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PORFLO Computer Code: Users Guide

December 1983

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Prepared for Rockwell Hanford Operations,
a Prime Contractor to the U.S. Department of Energy
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1.0 INTRODUCTION

1.1 BACKGROUND

A suite of numerical models (i.e., computer codes) has been developed and interfaced for use in assessing the long-term performance of a repository in basalt (Rockwell, 1982). These models are based primarily on deterministic approaches; however, certain codes are formulated on a probabilistic framework (Sagar and Clifton, 1983; Clifton, et al., 1983). The numerical models are grouped by space scale into three categories:

1. Waste package-scale (very near-field) models
2. Repository-scale (near-field) models
3. Regional-scale (far-field) models.

The waste package-scale models provide predictions of the temperature and flow field around the waste package and radionuclide release rates from the waste package and/or emplacement horizon. The repository-scale models are designed to calculate groundwater flow paths and traveltimes, the large-scale temperature field around the repository, and radionuclide concentrations and releases. Results from the repository-scale analysis provide boundary conditions for regional-scale predictions of groundwater traveltimes to and cumulative releases at the accessible environment boundary.

This report deals with one of the deterministic repository-scale models designated as PORFLO. The PORFLO code is a two-dimensional finite-difference code applicable to an equivalent porous continuum. This computer code is capable of simulating the coupled processes of heat transfer in the water/rock system, groundwater flow in a layered geology, and transport of a dissolved radionuclide. The conceptual modeling approach is based on representing the geologic system in terms of a vertical or horizontal cross section. Three-dimensional systems with axial symmetry can also be modeled with PORFLO. A set of support codes and graphics software have been developed and interfaced with the PORFLO code that (1) compute and plot pathlines/streamlines and traveltimes, (2) compute and plot the fractional release rates and cumulative releases at specified boundaries, and (3) plot contours, spatial cross sections, and time histories for temperature, hydraulic head, and concentrations.

The users guide provides detailed instructions regarding the use of the PORFLO computer code for repository performance analysis. It also contains descriptions of input data requirements as well as sample input and output for various test cases.

1.2 PURPOSE AND SCOPE

The PORFLO computer code was originally developed by Analytic and Computational Research, Inc., Los Angeles, California. A family of versions of PORFLO has since been developed by BCS Richland, Inc., Richland, Washington, for use in studies of nuclear waste disposal in deep geologic media. This document is intended to serve as a users guide for version 5.6 of the PORFLO computer code as it exists at the Basalt Waste Isolation Project site. It is also noteworthy that earlier versions of PORFLO used at the Basalt Waste Isolation Project have been implemented on a UNIVAC 1100/44 and a CRAY 1, as well as PRIME minicomputers. The current double precision version (5.6) has been extensively verified and benchmarked and is installed on PRIME 250 and 750 computers.

Although the Basalt Waste Isolation Project version of PORFLO is maintained and used in a PRIME operating environment, transportability of the code has been given high priority. Features of version 5.6 of the PORFLO computer code as described herein are machine independent. Sections 2.0 and 3.0 of this manual briefly describe the boundary value problem solved by PORFLO, the solution method, and the accuracy and stability of the solution method. Sections 4.0, 5.0, and 6.0 describe PORFLO input from the level of general features down to detailed instructions for inputting a given problem. Appendices contain a description of the computer code structure, tabulation of error messages, input and printed output for some test problems, an illustration of postprocessor graphics capability, and a checklist for assistance in running the code.

2.0 MATHEMATICAL FRAMEWORK

2.1 GOVERNING EQUATIONS

The PORFLO computer code is designed to simulate time-dependent or asymptotically steady-state processes consisting of coupled groundwater flow, heat transfer, and radionuclide transport. The code is applicable to problems in two dimensions over a rectangular or axially symmetric cylindrical domain. The mathematical model is based on the physical laws of mass, momentum, and energy conservation. Discussions on the theoretical bases are presented in Baca et al. (1981, 1983); however, for completeness, the governing equations are also given here.

The governing groundwater flow balance equation written in indicial notation for Cartesian coordinates is

$$S_s \frac{\partial h}{\partial t} = K_{ii} \frac{\partial}{\partial x_i} \left(\frac{\partial h}{\partial x_i} + \delta_b \delta_{i2}\right) + \gamma \frac{\partial T}{\partial t} \qquad (1)$$

where

S_s = specific storage of the porous rock matrix

h = hydraulic head at a reference density

t = the time coordinate

K_{ii} = principal hydraulic conductivities

x_i = space coordinate (x, y)

δb = density disparity

δ_{i2} = the Kronecker delta

γ = thermal coupling coefficient

T = temperature.

Furthermore, the thermal coupling coefficient is given by

$$\gamma = \phi\beta \tag{2}$$

where

ϕ = effective porosity

β = bulk modulus of fluid $(\frac{1}{\rho_f}\frac{\partial\rho_f}{\partial T})$.

The governing thermal energy balance equation also written for a Cartesian coordinate system in indical notation is

$$S_t \frac{\partial T}{\partial t} + \rho_f c_f \frac{\partial}{\partial x_i}(q_i T) = \frac{\partial}{\partial x_i}(D_t \frac{\partial T}{\partial x_i}) + Q \tag{3}$$

where

S_t = heat capacity of the fluid-rock system

ρ_f = fluid density

c_f = specific heat of fluid

q_i = component of the Darcy velocity vector

D_t = effective thermal conductivity coefficient

Q = volumetric heat generation rate.

Moreover,

$$S_t = \phi\rho_f c_f + (1 - \phi)\rho_s c_s \tag{4}$$

and

$$D_t = \phi D_f + (1 - \phi)D_s \tag{5}$$

where

ρ_s = bulk density of rock

c_s = specific heat of rock

D_f = thermal conductivity of fluid

D_s = thermal conductivity of rock.

Spatial components of D_t are further adjusted for dispersion.

The governing mass balance equation, also known as the concentration equation, is written for a single component as

$$R_d\phi\frac{\partial C}{\partial t} + \frac{\partial}{\partial x_i}(q_i C) = \frac{\partial}{\partial x_i}\left(D_{mi}\phi\frac{\partial C}{\partial x_i}\right) - \lambda R_d\phi C + \dot{m} \tag{6}$$

where

R_d = retardation factor

C = concentration of radionuclide mass

D_{mi} = hydrodynamic dispersion coefficient

λ = radioactive decay constant

$\dot{m}$ = mass source term.

Also, the retardation factor and dispersion coefficients are computed according to the relations

$$R_d = 1 + K_d \rho_s (1 - \phi)/\phi \tag{7}$$

$$D_{mx} = D + (\alpha_L U^2 + \alpha_T V^2)/(\bar{q}\phi) \tag{8}$$

$$D_{my} = D + (\alpha_T U^2 + \alpha_L V^2)/(\bar{q}\phi) \tag{9}$$

and the decay constant is given by

$$\lambda = \frac{\ln(2)}{T_{\frac{1}{2}}} \tag{10}$$

where

K_d = sorption or distribution coefficient

D = molecular diffusion coefficient

α_L = longitudinal dispersivity

α_T = transverse dispersivity

U = horizontal component of Darcy velocity

V = vertical component of Darcy velocity

$\bar{q}$ = $(U^2 + V^2)^{\frac{1}{2}}$ the groundwater speed

$T_{\frac{1}{2}}$ = half-life.

Equations 1, 3, and 6 are similar in form and, in fact, may be regarded as special cases of a general transport equation

$$\tau \frac{\partial F}{\partial t} + \mu \frac{\partial}{\partial x_i} (q_i F) - \frac{\partial}{\partial x_i} (\Gamma \frac{\partial F}{\partial x_i}) = S_F - S_m F \tag{11}$$

where

τ, μ = generalized coefficients

F = transport variable (h, T, or C)

Γ = generalized transport coefficient

S_F = net source rate

S_m = net loss rate.

The PORFLO code is programmed to solve this general equation with the coefficients defined according to Equations 1, 3, and/or 6. The numerical solution is obtained using an integrated finite-difference method. The units of the constants, coefficients, and state variables are given in the nomenclature list following Section 6.0.

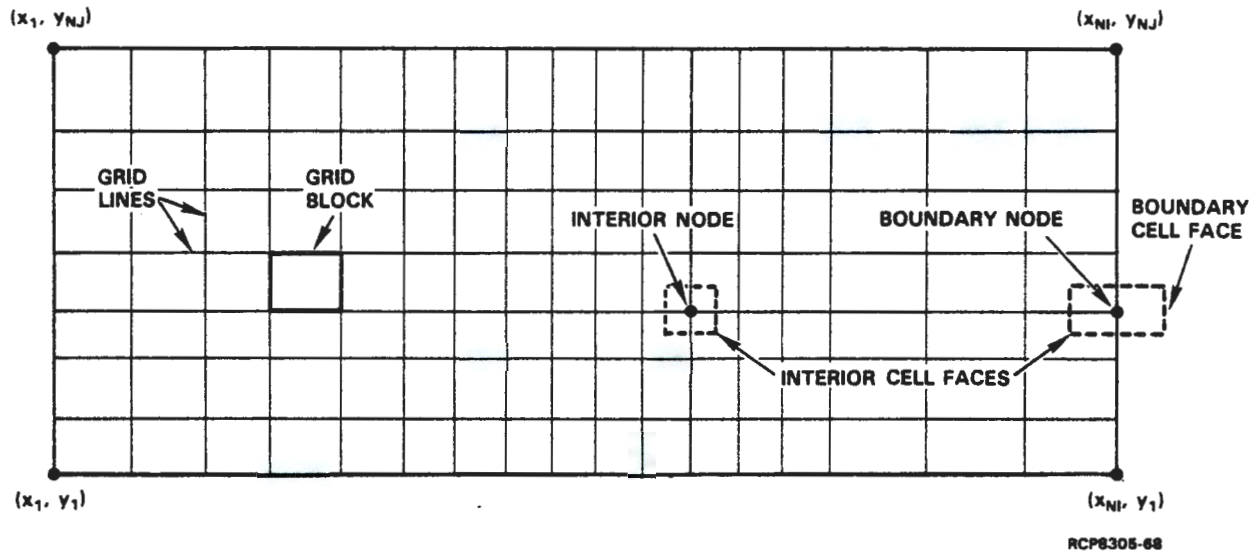
2.2 DISCRETIZATION GRIDS

The finite-difference method used to solve the general transport equation (Eq. 11) is based on a discrete representation of the domain of interest. The simulation domain is subdivided by a network of horizontal and vertical lines resulting in a finite-difference grid system (Patankar, 1980). Available domain shapes, coordinate systems used for grid definition, and labeling of grid components for later reference are treated in the following paragraphs; guidelines for selection of efficient grids are discussed in Section 3.0.

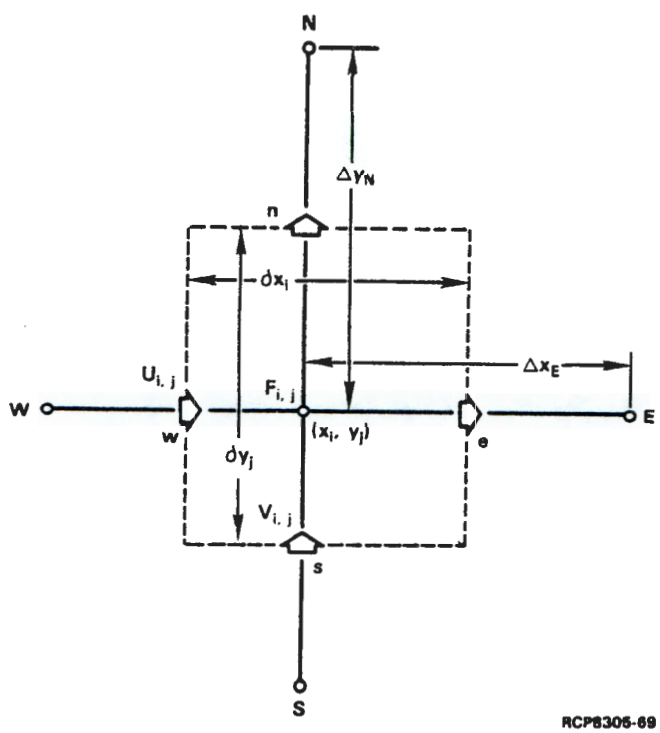
The PORFLO code can accommodate two types of coordinate systems. A grid may be defined over a rectangular domain using Cartesian coordinates or an axially symmetric cylindrical domain using radial coordinates. An example of a rectangular finite-difference grid is shown in Figure 1.

With reference to Figure 1(a), definition of some grid components follows. A simple rectangle determined by the intersection of any two adjacent horizontal grid lines with any two adjacent vertical grid lines is called a grid block. The grid block of maximum width (height) determines the horizontal (vertical) mesh of the grid. Each intersection of two grid lines determines a node. Each interior (boundary) node is the focal point of a distinct interior (boundary) grid cell. Each horizontal (vertical) interior cell face is midway between two adjacent horizontal (vertical) grid lines. Each horizontal (vertical) boundary cell is symmetric about the horizontal (vertical) grid line on which its node lies. A zone is a collection of grid cells. A subdomain is a rectangular array of contiguous grid cells. The simulation domain is the union of all grid cells.

The terminology introduced above is essential to much of the discussion in later sections. In particular, Sections 5.0 and 6.0 contain detailed descriptions of input records with which the user may define a grid and associated zones for a given PORFLO simulation domain.



(a)



(b)

FIGURE 1. Rectangular Finite-Difference Grid (a) Example of Finite-Difference Grid System (b) Typical Interior Finite-Difference Grid Cell.

2.3 INITIAL CONDITIONS

Solution of the general transport equation (Eq. 11) is dependent on initial conditions specified for the transport variable F. If no initial conditions are specified explicitly, F is assumed to be zero everywhere initially. Alternately, suppose ∇F is constant over some subdomain having lower left-hand corner at (x_k, y_ℓ) and upper right-hand corner at $(x_{k+m}, y_{\ell+n})$ and that $F_{k,\ell}$ is the initial value of F at (x_k, y_ℓ). Then

$$F^o_{i,j} = F^o_{k,\ell} - \frac{\partial F}{\partial x}(x_i - x_k) - \frac{\partial F}{\partial y}(y_j - y_\ell) \tag{12}$$

for $k \leq i \leq k + m$ and $\ell \leq j \leq \ell + n$ specifies a set of initial conditions on F over the given subdomain. It is in this manner that initial values of U, V, h, T, and C for a PORFLO simulation may be specified as detailed in Sections 5.0 and 6.0. In this respect it should be noted that, as indicated in Figure 1(b), h, T, and C are defined at the node, and U and V are defined at the left and bottom cell faces, respectively.

2.4 BOUNDARY CONDITIONS

Solution of the transport equation is also dependent on boundary conditions specified for F. If no boundary conditions are specified explicitly, the initial conditions of F at the boundary are taken as default boundary conditions. Alternately, the user may specify Dirichlet or Neumann boundary conditions explicitly.

The Dirichlet boundary conditions for F may be stated exactly as

$$F = F_o \tag{13}$$

where

F_o = the value of F at the boundary.

Referring to Figure 1(b), which depicts a typical interior finite-difference grid cell at node (x_i, y_j), suppose B is a neighboring boundary node at E, W, N, or S as is appropriate and let F_B denote the value of F at B. Then a discretized version of Equation 13 may be written as

$$F_B = F_o \tag{14}$$

which is referred to as a Dirichlet boundary condition specification of the first kind. In this case, the outermost grid line should correspond to a

physical boundary. If F_o is taken to be the value of F at the cell face midway between the interior node and the boundary node, instead of at the boundary node itself, then Equation 13 may be discretized by the linear approximation

$$F_B = 2F_o - F^o_{i,j} \tag{15}$$

which is called a Dirichlet boundary condition specification of the second kind. In this instance, the interior cell face of the boundary cell corresponds to a physical boundary; however, the boundary condition is enforced numerically by computation of F_B at the node as in Equation 15.

The essential difference between these two implementations of Dirichlet boundary conditions is that the former is intended primarily for general use while the latter is intended to allow use of Dirichlet boundary conditions along the axis of symmetry for a solid cylindrical domain.

The general form of a Neumann boundary condition for F may be written as

$$q_F = -\Gamma \frac{\partial F}{\partial \upsilon} \tag{16}$$

where

q_F = flux corresponding to variable F

Γ = transport coefficient corresponding to F

υ = coordinate normal to the boundary.

At the cell face midway between the interior and boundary nodes, a first-order difference approximation of Equation 16 is

$$q_F = -\Gamma(F_B - F_{i,j})/(\upsilon_B - \upsilon_{i,j}) \tag{17}$$

whereupon

$$F_B = F_{i,j} - q_F(\upsilon_B - \upsilon_{i,j})/\Gamma. \tag{18}$$

In this case, also, the interior face of the boundary cell is aligned with a physical boundary, while the boundary condition is used in computing nodal transport values.

Details concerning preparation of boundary condition input for PORFLO may be found in Sections 5.0 and 6.0. Examples of boundary condition applications may be found in Appendix D.

2.5 NUMERICAL SOLUTION METHOD

The numerical solution method used in PORFLO is the Alternating Direction Implicit technique composed with the method of Nodal Point Integration, which is also known as the method of Integrated Finite Differences (Gosman et al., 1969). Derivation of the computational algorithm employed by PORFLO is addressed in a forthcoming counterpart technical report; however, for the sake of completeness, a brief overview of the solution method is given here.

Consider an arbitrary grid cell such as the one depicted in Figure 1(b). Viewed over an infinitesimal period of time, δt, the grid cell is referred to as a control volume (Patankar, 1980). Integration of the general transport equation (Eq. 11) with respect to the control volume can be written

$$\int_{\delta x}\int_{\delta y}\int_{\delta t}\left[\tau\frac{\partial F}{\partial t} + \mu\frac{\partial}{\partial x_i}(q_i F) - \frac{\partial}{\partial x_i}\left(\Gamma\frac{\partial F}{\partial x_i}\right)\right]dxdydt$$
$$= \int_{\delta x}\int_{\delta y}\int_{\delta t}\left[S_F - S_m F\right]dxdydt. \qquad (19)$$

Discretization of the various terms in Equation 19 leads ultimately to an algebraic relation between the value of F at the node in the control volume and the values of F at the surrounding nodes. The resulting relation, known as the Nodal Point Integration analog of the general transport equation, is written (Gosman et al., 1969)

$$\theta_{i,j}(F^{\ell}_{i,j} - F^{\ell-1}_{i,j}) + \omega_k(F^{\ell}_{i,j} - F^{\ell}_{k}) + \delta w_{i,j}\, S_{m_{i,j}} F^{\ell}_{i,j}$$
$$= \delta w_{i,j}\, S_{F_{i,j}} \qquad (20)$$

where

k = E, W, N, and S (as in Fig. 1(b))

ℓ = time step index

δw = volume of the cell at node (x_i, y_j).

The various coefficients of Equation 20 are given by

$$\delta w_{i,j} = r_{i,j} \delta x_i \ \delta y_j \tag{21}$$

$$\theta_{i,j} = \delta w_{i,j} \ \tau_{i,j} / \delta t \tag{22}$$

$$\omega_E = r_E \ \delta y_j \ (-\mu_E U_E F_E + \Gamma_{x,E} / \Delta x_E) \tag{23}$$

$$\omega_W = r_W \ \delta y_j \ (-\mu_W U_W F_W + \Gamma_{x,W} / \Delta x_W) \tag{24}$$

$$\omega_N = r_N \ \delta x_i \ (-\mu_N V_N F_N + \Gamma_{y,N} / \Delta y_N) \tag{25}$$

$$\omega_S = r_S \ \delta x_i \ (-\mu_S V_S F_S + \Gamma_{y,S} / \Delta y_S). \tag{26}$$

In the above (Eq. 21 and 23-26), r accounts for the lateral depth of the domain or volume of revolution as dictated by the geometry.

The Alternating Direction Implicit technique is a two-stage method used to carry out the solution of the finite-difference equations. The first stage of the ℓth time step is characterized by a discrete approximation to Equation 11 written

$$2\tau_{i,j}(F_{i,j}^{\ell-\frac{1}{2}} - F_{i,j}^{\ell-1}) = \delta t(L_x^{\ell-\frac{1}{2}} + L_y^{\ell-1}) + S_{i,j}^{\ell-1,\ell-\frac{1}{2}} \tag{27}$$

where

L_x, L_y = the horizontal and vertical components, respectively, of the underlying differential operator from the general transport equation

S = an appropriate representation of the combined source and decay terms.

The ℓth time step is completed with a second half-step characterized by

$$2\tau_{i,j}(F^{\ell}_{i,j} - F^{\ell-\frac{1}{2}}_{i,j}) = \delta t(L^{\ell-\frac{1}{2}}_{x} + L^{\ell}_{y}) + S^{\ell-\frac{1}{2},\ell}_{i,j} . \tag{28}$$

The numerical method thus composed for utilization by PORFLO is a two-stage method in which an algorithm is derived for each of the first and second stages by appropriate combination of Equations 27 and 28, respectively, with Equations 20 through 26. Each half-step results in a tridiagonal system of linear equations, the coefficient matrix of which is diagonally dominant. Solution of the resulting linear system is then achieved by an efficient tridiagonal matrix inversion algorithm.

Solution of Equations 1, 3, and 6 over a single time step is characterized by the following computational sequence:

(1) The hydraulic conductivity, K, of the porous rock matrix is adjusted for temperature.

(2) The density disparity, δ_b, is calculated.

(3) The first half-step for the flow equation (Eq. 1) is completed.

(4) The horizontal component of Darcy velocity, U, is calculated.

(5) The second half-step for the flow equation (Eq. 1) is completed.

(6) The vertical component of Darcy velocity, V, is calculated.

(7) The thermal energy source, Q, is calculated.

(8) The thermal diffusivity, D_t, is calculated.

(9) The first half-step for the heat equation (Eq. 3) is completed.

(10) The second half-step for the heat equation (Eq. 3) is completed.

(11) The thermal coupling term, $\gamma\frac{\partial T}{\partial t}$, is calculated.

(12) The contaminant source, $\dot{m}$, is calculated.

(13) The dispersion coefficient, D_m, is calculated.

(14) The first half-step for the mass transport equation (Eq. 6) is completed.

(15) The second half-step for the mass transport equation (Eq. 6) is completed.

The above list is the general sequence of calculations that leads to solution of all three governing equations. Input options are incorporated in the code (see Section 5.0 and 6.0) that allow for omission of parts of the above sequence, selection of optional higher-order differencing, and selection of optional alogrithms for computation of hydraulic conductivity and density disparity.

3.0 COMPUTATIONAL ACCURACY AND STABILITY CONSIDERATIONS

3.1 ACCURACY OF DIFFERENCE APPROXIMATIONS

A parameter of interest in regard to the accuracy of the numerical solution is the grid Peclet number, Pe, defined for mass transport as

$$Pe_i = q_i \, \delta x_i / (D_{mx_i} \phi) \tag{29}$$

where, in this instance, the subscripts are taken as directional indicators. It can be shown that the accuracy of the numerical solution obtained from a second-order, central difference scheme is strongly influenced by the Peclet number. More particularly, Pe<2 is necessary to minimize the space truncation error introduced by the difference approximation (Roache, 1976).

The PORFLO code uses an Alternating Direction Implicit technique and a central-difference scheme; the algorithm uses a donor-cell technique to approximate the convective terms for Peclet numbers greater than one. Thus the PORFLO algorithm maintains mass and energy conservation for even larger values of the Peclet number. However, users should be cautious of utilizing excessively coarse grids. As a rule of thumb, a grid chosen for a given simulation domain should be such that the mesh in the principal flow direction is

$$\Delta x_i \leq 2 \max_i \left(\frac{\phi D_{mx_i}}{q_i} \right). \tag{30}$$

On the other hand, a Peclet number much less than one may be indicative of a mesh that is too small; i.e., some of the grid blocks may be smaller than needed to fully realize the numerical resolution of the algorithm, in which case extra computations would be performed and computer time would be wasted.

3.2 STABILITY OF THE ALTERNATING DIRECTION IMPLICIT TECHNIQUE

The Alternating Direction Implicit technique is generally an efficient as well as stable method of solving the equations governing coupled fluid flow, heat transfer, and contaminant transport. However, if the time steps used to obtain the solution are too large, or if the physical processes involved are significantly influenced by coupling effects, a weak instability may arise in the numerical solution. Such an instability is typically manifested as a mild step-to-step oscillation about a mean value at a given node. As a general guideline, the maximum time step should be smaller than the characteristic time for the flow equation. This characteristic time is given by

$$\Delta t_c = \frac{S_s \min_i (\Delta x_i)^2}{\max_i (K_{ii})} \tag{31}$$

where the coordinate index i is taken along the principal direction of flow.

If Δx_i is replaced by the total length of the domain, Δt_c represents roughly 70% of the time needed for the flow system to reach steady state. It can readily be seen that an increase in the specific storage coefficient, S_s, increases the time to steady state, but also increases the allowable step size. Thus, it may sometimes be advisable to exploit the largest reasonable values of S_s in the interest of minimizing the number of time steps. Such a strategy may be most applicable to long-running simulations of transient flow, in which case a steady-state solution is usually unimportant.

An optional stability enhancement feature incorporated into PORFLO is that of time-averaging transport variables at specified time steps. Use of this option may be beneficial in some cases, especially for simulation of asymptotically steady-state flow systems. Further details of this feature are contained in Sections 5.0 and 6.0

4.0 DESCRIPTION OF INPUT STRUCTURES

4.1 INTRODUCTORY COMMENTS

The input for a PORFLO simulation is effectively a stream of eighty-character card images with each card image being one of four possible record types. Problem definition and execution control data are entered in free format by the use of data input records and their respective continuation records. Titling information is entered via Hollerith records. Comment records allow the user the capability of annotating the input stream for

readability and easy reference. Ordering of cards in the input stream is largely independent of any prespecified sequence, although adoption of a standardizing convention for such facilitates maintenance of data sets.

Description of the structure of each of the above record types is contained in the following subsections. Structure and usage of particular data input records are covered in detail in Sections 5.0 and 6.0.

4.2 DATA INPUT RECORDS

Data input records, also referred to as keyword cards, are used to define a particular problem of coupled groundwater flow, heat transfer, and radionuclide transport as well as to control execution of the solution of a well-posed problem. Each keyword card begins with a particular alphabetic keyword that typically is followed by a keyword separator and subsequent alternating sequence of numeric fields and field separators.

A properly constructed keyword begins in column one and contains from one to eighty alphabetic characters of which, at most, the first four are significant. A keyword is terminated by the first occurrence of a blank or nonalphabetic character. For example, the keyword candidates **SOLV**, **SOLVE**, **SOLVEIMMEDIATELY**, AND **SOLVE NOW** are equivalent. On the other hand, the specifications, **S**, **SOL**, and **SOLV** are not necessarily equivalent keywords. A valid keyword may serve to direct PORFLO input routines to generate and/or store data items for use in ensuing computations. Alternately, a keyword may instruct PORFLO to initialize or reset parameters that control execution of the solution algorithm. A few keywords recognized by PORFLO serve purely to effect transfer of control. Elaboration of all keywords currently recognized by PORFLO is contained in Sections 5.0 and 6.0.

A keyword must be separated from the first following numeric field by a keyword separator. The simplest valid keyword separators are a literal blank ( ), a comma (,), and an equal sign (=). In many instances a keyword separator is conveniently embedded in the more general field separator described below.

A numeric field is an integer, real fixed point, or real floating point expression consisting only of numerals along with the characters plus (+), minus (-), decimal point (.), and exponent (E) and no embedded blanks. Regardless of whether a numeric field symbolically expresses an integer or a real number, the value of the expression is initially stored internally by PORFLO as a real number. Any subsequent internal requirement for integer representation is satisfied by truncation of the fractional part.

Any numeric field in a data input record must be separated from any immediately preceding numeric field by a field separator. A field separator may also intervene between a keyword and the first following numeric field. A field separator may contain any characters except numerals, plus sign (+), minus sign (-), decimal point (.), asterisk (*), and dollar sign ($) under the further restrictions that the alphabetic character (E) may only occur if it is immediately preceded and followed by other alphabetic characters and

that any given field separator contain no more than ten total embedded blanks. A candidate field separator containing more than ten total embedded blanks implies end-of-record. The flexibility thus provided by the stated field separator structure affords the user the capability of utilizing English-like constructs such as

T = 50 DEGREES CELSIUS OVER SUBDOMAIN FROM (1,1) TO (10,20)

and

SOLVE FOR 10 SECONDS IN STEPS OF 2 SECONDS

which enhance the readability and maintainability of input streams.

Two other structural features of the data input record remain. First, successive repetitive numeric fields may be condensed using a repetition specification of the form n*N, where N denotes a numeric field and n denotes the number of successive occurrences. For instance, the specification (3., 3., 3., 3., 3.) may be written equivalently as 5*3. Secondly, detection of a dollar sign ($) in a data input record terminates parsing of the record thus leaving the remainder of the record as an alphanumeric comment field.

4.3 CONTINUATION RECORDS

A continuation record is an extension of a data input record. As such, it bears no explicit keyword; rather, it contains a continuation of the sequence of numeric fields and field separators associated with the most recently specified keyword.

Structure of a continuation record is consistent with the above usage. It is composed of a sequence of numeric fields and field separators under the restriction that column one may contain any character except an alphabetic character, an asterisk (*), or a dollar sign ($). Furthermore, there is no explicit limit on the number of continuation records used; however, there is currently a limit on the number of numeric fields per each occurrence of each keyword, which in effect limits the number of continuations. (The maximum number of numeric fields per keyword is adjustable as described in the PORFLO main program.)

4.4 HOLLERITH RECORDS

Hollerith records are used as a means of entering Hollerith data (i.e., titling information). A Hollerith record begins with an asterisk (*) in column one followed by a Hollerith keyword beginning in column two. Following the keyword are a simple keyword separator and a Hollerith data field.

Construction of a Hollerith keyword is the same as described in Section 4.2 with the exceptions that it must begin in column two and contain from one to seventy-eight alphabetic characters. A simple keyword separator, namely either a blank ( ), a comma (,), or an equal sign (=) must immediately follow the keyword. The remaining positions on the card compose the Hollerith data field and may contain any alphanumeric and special characters.

As a final consideration on the structure of Hollerith records, it should be noted that a Hollerith record may not be continued. Hence, the maximum Hollerith data field length associated with a Hollerith keyword is 80-(2+n) characters, where n is the length in characters of the given keyword.

4.5 COMMENT RECORDS

Comment records are nonfunctional with respect to data specification and control of execution. Instead, they afford the user the option of annotating an input stream to any desired degree.

The formal structure of a comment record is nominal. A comment record begins with a dollar sign ($) in column one followed by any combination of alphanumeric or special characters. A comment record may not be formally continued, but may be followed by other comment records that are effectively continuations.

Hence, comment records used in conjunction with English-like keyword records provide the elements of compositon of input streams that resemble text and/or labeled data tables.

5.0 DESCRIPTION OF INPUT PREPARATION

5.1 INTRODUCTORY COMMENTS

Preparation of input for a PORFLO simulation typically consists of five phases. The phases of input preparation as described here are neither mutually exclusive nor strictly ordered. However, they represent the potential for a standardizing convention for layout and preparation of PORFLO input streams.

Given a simulation problem involving coupled groundwater flow, heat transfer, and radionuclide transport, the five identifiable phases relate to (1) construction of an appropriate discretization grid, (2) definition of zones, (3) specification of initial and boundary conditions, (4) specification of heat and mass sources, and (5) selection of a time-stepping strategy. It is clear that gridding is a prerequisite to the other phases of input preparation. It is also clear that, from the standpoint of execution, time-stepping input would normally be preceded by input from all other phases. The remaining phases may not appear to be sequentially ordered, but some precedences for such are implied in the following subsections.

5.2 SIMULATION TITLE

In Section 4.1, it was mentioned that ordering of cards in an input stream is largely up to the user. One immediate exception is that if the user wishes to specify a simulation title, it must be accomplished with the first keyword in the input file. The title is given on a Hollerith record bearing the **TITLe** keyword and is used to embellish printed output. Also, it may sometimes be desirable to follow a title with a section of comment records containing a narrative giving the purpose of the simulation, creation date, version number, source of data, and any other relevant information characterizing the simulation.

5.3 GRID CONSTRUCTION

A second exception to the independence of ordering of records in an input stream is that the first data input record in any input stream must bear the **GRID** keyword and contain NI and NJ, the numbers of vertical and horizontal grid lines, respectively, in the first and second numeric fields, respectively.

The values of NI and NJ also determine the extent of utilization of array storage in PORFLO. The array dimensions in turn are adjustable up to physical memory limitations as described in the main program source code. If during execution of PORFLO NI and/or NJ exceed current array limits, an error message is printed and execution is halted.

The **GRID** keyword card is usually followed by **X** and **Y** keyword cards and their continuations. The **X** keyword is used to indicate the list of **NI** x-coordinates in ascending order, and similarly for **Y**. If the number of x-coordinate candidates given is actually greater than NI, the excess coordinates are ignored; if, on the other hand, the number is less than NI, the list is filled out with zeroes. The same also applies to the y-coordinate list. Furthermore, if either or both of the **X** and **Y** keyword cards are not used, a list of equally spaced coordinates is generated for each unspecified axis by

$$x_i = (i - 3/2)/(NI - 2) \text{ for } i = 1, \ldots, NI \tag{32}$$

or

$$y_j = (j - 3/2)/(NJ - 2) \text{ for } j = 1, \ldots, NJ, \tag{33}$$

whichever is appropriate.

The above described procedure for specification of grid coordinates is tailored to definition of a rectangular grid in Cartesian coordinates.

Alternatively, if the user wishes to define a grid over a domain in the shape of a solid upright cylinder or the region bounded by two concentric upright cylinders using radial coordinates, it may be accomplished by following the same guidelines but with the addition of inserting a data input record containing the keyword **RADI**al. In this case, the x-coordinates are interpreted as r-coordinates (the radii of concentric circles) and the geometric considerations of area and volume are automatically treated appropriately. However, for either domain shape, rectangular or cylindrical, the discretization grid will always appear as a rectangular array of rectangular grid blocks.

There remain two requirements on specification of r-coordinates for an axially symmetric cylindrical domain. First, if the domain is a solid cylinder, then

$$0 > r_1 = -r_2 \tag{34}$$

must hold; i.e., the vertical cell faces midway between r_1 and r_2 must be positioned at $r = 0$ as shown in Figure 2(a). Secondly, if the domain is a region bounded between two concentric cylinders, then

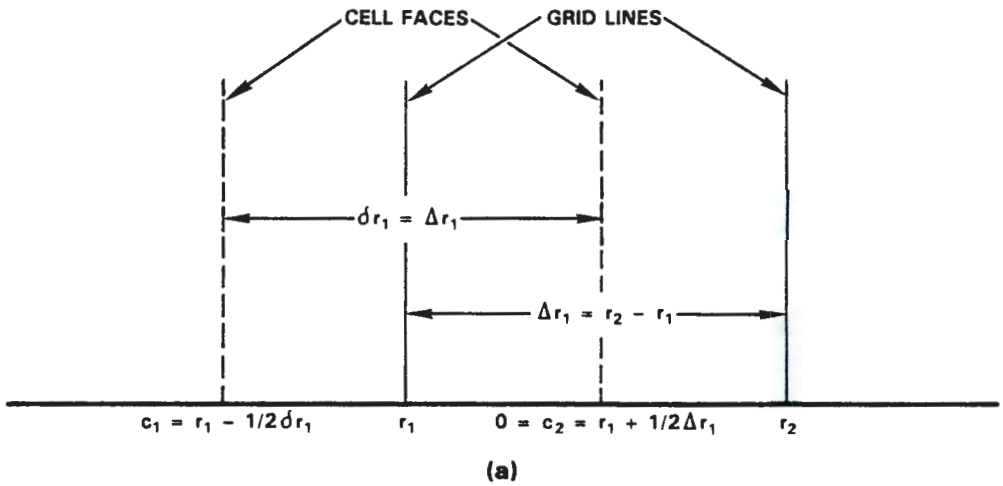
$$0 < r_1 < r_2 < 3r_1 \tag{35}$$

must hold; i.e., the inner bounding cylinder cannot degenerate to a line as pictured in Figure 2(b). The need for these requirements concerns boundary conditions and is spelled out in Section 5.5.

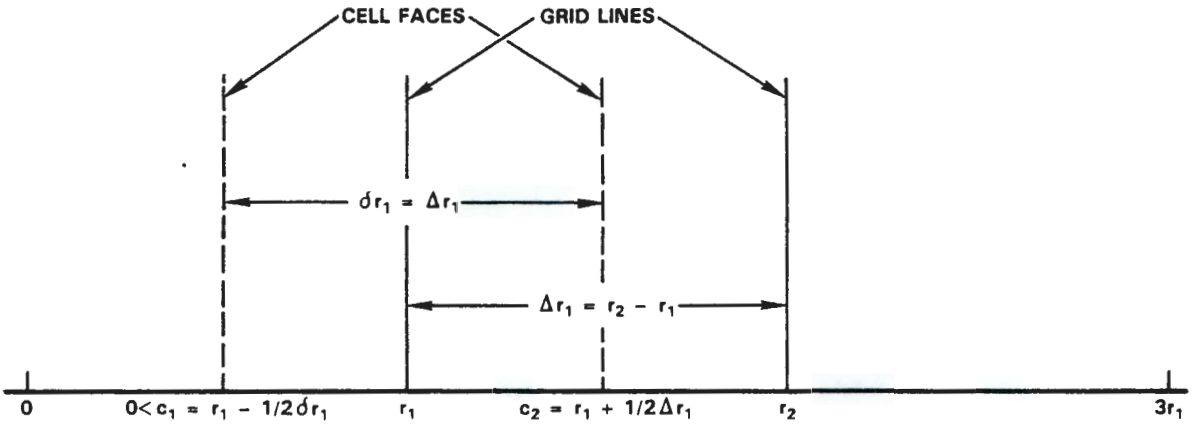
Aside from the procedurally oriented considerations of grid input preparation, there are other, somewhat more fundamental, factors affecting the grid design. In Section 3.2, it was pointed out that Δx is loosely governed by the grid Peclet number as in Equation 30. Further constraining a grid setup is the grid aspect ratio that should satisfy

$$\max\ (\Delta x/\Delta y) < 50 \tag{36}$$

in regions of thermal influence. Other factors influencing decision making during design of a grid include definition of zones and specification of initial and boundary conditions. Hence, the content of the following two subsections should enter into the grid design process.



