0050E-02	0.	1.0000E+00
26	1.8400E+00	2.4186E+00	9.7265E-01	5.0039E-02	8.2334E-02	1.8615E+00	1.8503E-02	8.0912E-02	0.	1.0000E+00
25	1.8400E+00	2.3006E+00	9.6596E-01	4.4729E-02	8.4280E-02	1.8116E+00	1.9841E-02	8.1777E-02	0.	1.0000E+00
24	1.8400E+00	2.1848E+00	9.5865E-01	3.9439E-02	8.5921E-02	1.7660E+00	2.1254E-02	8.2644E-02	0.	1.0000E+00
23	1.8400E+00	2.0710E+00	9.5074E-01	3.4230E-02	8.7048E-02	1.7200E+00	2.2892E-02	8.3593E-02	0.	1.0000E+00
22	1.8400E+00	1.9590E+00	9.4241E-01	2.9044E-02	8.7507E-02	1.6755E+00	2.4714E-02	8.4552E-02	0.	1.0000E+00
21	1.8400E+00	1.8487E+00	9.3378E-01	2.3811E-02	8.7139E-02	1.6315E+00	2.6799E-02	8.5622E-02	0.	1.0000E+00
20	1.8400E+00	1.7399E+00	9.2503E-01	1.8271E-02	8.5849E-02	1.5861E+00	2.9292E-02	8.6839E-02	0.	1.0000E+00
19	1.8400E+00	1.6326E+00	9.1623E-01	1.2374E-02	8.3569E-02	1.5382E+00	3.2373E-02	8.8250E-02	0.	1.0000E+00
18	1.8400E+00	1.5267E+00	9.0757E-01	6.0009E-03	8.0334E-02	1.4876E+00	3.6225E-02	8.9918E-02	0.	1.0000E+00
17	1.8400E+00	1.4221E+00	8.9918E-01	5.8992E-04	7.6310E-02	1.4343E+00	4.1089E-02	9.1931E-02	0.	1.0000E+00
16	1.8400E+00	1.3190E+00	8.9119E-01	7.8460E-03	7.1983E-02	1.3719E+00	4.7112E-02	9.4296E-02	0.	1.0000E+00
15	1.8400E+00	1.2171E+00	8.8360E-01	1.5800E-02	6.7770E-02	1.3244E+00	5.4595E-02	9.7058E-02	0.	1.0000E+00
14	1.8400E+00	1.1167E+00	8.7640E-01	2.4118E-02	6.3836E-02	1.2712E+00	6.3337E-02	1.0013E-01	0.	1.0000E+00
13	1.8400E+00	1.0175E+00	8.6958E-01	3.2777E-02	6.0025E-02	1.2235E+00	7.2780E-02	1.0333E-01	0.	1.0000E+00
12	1.8400E+00	9.1974E-01	8.6317E-01	4.2316E-02	5.5831E-02	1.1804E+00	8.2876E-02	1.0666E-01	0.	1.0000E+00
11	1.8400E+00	8.2332E-01	8.5722E-01	5.1706E-02	5.6297E-02	1.1415E+00	9.3500E-02	1.1006E-01	0.	1.0000E+00
10	1.8400E+00	7.2823E-01	8.5187E-01	6.1486E-02	4.4656E-02	1.1050E+00	1.0494E-01	1.1362E-01	0.	1.0000E+00
9	1.8400E+00	6.3449E-01	8.4716E-01	7.1247E-02	3.9316E-02	1.0686E+00	1.1811E-01	1.1764E-01	0.	1.0000E+00
8	1.8400E+00	5.4204E-01	8.4297E-01	7.8367E-02	3.6631E-02	1.0334E+00	1.3268E-01	1.2201E-01	0.	1.0000E+00
7	1.8400E+00	4.5161E-01	8.3900E-01	7.1161E-02	3.8739E-02	9.9554E-01	1.5068E-01	1.2735E-01	0.	1.0000E+00
6	1.8400E+00	3.6526E-01	8.3486E-01	4.4296E-02	4.4540E-02	9.4245E-01	1.8081E-01	1.3630E-01	1.3551E-02	1.0000E+00
5	1.8400E+00	2.8428E-01	8.3091E-01	1.0595E-02	5.2451E-02	8.8537E-01	2.2115E-01	1.4873E-01	2.6081E-02	1.0000E+00
4	1.8400E+00	2.0923E-01	8.2799E-01	1.5653E-02	6.0525E-02	8.2492E-01	2.7446E-01	1.6432E-01	2.3015E-02	1.0000E+00
3	1.8400E+00	1.3875E-01	8.2614E-01	2.8600E-02	6.6123E-02	7.7604E-01	3.2688E-01	1.7809E-01	5.7714E-03	1.0000E+00
2	1.8400E+00	6.9739E-02	8.2514E-01	1.7687E-02	7.0158E-02	7.5837E-01	3.4947E-01	1.8608E-01	0.	1.0000E+00
1	1.8400E+00	0.	8.2485E-01	0.	7.1857E-02	7.7095E-01	3.4061E-01	1.9659E-01	0.	1.0000E+00