(a)



(b)

RCP8305-111

FIGURE 2. Left (Inner) Boundary for a Radial Coordinate System (a) Solid Cylinder (b) Hollow Cylinder.

5.4 ZONE DEFINITION

Zones are used to distinguish regions of material of differing characteristic thermal, transport, and hydraulic properties and also to delimit sources of heat and radiocontaminants. If, for a given simulation, no zones are specified explicitly, the entire domain is regarded as a single zone. Alternately, the zones may be numbered sequentially beginning with zone number one.

Since the term "zone" was defined in Section 2.2 to be simply "a collection of grid cells," it follows that zones are not limited by any restrictions of relative size or connectedness. A further observation, and the only limiting factor on zone construction, is that any given zone may ultimately be decomposed into a collection of constituent rectangles, each containing one or more grid cells. For any given zone, it is the collection of mutually exclusive, maximal constituent rectangles of the zone that one defines explicitly in a PORFLO input stream. Actually, it is very seldom that a zone is disconnected. Most frequently, by convention, if a conceptual zone consists of two or more disconnected rectangles, the constituent rectangles are defined on input as distinct zones, even though they may have identical characteristic properties.

Examples of connected and disconnected zones may be found in the repository-scale performance simulations for which PORFLO is primarily utilized (Rockwell, 1982). For instance, spatially separated basalt entablatures with identical characteristics are distinguished as distinct zones because they are distinct layers in a sequence of formations. On the other hand, two disjoint repository panels having identical characteristics are defined as being parts of a single zone. This is because in a later portion of the input stream the repository zone is distinguished as a heat and contaminant release zone, of which there may be at most one per simulation domain. More details on source zones are contained in Section 5.6.

Given a well-chosen zoning strategy and a compatible grid for a simulation domain, implementation of the appropriate zone definition input is almost trivial. One data input record is required for each connected zone or section of a disconnected zone. The record begins with the keyword **ZONE** followed by the zone number, the i and j indices of the node in the cell occupying the lower left-hand corner, and the i and j indices of the node in the cell occupying the upper right-hand corner. Furthermore, it should be noted that each grid cell must belong to exactly one zone. Any grid cell that is not explicitly included as part of some zone will, by default, be included as part of zone one. On the other hand, PORFLO also ensures that zones do not overlap; i.e., if some grid cell is included in, for example, zone n_1, and then later included in zone n_2, affiliation of the cell with zone n_1 is superseded by inclusion in zone n_2.

A few remarks on assignment of zone numbers and organization of zoning records are appropriate at this point. First of all, the technique of bottom-up zoning is recommended. Very simply, bottom-up zoning is the strategy of assigning ascending zone numbers sequentially from the bottom to the top of the grid and is consistent with the ordering of y-coordinate indices. In the event that bottom-up zoning is not appropriate, left-to-right zoning may be preferable. Secondly, it is aesthetically appealing to order the

zone input records in the input stream from first to last by ascending zone number. Finally, in the spirit of exploiting the free-formatting features of PORFLO, it is often helpful, at least from the point of view of future reference, to physically align the keywords, numeric fields, and keyword separators in columns and head the resulting table with a comment record labeling the significant columns. Illustration of this approach again is found in input streams for the repository-scale performance simulations.

As mentioned at the beginning of this section, zones are used primarily as a means of distinguishing regions of differing material properties. Thus, following data input records defining the physical extent of zones, the user should include data input records giving numeric values to the various parameters characterizing each zone. There are three keywords that allow for such specifications. The **WATE**r keyword allows one to input the density (ρ_f), thermal conductivity (D_f), specific heat (c_f), and coefficient of molecular diffusion for groundwater (D_m). The water properties are global (i.e., common to all zones), but are mentioned here because they are used in computation of effective zone properties (e.g., in Eq. 4 and 5). The first three numeric fields of the **ROCK** keyword card contain the beginning zone number, ending zone number, and zone number increment for a sequence of zone numbers to which the parameter values in the fourth through tenth numeric fields apply. The seven rock properties in order are density (ρ_s), effective porosity (ϕ), thermal conductivity (D_s), specific heat (c_s), and the sorption coefficient (K_d) for a given nuclide. The first three numeric fields of the **HYDR**aulic keyword card are of the same form as in the rock properties card and are followed by horizontal hydraulic conductivity (K_{xx}), vertical hydraulic conductivity (K_{yy}), and specific storage (S_s).

In addition to the above, it should be noted that realistic values of the water properties are provided by default as seen in Section 6.0, but the thermal, transport, and hydraulic properties are all taken to be zero by default. Moreover, if the rock and/or hydraulic properties are explicitly specified more than once for a given zone, it is the latest specification that is used for computations.

As a final comment on zone properties, it is noteworthy that density disparity (δ_b) and hydraulic conductivity (K) are temperature dependent. Hence, PORFLO offers a selection of algorithms, tailored for a variety of applications, by which density disparity and hydraulic conductivity may be updated with respect to temperature change during time-stepping. Details concerning selection of an appropriate option for each may be found in Sections 5.8 and 6.0.

5.5 INITIAL AND BOUNDARY CONDITIONS

Solutions of the transport equations (Eq. 1, 3, and 6) are dependent on the initial conditions of the transport variables h, T, and C, respectively. Moreover, if the temperature equation and/or the concentration equation is/are being solved, but the flow balance equation is not being solved, then the initial conditions of U and V are also used. By default, each of U, V, h, T, and C is taken to be zero everywhere initially. Alternately, initial distributions of U, V, h, T, and C may be specified by using the keywords **U**, **V**, **P**, **T**, and C, respectively.

Four options allow the user to specify initial values of a variable for a single cell, over a zone, over a subdomain, or over an entire domain. The user may specify a constant initial value of the variable of interest over the entire domain by simply using the appropriate keyword followed by a numeric field containing the spatially constant initial value of the variable of interest. Following from this option, if a second non-zero numeric field is given and the third numeric field is zero or blank, then the second numeric field is interpreted as the number of a zone over which the constant initial value applies. A third option allows the user to specify an initial value for a cell by following the keyword with the value at the node (or cell face, in the case of U and V), and the i and j indices of the node in the cell. The fourth option, tailored after Equation 12, affords the capability of specifying an initial distribution in a subdomain over which the variable has constant gradient. This option is utilized by following the appropriate keyword with the value of the variable of interest in the cell in the lower left-hand corner of the subdomain, the i and j indices of the node in the lower left-hand corner, the i and j indices of the node in the upper right-hand corner, and the horizontal and vertical components of the gradient.

If more than one initial value of a particular variable is specified at a given node, the latest specification is effective. Occurrence of such is not necessarily accidental. Indeed, such a strategy is convenient in some cases. An example is found in the input stream for the Buretta case (shown in Appendix D) simulation in which temperature is initialized over the entire domain using the first of the four options above, and then point perturbations in the temperature field are specifed using the third option.

Solutions of the transport equations (Eq. 1, 3, and 6) are also dependent on the boundary conditions for the respective transport variables. Dirichlet or Neumann boundary conditions for h, T, and C may be specified along any vertical or horizontal boundary segment using the XBC or YBC keyword, respectively, the syntax for which is detailed in Section 6.0. By default, for each of h, T, and C, the initial conditions at the boundary are taken as Dirichlet boundary condition specifications of the first kind for each boundary segment along which no boundary condition is explicitly specified.

Boundary cells in a PORFLO simulation domain are referred to as noncomputational. This is due to the fact that values of the transport variables at the boundary nodes are obtained from enforcement of the boundary conditions. Moreover, with reference to Figure 1(b), the user may observe that velocities are defined at cell faces rather than nodes. Hence, the horizontal component of fluid velocity is always zero at the top, bottom, and left boundaries, and the vertical components is always zero at the left, right, and bottom boundaries.

An important implication of boundary condition selection is the placement of the physical system boundaries within the simulation domain. Dirichlet boundary condition specifications of the first kind are based on the assumption that the physical system boundaries are aligned with the grid lines on which the boundary nodes lie. Dirichlet boundary condition specifications of the second kind and Neumann boundary conditions are formulated

in terms of the interior vertical (horizontal) face of a cell on a vertical (horizontal) boundary. Thus, the Dirichlet boundary condition specification of the second kind allows for mixing Dirichlet and Neumann boundary conditions on a single boundary.

The following applies to the use of boundary conditions with axially symmetric cylindrical domains. For a cylindrical domain, regardless of whether the domain is a solid cylinder or the region bounded by two concentric cylinders, the right boundary is the outer wall of the cylinder. If the domain is the region bounded by two concentric cylinders, then the top and bottom boundaries are identical annuli, and the left boundary is the wall of the inner bounding cylinder. In this case, all of the available boundary condition options are generally applicable. If the domain is a solid cylinder, then the top and bottom boundaries are disks, and the left boundary is a vertical line through the origin. In this case, all of the available boundary condition options are generally applicable except that the Dirichlet boundary condition specification of the first kind (at the boundary node) is not appropriate for the left boundary. This exception is due to the fact that, in this case, the interior face of the boundary cell coincides with the axis of symmetry.

5.6 HEAT AND MASS SOURCES

The PORFLO code is equipped with a repertoire of keywords that allow the user to define the region, duration, and magnitude of heat and radiocontaminant sources as well as to compute contaminant flux across arbitrarily selected horizontal and vertical planes. For some simulations infusion of a radiocontaminant and/or heat to a system is adequately modeled by appropriately selected boundary conditions. In other cases (e.g., the Buretta case and the near-field repository performance simulations), transport within or away from an internal region of release is the focal point of the simulation, in which case the keywords of interest in this section are applicable.

A single, possibly disconnected, heat and/or contaminant release region may be defined by use of the SOURce keyword. The first four numeric fields on the SOURce keyword card are, in order, the i and j indices of the node in the lower left-hand corner and the i and j indices of the node in the upper right-hand corner of a rectangular region, say R_1, which is a superset of the intended source region. The fifth numeric field should contain the number of a previously defined zone bounding a region, say R_2, which is also a superset of the intended source region. The effective release region utilized by PORFLO is then $R_1 \cap R_2$. This rather general means of source region designation allows for a wide variety of source configurations, although typically a source region is in the form of a simple geometric shape. An example of the case $R_1 = R_2$ is the source region defined in the Buretta simulation. An example of the case $R_2 \subset R_1$ is the source region used in the repository performance simulations. No examples of the case $R_1 \subset R_2$ are currently available, although such is feasible.

An optional sixth numeric field on the SOURce keyword card is used to specify the extent of a pair of contaminant flux planes that are generated by sweeping a pair of user-specified grid line segments orthogonally to the

plane of the grid through the specified range. The keyword by which the user selects appropriate horizontal and vertical grid line segments for flux plane generation is described at the end of this section. At this point it suffices to say that, for a rectangular domain, the default depth of the flux planes is one length unit, and for a cylindrical domain the parameter is interpreted as an angle of revolution with a default value of 2π radians.

Specification of heat release from the source region is accomplished via the **HEAT** key word. The first numeric field on this card is the number, say n, of pairs of the form (t_i, S_i) where t_i is a simulation time point and S_i is the volumetric heat release rate at time t_i. It should be noted that the volume of concern is the total volume of the source region and that heat is released uniformly over the region during any time step. Moreover, the depth of the source region or angle of revolution of the source region as is appropriate, as used in establishing the volume, should correspond to the range of the above-mentioned flux planes.

Figure 3 illustrates a typical volumetric heat release curve based on a set of the form $\{(t_i, S_i): 1 \leq i \leq n\}$, along with the amount of heat ΔS, released uniformly over the source region during a time step of length Δt. If t_1 is greater than zero, then the heat release is assumed to be zero up until time, t_1, in which case it would normally be advisable to end a time step exactly at time t_1. After time t_1, the slope of the heat curve may be a limiting factor in time step size. More will be mentioned in this respect in Section 5.9.

The only further remarks on heat source input concern ordering of data. These remarks may be written concisely in the form of the algebraic constraints $t_1 \geq 0$, $t_i > t_{i-1}$ for $2 \leq i \leq n$, and $S_i \geq 0$ for $1 \leq i \leq n$.

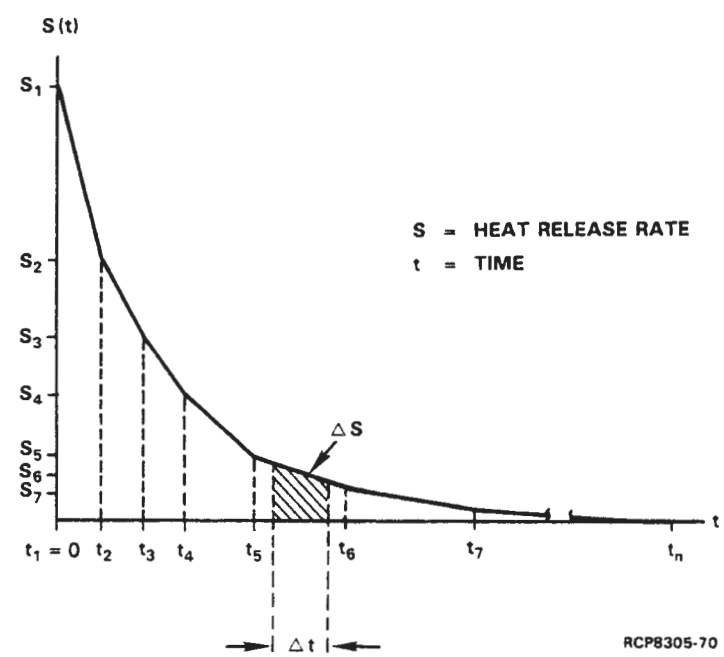


FIGURE 3. Typical Volumetric Heat Release Curve.

Specification of radionuclide release from the source region is accomplished via the **MASS** keyword. All of the above description of heat release input is applicable to mass release input with one exception. The exception is that, in the case of heat input, n = 0 implies no heat release and would probably only occur as an explicit specification by mistake, whereas, in the case of mass input, n = 0 activates another mass release input option. This second contaminant release option is referred to as solubility limited release, in which case the second numeric field contains the time at which release begins and is followed by the total inventory to be released and the maximum source region concentration in the third and fourth numeric fields, respectively. Under this second option, the contaminant concentration at each node in the source region is determined by the maximum specified concentration at the beginning of each time step following the initial release time until the specified initial inventory is exhausted.

An important contrast, which should be noted, is that in the case n>0, the volumetric release rate of contaminant is in terms of the total volume of the source region, whereas, in the case n = 0, the maximum contaminant concentration for the source region is in terms of the pore volume of the source region.

In some simulations involving transport of a long half-life nuclide, it is convenient to assume that the half-life is large enough to render decay as negligible. If, on the other hand, the half-life is significant with respect to the duration of the simulation, the user may specify the half-life of the nuclide of interest by use of the **HALF**-life keyword. This half-life specification is used to compute λ, the decay constant used in the concentration equation (Eq. 6). It is not, however, used to account for decay of the source. Decay of the source must be accounted for prior to input.

When decay is significant, one should probably refrain from using the solubility limited release option since, under this option, the source strength and duration may not be constrained by decay. Rather, if decay is significant, the user should consider specifying an appropriate volumetric release rate, along with which there is an underlying method of controlling release duration and, thus, decay, and possibly also specify an appropriate sorption coefficient, K_d. Specification of sorption is roughly equivalent to specification of maximum solubility in terms of simulation output.

Volumetric radionuclide release is typically dissolution-oriented with the underlying assumption that mass is released at a constant rate per unit time. Under this assumption, the volumetric contaminant release rate curve should appear as a step function. The effective release interval length, Δt_e, is the key parameter by which one may account for decay of the source. A useful result (see Appendix A) is $\Delta t_e = -1/\lambda \ \ln[f/(f+\lambda)]$, where f denotes the fractional mass release rate; i.e., f is the constant mass fraction being released per unit time. As half-life becomes very large, Δt_e approaches the reciprocal of f.

Thus, to completely determine a constant volumetric radionuclide release rate curve, the user needs to know the time at which release begins, the contaminant inventory at the beginning of the release period, the assumed fractional release rate, the volume of the source region, and the half-life of the nuclide of concern. Referring to Figure 4, which depicts an example of a constant volumetric radionuclide release rate curve, it can be seen that the curve is not exactly a step function. This is due to the fact that the input pairs of the form (t_j, S_j) are taken as end points of segments of a piecewise linear function and, therefore, the small time periods $t_3 - t_2$ and $t_5 - t_4$ are used to produce a linear function that is nearly a step function. In this case, t_2 is the time at which contaminant release begins, and t_4 is the time at which the contaminant inventory is depleted.

Given a simulation in which contaminant transport is of interest, it may sometimes be desirable to know the contaminant flux across a vertical or horizontal plane within the domain. Such may be provided by use of the **FLUX** keyword. The keyword is followed by the x-coordinate index at which a vertical flux plane is required and the y-coordinate indices, which give the vertical extent of the plane. The depth of the plane is governed by the sixth numeric field on the **SOUR**ce keyword card as mentioned previously. Three coordinate indices defining a horizontal plane may also be included on the **FLUX** card in the same manner as detailed in Section 6.0. In the case of axially symmetric radial coordinates, the vertical plane becomes the outer surface of a cylinder as intercepted by the specified angle of revolution from the **SOUR**ce card, and the horizontal plane becomes the intercepted portion of a disk or annulus depending on whether the domain is a solid cylinder or the region bounded by two concentric cylinders, respectively.

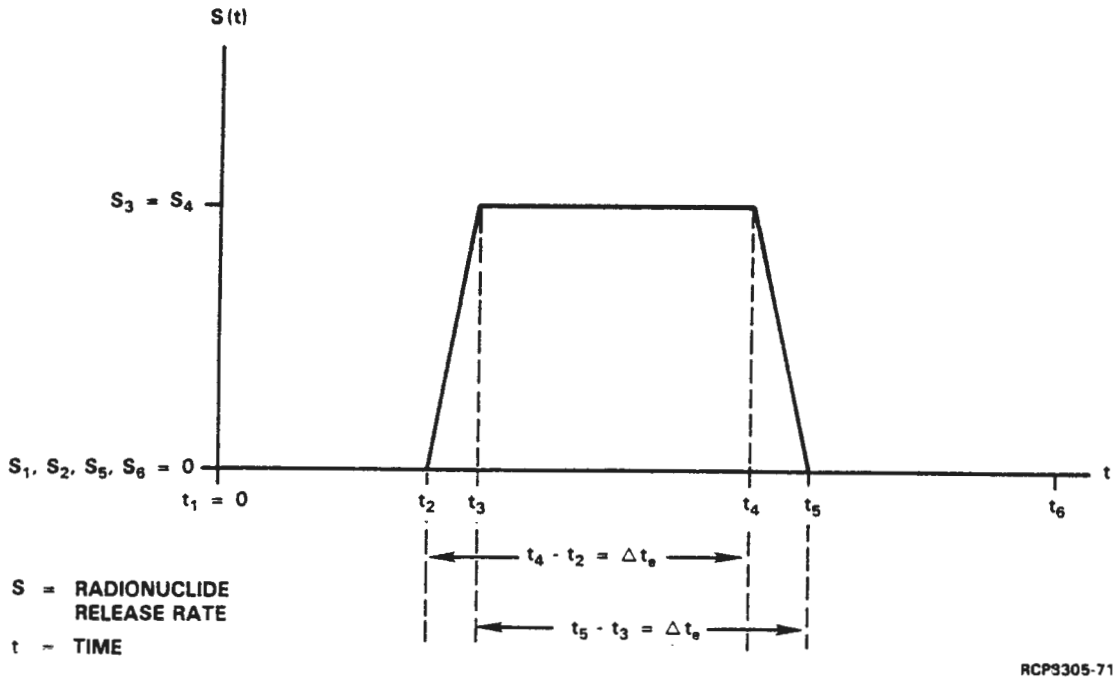


FIGURE 4. Typical Volumetric Radionuclide Release Rate Curve.

5.7 OUTPUT CONTROL

Seven keywords allow the user to manipulate the generation of output from a PORFLO simulation. The most fundamental of the available outputs is a time history of U, V, h, T, and C at a reference node. This output is invoked by using the keyword REFErence followed by the i and j indices of the node for which the time history is desired. There may be at most one reference node per run. Along with the time history output are printed three values that are sometimes useful as indicators of time step efficiency. The three values are denoted by $\Delta P/P$, $\Delta T/\Delta t$, and Pe and are representative of the maximum fractional change in hydraulic head, the maximum time rate of change of temperature, and the maximum Peclet number from the concentration equation, respectively, where each ranges over the entire grid. Usefulness of these indicators in assessing time step efficiency is pointed out in Section 5.9.

Three more keywords control generation of all other tabular output. The keyword IPRInt is the primary control of frequency of printout of the 25 available field arrays. The first through twenty-fifth numeric fields on the IPRInt card contain parameters specifying the frequency of printout of the respective field arrays. The field arrays available for printing are summarized in Table 1. Possible values of the frequency parameters are described in Section 6.0. The OUTPut keyword is used in conjunction with IPRInt to specify a subdomain limiting the range of the field array printout along with a secondary frequency parameter common to all field arrays. The syntax for the OUTPut keyword card is also detailed in Section 6.0. The keyword TEST followed by a frequency in number of time steps invokes generation of extensive diagnostic output and should be used with caution since the diagnostic output can be extremely lengthy.

PORFLO also writes binary plot files as controlled by use of keywords. The keyword PRINterplot followed by a list of pairs of nodal coordinate indices causes a record of U, V, h, T, and C at each specified node to be written in the printer plot file at each time step. At the end of the simulation up to five time history printer plots are generated, one each for U, V, h, T, and C, as is appropriate, showing the time-dependent behavior at each specified node. The keyword PLOT may be used to select times at which h, T, and C and/or U and V from the entire grid are to be written to files intended for compatibility with graphics postprocessors. Options available with the PLOT keyword are given in Section 6.0, while examples of postprocessor graphics are shown in Appendix E. A fourth plot file is written automatically when the user requests FLUX output. The flux output file contains time history records of contaminant arrivals along the lines of flux plane generation and is intended for compatibility with a postprocessor.

Following each section of tabular printout is the mass flux and integrated mass flux up to the most recent time step as generated from invocation of the FLUX option. Also printed at this point is the current total water flow rate at each of a pair of planes defined by way of the FLOW keyword. The syntax of a FLOW keyword record is identical to that of a FLUX keyword record and is detailed in Section 6.0.

TABLE 1. Summary of Printable Field Arrays.

Array number (i)	Array name	Description
1	U	Horizontal Darcy velocity (U)
2	V	Vertical Darcy velocity (V)
3	P	Hydraulic head (h)
4	T	Temperature (T)
5	C	Radionuclide concentration (C)
6	ZONE	Zone numbers
7	VOL	Cell volume coefficient ($r\delta x\delta y$)
8	DRHO	Density disparity (δ_b)
9	DPX	Horizontal conductivity of rock (K_{xx})
10	DPY	Vertical conductivity of rock (K_{yy})
11	SP	Pressure source term ($\gamma\frac{\delta T}{\delta t}$)
12	POLD	Previous head value ($h^{\ell-1}$)
13	DTX	Horizontal thermal conductivity of rock (D_{t_x})
14	DTY	Vertical thermal conductivity of rock (D_{t_y})
15	ST	Thermal source term (Q)
16	TOLD	Previous temperature value ($T^{\ell-1}$)
17	DCX	Coefficient of horizontal contaminant dispersion (D_{mx})
18	DCY	Coefficient of vertical contaminant dispersion (D_{my})
19	SC	Contaminant source term ($\dot{m}$)
20	COLD	Previous concentration value ($C^{\ell-1}$)
21	AREAX	Areal coefficient of vertical cell face ($r\delta y$)
22	AREAY	Areal coefficient of horizontal cell face ($r\delta x$)
23	FLOWX	Horizontal flow rate ($Ur\delta y$)
24	FLOWY	Vertical flow rate ($Vr\delta x$)
25	ROZERO	Initial density disparity (δ_b^o)

5.8 EXECUTION CONTROL

Five keywords that directly affect execution of the solution algorithm are introduced here. Full definition of the numeric fields associated with the keywords is given in Section 6.0.

The ISOLVE keyword followed by three indicator values determines which of Equations 1, 3, and 6 are to be solved by PORFLO. The current default is that PORFLO solves the pressure and temperature equations. In solution of the pressure equation, PORFLO utilizes standard central differencing, and by default, central differencing with switch-over to donor cells for Peclet numbers greater than 1 is used for the temperature equation. By way of the FDS keyword, the user may select optional higher-order profiles for use in solution of the temperature equation. The two available higher-order schemes are basically an exponential profile and a polynomial profile. If the user specifies solution of the concentration equation, the exponential profile is assumed by default; whereas, in this case, the FDS keyword may be used to optionally select central differencing with switch-over to donor cells or the polynomial profile. It should be noted that utilization of the higher-order schemes is usually only beneficial when the Peclet number is large but less than 200. Such a condition may be symptomatic of excessively high fluid velocities or an excessively coarse grid which may, in some cases, be unrealistic and, in turn, may be indicative of the need for user action other than invocation of higher-order accuracy schemes. On the other hand, at worst, use of the higher-order nodal profiles may result in some unnecessary computing overhead.

Use of the keyword KINDex allows the user to select an algorithm by which the hydraulic conductivity matrix is updated with respect to temperature change at each time step. The default is constant conductivity. The most commonly used option is governed by the relation

$$K_{i,j}^{\ell+1} = K_{i,j}^{\ell} \exp\left(\frac{s}{T^* + T_c} \cdot \frac{T_{i,j}^{\ell} - T^*}{T_{i,j}^{\ell} + T_c}\right) \tag{37}$$

where

s = viscosity exponent

T^* = reference temperature

T_c = critical fluid temperature.

Each of s, T^*, and T_c may be specified on the KINDex card, although realistic defaults are provided. Two further conductivity options are tailored for compatibility with the Buretta and Holst convection cell simulations. The basis for all these options will be elaborated in a later report.

The **DENS**ity keyword allows the user to select an algorithm for updating the density disparity matrix with respect to temperature change at each time step. The default is zero density disparity. Alternately, a commonly used option is summarized by the equation

$$\delta b_{i,j}^{\ell+1} = \left(\frac{T_c - T_{i,j}^{\ell}}{T_c - T^*} \right)^A - \delta b_{i,j}^{o} \tag{38}$$

where

A = density exponent

and

$$\delta b_{i,j}^{o} = \left(\frac{T_c - T_{i,j}^{o}}{T_c - T^*} \right)^A . \tag{39}$$

Another generally applicable option is expressed by

$$\delta b_{i,j}^{\ell+1} = \left[\frac{T_c - \frac{1}{2} (T_{i,j}^{\ell} + T_{i,j-1}^{\ell})}{T_c - T^*} \right]^A - 1 . \tag{40}$$

In either of the above cases, each of A, T_c, and T* are user definable although realistic values are provided by default. Two further density options are available and are tailored primarily for the Holst and Buretta convection cell simulations. The basis for these options will also be included in a forthcoming report.

A fifth keyword through which the user may exercise some control over the solution algorithm is **MIX**. This keyword is followed by a numeric field containing a frequency in time steps at which each of h, T, and C is time averaged at each node. This option is intended for use in stability enhancement, although it should be utilized judiciously. For many transient simulations it is not appropriate. On the other hand, for occasions in which its use is justified to smooth out oscillations, it may cause slight overdamping or even induce oscillations.

5.9 TIME STEPPING

A time-stepping strategy for a PORFLO simulation is fundamentally an appropriate sequence of **SOLVe** keyword cards. It may be as simple as a single **SOLVe** card, or it may contain many **SOLVe** cards with embedded parameter setting, output control, and execution control keyword cards. In fact, any of the previously mentioned keywords with the exceptions of **TITLE, GRID, X, Y, RADIal, DENSity, AND KINDex** may be referenced during time stepping. With this degree of flexibility, the user may possibly incorporate such levels of sophistication as time-dependent zoning and time-dependent boundary conditions, although implementation of such should only be undertaken with due caution.

The **SOLVe** keyword, which is the means of time stepping, may have been included in the previous section but is treated separately since time stepping is of primary importance as regards numerical stability. Before describing factors that affect design of a time-stepping strategy, it is useful to briefly describe the syntax of the **SOLVe** keyword card. The **SOLVe** keyword is followed by at least two and up to five significant numeric fields. The first value is the length of time in simulation time units during which the equations specified by the **ISOLve** card are to be solved. The second value is a time step size. The three optional fields following are, in order, a time step growth factor, a maximum time step size, and a cumulative maximum number of steps.

For some relatively unencumbered simulations, a single **SOLVe** card containing the length of the solution period and constant step size is sufficient to drive the simulation. For more involved simulations, it is often desirable to divide the solution period of the simulation into subperiods, the ending times of which are loosely referred to as time planes, for two principal reasons. One reason for subdividing the solution period is to provide additional control over step size. The other reason is to allow break points at which the user may wish to reset parameters and/or request intermediate output.

Initial time step size should be of the order of Δt_c, the characteristic time described in Section 3.2. A good indicator of appropriateness of step size growth is $\Delta P/P$. An empirical rule of thumb is that the maximum $\Delta P/P$ over the entire domain at any given time step should be the order of 10^{-4}. A second indicator is $\Delta T/\Delta t$, which should be of the order of 10^{-2}. Step size growth factors that allow the user to maintain good values of these indicators typically range over the interval from 1.01 to 1.1 with largest growth at later time.

These indicator values are available at each time step along with the maximum Peclet number from solution of the mass transport equation. The Peclet number is more indicative of the relative goodness of the grid as opposed to reflecting the effectiveness of the time steps. However, it does vary with time in that the velocity field is transient in nature and hence it is computed at each time step. The guideline in consideration of this parameter is that the maximum value of the Peclet number should be less than 20 when using the standard central differencing option. Use of the high-order nodal profiles may allow accurate computation with Peclet numbers as high as 200.

Another consideration regarding step size is the slope of a heat or contaminant release curve. Referring to Figure 3 in which a source is released over time Δt, the user should remember that the source strength is exact with respect to the release profile, but that the release is constant over incremental time Δt. So time stepping has the effect of rendering the release profile to a step function. Hence, over a period during which the actual release curve has high slope, the time steps should be relatively small such that the resulting effective step function is an accurate portrayal of the intended release. On the other hand, constant release such as that depicted in Figure 4 is not impacted by step size.

Time planes are useful as break points at which the user may wish to perform any of a variety of actions in addition to changing step size and step-size growth. One such action is a request for tabular output and/or plot record generation. These outputs may be controlled on a time step frequency basis, but more often these outputs are desirable at fixed times that establish critical time planes. An example of a critical time is the beginning of a contaminant release period. As an efficiency consideration, it is typical that one does not specify solution of the concentration equation until reaching the time plane marked by the beginning contaminant release time. Moreover, the user may wish to specify output characterizing the flow field and temperature at this time plane. Some other time plane controlled actions include changing the frequency of mixing, updating time-dependent boundary conditions, and updating time-dependent zoning.

Another consideration of time planes is the distance between time planes that mark velocity plot file records. In general, inter-time plane distances affect stability of pathline plot generation by postprocessors in the manner that time step size affects solution of the pressure equation. In other words, excessive inter-time plane distances can induce time truncation error in the postprocessor algorithm that generates pathline trajectories.

5.10 SIMULATION RESTART

A singularly important user action, which is commonly marked by a significant time plane, is a request for generation of a restart file. The means of requesting a restart file is the keyword **SAVE**. If no numeric field follows the keyword, the restart file is written immediately. Alternately, a numeric field following the keyword is interpreted as a frequency in number of time steps at which the restart file is to be rewritten. In the former case, the restart capability is intended to allow the user the option of running a simulation in a piecemeal fashion, while in the latter case, the restart feature may be used as a guard against complete reexecution of lengthy computations due to operating environment failures. Regardless of the number of **SAVE**s executed during a run, the restart file will only contain data to allow for restarting from the latest time step that has been **SAVE**d.

A restart file always contains only the necessary data to characterize the transport processes over the entire domain at the latest time step for which a **SAVE** has been performed. More particularly, the transport variables U, V, h, T, C, and δ_b^o are preserved in binary format. Conceptually, then,

the restart file holds an updated set of initial conditions. Thus, given a simulation for which a restart file exists, restarting is accomplished by replacing the **SOLVe** cards that have already been executed up to the latest **SAVE** with a **RESTart** card in the original input stream, and then reexecuting.

Four significant numeric fields may be used in a **RESTart** data input record to implement optional plot file repositioning. Each of the numeric fields is a switch used to indicate whether or not the printer plot, contour, velocity, or mass flux file is to be repositioned to the time step corresponding to the restart point.

No file positioning option is available for the formatted report file written for a restarted run. Instead, the report file for a run during which a **SAVE** was performed is tagged with the date and time of initiation of the run. This tag is subsequently used to identify any restart or postprocessor plot files originated by the run. The report file for a restarted run is tagged with its own date and time of initiation, which, in turn, is propagated to any restart or postprocessor plot files originated by the run, but not to any repositioned plot files. Hence, a sequence of distinct report files provides for traceability of saving and restarting simulations.

6.0 KEYWORD SUMMARY

The syntax and function of PORFLO input structures have been described in Section 4.0, followed by elaboration of usage in varying levels of detail as deemed appropriate for particular data input records in Section 5.0. The present section is a compact tabulation of all currently recognizable keywords containing concise definition of significant numeric fields and commonly used units for input values ascribed to those fields. The intent of the tabulation is to provide easy reference to keyword records, especially for the processes of input preparation and output interpretation.

The PORFLO input data are expected to be in metric units with the basic units of length, mass, and time being meters, grams, and years, respectively. Use of centimeters, grams, and seconds as the fundamental units of input is also compatible with the code. English units should only be used with caution and with the understanding that temperatures should always be in units of degrees Celcius.

The keyword summary is contained in Table 2, which proceeds by order of first occurrence of keywords as encountered in the text. This scheme is suggestive of the order in which keywords might appear in a PORFLO input stream. Moveover, this same convention also applies to the nomenclature pages following Table 2.

TABLE 2. Keyword Summary (Sheet 1 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
TITL					Hollerith keyword that is preceded by an asterisk (*) and followed by a field separator and a problem title with no continuations. If used, it must be the first keyword in the input stream.
GRID					Determines grid size and array utilization. This keyword must be used and must precede all other keywords except TITL.
	IMAX (NI)	≥ 3	3		Number of x- (or r-) coordinates.
	JMAX (NJ)	≥ 3	3		Number of y-coordinates.
X					Designates x- or (r-) coordinate list.
	X (Array)	Any	Refer to Section 5.3	m	Algebraically ascending x- (or r-) coordinates.
Y					Designates y-coordinate list.
	Y (Array)	Any	Refer to Section 5.3	m	Algebraically ascending y-coordinates.
RADI					Indicates axially symmetric radial coordinate system.
ZONE					Allows for definition of a rectangular zone or rectangular segment of a zone within the computational domain.
	IZON	≥ 1 $\leq$JZONE	1		Zone number. (JZONE is a parameter that may be adjusted as detailed in the main program source code.)
	IL	≥ 1 $\leq$IMAX	1		Index of the x-coordinate of the node in the lower left-hand corner.
	JL	≥ 1 $\leq$JMAX	1		Index of the y-coordinate of the node in the lower left-hand corner.
	IH	$\geq$IL $\leq$IMAX	IMAX		Index of the x-coordinate of the node in the upper right-hand corner.
	JH	$\geq$JL $\leq$JMAX	JMAX		Index of the y-coordinate of the node in the upper right-hand corner.
					If IL=0, then the entire domain is zone IZON.
WATE					Designates characteristic properties of groundwater.
	RHOF	Any	997.0	kg/m^3	Fluid density (ρ_f).
	TKF	Any	2.05×10^7	J/m-yr-°C	Thermal conductivity of fluid (D_f).
	CF	Any	4.1868×10^3	J/kg-°C	Specific heat of fluid (c_f).
	DFM	Any	0.03	m^2/yr	Coefficient of molecular diffusion (D).
ROCK					Designates thermal and transport properties of host rock.
	IZ	≥ 1 $\leq$JZONE	1		Beginning zone number to which the rock properties apply.