2HEMP LIP-01
 (CYCLE) (K-NUMBER) 1 TIME 1 DELTA-T 1 DELTA-T-K 1 DELTA-T-J 1 SOUND SPEED 1 Z WIDTH 1
 198 8 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DDT	Y-DDT	V	P	E	Q	F
41	0.	6.1350E+00	7.8378E-01	5.2420E-01	3.9378E-02	0.	0.	0.	0.	0.
40	1.8400E+00	4.9988E+00	7.9617E-01	3.1189E-01	4.0628E-02	1.7370E+01	8.4744E-04	4.2543E-02	0.	1.0000E+00
39	1.8400E+00	4.5655E+00	8.0159E-01	2.3961E-01	3.5563E-02	6.3050E+00	3.1078E-03	5.6024E-02	0.	1.0000E+00
38	1.8400E+00	4.2755E+00	8.0456E-01	1.9196E-01	3.1838E-02	4.1737E+00	5.2868E-03	6.3178E-02	0.	1.0000E+00
37	1.8400E+00	4.0421E+00	8.2401E-01	1.6203E-01	3.9998E-02	3.2865E+00	7.2283E-03	6.8040E-02	0.	1.0000E+00
36	1.8400E+00	3.8418E+00	8.3490E-01	1.4113E-01	4.1605E-02	2.8001E+00	6.9473E-03	7.1352E-02	0.	1.0000E+00
35	1.8400E+00	3.6618E+00	8.4449E-01	1.2423E-01	4.7454E-02	2.6003E+00	9.9144E-03	7.2820E-02	0.	1.0000E+00
34	1.8400E+00	3.4955E+00	8.5242E-01	1.1167E-01	5.3742E-02	2.5014E+00	1.0478E-02	7.3517E-02	0.	1.0000E+00
33	1.8400E+00	3.3401E+00	8.5752E-01	1.0112E-01	5.8324E-02	2.4046E+00	1.1115E-02	7.4245E-02	0.	1.0000E+00
32	1.8400E+00	3.1925E+00	8.5976E-01	9.2031E-02	6.2174E-02	2.3229E+00	1.1751E-02	7.4991E-02	0.	1.0000E+00
31	1.8400E+00	3.0515E+00	8.6040E-01	8.4078E-02	6.5405E-02	2.2463E+00	1.2435E-02	7.5712E-02	0.	1.0000E+00
30	1.8400E+00	2.9157E+00	8.5907E-01	7.6649E-02	6.7946E-02	2.1712E+00	1.3223E-02	7.6523E-02	0.	1.0000E+00
29	1.8400E+00	2.7844E+00	8.5653E-01	6.9757E-02	7.0075E-02	2.0999E+00	1.4099E-02	7.7343E-02	0.	1.0000E+00
28	1.8400E+00	2.6569E+00	8.5274E-01	6.3486E-02	7.1665E-02	2.0332E+00	1.5067E-02	7.8194E-02	0.	1.0000E+00
27	1.8400E+00	2.5327E+00	8.4818E-01	5.7480E-02	7.2934E-02	1.9680E+00	1.6184E-02	7.9120E-02	0.	1.0000E+00
26	1.8400E+00	2.4115E+00	8.4274E-01	5.1552E-02	7.3717E-02	1.9035E+00	1.7493E-02	8.0099E-02	0.	1.0000E+00
25	1.8400E+00	2.2930E+00	8.3676E-01	4.5933E-02	7.3982E-02	1.8420E+00	1.8980E-02	8.1115E-02	0.	1.0000E+00
24	1.8400E+00	2.1766E+00	8.3032E-01	4.0318E-02	7.3724E-02	1.7834E+00	2.0670E-02	8.2197E-02	0.	1.0000E+00
23	1.8400E+00	2.0624E+00	8.2358E-01	3.4628E-02	7.2973E-02	1.7228E+00	2.2769E-02	8.3449E-02	0.	1.0000E+00
22	1.8400E+00	1.9501E+00	8.1663E-01	2.8852E-02	7.1676E-02	1.6622E+00	2.5301E-02	8.4620E-02	0.	1.0000E+00
21	1.8400E+00	1.8396E+00	8.0964E-01	2.2970E-02	6.9896E-02	1.6024E+00	2.8346E-02	8.5363E-02	0.	1.0000E+00
20	1.8400E+00	1.7307E+00	8.0267E-01	1.6752E-02	6.7767E-02	1.5436E+00	3.2001E-02	8.6092E-02	0.	1.0000E+00
19	1.8400E+00	1.6234E+00	7.9582E-01	1.0183E-02	6.5427E-02	1.4853E+00	3.6421E-02	8.6825E-02	0.	1.0000E+00
18	1.8400E+00	1.5177E+00	7.8910E-01	3.1731E-03	6.3011E-02	1.4287E+00	4.1657E-02	8.7613E-02	0.	1.0000E+00
17	1.8400E+00	1.4134E+00	7.8254E-01	3.9662E-03	6.0540E-02	1.3746E+00	4.7750E-02	8.8407E-02	0.	1.0000E+00
16	1.8400E+00	1.3105E+00	7.7618E-01	1.1607E-02	5.7858E-02	1.3255E+00	5.4431E-02	8.9197E-02	0.	1.0000E+00
15	1.8400E+00	1.2090E+00	7.7010E-01	1.9934E-02	5.4668E-02	1.2744E+00	6.1873E-02	9.0028E-02	0.	1.0000E+00
14	1.8400E+00	1.1090E+00	7.6435E-01	2.8723E-02	5.0561E-02	1.2357E+00	7.0198E-02	1.0246E-01	0.	1.0000E+00
13	1.8400E+00	1.0104E+00	7.5905E-01	3.7828E-02	4.5479E-02	1.1945E+00	7.9372E-02	1.0549E-01	0.	1.0000E+00
12	1.8400E+00	9.114E-01	7.5429E-01	4.7737E-02	4.0048E-02	1.1536E+00	9.0006E-02	1.0890E-01	0.	1.0000E+00
11	1.8400E+00	8.1728E-01	7.5010E-01	5.6835E-02	3.5539E-02	1.1127E+00	1.0239E-01	1.1281E-01	0.	1.0000E+00
10	1.8400E+00	7.2270E-01	7.4632E-01	6.5172E-02	3.3607E-02	1.0748E+00	1.1575E-01	1.1691E-01	0.	1.0000E+00
9	1.8400E+00	6.2428E-01	7.4201E-01	7.2459E-02	3.4928E-02	1.0423E+00	1.2879E-01	1.2084E-01	0.	1.0000E+00
8	1.8400E+00	5.3689E-01	7.3865E-01	7.6615E-02	3.8603E-02	1.0181E+00	1.3963E-01	1.2406E-01	0.	1.0000E+00
7	1.8400E+00	4.4637E-01	7.3420E-01	6.5215E-02	4.2335E-02	9.9248E-01	1.5223E-01	1.2777E-01	4.3095E-03	1.0000E+00
6	1.8400E+00	3.6039E-01	7.2965E-01	3.4632E-02	4.6671E-02	9.4422E-01	1.7978E-01	1.3617E-01	2.2483E-02	1.0000E+00
5	1.8400E+00	2.8083E-01	7.2570E-01	8.0109E-04	5.1585E-02	8.7731E-01	2.2755E-01	1.5059E-01	3.0569E-02	1.0000E+00
4	1.8400E+00	2.0709E-01	7.2275E-01	2.2208E-02	5.4541E-02	8.1016E-01	2.8913E-01	1.6790E-01	1.9055E-02	1.0000E+00
3	1.8400E+00	1.3745E-01	7.2663E-01	3.2853E-02	5.5843E-02	7.6198E-01	3.4391E-01	1.8268E-01	9.5007E-04	1.0000E+00
2	1.8400E+00	6.8980E-02	7.1552E-01	1.9726E-02	5.7000E-02	7.4766E-01	3.6397E-01	1.9132E-01	0.	1.0000E+00
1	1.8400E+00	0.	7.1919E-01	0.	5.7467E-02	7.5444E-01	3.6297E-01	2.0579E-01	0.	1.0000E+00

ZHEPP LIP-01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 7 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHG	X(1)	Y(1)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	6.1434E+00	6.5464E-01	5.2705E-01	3.0260E-02	0.	0.	0.	0.	0.
40	1.8400E+00	5.0128E+00	6.7177E-01	3.1370E-01	3.3636E-02	1.6179E+01	9.4721E-04	4.3789E-02	0.	1.0000E+00
39	1.8400E+00	4.5727E+00	6.8663E-01	2.4003E-01	2.9960E-02	6.0301E+00	3.3002E-03	5.6904E-02	0.	1.0000E+00
38	1.8400E+00	4.2647E+00	6.8912E-01	1.9579E-01	2.4756E-02	3.9332E+00	5.7256E-03	6.4495E-02	0.	1.0000E+00
37	1.8400E+00	4.0507E+00	7.0014E-01	1.6431E-01	3.6746E-02	3.3058E+00	7.1684E-03	6.7875E-02	0.	1.0000E+00
36	1.8400E+00	3.8485E+00	7.1196E-01	1.4373E-01	4.0812E-02	2.9230E+00	8.4158E-03	7.0245E-02	0.	1.0000E+00
35	1.8400E+00	3.6666E+00	7.1966E-01	1.2824E-01	4.3074E-02	2.6758E+00	9.4961E-03	7.2049E-02	0.	1.0000E+00
34	1.8400E+00	3.4989E+00	7.2490E-01	1.1521E-01	4.6478E-02	2.5422E+00	1.0212E-02	7.3046E-02	0.	1.0000E+00
33	1.8400E+00	3.3412E+00	7.2829E-01	1.0406E-01	4.4898E-02	2.4434E+00	1.0823E-02	7.3774E-02	0.	1.0000E+00
32	1.8400E+00	3.1922E+00	7.3002E-01	9.4580E-02	5.2521E-02	2.3452E+00	1.1551E-02	7.4672E-02	0.	1.0000E+00
31	1.8400E+00	3.0496E+00	7.2494E-01	8.6203E-02	5.4536E-02	2.2564E+00	1.2327E-02	7.5537E-02	0.	1.0000E+00
30	1.8400E+00	2.9127E+00	7.2881E-01	7.8533E-02	5.6236E-02	2.1725E+00	1.3200E-02	7.6455E-02	0.	1.0000E+00
29	1.8400E+00	2.7804E+00	7.2643E-01	7.1247E-02	5.7417E-02	2.0909E+00	1.4215E-02	7.7421E-02	0.	1.0000E+00
28	1.8400E+00	2.6521E+00	7.2331E-01	6.4718E-02	5.8221E-02	2.0149E+00	1.5357E-02	7.8429E-02	0.	1.0000E+00
27	1.8400E+00	2.5272E+00	7.1943E-01	5.8432E-02	5.8618E-02	1.9405E+00	1.6711E-02	7.9513E-02	0.	1.0000E+00
26	1.8400E+00	2.4054E+00	7.1509E-01	5.2164E-02	5.8741E-02	1.8682E+00	1.8316E-02	8.0680E-02	0.	1.0000E+00
25	1.8400E+00	2.2864E+00	7.1029E-01	4.6089E-02	5.8472E-02	1.7983E+00	2.0215E-02	8.1925E-02	0.	1.0000E+00
24	1.8400E+00	2.1697E+00	7.0522E-01	4.0170E-02	5.7912E-02	1.7332E+00	2.2381E-02	8.3233E-02	0.	1.0000E+00
23	1.8400E+00	2.0592E+00	6.9993E-01	3.4061E-02	5.7124E-02	1.6685E+00	2.5023E-02	8.4696E-02	0.	1.0000E+00
22	1.8400E+00	1.9428E+00	6.9451E-01	2.7871E-02	5.6114E-02	1.6062E+00	2.8134E-02	8.6252E-02	0.	1.0000E+00
21	1.8400E+00	1.8322E+00	6.8903E-01	2.1580E-02	5.4900E-02	1.5476E+00	3.1722E-02	8.7946E-02	0.	1.0000E+00
20	1.8400E+00	1.7234E+00	6.8357E-01	1.5015E-02	5.3454E-02	1.4925E+00	3.5821E-02	8.9766E-02	0.	1.0000E+00
19	1.8400E+00	1.6162E+00	6.7816E-01	8.0734E-03	5.1691E-02	1.4404E+00	4.0485E-02	9.1693E-02	0.	1.0000E+00
18	1.8400E+00	1.5105E+00	6.7288E-01	6.5714E-04	4.9398E-02	1.3910E+00	4.5776E-02	9.3740E-02	0.	1.0000E+00
17	1.8400E+00	1.4085E+00	6.6779E-01	7.0527E-03	4.6273E-02	1.3428E+00	5.1924E-02	9.6030E-02	0.	1.0000E+00
16	1.8400E+00	1.3039E+00	6.6302E-01	1.5284E-02	4.2280E-02	1.2970E+00	5.8867E-02	9.8542E-02	0.	1.0000E+00
15	1.8400E+00	1.2028E+00	6.5865E-01	2.4213E-02	3.7725E-02	1.2509E+00	6.7128E-02	1.0140E-01	0.	1.0000E+00
14	1.8400E+00	1.1033E+00	6.5476E-01	3.3358E-02	3.3234E-02	1.2048E+00	7.6929E-02	1.0467E-01	0.	1.0000E+00
13	1.8400E+00	1.0051E+00	6.5131E-01	4.1988E-02	2.9942E-02	1.1610E+00	8.7949E-02	1.0823E-01	0.	1.0000E+00
12	1.8400E+00	9.0826E-01	6.4814E-01	5.0428E-02	2.4075E-02	1.1208E+00	9.9795E-02	1.1197E-01	0.	1.0000E+00
11	1.8400E+00	8.1253E-01	6.4492E-01	5.7268E-02	3.0930E-02	1.0867E+00	1.1132E-01	1.1552E-01	0.	1.0000E+00
10	1.8400E+00	7.1799E-01	6.4141E-01	6.3146E-02	3.4777E-02	1.0619E+00	1.2072E-01	1.1837E-01	0.	1.0000E+00
9	1.8400E+00	6.2426E-01	6.3743E-01	6.8899E-02	3.9197E-02	1.0444E+00	1.2789E-01	1.2051E-01	0.	1.0000E+00
8	1.8400E+00	5.3147E-01	6.3299E-01	7.2977E-02	4.2561E-02	1.0307E+00	1.3384E-01	1.2228E-01	0.	1.0000E+00
7	1.8400E+00	4.4079E-01	6.2832E-01	6.1489E-02	4.4179E-02	1.0051E+00	1.4584E-01	1.2584E-01	5.0076E-03	1.0000E+00
6	1.8400E+00	3.5584E-01	6.2398E-01	2.7991E-02	4.5229E-02	9.4193E-01	1.8117E-01	1.3648E-01	2.3255E-02	1.0000E+00
5	1.8400E+00	2.7758E-01	6.2050E-01	3.0189E-03	4.6336E-02	8.6241E-01	2.3971E-01	1.5366E-01	2.5713E-02	1.0000E+00
4	1.8400E+00	2.0478E-01	6.1787E-01	2.3966E-02	4.6085E-02	7.9469E-01	3.0556E-01	1.7216E-01	1.3283E-02	1.0000E+00
3	1.8400E+00	1.3590E-01	6.1599E-01	3.2834E-02	4.4980E-02	7.4692E-01	3.6342E-01	1.8828E-01	0.	1.0000E+00
2	1.8400E+00	6.8133E-02	6.1495E-01	1.9539E-02	4.4513E-02	7.3199E-01	3.8593E-01	1.9842E-01	0.	1.0000E+00
1	1.8400E+00	0.	6.1465E-01	0.	4.4656E-02	7.3577E-01	3.8926E-01	2.1503E-01	0.	1.0000E+00