TABLE 2. Keyword Summary (Sheet 2 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	NZ	≥IZ ≤JZONE	1		Ending zone number to which the rock properties apply.
	IREP	>0 ≤NZ-IZ	1		Zone number increment for sequence of zone numbers to which the rock properties apply. (Rock properties are assigned to zones in a DO loop of the form: DO I = IZ, NZ, IREP.)
	RHO	Any	0	kg/m^3	Density of rock (ρ_s).
	POR	Any	0		Effective porosity of rock(ϕ).
	DTX,DTY	Any	0	J/m-yr-°C	Thermal conductivity of rock (Θ_s).
	CP	Any	0	J/kg-°C	Specific heat of rock (c_s).
	DISL	Any	0	m	Lateral dispersivity of rock (α_L).
	DIST	Any	0	m	Transverse dispersivity of rock (α_T).
	KD	Any	0	m^3/kg	Sorption coefficient of rock for a particular radionuclide (K_d).
HYDR					Designates hydraulic properties of host rock.
	IZ				Same usage as on **ROCK** card.
	NZ				Same usage as on **ROCK** card.
	IREP				Same usage as on **ROCK** card.
	DPX	Any	0	m/yr	Horizontal hydraulic conductivity of rock (K_{xx}).
	DPY	Any	0	m/yr	Vertical hydraulic conductivity of rock (K_{yy}).
	STOR	Any	0	1/m	Specific storage of rock (S_s).
P					Specifies the initial distribution of hydraulic head.
	P (Array)	Any	0	m	Base value of the hydraulic head (h).
	IL	≥1 ≤IMAX	1		If IL=0, the hydraulic head is taken to be constant over the entire domain. If IL≠0 and JL=0, then IL is taken to be the number of a zone over which the base value of h applies. If IL≠0, JL≠0, and IH=0, then IL and JL are taken to be the indices of a single node to which the base value of h applies.
	JL	≥1 ≤JMAX	1		Index of the y-coordinate of a single node, or the node in the lower left-hand corner of a subdomain, to which the base value of h applies.
	IH	≥IL ≤JMAX	IMAX		Index of the x-coordinate of the node in the upper right-hand corner of a subdomain over which the base value of h applies.
	JH	≥JL ≥JMAX	JMAX		Index of the y-coordinate of the node in the upper right-hand corner of a subdomain over which the base value of h applies.

TABLE 2. Keyword Summary (Sheet 3 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	GRADX	Any	0	m/m	Constant value of $\partial h/\partial x$ over the subdomain to which the base value of h applies (Eq. 12).
	GRADY	Any	0	m/m	Constant value of $\partial h/\partial y$ over the subdomain to which the base value of h applies (Eq. 12).
T					Specifies the initial distribution of temperature in the same manner as P.
	T (Array)	Any	0	°C	Base value of the rock matrix temperature (T).
C					Specifies the initial distribution of concentration of radionuclide mass in the same manner as P.
	C (Array)	Any	0	mg/L	Base concentration of radionuclide mass in the groundwater (C).
U					Specifies the initial distribution of horizontal velocity in the same manner as P.
	U (Array)	Any	0	m/yr	Base value of the horizontal component of Darcy velocity (U). Note that in the case of velocity, which is defined at a cell face, the nodal index values IL, JL, IH, and JH identify the cell(s) for which cell faces are being assigned velocities.
V					Specifies the initial distribution of vertical velocity in the same manner as U.
	V (Array)	Any	0	m/yr	Base value of the vertical component of Darcy velocity (V).
XBC					Allows for specification of boundary values for h, T, and C along the vertical boundaries (i.e., for the boundary cells along the lines $x = x_1$ and $x = x_{NI}$).
	NV	1,2,3	Refer to Section 5.5		Transport variable indicator NV = 1 => h NV = 2 => T NV = 3 => C
	IB	1,2	Refer to Section 5.5		Boundary indicator IB = 1 => Left boundary IB = 2 => Right boundary
	IBCX	0,1,2	0		Boundary condition type indicator IBCX =0 => Dirichlet boundary condition of the first kind IBCX =1 => Dirichlet boundary condition of the second kind IBCX =2 => Neumann boundary condition

TABLE 2. Keyword Summary (Sheet 4 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	BCX	Any	0	As per NV	Value of the transport variable at the boundary IBCX =0 => BCX = F_0 as in Equation 14 IBCX =1 => BCX = F_0 as in Equation 15 IBCX =2 => BCX = q_F as in Equation 18
	JL	>1 <JMAX	2		Index of the y-coordinate of the node at the bottom of the boundary segment.
	JH	>JL <JMAX	JMAX-1		Index of the y-coordinate of the node at the top of the boundary segment.
YBC					Allows for specification of boundary values of h, T, and C along the horizontal boundaries in the same manner as XBC. In this case IB =1 => bottom boundary and IB =1 => top boundary.
SOUR					Specifies a heat and radionuclide source region. By default, there are no heat or mass releases.
	ILR	>1 <IMAX			Index of the x-coordinate of the node in the lower left-hand corner of a subdomain containing the source region.
	JLR	>1 <JMAX			Index of the y-coordinate of the node in the lower left-hand corner of a subdomain containing the source region.
	IHR	≥IL <IMAX			Index of the x-coordinate of the node in the upper right-hand corner of a subdomain containing the source region.
	JHR	≥JL <JMAX			Index of the y-coordinate of the node in the upper right-hand corner of a subdomain containing the source region.
	IZRS	≥1 ≤JZONE			Number of a zone containing the source region. The effective source region is the set intersection of this zone with the subdomain defined by the first four numeric fields (cf. Section 5.6).
	RWID	≥0	Refer to Section 5.6	m or radians	Lateral depth of the source region as used to compute radionuclide mass flux.
HEAT					Designates heat release from a source region.
	NSETS	≥1 ≤60	0		Number of points used to define a piecewise linear volumetric heat release rate as in Section 5.6.
	TTSO (Array)	≥0	0	yr	Abscissa for a point on the heat release rate curve. If NSETS=1, TTSO(1) is interpreted as a starting time for constant strength heat release.
	QTSO (Array)	≥0	0	J/m^3-yr	Ordinate for a point on the heat release rate curve. If NSETS=1, QTSO (1) is taken as the constant rate of heat release from time TTSO (1) until the end of the run. Values of TTSO and QTSO must alternate in successive numberic fields beginning with TTSO(1) in the second field. Note that the volume of concern is the total volume of the source region.

TABLE 2. Keyword Summary (Sheet 5 of 11)

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
MASS					Designates radionuclide mass release from a source region.
	NSETS	≥ 0 ≤ 30	0		If $1 \leq NSETS \leq 30$, mass release input is interpreted similarly to heat release input. NSETS=0 implies invocation of the solubility limited mass release option.
	$1 \leq NSETS$	≤ 30			Number of points used to define a piecewise linear volumetric contaminant mass release rate as in Section 5.6.
	TCSO (ARRAY)	≥ 0	0	yr	Abscissa for a point on the mass release rate curve, or starting time for constant mass release.
	QCSO (Array)	≥ 0	0	mg/L-yr	Ordinate for a point on the mass release rate curve, or constant rate of mass release. Note that the volume of concern is the total volume of the source region.
	NSETS=0				Indicates use of the solubility limited mass release option described in Section 5.6.
	TCSO(1)	≥ 0	0	yr	Starting time for solubility limited mass release.
	QCSO(1)	≥ 0	0	kg	Inventory of radionuclide mass at time TCSO(1).
	CSAT	≥ 0	0	mg/L	Saturation concentration of contaminant. Note that the volume of concern in this case is a unit of fluid volume.
HALF					Designates the half-life for the radionuclide of interest.
	VALUE(1)	$\geq 10^{-20}$	10^{30}	yr	Half-life as used in Equation 10.
FLUX					Invokes radionuclide mass flux computations.
	ILOC	>1 <IMAX	0		Index for the x-coordinate of a vertical plane (parallel to an implied yz plane) at which mass flux is to be computed. ILOC=0 implies no flux planes.
	JLF	>1 <JMAX	0		Index for the y-coordinate defining the bottom of the vertical flux plane.
	JHF	<JLF <JMAX	0		Index of the y-coordinate defining the top of the vertical flux plane.
	JLOC	>1 <JMAX	0		Index for the y-coordinate of a horizontal plane (parallel to an implied xz plane) at which mass flux is to be computed. JLOC=0 implies no horizontal flux plane.
	ILF	>1 <IMAX	0		Index of the x-coordinate defining the left boundary of the horizontal flux plane.

TABLE 2. Keyword Summary (Sheet 6 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	IHF	≥ILF ≤IMAX	0		Index of the x-coordinate defining the right boundary of the horizontal flux plane. The depth (or angle at revolution) for each flux plane is defined on the SOURce keyword card. Cumulative mass flux at each flux plane is written at each time step to a file intended for compatibility with a postprocessor.
REFE					Defines a reference node for time step history output. Note that there may be at most one reference node per run.
	IR	≥0 ≤IMAX	0		Index of the x-coordinate of the reference node.
	JR	≥0 ≤JMAX	0		Index of the y-coordinate of the reference node.
IPR1					Controls tabular printout frequency of the two-dimensional field arrays.
	IPRINT (Array)	≥0 ≤7	0		The ith entry in the array IPRINT control printout frequency of the ith field array from Table 1 as follows: IPRINT(i)=0 => No printout of the ith field array at any stage of the calculation sequence. 1 => Printout of the initial values of the ith field array upon encountering the first SOLV card. 2 => Printout of the ith field array during the calculation sequence as governed by the OUTP card. 3 => 1+2. 4 => Printout of the final values of the ith field array immediately following the last time step. 5 => 1+4. 6 => 2+4. 7 => 1+2+4. IPRINT(26)≠0 is a flag that indicates that β is to be added to the time-step history output as long as the temperature equation is being solved.
OUTP					Specifies a subdomain over which the field arrays are to be printed and also provides a secondary printout frequency control and print-skipping options.

TABLE 2. Keyword Summary (Sheet 7 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	NPJUMP	≥0	999999		If NPJUMP>0, then it is taken as a frequency in time steps for printout of the field arrays for which the corresponding IPRInt value is either 2, 3, 6, or 7. If NPJUMP=0, then all field arrays for which the corresponding IPRInt value is greater than or equal to 4 are printed immediately. Furthermore, NPJUMP=0 is a temporary specification in that only the immediate printout is affected and the latest non-zero value of NPJUMP is preserved.
	ISK(1)	≥1 ≤IMAX	1		Index of the x-coordinate of the node in the lower left-hand corner of a subdomain over which the field arrays are to be printed.
	JSK(1)	≥1 ≤JMAX	1		Index of the y-coordinate of the node in the lower left-hand corner of a subdomain over which the field arrays are to be printed.
	ISK(2)	≥ISK(1) ≤IMAX	0		Index of the x-coordinate of the node in the upper right-hand corner of a subdomain over which the field arrays are to be printed.
	JSK(2)	≥JSK(1) ≤JMAX	0		Index of the y-coordinate of the node in the upper right-hand corner of a subdomain over which the field arrays are to be printed.
	ISK(3)	≤IMAX-1	2		If ISK(3)>0, skip ISK(3)-1 columns between printed columns in the output subdomain.
	JSK(3)	≤JMAX-1	2		Print-skip option for rows in the same manner as ISK(3) controls print-skipping for columns.
TEST					Generates extensive diagnostic output consisting of the coefficient matrix from the ADI algorithm at each half of a given time step along with the interiors of the field arrays as per the latest IPRInt and OUTPut specifications.
	ITEST	≥1	999999		Frequency in time steps for diagnostic output.
FLOW					Allows for specification of a vertical plane and a horizontal plane at which to compute the total water flow rate.
	I0				Same usage as ILOC in FLUX card.
	J1				Same usage as JLF in FLUX card.
	J2				Same usage as JHF in FLUX card.
	J0				Same usage as JLOC in FLUX card.
	I1				Same usage as ILF in FLUX card.

TABLE 2. Keyword Summary (Sheet 8 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	I2				Same usage is IHF in FLUX card. The depth (or angle of revolution) of each plane at which the total water flow rate is to be computed is taken to be one length unit or 2π radians as is appropriate to the geometry.
PRIN					Specifies a list of coordinate indices for up to 10 nodes for which time-history printer plots of U, V, h, T, and C are to be generated at the end of the run.
	IPL (Array)	≥1 ≤IMAX	0		Index of the x-coordinate for a node at which time-history of U, V, h, T, and C is desired.
	JPL (Array)	≥1 ≤JMAX	0		Index of the y-coordinate for a node at which time-history of U, V, h, T, and C is desired. Values of IPL and JPL must alternate in successive numeric fields beginning with IPL(1) in the first field. This keyword should not be referenced more than once per run.
PLOT					Invokes generation of binary records of U and V and/or h, T, and C over the entire grid in files intended for compatibility with postprocessors.
	IPLOT	Any	-999999		Frequency in time steps at which plot records are to be generated. If IPLOT>0, records are generated every IPLOT time steps and after the last time step. If IPLOT=0, only the values from the current step are written. If IPLOT<0, no plot records are written. Furthermore, IPLOT=0 is a temporary specification in that only the immediate plot records are affected and the latest non-zero value of IPLOT is preserved.
	NPLTS(1)	Any	0		Indicator for h, T, and C. If NPLTS(1)=0, no records of h, T, and C are saved. If NPLTS(1)≠0, records of h, T, and C are written to a file suitable for input to a contouring postprocessor at each indicated time step.
	NPLTS(2)	Any	0		Indicator for U and V. If NPLTS(2)=0, no records of U and V are saved. If NPLTS(2)≠0, records of U and V are written to a file suitable for input to a pathline postprocessor at each indicated time step. Each of the two plot files has header records containing the X, Y, and ZONE arrays. The pathline plot file also has the porosity array in the header for use in converting U and V to pore velocities.
ISOL					Indicates which of the three governing equations are to be solved.

and cross the southwestern part of the site toward the Yakima River. Surface flow, when it occurs, infiltrates and disappears into the surface sediments in the western part of the site. Rattlesnake Springs, located on the western part of the site, forms a small surface stream that flows for about 3 km before disappearing into the ground.

4.1.1.1.1 Flooding. The Washington State portion of the Columbia Plateau has been subdivided into water resource inventory areas that correspond to component watersheds of the Columbia River drainage (DOE 1988). Leonhart (1979), for the purpose of regional hydrologic assessment, proposed division of the Washington State portion of the Columbia Plateau into six subbasins on the basis of both structural and drainage characteristics, shown in Figure 4.3. The Hanford Site is located within the Pasco Basin hydrologic basin. Surface water drainage from the surrounding five basins (with the exception of the southern part of the Horse Heaven Basin) enters the Pasco Basin.

Large Columbia River floods have occurred in the past (DOE 1987) but the likelihood of recurrence of large scale flooding has been reduced by the construction of several flood control/water storage dams upstream of the site. Major floods on the Columbia River are typically the result of rapid melting of the winter snowpack over a wide area augmented by above-normal precipitation. The maximum historical flood on record occurred June 7, 1894, with a peak discharge at the Hanford Site of 21,000 m^3/s. The largest recent flood took place in 1948 with an observed peak discharge of 20,000 m^3/s at the Hanford Site. The probability of flooding at the magnitude of the 1894 and 1948 floods has been greatly lowered because of upstream regulation by dams.

There are no Federal Emergency Management Agency (FEMA) flood plain maps for the Hanford reach of the Columbia River. FEMA only maps developing areas, and the Hanford reach is specifically excluded.

There have been fewer than 20 major floods on the Yakima River since 1862 (DOE 1986). The most severe floods occurred in November 1906, December 1933, and May 1948. Discharge magnitudes at Kiona, Washington, were 1,870, 1,900, and 1,050 m^3/s, respectively. The recurrence intervals for the 1933

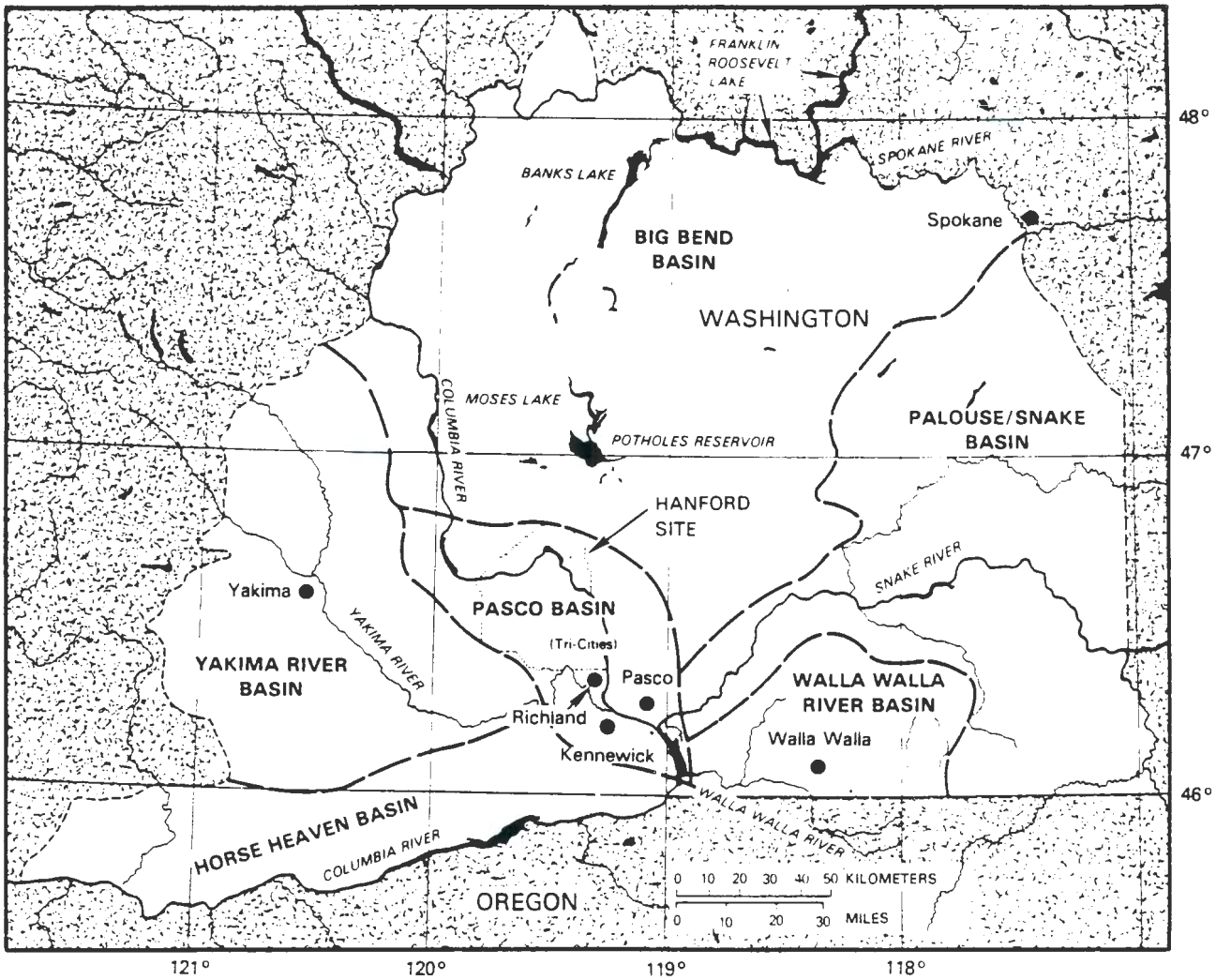


FIGURE 4.3. Hydrologic Basins Designated for the Washington State Portion of the Columbia Plateau (DOE 1988)

and 1948 floods are estimated at 170 and 33 years respectively. The development of irrigation reservoirs within the Yakima River Basin has considerably reduced the flood potential of the river. Flooded areas from the 100-year flood could extend into the southern section of the Hanford Site, but the Yakima River upstream is physically separated from the Hanford Site by Rattlesnake Mountain, which would prevent major flooding of the Hanford Site.

Evaluation of flood potential is conducted in part through the concept of the probable maximum flood, which is determined from the upper limit of precipitation falling on a drainage area and other hydrologic factors, such

TABLE 2. Keyword Summary (Sheet 9 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	ISOLVE(1)	Any	1		The pressure equation (Eq. 1) is solved as long as ISOLVE(1)≠0.
	ISOLVE(2)	Any	1		The temperature equation (Eq. 3) is solved as long as ISOLVE(2)≠0.
	ISOLVE(3)	Any	0		The concentration equation (Eq. 6) is solved as long as ISOLVE(3)≠0.
FDS					Selects a nodal profile for solution of Equations 3 and 6.
	IFDS(2)	1,2,3	1		Indicator of the local nodal profile to be used in solution of the temperature equation (Eq. 3).
	IFDS(3)	1,2,3	2		Indicator of the local nodal profile to be used in solution of the concentration equation (Eq. 6). IFDS=1 => Standard central differencing with switch-over to donor cells for Peclet numbers greater than one. IFDS=2 => Exponential profile. IFDS=3 => Polynomial profile.
KIND					Indicates the relation by which hydraulic conductivity is updated with respect to temperature change during time stepping.
	IKH	0,1,2,3	0		Conductivity indicator, recognizable values of which are as follows: IKH=0 => Constant conductivity. IKH=1 => Conductivity is updated as in Equation 37. IKH=2 => Conductivity is updated by an exponential relation used for the Holst convection cell simulation. IKH=3 => Conductivity is calculated as a rational function of temperature as tailored for the Euretta convection cell simulation.
	TMU	Any	26.85	°C	Reference temperature, T*, as in Equation 37.
	TAMU	Any	273.15	°C	Critical fluid temperature, T_c, as in Equation 37.
	VSCN	Any	1436	°C	Viscosity exponent, s, as in Equation 37.
DENS					Indicates the relation by which density disparity is updated with respect to temperature change during time-stepping.

TABLE 2. Keyword Summary (Sheet 10 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
	IDENS	0,1,2, 3,4	0		Density disparity indicator, recognizable values of which are as follows: IDENS=0 => No density disparity. IDENS=1 => Density disparity is updated as in Equation 38. IDENS=2 => Density disparity is calculated as per an option tailored for the HOLST convection cell simulation. IDENS=3 => Density disparity is calculated as a cubic polynominal of temperature as tailored for the Buretta convection cell simulation. IDENS=4 => Density disparity is updated as in Equation 40.
	TREF	Any	26.85	°C	Reference temperature, T*, as in Equation 38.
	DNSX	Any	0.2		Density exponent, A, as in Equation 38.
	DNSX2	Any	0		DNSX2=0 uncouples temperature effects from the potential field. DNSX2≠0 implies that, if Equations 1 and 3 are both being solved, the thermal coupling term is computed.
MIX					Controls time averaging of h, T, and C.
	NMIX	≥1	999999		Frequency in time steps at which mixing is to take place. The mixing strategy is simply arithmetically averaging the values from the last two time steps at each node in the interior of the domain.
SOLV					Initiates time stepping.
	TIMAX	≥0	0	yr	Length of the current solution period.
	DT	≥0	0	yr	Beginning time step size for the current solution period.
	DTFAC	≥0	1		Current time step growth factor that is carried over to subsequent solution periods if not reset.
	DTMAX	≥0	10^{20}	yr	Current maximum step size that is carried over to subsequent solution periods if not reset.
	MXSTEP	≥1	999999		Cumulative maximum number of time steps. The default value may be automatically overridden due to storage considerations if printer plots are requested.
SAVE					Invokes restart file generation.
	ISAVE	≥0	9999999		Frequency in time steps at which the restart file is to be rewritten. ISAVE =0 implies immediate generation of a restart file and any previous non-zero value of ISAVE is preserved.

TABLE 2. Keyword Summary (Sheet 11 of 11).

Keyword	Numeric field name[a]	Numeric value[b]	Default value[c]	Typical units[d]	Remarks
REST					Restores restart conditions of transport variables, once per run at most.
	VALUE(1)	Any	0		Nonzero value implies that the printer plot file is to be repositioned to the restart time.
	VALUE(2)	Any	0		Nonzero value implies that the contour plot file is to be repositioned to the restart time.
	VALUE(3)	Any	0		Nonzero value implies that the pathline plot file is to be repositioned to the restart time.
	VALUE(4)	Any	0		Nonzero value implies that the mass flux plot file is to be repositioned to the restart time.
END					Signifies end of data set. This card may be omitted if the input stream contains a single data set.
QUIT					Signifies end of run.

[a]Numeric field name is the FORTRAN variable name in which the numeric field value(s) is (are) stored.
[b]The numeric values shown are suggestive of acceptable values.
[c]The default values are generally provided by way of initialization at the beginning of processing of each data set, although some are invoked during input parsing.
[d]Typical units are length in meters, mass in grams, and time in years.

NOMENCLATURE

Symbol	Interpretation	Units
S_s	Specific storage	1/m
h	Hydraulic head	m
t	Time coordinate	yr
K	Hydraulic conductivity	m/yr
x,y,r	Space coordinates	m
δ_b	Density disparity	--
δ_{ij}	Kronecker delta	--
γ	Thermal coupling coefficient	$1/^oC$
T	Temperature	^oC
ϕ	Effective porosity	--
β	Bulk modulus of fluid	$1/^oC$
S_t	Bulk heat capacity	$J/kg\text{-}^oC$
C_f	Specific heat of water	$J/kg\text{-}^oC$
q	Component of specific discharge	m/yr
U	Horizontal specific discharge	m/yr
V	Vertical specific discharge	m/yr
$\bar{q}$	Groundwater speed	m/yr
D_t	Effective thermal conductivity	$J/m\text{-}yr\text{-}^oC$
Q	Thermal source	J/kg-yr
ρ_f	Density of water	kg/m^3
ρ_s	Density of rock	kg/m^3
c_s	Specific heat of rock	$J/kg\text{-}^oC$
D_f	Thermal conductivity of water	$J/m\text{-}yr\text{-}^oC$
D_s	Thermal conductivity of rock	$J/m\text{-}yr\text{-}^oC$

NOMENCLATURE (Contd)

Symbol	Interpretation	Units
R_d	Radionuclide retardation factor	--
K_d	Sorption coefficient	m^3/kg
C	Radionuclide concentration	mg/L
D_m	Hydrodynamic dispersion coefficient	m^2/yr
m	Radionuclide inventory	mg
$\dot{m}$	Radionuclide mass release rate	mg/yr
λ	Radionuclide decay rate	1/yr
D	Molecular diffusion coefficient	m^2/yr
α	Dispersivity	m
$T_{1/2}$	Contaminant half-life	yr
F	Generalized transport variable	--
∇F	Spatial gradient of F	--
τ, μ	Generalized coefficients	--
Γ	Generalized transport coefficient	--
S_F	Generalized source term	--
S_m	Generalized decay rate	--
NI	Number of vertical grid lines	--
NJ	Number of horizontal grid lines	--
$\Delta x, \Delta y$	Grid block dimensions	m
$\delta x, \delta y$	Grid cell dimensions	m
q_F	Generalized flux	--
ν	Normal coordinate	m
δW	Cell volume coefficient	--

NOMENCLATURE (Contd)

Symbol	Interpretation	Units
Θ, ω	Discretized coefficients	--
L	Differential operator	--
S	Discrete source term	--
Pe	Peclet number	--
Δt_c	Characteristic time	yr
M	Fractional mass inventory	--
f	Fractional mass release rate	1/yr
Δt_e	Effective mass release interval	yr
s	Viscosity exponent	^oC
T*	Reference temperature	^oC
T_c	Critical temperature	^oC
A	Density exponent	--

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APPENDICES

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APPENDIX A

DERIVATION OF AN EFFECTIVE CONTAMINANT RELEASE INTERVAL

Assuming that a contaminant inventory is available at some reference time, say t_o, for transport from a source region, the time rate of change of inventory due to constant release and decay may be expressed as

$$\frac{dm}{dt} = -\dot{m} - \lambda m, \tag{A-1}$$

where

$m(t)$ = contaminant mass remaining at time $t \geq t_o$

$\dot{m}$ = constant rate of mass release

λ = mass decay rate.

Dividing both sides of Equation A-1 by $m_o \equiv m(t_o)$, one may write

$$\frac{dM}{dt} = -f - \lambda M \tag{A-2}$$

where

$M(t) \equiv \frac{m(t)}{m_o}$ = fractional mass inventory at time t

$f \equiv \frac{\dot{m}}{m_o}$ = constant fractional mass release rate.

Assuming $t_o = o$ without loss of generality and letting $\mathcal{M}(s)$ denote the Laplace transform of $M(t)$, i.e.,

$$\mathcal{M}(s) = \mathcal{L}\{M(t)\} \equiv \int_0^{\infty} e^{-st} M(t)dt,$$

one may write the transformation of Equation A-2 as

$$\mathcal{M}(s) = \frac{1}{s+\lambda} - f\,\frac{1}{s(s+\lambda)} \tag{A-3}$$

in which case

$$M(t) = \mathcal{L}^{-1}\{\mathcal{M}(s)\} = \left(\frac{f}{\lambda} + 1\right) e^{-\lambda t} - \frac{f}{\lambda}\,. \tag{A-4}$$

Then the effective release interval, Δt_e, which represents the duration required to deplete the inventory, may be expressed as

$$\Delta t_e = -\frac{1}{\lambda} \ln\left(\frac{f}{f+\lambda}\right). \tag{A-5}$$

An intuitively reasonable conjecture is that Δt_e approaches the reciprocal of f as the half-life of the contaminant becomes very large. This may be formalized as a proposition stated

$$\lim_{\lambda \to o} \Delta t_e = \frac{1}{f} \tag{A-6}$$

which may be proved readily using techniques of elementary calculus, particularly l'Hospital's rule.

APPENDIX B

COMPUTER CODE STRUCTURE

The Basalt Waste Isolation Project version of the PORFLO computer code is a FORTRAN IV program consisting of a main program and 30 subroutines totaling ~3,300 source statements. These 31 modules represent a complete functioning code in that no auxiliary routines or libraries are needed to allow operation of all features and options described in foregoing sections. The current version also references four local utility subroutines that may be bypassed or replaced without affecting numerical results produced by the code.

The hierarchy of PORFLO subroutines is depicted in Figure B-1. This diagram is intended to convey the structure of the PORFLO code. Actual flow of data through and transfer of control between modules is dependent upon options selected by the user. In the figure, subroutine names enclosed by a solid line are pertinent to the features/options available in PORFLO. These routines contain functional descriptions in the form of comments embedded in the source code. Those enclosed by broken lines are local utility routines and are described in the source code of the calling routines.

The FORTRAN source for PORFLO is not duplicated here for sake of compactness, but is available in the form of a paper listing and/or magnetic tape. Also available are simple installation procedures and input and output files for the test cases shown in Appendix D. Requests for copies of the PORFLO code should be forwarded to:

Mr. R. G. Baca
Rockwell Hanford Operations
Basalt Waste Isolation Project
Performance Assessment Group
P.O. Box 800
Richland, WA 99352

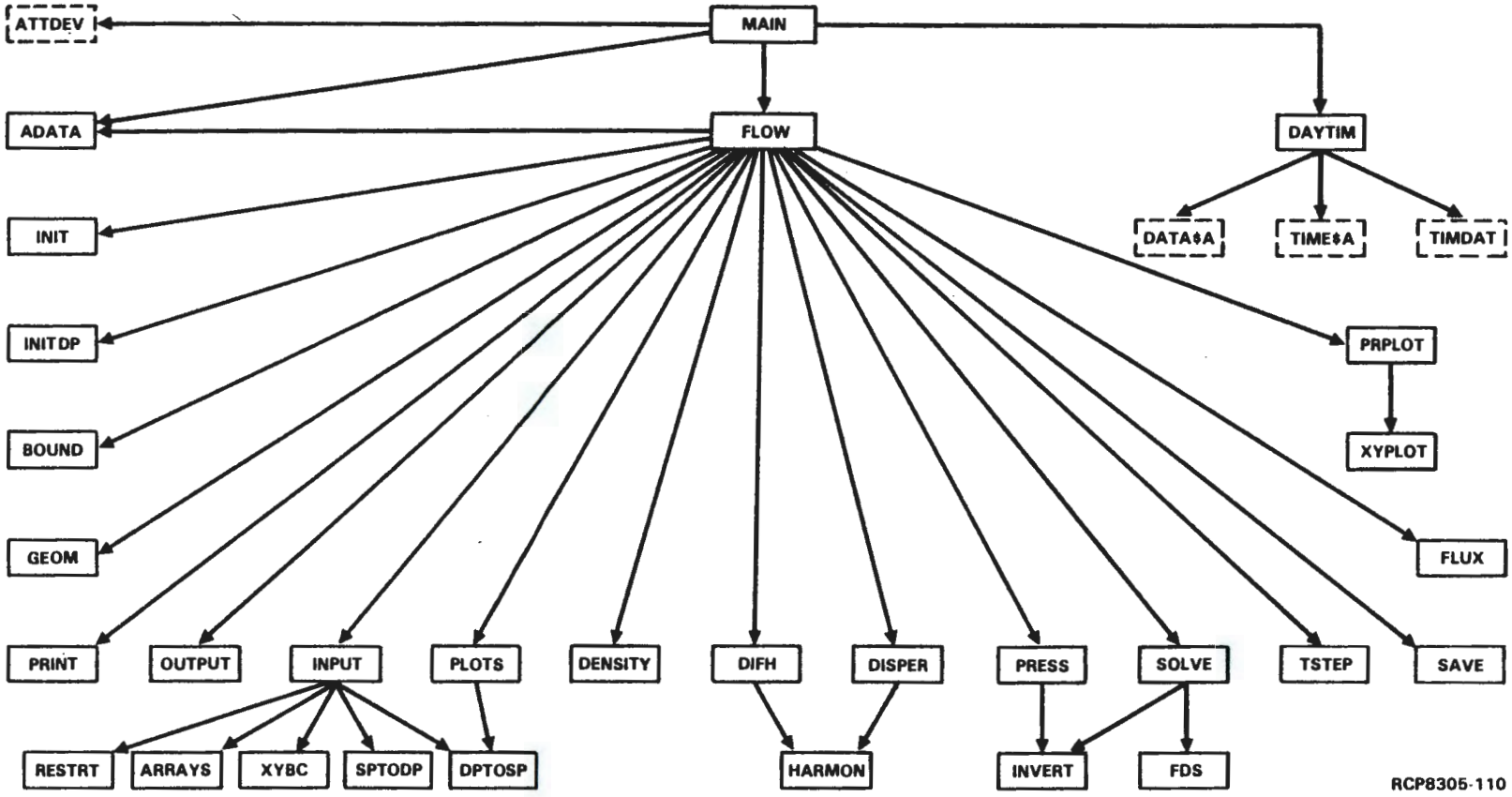

FIGURE B-1. PORFLO Subroutine Hierarchy.

APPENDIX C

ERROR MESSAGES

The PORFLO computer code is designed to provide realistic default values to most user-controllable parameters and to allow for a broad range of possible user-specified values in numeric input fields. Moreover, extraneous numeric fields are generally ignored, and numeric fields that are obviously erroneous are reset to realistic values. Hence, there are relatively few user-input errors that result in immediate termination. Furthermore, there are even fewer detectable execution time errors. Currently recognized fatal error conditions are summarized in Table C-1. When PORFLO detects one of these fatal conditions, execution is terminated with a FORTRAN STOP statement bearing an integer error number. The error numbers are coded in the program as decimal integers and are output by FORTRAN as octal integers.

TABLE C-1. Fatal Errors (Sheet 1 of 2).

Error number (Decimal)	(Octal)	Error condition	
1	1	Maximum number of x- or y- coordinates exceeded	Input errors
2	2	Negative ordinate for a point on a heat release curve	
3	3	Nonascending time coordinates for a heat release curve	
4	4	Negative ordinate for a point on a mass release curve	
5	5	Nonascending time coordinates for a mass release curve	
6	6	Negative or nearly zero contaminant half-life	
7	7	Unrecognized keyword	
8	10	Nonincreasing x-coordinates	Execution errors
9	11	Nonincreasing y-coordinates	
10	12	Nonpositive time-step size	
11	13	Inordinately large pressure buildup at the reference node	
12	14	Heat or mass release rate curve ends prematurely	

TABLE C-1. Fatal Errors (Sheet 2 of 2).

Error number (Decimal)	(Octal)	Error condition	
13	15	Empty restart file	Restart errors
14	16	Grid for restart run is too big	
15	17	Grid for restart run is too small	
16	20	Premature end of printer plot file	
17	21	Printer plot file does not correspond to restart file	
18	22	Premature end of contour plot file	
19	23	Contour plot file does not correspond to restart file	
20	24	Premature end of pathline plot file	
21	25	Pathline plot file does not correspond to restart file	
22	26	Premature end of mass flux plot file	
23	27	Mass flux plot file does not correspond to restart file	
24	30	Read error during restart	

APPENDIX D

TEST CASE INPUT AND OUTPUT

Reproduced listings of input and printed output for some test problems are contained in the following pages. Case 1 is a simulation of fluid flow driven horizontally by a constant hydraulic gradient through a soil column. Case 2 is a simulation of convective and diffuse heat and mass transport in a column with fixed end temperatures and concentrations and fixed uniform velocity field. Case 3 is the Buretta convection cell simulation. Graphic output from the Buretta case obtained via postprocessing is displayed in Appendix E.

The data sets for Cases 1 and 2 comprise a single input stream and, hence, a single input listing and a single output listing reflect the setup and results for these cases. Following are the input and output listings for Case 3. For each case the output contains an echo of the input stream, a time-step history at a strategically placed reference node, and tabular output of pertinent transport variables.

Printer plots of U, V, h, and T are also shown for the Buretta case. The principal usefulness of the printer plots in this case is as a tool for depicting the convergence to steady state.

```
*TITLE  EXAMPLE CASE 1
$
$ SIMULATION OF FLOW IN A HORIZONTAL PIPE WITH CONSTANT HYDRAULIC GRADIENT
$
GRID 5,5
ISOLVE 1 $ FLOW ONLY
YBC NV=1, IB=1, TYPE=2, dhdy=0. AT BOTTOM BOUNDARY
YBC NV=1, IB=2, TYPE=2, dhdy=0. AT TOP BOUNDARY
P=0.1666667 FROM (1,1) TO (5,5) GRADX=-1. GRADY=0.
WATER PROPERTIES RHO=1, KT=1, CF=1, DMFXY=1
HYDRAULIC PROPERTIES IZ=1 1 0  KHX=1 KHY=1 STOR=1
ROCK PROPERTIES 1 1 0 RHO=1 POR=1 KT=1 CP=1 DL=0 DT=0 KD=0
REFERENCE POINT AT (3,3)
OUTPUT EVERY 20 STEPS
IPRINT 4 4 5
SOLVE UNTIL TIME=20 IN STEPS OF 1
END
$
*TITLE  EXAMPLE CASE 2
$
$ SIMULATION OF CONVECTIVE AND DIFFUSIVE HEAT TRANSFER AND CONTAMINANT
$ TRANSPORT IN A COLUMN OF WATER WITH CONSTANT VELOCITY
$
GRID 3,5
ISOLVE 0 1 1 $ TEMPERATURE AND CONCENTRATION
V=1. EVERYWHERE
XBC NV=2, IB=1, BTYPE=2, dTdx=0. AT LEFT BOUNDARY
XBC NV=2, IB=2, BTYPE=2, dTdx=0. AT RIGHT BOUNDARY
YBC NV=2, IB=1, BTYPE=1, T=1. AT INTERIOR FACE OF BOTTOM BOUNDARY CELL
YBC NV=2, IB=2, BTYPE=1, T=0. AT INTERIOR FACE OF TOP BOUNDARY CELL
XBC NV=3, IB=1, BTYPE=2, dCdx=0. AT LEFT BOUNDARY
XBC NV=3, IB=2, BTYPE=2, dCdx=0. AT RIGHT BOUNDARY
YBC NV=3, IB=1, BTYPE=1, C=1. AT INTERIOR FACE OF BOTTOM BOUNDARY CELL
YBC NV=3, IB=2, BTYPE=1, C=0. AT INTERIOR FACE OF TOP BOUNDARY CELL
WATER PROPERTIES RHO=1, KT=1, CF=1, DMFXY=1
HYDRAULIC PROPERTIES IZ=1 1 0  KHX=1 KHY=1 STOR=1
ROCK PROPERTIES 1 1 0 RHO=1 POR=1 KT=1 CP=1 DL=0 DT=0 KD=0
REFERENCE POINT AT (2,3)
IPRINT 4, 4, 0, 4, 4
SOLVE UNTIL TIME=0.2 IN STEPS OF 0.01
END
$
QUIT
```

```
*TITLE NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)
*
*  SIMULATION BASED ON LABORATORY EXPERIMENTS BY BURETTA
*
*  SEPTEMBER 15, 1983      VERSION 5.6
*
GRID 43 BY 43
RADIAL
X = -.002 .002 .004 .007 .011 .015 .018 .022
 .026 .029 .033 .036 .040 .044 .047 .051
 .055 .058 .062 .066 .069 .073 .077 .080
 .084 .088 .091 .095 .099 .102 .106 .109
 .113 .117 .120 .124 .128 .131 .135 .139
 .142 .144 .148
Y = -.001 .001 .0015 .002 .003 .004 .005 .006
 .008 .009 .010 .011 .012 .013 .014 .015
 .016 .017 .018 .019 .020 .021 .023 .024
 .025 .026 .027 .028 .029 .030 .031 .032
 .033 .034 .035 .037 .038 .039 .040 .041
 .042 .043 .044
*
ZONE 1 FROM 1,1 TO 43,43
ZONE 2 FROM 2,2 TO 42,42
*
* WATER PROPERTIES CARD
*
*  RHO is the density,  KG/M**3
*  KT is the thermal conductivity,  J/M/SEC DEG C
*  CF is the specific heat,  J/KG/DEG C
*  DFMXY is the coefficient of molecular diffusion,  M**2/SEC
*
* ROCK PROPERTIES CARD:
*
*  IZON is the beginning zone number
*  NZON is the ending zone number
*  IREP is the zone increment
*  RHO is the density,  KG/M**3
*  POR is the dimensionless porosity
*  KT is the thermal conductivity,  J/M/SEC DEG C
*  CP is the specific heat,  J/KG/DEG C
*  DL is the longitudinal dispersivity,  M
*  DT is the transverse dispersivity,  M
*  KD is the sorption coefficient, M**3/KG
*
* HYDRAULIC PROPERTIES CARD
*
*  IZON is the beginning zone number
*  NZON is the ending zone number
*  IREP is the zone increment
*  KHX is the horizontal conductivity,  M/SEC
*  KHY is the vertical conductivity,  M/SEC
*  STOR is the specific storage,  1/M
*
```

```
WATER RHO=997.0, KT=0.57, CF=4186.8, DFMXY=0.
ROCK 1 TO 2 IN 1 RHO=2200.0, POR=0.394, KT=1.09, CP=840.0, DL=0, DT=0, KD=0
HYDRAULIC 1 TO 2 IN 1 KHX=7.53E-2, KHY=7.53E-2, STOR=10000.
$
$ INITIAL TEMPERATURE DISTRIBUTION:
$
T = 25.03 FROM 1,1 TO 43,43
T = 23 AT 23,39
T = 27 AT 5,21
T = 27 AT 38,21
$
$ INITIAL HYDRAULIC HEAD DISTRIBUTION:
$
P = .044 FROM 1,1 TO 43,43
$
$ BOUNDARY CONDITIONS:
$
XBC NV=1 IB=1 TYP=2 dhdx=0.0
XBC NV=1 IB=2 TYP=2 dhdx=0.0
XBC NV=2 IB=1 TYP=2 dTdx=0.0
XBC NV=2 IB=2 TYP=2 dTdx=0.0
YBC NV=1 IB=1 TYP=2 dhdy=0.0
YBC NV=1 IB=2 TYP=2 dhdy=0.0
YBC NV=2 IB=1 TYP=2 dTdy=0.0
YBC NV=2 IB=2 TYP=1 T=16.84 DEGREES CENTIGRADE
$
SOURCE REGION FROM 2,2 TO 42,42 IN ZONE 2
HEAT IS CONSTANT (1) FROM TIME 0.0 AT 17037.0 JOULES PER CUBIC METER PER SECOND
$
ISOLVE 1 1 0
FDS    1 0
DENSITY 3 TREF 25
KIND  3
MIX 5
$
REFERENCE NODE AT 13,13
IPRINT 4,4,4,4
OUTPUT EVERY 1000 STEPS FROM 1,1 TO 43,43
PRINTERPLOTS AT 3,3 3,21 3,39 21,3 21,21 21,39 39,3 39,21 39,39
$
SOLVE FOR 2000 SECONDS IN STEP OF 0.1 SECONDS, DTFAC 1.05, MAX=15
PLOT  0 1 0
SOLVE FOR 2000 SECONDS IN STEP OF 15 SECONDS, DTFAC=1.05, MAX=30
PLOT  0 1 0
SOLVE FOR 4000 SECONDS IN STEP OF 30 SECONDS, DTFAC=1.05, MAX=50
PLOT  0 1 0
SOLVE FOR 10000 SECONDS IN STEP OF 50 SECONDS, DTFAC=1.0, MAX=50
PLOT  0 1 1
$
END
QUIT
```

```
*****************************************************************************

                THIS OUTPUT IS PRODUCED BY THE COMPUTATIONAL MODEL

                ------------------ P O R F L O -------------------

              FOR TRANSIENT OR ASYMPTOTICALLY STEADY STATE ANALYSIS
                OF FLUID FLOW, THERMAL ENERGY AND MASS TRANSPORT
                      IN POROUS OR EQUIVALENT POROUS MEDIA
                  WITH ANISOTROPIC AND INHOMOGENIOUS PROPERTIES
                  IN 2-D CARTESIAN OR 3-D AXI-SYMMETRIC GEOMETRY

                         VERSION 5.6 , DATED:  7 JAN. 1983

                DATE RUN - FRI, AUG 12 1983   TIME RUN - 09:25:58

*****************************************************************************

-----------------------------------------------------------------------------
RECORD OF INPUT DATA STREAM
-----------------------------------------------------------------------------
*** RECORD NO.  1 HOLLERITH ******  *TITLE  EXAMPLE CASE 1
*** RECORD NO.  2 COMMENT ********  $
*** RECORD NO.  3 COMMENT ********  $ SIMULATION OF FLOW IN A HORIZONTAL PIPE WITH CONSTANT HYDRAULIC GRADIENT
*** RECORD NO.  4 COMMENT ********  $
*** RECORD NO.  5 DATA INPUT *****  GRID 5,5
*** RECORD NO.  6 DATA INPUT *****  ISOLVE 1 $ FLOW ONLY
*** RECORD NO.  7 DATA INPUT *****  YBC NV=1, IB=1, TYPE=2, dhdy=0. AT BOTTOM BOUNDARY
*** RECORD NO.  8 DATA INPUT *****  YBC NV=1, IB=2, TYPE=2, dhdy=0. AT TOP BOUNDARY
*** RECORD NO.  9 DATA INPUT *****  P=0.1666667 FROM (1,1) TO (5,5) GRADX=-1. GRADY=0.
*** RECORD NO. 10 DATA INPUT *****  WATER PROPERTIES RHO=1, KT=1, CF=1, DMFXY=1
*** RECORD NO. 11 DATA INPUT *****  HYDRAULIC PROPERTIES IZ=1 1 0  KHX=1 KHY=1 STOR=1
*** RECORD NO. 12 DATA INPUT *****  ROCK PROPERTIES 1 1 0 RHO=1 POR=1 KT=1 CP=1 DL=0 DT=0 KD=0
*** RECORD NO. 13 DATA INPUT *****  REFERENCE POINT AT (3,3)
*** RECORD NO. 14 DATA INPUT *****  OUTPUT EVERY 20 STEPS
*** RECORD NO. 15 DATA INPUT *****  IPRINT 4 4 5
*** RECORD NO. 16 DATA INPUT *****  SOLVE UNTIL TIME=20 IN STEPS OF 1
```

```
EXAMPLE CASE 1

    GRID DIMENSIONS.................(IDIM,JDIM) =  5 BY  5
    NUMBER OF TWO DIMENSIONAL FIELD ARRAYS.... = 27
    FIELD LENGTH REQUIRED FOR BLANK COMMON.... =   900


X OR R COORDINATE VALUES

   -0.167    0.167    0.500    0.833    1.167


Y COORDINATE VALUES

   -0.167    0.167    0.500    0.833    1.167
```

```
-----------------------------------------------------------------------------
 EXAMPLE CASE 1
-----------------------------------------------------------------------------

PROGRAM CONSTANTS, CONTROL PARAMETERS, AND REFERENCE VALUES
-----------------------------------------------------------
    START TIME ........................(TIME) =  0.000E-01
    MAX. SPECIFIED TIME AT THIS STAGE .(TIMAX) =  2.000E 01
    STARTING TIME STEP ...................(DT) =  1.000E 00
    TIME STEP GROWTH FACTOR ...........(DTFAC) =  1.000E 00
    MAXIMUM TIME STEP .................(DTMAX) =  1.000E 20
    FLUID SPECIFIC HEAT...................(CF) =  1.000E 00
    HYDRAULIC CONDUCTIVITY INDEX ........(IKH) =       0
    RADIAL GEOMETRY INDEX...............(IRAD) =       0
    TIME HISTORY PLOT FILE UNIT........(NPLT1) =       7
    CONTOUR PLOT FILE UNIT.............(NPLT2) =       8
    VELOCITY FIELD PLOT FILE UNIT......(NPLT3) =       9
    MASS FLUX PLOT FILE UNIT...........(NPLT4) =      11

*****************************************************************************************************************

*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- HYDRAULIC HEAD.............(P) AT STEP    0, TIME = 0.0000E-01 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
  Y =          J =
  1.167E 00    5     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
  8.333E-01    4     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
  5.000E-01    3     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
  1.667E-01    2     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
 -1.667E-01    1     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00

               I =      1         2         3         4         5
               X = -1.67E-01  1.67E-01  5.00E-01  8.33E-01  1.17E 00

*****************************************************************************************************************

  STEP     TIME        U REF       V REF       P REF       T REF       C REF       dP/P        dT/dt       Pe
    1   1.000E 00   1.000D 00  -4.263D-14  -5.000D-01   0.000D-01   0.000D-01   3.847D-07   0.000D-01   0.000D-01
    2   2.000E 00   1.000D 00  -4.263D-14  -5.000D-01   0.000D-01   0.000D-01   2.463D-07   0.000D-01   0.000D-01
    3   3.000E 00   1.000D 00  -4.263D-14  -5.000D-01   0.000D-01   0.000D-01   2.394D-07   0.000D-01   0.000D-01
    4   4.000E 00   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   2.494D-07   0.000D-01   0.000D-01
    5   5.000E 00   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   2.298D-07   0.000D-01   0.000D-01
    6   6.000E 00   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   2.071D-07   0.000D-01   0.000D-01
    7   7.000E 00   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   1.833D-07   0.000D-01   0.000D-01
    8   8.000E 00   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   1.609D-07   0.000D-01   0.000D-01
    9   9.000E 00   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   1.407D-07   0.000D-01   0.000D-01
   10   1.000E 01   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   1.227D-07   0.000D-01   0.000D-01
   11   1.100E 01   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   1.070D-07   0.000D-01   0.000D-01
   12   1.200E 01   1.000D 00   0.000D-01  -5.000D-01   0.000D-01   0.000D-01   9.335D-08   0.000D-01   0.000D-01
   13   1.300E 01   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   8.144D-08   0.000D-01   0.000D-01
   14   1.400E 01   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   7.107D-08   0.000D-01   0.000D-01
   15   1.500E 01   1.000D 00   0.000D-01  -5.000D-01   0.000D-01   0.000D-01   6.204D-08   0.000D-01   0.000D-01
   16   1.600E 01   1.000D 00   0.000D-01  -5.000D-01   0.000D-01   0.000D-01   5.419D-08   0.000D-01   0.000D-01
   17   1.700E 01   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   4.735D-08   0.000D-01   0.000D-01
   18   1.800E 01   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   4.138D-08   0.000D-01   0.000D-01
   19   1.900E 01   1.000D 00  -2.132D-14  -5.000D-01   0.000D-01   0.000D-01   3.618D-08   0.000D-01   0.000D-01
   20   2.000E 01   1.000D 00   0.000D-01  -5.000D-01   0.000D-01   0.000D-01   3.165D-08   0.000D-01   0.000D-01

  STEP     TIME        U REF       V REF       P REF       T REF       C REF       dP/P        dT/dt       Pe
*** RECORD NO. 17 DATA INPUT *****  END
```

```
*****************************************************************************************************************************

*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- X-COMPONENT OF VELOCITY..(U) AT STEP   20, TIME = 2.0000E 01 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
  Y =          J =
  1.167E 00    5     0.00D-01  0.00D-01  0.00D-01  0.00D-01  0.00D-01
  8.333E-01    4     0.00D-01  1.00D 00  1.00D 00  1.00D 00  1.00D 00
  5.000E-01    3     0.00D-01  1.00D 00  1.00D 00  1.00D 00  1.00D 00
  1.667E-01    2     0.00D-01  1.00D 00  1.00D 00  1.00D 00  1.00D 00
 -1.667E-01    1     0.00D-01  0.00D-01  0.00D-01  0.00D-01  0.00D-01

               I =      1         2         3         4         5
              XU =  0.00E-01  0.00E-01  3.33E-01  6.67E-01  1.00E 00


*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- Y-COMPONENT OF VELOCITY..(V) AT STEP   20, TIME = 2.0000E 01 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
  YV =         J =
  1.000E 00    5     0.00D-01  0.00D-01  0.00D-01 -2.13D-14  0.00D-01
  6.667E-01    4     0.00D-01  3.20D-14 -1.07D-13  1.49D-13  0.00D-01
  3.333E-01    3     0.00D-01  1.07D-14  0.00D-01 -8.53D-14  0.00D-01
  0.000E-01    2     0.00D-01  0.00D-01  0.00D-01  0.00D-01  0.00D-01
  0.000E-01    1     0.00D-01  0.00D-01  0.00D-01  0.00D-01  0.00D-01

               I =      1         2         3         4         5
               X = -1.67E-01  1.67E-01  5.00E-01  8.33E-01  1.17E 00


*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- HYDRAULIC HEAD..........(P) AT STEP   20, TIME = 2.0000E 01 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
  Y =          J =
  1.167E 00    5     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
  8.333E-01    4     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
  5.000E-01    3     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
  1.667E-01    2     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00
 -1.667E-01    1     1.67D-01 -1.67D-01 -5.00D-01 -8.33D-01 -1.17D 00

               I =      1         2         3         4         5
               X = -1.67E-01  1.67E-01  5.00E-01  8.33E-01  1.17E 00

*****************************************************************************************************************************
```

```
-----------------------------------------------------------------------------
 EXAMPLE CASE 1
-----------------------------------------------------------------------------

PROGRAM CONSTANTS, CONTROL PARAMETERS, AND REFERENCE VALUES
-----------------------------------------------------------
    START TIME ........................(TIME) =  2.000E 01
    MAX. SPECIFIED TIME AT THIS STAGE .(TIMAX) =  2.000E 01
    STARTING TIME STEP ................(DT) =  1.000E 00
    TIME STEP GROWTH FACTOR ...........(DTFAC) =  1.000E 00
    MAXIMUM TIME STEP .................(DTMAX) =  1.000E 20
    FLUID SPECIFIC HEAT................(CF) =  1.000E 00
    HYDRAULIC CONDUCTIVITY INDEX ......(IKH) =      0
    RADIAL GEOMETRY INDEX..............(IRAD) =      0
    TIME HISTORY PLOT FILE UNIT........(NPLT1) =      7
    CONTOUR PLOT FILE UNIT.............(NPLT2) =      8
    VELOCITY FIELD PLOT FILE UNIT......(NPLT3) =      9
    MASS FLUX PLOT FILE UNIT...........(NPLT4) =     11

         VALUES AT REFERENCE GRID NODE( 3, 3)
         X-VELOCITY COMPONENT.....(U) =  1.000D 00
         Y-VELOCITY COMPONENT.....(V) =  0.000D-01
         HYDRAULIC HEAD...........(P) = -3.000D-01
         TEMPERATURE..............(T) =  0.000D-01
         CONCENTRATION............(C) =  0.000D-01
         POROSITY...............(POR) =  1.000E 00
         ZONE NUMBER...........(ZONE) =  1.000E 00
         ELEMENT VOLUME.........(VOL) =  1.111E-01
         DENSITY DEFICIT.......(DRHO) =  0.000D-01
         STORATIVITY...........(STOR) =  1.000E 00
         X-PERMEABILITY.........(DPX) =  1.000E 00
         Y-PERMEABILITY.........(DPY) =  1.000E 00
         PRESSURE SOURCE.........(SP) =  0.000E-01
         PREVIOUS VALUE OF P...(POLD) = -3.000D-01
         HEAT CAPACITY OF ROCK...(CP) =  1.000E 00
         X-THERMAL CONDUCTIVITY.(DTX) =  0.000E-01
         Y-THERMAL CONDUCTIVITY.(DTY) =  0.000E-01
         THERMAL SOURCE..........(ST) =  0.000E-01
         PREVIOUS VALUE OF T...(TOLD) =  0.000E-01
         RETARDATION FACTOR......(RD) =  1.000E 00
         X-MASS DISPERSION COEF.(DCX) =  0.000E-01
         Y-MASS DISPERSION COEF.(DCY) =  0.000E-01
         MASS SOURCE............(SC) =  0.000E-01
         MASS DECAY RATE.........(CR) =  0.000E-01
         PREVIOUS VALUE OF C...(COLD) =  0.000E-01
         X-CELL FACE...........(AREAX) =  3.333E-01
         Y-CELL FACE...........(AREAY) =  3.333E-01
         HORIZONTAL FLOW......(FLOWX) =  3.333D-01
         VERTICAL FLOW........(FLOWY) =  0.000D-01
         INITIAL DENSITY.....(ROZERO) =  0.000E-01
```

```
*****************************************************************************

                THIS OUTPUT IS PRODUCED BY THE COMPUTATIONAL MODEL

                ------------------ P O R F L O -------------------

               FOR TRANSIENT OR ASYMPTOTICALLY STEADY STATE ANALYSIS
                 OF FLUID FLOW, THERMAL ENERGY AND MASS TRANSPORT
                       IN POROUS OR EQUIVALENT POROUS MEDIA
                   WITH ANISOTROPIC AND INHOMOGENIOUS PROPERTIES
                   IN 2-D CARTESIAN OR 3-D AXI-SYMMETRIC GEOMETRY

                          VERSION 5.6 , DATED:  7 JAN. 1983

                DATE RUN - FRI, AUG 12 1983   TIME RUN - 09:26:09

*****************************************************************************

-----------------------------------------------------------------------------
RECORD OF INPUT DATA STREAM
-----------------------------------------------------------------------------
*** RECORD NO. 18 COMMENT ********  $
*** RECORD NO. 19 HOLLERITH ******  *TITLE  EXAMPLE CASE 2
*** RECORD NO. 20 COMMENT ********  $
*** RECORD NO. 21 COMMENT ********  $ SIMULATION OF CONVECTIVE AND DIFFUSIVE HEAT TRANSFER AND CONTAMINANT
*** RECORD NO. 22 COMMENT ********  $ TRANSPORT IN A COLUMN OF WATER WITH CONSTANT VELOCITY
*** RECORD NO. 23 COMMENT ********  $
*** RECORD NO. 24 DATA INPUT *****  GRID 3,5
*** RECORD NO. 25 DATA INPUT *****  ISOLVE 0 1 1 $ TEMPERATURE AND CONCENTRATION
*** RECORD NO. 26 DATA INPUT *****  V=1. EVERYWHERE
*** RECORD NO. 27 DATA INPUT *****  XBC NV=2, IB=1, BTYPE=2, dTdx=0. AT LEFT BOUNDARY
*** RECORD NO. 28 DATA INPUT *****  XBC NV=2, IB=2, BTYPE=2, dTdx=0. AT RIGHT BOUNDARY
*** RECORD NO. 29 DATA INPUT *****  YBC NV=2, IB=1, BTYPE=1, T=1. AT INTERIOR FACE OF BOTTOM BOUNDARY CELL
*** RECORD NO. 30 DATA INPUT *****  YBC NV=2, IB=2, BTYPE=1, T=0. AT INTERIOR FACE OF TOP BOUNDARY CELL
*** RECORD NO. 31 DATA INPUT *****  XBC NV=3, IB=1, BTYPE=2, dCdx=0. AT LEFT BOUNDARY
*** RECORD NO. 32 DATA INPUT *****  XBC NV=3, IB=2, BTYPE=2, dCdx=0. AT RIGHT BOUNDARY
*** RECORD NO. 33 DATA INPUT *****  YBC NV=3, IB=1, BTYPE=1, C=1. AT INTERIOR FACE OF BOTTOM BOUNDARY CELL
*** RECORD NO. 34 DATA INPUT *****  YBC NV=3, IB=2, BTYPE=1, C=0. AT INTERIOR FACE OF TOP BOUNDARY CELL
*** RECORD NO. 35 DATA INPUT *****  WATER PROPERTIES RHO=1, KT=1, CF=1, DMFXY=1
*** RECORD NO. 36 DATA INPUT *****  HYDRAULIC PROPERTIES IZ=1 1 0  KHX=1 KHY=1 STOR=1
*** RECORD NO. 37 DATA INPUT *****  ROCK PROPERTIES 1 1 0 RHO=1 POR=1 KT=1 CP=1 DL=0 DT=0 KD=0
*** RECORD NO. 38 DATA INPUT *****  REFERENCE POINT AT (2,3)
*** RECORD NO. 39 DATA INPUT *****  IPRINT 4, 4, 0, 4, 4
*** RECORD NO. 40 DATA INPUT *****  SOLVE UNTIL TIME=0.2 IN STEPS OF 0.01
```

```
EXAMPLE CASE 2
GRID DIMENSIONS.................(IDIM,JDIM) =  3 BY  5
NUMBER OF TWO DIMENSIONAL FIELD ARRAYS.... = 27
FIELD LENGTH REQUIRED FOR BLANK COMMON.... =   540

X OR R COORDINATE VALUES

  -0.500    0.500    1.500

Y COORDINATE VALUES

  -0.167    0.167    0.500    0.833    1.167
```

EXAMPLE CASE 2

PROGRAM CONSTANTS, CONTROL PARAMETERS, AND REFERENCE VALUES

```
START TIME ..........................(TIME) =  0.000E-01
MAX. SPECIFIED TIME AT THIS STAGE . (TIMAX) =  2.000E-01
STARTING TIME STEP ..................(DT) =  1.000E-02
TIME STEP GROWTH FACTOR ...........(DTFAC) =  1.000E 00
MAXIMUM TIME STEP .................(DTMAX) =  1.000E 20
FLUID SPECIFIC HEAT.................(CF) =  1.000E 00
HYDRAULIC CONDUCTIVITY INDEX .......(IKH) =      0
RADIAL GEOMETRY INDEX..............(IRAD) =      0
TIME HISTORY PLOT FILE UNIT........(NPLT1) =      7
CONTOUR PLOT FILE UNIT.............(NPLT2) =      8
VELOCITY FIELD PLOT FILE UNIT......(NPLT3) =      9
MASS FLUX PLOT FILE UNIT...........(NPLT4) =     11
```

STEP	TIME	U REF	V REF	P REF	T REF	C REF	dP/P	dT/dt	Pe
1	1.000E-02	0.000D-01	1.000D 00	0.000D-01	4.441D-03	4.503D-03	0.000D-01	9.205D 00	3.333D-01
2	2.000E-02	0.000D-01	1.000D 00	0.000D-01	2.041D-02	2.069D-02	0.000D-01	1.617D 01	3.333D-01
3	3.000E-02	0.000D-01	1.000D 00	0.000D-01	4.758D-02	4.818D-02	0.000D-01	1.228D 01	3.333D-01
4	4.000E-02	0.000D-01	1.000D 00	0.000D-01	8.099D-02	8.192D-02	0.000D-01	9.412D 00	3.333D-01
5	5.000E-02	0.000D-01	1.000D 00	0.000D-01	1.173D-01	1.186D-01	0.000D-01	7.293D 00	3.333D-01
6	6.000E-02	0.000D-01	1.000D 00	0.000D-01	1.545D-01	1.560D-01	0.000D-01	5.715D 00	3.333D-01
7	7.000E-02	0.000D-01	1.000D 00	0.000D-01	1.911D-01	1.928D-01	0.000D-01	4.532D 00	3.333D-01
8	8.000E-02	0.000D-01	1.000D 00	0.000D-01	2.264D-01	2.282D-01	0.000D-01	3.637D 00	3.333D-01
9	9.000E-02	0.000D-01	1.000D 00	0.000D-01	2.598D-01	2.617D-01	0.000D-01	3.342D 00	3.333D-01
10	1.000E-01	0.000D-01	1.000D 00	0.000D-01	2.911D-01	2.931D-01	0.000D-01	3.133D 00	3.333D-01
11	1.100E-01	0.000D-01	1.000D 00	0.000D-01	3.203D-01	3.223D-01	0.000D-01	2.915D 00	3.333D-01
12	1.200E-01	0.000D-01	1.000D 00	0.000D-01	3.473D-01	3.492D-01	0.000D-01	2.697D 00	3.333D-01
13	1.300E-01	0.000D-01	1.000D 00	0.000D-01	3.721D-01	3.740D-01	0.000D-01	2.486D 00	3.333D-01
14	1.400E-01	0.000D-01	1.000D 00	0.000D-01	3.950D-01	3.968D-01	0.000D-01	2.285D 00	3.333D-01
15	1.500E-01	0.000D-01	1.000D 00	0.000D-01	4.159D-01	4.177D-01	0.000D-01	2.096D 00	3.333D-01
16	1.600E-01	0.000D-01	1.000D 00	0.000D-01	4.351D-01	4.368D-01	0.000D-01	1.919D 00	3.333D-01
17	1.700E-01	0.000D-01	1.000D 00	0.000D-01	4.527D-01	4.543D-01	0.000D-01	1.756D 00	3.333D-01
18	1.800E-01	0.000D-01	1.000D 00	0.000D-01	4.687D-01	4.702D-01	0.000D-01	1.605D 00	3.333D-01
19	1.900E-01	0.000D-01	1.000D 00	0.000D-01	4.834D-01	4.848D-01	0.000D-01	1.467D 00	3.333D-01
20	2.000E-01	0.000D-01	1.000D 00	0.000D-01	4.968D-01	4.980D-01	0.000D-01	1.339D 00	3.333D-01

*** RECORD NO. 41 DATA INPUT ***** END

****

-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- X-COMPONENT OF VELOCITY..(U) AT STEP 20, TIME = 2.0000E-01 -*

Y =	J =			
1.167E 00	5	0.00D-01	0.00D-01	0.00D-01
8.333E-01	4	0.00D-01	0.00D-01	0.00D-01
5.000E-01	3	0.00D-01	0.00D-01	0.00D-01
1.667E-01	2	0.00D-01	0.00D-01	0.00D-01
-1.667E-01	1	0.00D-01	0.00D-01	0.00D-01
	I =	1	2	3
	XU =	0.00E-01	0.00E-01	1.00E 00

-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- Y-COMPONENT OF VELOCITY..(V) AT STEP 20, TIME = 2.0000E-01 -*

YV = J =

```
 1.000E 00   5    1.00D 00  1.00D 00  1.00D 00
 6.667E-01   4    1.00D 00  1.00D 00  1.00D 00
 3.333E-01   3    1.00D 00  1.00D 00  1.00D 00
 0.000E-01   2    1.00D 00  1.00D 00  1.00D 00
 0.000E-01   1    1.00D 00  1.00D 00  1.00D 00

             I =      1         2         3
             X = -5.00E-01  5.00E-01  1.50E 00


*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- TEMPERATURE.............(T) AT STEP   20, TIME = 2.0000E-01 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
 Y =          J =
 1.167E 00   5    0.00D-01 -1.73D-01  0.00D-01
 8.333E-01   4    1.71D-01  1.73D-01  1.71D-01
 5.000E-01   3    4.90D-01  4.97D-01  4.90D-01
 1.667E-01   2    8.46D-01  8.48D-01  8.46D-01
-1.667E-01   1    0.00D-01  1.15D 00  0.00D-01

             I =      1         2         3
             X = -5.00E-01  5.00E-01  1.50E 00


*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- SPECIES CONCENTRATION....(C) AT STEP   20, TIME = 2.0000E-01 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
 Y =          J =
 1.167E 00   5    0.00D-01 -1.76D-01  0.00D-01
 8.333E-01   4    1.72D-01  1.76D-01  1.72D-01
 5.000E-01   3    4.92D-01  4.98D-01  4.92D-01
 1.667E-01   2    8.46D-01  8.49D-01  8.46D-01
-1.667E-01   1    0.00D-01  1.15D 00  0.00D-01

             I =      1         2         3
             X = -5.00E-01  5.00E-01  1.50E 00

*****************************************************************************************************************************
```

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--------------------------------------------------------------------------------
 EXAMPLE CASE 2
--------------------------------------------------------------------------------

PROGRAM CONSTANTS, CONTROL PARAMETERS, AND REFERENCE VALUES
-----------------------------------------------------------
    START TIME ..........................(TIME) =  2.000E-01
    MAX. SPECIFIED TIME AT THIS STAGE .(TIMAX) =  2.000E-01
    STARTING TIME STEP ..................(DT) =  1.000E-02
    TIME STEP GROWTH FACTOR ........... (DTFAC) =  1.000E 00
    MAXIMUM TIME STEP ................ (DTMAX) =  1.000E 20
    FLUID SPECIFIC HEAT.................(CF) =  1.000E 00
    HYDRAULIC CONDUCTIVITY INDEX ......(IKH) =      0
    RADIAL GEOMETRY INDEX.............(IRAD) =      0
    TIME HISTORY PLOT FILE UNIT.......(NPLT1) =      7
    CONTOUR PLOT FILE UNIT............(NPLT2) =      8
    VELOCITY FIELD PLOT FILE UNIT.....(NPLT3) =      9
    MASS FLUX PLOT FILE UNIT..........(NPLT4) =     11

         VALUES AT REFERENCE GRID NODE( 2, 3)
         X-VELOCITY COMPONENT.....(U) =  0.000D-01
         Y-VELOCITY COMPONENT.....(V) =  1.000D 00
         HYDRAULIC HEAD...........(P) =  0.000D-01
         TEMPERATURE..............(T) =  4.968D-01
         CONCENTRATION............(C) =  4.980D-01
         POROSITY................(POR) =  1.000E 00
         ZONE NUMBER...........(ZONE) =  1.000E 00
         ELEMENT VOLUME.........(VOL) =  3.333E-01
         DENSITY DEFICIT.......(DRHO) =  0.000D-01
         STORATIVITY...........(STOR) =  1.000E 00
         X-PERMEABILITY.........(DPX) =  0.000E-01
         Y-PERMEABILITY.........(DPY) =  0.000E-01
         PRESSURE SOURCE........(SP) =  0.000E-01
         PREVIOUS VALUE OF P...(POLD) =  0.000D-01
         HEAT CAPACITY OF ROCK...(CP) =  1.000E 00
         X-THERMAL CONDUCTIVITY.(DTX) =  1.000E 00
         Y-THERMAL CONDUCTIVITY.(DTY) =  1.000E 00
         THERMAL SOURCE..........(ST) =  0.000E-01
         PREVIOUS VALUE OF T...(TOLD) =  4.834E-01
         RETARDATION FACTOR......(RD) =  1.000E 00
         X-MASS DISPERSION COEF.(DCX) =  1.000E 00
         Y-MASS DISPERSION COEF.(DCY) =  1.000E 00
         MASS SOURCE.............(SC) =  0.000E-01
         MASS DECAY RATE.........(CR) =  0.000E-01
         PREVIOUS VALUE OF C...(COLD) =  4.848E-01
         X-CELL FACE........(AREAX) =  3.333E-01
         Y-CELL FACE........(AREAY) =  1.000E 00
         HORIZONTAL FLOW.....(FLOWX) =  0.000D-01
         VERTICAL FLOW.......(FLOWY) =  1.000D 00
         INITIAL DENSITY.....(ROZERO) =  0.000E-01
```

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*****************************************************************************

              THIS OUTPUT IS PRODUCED BY THE COMPUTATIONAL MODEL

              ------------------ P O R F L O -------------------

            FOR TRANSIENT OR ASYMPTOTICALLY STEADY STATE ANALYSIS
              OF FLUID FLOW, THERMAL ENERGY AND MASS TRANSPORT
                   IN POROUS OR EQUIVALENT POROUS MEDIA
             WITH ANISOTROPIC AND INHOMOGENIOUS PROPERTIES
             IN 2-D CARTESIAN OR 3-D AXI-SYMMETRIC GEOMETRY

                     VERSION 5.6 , DATED:  7 JAN. 1983

              DATE RUN - FRI, AUG 12 1983   TIME RUN - 09:26:23

*****************************************************************************

-----------------------------------------------------------------------------
RECORD OF INPUT DATA STREAM
-----------------------------------------------------------------------------
*** RECORD NO.  42 COMMENT ********  $
*** RECORD NO.  43 DATA INPUT *****  QUIT
```

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*************************************************************************

              THIS OUTPUT IS PRODUCED BY THE COMPUTATIONAL MODEL

              ------------------ P O R F L O -------------------

            FOR TRANSIENT OR ASYMPTOTICALLY STEADY STATE ANALYSIS
              OF FLUID FLOW, THERMAL ENERGY AND MASS TRANSPORT
                    IN POROUS OR EQUIVALENT POROUS MEDIA
                 WITH ANISOTROPIC AND INHOMOGENIOUS PROPERTIES
                 IN 2-D CARTESIAN OR 3-D AXI-SYMMETRIC GEOMETRY