ZHEMP LIP-01 CCCE FILE HEMPDG MAP HEMPDG
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 6 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	6.1492E+00	5.3374E-01	5.2952E-01	2.2442E-02	0.	0.	0.	0.	0.
40	1.8400E+00	5.0249E+00	5.4499E-01	3.1619E-01	2.7678E-02	1.4473E+01	1.0517E-03	4.4993E-02	0.	1.0000E+00
39	1.8400E+00	4.5818E+00	5.6405E-01	2.3934E-01	2.7306E-02	5.8766E+00	3.4167E-03	5.7419E-02	0.	1.0000E+00
38	1.8400E+00	4.2906E+00	5.7566E-01	1.9811E-01	2.2556E-02	3.7911E+00	6.0160E-03	6.5329E-02	0.	1.0000E+00
37	1.8400E+00	4.0581E+00	5.8024E-01	1.6847E-01	2.5715E-02	3.1429E+00	7.6791E-03	6.9082E-02	0.	1.0000E+00
36	1.8400E+00	3.8543E+00	5.8759E-01	1.4617E-01	3.2319E-02	2.8992E+00	8.5112E-03	7.0436E-02	0.	1.0000E+00
35	1.8400E+00	3.6706E+00	5.9461E-01	1.3016E-01	3.6205E-02	2.7041E+00	9.3497E-03	7.1773E-02	0.	1.0000E+00
34	1.8400E+00	3.5009E+00	5.9889E-01	1.1728E-01	3.7986E-02	2.5375E+00	1.0236E-02	7.3075E-02	0.	1.0000E+00
33	1.8400E+00	3.3421E+00	6.0123E-01	1.0605E-01	3.9750E-02	2.4143E+00	1.1033E-02	7.4076E-02	0.	1.0000E+00
32	1.8400E+00	3.1915E+00	6.0210E-01	9.6130E-02	4.1472E-02	2.3046E+00	1.1855E-02	7.5062E-02	0.	1.0000E+00
31	1.8400E+00	3.0480E+00	6.0203E-01	8.7561E-02	4.2829E-02	2.2153E+00	1.2744E-02	7.6031E-02	0.	1.0000E+00
30	1.8400E+00	2.9101E+00	6.0065E-01	7.9634E-02	4.3795E-02	2.1270E+00	1.3754E-02	7.7046E-02	0.	1.0000E+00
29	1.8400E+00	2.7770E+00	5.9902E-01	7.2140E-02	4.4608E-02	2.0437E+00	1.4908E-02	7.8036E-02	0.	1.0000E+00
28	1.8400E+00	2.6480E+00	5.9644E-01	6.5281E-02	4.5078E-02	1.9651E+00	1.6240E-02	7.9172E-02	0.	1.0000E+00
27	1.8400E+00	2.5227E+00	5.9345E-01	5.8782E-02	4.5292E-02	1.8910E+00	1.7781E-02	8.0335E-02	0.	1.0000E+00
26	1.8400E+00	2.4005E+00	5.9004E-01	5.2236E-02	4.5232E-02	1.8200E+00	1.9591E-02	8.1565E-02	0.	1.0000E+00
25	1.8400E+00	2.2811E+00	5.8634E-01	4.5861E-02	4.4944E-02	1.7523E+00	2.1705E-02	8.2862E-02	0.	1.0000E+00
24	1.8400E+00	2.1642E+00	5.8240E-01	3.9690E-02	4.4377E-02	1.6901E+00	2.4082E-02	8.4206E-02	0.	1.0000E+00
23	1.8400E+00	2.0495E+00	5.7836E-01	3.3277E-02	4.3909E-02	1.6296E+00	2.6897E-02	8.5677E-02	0.	1.0000E+00
22	1.8400E+00	1.9370E+00	5.7423E-01	2.6737E-02	4.2233E-02	1.5714E+00	3.0177E-02	8.7224E-02	0.	1.0000E+00
21	1.8400E+00	1.8264E+00	5.7012E-01	2.0033E-02	4.0436E-02	1.5162E+00	3.3958E-02	8.8936E-02	0.	1.0000E+00
20	1.8400E+00	1.7177E+00	5.6610E-01	1.2974E-02	3.8013E-02	1.4634E+00	3.8320E-02	9.0807E-02	0.	1.0000E+00
19	1.8400E+00	1.6106E+00	5.6226E-01	5.4833E-03	3.4907E-02	1.4119E+00	4.3425E-02	9.2854E-02	0.	1.0000E+00
18	1.8400E+00	1.5052E+00	5.5874E-01	2.4891E-03	3.1246E-02	1.3610E+00	4.9461E-02	9.5136E-02	0.	1.0000E+00
17	1.8400E+00	1.4015E+00	5.5555E-01	1.0700E-02	2.7943E-02	1.3099E+00	5.6793E-02	9.7728E-02	0.	1.0000E+00
16	1.8400E+00	1.2993E+00	5.5272E-01	1.8948E-02	2.4248E-02	1.2612E+00	6.5157E-02	1.0072E-01	0.	1.0000E+00
15	1.8400E+00	1.1985E+00	5.5019E-01	2.7185E-02	2.2350E-02	1.2146E+00	7.4700E-02	1.0393E-01	0.	1.0000E+00
14	1.8400E+00	1.0992E+00	5.4779E-01	3.4838E-02	2.0652E-02	1.1725E+00	8.4872E-02	1.0724E-01	0.	1.0000E+00
13	1.8400E+00	1.0012E+00	5.4526E-01	4.1474E-02	2.5211E-02	1.1383E+00	9.4422E-02	1.1027E-01	0.	1.0000E+00
12	1.8400E+00	9.0418E-01	5.4239E-01	4.7816E-02	2.9356E-02	1.1123E+00	1.0253E-01	1.1279E-01	0.	1.0000E+00
11	1.8400E+00	8.0819E-01	5.3904E-01	5.3363E-02	3.1970E-02	1.0927E+00	1.0919E-01	1.1483E-01	0.	1.0000E+00
10	1.8400E+00	7.1311E-01	5.3516E-01	5.9255E-02	3.7792E-02	1.0776E+00	1.1465E-01	1.1646E-01	0.	1.0000E+00
9	1.8400E+00	6.1898E-01	5.3091E-01	6.6225E-02	3.4913E-02	1.0627E+00	1.2035E-01	1.1818E-01	0.	1.0000E+00
8	1.8400E+00	5.2600E-01	5.2651E-01	7.1910E-02	4.0230E-02	1.0441E+00	1.2798E-01	1.2047E-01	0.	1.0000E+00
7	1.8400E+00	4.3569E-01	5.2229E-01	5.9423E-02	3.9805E-02	1.0072E+00	1.4478E-01	1.2548E-01	1.4369E-03	1.0000E+00
6	1.8400E+00	3.5195E-01	5.1864E-01	2.5744E-02	3.9144E-02	9.2748E-01	1.9045E-01	1.3905E-01	2.0604E-02	1.0000E+00
5	1.8400E+00	2.7473E-01	5.1561E-01	3.5213E-03	3.8259E-02	8.4472E-01	2.5519E-01	1.5781E-01	2.0237E-02	1.0000E+00
4	1.8400E+00	2.0276E-01	5.1368E-01	2.2879E-02	3.6673E-02	7.7880E-01	3.2363E-01	1.7719E-01	1.0062E-02	1.0000E+00
3	1.8400E+00	1.3445E-01	5.1214E-01	3.0700E-02	3.4687E-02	7.3271E-01	3.8293E-01	1.9399E-01	0.	1.0000E+00
2	1.8400E+00	6.7381E-02	5.1132E-01	1.8657E-02	3.3767E-02	7.1669E-01	4.0854E-01	2.0548E-01	0.	1.0000E+00
1	1.8400E+00	0.	5.1108E-01	0.	3.3646E-02	7.1866E-01	4.1477E-01	2.2348E-01	0.	1.0000E+00