                        VERSION 5.6 , DATED:   7 JAN. 1983

              DATE RUN - MON. OCT 24 1983   TIME RUN - 17:00:24

*************************************************************************

-------------------------------------------------------------------------
RECORD OF INPUT DATA STREAM
-------------------------------------------------------------------------
*** RECORD NO.  1 HOLLERITH ******  *TITLE NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)
*** RECORD NO   2 COMMENT ********  $
*** RECORD NO.  3 COMMENT ********  $  SIMULATION BASED ON LABORATORY EXPERIMENTS BY BURETTA
*** RECORD NO   4 COMMENT ********  $
*** RECORD NO.  5 COMMENT ********  $  SEPTEMBER 15, 1983       VERSION 5.6
*** RECORD NO   6 COMMENT ********  $
*** RECORD NO   7 DATA INPUT *****  GRID 43 BY 43
*** RECORD NO.  8 DATA INPUT *****  RADIAL
*** RECORD NO.  9 DATA INPUT *****  X = -.002 .002 .004 .007 .011 .015 .018 .022
*** RECORD NO  10 CONTINUATION ***  .026 .029 .033 .036 .040 .044 .047 .051
*** RECORD NO  11 CONTINUATION ***  .055 .058 .062 .066 .069 .073 .077 .080
*** RECORD NO  12 CONTINUATION ***  .084 .088 .091 .095 .099 .102 .106 .109
*** RECORD NO. 13 CONTINUATION ***  .113 .117 .120 .124 .128 .131 .135 .139
*** RECORD NO  14 CONTINUATION ***  .142 .144 .148
*** RECORD NO. 15 DATA INPUT *****  Y = -.001 .001 .0015 .002 .003 .004 .005 .006
*** RECORD NO. 16 CONTINUATION ***  .008 .009 .010 .011 .012 .013 .014 .015
*** RECORD NO  17 CONTINUATION ***  .016 .017 .018 .019 .020 .021 .023 .024
*** RECORD NO  18 CONTINUATION ***  .025 .026 .027 .028 .029 .030 .031 .032
*** RECORD NO  19 CONTINUATION ***  .033 .034 .035 .037 .038 .039 .040 .041
*** RECORD NO. 20 CONTINUATION ***  .042 .043 .044
*** RECORD NO  21 COMMENT ********  $
*** RECORD NO. 22 DATA INPUT *****  ZONE 1 FROM 1,1 TO 43,43
*** RECORD NO. 23 DATA INPUT *****  ZONE 2 FROM 2,2 TO 42,42
*** RECORD NO. 24 COMMENT ********  $
*** RECORD NO. 25 COMMENT ********  $ WATER PROPERTIES CARD:
*** RECORD NO  26 COMMENT ********  $
*** RECORD NO  27 COMMENT ********  $  RHO is the density,  KG/M**3
*** RECORD NO  28 COMMENT ********  $  KT is the thermal conductivity,  J/M/SEC DEG C
*** RECORD NO  29 COMMENT ********  $  CF is the specific heat,  J/KG/DEG C
*** RECORD NO  30 COMMENT ********  $  DFMXY is the coefficient of molecular diffusion,  M**2/SEC
*** RECORD NO. 31 COMMENT ********  $
*** RECORD NO  32 COMMENT ********  $ ROCK PROPERTIES CARD
*** RECORD NO  33 COMMENT ********  $
*** RECORD NO  34 COMMENT ********  $  IZON is the beginning zone number
*** RECORD NO  35 COMMENT ********  $  NZON is the ending zone number
*** RECORD NO  36 COMMENT ********  $  IREP is the zone increment
*** RECORD NO  37 COMMENT ********  $  RHO is the density,  KG/M**3
*** RECORD NO  38 COMMENT ********  $  POR is the dimensionless porosity
*** RECORD NO  39 COMMENT ********  $  KT is the thermal conductivity,  J/M/SEC DEG C
*** RECORD NO  40 COMMENT ********  $  CP is the specific heat,  J/KG/DEG C
*** RECORD NO  41 COMMENT ********  $  DL is the longitudinal dispersivity,  M
*** RECORD NO  42 COMMENT ********  $  DT is the transverse dispersivity,  M
*** RECORD NO  43 COMMENT ********  $  KD is the sorption coefficient, M**3/KG
*** RECORD NO  44 COMMENT ********  $
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*** RECORD NO.  45 COMMENT ********  $ HYDRAULIC PROPERTIES CARD
*** RECORD NO.  46 COMMENT ********  $
*** RECORD NO.  47 COMMENT ********  $  IZON is the beginning zone number
*** RECORD NO.  48 COMMENT ********  $  NZON is the ending zone number
*** RECORD NO.  49 COMMENT ********  $  IREP is the zone increment
*** RECORD NO.  50 COMMENT ********  $  KHX is the horizontal conductivity,  M/SEC
*** RECORD NO.  51 COMMENT ********  $  KHY is the vertical conductivity,  M/SEC
*** RECORD NO.  52 COMMENT ********  $  STOR is the specific storage,  1/M
*** RECORD NO.  53 COMMENT ********  $
*** RECORD NO.  54 DATA INPUT *****  WATER RHO=997.0, KT=0.57, CF=4186.8, DFMXY=0.
*** RECORD NO.  55 DATA INPUT *****  ROCK 1 TO 2 IN 1 RHO=2200.0, POR=0.394, KT=1.09, CP=840.0, DL=0, DT=0, KD=0
*** RECORD NO.  56 DATA INPUT *****  HYDRAULIC 1 TO 2 IN 1 KHX=7.53E-2, KHY=7.53E-2, STOR=10000.
*** RECORD NO.  57 COMMENT ********  $
*** RECORD NO.  58 COMMENT ********  $ INITIAL TEMPERATURE DISTRIBUTION.
*** RECORD NO.  59 COMMENT ********  $
*** RECORD NO.  60 DATA INPUT *****  T = 25.03 FROM 1,1 TO 43,43
*** RECORD NO.  61 DATA INPUT *****  T = 23 AT 23,39
*** RECORD NO.  62 DATA INPUT *****  T = 27 AT 5,21
*** RECORD NO.  63 DATA INPUT *****  T = 27 AT 38,21
*** RECORD NO.  64 COMMENT ********  $
*** RECORD NO.  65 COMMENT ********  $ INITIAL HYDRAULIC HEAD DISTRIBUTION.
*** RECORD NO.  66 COMMENT ********  $
*** RECORD NO.  67 DATA INPUT *****  P = .044 FROM 1,1 TO 43,43
*** RECORD NO.  68 COMMENT ********  $
*** RECORD NO.  69 COMMENT ********  $ BOUNDARY CONDITIONS:
*** RECORD NO.  70 COMMENT ********  $
*** RECORD NO.  71 DATA INPUT *****  XBC NV=1 IB=1 TYP=2 dhdx=0.0
*** RECORD NO.  72 DATA INPUT *****  XBC NV=1 IB=2 TYP=2 dhdx=0.0
*** RECORD NO.  73 DATA INPUT *****  XBC NV=2 IB=1 TYP=2 dTdx=0.0
*** RECORD NO.  74 DATA INPUT *****  XBC NV=2 IB=2 TYP=2 dTdx=0.0
*** RECORD NO.  75 DATA INPUT *****  YBC NV=1 IB=1 TYP=2 dhdy=0.0
*** RECORD NO.  76 DATA INPUT *****  YBC NV=1 IB=2 TYP=2 dhdy=0.0
*** RECORD NO.  77 DATA INPUT *****  YBC NV=2 IB=1 TYP=2 dTdy=0.0
*** RECORD NO.  78 DATA INPUT *****  YBC NV=2 IB=2 TYP=1 T=16.84 DEGREES CENTIGRADE
*** RECORD NO.  79 COMMENT ********  $
*** RECORD NO.  80 DATA INPUT *****  SOURCE REGION FROM 2,2 TO 42,42 IN ZONE 2
*** RECORD NO.  81 DATA INPUT *****  HEAT IS CONSTANT (1) FROM TIME 0.0 AT 17037.0 JOULES PER CUBIC METER PER SECOND
*** RECORD NO.  82 COMMENT ********  $
*** RECORD NO.  83 DATA INPUT *****  ISOLVE 1 1 0
*** RECORD NO.  84 DATA INPUT *****  FDB    1 0
*** RECORD NO.  85 DATA INPUT *****  DENSITY 3 TREF 25
*** RECORD NO.  86 DATA INPUT *****  KIND  3
*** RECORD NO.  87 DATA INPUT *****  MIX 5
*** RECORD NO.  88 COMMENT ********  $
*** RECORD NO.  89 DATA INPUT *****  REFERENCE NODE AT 13,13
*** RECORD NO.  90 DATA INPUT *****  IPRINT 4,4,4,4
*** RECORD NO.  91 DATA INPUT *****  OUTPUT EVERY 1000 STEPS FROM 1,1 TO 43,43
*** RECORD NO.  92 DATA INPUT *****  PRINTERPLOTS AT 3,3 3,21 3,39 21,3 21,21 21,39 39,3 39,21 39,39
*** RECORD NO.  93 COMMENT ********  $
*** RECORD NO.  94 DATA INPUT *****  SOLVE FOR 2000 SECONDS IN STEP OF 0.1 SECONDS, DTFAC 1.05, MAX=15
```

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-----------------------------------------------------------------------------
NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)
-----------------------------------------------------------------------------
    GRID DIMENSIONS ..............(IDIM, JDIM) = 43 BY 43
    NUMBER OF TWO DIMENSIONAL FIELD ARRAYS.... = 27
    FIELD LENGTH REQUIRED FOR BLANK COMMON.... = 66564


X OR R COORDINATE VALUES

   -0.002    0.002    0.004    0.007    0.011    0.015    0.018    0.022
    0.026    0.029    0.033    0.036    0.040    0.044    0.047    0.051
    0.055    0.058    0.062    0.066    0.069    0.073    0.077    0.080
    0.084    0.088    0.091    0.095    0.099    0.102    0.106    0.109
    0.113    0.117    0.120    0.124    0.128    0.131    0.135    0.139
    0.142    0.144    0.148


Y COORDINATE VALUES

   -0.001    0.001    0.001    0.002    0.003    0.004    0.005    0.006
    0.008    0.009    0.010    0.011    0.012    0.013    0.014    0.015
    0.016    0.017    0.018    0.019    0.020    0.021    0.023    0.024
    0.025    0.026    0.027    0.028    0.029    0.030    0.031    0.032
    0.033    0.034    0.035    0.037    0.038    0.039    0.040    0.041
    0.042    0.043    0.044

PRINTER PLOTS AT NODES:
    I    J
    3    3
    3   21
    3   39
   21    3
   21   21
   21   39
   39    3
   39   21
   39   39
```

NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)

PROGRAM CONSTANTS, CONTROL PARAMETERS, AND REFERENCE VALUES

START TIME	(TIME) =	0.000E-01
MAX SPECIFIED TIME AT THIS STAGE	(TIMAX) =	2.000E 03
STARTING TIME STEP	(DT) =	1.000E-01
TIME STEP GROWTH FACTOR	(DTFAC) =	1.050E 00
MAXIMUM TIME STEP	(DTMAX) =	1.500E 01
MAXIMUM NUMBER OF STEPS	(MXSTEP) =	10000
FLUID SPECIFIC HEAT	(CF) =	4.174E 06
VISCOSITY COEFFICIENT	(VSCN) =	1.436E 03
BASE TEMPERATURE FOR VISCOSITY	(TMU) =	2.685E 01
HYDRAULIC CONDUCTIVITY INDEX	(IKH) =	3
RADIAL GEOMETRY INDEX	(IRAD) =	1
TIME HISTORY PLOT FILE UNIT	(NPLT1) =	7
CONTOUR PLOT FILE UNIT	(NPLT2) =	8
VELOCITY FIELD PLOT FILE UNIT	(NPLT3) =	9
MASS FLUX PLOT FILE UNIT	(NPLT4) =	11

STEP	TIME	U REF	V REF	P REF	T REF	C REF	dP/P	dT/dt	Pe
1	1.000E-01	0.000D-01	5.580D-07	4.400D-02	2.503D 01	0.000D-01	1.327D-06	2.497D 00	0.000D-01
2	2.050E-01	0.000D-01	5.695D-07	4.400D-02	2.503D 01	0.000D-01	1.533D-06	4.764D 00	0.000D-01
3	3.152E-01	0.000D-01	5.815D-07	4.400D-02	2.503D 01	0.000D-01	9.998D-07	4.307D 00	0.000D-01
4	4.310E-01	-1.604D-14	5.940D-07	4.400D-02	2.503D 01	0.000D-01	1.334D-06	3.880D 00	0.000D-01
5	5.526E-01	0.000D-01	6.073D-07	4.400D-02	2.503D 01	0.000D-01	6.900D-07	1.742D 00	0.000D-01
6	6.802E-01	8.019D-15	6.141D-07	4.400D-02	2.503D 01	0.000D-01	1.592D-06	3.292D 00	0.000D-01
7	8.142E-01	-1.604D-14	6.285D-07	4.400D-02	2.503D 01	0.000D-01	1.251D-06	2.932D 00	0.000D-01
8	9.549E-01	0.000D-01	6.432D-07	4.400D-02	2.504D 01	0.000D-01	1.380D-06	2.602D 00	0.000D-01
9	1.103E 00	-2.406D-14	6.583D-07	4.400D-02	2.504D 01	0.000D-01	1.376D-06	2.301D 00	0.000D-01
10	1.258E 00	-9.624D-14	6.744D-07	4.400D-02	2.504D 01	0.000D-01	6.887D-07	1.016D 00	0.000D-01
11	1.421E 00	-1.684D-13	6.813D-07	4.400D-02	2.504D 01	0.000D-01	1.598D-06	1.900D 00	0.000D-01
12	1.592E 00	-4.331D-13	6.972D-07	4.400D-02	2.504D 01	0.000D-01	1.237D-06	1.664D 00	0.000D-01
13	1.771E 00	-9.785D-13	7.133D-07	4.400D-02	2.504D 01	0.000D-01	1.396D-06	1.452D 00	0.000D-01
14	1.960E 00	-2.013D-12	7.296D-07	4.400D-02	2.504D 01	0.000D-01	1.396D-06	1.265D 00	0.000D-01
15	2.158E 00	-3.834D-12	7.486D-07	4.400D-02	2.504D 01	0.000D-01	7.046D-07	5.518D-01	0.000D-01
16	2.366E 00	-5.430D-12	7.542D-07	4.400D-02	2.504D 01	0.000D-01	1.641D-06	1.023D 00	0.000D-01
17	2.584E 00	-9.585D-12	7.714D-07	4.400D-02	2.504D 01	0.000D-01	1.293D-06	8.867D-01	0.000D-01
18	2.813E 00	-1.618D-11	7.889D-07	4.400D-02	2.505D 01	0.000D-01	1.468D-06	7.855D-01	0.000D-01
19	3.054E 00	-2.614D-11	8.069D-07	4.400D-02	2.505D 01	0.000D-01	1.475D-06	7.456D-01	0.000D-01
20	3.307E 00	-4.066D-11	8.300D-07	4.400D-02	2.505D 01	0.000D-01	7.506D-07	3.537D-01	0.000D-01
21	3.572E 00	-5.116D-11	8.346D-07	4.400D-02	2.505D 01	0.000D-01	1.741D-06	6.787D-01	0.000D-01
22	3.851E 00	-7.605D-11	8.544D-07	4.400D-02	2.505D 01	0.000D-01	1.387D-06	6.355D-01	0.000D-01
23	4.143E 00	-1.098D-10	8.748D-07	4.400D-02	2.505D 01	0.000D-01	1.565D-06	5.905D-01	0.000D-01
24	4.450E 00	-1.541D-10	8.959D-07	4.400D-02	2.506D 01	0.000D-01	1.576D-06	5.466D-01	0.000D-01
25	4.773E 00	-2.112D-10	9.244D-07	4.400D-02	2.506D 01	0.000D-01	8.032D-07	2.541D-01	0.000D-01
26	5.111E 00	-2.479D-10	9.285D-07	4.400D-02	2.506D 01	0.000D-01	1.856D-06	4.836D-01	0.000D-01
27	5.467E 00	-3.298D-10	9.518D-07	4.400D-02	2.506D 01	0.000D-01	1.503D-06	4.481D-01	0.000D-01
28	5.840E 00	-4.298D-10	9.758D-07	4.400D-02	2.506D 01	0.000D-01	1.679D-06	4.128D-01	0.000D-01
29	6.232E 00	-5.497D-10	1.000D-06	4.400D-02	2.507D 01	0.000D-01	1.700D-06	3.799D-01	0.000D-01
30	6.644E 00	-6.909D-10	1.036D-06	4.400D-02	2.507D 01	0.000D-01	8.673D-07	1.761D-01	0.000D-01
31	7.076E 00	-7.750D-10	1.038D-06	4.400D-02	2.507D 01	0.000D-01	1.999D-06	3.329D-01	0.000D-01
32	7.530E 00	-9.553D-10	1.064D-06	4.400D-02	2.507D 01	0.000D-01	1.640D-06	3.060D-01	0.000D-01
33	8.006E 00	-1.161D-09	1.090D-06	4.400D-02	2.507D 01	0.000D-01	1.815D-06	2.800D-01	0.000D-01
34	8.507E 00	-1.392D-09	1.116D-06	4.400D-02	2.508D 01	0.000D-01	1.845D-06	2.625D-01	0.000D-01
35	9.032E 00	-1.650D-09	1.158D-06	4.400D-02	2.508D 01	0.000D-01	9.401D-07	1.254D-01	0.000D-01
36	9.584E 00	-1.796D-09	1.154D-06	4.400D-02	2.508D 01	0.000D-01	2.163D-06	2.407D-01	0.000D-01
37	1.016E 01	-2.102D-09	1.180D-06	4.400D-02	2.509D 01	0.000D-01	1.790D-06	2.275D-01	0.000D-01
38	1.077E 01	-2.436D-09	1.205D-06	4.400D-02	2.509D 01	0.000D-01	1.965D-06	2.140D-01	0.000D-01
39	1.141E 01	-2.799D-09	1.228D-06	4.400D-02	2.509D 01	0.000D-01	2.005D-06	2.010D-01	0.000D-01
40	1.208E 01	-3.191D-09	1.276D-06	4.400D-02	2.510D 01	0.000D-01	1.020D-06	9.528D-02	0.000D-01
41	1.278E 01	-3.407D-09	1.259D-06	4.400D-02	2.510D 01	0.000D-01	2.345D-06	1.814D-01	0.000D-01
42	1.352E 01	-3.852D-09	1.279D-06	4.400D-02	2.511D 01	0.000D-01	1.950D-06	1.701D-01	0.000D-01
43	1.430E 01	-4.327D-09	1.297D-06	4.400D-02	2.511D 01	0.000D-01	2.127D-06	1.586D-01	0.000D-01

44	1.511E 01	-4.830D-09	1.313D-06	4.400D-02	2.511D 01	0.000D-01	2.176D-06	1.479D-01	0.000D-01
45	1.597E 01	-5.361D-09	1.367D-06	4.400D-02	2.512D 01	0.000D-01	1.105D-06	6.976D-02	0.000D-01
46	1.687E 01	-5.646D-09	1.331D-06	4.400D-02	2.512D 01	0.000D-01	2.540D-06	1.319D-01	0.000D-01
47	1.781E 01	-6.228D-09	1.341D-06	4.400D-02	2.513D 01	0.000D-01	2.115D-06	1.246D-01	0.000D-01
48	1.880E 01	-6.833D-09	1.349D-06	4.400D-02	2.513D 01	0.000D-01	2.298D-06	1.179D-01	0.000D-01
49	1.984E 01	-7.458D-09	1.354D-06	4.400D-02	2.514D 01	0.000D-01	2.354D-06	1.114D-01	0.000D-01
50	2.093E 01	-8.099D-09	1.415D-06	4.400D-02	2.514D 01	0.000D-01	1.193D-06	5.326D-02	0.000D-01
51	2.208E 01	-8.435D-09	1.354D-06	4.400D-02	2.515D 01	0.000D-01	2.745D-06	1.013D-01	0.000D-01
52	2.329E 01	-9.110D-09	1.353D-06	4.400D-02	2.516D 01	0.000D-01	2.283D-06	9.562D-02	0.000D-01
53	2.455E 01	-9.791D-09	1.349D-06	4.400D-02	2.517D 01	0.000D-01	2.472D-06	8.972D-02	0.000D-01
54	2.588E 01	-1.047D-08	1.344D-06	4.400D-02	2.518D 01	0.000D-01	2.535D-06	8.415D-02	0.000D-01
55	2.727E 01	-1.115D-08	1.417D-06	4.400D-02	2.518D 01	0.000D-01	1.282D-06	4.009D-02	0.000D-01
56	2.873E 01	-1.150D-08	1.328D-06	4.400D-02	2.519D 01	0.000D-01	2.955D-06	7.564D-02	0.000D-01
57	3.027E 01	-1.218D-08	1.317D-06	4.400D-02	2.520D 01	0.000D-01	2.449D-06	7.146D-02	0.000D-01
58	3.188E 01	-1.285D-08	1.305D-06	4.400D-02	2.521D 01	0.000D-01	2.645D-06	6.770D-02	0.000D-01
59	3.358E 01	-1.350D-08	1.292D-06	4.400D-02	2.522D 01	0.000D-01	2.714D-06	6.405D-02	0.000D-01
60	3.536E 01	-1.412D-08	1.383D-06	4.400D-02	2.522D 01	0.000D-01	1.369D-06	3.080D-02	0.000D-01
61	3.723E 01	-1.443D-08	1.265D-06	4.400D-02	2.524D 01	0.000D-01	3.163D-06	5.824D-02	0.000D-01
62	3.919E 01	-1.502D-08	1.249D-06	4.400D-02	2.525D 01	0.000D-01	2.602D-06	5.516D-02	0.000D-01
63	4.125E 01	-1.558D-08	1.232D-06	4.400D-02	2.526D 01	0.000D-01	2.806D-06	5.182D-02	0.000D-01
64	4.341E 01	-1.610D-08	1.215D-06	4.400D-02	2.527D 01	0.000D-01	2.878D-06	4.867D-02	0.000D-01
65	4.568E 01	-1.659D-08	1.333D-06	4.400D-02	2.528D 01	0.000D-01	1.447D-06	2.333D-02	0.000D-01
66	4.806E 01	-1.682D-08	1.185D-06	4.400D-02	2.530D 01	0.000D-01	3.355D-06	4.413D-02	0.000D-01
67	5.057E 01	-1.725D-08	1.167D-06	4.400D-02	2.531D 01	0.000D-01	2.729D-06	4.195D-02	0.000D-01
68	5.319E 01	-1.765D-08	1.150D-06	4.400D-02	2.533D 01	0.000D-01	2.941D-06	3.949D-02	0.000D-01
69	5.595E 01	-1.799D-08	1.134D-06	4.400D-02	2.534D 01	0.000D-01	3.015D-06	3.719D-02	0.000D-01
70	5.885E 01	-1.830D-08	1.289D-06	4.400D-02	2.535D 01	0.000D-01	1.509D-06	1.789D-02	0.000D-01
71	6.189E 01	-1.846D-08	1.104D-06	4.400D-02	2.537D 01	0.000D-01	3.516D-06	3.343D-02	0.000D-01
72	6.509E 01	-1.870D-08	1.087D-06	4.400D-02	2.539D 01	0.000D-01	2.815D-06	3.157D-02	0.000D-01
73	6.844E 01	-1.893D-08	1.071D-06	4.400D-02	2.541D 01	0.000D-01	3.036D-06	2.951D-02	0.000D-01
74	7.197E 01	-1.910D-08	1.062D-06	4.400D-02	2.543D 01	0.000D-01	3.105D-06	2.778D-02	0.000D-01
75	7.566E 01	-1.926D-08	1.264D-06	4.400D-02	2.544D 01	0.000D-01	1.547D-06	1.339D-02	0.000D-01
76	7.955E 01	-1.933D-08	1.032D-06	4.400D-02	2.547D 01	0.000D-01	3.625D-06	2.499D-02	0.000D-01
77	8.363E 01	-1.942D-08	1.014D-06	4.400D-02	2.549D 01	0.000D-01	2.842D-06	2.356D-02	0.000D-01
78	8.791E 01	-1.949D-08	1.006D-06	4.400D-02	2.552D 01	0.000D-01	3.069D-06	2.202D-02	0.000D-01
79	9.240E 01	-1.953D-08	1.005D-06	4.400D-02	2.555D 01	0.000D-01	3.131D-06	2.056D-02	0.000D-01
80	9.712E 01	-1.956D-08	1.267D-06	4.400D-02	2.556D 01	0.000D-01	1.550D-06	9.900D-03	0.000D-01
81	1.021E 02	-1.957D-08	9.666D-07	4.400D-02	2.559D 01	0.000D-01	3.657D-06	1.819D-02	0.000D-01
82	1.073E 02	-1.955D-08	9.512D-07	4.400D-02	2.562D 01	0.000D-01	2.786D-06	1.707D-02	0.000D-01
83	1.127E 02	-1.950D-08	9.578D-07	4.400D-02	2.566D 01	0.000D-01	3.015D-06	1.583D-02	0.000D-01
84	1.185E 02	-1.945D-08	9.611D-07	4.400D-02	2.569D 01	0.000D-01	3.065D-06	1.479D-02	0.000D-01
85	1.245E 02	-1.940D-08	1.296D-06	4.400D-02	2.571D 01	0.000D-01	1.504D-06	7.188D-03	0.000D-01
86	1.308E 02	-1.935D-08	9.030D-07	4.400D-02	2.575D 01	0.000D-01	3.580D-06	1.315D-02	0.000D-01
87	1.375E 02	-1.928D-08	9.014D-07	4.400D-02	2.579D 01	0.000D-01	2.620D-06	1.243D-02	0.000D-01
88	1.444E 02	-1.916D-08	9.254D-07	4.400D-02	2.583D 01	0.000D-01	2.846D-06	1.155D-02	0.000D-01
89	1.518E 02	-1.907D-08	9.261D-07	4.400D-02	2.587D 01	0.000D-01	2.878D-06	1.073D-02	0.000D-01
90	1.595E 02	-1.896D-08	1.346D-06	4.400D-02	2.590D 01	0.000D-01	1.394D-06	5.202D-03	0.000D-01
91	1.675E 02	-1.886D-08	8.381D-07	4.400D-02	2.594D 01	0.000D-01	3.357D-06	9.326D-03	0.000D-01
92	1.760E 02	-1.878D-08	8.704D-07	4.400D-02	2.599D 01	0.000D-01	2.870D-06	8.754D-03	0.000D-01
93	1.849E 02	-1.860D-08	9.053D-07	4.400D-02	2.604D 01	0.000D-01	3.060D-06	8.057D-03	0.000D-01
94	1.943E 02	-1.849D-08	8.972D-07	4.400D-02	2.609D 01	0.000D-01	3.256D-06	7.438D-03	0.000D-01
95	2.041E 02	-1.835D-08	1.409D-06	4.400D-02	2.612D 01	0.000D-01	1.706D-06	3.603D-03	0.000D-01
96	2.144E 02	-1.821D-08	7.802D-07	4.400D-02	2.617D 01	0.000D-01	3.433D-06	6.340D-03	0.000D-01
97	2.252E 02	-1.811D-08	8.661D-07	4.400D-02	2.623D 01	0.000D-01	3.547D-06	6.098D-03	0.000D-01
98	2.365E 02	-1.793D-08	8.946D-07	4.400D-02	2.629D 01	0.000D-01	3.863D-06	6.068D-03	0.000D-01
99	2.485E 02	-1.783D-08	8.793D-07	4.400D-02	2.634D 01	0.000D-01	4.096D-06	6.030D-03	0.000D-01
100	2.610E 02	-1.769D-08	1.481D-06	4.400D-02	2.637D 01	0.000D-01	2.131D-06	2.992D-03	0.000D-01
101	2.741E 02	-1.750D-08	7.490D-07	4.400D-02	2.644D 01	0.000D-01	4.183D-06	5.956D-03	0.000D-01
102	2.880E 02	-1.749D-08	8.921D-07	4.400D-02	2.650D 01	0.000D-01	4.403D-06	5.895D-03	0.000D-01
103	3.025E 02	-1.736D-08	8.947D-07	4.400D-02	2.656D 01	0.000D-01	4.903D-06	5.824D-03	0.000D-01
104	3.175E 02	-1.730D-08	8.925D-07	4.400D-02	2.663D 01	0.000D-01	5.085D-06	5.744D-03	0.000D-01
105	3.325E 02	-1.723D-08	1.585D-06	4.400D-02	2.666D 01	0.000D-01	2.575D-06	2.830D-03	0.000D-01
106	3.475E 02	-1.710D-08	8.215D-07	4.400D-02	2.672D 01	0.000D-01	4.807D-06	5.611D-03	0.000D-01
107	3.625E 02	-1.715D-08	9.676D-07	4.400D-02	2.678D 01	0.000D-01	4.954D-06	5.517D-03	0.000D-01
108	3.775E 02	-1.712D-08	9.550D-07	4.400D-02	2.684D 01	0.000D-01	5.255D-06	5.420D-03	0.000D-01
109	3.925E 02	-1.714D-08	9.510D-07	4.400D-02	2.690D 01	0.000D-01	5.172D-06	5.320D-03	0.000D-01

110	4.075E 02	-1.716D-08	1.564D-06	4.400D-02	2.692D 01	0.000D-01	2.562D-06	2.613D-03	0.000D-01
111	4.225E 02	-1.713D-08	8.892D-07	4.400D-02	2.698D 01	0.000D-01	4.765D-06	5.172D-03	0.000D-01
112	4.375E 02	-1.721D-08	9.964D-07	4.400D-02	2.703D 01	0.000D-01	4.924D-06	5.070D-03	0.000D-01
113	4.525E 02	-1.728D-08	9.833D-07	4.400D-02	2.709D 01	0.000D-01	5.174D-06	4.970D-03	0.000D-01
114	4.675E 02	-1.738D-08	9.817D-07	4.400D-02	2.714D 01	0.000D-01	5.070D-06	4.871D-03	0.000D-01
115	4.825E 02	-1.745D-08	1.548D-06	4.400D-02	2.716D 01	0.000D-01	2.528D-06	2.391D-03	0.000D-01
116	4.975E 02	-1.749D-08	9.401D-07	4.400D-02	2.722D 01	0.000D-01	4.714D-06	4.730D-03	0.000D-01
117	5.125E 02	-1.761D-08	1.019D-06	4.400D-02	2.727D 01	0.000D-01	4.876D-06	4.634D-03	0.000D-01
118	5.275E 02	-1.774D-08	1.009D-06	4.400D-02	2.731D 01	0.000D-01	5.080D-06	4.543D-03	0.000D-01
119	5.425E 02	-1.789D-08	1.007D-06	4.400D-02	2.736D 01	0.000D-01	4.977D-06	4.453D-03	0.000D-01
120	5.575E 02	-1.803D-08	1.540D-06	4.400D-02	2.739D 01	0.000D-01	2.486D-06	2.188D-03	0.000D-01
121	5.725E 02	-1.813D-08	9.761D-07	4.400D-02	2.743D 01	0.000D-01	4.669D-06	4.329D-03	0.000D-01
122	5.875E 02	-1.825D-0	1.036D-06	4.400D-02	2.748D 01	0.000D-01	4.816D-06	4.244D-03	0.000D-01
123	6.025E 02	-1.840D-08	1.027D-06	4.400D-02	2.753D 01	0.000D-01	4.982D-06	4.165D-03	0.000D-01
124	6.175E 02	-1.861D-08	1.025D-06	4.400D-02	2.757D 01	0.000D-01	4.887D-06	4.088D-03	0.000D-01
125	6.325E 02	-1.878D-08	1.533D-06	4.400D-02	2.760D 01	0.000D-01	2.442D-06	2.013D-03	0.000D-01
126	6.475E 02	-1.888D-08	9.990D-07	4.400D-02	2.764D 01	0.000D-01	4.621D-06	3.983D-03	0.000D-01
127	6.625E 02	-1.906D-08	1.046D-06	4.400D-02	2.769D 01	0.000D-01	4.747D-06	3.911D-03	0.000D-01
128	6.775E 02	-1.930D-08	1.038D-06	4.400D-02	2.773D 01	0.000D-01	4.883D-06	3.844D-03	0.000D-01
129	6.925E 02	-1.950D-08	1.035D-06	4.400D-02	2.777D 01	0.000D-01	4.798D-06	3.779D-03	0.000D-01
130	7.075E 02	-1.972D-08	1.522D-06	4.400D-02	2.780D 01	0.000D-01	2.397D-06	1.865D-03	0.000D-01
131	7.225E 02	-1.987D-08	1.011D-06	4.400D-02	2.784D 01	0.000D-01	4.566D-06	3.692D-03	0.000D-01
132	7.375E 02	-2.005D-08	1.048D-06	4.400D-02	2.788D 01	0.000D-01	4.671D-06	3.631D-03	0.000D-01
133	7.525E 02	-2.029D-08	1.041D-06	4.400D-02	2.792D 01	0.000D-01	4.782D-06	3.575D-03	0.000D-01
134	7.675E 02	-2.053D-08	1.037D-06	4.400D-02	2.797D 01	0.000D-01	4.707D-06	3.521D-03	0.000D-01
135	7.825E 02	-2.076D-08	1.508D-06	4.400D-02	2.799D 01	0.000D-01	2.351D-06	1.741D-03	0.000D-01
136	7.975E 02	-2.092D-08	1.014D-06	4.400D-02	2.803D 01	0.000D-01	4.503D-06	3.449D-03	0.000D-01
137	8.125E 02	-2.115D-08	1.044D-06	4.400D-02	2.807D 01	0.000D-01	4.588D-06	3.398D-03	0.000D-01
138	8.275E 02	-2.147D-08	1.038D-06	4.400D-02	2.811D 01	0.000D-01	4.680D-06	3.351D-03	0.000D-01
139	8.425E 02	-2.174D-08	1.033D-06	4.400D-02	2.815D 01	0.000D-01	4.614D-06	3.305D-03	0.000D-01
140	8.575E 02	-2.200D-08	1.490D-06	4.400D-02	2.817D 01	0.000D-01	2.303D-06	1.637D-03	0.000D-01
141	8.725E 02	-2.216D-08	1.011D-06	4.400D-02	2.821D 01	0.000D-01	4.431D-06	3.246D-03	0.000D-01
142	8.875E 02	-2.244D-08	1.036D-06	4.400D-02	2.825D 01	0.000D-01	4.501D-06	3.201D-03	0.000D-01
143	9.025E 02	-2.274D-08	1.030D-06	4.400D-02	2.829D 01	0.000D-01	4.578D-06	3.162D-03	0.000D-01
144	9.175E 02	-2.306D-08	1.024D-06	4.400D-02	2.833D 01	0.000D-01	4.519D-06	3.123D-03	0.000D-01
145	9.325E 02	-2.343D-08	1.468D-06	4.400D-02	2.835D 01	0.000D-01	2.255D-06	1.549D-03	0.000D-01
146	9.475E 02	-2.364D-08	1.002D-06	4.400D-02	2.839D 01	0.000D-01	4.353D-06	3.073D-03	0.000D-01
147	9.625E 02	-2.391D-08	1.024D-06	4.400D-02	2.843D 01	0.000D-01	4.411D-06	3.035D-03	0.000D-01
148	9.775E 02	-2.429D-08	1.018D-06	4.400D-02	2.846D 01	0.000D-01	4.476D-06	3.001D-03	0.000D-01
149	9.925E 02	-2.461D-08	1.012D-06	4.400D-02	2.850D 01	0.000D-01	4.422D-06	2.967D-03	0.000D-01
150	1.007E 03	-2.497D-08	1.444D-06	4.400D-02	2.852D 01	0.000D-01	2.205D-06	1.474D-03	0.000D-01
151	1.022E 03	-2.518D-08	9.898D-07	4.400D-02	2.856D 01	0.000D-01	4.270D-06	2.926D-03	0.000D-01
152	1.037E 03	-2.555D-08	1.008D-06	4.400D-02	2.860D 01	0.000D-01	4.318D-06	2.892D-03	0.000D-01
153	1.052E 03	-2.594D-08	1.002D-06	4.400D-02	2.863D 01	0.000D-01	4.374D-06	2.862D-03	0.000D-01
154	1.067E 03	-2.634D-08	9.963D-07	4.400D-02	2.867D 01	0.000D-01	4.324D-06	2.833D-03	0.000D-01
155	1.082E 03	-2.672D-08	1.417D-06	4.400D-02	2.869D 01	0.000D-01	2.156D-06	1.409D-03	0.000D-01
156	1.097E 03	-2.696D-08	9.745D-07	4.400D-02	2.872D 01	0.000D-01	4.183D-06	2.797D-03	0.000D-01
157	1.112E 03	-2.735D-08	9.908D-07	4.400D-02	2.876D 01	0.000D-01	4.223D-06	2.767D-03	0.000D-01
158	1.127E 03	-2.779D-08	9.848D-07	4.400D-02	2.879D 01	0.000D-01	4.272D-06	2.741D-03	0.000D-01
159	1.142E 03	-2.820D-08	9.786D-07	4.400D-02	2.883D 01	0.000D-01	4.226D-06	2.715D-03	0.000D-01
160	1.157E 03	-2.865D-08	1.389D-06	4.400D-02	2.885D 01	0.000D-01	2.106D-06	1.351D-03	0.000D-01
161	1.172E 03	-2.899D-08	9.570D-07	4.400D-02	2.888D 01	0.000D-01	4.093D-06	2.683D-03	0.000D-01
162	1.187E 03	-2.942D-08	9.716D-07	4.400D-02	2.892D 01	0.000D-01	4.128D-06	2.656D-03	0.000D-01
163	1.202E 03	-2.992D-08	9.657D-07	4.400D-02	2.895D 01	0.000D-01	4.172D-06	2.633D-03	0.000D-01
164	1.217E 03	-3.041D-08	9.593D-07	4.400D-02	2.899D 01	0.000D-01	4.128D-06	2.609D-03	0.000D-01
165	1.232E 03	-3.094D-08	1.360D-06	4.400D-02	2.900D 01	0.000D-01	2.057D-06	1.300D-03	0.000D-01
166	1.247E 03	-3.126D-08	9.379D-07	4.400D-02	2.904D 01	0.000D-01	4.002D-06	2.582D-03	0.000D-01
167	1.262E 03	-3.170D-08	9.512D-07	4.400D-02	2.907D 01	0.000D-01	4.032D-06	2.557D-03	0.000D-01
168	1.277E 03	-3.223D-08	9.452D-07	4.400D-02	2.910D 01	0.000D-01	4.072D-06	2.536D-03	0.000D-01
169	1.292E 03	-3.274D-08	9.388D-07	4.400D-02	2.914D 01	0.000D-01	4.030D-06	2.514D-03	0.000D-01
170	1.307E 03	-3.327D-08	1.330D-06	4.400D-02	2.916D 01	0.000D-01	2.008D-06	1.253D-03	0.000D-01
171	1.322E 03	-3.361D-08	9.177D-07	4.400D-02	2.919D 01	0.000D-01	3.910D-06	2.489D-03	0.000D-01
172	1.337E 03	-3.416D-08	9.299D-07	4.400D-02	2.922D 01	0.000D-01	3.936D-06	2.466D-03	0.000D-01
173	1.352E 03	-3.472D-08	9.240D-07	4.400D-02	2.925D 01	0.000D-01	3.973D-06	2.447D-03	0.000D-01
174	1.367E 03	-3.537D-08	9.175D-07	4.400D-02	2.929D 01	0.000D-01	3.933D-06	2.427D-03	0.000D-01
175	1.382E 03	-3.598D-08	1.299D-06	4.400D-02	2.930D 01	0.000D-01	1.959D-06	1.210D-03	0.000D-01

176	1.397E 03	-3.638D-08	8.968D-07	4.400D-02	2.933D 01	0.000D-01	3.818D-06	2.404D-03	0.000D-01
177	1.412E 03	-3.701D-08	9.080D-07	4.400D-02	2.937D 01	0.000D-01	3.842D-06	2.382D-03	0.000D-01
178	1.427E 03	-3.764D-08	9.021D-07	4.400D-02	2.940D 01	0.000D-01	3.875D-06	2.364D-03	0.000D-01
179	1.442E 03	-3.832D-08	8.956D-07	4.400D-02	2.943D 01	0.000D-01	3.837D-06	2.346D-03	0.000D-01
180	1.457E 03	-3.908D-08	1.268D-06	4.400D-02	2.944D 01	0.000D-01	1.911D-06	1.170D-03	0.000D-01
181	1.472E 03	-3.948D-08	8.753D-07	4.400D-02	2.947D 01	0.000D-01	3.726D-06	2.325D-03	0.000D-01
182	1.487E 03	-4.017D-08	8.858D-07	4.400D-02	2.951D 01	0.000D-01	3.748D-06	2.304D-03	0.000D-01
183	1.502E 03	-4.089D-08	8.798D-07	4.400D-02	2.954D 01	0.000D-01	3.779D-06	2.287D-03	0.000D-01
184	1.517E 03	-4.160D-08	8.733D-07	4.400D-02	2.957D 01	0.000D-01	3.742D-06	2.270D-03	0.000D-01
185	1.532E 03	-4.242D-08	1.237D-06	4.400D-02	2.958D 01	0.000D-01	1.863D-06	1.133D-03	0.000D-01
186	1.547E 03	-4.293D-08	8.533D-07	4.400D-02	2.961D 01	0.000D-01	3.634D-06	2.251D-03	0.000D-01
187	1.562E 03	-4.361D-08	8.632D-07	4.400D-02	2.964D 01	0.000D-01	3.655D-06	2.231D-03	0.000D-01
188	1.577E 03	-4.448D-08	8.573D-07	4.400D-02	2.967D 01	0.000D-01	3.684D-06	2.215D-03	0.000D-01
189	1.592E 03	-4.533D-08	8.507D-07	4.400D-02	2.970D 01	0.000D-01	3.648D-06	2.198D-03	0.000D-01
190	1.607E 03	-4.622D-08	1.206D-06	4.400D-02	2.972D 01	0.000D-01	1.817D-06	1.098D-03	0.000D-01
191	1.622E 03	-4.675D-08	8.312D-07	4.400D-02	2.974D 01	0.000D-01	3.544D-06	2.180D-03	0.000D-01
192	1.637E 03	-4.752D-08	8.405D-07	4.400D-02	2.977D 01	0.000D-01	3.563D-06	2.162D-03	0.000D-01
193	1.652E 03	-4.847D-08	8.345D-07	4.400D-02	2.980D 01	0.000D-01	3.592D-06	2.146D-03	0.000D-01
194	1.667E 03	-4.945D-08	8.279D-07	4.400D-02	2.983D 01	0.000D-01	3.556D-06	2.131D-03	0.000D-01
195	1.682E 03	-5.042D-08	1.175D-06	4.400D-02	2.984D 01	0.000D-01	1.771D-06	1.064D-03	0.000D-01
196	1.697E 03	-5.106D-08	8.088D-07	4.400D-02	2.987D 01	0.000D-01	3.455D-06	2.114D-03	0.000D-01
197	1.712E 03	-5.197D-08	8.176D-07	4.400D-02	2.990D 01	0.000D-01	3.474D-06	2.096D-03	0.000D-01
198	1.727E 03	-5.294D-08	8.117D-07	4.400D-02	2.993D 01	0.000D-01	3.501D-06	2.081D-03	0.000D-01
199	1.742E 03	-5.399D-08	8.051D-07	4.400D-02	2.996D 01	0.000D-01	3.466D-06	2.066D-03	0.000D-01
200	1.757E 03	-5.511D-08	1.143D-06	4.400D-02	2.997D 01	0.000D-01	1.726D-06	1.033D-03	0.000D-01
201	1.772E 03	-5.579D-08	7.863D-07	4.400D-02	3.000D 01	0.000D-01	3.368D-06	2.050D-03	0.000D-01
202	1.787E 03	-5.680D-08	7.946D-07	4.400D-02	3.002D 01	0.000D-01	3.385D-06	2.033D-03	0.000D-01
203	1.802E 03	-5.802D-08	7.886D-07	4.400D-02	3.005D 01	0.000D-01	3.411D-06	2.019D-03	0.000D-01
204	1.817E 03	-5.914D-08	7.820D-07	4.400D-02	3.008D 01	0.000D-01	3.378D-06	2.005D-03	0.000D-01
205	1.832E 03	-6.039D-08	1.112D-06	4.400D-02	3.009D 01	0.000D-01	1.682D-06	1.002D-03	0.000D-01
206	1.847E 03	-6.112D-08	7.636D-07	4.400D-02	3.012D 01	0.000D-01	3.282D-06	1.989D-03	0.000D-01
207	1.862E 03	-6.234D-08	7.715D-07	4.400D-02	3.015D 01	0.000D-01	3.299D-06	1.973D-03	0.000D-01
208	1.877E 03	-6.358D-08	7.655D-07	4.400D-02	3.017D 01	0.000D-01	3.324D-06	1.959D-03	0.000D-01
209	1.892E 03	-6.494D-08	7.588D-07	4.400D-02	3.020D 01	0.000D-01	3.291D-06	1.945D-03	0.000D-01
210	1.907E 03	-6.632D-08	1.080D-06	4.400D-02	3.021D 01	0.000D-01	1.639D-06	9.727D-04	0.000D-01
211	1.922E 03	-6.721D-08	7.407D-07	4.400D-02	3.024D 01	0.000D-01	3.199D-06	1.931D-03	0.000D-01
212	1.937E 03	-6.847D-08	7.482D-07	4.400D-02	3.026D 01	0.000D-01	3.215D-06	1.915D-03	0.000D-01
213	1.952E 03	-6.994D-08	7.420D-07	4.400D-02	3.029D 01	0.000D-01	3.240D-06	1.902D-03	0.000D-01
214	1.967E 03	-7.137D-08	7.353D-07	4.400D-02	3.031D 01	0.000D-01	3.207D-06	1.889D-03	0.000D-01
215	1.982E 03	-7.291D-08	1.049D-06	4.400D-02	3.033D 01	0.000D-01	1.597D-06	9.447D-04	0.000D-01
216	1.997E 03	-7.391D-08	7.175D-07	4.400D-02	3.035D 01	0.000D-01	3.117D-06	1.875D-03	0.000D-01
217	2.000E 03	-7.480D-08	1.212D-06	4.400D-02	3.035D 01	0.000D-01	9.254D-07	1.882D-03	0.000D-01

*** RECORD NO 95 DATA INPUT ***** PLOT 0 1 0

CONTOUR PLOT RECORDS GENERATED AT STEP NUMBER 217 .
SIMULATION TIME = 2.0000E 03, RUNID = 1024831700 .

*** RECORD NO 96 DATA INPUT ***** SOLVE FOR 2000 SECONDS IN STEP OF 15 SECONDS, DTFAC=1.05, MAX=30

218	2.015E 03	-7.603D-08	5.261D-07	4.400D-02	3.038D 01	0.000D-01	3.639D-06	1.853D-03	0.000D-01
219	2.031E 03	-7.772D-08	6.488D-07	4.400D-02	3.040D 01	0.000D-01	2.419D-06	1.841D-03	0.000D-01
220	2.047E 03	-7.910D-08	9.829D-07	4.400D-02	3.042D 01	0.000D-01	1.716D-06	9.215D-04	0.000D-01
221	2.065E 03	-8.029D-08	6.331D-07	4.400D-02	3.045D 01	0.000D-01	3.284D-06	1.826D-03	0.000D-01
222	2.083E 03	-8.184D-08	6.534D-07	4.400D-02	3.047D 01	0.000D-01	3.427D-06	1.807D-03	0.000D-01
223	2.102E 03	-8.401D-08	6.493D-07	4.400D-02	3.050D 01	0.000D-01	3.710D-06	1.792D-03	0.000D-01
224	2.122E 03	-8.620D-08	6.413D-07	4.400D-02	3.054D 01	0.000D-01	3.824D-06	1.775D-03	0.000D-01
225	2.143E 03	-8.863D-08	1.039D-06	4.400D-02	3.055D 01	0.000D-01	2.012D-06	8.903D-04	0.000D-01
226	2.165E 03	-9.045D-08	6.080D-07	4.400D-02	3.059D 01	0.000D-01	4.017D-06	1.757D-03	0.000D-01
227	2.189E 03	-9.280D-08	6.324D-07	4.400D-02	3.062D 01	0.000D-01	4.287D-06	1.735D-03	0.000D-01
228	2.213E 03	-9.590D-08	6.175D-07	4.400D-02	3.066D 01	0.000D-01	4.585D-06	1.717D-03	0.000D-01
229	2.239E 03	-9.924D-08	6.101D-07	4.400D-02	3.070D 01	0.000D-01	4.727D-06	1.697D-03	0.000D-01
230	2.266E 03	-1.029D-07	1.094D-06	4.400D-02	3.072D 01	0.000D-01	2.471D-06	8.565D-04	0.000D-01
231	2.294E 03	-1.058D-07	5.659D-07	4.400D-02	3.076D 01	0.000D-01	4.878D-06	1.678D-03	0.000D-01
232	2.324E 03	-1.091D-07	5.981D-07	4.399D-02	3.080D 01	0.000D-01	5.256D-06	1.651D-03	0.000D-01
233	2.354E 03	-1.139D-07	5.931D-07	4.399D-02	3.085D 01	0.000D-01	5.525D-06	1.631D-03	0.000D-01
234	2.384E 03	-1.190D-07	5.946D-07	4.399D-02	3.089D 01	0.000D-01	5.511D-06	1.610D-03	0.000D-01

235	2.414E 03	-1.245D-07	1.136D-06	4.399D-02	3.091D 01	0.000D-01	2.766D-06	8.210D-04	0.000D-01
236	2.444E 03	-1.287D-07	5.624D-07	4.399D-02	3.095D 01	0.000D-01	5.263D-06	1.595D-03	0.000D-01
237	2.474E 03	-1.331D-07	5.854D-07	4.399D-02	3.099D 01	0.000D-01	5.413D-06	1.569D-03	0.000D-01
238	2.504E 03	-1.396D-07	5.553D-07	4.399D-02	3.103D 01	0.000D-01	5.486D-06	1.552D-03	0.000D-01
239	2.534E 03	-1.461D-07	5.439D-07	4.399D-02	3.107D 01	0.000D-01	5.348D-06	1.533D-03	0.000D-01
240	2.564E 03	-1.531D-07	1.053D-06	4.399D-02	3.109D 01	0.000D-01	2.662D-06	7.848D-04	0.000D-01
241	2.594E 03	-1.584D-07	5.037D-07	4.399D-02	3.113D 01	0.000D-01	5.057D-06	1.520D-03	0.000D-01
242	2.624E 03	-1.640D-07	5.204D-07	4.399D-02	3.117D 01	0.000D-01	5.190D-06	1.497D-03	0.000D-01
243	2.654E 03	-1.721D-07	4.874D-07	4.399D-02	3.121D 01	0.000D-01	5.254D-06	1.481D-03	0.000D-01
244	2.684E 03	-1.803D-07	4.723D-07	4.399D-02	3.124D 01	0.000D-01	5.123D-06	1.465D-03	0.000D-01
245	2.714E 03	-1.893D-07	9.497D-07	4.399D-02	3.127D 01	0.000D-01	2.552D-06	7.562D-04	0.000D-01
246	2.744E 03	-1.960D-07	4.280D-07	4.399D-02	3.130D 01	0.000D-01	4.853D-06	1.455D-03	0.000D-01
247	2.774E 03	-2.031D-07	4.391D-07	4.399D-02	3.134D 01	0.000D-01	4.988D-06	1.434D-03	0.000D-01
248	2.804E 03	-2.134D-07	4.020D-07	4.399D-02	3.137D 01	0.000D-01	5.055D-06	1.421D-03	0.000D-01
249	2.834E 03	-2.239D-07	3.817D-07	4.399D-02	3.141D 01	0.000D-01	4.936D-06	1.407D-03	0.000D-01
250	2.864E 03	-2.351D-07	8.263D-07	4.399D-02	3.143D 01	0.000D-01	2.463D-06	7.398D-04	0.000D-01
251	2.894E 03	-2.437D-07	3.297D-07	4.399D-02	3.146D 01	0.000D-01	4.694D-06	1.401D-03	0.000D-01
252	2.924E 03	-2.526D-07	3.324D-07	4.399D-02	3.149D 01	0.000D-01	4.835D-06	1.385D-03	0.000D-01
253	2.954E 03	-2.657D-07	2.884D-07	4.399D-02	3.152D 01	0.000D-01	4.905D-06	1.374D-03	0.000D-01
254	2.984E 03	-2.789D-07	2.597D-07	4.399D-02	3.156D 01	0.000D-01	4.803D-06	1.365D-03	0.000D-01
255	3.014E 03	-2.931D-07	6.685D-07	4.399D-02	3.157D 01	0.000D-01	2.403D-06	7.479D-04	0.000D-01
256	3.044E 03	-3.041D-07	1.940D-07	4.399D-02	3.160D 01	0.000D-01	4.595D-06	1.364D-03	0.000D-01
257	3.074E 03	-3.155D-07	1.840D-07	4.399D-02	3.163D 01	0.000D-01	4.744D-06	1.367D-03	0.000D-01
258	3.104E 03	-3.322D-07	1.284D-07	4.399D-02	3.166D 01	0.000D-01	4.821D-06	1.377D-03	0.000D-01
259	3.134E 03	-3.489D-07	8.586D-08	4.399D-02	3.169D 01	0.000D-01	4.742D-06	1.396D-03	0.000D-01
260	3.164E 03	-3.669D-07	4.534D-07	4.399D-02	3.171D 01	0.000D-01	2.381D-06	8.022D-04	0.000D-01
261	3.194E 03	-3.808D-07	-2.950D-09	4.399D-02	3.174D 01	0.000D-01	4.574D-06	1.443D-03	0.000D-01
262	3.224E 03	-3.953D-07	-3.272D-08	4.399D-02	3.176D 01	0.000D-01	4.738D-06	1.483D-03	0.000D-01
263	3.254E 03	-4.165D-07	-1.075D-07	4.399D-02	3.179D 01	0.000D-01	4.826D-06	1.529D-03	0.000D-01
264	3.284E 03	-4.378D-07	-1.726D-07	4.399D-02	3.182D 01	0.000D-01	4.776D-06	1.584D-03	0.000D-01
265	3.314E 03	-4.608D-07	1.438D-07	4.399D-02	3.183D 01	0.000D-01	2.410D-06	9.276D-04	0.000D-01
266	3.344E 03	-4.786D-07	-2.999D-07	4.399D-02	3.186D 01	0.000D-01	4.660D-06	1.691D-03	0.000D-01
267	3.374E 03	-4.972D-07	-3.609D-07	4.399D-02	3.188D 01	0.000D-01	4.848D-06	1.767D-03	0.000D-01
268	3.404E 03	-5.240D-07	-4.674D-07	4.399D-02	3.190D 01	0.000D-01	4.952D-06	1.856D-03	0.000D-01
269	3.434E 03	-5.509D-07	-5.692D-07	4.399D-02	3.193D 01	0.000D-01	4.943D-06	1.958D-03	0.000D-01
270	3.464E 03	-5.803D-07	-3.213D-07	4.399D-02	3.194D 01	0.000D-01	2.510D-06	1.160D-03	0.000D-01
271	3.494E 03	-6.031D-07	-7.598D-07	4.399D-02	3.196D 01	0.000D-01	4.892D-06	2.147D-03	0.000D-01
272	3.524E 03	-6.269D-07	-8.711D-07	4.399D-02	3.198D 01	0.000D-01	5.119D-06	2.278D-03	0.000D-01
273	3.554E 03	-6.608D-07	-1.030D-06	4.399D-02	3.200D 01	0.000D-01	5.242D-06	2.431D-03	0.000D-01
274	3.584E 03	-6.952D-07	-1.191D-06	4.399D-02	3.201D 01	0.000D-01	5.286D-06	2.605D-03	0.000D-01
275	3.614E 03	-7.325D-07	-1.042D-06	4.399D-02	3.202D 01	0.000D-01	2.704D-06	1.556D-03	0.000D-01
276	3.644E 03	-7.620D-07	-1.486D-06	4.399D-02	3.204D 01	0.000D-01	5.317D-06	2.912D-03	0.000D-01
277	3.674E 03	-7.925D-07	-1.679D-06	4.399D-02	3.205D 01	0.000D-01	5.603D-06	3.136D-03	0.000D-01
278	3.704E 03	-8.346D-07	-1.923D-06	4.399D-02	3.206D 01	0.000D-01	5.744D-06	3.388D-03	0.000D-01
279	3.734E 03	-8.784D-07	-2.182D-06	4.399D-02	3.207D 01	0.000D-01	5.856D-06	3.672D-03	0.000D-01
280	3.764E 03	-9.256D-07	-2.184D-06	4.399D-02	3.208D 01	0.000D-01	3.015D-06	2.212D-03	0.000D-01
281	3.794E 03	-9.638D-07	-2.643D-06	4.399D-02	3.208D 01	0.000D-01	6.541D-06	4.165D-03	0.000D-01
282	3.824E 03	-1.003D-06	-2.973D-06	4.399D-02	3.209D 01	0.000D-01	6.345D-06	4.533D-03	0.000D-01
283	3.854E 03	-1.054D-06	-3.356D-06	4.399D-02	3.209D 01	0.000D-01	6.683D-06	4.944D-03	0.000D-01
284	3.884E 03	-1.110D-06	-3.775D-06	4.399D-02	3.209D 01	0.000D-01	7.234D-06	5.403D-03	0.000D-01
285	3.914E 03	-1.168D-06	-4.018D-06	4.399D-02	3.209D 01	0.000D-01	3.892D-06	3.290D-03	0.000D-01
286	3.944E 03	-1.217D-06	-4.510D-06	4.399D-02	3.208D 01	0.000D-01	8.999D-06	6.163D-03	0.000D-01
287	3.974E 03	-1.269D-06	-5.059D-06	4.399D-02	3.207D 01	0.000D-01	8.676D-06	6.776D-03	0.000D-01
288	4.000E 03	-1.324D-06	-5.654D-06	4.399D-02	3.205D 01	0.000D-01	8.783D-06	7.599D-03	0.000D-01

*** RECORD NO. 97 DATA INPUT ***** PLOT 0 1 0

CONTOUR PLOT RECORDS GENERATED AT STEP NUMBER 288 .
SIMULATION TIME = 4.0000E 03, RUNID = 1024831700 .

*** RECORD NO. 98 DATA INPUT ***** SOLVE FOR 4000 SECONDS IN STEP OF 30 SECONDS, DTFAC=1.05, MAX=50

289	4.030E 03	-1.393D-06	-6.297D-06	4.399D-02	3.203D 01	0.000D-01	1.022D-05	8.019D-03	0.000D-01
290	4.061E 03	-1.458D-06	-6.918D-06	4.399D-02	3.202D 01	0.000D-01	5.684D-06	4.913D-03	0.000D-01
291	4.095E 03	-1.513D-06	-7.439D-06	4.399D-02	3.198D 01	0.000D-01	1.348D-05	8.946D-03	0.000D-01
292	4.129E 03	-1.583D-06	-8.388D-06	4.399D-02	3.194D 01	0.000D-01	1.392D-05	9.825D-03	0.000D-01
293	4.166E 03	-1.638D-06	-9.442D-06	4.399D-02	3.188D 01	0.000D-01	1.618D-05	1.061D-02	0.000D-01

294	4.204E 03	-1.720D-06	-1.069D-05	4.399D-02	3.181D 01	0.000D-01	1.845D-05	1.154D-02	0.000D-01
295	4.244E 03	-1.794D-06	-1.234D-05	4.399D-02	3.176D 01	0.000D-01	1.050D-05	7.516D-03	0.000D-01
296	4.286E 03	-1.842D-06	-1.298D-05	4.399D-02	3.165D 01	0.000D-01	2.454D-05	1.260D-02	0.000D-01
297	4.331E 03	-1.950D-06	-1.496D-05	4.399D-02	3.151D 01	0.000D-01	2.567D-05	1.354D-02	0.000D-01
298	4.377E 03	-1.922D-06	-1.704D-05	4.399D-02	3.134D 01	0.000D-01	2.852D-05	1.389D-02	0.000D-01
299	4.426E 03	-1.946D-06	-1.958D-05	4.399D-02	3.111D 01	0.000D-01	3.028D-05	1.403D-02	0.000D-01
300	4.476E 03	-1.888D-06	-2.380D-05	4.399D-02	3.096D 01	0.000D-01	1.556D-05	9.627D-03	0.000D-01
301	4.526E 03	-1.722D-06	-2.410D-05	4.399D-02	3.067D 01	0.000D-01	3.430D-05	1.198D-02	0.000D-01
302	4.576E 03	-1.780D-06	-2.802D-05	4.399D-02	3.030D 01	0.000D-01	2.564D-05	1.218D-02	0.000D-01
303	4.626E 03	-1.279D-06	-3.137D-05	4.399D-02	2.990D 01	0.000D-01	2.368D-05	9.710D-03	0.000D-01
304	4.676E 03	-8.583D-07	-3.531D-05	4.399D-02	2.944D 01	0.000D-01	2.486D-05	1.036D-02	0.000D-01
305	4.726E 03	-2.086D-07	-4.241D-05	4.399D-02	2.917D 01	0.000D-01	1.453D-05	7.144D-03	0.000D-01
306	4.776E 03	5.306D-07	-4.050D-05	4.399D-02	2.869D 01	0.000D-01	3.386D-05	1.016D-02	0.000D-01
307	4.826E 03	1.007D-06	-4.495D-05	4.399D-02	2.818D 01	0.000D-01	3.373D-05	1.219D-02	0.000D-01
308	4.876E 03	2.167D-06	-4.684D-05	4.399D-02	2.771D 01	0.000D-01	4.012D-05	1.143D-02	0.000D-01
309	4.926E 03	3.360D-06	-4.920D-05	4.399D-02	2.729D 01	0.000D-01	3.881D-05	1.136D-02	0.000D-01
310	4.976E 03	4.657D-06	-5.406D-05	4.400D-02	2.708D 01	0.000D-01	2.064D-05	7.464D-03	0.000D-01
311	5.026E 03	5.874D-06	-4.978D-05	4.399D-02	2.677D 01	0.000D-01	3.446D-05	1.121D-02	0.000D-01
312	5.076E 03	6.778D-06	-5.066D-05	4.400D-02	2.651D 01	0.000D-01	4.468D-05	1.063D-02	0.000D-01
313	5.126E 03	7.754D-06	-4.872D-05	4.400D-02	2.634D 01	0.000D-01	4.544D-05	1.003D-02	0.000D-01
314	5.176E 03	8.853D-06	-4.745D-05	4.400D-02	2.621D 01	0.000D-01	4.391D-05	9.309D-03	0.000D-01
315	5.226E 03	9.691D-06	-4.761D-05	4.400D-02	2.616D 01	0.000D-01	2.129D-05	5.531D-03	0.000D-01
316	5.276E 03	1.033D-05	-4.400D-05	4.400D-02	2.610D 01	0.000D-01	4.443D-05	8.419D-03	0.000D-01
317	5.326E 03	1.072D-05	-4.198D-05	4.400D-02	2.608D 01	0.000D-01	4.371D-05	8.032D-03	0.000D-01
318	5.376E 03	1.098D-05	-3.958D-05	4.400D-02	2.608D 01	0.000D-01	4.216D-05	7.980D-03	0.000D-01
319	5.426E 03	1.126D-05	-3.742D-05	4.400D-02	2.609D 01	0.000D-01	3.603D-05	7.695D-03	0.000D-01
320	5.476E 03	1.141D-05	-3.632D-05	4.400D-02	2.610D 01	0.000D-01	1.654D-05	5.120D-03	0.000D-01
321	5.526E 03	1.146D-05	-3.452D-05	4.400D-02	2.613D 01	0.000D-01	3.933D-05	6.557D-03	0.000D-01
322	5.576E 03	1.153D-05	-3.248D-05	4.400D-02	2.617D 01	0.000D-01	2.500D-05	7.080D-03	0.000D-01
323	5.626E 03	1.151D-05	-3.122D-05	4.400D-02	2.621D 01	0.000D-01	2.765D-05	6.198D-03	0.000D-01
324	5.676E 03	1.148D-05	-2.965D-05	4.400D-02	2.625D 01	0.000D-01	2.544D-05	6.104D-03	0.000D-01
325	5.726E 03	1.145D-05	-2.862D-05	4.400D-02	2.628D 01	0.000D-01	1.141D-05	3.774D-03	0.000D-01
326	5.776E 03	1.138D-05	-2.795D-05	4.400D-02	2.632D 01	0.000D-01	2.872D-05	4.803D-03	0.000D-01
327	5.826E 03	1.141D-05	-2.655D-05	4.400D-02	2.638D 01	0.000D-01	1.401D-05	5.114D-03	0.000D-01
328	5.876E 03	1.137D-05	-2.592D-05	4.400D-02	2.643D 01	0.000D-01	1.711D-05	4.338D-03	0.000D-01
329	5.926E 03	1.135D-05	-2.494D-05	4.400D-02	2.648D 01	0.000D-01	1.485D-05	4.318D-03	0.000D-01
330	5.976E 03	1.135D-05	-2.410D-05	4.400D-02	2.650D 01	0.000D-01	6.431D-06	2.496D-03	0.000D-01
331	6.026E 03	1.133D-05	-2.396D-05	4.400D-02	2.655D 01	0.000D-01	1.610D-05	3.364D-03	0.000D-01
332	6.076E 03	1.138D-05	-2.308D-05	4.400D-02	2.660D 01	0.000D-01	8.504D-06	3.567D-03	0.000D-01
333	6.126E 03	1.141D-05	-2.273D-05	4.400D-02	2.665D 01	0.000D-01	9.863D-06	3.068D-03	0.000D-01
334	6.176E 03	1.146D-05	-2.213D-05	4.400D-02	2.670D 01	0.000D-01	8.366D-06	3.047D-03	0.000D-01
335	6.226E 03	1.152D-05	-2.144D-05	4.400D-02	2.672D 01	0.000D-01	3.857D-06	1.743D-03	0.000D-01
336	6.276E 03	1.157D-05	-2.154D-05	4.400D-02	2.677D 01	0.000D-01	8.562D-06	2.457D-03	0.000D-01
337	6.326E 03	1.165D-05	-2.100D-05	4.400D-02	2.681D 01	0.000D-01	5.364D-06	2.572D-03	0.000D-01
338	6.376E 03	1.174D-05	-2.078D-05	4.400D-02	2.686D 01	0.000D-01	6.190D-06	2.269D-03	0.000D-01
339	6.426E 03	1.185D-05	-2.042D-05	4.400D-02	2.690D 01	0.000D-01	5.383D-06	2.245D-03	0.000D-01
340	6.476E 03	1.196D-05	-1.985D-05	4.400D-02	2.692D 01	0.000D-01	2.504D-06	1.274D-03	0.000D-01
341	6.526E 03	1.208D-05	-2.004D-05	4.400D-02	2.696D 01	0.000D-01	5.400D-06	1.898D-03	0.000D-01
342	6.576E 03	1.218D-05	-1.971D-05	4.400D-02	2.701D 01	0.000D-01	3.680D-06	1.957D-03	0.000D-01
343	6.626E 03	1.232D-05	-1.955D-05	4.400D-02	2.704D 01	0.000D-01	4.288D-06	1.789D-03	0.000D-01
344	6.676E 03	1.248D-05	-1.931D-05	4.400D-02	2.708D 01	0.000D-01	3.872D-06	1.771D-03	0.000D-01
345	6.726E 03	1.264D-05	-1.884D-05	4.400D-02	2.710D 01	0.000D-01	1.848D-06	1.011D-03	0.000D-01
346	6.776E 03	1.281D-05	-1.905D-05	4.400D-02	2.714D 01	0.000D-01	3.921D-06	1.589D-03	0.000D-01
347	6.826E 03	1.293D-05	-1.883D-05	4.400D-02	2.717D 01	0.000D-01	3.504D-06	1.624D-03	0.000D-01
348	6.876E 03	1.310D-05	-1.869D-05	4.400D-02	2.720D 01	0.000D-01	3.647D-06	1.552D-03	0.000D-01
349	6.926E 03	1.330D-05	-1.852D-05	4.400D-02	2.723D 01	0.000D-01	3.439D-06	1.550D-03	0.000D-01
350	6.976E 03	1.349D-05	-1.812D-05	4.400D-02	2.725D 01	0.000D-01	1.737D-06	8.966D-04	0.000D-01
351	7.026E 03	1.369D-05	-1.830D-05	4.400D-02	2.728D 01	0.000D-01	3.441D-06	1.485D-03	0.000D-01
352	7.076E 03	1.382D-05	-1.814D-05	4.400D-02	2.731D 01	0.000D-01	3.305D-06	1.517D-03	0.000D-01
353	7.126E 03	1.402D-05	-1.800D-05	4.400D-02	2.734D 01	0.000D-01	3.350D-06	1.508D-03	0.000D-01
354	7.176E 03	1.423D-05	-1.785D-05	4.400D-02	2.736D 01	0.000D-01	3.274D-06	1.526D-03	0.000D-01
355	7.226E 03	1.445D-05	-1.750D-05	4.400D-02	2.738D 01	0.000D-01	1.656D-06	8.943D-04	0.000D-01
356	7.276E 03	1.466D-05	-1.762D-05	4.400D-02	2.740D 01	0.000D-01	3.532D-06	1.545D-03	0.000D-01
357	7.326E 03	1.480D-05	-1.748D-05	4.400D-02	2.743D 01	0.000D-01	3.168D-06	1.581D-03	0.000D-01
358	7.376E 03	1.501D-05	-1.731D-05	4.400D-02	2.745D 01	0.000D-01	3.567D-06	1.620D-03	0.000D-01
359	7.426E 03	1.523D-05	-1.715D-05	4.400D-02	2.747D 01	0.000D-01	3.601D-06	1.659D-03	0.000D-01

360	7.476E 03	1.545D-05	-1.683D-05	4.400D-02	2.749D 01	0.000D-01	1.841D-06	9.744D-04	0.000D-01
361	7.526E 03	1.566D-05	-1.688D-05	4.400D-02	2.751D 01	0.000D-01	3.918D-06	1.744D-03	0.000D-01
362	7.576E 03	1.580D-05	-1.672D-05	4.400D-02	2.753D 01	0.000D-01	3.745D-06	1.782D-03	0.000D-01
363	7.626E 03	1.602D-05	-1.652D-05	4.400D-02	2.755D 01	0.000D-01	4.022D-06	1.852D-03	0.000D-01
364	7.676E 03	1.624D-05	-1.633D-05	4.400D-02	2.757D 01	0.000D-01	4.100D-06	1.911D-03	0.000D-01
365	7.726E 03	1.645D-05	-1.602D-05	4.400D-02	2.758D 01	0.000D-01	2.100D-06	1.114D-03	0.000D-01
366	7.776E 03	1.665D-05	-1.600D-05	4.400D-02	2.760D 01	0.000D-01	4.409D-06	2.047D-03	0.000D-01
367	7.826E 03	1.679D-05	-1.581D-05	4.400D-02	2.762D 01	0.000D-01	4.446D-06	2.084D-03	0.000D-01
368	7.876E 03	1.700D-05	-1.557D-05	4.400D-02	2.764D 01	0.000D-01	4.549D-06	2.172D-03	0.000D-01
369	7.926E 03	1.721D-05	-1.534D-05	4.400D-02	2.766D 01	0.000D-01	4.644D-06	2.246D-03	0.000D-01
370	7.976E 03	1.741D-05	-1.502D-05	4.400D-02	2.767D 01	0.000D-01	2.369D-06	1.292D-03	0.000D-01
371	8.000E 03	1.757D-05	-1.484D-05	4.400D-02	2.768D 01	0.000D-01	3.670D-06	2.678D-03	0.000D-01

*** RECORD NO 99 DATA INPUT ***** PLOT 0 1 0

CONTOUR PLOT RECORDS GENERATED AT STEP NUMBER 371 .
SIMULATION TIME = 8.0000E 03. RUNID = 1024831700 .