2HEMP LIP.01
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
198 5 5.035029E+00 3.876095E-C2 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHG	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	6.1525E+00	4.1960E-01	5.3130E-01	1.5614E-02	0.	0.	0.	0.	0.
40	1.8400E+00	5.0344E+00	4.3247E-01	3.1923E-01	2.1532E-02	1.3960E+01	1.1560E-03	4.6109E-02	0.	1.0000E+00
39	1.8400E+00	4.5920E+00	4.5245E-01	2.3909E-01	2.5230E-02	5.7380E+00	3.5286E-03	5.7901E-02	0.	1.0000E+00
38	1.8400E+00	4.2964E+00	4.6418E-01	1.9744E-01	2.0176E-02	3.8144E+00	5.9658E-03	6.5187E-02	0.	1.0000E+00
37	1.8400E+00	4.0618E+00	4.6762E-01	1.7051E-01	1.6334E-02	3.0325E+00	8.0660E-03	6.9951E-02	0.	1.0000E+00
36	1.8400E+00	3.8583E+00	4.6899E-01	1.4937E-01	1.8130E-02	2.7501E+00	9.1749E-03	7.1753E-02	0.	1.0000E+00
35	1.8400E+00	3.6734E+00	4.7140E-01	1.3225E-01	2.2707E-02	2.6260E+00	9.7627E-03	7.2517E-02	0.	1.0000E+00
34	1.8400E+00	3.5025E+00	4.7397E-01	1.1873E-01	2.6151E-02	2.5091E+00	1.0418E-02	7.3366E-02	0.	1.0000E+00
33	1.8400E+00	3.3423E+00	4.7542E-01	1.0730E-01	2.7989E-02	2.3878E+00	1.1234E-02	7.4366E-02	0.	1.0000E+00
32	1.8400E+00	3.1910E+00	4.7586E-01	9.7287E-02	2.9274E-02	2.2760E+00	1.2162E-02	7.5458E-02	0.	1.0000E+00
31	1.8400E+00	3.0465E+00	4.7543E-01	8.8388E-02	3.0268E-02	2.1793E+00	1.3142E-02	7.6489E-02	0.	1.0000E+00
30	1.8400E+00	2.9080E+00	4.7451E-01	8.0333E-02	3.1077E-02	2.0905E+00	1.4241E-02	7.7548E-02	0.	1.0000E+00
29	1.8400E+00	2.7743E+00	4.7298E-01	7.2642E-02	3.1365E-02	2.0072E+00	1.5503E-02	7.8633E-02	0.	1.0000E+00
28	1.8400E+00	2.6449E+00	4.7112E-01	6.5575E-02	3.1564E-02	1.9289E+00	1.6959E-02	7.9761E-02	0.	1.0000E+00
27	1.8400E+00	2.5192E+00	4.6888E-01	5.8758E-02	3.1403E-02	1.8552E+00	1.8652E-02	8.0970E-02	0.	1.0000E+00
26	1.8400E+00	2.3967E+00	4.6646E-01	5.1935E-02	3.0866E-02	1.7858E+00	2.0610E-02	8.2237E-02	0.	1.0000E+00
25	1.8400E+00	2.2770E+00	4.6364E-01	4.5199E-02	2.9871E-02	1.7190E+00	2.2928E-02	8.3594E-02	0.	1.0000E+00
24	1.8400E+00	2.1600E+00	4.6117E-01	3.8725E-02	2.8447E-02	1.6567E+00	2.5572E-02	8.5021E-02	0.	1.0000E+00
23	1.8400E+00	2.0453E+00	4.5848E-01	3.1879E-02	2.6598E-02	1.5961E+00	2.8716E-02	8.6592E-02	0.	1.0000E+00
22	1.8400E+00	1.9328E+00	4.5589E-01	2.4843E-02	2.4238E-02	1.5370E+00	3.2453E-02	8.8285E-02	0.	1.0000E+00
21	1.8400E+00	1.8224E+00	4.5348E-01	1.7656E-02	2.1450E-02	1.4800E+00	3.6866E-02	9.0192E-02	0.	1.0000E+00
20	1.8400E+00	1.7138E+00	4.5131E-01	1.0187E-02	1.8473E-02	1.4247E+00	4.2070E-02	9.2335E-02	0.	1.0000E+00
19	1.8400E+00	1.6070E+00	4.4941E-01	2.5028E-03	1.5685E-02	1.3711E+00	4.8203E-02	9.4701E-02	0.	1.0000E+00
18	1.8400E+00	1.5018E+00	4.4776E-01	5.1123E-03	1.3684E-02	1.3201E+00	5.5230E-02	9.7257E-02	0.	1.0000E+00
17	1.8400E+00	1.3983E+00	4.4626E-01	1.2372E-02	1.3215E-02	1.2725E+00	6.3093E-02	1.0001E-01	0.	1.0000E+00
16	1.8400E+00	1.2963E+00	4.4474E-01	1.9190E-02	1.4690E-02	1.2317E+00	7.1022E-02	1.0271E-01	0.	1.0000E+00
15	1.8400E+00	1.1955E+00	4.4300E-01	2.5664E-02	1.7914E-02	1.1977E+00	7.8600E-02	1.0519E-01	0.	1.0000E+00
14	1.8400E+00	1.0960E+00	4.4090E-01	3.1564E-02	2.2333E-02	1.1707E+00	8.5332E-02	1.0736E-01	0.	1.0000E+00
13	1.8400E+00	9.9755E-01	4.3830E-01	3.7199E-02	2.7116E-02	1.1503E+00	9.0916E-02	1.0912E-01	0.	1.0000E+00
12	1.8400E+00	9.0099E-01	4.3519E-01	4.3580E-02	3.1255E-02	1.1329E+00	9.6024E-02	1.1072E-01	0.	1.0000E+00
11	1.8400E+00	8.0366E-01	4.3167E-01	4.9957E-02	3.4048E-02	1.1154E+00	1.0148E-01	1.1341E-01	0.	1.0000E+00
10	1.8400E+00	7.0823E-01	4.2790E-01	5.7410E-02	3.5396E-02	1.0946E+00	1.0793E-01	1.1437E-01	0.	1.0000E+00
9	1.8400E+00	6.1397E-01	4.2400E-01	6.6445E-02	3.5164E-02	1.0726E+00	1.1651E-01	1.1697E-01	0.	1.0000E+00
8	1.8400E+00	5.2112E-01	4.2020E-01	7.3269E-02	3.3591E-02	1.0444E+00	1.2785E-01	1.2040E-01	0.	1.0000E+00
7	1.8400E+00	4.3152E-01	4.1678E-01	5.8248E-02	3.2110E-02	9.9649E-01	1.5013E-01	1.2703E-01	3.8289E-04	1.0000E+00
6	1.8400E+00	3.4884E-01	4.1394E-01	2.5933E-02	3.1047E-02	9.0831E-01	2.0362E-01	1.4279E-01	1.8464E-02	1.0000E+00
5	1.8400E+00	2.7246E-01	4.1178E-01	2.6014E-02	2.9480E-02	8.2776E-01	2.7114E-01	1.6225E-01	1.8385E-02	1.0000E+00
4	1.8400E+00	2.0111E-01	4.1016E-01	2.0726E-02	2.7708E-02	7.6468E-01	3.4073E-01	1.8209E-01	8.8552E-03	1.0000E+00
3	1.8400E+00	1.3329E-01	4.0900E-01	2.8246E-02	2.5844E-02	7.2080E-01	4.0015E-01	1.9905E-01	0.	1.0000E+00
2	1.8400E+00	6.6789E-02	4.0637E-01	1.7525E-02	2.4871E-02	7.0389E-01	4.2844E-01	2.1159E-01	0.	1.0000E+00
1	1.8400E+00	0.	4.0819E-01	0.	2.4729E-02	7.0548E-01	4.3555E-01	2.3023E-01	0.	1.0000E+00

2HEMP LIP.01
(CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (2 WIDTH)
198 4 5.035029E+00 3.876095E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DOT	Y-DOT	V	P	E	Q	F
41	0.	6.1545E+00	3.1054E-01	5.3253E-01	5.8934E-03	0.	0.	0.	0.	0.
40	1.8400E+00	5.0411E+00	3.1962E-01	3.2209E-01	1.5253E-02	1.3105E+01	1.2588E-03	4.7140E-02	0.	1.0000E+00
39	1.8400E+00	4.6019E+00	3.3702E-01	2.4023E-01	2.1146E-02	5.5384E+00	3.7009E-03	5.8622E-02	0.	1.0000E+00
38	1.8400E+00	4.3029E+00	3.5045E-01	1.9578E-01	1.9328E-02	3.9000E+00	5.7911E-03	6.4686E-02	0.	1.0000E+00
37	1.8400E+00	4.0645E+00	3.5639E-01	1.6908E-01	1.3666E-02	3.1100E+00	7.7906E-03	6.9336E-02	0.	1.0000E+00
36	1.8400E+00	3.8592E+00	3.5672E-01	1.4983E-01	8.8396E-03	2.6905E+00	9.4720E-03	7.2309E-02	0.	1.0000E+00
35	1.8400E+00	3.6741E+00	3.5504E-01	1.3405E-01	7.4748E-03	2.4958E+00	1.0552E-02	7.3839E-02	0.	1.0000E+00
34	1.8400E+00	3.5028E+00	3.5363E-01	1.2034E-01	9.0242E-03	2.3921E+00	1.1246E-02	7.4631E-02	0.	1.0000E+00
33	1.8400E+00	3.3421E+00	3.5289E-01	1.0864E-01	1.1264E-02	2.3045E+00	1.1932E-02	7.5331E-02	0.	1.0000E+00
32	1.8400E+00	3.1902E+00	3.5222E-01	9.8298E-02	1.2980E-02	2.2077E+00	1.2855E-02	7.6304E-02	0.	1.0000E+00
31	1.8400E+00	3.0454E+00	3.5148E-01	8.9206E-02	1.4145E-02	2.1162E+00	1.3918E-02	7.7341E-02	0.	1.0000E+00
30	1.8400E+00	2.9063E+00	3.5052E-01	8.0743E-02	1.4771E-02	2.0299E+00	1.5153E-02	7.8437E-02	0.	1.0000E+00
29	1.8400E+00	2.7724E+00	3.4945E-01	7.2822E-02	1.4909E-02	1.9489E+00	1.6576E-02	7.9565E-02	0.	1.0000E+00
28	1.8400E+00	2.6426E+00	3.4818E-01	6.5458E-02	1.4592E-02	1.8719E+00	1.8252E-02	8.0762E-02	0.	1.0000E+00
27	1.8400E+00	2.5167E+00	3.4686E-01	5.8275E-02	1.3903E-02	1.7994E+00	2.0209E-02	8.2047E-02	0.	1.0000E+00
26	1.8400E+00	2.3941E+00	3.4549E-01	5.1007E-02	1.2750E-02	1.7310E+00	2.2490E-02	8.3412E-02	0.	1.0000E+00
25	1.8400E+00	2.2744E+00	3.4419E-01	4.3791E-02	1.1118E-02	1.6648E+00	2.5211E-02	8.4890E-02	0.	1.0000E+00
24	1.8400E+00	2.1573E+00	3.4296E-01	3.6988E-02	9.1077E-03	1.6024E+00	2.8373E-02	8.6479E-02	0.	1.0000E+00
23	1.8400E+00	2.0428E+00	3.4188E-01	2.9833E-02	6.9477E-03	1.5420E+00	3.2129E-02	8.8231E-02	0.	1.0000E+00
22	1.8400E+00	1.9304E+00	3.4096E-01	2.2711E-02	4.9824E-03	1.4635E+00	3.6545E-02	9.0108E-02	0.	1.0000E+00
21	1.8400E+00	1.8202E+00	3.4023E-01	1.5638E-02	3.5598E-03	1.4300E+00	4.1533E-02	9.2135E-02	0.	1.0000E+00
20	1.8400E+00	1.7118E+00	3.3965E-01	8.7797E-03	3.1250E-03	1.3808E+00	4.7009E-02	9.4275E-02	0.	1.0000E+00
19	1.8400E+00	1.6051E+00	3.3910E-01	2.0211E-03	4.0843E-03	1.3365E+00	5.2835E-02	9.6433E-02	0.	1.0000E+00
18	1.8400E+00	1.5000E+00	3.3844E-01	4.3391E-03	6.4217E-03	1.2980E+00	5.8706E-02	9.8503E-02	0.	1.0000E+00
17	1.8400E+00	1.3964E+00	3.3754E-01	1.0014E-02	5.9675E-03	1.2657E+00	6.4318E-02	1.0043E-01	0.	1.0000E+00
16	1.8400E+00	1.2940E+00	3.3625E-01	1.5501E-02	1.4355E-02	1.2403E+00	6.9230E-02	1.0209E-01	0.	1.0000E+00
15	1.8400E+00	1.1929E+00	3.3448E-01	2.1280E-02	1.6906E-02	1.2185E+00	7.3836E-02	1.0359E-01	0.	1.0000E+00
14	1.8400E+00	1.0930E+00	3.3226E-01	2.7116E-02	2.2937E-02	1.1987E+00	7.8347E-02	1.0505E-01	0.	1.0000E+00
13	1.8400E+00	9.9402E-01	3.2966E-01	3.3290E-02	2.6110E-02	1.1796E+00	8.3035E-02	1.0656E-01	0.	1.0000E+00
12	1.8400E+00	8.9615E-01	3.2674E-01	4.0976E-02	2.8219E-02	1.1571E+00	8.8976E-02	1.0846E-01	0.	1.0000E+00
11	1.8400E+00	7.9949E-01	3.2463E-01	4.8898E-02	2.8988E-02	1.1311E+00	9.6559E-02	1.1084E-01	0.	1.0000E+00
10	1.8400E+00	7.0398E-01	3.2048E-01	5.7679E-02	2.8589E-02	1.1031E+00	1.0554E-01	1.1362E-01	0.	1.0000E+00
9	1.8400E+00	6.0977E-01	3.1739E-01	6.8174E-02	2.7345E-02	1.0716E+00	1.1687E-01	1.1706E-01	0.	1.0000E+00
8	1.8400E+00	5.1723E-01	3.1447E-01	7.5619E-02	2.5371E-02	1.0362E+00	1.3136E-01	1.2143E-01	0.	1.0000E+00
7	1.8400E+00	4.2838E-01	3.1193E-01	5.7748E-02	2.3681E-02	9.8111E-01	1.5818E-01	1.2938E-01	1.4244E-03	1.0000E+00
6	1.8400E+00	3.4651E-01	3.0989E-01	2.6778E-02	2.2651E-02	8.9112E-01	2.1630E-01	1.4640E-01	1.7395E-02	1.0000E+00
5	1.8400E+00	2.7076E-01	3.0834E-01	1.1139E-03	2.1223E-02	8.1366E-01	2.8524E-01	1.6625E-01	1.8508E-02	1.0000E+00
4	1.8400E+00	1.9987E-01	3.0718E-01	1.8802E-02	1.9703E-02	7.5364E-01	3.5478E-01	1.8616E-01	9.0106E-03	1.0000E+00
3	1.8400E+00	1.3242E-01	3.0635E-01	2.6002E-02	1.8233E-02	7.1152E-01	4.1412E-01	2.0315E-01	0.	1.0000E+00
2	1.8400E+00	6.6351E-02	3.0590E-01	1.6584E-02	1.7457E-02	6.9425E-01	4.4407E-01	2.1637E-01	0.	1.0000E+00
1	1.8400E+00	0.	3.0578E-01	0.	1.7342E-02	6.9580E-01	4.5147E-01	2.3534E-01	0.	1.0000E+00