*** RECORD NO 100 DATA INPUT ***** SOLVE FOR 10000 SECONDS IN STEP OF 50 SECONDS, DTFAC=1.0, MAX=50

372	8.050E 03	1.771D-05	-1.481D-05	4.400D-02	2.770D 01	0.000D-01	3.815D-06	2.446D-03	0.000D-01
373	8.100E 03	1.782D-05	-1.457D-05	4.400D-02	2.772D 01	0.000D-01	5.161D-06	2.497D-03	0.000D-01
374	8.150E 03	1.802D-05	-1.428D-05	4.400D-02	2.774D 01	0.000D-01	5.070D-06	2.581D-03	0.000D-01
375	8.200E 03	1.821D-05	-1.394D-05	4.400D-02	2.775D 01	0.000D-01	2.581D-06	1.462D-03	0.000D-01
376	8.250E 03	1.837D-05	-1.382D-05	4.400D-02	2.776D 01	0.000D-01	5.165D-06	2.769D-03	0.000D-01
377	8.300E 03	1.850D-05	-1.356D-05	4.400D-02	2.778D 01	0.000D-01	5.704D-06	2.793D-03	0.000D-01
378	8.350E 03	1.867D-05	-1.322D-05	4.400D-02	2.780D 01	0.000D-01	5.345D-06	2.887D-03	0.000D-01
379	8.400E 03	1.885D-05	-1.293D-05	4.400D-02	2.782D 01	0.000D-01	5.418D-06	2.967D-03	0.000D-01
380	8.450E 03	1.902D-05	-1.257D-05	4.400D-02	2.783D 01	0.000D-01	2.809D-06	1.651D-03	0.000D-01
381	8.500E 03	1.915D-05	-1.240D-05	4.400D-02	2.785D 01	0.000D-01	5.398D-06	3.162D-03	0.000D-01
382	8.550E 03	1.927D-05	-1.210D-05	4.400D-02	2.787D 01	0.000D-01	6.395D-06	3.163D-03	0.000D-01
383	8.600E 03	1.943D-05	-1.174D-05	4.400D-02	2.789D 01	0.000D-01	6.273D-06	3.244D-03	0.000D-01
384	8.650E 03	1.959D-05	-1.141D-05	4.400D-02	2.791D 01	0.000D-01	6.507D-06	3.311D-03	0.000D-01
385	8.700E 03	1.974D-05	-1.104D-05	4.400D-02	2.791D 01	0.000D-01	3.410D-06	1.807D-03	0.000D-01
386	8.750E 03	1.982D-05	-1.084D-05	4.400D-02	2.793D 01	0.000D-01	6.451D-06	3.478D-03	0.000D-01
387	8.800E 03	1.995D-05	-1.051D-05	4.400D-02	2.795D 01	0.000D-01	7.762D-06	3.452D-03	0.000D-01
388	8.850E 03	2.008D-05	-1.013D-05	4.400D-02	2.797D 01	0.000D-01	7.533D-06	3.503D-03	0.000D-01
389	8.900E 03	2.022D-05	-9.768D-06	4.400D-02	2.798D 01	0.000D-01	7.718D-06	3.532D-03	0.000D-01
390	8.950E 03	2.034D-05	-9.448D-06	4.400D-02	2.799D 01	0.000D-01	4.015D-06	1.902D-03	0.000D-01
391	9.000E 03	2.036D-05	-9.171D-06	4.400D-02	2.801D 01	0.000D-01	7.467D-06	3.646D-03	0.000D-01
392	9.050E 03	2.049D-05	-8.839D-06	4.400D-02	2.803D 01	0.000D-01	9.032D-06	3.583D-03	0.000D-01
393	9.100E 03	2.060D-05	-8.439D-06	4.400D-02	2.804D 01	0.000D-01	8.670D-06	3.582D-03	0.000D-01
394	9.150E 03	2.070D-05	-8.081D-06	4.400D-02	2.805D 01	0.000D-01	8.692D-06	3.568D-03	0.000D-01
395	9.200E 03	2.078D-05	-7.762D-06	4.400D-02	2.806D 01	0.000D-01	4.459D-06	1.892D-03	0.000D-01
396	9.250E 03	2.073D-05	-7.496D-06	4.400D-02	2.807D 01	0.000D-01	8.094D-06	3.574D-03	0.000D-01
397	9.300E 03	2.087D-05	-7.173D-06	4.400D-02	2.809D 01	0.000D-01	9.777D-06	3.475D-03	0.000D-01
398	9.350E 03	2.093D-05	-6.787D-06	4.400D-02	2.810D 01	0.000D-01	9.220D-06	3.407D-03	0.000D-01
399	9.400E 03	2.099D-05	-6.457D-06	4.400D-02	2.811D 01	0.000D-01	8.947D-06	3.335D-03	0.000D-01
400	9.450E 03	2.103D-05	-6.204D-06	4.400D-02	2.811D 01	0.000D-01	4.487D-06	1.748D-03	0.000D-01
401	9.500E 03	2.090D-05	-5.938D-06	4.400D-02	2.812D 01	0.000D-01	7.844D-06	3.217D-03	0.000D-01
402	9.550E 03	2.106D-05	-5.644D-06	4.400D-02	2.813D 01	0.000D-01	9.506D-06	3.097D-03	0.000D-01
403	9.600E 03	2.107D-05	-5.306D-06	4.400D-02	2.813D 01	0.000D-01	8.693D-06	2.969D-03	0.000D-01
404	9.650E 03	2.108D-05	-5.031D-06	4.400D-02	2.813D 01	0.000D-01	8.108D-06	2.855D-03	0.000D-01
405	9.700E 03	2.107D-05	-4.867D-06	4.400D-02	2.814D 01	0.000D-01	3.949D-06	1.475D-03	0.000D-01
406	9.750E 03	2.089D-05	-4.622D-06	4.400D-02	2.814D 01	0.000D-01	6.530D-06	2.648D-03	0.000D-01
407	9.800E 03	2.103D-05	-4.376D-06	4.400D-02	2.814D 01	0.000D-01	8.092D-06	2.545D-03	0.000D-01
408	9.850E 03	2.100D-05	-4.114D-06	4.400D-02	2.814D 01	0.000D-01	7.075D-06	2.402D-03	0.000D-01
409	9.900E 03	2.098D-05	-3.907D-06	4.400D-02	2.814D 01	0.000D-01	6.333D-06	2.268D-03	0.000D-01
410	9.950E 03	2.094D-05	-3.827D-06	4.400D-02	2.814D 01	0.000D-01	2.988D-06	1.123D-03	0.000D-01
411	1.000E 04	2.074D-05	-3.677D-06	4.400D-02	2.814D 01	0.000D-01	4.602D-06	2.073D-03	0.000D-01
412	1.005E 04	2.085D-05	-3.429D-06	4.400D-02	2.814D 01	0.000D-01	5.972D-06	1.903D-03	0.000D-01
413	1.010E 04	2.079D-05	-3.243D-06	4.400D-02	2.814D 01	0.000D-01	4.944D-06	1.734D-03	0.000D-01
414	1.015E 04	2.075D-05	-3.098D-06	4.400D-02	2.814D 01	0.000D-01	4.255D-06	1.594D-03	0.000D-01
415	1.020E 04	2.069D-05	-3.067D-06	4.400D-02	2.813D 01	0.000D-01	1.947D-06	7.538D-04	0.000D-01
416	1.025E 04	2.052D-05	-2.905D-06	4.400D-02	2.813D 01	0.000D-01	2.761D-06	1.383D-03	0.000D-01
417	1.030E 04	2.059D-05	-2.763D-06	4.400D-02	2.813D 01	0.000D-01	3.818D-06	1.226D-03	0.000D-01
418	1.035E 04	2.052D-05	-2.637D-06	4.400D-02	2.813D 01	0.000D-01	2.973D-06	1.094D-03	0.000D-01

419	1.040E 04	2.046D-05	-2.533D-06	4.400D-02	2.813D 01	0.000D-01	2.460D-06	9.613D-04	0.000D-01
420	1.045E 04	2.040D-05	-2.513D-06	4.400D-02	2.813D 01	0.000D-01	1.089D-06	4.391D-04	0.000D-01
421	1.050E 04	2.027D-05	-2.397D-06	4.400D-02	2.813D 01	0.000D-01	1.401D-06	7.934D-04	0.000D-01
422	1.055E 04	2.029D-05	-2.289D-06	4.400D-02	2.813D 01	0.000D-01	2.094D-06	6.803D-04	0.000D-01
423	1.060E 04	2.023D-05	-2.201D-06	4.400D-02	2.813D 01	0.000D-01	1.501D-06	5.865D-04	0.000D-01
424	1.065E 04	2.017D-05	-2.120D-06	4.400D-02	2.813D 01	0.000D-01	1.185D-06	4.967D-04	0.000D-01
425	1.070E 04	2.011D-05	-2.087D-06	4.400D-02	2.813D 01	0.000D-01	4.972D-07	2.180D-04	0.000D-01
426	1.075E 04	2.002D-05	-2.014D-06	4.400D-02	2.813D 01	0.000D-01	1.200D-06	3.862D-04	0.000D-01
427	1.080E 04	2.002D-05	-1.926D-06	4.400D-02	2.813D 01	0.000D-01	9.298D-07	3.166D-04	0.000D-01
428	1.085E 04	1.996D-05	-1.861D-06	4.400D-02	2.813D 01	0.000D-01	9.409D-07	2.798D-04	0.000D-01
429	1.090E 04	1.991D-05	-1.791D-06	4.400D-02	2.813D 01	0.000D-01	8.944D-07	2.751D-04	0.000D-01
430	1.095E 04	1.986D-05	-1.739D-06	4.400D-02	2.813D 01	0.000D-01	4.433D-07	1.567D-04	0.000D-01
431	1.100E 04	1.979D-05	-1.700D-06	4.400D-02	2.814D 01	0.000D-01	1.072D-06	2.528D-04	0.000D-01
432	1.105E 04	1.978D-05	-1.625D-06	4.400D-02	2.814D 01	0.000D-01	7.074D-07	2.577D-04	0.000D-01
433	1.110E 04	1.973D-05	-1.571D-06	4.400D-02	2.814D 01	0.000D-01	8.159D-07	2.476D-04	0.000D-01
434	1.115E 04	1.969D-05	-1.508D-06	4.400D-02	2.815D 01	0.000D-01	7.705D-07	2.429D-04	0.000D-01
435	1.120E 04	1.965D-05	-1.440D-06	4.400D-02	2.815D 01	0.000D-01	3.798D-07	1.374D-04	0.000D-01
436	1.125E 04	1.961D-05	-1.424D-06	4.400D-02	2.815D 01	0.000D-01	9.038D-07	2.222D-04	0.000D-01
437	1.130E 04	1.959D-05	-1.358D-06	4.400D-02	2.816D 01	0.000D-01	5.926D-07	2.256D-04	0.000D-01
438	1.135E 04	1.955D-05	-1.309D-06	4.400D-02	2.816D 01	0.000D-01	6.885D-07	2.172D-04	0.000D-01
439	1.140E 04	1.952D-05	-1.251D-06	4.400D-02	2.816D 01	0.000D-01	6.497D-07	2.127D-04	0.000D-01
440	1.145E 04	1.948D-05	-1.173D-06	4.400D-02	2.817D 01	0.000D-01	3.199D-07	1.194D-04	0.000D-01
441	1.150E 04	1.945D-05	-1.170D-06	4.400D-02	2.817D 01	0.000D-01	7.469D-07	1.968D-04	0.000D-01
442	1.155E 04	1.944D-05	-1.110D-06	4.400D-02	2.818D 01	0.000D-01	4.996D-07	1.974D-04	0.000D-01
443	1.160E 04	1.941D-05	-1.063D-06	4.400D-02	2.818D 01	0.000D-01	5.768D-07	1.912D-04	0.000D-01
444	1.165E 04	1.938D-05	-1.007D-06	4.400D-02	2.819D 01	0.000D-01	5.464D-07	1.878D-04	0.000D-01
445	1.170E 04	1.936D-05	-9.252D-07	4.400D-02	2.819D 01	0.000D-01	2.701D-07	1.043D-04	0.000D-01
446	1.175E 04	1.934D-05	-9.285D-07	4.400D-02	2.819D 01	0.000D-01	6.203D-07	1.778D-04	0.000D-01
447	1.180E 04	1.932D-05	-8.720D-07	4.400D-02	2.820D 01	0.000D-01	4.366D-07	1.769D-04	0.000D-01
448	1.185E 04	1.930D-05	-8.249D-07	4.400D-02	2.821D 01	0.000D-01	4.925D-07	1.728D-04	0.000D-01
449	1.190E 04	1.928D-05	-7.713D-07	4.400D-02	2.821D 01	0.000D-01	4.698D-07	1.701D-04	0.000D-01
450	1.195E 04	1.926D-05	-6.887D-07	4.400D-02	2.821D 01	0.000D-01	2.351D-07	9.316D-05	0.000D-01
451	1.200E 04	1.924D-05	-6.933D-07	4.400D-02	2.822D 01	0.000D-01	5.299D-07	1.633D-04	0.000D-01
452	1.205E 04	1.923D-05	-6.399D-07	4.400D-02	2.822D 01	0.000D-01	4.226D-07	1.614D-04	0.000D-01
453	1.210E 04	1.921D-05	-5.919D-07	4.400D-02	2.823D 01	0.000D-01	4.372D-07	1.591D-04	0.000D-01
454	1.215E 04	1.919D-05	-5.397D-07	4.400D-02	2.823D 01	0.000D-01	4.206D-07	1.567D-04	0.000D-01
455	1.220E 04	1.918D-05	-4.586D-07	4.400D-02	2.824D 01	0.000D-01	2.121D-07	8.572D-05	0.000D-01
456	1.225E 04	1.916D-05	-4.620D-07	4.400D-02	2.824D 01	0.000D-01	4.740D-07	1.525D-04	0.000D-01
457	1.230E 04	1.916D-05	-4.108D-07	4.400D-02	2.825D 01	0.000D-01	4.101D-07	1.503D-04	0.000D-01
458	1.235E 04	1.914D-05	-3.619D-07	4.400D-02	2.825D 01	0.000D-01	4.010D-07	1.489D-04	0.000D-01
459	1.240E 04	1.912D-05	-3.108D-07	4.400D-02	2.826D 01	0.000D-01	3.900D-07	1.469D-04	0.000D-01
460	1.245E 04	1.911D-05	-2.322D-07	4.400D-02	2.826D 01	0.000D-01	1.973D-07	8.034D-05	0.000D-01
461	1.250E 04	1.909D-05	-2.336D-07	4.400D-02	2.826D 01	0.000D-01	4.395D-07	1.444D-04	0.000D-01
462	1.255E 04	1.909D-05	-1.839D-07	4.400D-02	2.827D 01	0.000D-01	3.890D-07	1.419D-04	0.000D-01
463	1.260E 04	1.907D-05	-1.347D-07	4.400D-02	2.827D 01	0.000D-01	3.785D-07	1.412D-04	0.000D-01
464	1.265E 04	1.905D-05	-8.453D-08	4.400D-02	2.828D 01	0.000D-01	3.817D-07	1.396D-04	0.000D-01
465	1.270E 04	1.904D-05	-8.558D-09	4.400D-02	2.828D 01	0.000D-01	1.880D-07	7.634D-05	0.000D-01
466	1.275E 04	1.903D-05	-8.096D-09	4.400D-02	2.828D 01	0.000D-01	4.191D-07	1.380D-04	0.000D-01
467	1.280E 04	1.902D-05	4.051D-08	4.400D-02	2.829D 01	0.000D-01	3.766D-07	1.354D-04	0.000D-01
468	1.285E 04	1.900D-05	8.962D-08	4.400D-02	2.829D 01	0.000D-01	3.652D-07	1.351D-04	0.000D-01
469	1.290E 04	1.899D-05	1.389D-07	4.400D-02	2.830D 01	0.000D-01	3.746D-07	1.337D-04	0.000D-01
470	1.295E 04	1.897D-05	2.122D-07	4.400D-02	2.830D 01	0.000D-01	1.818D-07	7.319D-05	0.000D-01
471	1.300E 04	1.896D-05	2.142D-07	4.400D-02	2.830D 01	0.000D-01	4.060D-07	1.324D-04	0.000D-01
472	1.305E 04	1.895D-05	2.619D-07	4.400D-02	2.831D 01	0.000D-01	3.700D-07	1.300D-04	0.000D-01
473	1.310E 04	1.893D-05	3.103D-07	4.400D-02	2.831D 01	0.000D-01	3.580D-07	1.297D-04	0.000D-01
474	1.315E 04	1.892D-05	3.586D-07	4.400D-02	2.832D 01	0.000D-01	3.665D-07	1.285D-04	0.000D-01
475	1.320E 04	1.890D-05	4.297D-07	4.400D-02	2.832D 01	0.000D-01	1.774D-07	7.049D-05	0.000D-01
476	1.325E 04	1.889D-05	4.324D-07	4.400D-02	2.832D 01	0.000D-01	3.955D-07	1.274D-04	0.000D-01
477	1.330E 04	1.888D-05	4.793D-07	4.400D-02	2.833D 01	0.000D-01	3.608D-07	1.250D-04	0.000D-01
478	1.335E 04	1.887D-05	5.268D-07	4.400D-02	2.833D 01	0.000D-01	3.482D-07	1.249D-04	0.000D-01
479	1.340E 04	1.885D-05	5.740D-07	4.400D-02	2.833D 01	0.000D-01	3.557D-07	1.236D-04	0.000D-01
480	1.345E 04	1.884D-05	6.429D-07	4.400D-02	2.834D 01	0.000D-01	1.720D-07	6.833D-05	0.000D-01
481	1.350E 04	1.882D-05	6.461D-07	4.400D-02	2.834D 01	0.000D-01	3.850D-07	1.225D-04	0.000D-01
482	1.355E 04	1.882D-05	6.919D-07	4.400D-02	2.834D 01	0.000D-01	3.490D-07	1.205D-04	0.000D-01
483	1.360E 04	1.880D-05	7.382D-07	4.400D-02	2.835D 01	0.000D-01	3.355D-07	1.206D-04	0.000D-01
484	1.365E 04	1.878D-05	7.844D-07	4.400D-02	2.835D 01	0.000D-01	3.428D-07	1.194D-04	0.000D-01

485	1.370E 04	1.877D-05	8.514D-07	4.400D-02	2.835D 01	0.000D-01	1.660D-07	6.610D-05	0.000D-01
486	1.375E 04	1.875D-05	8.545D-07	4.400D-02	2.836D 01	0.000D-01	3.731D-07	1.179D-04	0.000D-01
487	1.380E 04	1.875D-05	8.993D-07	4.400D-02	2.836D 01	0.000D-01	3.354D-07	1.164D-04	0.000D-01
488	1.385E 04	1.873D-05	9.442D-07	4.400D-02	2.837D 01	0.000D-01	3.223D-07	1.163D-04	0.000D-01
489	1.390E 04	1.872D-05	9.891D-07	4.400D-02	2.837D 01	0.000D-01	3.283D-07	1.152D-04	0.000D-01
490	1.395E 04	1.870D-05	1.054D-06	4.400D-02	2.837D 01	0.000D-01	1.599D-07	6.373D-05	0.000D-01
491	1.400E 04	1.869D-05	1.057D-06	4.400D-02	2.838D 01	0.000D-01	3.594D-07	1.135D-04	0.000D-01
492	1.405E 04	1.868D-05	1.101D-06	4.400D-02	2.838D 01	0.000D-01	3.204D-07	1.120D-04	0.000D-01
493	1.410E 04	1.866D-05	1.144D-06	4.400D-02	2.838D 01	0.000D-01	3.098D-07	1.119D-04	0.000D-01
494	1.415E 04	1.865D-05	1.188D-06	4.400D-02	2.839D 01	0.000D-01	3.130D-07	1.107D-04	0.000D-01
495	1.420E 04	1.863D-05	1.251D-06	4.400D-02	2.839D 01	0.000D-01	1.534D-07	6.126D-05	0.000D-01
496	1.425E 04	1.862D-05	1.254D-06	4.400D-02	2.839D 01	0.000D-01	3.446D-07	1.089D-04	0.000D-01
497	1.430E 04	1.861D-05	1.296D-06	4.400D-02	2.840D 01	0.000D-01	3.051D-07	1.075D-04	0.000D-01
498	1.435E 04	1.860D-05	1.338D-06	4.400D-02	2.840D 01	0.000D-01	2.965D-07	1.073D-04	0.000D-01
499	1.440E 04	1.858D-05	1.380D-06	4.400D-02	2.840D 01	0.000D-01	2.976D-07	1.062D-04	0.000D-01
500	1.445E 04	1.857D-05	1.442D-06	4.400D-02	2.841D 01	0.000D-01	1.465D-07	5.872D-05	0.000D-01
501	1.450E 04	1.856D-05	1.444D-06	4.400D-02	2.841D 01	0.000D-01	3.291D-07	1.043D-04	0.000D-01
502	1.455E 04	1.855D-05	1.485D-06	4.400D-02	2.841D 01	0.000D-01	2.900D-07	1.029D-04	0.000D-01
503	1.460E 04	1.853D-05	1.526D-06	4.400D-02	2.842D 01	0.000D-01	2.830D-07	1.027D-04	0.000D-01
504	1.465E 04	1.852D-05	1.567D-06	4.400D-02	2.842D 01	0.000D-01	2.827D-07	1.015D-04	0.000D-01
505	1.470E 04	1.850D-05	1.626D-06	4.400D-02	2.842D 01	0.000D-01	1.397D-07	5.619D-05	0.000D-01
506	1.475E 04	1.849D-05	1.628D-06	4.400D-02	2.843D 01	0.000D-01	3.136D-07	9.973D-05	0.000D-01
507	1.480E 04	1.849D-05	1.668D-06	4.400D-02	2.843D 01	0.000D-01	2.805D-07	9.839D-05	0.000D-01
508	1.485E 04	1.847D-05	1.707D-06	4.400D-02	2.843D 01	0.000D-01	2.696D-07	9.816D-05	0.000D-01
509	1.490E 04	1.846D-05	1.747D-06	4.400D-02	2.844D 01	0.000D-01	2.699D-07	9.705D-05	0.000D-01
510	1.495E 04	1.844D-05	1.804D-06	4.400D-02	2.844D 01	0.000D-01	1.331D-07	5.365D-05	0.000D-01
511	1.500E 04	1.843D-05	1.806D-06	4.400D-02	2.844D 01	0.000D-01	2.985D-07	9.530D-05	0.000D-01
512	1.505E 04	1.843D-05	1.844D-06	4.400D-02	2.844D 01	0.000D-01	2.720D-07	9.394D-05	0.000D-01
513	1.510E 04	1.841D-05	1.882D-06	4.400D-02	2.845D 01	0.000D-01	2.569D-07	9.379D-05	0.000D-01
514	1.515E 04	1.840D-05	1.920D-06	4.400D-02	2.845D 01	0.000D-01	2.615D-07	9.268D-05	0.000D-01
515	1.520E 04	1.838D-05	1.976D-06	4.400D-02	2.845D 01	0.000D-01	1.268D-07	5.121D-05	0.000D-01
516	1.525E 04	1.837D-05	1.977D-06	4.400D-02	2.846D 01	0.000D-01	2.841D-07	9.102D-05	0.000D-01
517	1.530E 04	1.837D-05	2.014D-06	4.399D-02	2.846D 01	0.000D-01	2.630D-07	8.976D-05	0.000D-01
518	1.535E 04	1.835D-05	2.051D-06	4.399D-02	2.846D 01	0.000D-01	2.447D-07	8.953D-05	0.000D-01
519	1.540E 04	1.834D-05	2.088D-06	4.399D-02	2.847D 01	0.000D-01	2.528D-07	8.857D-05	0.000D-01
520	1.545E 04	1.833D-05	2.141D-06	4.399D-02	2.847D 01	0.000D-01	1.209D-07	4.889D-05	0.000D-01
521	1.550E 04	1.832D-05	2.143D-06	4.399D-02	2.847D 01	0.000D-01	2.707D-07	8.701D-05	0.000D-01
522	1.555E 04	1.831D-05	2.178D-06	4.399D-02	2.847D 01	0.000D-01	2.538D-07	8.571D-05	0.000D-01
523	1.560E 04	1.830D-05	2.214D-06	4.399D-02	2.848D 01	0.000D-01	2.333D-07	8.560D-05	0.000D-01
524	1.565E 04	1.829D-05	2.249D-06	4.399D-02	2.848D 01	0.000D-01	2.440D-07	8.461D-05	0.000D-01
525	1.570E 04	1.827D-05	2.301D-06	4.399D-02	2.848D 01	0.000D-01	1.156D-07	4.667D-05	0.000D-01
526	1.575E 04	1.826D-05	2.302D-06	4.399D-02	2.848D 01	0.000D-01	2.582D-07	8.316D-05	0.000D-01
527	1.580E 04	1.826D-05	2.336D-06	4.399D-02	2.849D 01	0.000D-01	2.446D-07	8.199D-05	0.000D-01
528	1.585E 04	1.824D-05	2.371D-06	4.399D-02	2.849D 01	0.000D-01	2.240D-07	8.182D-05	0.000D-01
529	1.590E 04	1.823D-05	2.405D-06	4.399D-02	2.849D 01	0.000D-01	2.350D-07	8.086D-05	0.000D-01
530	1.595E 04	1.822D-05	2.454D-06	4.399D-02	2.849D 01	0.000D-01	1.114D-07	4.461D-05	0.000D-01
531	1.600E 04	1.821D-05	2.456D-06	4.399D-02	2.850D 01	0.000D-01	2.465D-07	7.953D-05	0.000D-01
532	1.605E 04	1.820D-05	2.489D-06	4.399D-02	2.850D 01	0.000D-01	2.354D-07	7.835D-05	0.000D-01
533	1.610E 04	1.819D-05	2.522D-06	4.399D-02	2.850D 01	0.000D-01	2.156D-07	7.827D-05	0.000D-01
534	1.615E 04	1.818D-05	2.554D-06	4.399D-02	2.851D 01	0.000D-01	2.261D-07	7.734D-05	0.000D-01
535	1.620E 04	1.817D-05	2.602D-06	4.399D-02	2.851D 01	0.000D-01	1.072D-07	4.267D-05	0.000D-01
536	1.625E 04	1.816D-05	2.604D-06	4.399D-02	2.851D 01	0.000D-01	2.357D-07	7.609D-05	0.000D-01
537	1.630E 04	1.815D-05	2.635D-06	4.399D-02	2.851D 01	0.000D-01	2.265D-07	7.494D-05	0.000D-01
538	1.635E 04	1.814D-05	2.667D-06	4.399D-02	2.852D 01	0.000D-01	2.072D-07	7.487D-05	0.000D-01
539	1.640E 04	1.813D-05	2.698D-06	4.399D-02	2.852D 01	0.000D-01	2.176D-07	7.395D-05	0.000D-01
540	1.645E 04	1.812D-05	2.745D-06	4.399D-02	2.852D 01	0.000D-01	1.030D-07	4.082D-05	0.000D-01
541	1.650E 04	1.811D-05	2.746D-06	4.399D-02	2.852D 01	0.000D-01	2.254D-07	7.276D-05	0.000D-01
542	1.655E 04	1.811D-05	2.777D-06	4.399D-02	2.852D 01	0.000D-01	2.176D-07	7.177D-05	0.000D-01
543	1.660E 04	1.809D-05	2.807D-06	4.399D-02	2.853D 01	0.000D-01	1.992D-07	7.161D-05	0.000D-01
544	1.665E 04	1.808D-05	2.837D-06	4.399D-02	2.853D 01	0.000D-01	2.092D-07	7.085D-05	0.000D-01
545	1.670E 04	1.807D-05	2.882D-06	4.399D-02	2.853D 01	0.000D-01	9.896D-08	3.905D-05	0.000D-01
546	1.675E 04	1.806D-05	2.883D-06	4.399D-02	2.853D 01	0.000D-01	2.157D-07	6.969D-05	0.000D-01
547	1.680E 04	1.806D-05	2.912D-06	4.399D-02	2.854D 01	0.000D-01	2.092D-07	6.868D-05	0.000D-01
548	1.685E 04	1.805D-05	2.942D-06	4.399D-02	2.854D 01	0.000D-01	1.914D-07	6.854D-05	0.000D-01
549	1.690E 04	1.804D-05	2.971D-06	4.399D-02	2.854D 01	0.000D-01	2.010D-07	6.777D-05	0.000D-01
550	1.695E 04	1.803D-05	3.013D-06	4.399D-02	2.854D 01	0.000D-01	9.514D-08	3.740D-05	0.000D-01

551	1.700E 04	1.802D-05	3.015D-06	4.399D-02	2.855D 01	0.000D-01	2.071D-07	6.671D-05	0.000D-01
552	1.705E 04	1.801D-05	3.043D-06	4.399D-02	2.855D 01	0.000D-01	2.010D-07	6.571D-05	0.000D-01
553	1.710E 04	1.800D-05	3.071D-06	4.399D-02	2.855D 01	0.000D-01	1.839D-07	6.564D-05	0.000D-01
554	1.715E 04	1.799D-05	3.099D-06	4.399D-02	2.855D 01	0.000D-01	1.933D-07	6.487D-05	0.000D-01
555	1.720E 04	1.798D-05	3.140D-06	4.399D-02	2.855D 01	0.000D-01	9.132D-08	3.578D-05	0.000D-01
556	1.725E 04	1.797D-05	3.141D-06	4.399D-02	2.856D 01	0.000D-01	1.989D-07	6.389D-05	0.000D-01
557	1.730E 04	1.797D-05	3.169D-06	4.399D-02	2.856D 01	0.000D-01	1.932D-07	6.292D-05	0.000D-01
558	1.735E 04	1.796D-05	3.196D-06	4.399D-02	2.856D 01	0.000D-01	1.767D-07	6.284D-05	0.000D-01
559	1.740E 04	1.795D-05	3.223D-06	4.399D-02	2.856D 01	0.000D-01	1.857D-07	6.214D-05	0.000D-01
560	1.745E 04	1.794D-05	3.262D-06	4.399D-02	2.856D 01	0.000D-01	8.772D-08	3.426D-05	0.000D-01
561	1.750E 04	1.793D-05	3.263D-06	4.399D-02	2.857D 01	0.000D-01	1.909D-07	6.117D-05	0.000D-01
562	1.755E 04	1.793D-05	3.289D-06	4.399D-02	2.857D 01	0.000D-01	1.856D-07	6.026D-05	0.000D-01
563	1.760E 04	1.792D-05	3.315D-06	4.399D-02	2.857D 01	0.000D-01	1.698D-07	6.015D-05	0.000D-01
564	1.765E 04	1.791D-05	3.341D-06	4.399D-02	2.857D 01	0.000D-01	1.784D-07	5.947D-05	0.000D-01
565	1.770E 04	1.790D-05	3.379D-06	4.399D-02	2.857D 01	0.000D-01	8.428D-08	3.280D-05	0.000D-01
566	1.775E 04	1.789D-05	3.380D-06	4.399D-02	2.858D 01	0.000D-01	1.833D-07	5.854D-05	0.000D-01
567	1.780E 04	1.789D-05	3.405D-06	4.399D-02	2.858D 01	0.000D-01	1.781D-07	5.762D-05	0.000D-01
568	1.785E 04	1.787D-05	3.430D-06	4.399D-02	2.858D 01	0.000D-01	1.633D-07	5.756D-05	0.000D-01
569	1.790E 04	1.787D-05	3.455D-06	4.399D-02	2.858D 01	0.000D-01	1.712D-07	5.692D-05	0.000D-01
570	1.795E 04	1.786D-05	3.491D-06	4.399D-02	2.858D 01	0.000D-01	8.105D-08	3.140D-05	0.000D-01
571	1.800E 04	1.785D-05	3.493D-06	4.399D-02	2.859D 01	0.000D-01	1.757D-07	5.596D-05	0.000D-01

```
*** RECORD NO 101 DATA INPUT *****  PLOT  0 1 1
*** RECORD NO 102 COMMENT ********  *

-------------------------------------------------------------
CONTOUR  PLOT RECORDS GENERATED AT STEP NUMBER   571
SIMULATION TIME =  1.8000E 04,     RUNID = 1024831700
-------------------------------------------------------------

-------------------------------------------------------------
PATHLINE PLOT RECORDS GENERATED AT STEP NUMBER   571
SIMULATION TIME =  1.8000E 04,     RUNID = 1024831700
-------------------------------------------------------------
*** RECORD NO 103 DATA INPUT *****  END

*****************************************************************************************************************

-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- X-COMPONENT OF VELOCITY  (U) AT STEP  571,  TIME = 1.8000E 04 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
```

Y =	J =												
4.400E-02	43	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01
4.300E-02	42	0.00D-01	0.00D-01	-4.10D-06	-7.50D-06	-1.22D-05	-1.73D-05	-2.14D-05	-2.51D-05	-2.85D-05	-3.05D-05	-3.15D-05	
4.200E-02	41	0.00D-01	0.00D-01	-4.12D-06	-7.53D-06	-1.22D-05	-1.74D-05	-2.15D-05	-2.53D-05	-2.88D-05	-3.08D-05	-3.19D-05	
4.100E-02	40	0.00D-01	0.00D-01	-4.11D-06	-7.52D-06	-1.22D-05	-1.74D-05	-2.16D-05	-2.54D-05	-2.89D-05	-3.10D-05	-3.22D-05	
4.000E-02	39	0.00D-01	0.00D-01	-4.09D-06	-7.47D-06	-1.21D-05	-1.73D-05	-2.15D-05	-2.53D-05	-2.89D-05	-3.10D-05	-3.23D-05	
3.900E-02	38	0.00D-01	0.00D-01	-4.04D-06	-7.39D-06	-1.20D-05	-1.71D-05	-2.13D-05	-2.51D-05	-2.87D-05	-3.08D-05	-3.21D-05	
3.800E-02	37	0.00D-01	0.00D-01	-3.98D-06	-7.27D-06	-1.18D-05	-1.68D-05	-2.10D-05	-2.47D-05	-2.83D-05	-3.05D-05	-3.17D-05	
3.700E-02	36	0.00D-01	0.00D-01	-3.89D-06	-7.11D-06	-1.16D-05	-1.65D-05	-2.05D-05	-2.42D-05	-2.77D-05	-2.99D-05	-3.11D-05	
3.500E-02	35	0.00D-01	0.00D-01	-3.65D-06	-6.67D-06	-1.09D-05	-1.55D-05	-1.93D-05	-2.28D-05	-2.61D-05	-2.81D-05	-2.93D-05	
3.400E-02	34	0.00D-01	0.00D-01	-3.50D-06	-6.39D-06	-1.04D-05	-1.48D-05	-1.85D-05	-2.18D-05	-2.50D-05	-2.69D-05	-2.80D-05	
3.300E-02	33	0.00D-01	0.00D-01	-3.32D-06	-6.08D-06	-9.89D-06	-1.41D-05	-1.76D-05	-2.07D-05	-2.37D-05	-2.55D-05	-2.65D-05	
3.200E-02	32	0.00D-01	0.00D-01	-3.13D-06	-5.73D-06	-9.32D-06	-1.33D-05	-1.65D-05	-1.95D-05	-2.23D-05	-2.39D-05	-2.48D-05	
3.100E-02	31	0.00D-01	0.00D-01	-2.92D-06	-5.35D-06	-8.70D-06	-1.24D-05	-1.54D-05	-1.81D-05	-2.07D-05	-2.22D-05	-2.30D-05	
3.000E-02	30	0.00D-01	0.00D-01	-2.70D-06	-4.93D-06	-8.02D-06	-1.14D-05	-1.42D-05	-1.67D-05	-1.90D-05	-2.03D-05	-2.10D-05	
2.900E-02	29	0.00D-01	0.00D-01	-2.45D-06	-4.49D-06	-7.29D-06	-1.04D-05	-1.28D-05	-1.51D-05	-1.72D-05	-1.83D-05	-1.88D-05	
2.800E-02	28	0.00D-01	0.00D-01	-2.20D-06	-4.02D-06	-6.53D-06	-9.26D-06	-1.15D-05	-1.35D-05	-1.52D-05	-1.62D-05	-1.66D-05	
2.700E-02	27	0.00D-01	0.00D-01	-1.93D-06	-3.52D-06	-5.72D-06	-8.10D-06	-1.00D-05	-1.17D-05	-1.32D-05	-1.40D-05	-1.43D-05	
2.600E-02	26	0.00D-01	0.00D-01	-1.64D-06	-3.01D-06	-4.88D-06	-6.89D-06	-8.48D-06	-9.92D-06	-1.11D-05	-1.17D-05	-1.20D-05	
2.500E-02	25	0.00D-01	0.00D-01	-1.35D-06	-2.47D-06	-4.00D-06	-5.64D-06	-6.91D-06	-8.06D-06	-9.01D-06	-9.44D-06	-9.57D-06	
2.400E-02	24	0.00D-01	0.00D-01	-1.05D-06	-1.92D-06	-3.11D-06	-4.36D-06	-5.31D-06	-6.16D-06	-6.83D-06	-7.10D-06	-7.16D-06	
2.300E-02	23	0.00D-01	0.00D-01	-7.42D-07	-1.36D-06	-2.19D-06	-3.04D-06	-3.67D-06	-4.22D-06	-4.63D-06	-4.75D-06	-4.74D-06	
2.100E-02	22	0.00D-01	0.00D-01	-1.12D-07	-2.03D-07	-3.13D-07	-3.72D-07	-3.54D-07	-3.23D-07	-2.03D-07	-5.50D-08	5.48D-08	
2.000E-02	21	0.00D-01	0.00D-01	2.08D-07	3.83D-07	6.39D-07	9.80D-07	1.32D-06	1.64D-06	2.01D-06	2.28D-06	2.43D-06	
1.900E-02	20	0.00D-01	0.00D-01	5.30D-07	9.71D-07	1.59D-06	2.33D-06	2.99D-06	3.60D-06	4.21D-06	4.60D-06	4.78D-06	

1.800E-02	19	0.00D-01	0.00D-01	8.51D-07	1.56D-06	2.55D-06	3.68D-06	4.66D-06	5.54D-06	6.39D-06	6.89D-06	7.09D-06
1.700E-02	18	0.00D-01	0.00D-01	1.17D-06	2.14D-06	3.50D-06	5.03D-06	6.31D-06	7.47D-06	8.55D-06	9.15D-06	9.37D-06
1.600E-02	17	0.00D-01	0.00D-01	1.49D-06	2.72D-06	4.44D-06	6.35D-06	7.94D-06	9.37D-06	1.07D-05	1.14D-05	1.16D-05
1.500E-02	16	0.00D-01	0.00D-01	1.80D-06	3.30D-06	5.37D-06	7.67D-06	9.55D-06	1.12D-05	1.28D-05	1.36D-05	1.38D-05
1.400E-02	15	0.00D-01	0.00D-01	2.11D-06	3.86D-06	6.28D-06	8.95D-06	1.11D-05	1.31D-05	1.48D-05	1.57D-05	1.60D-05
1.300E-02	14	0.00D-01	0.00D-01	2.42D-06	4.42D-06	7.18D-06	1.02D-05	1.27D-05	1.49D-05	1.68D-05	1.78D-05	1.82D-05
1.200E-02	13	0.00D-01	0.00D-01	2.71D-06	4.96D-06	8.06D-06	1.15D-05	1.42D-05	1.66D-05	1.88D-05	1.99D-05	2.03D-05
1.100E-02	12	0.00D-01	0.00D-01	3.00D-06	5.49D-06	8.91D-06	1.27D-05	1.57D-05	1.84D-05	2.07D-05	2.20D-05	2.24D-05
1.000E-02	11	0.00D-01	0.00D-01	3.29D-06	6.01D-06	9.74D-06	1.38D-05	1.71D-05	2.00D-05	2.26D-05	2.40D-05	2.45D-05
9.000E-03	10	0.00D-01	0.00D-01	3.56D-06	6.51D-06	1.06D-05	1.50D-05	1.85D-05	2.17D-05	2.45D-05	2.60D-05	2.66D-05
8.000E-03	9	0.00D-01	0.00D-01	3.82D-06	6.99D-06	1.13D-05	1.61D-05	1.99D-05	2.33D-05	2.63D-05	2.80D-05	2.87D-05
6.000E-03	8	0.00D-01	0.00D-01	4.33D-06	7.91D-06	1.28D-05	1.82D-05	2.25D-05	2.64D-05	2.99D-05	3.19D-05	3.30D-05
5.000E-03	7	0.00D-01	0.00D-01	4.57D-06	8.35D-06	1.35D-05	1.92D-05	2.37D-05	2.79D-05	3.17D-05	3.39D-05	3.52D-05
4.000E-03	6	0.00D-01	0.00D-01	4.80D-06	8.77D-06	1.42D-05	2.02D-05	2.50D-05	2.94D-05	3.35D-05	3.59D-05	3.74D-05
3.000E-03	5	0.00D-01	0.00D-01	5.02D-06	9.19D-06	1.49D-05	2.12D-05	2.62D-05	3.09D-05	3.53D-05	3.80D-05	3.97D-05
2.000E-03	4	0.00D-01	0.00D-01	5.25D-06	9.60D-06	1.56D-05	2.22D-05	2.74D-05	3.24D-05	3.71D-05	4.00D-05	4.21D-05
1.500E-03	3	0.00D-01	0.00D-01	5.36D-06	9.80D-06	1.59D-05	2.26D-05	2.81D-05	3.32D-05	3.80D-05	4.11D-05	4.33D-05
1.000E-03	2	0.00D-01	0.00D-01	5.46D-06	1.00D-05	1.63D-05	2.31D-05	2.87D-05	3.39D-05	3.90D-05	4.22D-05	4.46D-05
-1.000E-03	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01