2HEMP LIP.O1
(CYCLE) (K-NUMBER) (

TIME) (

DELTA-T) (

DELTA-T-K) (

DELTA-T-J) (

CCCE FILE HEMPDG MAP

HEMPDG
(SOUND SPEED) (

Z WIDTH)

198

3

5.035029E+00

3.876095E-02

1.300000E+01

3.000000E+01

5.635797E-01

6.493454E-02

J	RHO	K(Z)	Y(R)	X-DOT	Y-DOT	V	H	E	Q	F
41	0.	6.1555E+00	2.0524E-01	5.3327E-01	5.5794E-03	0.	0.	0.	0.	0.
40	1.8400E+00	5.0453E+00	2.1069E-01	3.2435E-01	5.4406E-03	1.2458E+01	1.3479E-03	4.7983E-02	0.	1.0000E+00
39	1.8400E+00	4.6098E+00	2.2289E-01	2.4205E-01	1.4979E-02	5.3100E+00	3.9169E-03	5.9492E-02	0.	1.0000E+00
38	1.8400E+00	4.3095E+00	2.3420E-01	1.9501E-01	1.5651E-02	3.9398E+00	5.7127E-03	6.4457E-02	0.	1.0000E+00
37	1.8400E+00	4.0675E+00	2.4101E-01	1.6664E-01	1.2542E-02	3.2835E+00	7.2346E-03	6.8035E-02	0.	1.0000E+00
36	1.8400E+00	3.8595E+00	2.4303E-01	1.4738E-01	7.6972E-03	2.8322E+00	6.7971E-03	7.1016E-02	0.	1.0000E+00
35	1.8400E+00	3.6730E+00	2.4187E-01	1.3272E-01	2.6785E-03	2.5214E+00	1.0385E-02	7.3571E-02	0.	1.0000E+00
34	1.8400E+00	3.5014E+00	2.3928E-01	1.2029E-01	1.0701E-03	2.3204E+00	1.1838E-02	7.5459E-02	0.	1.0000E+00
33	1.8400E+00	3.3407E+00	2.3653E-01	1.0906E-01	2.9494E-03	2.1912E+00	1.3072E-02	7.6745E-02	0.	1.0000E+00
32	1.8400E+00	3.1889E+00	2.3432E-01	9.9015E-02	3.3621E-03	2.0919E+00	1.4201E-02	7.7177E-02	0.	1.0000E+00
31	1.8400E+00	3.0440E+00	2.3265E-01	8.9808E-02	3.0446E-03	2.0065E+00	1.5568E-02	7.8954E-02	0.	1.0000E+00
30	1.8400E+00	2.9051E+00	2.3145E-01	8.1132E-02	2.6170E-03	1.9279E+00	1.7035E-02	8.0074E-02	0.	1.0000E+00
29	1.8400E+00	2.7710E+00	2.3053E-01	7.2735E-02	2.4980E-03	1.8529E+00	1.8759E-02	8.1258E-02	0.	1.0000E+00
28	1.8400E+00	2.6413E+00	2.2984E-01	6.5060E-02	2.8061E-03	1.7819E+00	2.0773E-02	8.2515E-02	0.	1.0000E+00
27	1.8400E+00	2.5153E+00	2.2925E-01	5.7515E-02	3.4368E-03	1.7146E+00	2.3133E-02	8.3876E-02	0.	1.0000E+00
26	1.8400E+00	2.3928E+00	2.2883E-01	4.9984E-02	4.2094E-03	1.6522E+00	2.5822E-02	8.5308E-02	0.	1.0000E+00
25	1.8400E+00	2.2732E+00	2.2859E-01	4.2568E-02	4.9177E-03	1.5934E+00	2.8908E-02	8.6818E-02	0.	1.0000E+00
24	1.8400E+00	2.1563E+00	2.2851E-01	3.5740E-02	5.4194E-03	1.5397E+00	3.2305E-02	8.8375E-02	0.	1.0000E+00
23	1.8400E+00	2.0418E+00	2.2855E-01	2.8871E-02	5.4429E-03	1.4896E+00	3.6099E-02	9.0016E-02	0.	1.0000E+00
22	1.8400E+00	1.9296E+00	2.2864E-01	2.2374E-02	4.7099E-03	1.4438E+00	4.0175E-02	9.1643E-02	0.	1.0000E+00
21	1.8400E+00	1.8194E+00	2.2870E-01	1.6133E-02	3.0679E-03	1.4045E+00	4.4253E-02	9.3225E-02	0.	1.0000E+00
20	1.8400E+00	1.7110E+00	2.2864E-01	1.0402E-02	5.1906E-04	1.3717E+00	4.8134E-02	9.4700E-02	0.	1.0000E+00
19	1.8400E+00	1.6042E+00	2.2836E-01	4.7513E-03	2.7773E-03	1.3445E+00	5.1713E-02	9.6008E-02	0.	1.0000E+00
18	1.8400E+00	1.4988E+00	2.2777E-01	7.8899E-04	6.5061E-03	1.3203E+00	5.5192E-02	9.7228E-02	0.	1.0000E+00
17	1.8400E+00	1.3949E+00	2.2685E-01	5.9677E-03	1.0225E-02	1.2984E+00	5.8629E-02	9.8415E-02	0.	1.0000E+00
16	1.8400E+00	1.2921E+00	2.2558E-01	1.1333E-02	1.3636E-02	1.2780E+00	6.2083E-02	9.9610E-02	0.	1.0000E+00
15	1.8400E+00	1.1905E+00	2.2397E-01	1.7530E-02	1.6554E-02	1.2548E+00	6.6342E-02	1.0104E-01	0.	1.0000E+00
14	1.8400E+00	1.0902E+00	2.2208E-01	2.4238E-02	1.8728E-02	1.2288E+00	7.1590E-02	1.0278E-01	0.	1.0000E+00
13	1.8400E+00	9.9102E-01	2.2000E-01	3.1312E-02	2.0073E-02	1.2016E+00	7.7648E-02	1.0478E-01	0.	1.0000E+00
12	1.8400E+00	8.9294E-01	2.1781E-01	4.0046E-02	2.0726E-02	1.1707E+00	8.5315E-02	1.0727E-01	0.	1.0000E+00
11	1.8400E+00	7.9623E-01	2.1556E-01	4.9262E-02	2.0580E-02	1.1359E+00	9.5091E-02	1.1037E-01	0.	1.0000E+00
10	1.8400E+00	7.0078E-01	2.1335E-01	5.8874E-02	1.9715E-02	1.1014E+00	1.0612E-01	1.1379E-01	0.	1.0000E+00
9	1.8400E+00	6.0671E-01	2.1125E-01	7.0166E-02	1.8399E-02	1.0658E+00	1.1914E-01	1.1775E-01	0.	1.0000E+00
8	1.8400E+00	5.1444E-01	2.0931E-01	7.7746E-02	1.6822E-02	1.0268E+00	1.3557E-01	1.2268E-01	0.	1.0000E+00
7	1.8400E+00	4.2623E-01	2.0765E-01	5.7721E-02	1.5502E-02	9.6701E-01	1.6600E-01	1.3165E-01	3.1674E-03	1.0000E+00
6	1.8400E+00	3.4489E-01	2.0633E-01	2.7600E-02	1.4694E-02	8.7832E-01	2.2629E-01	1.4924E-01	1.7173E-02	1.0000E+00
5	1.8400E+00	2.6958E-01	2.0533E-01	1.8119E-04	1.3693E-02	8.0340E-01	2.9612E-01	1.6933E-01	1.9055E-02	1.0000E+00
4	1.8400E+00	1.9901E-01	2.0458E-01	1.7275E-02	1.2615E-02	7.4560E-01	3.6540E-01	1.8925E-01	9.7846E-03	1.0000E+00
3	1.8400E+00	1.3181E-01	2.0406E-01	2.4359E-02	1.1614E-02	7.0499E-01	4.2425E-01	2.0613E-01	0.	1.0000E+00
2	1.8400E+00	6.6056E-02	2.0377E-01	1.5900E-02	1.1095E-02	6.8736E-01	4.5561E-01	2.1988E-01	0.	1.0000E+00
1	1.8400E+00	0.	2.0369E-01	0.	1.1011E-02	6.8906E-01	4.6288E-01	2.3899E-01	0.	1.0000E+00

ZMEPP LIP.01
 (CYCLE) (K-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 2 5.035029E+00 3.876049E-02 1.300000E+01 3.000000E+01 5.635797E-01 6.493454E-02

CCCE FILE HEMPOG MAP HEMPOG

J	RHG	X(Z)	YIR	X-DUT	Y-DUT	V	P	E	Q	F
41	0.	6.1560E+00	1.0209E-01	5.3368E-01	2.4405E-03	0.	0.	0.	0.	0.
40	1.8400E+00	5.0475E+00	1.0466E-01	3.2574E-01	4.4513E-03	1.2043E+01	1.4110E-03	4.8556E-02	0.	1.0000E+00
39	1.8400E+00	4.6147E+00	1.1077E-01	2.4362E-01	7.6644E-03	5.1216E+00	4.1122E-03	6.0248E-02	0.	1.0000E+00
38	1.8400E+00	4.3142E+00	1.1713E-01	1.9497E-01	8.6864E-03	1.9254E+00	5.7409E-03	6.4540E-02	0.	1.0000E+00
37	1.8400E+00	4.0703E+00	1.2142E-01	1.6527E-01	7.7205E-03	3.4163E+00	6.8561E-03	6.7099E-02	0.	1.0000E+00
36	1.8400E+00	3.8601E+00	1.2337E-01	1.4512E-01	5.7030E-03	3.6361E+00	7.9819E-03	6.9308E-02	0.	1.0000E+00
35	1.8400E+00	3.6722E+00	1.2349E-01	1.3015E-01	3.0172E-03	2.7166E+00	9.2869E-03	7.1656E-02	0.	1.0000E+00
34	1.8400E+00	3.4998E+00	1.2245E-01	1.1804E-01	5.6281E-05	2.4503E+00	1.0816E-02	7.3990E-02	0.	1.0000E+00
33	1.8400E+00	3.3390E+00	1.2080E-01	1.0756E-01	3.0413E-03	2.2399E+00	1.2551E-02	7.6122E-02	0.	1.0000E+00
32	1.8400E+00	3.1872E+00	1.1907E-01	9.8369E-02	5.1828E-03	2.0762E+00	1.4503E-02	7.8103E-02	0.	1.0000E+00
31	1.8400E+00	3.0427E+00	1.1758E-01	8.9777E-02	6.2257E-03	1.9339E+00	1.6535E-02	7.9798E-02	0.	1.0000E+00
30	1.8400E+00	2.9039E+00	1.1652E-01	8.1190E-02	6.5359E-03	1.8581E+00	1.8653E-02	8.1318E-02	0.	1.0000E+00
29	1.8400E+00	2.7702E+00	1.1580E-01	7.2723E-02	6.5695E-03	1.7798E+00	2.0870E-02	8.2704E-02	0.	1.0000E+00
28	1.8400E+00	2.6405E+00	1.1539E-01	6.4763E-02	6.5619E-03	1.7126E+00	2.3238E-02	8.4039E-02	0.	1.0000E+00
27	1.8400E+00	2.5147E+00	1.1513E-01	5.7120E-02	6.6650E-03	1.6536E+00	2.5775E-02	8.5366E-02	0.	1.0000E+00
26	1.8400E+00	2.3923E+00	1.1503E-01	4.9632E-02	6.6427E-03	1.6015E+00	2.8464E-02	8.6682E-02	0.	1.0000E+00
25	1.8400E+00	2.2729E+00	1.1502E-01	4.2441E-02	6.4010E-03	1.5566E+00	3.1185E-02	8.7923E-02	0.	1.0000E+00
24	1.8400E+00	2.1561E+00	1.1514E-01	3.5885E-02	5.8374E-03	1.5188E+00	3.3812E-02	8.9065E-02	0.	1.0000E+00
23	1.8400E+00	2.0417E+00	1.1529E-01	2.9662E-02	4.8503E-03	1.4859E+00	3.6400E-02	9.0147E-02	0.	1.0000E+00
22	1.8400E+00	1.9295E+00	1.1544E-01	2.3846E-02	3.3169E-03	1.4566E+00	3.8962E-02	9.1138E-02	0.	1.0000E+00
21	1.8400E+00	1.8192E+00	1.1549E-01	1.8320E-02	1.3758E-03	1.4314E+00	4.1388E-02	9.2073E-02	0.	1.0000E+00
20	1.8400E+00	1.7106E+00	1.1539E-01	1.3034E-02	7.4249E-04	1.4090E+00	4.3745E-02	9.2982E-02	0.	1.0000E+00
19	1.8400E+00	1.6035E+00	1.1510E-01	7.7627E-03	2.8540E-03	1.3879E+00	4.6145E-02	9.3883E-02	0.	1.0000E+00
18	1.8400E+00	1.4979E+00	1.1464E-01	2.3143E-03	4.9237E-03	1.3646E+00	4.9002E-02	9.4922E-02	0.	1.0000E+00
17	1.8400E+00	1.3937E+00	1.1398E-01	3.1396E-03	6.7652E-03	1.3392E+00	5.2414E-02	9.6149E-02	0.	1.0000E+00
16	1.8400E+00	1.2906E+00	1.1317E-01	8.8353E-03	8.2941E-03	1.3124E+00	5.6377E-02	9.7573E-02	0.	1.0000E+00
15	1.8400E+00	1.1888E+00	1.1222E-01	1.5535E-02	5.5082E-03	1.2814E+00	6.1471E-02	9.9338E-02	0.	1.0000E+00
14	1.8400E+00	1.0884E+00	1.1115E-01	2.2944E-02	1.0329E-02	1.2467E+00	6.7915E-02	1.0153E-01	0.	1.0000E+00
13	1.8400E+00	9.8903E-01	1.1002E-01	3.0637E-02	1.0758E-02	1.2111E+00	7.5337E-02	1.0400E-01	0.	1.0000E+00
12	1.8400E+00	8.9089E-01	1.0886E-01	3.9964E-02	1.0822E-02	1.1750E+00	8.4192E-02	1.0690E-01	0.	1.0000E+00
11	1.8400E+00	7.9417E-01	1.0770E-01	4.9830E-02	1.0582E-02	1.1533E+00	9.5264E-02	1.1042E-01	0.	1.0000E+00
10	1.8400E+00	6.9881E-01	1.0657E-01	6.0010E-02	5.9956E-03	1.0972E+00	1.0755E-01	1.1423E-01	0.	1.0000E+00
9	1.8400E+00	6.0486E-01	1.0552E-01	7.1497E-02	9.2018E-03	1.0598E+00	1.2152E-01	1.1847E-01	0.	1.0000E+00
8	1.8400E+00	5.1279E-01	1.0455E-01	7.9120E-02	8.3581E-03	1.0144E+00	1.3894E-01	1.2367E-01	0.	1.0000E+00
7	1.8400E+00	4.2497E-01	1.0373E-01	5.7844E-02	7.6508E-03	9.5697E-01	1.7183E-01	1.3334E-01	4.6509E-03	1.0000E+00
6	1.8400E+00	3.4395E-01	1.0309E-01	2.8161E-02	7.2315E-03	8.7014E-01	2.3295E-01	1.5114E-01	1.7279E-02	1.0000E+00
5	1.8400E+00	2.6889E-01	1.0260E-01	1.0224E-03	6.7037E-03	7.9679E-01	3.0318E-01	1.7138E-01	1.9550E-02	1.0000E+00
4	1.8400E+00	1.9851E-01	1.0223E-01	1.6300E-02	6.1542E-03	7.4044E-01	3.7240E-01	1.9130E-01	1.0404E-02	1.0000E+00
3	1.8400E+00	1.3146E-01	1.0198E-01	2.3398E-02	5.6637E-03	7.0085E-01	4.3081E-01	2.0807E-01	0.	1.0000E+00
2	1.8400E+00	6.5881E-02	1.0164E-01	1.5466E-02	5.3994E-03	6.8296E-01	4.6312E-01	2.2216E-01	0.	1.0000E+00
1	1.8400E+00	0.	1.0180E-01	0.	5.3451E-03	6.8483E-01	4.7021E-01	2.4133E-01	0.	1.0000E+00

2HEMP LIP-01
 (CYCLE) (X-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)
 198 1 5.035029E+00 3.876C95E-C2 1.3C0CCCE+01 3.000000E+01 5.535797E-01 6.493454E-02

J	RHO	X(Z)	Y(R)	X-DUT	Y-DCT	V	P	E	Q	F
41	0.	6.1561E+00	0.	5.3379E-01-C.	0.	0.	0.	0.	0.	0.
40	1.8400E+00	5.0482E+00	0.	3.2622E-01-C.	1.1844E+01	1.4430E-03	4.8839E-02	0.	1.0000E+00	1.0000E+00
39	1.8400E+00	4.6163E+00	0.	2.4419E-01-C.	5.0185E+00	4.2263E-03	6.0678E-02	0.	1.0000E+00	1.0000E+00
38	1.8400E+00	4.3159E+00	0.	1.9507E-01-C.	3.9021E+00	5.7871E-03	6.4674E-02	0.	1.0000E+00	1.0000E+00
37	1.8400E+00	4.0713E+00	0.	1.6486E-01-C.	3.4734E+00	6.7042E-03	6.6712E-02	0.	1.0000E+00	1.0000E+00
36	1.8400E+00	3.8606E+00	0.	1.4443E-01-C.	3.1508E+00	7.5854E-03	6.8415E-02	0.	1.0000E+00	1.0000E+00
35	1.8400E+00	3.6719E+00	0.	1.2910E-01-C.	2.8665E+00	8.5996E-03	7.0317E-02	0.	1.0000E+00	1.0000E+00
34	1.8400E+00	3.4993E+00	0.	1.1689E-01-C.	2.6084E+00	9.8176E-03	7.2362E-02	0.	1.0000E+00	1.0000E+00
33	1.8400E+00	3.3381E+00	0.	1.0641E-01-C.	2.3807E+00	1.1290E-02	7.4448E-02	0.	1.0000E+00	1.0000E+00
32	1.8400E+00	3.1866E+00	0.	9.7710E-02-C.	2.1821E+00	1.3140E-02	7.6643E-02	1.3304E-04	1.0000E+00	1.0000E+00
31	1.8400E+00	3.0420E+00	0.	8.9488E-02-C.	2.0231E+00	1.5292E-02	7.8704E-02	6.6823E-04	1.0000E+00	1.0000E+00
30	1.8400E+00	2.9036E+00	0.	8.1118E-02-C.	1.8997E+00	1.7654E-02	8.0575E-02	9.2900E-04	1.0000E+00	1.0000E+00
29	1.8400E+00	2.7698E+00	0.	7.2728E-02-C.	1.8050E+00	2.0092E-02	8.2203E-02	1.0356E-03	1.0000E+00	1.0000E+00
28	1.8400E+00	2.6404E+00	0.	6.4724E-02-C.	1.7313E+00	2.2523E-02	8.3629E-02	1.1488E-03	1.0000E+00	1.0000E+00
27	1.8400E+00	2.5145E+00	0.	5.7070E-02-C.	1.6712E+00	2.4963E-02	8.4938E-02	1.2535E-03	1.0000E+00	1.0000E+00
26	1.8400E+00	2.3922E+00	0.	4.9688E-02-C.	1.6212E+00	2.7388E-02	8.6149E-02	1.3267E-03	1.0000E+00	1.0000E+00
25	1.8400E+00	2.2728E+00	0.	4.2623E-02-C.	1.5796E+00	2.9728E-02	8.7234E-02	1.3395E-03	1.0000E+00	1.0000E+00
24	1.8400E+00	2.1561E+00	0.	3.6243E-02-C.	1.5466E+00	3.1832E-02	8.8163E-02	1.2985E-03	1.0000E+00	1.0000E+00
23	1.8400E+00	2.0417E+00	0.	3.0296E-02-C.	1.5187E+00	3.3804E-02	8.9001E-02	1.0013E-03	1.0000E+00	1.0000E+00
22	1.8400E+00	1.9295E+00	0.	2.4764E-02-C.	1.4934E+00	3.5757E-02	8.9766E-02	4.9469E-04	1.0000E+00	1.0000E+00
21	1.8400E+00	1.8191E+00	0.	1.9413E-02-C.	1.4704E+00	3.7692E-02	9.0533E-02	0.	1.0000E+00	1.0000E+00
20	1.8400E+00	1.7105E+00	0.	1.4154E-02-C.	1.4473E+00	3.9810E-02	9.1382E-02	0.	1.0000E+00	1.0000E+00
19	1.8400E+00	1.6033E+00	0.	8.8790E-03-C.	1.4225E+00	4.2282E-02	9.2350E-02	0.	1.0000E+00	1.0000E+00
18	1.8400E+00	1.4976E+00	0.	3.4144E-03-C.	1.3941E+00	4.5393E-02	9.3527E-02	0.	1.0000E+00	1.0000E+00
17	1.8400E+00	1.3932E+00	0.	-2.2419E-03-C.	1.3626E+00	4.9250E-02	9.4961E-02	0.	1.0000E+00	1.0000E+00
16	1.8400E+00	1.2901E+00	0.	-8.0528E-03-C.	1.3293E+00	5.3823E-02	9.6640E-02	0.	1.0000E+00	1.0000E+00
15	1.8400E+00	1.1882E+00	0.	-1.4973E-02-C.	1.2933E+00	5.9444E-02	9.8619E-02	0.	1.0000E+00	1.0000E+00
14	1.8400E+00	1.0877E+00	0.	-2.2584E-02-C.	1.2536E+00	6.6569E-02	1.0106E-01	0.	1.0000E+00	1.0000E+00
13	1.8400E+00	9.8832E-01	0.	-3.0506E-02-C.	1.2149E+00	7.4600E-02	1.0375E-01	0.	1.0000E+00	1.0000E+00
12	1.8400E+00	8.9021E-01	0.	-4.0029E-02-C.	1.1753E+00	8.4110E-02	1.0687E-01	0.	1.0000E+00	1.0000E+00
11	1.8400E+00	7.9346E-01	0.	-5.0050E-02-C.	1.1341E+00	9.5639E-02	1.1054E-01	0.	1.0000E+00	1.0000E+00
10	1.8400E+00	6.9816E-01	0.	-6.0473E-02-C.	1.0943E+00	1.0858E-01	1.1455E-01	0.	1.0000E+00	1.0000E+00
9	1.8400E+00	6.0424E-01	0.	-7.1978E-02-C.	1.0563E+00	1.2289E-01	1.1888E-01	0.	1.0000E+00	1.0000E+00
8	1.8400E+00	5.1224E-01	0.	-7.9604E-02-C.	1.0154E+00	1.4081E-01	1.2423E-01	0.	1.0000E+00	1.0000E+00
7	1.8400E+00	4.2456E-01	0.	-5.7893E-02-C.	9.5190E-01	1.7486E-01	1.3421E-01	5.4678E-03	1.0000E+00	1.0000E+00
6	1.8400E+00	3.4363E-01	0.	-2.8364E-02-C.	8.6609E-01	2.3633E-01	1.5210E-01	1.7370E-02	1.0000E+00	1.0000E+00
5	1.8400E+00	2.6866E-01	0.	-1.3174E-03-C.	7.9357E-01	3.0675E-01	1.7241E-01	1.9798E-02	1.0000E+00	1.0000E+00
4	1.8400E+00	1.9835E-01	0.	1.5974E-02-C.	7.3795E-01	3.7584E-01	1.9231E-01	1.0732E-02	1.0000E+00	1.0000E+00
3	1.8400E+00	1.3135E-01	0.	2.3086E-02-C.	6.9882E-01	4.3406E-01	2.0902E-01	0.	1.0000E+00	1.0000E+00
2	1.8400E+00	6.9820E-02	0.	1.5310E-02-C.	5.8094E-01	4.6663E-01	2.2324E-01	0.	1.0000E+00	1.0000E+00
1	1.8400E+00	0.	0.	-0.	5.8279E-01	4.7380E-01	2.4247E-01	0.	1.0000E+00	1.0000E+00

(CYCLE) (X-NUMBER) (TIME) (DELTA-T) (DELTA-T-K) (DELTA-T-J) (SOUND SPEED) (Z WIDTH)

ZHEMP LIP.01		CCDE FILE HEMPDG MAP HEMPDG					
(CYCLE)	(K-NUMBER)	(TIME)	(DELTA-T)	(DELTA-T-K)	(DELTA-T-J)	(SOUND SPEED)	(Z WIDTH)
198	1	5.035029E+00	3.876095E-02	1.400000E+01	1.400000E+01	5.635797E-01	6.493454E-02

(TOTAL E)	(E-ZERO)	(E-CHANGE)	(K.E.SUM)	(I.E.SUM)	(MASS-SUM)
1.749545E+00	1.757432E+00	-4.487919E-01	4.328246E-01	1.316720E+00	1.178223E+02

(MATERIAL)	(MASS)	(TOTAL E)	(KINETIC E)	(INTERNAL E)
10	9.470017E+01	3.043768E-01	2.560245E-01	4.835223E-02
1	2.312212E+01	1.445168E+00	1.768001E-01	1.268368E+00

Appendix F Flow Charts

Fig. F-1. Relationship of principal subroutines.

Fig. F-2. Chart of subroutine linkage and main branch points for generator GENLAA subroutine.

Fig. F-3. Chart of subroutine linkage and main branch points for cycling CYCLAA subroutine.