	I =	1	2	3	4	5	6	7	8	9	10	11
	XU =	0.00E-01	0.00E-01	3.00E-03	5.50E-03	9.00E-03	1.30E-02	1.65E-02	2.00E-02	2.40E-02	2.75E-02	3.10E-02
Y =	J =											
4.400E-02	43	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01
4.300E-02	42	-3.10D-05	-2.94D-05	-2.54D-05	-2.03D-05	-1.43D-05	-6.12D-06	1.60D-06	9.24D-06	1.74D-05	2.34D-05	2.83D-05
4.200E-02	41	-3.15D-05	-2.99D-05	-2.59D-05	-2.08D-05	-1.46D-05	-6.25D-06	1.66D-06	9.50D-06	1.78D-05	2.39D-05	2.89D-05
4.100E-02	40	-3.18D-05	-3.02D-05	-2.63D-05	-2.11D-05	-1.48D-05	-6.33D-06	1.74D-06	9.71D-06	1.82D-05	2.44D-05	2.94D-05
4.000E-02	39	-3.19D-05	-3.04D-05	-2.65D-05	-2.12D-05	-1.49D-05	-6.32D-06	1.83D-06	9.89D-06	1.84D-05	2.46D-05	2.96D-05
3.900E-02	38	-3.18D-05	-3.03D-05	-2.64D-05	-2.11D-05	-1.49D-05	-6.22D-06	1.95D-06	1.00D-05	1.85D-05	2.47D-05	2.96D-05
3.800E-02	37	-3.15D-05	-3.00D-05	-2.61D-05	-2.09D-05	-1.46D-05	-6.03D-06	2.09D-06	1.01D-05	1.85D-05	2.45D-05	2.93D-05
3.700E-02	36	-3.09D-05	-2.94D-05	-2.56D-05	-2.04D-05	-1.42D-05	-5.74D-06	2.24D-06	1.01D-05	1.83D-05	2.42D-05	2.88D-05
3.500E-02	35	-2.90D-05	-2.75D-05	-2.38D-05	-1.89D-05	-1.30D-05	-4.93D-06	2.57D-06	9.88D-06	1.74D-05	2.28D-05	2.69D-05
3.400E-02	34	-2.77D-05	-2.62D-05	-2.26D-05	-1.78D-05	-1.21D-05	-4.41D-06	2.73D-06	9.66D-06	1.68D-05	2.18D-05	2.56D-05
3.300E-02	33	-2.61D-05	-2.47D-05	-2.12D-05	-1.66D-05	-1.12D-05	-3.86D-06	2.87D-06	9.36D-06	1.60D-05	2.06D-05	2.40D-05
3.200E-02	32	-2.44D-05	-2.30D-05	-1.97D-05	-1.53D-05	-1.01D-05	-3.28D-06	2.98D-06	8.98D-06	1.50D-05	1.92D-05	2.23D-05
3.100E-02	31	-2.25D-05	-2.12D-05	-1.80D-05	-1.39D-05	-9.05D-06	-2.70D-06	3.06D-06	8.54D-06	1.40D-05	1.77D-05	2.04D-05
3.000E-02	30	-2.05D-05	-1.92D-05	-1.62D-05	-1.24D-05	-7.95D-06	-2.13D-06	3.09D-06	8.02D-06	1.29D-05	1.61D-05	1.84D-05
2.900E-02	29	-1.84D-05	-1.71D-05	-1.44D-05	-1.09D-05	-6.84D-06	-1.59D-06	3.07D-06	7.43D-06	1.16D-05	1.44D-05	1.62D-05
2.800E-02	28	-1.61D-05	-1.50D-05	-1.25D-05	-9.39D-06	-5.75D-06	-1.09D-06	3.01D-06	6.79D-06	1.04D-05	1.26D-05	1.41D-05
2.700E-02	27	-1.38D-05	-1.28D-05	-1.06D-05	-7.88D-06	-4.69D-06	-6.36D-07	2.89D-06	6.10D-06	9.04D-06	1.08D-05	1.19D-05
2.600E-02	26	-1.15D-05	-1.06D-05	-8.70D-06	-6.39D-06	-3.68D-06	-2.33D-07	2.73D-06	5.37D-06	7.68D-06	8.97D-06	9.63D-06
2.500E-02	25	-9.17D-06	-8.38D-06	-6.83D-06	-4.95D-06	-2.71D-06	1.17D-07	2.51D-06	4.60D-06	6.31D-06	7.12D-06	7.41D-06
2.400E-02	24	-6.81D-06	-6.19D-06	-5.00D-06	-3.55D-06	-1.80D-06	4.17D-07	2.26D-06	3.80D-06	4.92D-06	5.29D-06	5.21D-06
2.300E-02	23	-4.47D-06	-4.02D-06	-3.21D-06	-2.20D-06	-9.42D-07	6.67D-07	1.97D-06	2.97D-06	3.52D-06	3.46D-06	3.04D-06
2.100E-02	22	1.33D-07	1.85D-07	2.29D-07	3.51D-07	6.30D-07	1.05D-06	1.29D-06	1.28D-06	7.50D-07	-1.14D-07	-1.17D-06
2.000E-02	21	2.40D-06	2.24D-06	1.89D-06	1.57D-06	1.36D-06	1.19D-06	9.22D-07	4.20D-07	-6.27D-07	-1.87D-06	-3.21D-06
1.900E-02	20	4.64D-06	4.27D-06	3.52D-06	2.75D-06	2.06D-06	1.30D-06	5.37D-07	-4.46D-07	-1.99D-06	-3.59D-06	-5.21D-06
1.800E-02	19	6.84D-06	6.25D-06	5.12D-06	3.91D-06	2.73D-06	1.40D-06	1.41D-07	-1.31D-06	-3.34D-06	-5.28D-06	-7.15D-06
1.700E-02	18	9.00D-06	8.21D-06	6.69D-06	5.05D-06	3.40D-06	1.50D-06	-2.59D-07	-2.18D-06	-4.68D-06	-6.94D-06	-9.05D-06
1.600E-02	17	1.11D-05	1.01D-05	8.25D-06	6.18D-06	4.06D-06	1.59D-06	-6.61D-07	-3.04D-06	-6.00D-06	-8.58D-06	-1.09D-05
1.500E-02	16	1.33D-05	1.21D-05	9.82D-06	7.32D-06	4.74D-06	1.69D-06	-1.06D-06	-3.91D-06	-7.32D-06	-1.02D-05	-1.27D-05
1.400E-02	15	1.54D-05	1.40D-05	1.14D-05	8.48D-06	5.43D-06	1.80D-06	-1.45D-06	-4.77D-06	-8.63D-06	-1.18D-05	-1.45D-05
1.300E-02	14	1.74D-05	1.59D-05	1.30D-05	9.68D-06	6.16D-06	1.94D-06	-1.83D-06	-5.63D-06	-9.95D-06	-1.34D-05	-1.63D-05
1.200E-02	13	1.95D-05	1.79D-05	1.46D-05	1.09D-05	6.94D-06	2.11D-06	-2.20D-06	-6.50D-06	-1.13D-05	-1.50D-05	-1.80D-05
1.100E-02	12	2.16D-05	1.98D-05	1.63D-05	1.22D-05	7.78D-06	2.32D-06	-2.56D-06	-7.37D-06	-1.26D-05	-1.66D-05	-1.97D-05
1.000E-02	11	2.37D-05	2.18D-05	1.81D-05	1.36D-05	8.69D-06	2.57D-06	-2.90D-06	-8.26D-06	-1.40D-05	-1.82D-05	-2.15D-05
9.000E-03	10	2.58D-05	2.39D-05	1.99D-05	1.51D-05	9.69D-06	2.88D-06	-3.23D-06	-9.16D-06	-1.54D-05	-1.98D-05	-2.32D-05
8.000E-03	9	2.80D-05	2.60D-05	2.19D-05	1.67D-05	1.08D-05	3.25D-06	-3.55D-06	-1.01D-05	-1.68D-05	-2.15D-05	-2.50D-05
6.000E-03	8	3.24D-05	3.05D-05	2.61D-05	2.03D-05	1.34D-05	4.21D-06	-4.14D-06	-1.21D-05	-1.99D-05	-2.50D-05	-2.87D-05
5.000E-03	7	3.47D-05	3.30D-05	2.85D-05	2.24D-05	1.49D-05	4.83D-06	-4.43D-06	-1.32D-05	-2.16D-05	-2.69D-05	-3.06D-05
4.000E-03	6	3.72D-05	3.55D-05	3.11D-05	2.47D-05	1.67D-05	5.55D-06	-4.72D-06	-1.43D-05	-2.34D-05	-2.90D-05	-3.27D-05
3.000E-03	5	3.97D-05	3.83D-05	3.38D-05	2.72D-05	1.86D-05	6.38D-06	-5.01D-06	-1.56D-05	-2.54D-05	-3.11D-05	-3.48D-05
2.000E-03	4	4.24D-05	4.12D-05	3.69D-05	3.00D-05	2.08D-05	7.35D-06	-5.31D-06	-1.70D-05	-2.75D-05	-3.35D-05	-3.71D-05
1.500E-03	3	4.38D-05	4.27D-05	3.85D-05	3.15D-05	2.20D-05	7.88D-06	-5.47D-06	-1.77D-05	-2.86D-05	-3.47D-05	-3.83D-05
1.000E-03	2	4.52D-05	4.43D-05	4.01D-05	3.32D-05	2.33D-05	8.45D-06	-5.64D-06	-1.85D-05	-2.98D-05	-3.60D-05	-3.96D-05
-1.000E-03	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01

	I =	12	13	14	15	16	17	18	19	20	21	22
	XU =	3.45E-02	3.80E-02	4.20E-02	4.55E-02	4.90E-02	5.30E-02	5.65E-02	6.00E-02	6.40E-02	6.75E-02	7.10E-02
Y =	J =											
4.400E-02	43	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01
4.300E-02	42	3.17D-05	3.25D-05	3.16D-05	2.79D-05	2.26D-05	1.60D-05	7.15D-06	-1.08D-06	-9.19D-06	-1.67D-05	-2.32D-05
4.200E-02	41	3.23D-05	3.31D-05	3.20D-05	2.82D-05	2.28D-05	1.61D-05	7.19D-06	-1.09D-06	-9.24D-06	-1.68D-05	-2.34D-05
4.100E-02	40	3.28D-05	3.34D-05	3.23D-05	2.83D-05	2.28D-05	1.61D-05	7.18D-06	-1.09D-06	-9.24D-06	-1.68D-05	-2.35D-05
4.000E-02	39	3.29D-05	3.35D-05	3.23D-05	2.82D-05	2.27D-05	1.60D-05	7.12D-06	-1.09D-06	-9.18D-06	-1.67D-05	-2.34D-05
3.900E-02	38	3.28D-05	3.33D-05	3.20D-05	2.79D-05	2.24D-05	1.58D-05	7.01D-06	-1.08D-06	-9.06D-06	-1.65D-05	-2.31D-05
3.800E-02	37	3.24D-05	3.28D-05	3.15D-05	2.74D-05	2.20D-05	1.54D-05	6.85D-06	-1.07D-06	-8.88D-06	-1.62D-05	-2.27D-05
3.700E-02	36	3.17D-05	3.20D-05	3.07D-05	2.67D-05	2.13D-05	1.50D-05	6.63D-06	-1.06D-06	-8.64D-06	-1.57D-05	-2.21D-05
3.500E-02	35	2.95D-05	2.96D-05	2.83D-05	2.45D-05	1.95D-05	1.37D-05	6.04D-06	-1.01D-06	-7.99D-06	-1.46D-05	-2.05D-05
3.400E-02	34	2.79D-05	2.80D-05	2.66D-05	2.31D-05	1.84D-05	1.29D-05	5.68D-06	-9.83D-07	-7.57D-06	-1.38D-05	-1.94D-05
3.300E-02	33	2.61D-05	2.61D-05	2.48D-05	2.15D-05	1.71D-05	1.20D-05	5.27D-06	-9.45D-07	-7.10D-06	-1.29D-05	-1.82D-05
3.200E-02	32	2.41D-05	2.40D-05	2.28D-05	1.97D-05	1.57D-05	1.10D-05	4.82D-06	-9.01D-07	-6.58D-06	-1.20D-05	-1.68D-05
3.100E-02	31	2.19D-05	2.18D-05	2.06D-05	1.78D-05	1.42D-05	9.93D-06	4.35D-06	-8.49D-07	-6.02D-06	-1.09D-05	-1.54D-05
3.000E-02	30	1.96D-05	1.94D-05	1.83D-05	1.58D-05	1.26D-05	8.82D-06	3.85D-06	-7.91D-07	-5.42D-06	-9.81D-06	-1.38D-05
2.900E-02	29	1.72D-05	1.69D-05	1.59D-05	1.37D-05	1.09D-05	7.66D-06	3.33D-06	-7.24D-07	-4.78D-06	-8.65D-06	-1.22D-05
2.800E-02	28	1.47D-05	1.44D-05	1.35D-05	1.16D-05	9.21D-06	6.47D-06	2.81D-06	-6.51D-07	-4.12D-06	-7.43D-06	-1.05D-05
2.700E-02	27	1.22D-05	1.18D-05	1.10D-05	9.42D-06	7.48D-06	5.26D-06	2.27D-06	-5.70D-07	-3.44D-06	-6.18D-06	-8.73D-06
2.600E-02	26	9.70D-06	9.28D-06	8.54D-06	7.25D-06	5.75D-06	4.05D-06	1.74D-06	-4.83D-07	-2.74D-06	-4.91D-06	-6.95D-06
2.500E-02	25	7.21D-06	6.73D-06	6.08D-06	5.10D-06	4.02D-06	2.84D-06	1.21D-06	-3.90D-07	-2.03D-06	-3.63D-06	-5.15D-06
2.400E-02	24	4.75D-06	4.22D-06	3.65D-06	2.98D-06	2.32D-06	1.64D-06	6.83D-07	-2.92D-07	-1.32D-06	-2.34D-06	-3.35D-06
2.300E-02	23	2.34D-06	1.77D-06	1.28D-06	8.97D-07	6.54D-07	4.67D-07	1.71D-07	-1.90D-07	-6.07D-07	-1.06D-06	-1.56D-06
2.100E-02	22	-2.29D-06	-2.94D-06	-3.25D-06	-3.07D-06	-2.53D-06	-1.78D-06	-8.04D-07	2.31D-08	7.86D-07	1.44D-06	1.93D-06
2.000E-02	21	-4.52D-06	-5.19D-06	-5.41D-06	-4.96D-06	-4.05D-06	-2.85D-06	-1.27D-06	1.31D-07	1.46D-06	2.65D-06	3.62D-06
1.900E-02	20	-6.69D-06	-7.37D-06	-7.50D-06	-6.78D-06	-5.52D-06	-3.88D-06	-1.72D-06	2.38D-07	2.12D-06	3.83D-06	5.27D-06
1.800E-02	19	-8.79D-06	-9.47D-06	-9.50D-06	-8.53D-06	-6.92D-06	-4.87D-06	-2.14D-06	3.44D-07	2.76D-06	4.97D-06	6.86D-06
1.700E-02	18	-1.08D-05	-1.15D-05	-1.14D-05	-1.02D-05	-8.26D-06	-5.82D-06	-2.55D-06	4.46D-07	3.38D-06	6.07D-06	8.40D-06
1.600E-02	17	-1.28D-05	-1.34D-05	-1.33D-05	-1.18D-05	-9.54D-06	-6.72D-06	-2.94D-06	5.46D-07	3.97D-06	7.13D-06	9.87D-06
1.500E-02	16	-1.47D-05	-1.53D-05	-1.50D-05	-1.33D-05	-1.08D-05	-7.58D-06	-3.31D-06	6.41D-07	4.53D-06	8.14D-06	1.13D-05
1.400E-02	15	-1.66D-05	-1.71D-05	-1.67D-05	-1.48D-05	-1.19D-05	-8.40D-06	-3.67D-06	7.31D-07	5.07D-06	9.10D-06	1.26D-05
1.300E-02	14	-1.84D-05	-1.89D-05	-1.84D-05	-1.62D-05	-1.30D-05	-9.17D-06	-4.01D-06	8.14D-07	5.58D-06	1.00D-05	1.39D-05
1.200E-02	13	-2.01D-05	-2.06D-05	-1.99D-05	-1.75D-05	-1.41D-05	-9.91D-06	-4.33D-06	8.91D-07	6.06D-06	1.09D-05	1.51D-05
1.100E-02	12	-2.19D-05	-2.22D-05	-2.14D-05	-1.88D-05	-1.51D-05	-1.06D-05	-4.63D-06	9.61D-07	6.51D-06	1.17D-05	1.63D-05
1.000E-02	11	-2.36D-05	-2.39D-05	-2.29D-05	-2.00D-05	-1.60D-05	-1.13D-05	-4.93D-06	1.02D-06	6.93D-06	1.25D-05	1.74D-05
9.000E-03	10	-2.53D-05	-2.55D-05	-2.43D-05	-2.11D-05	-1.70D-05	-1.19D-05	-5.21D-06	1.08D-06	7.32D-06	1.32D-05	1.85D-05
8.000E-03	9	-2.70D-05	-2.70D-05	-2.57D-05	-2.23D-05	-1.78D-05	-1.25D-05	-5.49D-06	1.12D-06	7.69D-06	1.39D-05	1.94D-05
6.000E-03	8	-3.05D-05	-3.02D-05	-2.85D-05	-2.45D-05	-1.96D-05	-1.37D-05	-6.03D-06	1.17D-06	8.36D-06	1.52D-05	2.13D-05
5.000E-03	7	-3.23D-05	-3.18D-05	-2.99D-05	-2.56D-05	-2.04D-05	-1.43D-05	-6.31D-06	1.18D-06	8.66D-06	1.58D-05	2.22D-05
4.000E-03	6	-3.42D-05	-3.35D-05	-3.13D-05	-2.68D-05	-2.13D-05	-1.49D-05	-6.61D-06	1.17D-06	8.94D-06	1.63D-05	2.31D-05
3.000E-03	5	-3.62D-05	-3.52D-05	-3.28D-05	-2.79D-05	-2.22D-05	-1.56D-05	-6.92D-06	1.15D-06	9.21D-06	1.69D-05	2.40D-05
2.000E-03	4	-3.82D-05	-3.70D-05	-3.43D-05	-2.92D-05	-2.31D-05	-1.62D-05	-7.27D-06	1.10D-06	9.46D-06	1.74D-05	2.48D-05
1.500E-03	3	-3.93D-05	-3.79D-05	-3.51D-05	-2.98D-05	-2.36D-05	-1.66D-05	-7.45D-06	1.07D-06	9.58D-06	1.77D-05	2.53D-05
1.000E-03	2	-4.04D-05	-3.89D-05	-3.59D-05	-3.05D-05	-2.41D-05	-1.70D-05	-7.65D-06	1.03D-06	9.71D-06	1.80D-05	2.57D-05
-1.000E-03	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01

	I =	23	24	25	26	27	28	29	30	31	32	33
	XU =	7.50E-02	7.85E-02	8.20E-02	8.60E-02	8.95E-02	9.30E-02	9.70E-02	1.00E-01	1.04E-01	1.07E-01	1.11E-01
Y =	J =											
4.400E-02	43	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	
4.300E-02	42	-2.90D-05	-3.21D-05	-3.36D-05	-3.28D-05	-3.00D-05	-2.58D-05	-1.91D-05	-1.19D-05	-6.54D-06	-6.68D-15	
4.200E-02	41	-2.93D-05	-3.25D-05	-3.41D-05	-3.34D-05	-3.06D-05	-2.64D-05	-1.95D-05	-1.22D-05	-6.70D-06	-6.88D-15	
4.100E-02	40	-2.94D-05	-3.27D-05	-3.44D-05	-3.38D-05	-3.10D-05	-2.68D-05	-1.99D-05	-1.25D-05	-6.83D-06	-7.08D-15	
4.000E-02	39	-2.93D-05	-3.27D-05	-3.45D-05	-3.39D-05	-3.12D-05	-2.70D-05	-2.01D-05	-1.26D-05	-6.91D-06	0.00D-01	
3.900E-02	38	-2.91D-05	-3.25D-05	-3.43D-05	-3.38D-05	-3.12D-05	-2.70D-05	-2.01D-05	-1.26D-05	-6.93D-06	-7.46D-15	
3.800E-02	37	-2.86D-05	-3.20D-05	-3.39D-05	-3.35D-05	-3.09D-05	-2.68D-05	-2.00D-05	-1.26D-05	-6.89D-06	-7.64D-15	
3.700E-02	36	-2.79D-05	-3.13D-05	-3.31D-05	-3.28D-05	-3.03D-05	-2.63D-05	-1.96D-05	-1.24D-05	-6.79D-06	-7.81D-15	
3.500E-02	35	-2.59D-05	-2.91D-05	-3.09D-05	-3.06D-05	-2.84D-05	-2.47D-05	-1.84D-05	-1.16D-05	-6.38D-06	-8.11D-15	
3.400E-02	34	-2.45D-05	-2.76D-05	-2.93D-05	-2.91D-05	-2.70D-05	-2.35D-05	-1.75D-05	-1.11D-05	-6.09D-06	-8.24D-15	
3.300E-02	33	-2.30D-05	-2.59D-05	-2.76D-05	-2.74D-05	-2.54D-05	-2.21D-05	-1.65D-05	-1.04D-05	-5.74D-06	-8.36D-15	
3.200E-02	32	-2.13D-05	-2.40D-05	-2.56D-05	-2.54D-05	-2.36D-05	-2.05D-05	-1.54D-05	-9.73D-06	-5.35D-06	-8.47D-15	
3.100E-02	31	-1.95D-05	-2.19D-05	-2.34D-05	-2.33D-05	-2.16D-05	-1.88D-05	-1.41D-05	-8.96D-06	-4.93D-06	0.00D-01	
3.000E-02	30	-1.75D-05	-1.97D-05	-2.10D-05	-2.10D-05	-1.95D-05	-1.70D-05	-1.28D-05	-8.13D-06	-4.48D-06	0.00D-01	
2.900E-02	29	-1.55D-05	-1.74D-05	-1.86D-05	-1.86D-05	-1.73D-05	-1.51D-05	-1.14D-05	-7.28D-06	-4.01D-06	-8.72D-15	

2.800E-02	28	-1.33D-05	-1.50D-05	-1.61D-05	-1.61D-05	-1.51D-05	-1.32D-05	-9.99D-06	-6.40D-06	-3.54D-06	-8.78D-15
2.700E-02	27	-1.11D-05	-1.25D-05	-1.34D-05	-1.35D-05	-1.27D-05	-1.12D-05	-8.56D-06	-5.51D-06	-3.05D-06	-8.83D-15
2.600E-02	26	-8.86D-06	-1.00D-05	-1.08D-05	-1.10D-05	-1.04D-05	-9.26D-06	-7.13D-06	-4.62D-06	-2.57D-06	0.00D-01
2.500E-02	25	-6.60D-06	-7.52D-06	-8.17D-06	-8.40D-06	-8.09D-06	-7.29D-06	-5.70D-06	-3.74D-06	-2.09D-06	-8.91D-15
2.400E-02	24	-4.33D-06	-5.00D-06	-5.53D-06	-5.84D-06	-5.78D-06	-5.34D-06	-4.29D-06	-2.86D-06	-1.61D-06	-8.95D-15
2.300E-02	23	-2.09D-06	-2.51D-06	-2.93D-06	-3.32D-06	-3.50D-06	-3.42D-06	-2.90D-06	-2.00D-06	-1.14D-06	0.00D-01
2.100E-02	22	2.27D-06	2.33D-06	2.14D-06	1.59D-06	9.39D-07	3.23D-07	-1.97D-07	-3.30D-07	-2.29D-07	-9.01D-15
2.000E-02	21	4.39D-06	4.68D-06	4.59D-06	3.98D-06	3.10D-06	2.15D-06	1.12D-06	4.89D-07	2.17D-07	0.00D-01
1.900E-02	20	6.45D-06	6.96D-06	6.98D-06	6.31D-06	5.21D-06	3.94D-06	2.42D-06	1.29D-06	6.56D-07	0.00D-01
1.800E-02	19	8.44D-06	9.17D-06	9.31D-06	8.57D-06	7.28D-06	5.70D-06	3.70D-06	2.09D-06	1.09D-06	-9.04D-15
1.700E-02	18	1.04D-05	1.13D-05	1.16D-05	1.08D-05	9.30D-06	7.43D-06	4.97D-06	2.88D-06	1.52D-06	-9.05D-15
1.600E-02	17	1.22D-05	1.34D-05	1.37D-05	1.29D-05	1.13D-05	9.13D-06	6.23D-06	3.67D-06	1.95D-06	-9.05D-15
1.500E-02	16	1.40D-05	1.54D-05	1.59D-05	1.50D-05	1.32D-05	1.08D-05	7.48D-06	4.46D-06	2.39D-06	0.00D-01
1.400E-02	15	1.57D-05	1.73D-05	1.79D-05	1.71D-05	1.52D-05	1.25D-05	8.75D-06	5.26D-06	2.83D-06	-9.06D-15
1.300E-02	14	1.73D-05	1.91D-05	1.99D-05	1.91D-05	1.71D-05	1.42D-05	1.00D-05	6.07D-06	3.27D-06	0.00D-01
1.200E-02	13	1.89D-05	2.09D-05	2.18D-05	2.11D-05	1.89D-05	1.59D-05	1.13D-05	6.91D-06	3.74D-06	-9.06D-15
1.100E-02	12	2.04D-05	2.26D-05	2.37D-05	2.30D-05	2.08D-05	1.76D-05	1.27D-05	7.78D-06	4.22D-06	-9.06D-15
1.000E-02	11	2.18D-05	2.43D-05	2.55D-05	2.49D-05	2.27D-05	1.93D-05	1.41D-05	8.68D-06	4.72D-06	-9.06D-15
9.000E-03	10	2.32D-05	2.59D-05	2.73D-05	2.68D-05	2.46D-05	2.11D-05	1.55D-05	9.64D-06	5.26D-06	-9.06D-15
8.000E-03	9	2.45D-05	2.74D-05	2.91D-05	2.88D-05	2.66D-05	2.30D-05	1.70D-05	1.07D-05	5.83D-06	-9.06D-15
6.000E-03	8	2.70D-05	3.05D-05	3.25D-05	3.27D-05	3.06D-05	2.69D-05	2.04D-05	1.29D-05	7.12D-06	-9.06D-15
5.000E-03	7	2.82D-05	3.20D-05	3.43D-05	3.47D-05	3.28D-05	2.91D-05	2.22D-05	1.43D-05	7.87D-06	-9.05D-15
4.000E-03	6	2.95D-05	3.34D-05	3.61D-05	3.67D-05	3.50D-05	3.14D-05	2.43D-05	1.57D-05	8.70D-06	0.00D-01
3.000E-03	5	3.07D-05	3.50D-05	3.79D-05	3.89D-05	3.74D-05	3.38D-05	2.65D-05	1.73D-05	9.64D-06	0.00D-01
2.000E-03	4	3.19D-05	3.65D-05	3.98D-05	4.12D-05	3.99D-05	3.65D-05	2.89D-05	1.91D-05	1.07D-05	-9.05D-15
1.500E-03	3	3.26D-05	3.73D-05	4.08D-05	4.24D-05	4.12D-05	3.79D-05	3.02D-05	2.01D-05	1.13D-05	-9.05D-15
1.000E-03	2	3.32D-05	3.81D-05	4.18D-05	4.36D-05	4.26D-05	3.93D-05	3.16D-05	2.11D-05	1.19D-05	-9.05D-15
-1.000E-03	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01
	I =	34	35	36	37	38	39	40	41	42	43
	XU =	1.15E-01	1.18E-01	1.22E-01	1.26E-01	1.29E-01	1.33E-01	1.37E-01	1.40E-01	1.43E-01	1.46E-01

--*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- Y-COMPONENT OF VELOCITY..(V) AT STEP 571, TIME = 1.8000E 04 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*

YV =	J =										
4.350E-02	43	0.00D-01	4.54D-12	5.51D-12	7.38D-12	1.24D-11	6.57D-12	1.30D-12	2.98D-12	1.09D-11	4.51D-12	1.14D-11
4.250E-02	42	0.00D-01	-2.73D-06	-2.72D-06	-2.69D-06	-2.61D-06	-2.49D-06	-2.33D-06	-2.07D-06	-1.71D-06	-1.35D-06	-8.15D-07
4.150E-02	41	0.00D-01	-5.48D-06	-5.45D-06	-5.39D-06	-5.24D-06	-4.99D-06	-4.69D-06	-4.17D-06	-3.45D-06	-2.74D-06	-1.66D-06
4.050E-02	40	0.00D-01	-8.22D-06	-8.18D-06	-8.09D-06	-7.88D-06	-7.51D-06	-7.06D-06	-6.29D-06	-5.22D-06	-4.16D-06	-2.53D-06
3.950E-02	39	0.00D-01	-1.09D-05	-1.09D-05	-1.08D-05	-1.05D-05	-1.00D-05	-9.43D-06	-8.42D-06	-6.99D-06	-5.59D-06	-3.42D-06
3.850E-02	38	0.00D-01	-1.36D-05	-1.36D-05	-1.34D-05	-1.31D-05	-1.25D-05	-1.18D-05	-1.05D-05	-8.77D-06	-7.03D-06	-4.31D-06
3.750E-02	37	0.00D-01	-1.63D-05	-1.62D-05	-1.61D-05	-1.57D-05	-1.50D-05	-1.41D-05	-1.26D-05	-1.05D-05	-8.45D-06	-5.20D-06
3.600E-02	36	0.00D-01	-2.02D-05	-2.01D-05	-1.99D-05	-1.94D-05	-1.86D-05	-1.75D-05	-1.57D-05	-1.31D-05	-1.06D-05	-6.51D-06
3.450E-02	35	0.00D-01	-2.38D-05	-2.37D-05	-2.35D-05	-2.29D-05	-2.20D-05	-2.08D-05	-1.86D-05	-1.56D-05	-1.25D-05	-7.72D-06
3.350E-02	34	0.00D-01	-2.62D-05	-2.61D-05	-2.58D-05	-2.52D-05	-2.41D-05	-2.28D-05	-2.05D-05	-1.71D-05	-1.38D-05	-8.48D-06
3.250E-02	33	0.00D-01	-2.84D-05	-2.83D-05	-2.80D-05	-2.73D-05	-2.62D-05	-2.48D-05	-2.22D-05	-1.86D-05	-1.50D-05	-9.18D-06
3.150E-02	32	0.00D-01	-3.05D-05	-3.03D-05	-3.01D-05	-2.94D-05	-2.81D-05	-2.66D-05	-2.39D-05	-1.99D-05	-1.60D-05	-9.82D-06
3.050E-02	31	0.00D-01	-3.24D-05	-3.23D-05	-3.20D-05	-3.12D-05	-2.99D-05	-2.83D-05	-2.54D-05	-2.12D-05	-1.70D-05	-1.04D-05
2.950E-02	30	0.00D-01	-3.42D-05	-3.41D-05	-3.38D-05	-3.30D-05	-3.16D-05	-2.99D-05	-2.68D-05	-2.23D-05	-1.79D-05	-1.09D-05
2.850E-02	29	0.00D-01	-3.58D-05	-3.57D-05	-3.54D-05	-3.45D-05	-3.31D-05	-3.13D-05	-2.80D-05	-2.33D-05	-1.87D-05	-1.13D-05
2.750E-02	28	0.00D-01	-3.73D-05	-3.72D-05	-3.68D-05	-3.59D-05	-3.44D-05	-3.25D-05	-2.91D-05	-2.42D-05	-1.94D-05	-1.17D-05
2.650E-02	27	0.00D-01	-3.86D-05	-3.85D-05	-3.81D-05	-3.72D-05	-3.56D-05	-3.36D-05	-3.01D-05	-2.50D-05	-2.00D-05	-1.20D-05
2.550E-02	26	0.00D-01	-3.97D-05	-3.95D-05	-3.92D-05	-3.82D-05	-3.65D-05	-3.45D-05	-3.09D-05	-2.56D-05	-2.05D-05	-1.22D-05
2.450E-02	25	0.00D-01	-4.06D-05	-4.04D-05	-4.00D-05	-3.91D-05	-3.73D-05	-3.53D-05	-3.15D-05	-2.61D-05	-2.08D-05	-1.24D-05
2.350E-02	24	0.00D-01	-4.13D-05	-4.11D-05	-4.07D-05	-3.97D-05	-3.79D-05	-3.58D-05	-3.19D-05	-2.64D-05	-2.11D-05	-1.25D-05
2.200E-02	23	0.00D-01	-4.20D-05	-4.19D-05	-4.14D-05	-4.04D-05	-3.85D-05	-3.64D-05	-3.24D-05	-2.67D-05	-2.13D-05	-1.26D-05
2.050E-02	22	0.00D-01	-4.21D-05	-4.20D-05	-4.15D-05	-4.05D-05	-3.86D-05	-3.64D-05	-3.24D-05	-2.67D-05	-2.13D-05	-1.26D-05
1.950E-02	21	0.00D-01	-4.20D-05	-4.18D-05	-4.14D-05	-4.03D-05	-3.84D-05	-3.62D-05	-3.22D-05	-2.65D-05	-2.12D-05	-1.25D-05
1.850E-02	20	0.00D-01	-4.16D-05	-4.15D-05	-4.10D-05	-3.99D-05	-3.80D-05	-3.59D-05	-3.19D-05	-2.62D-05	-2.09D-05	-1.24D-05
1.750E-02	19	0.00D-01	-4.11D-05	-4.09D-05	-4.05D-05	-3.94D-05	-3.74D-05	-3.54D-05	-3.14D-05	-2.58D-05	-2.06D-05	-1.22D-05
1.650E-02	18	0.00D-01	-4.03D-05	-4.01D-05	-3.97D-05	-3.86D-05	-3.67D-05	-3.46D-05	-3.07D-05	-2.53D-05	-2.03D-05	-1.21D-05
1.550E-02	17	0.00D-01	-3.93D-05	-3.92D-05	-3.87D-05	-3.76D-05	-3.58D-05	-3.38D-05	-3.00D-05	-2.47D-05	-1.98D-05	-1.19D-05
1.450E-02	16	0.00D-01	-3.81D-05	-3.80D-05	-3.75D-05	-3.65D-05	-3.46D-05	-3.27D-05	-2.90D-05	-2.40D-05	-1.93D-05	-1.16D-05
1.350E-02	15	0.00D-01	-3.67D-05	-3.66D-05	-3.61D-05	-3.51D-05	-3.33D-05	-3.15D-05	-2.80D-05	-2.31D-05	-1.86D-05	-1.13D-05
1.250E-02	14	0.00D-01	-3.51D-05	-3.49D-05	-3.46D-05	-3.35D-05	-3.19D-05	-3.01D-05	-2.68D-05	-2.21D-05	-1.79D-05	-1.10D-05

1.150E-02	13	0.00D-01	-3.33D-05	-3.31D-05	-3.28D-05	-3.18D-05	-3.02D-05	-2.86D-05	-2.54D-05	-2.11D-05	-1.71D-05	-1.06D-05
1.050E-02	12	0.00D-01	-3.13D-05	-3.12D-05	-3.08D-05	-2.99D-05	-2.84D-05	-2.69D-05	-2.39D-05	-1.99D-05	-1.62D-05	-1.02D-05
9.500E-03	11	0.00D-01	-2.91D-05	-2.90D-05	-2.86D-05	-2.78D-05	-2.64D-05	-2.50D-05	-2.23D-05	-1.86D-05	-1.53D-05	-9.67D-06
8.500E-03	10	0.00D-01	-2.67D-05	-2.66D-05	-2.63D-05	-2.55D-05	-2.43D-05	-2.30D-05	-2.05D-05	-1.72D-05	-1.42D-05	-9.11D-06
7.000E-03	9	0.00D-01	-2.29D-05	-2.28D-05	-2.26D-05	-2.19D-05	-2.08D-05	-1.98D-05	-1.77D-05	-1.49D-05	-1.24D-05	-8.14D-06
5.500E-03	8	0.00D-01	-1.86D-05	-1.85D-05	-1.83D-05	-1.78D-05	-1.69D-05	-1.61D-05	-1.45D-05	-1.22D-05	-1.03D-05	-6.88D-06
4.500E-03	7	0.00D-01	-1.55D-05	-1.55D-05	-1.53D-05	-1.49D-05	-1.42D-05	-1.35D-05	-1.22D-05	-1.03D-05	-8.75D-06	-5.94D-06
3.500E-03	6	0.00D-01	-1.23D-05	-1.23D-05	-1.22D-05	-1.18D-05	-1.12D-05	-1.08D-05	-9.72D-06	-8.28D-06	-7.07D-06	-4.86D-06
2.500E-03	5	0.00D-01	-8.96D-06	-8.94D-06	-8.86D-06	-8.61D-06	-8.20D-06	-7.87D-06	-7.13D-06	-6.09D-06	-5.24D-06	-3.65D-06
1.750E-03	4	0.00D-01	-6.34D-06	-6.32D-06	-6.27D-06	-6.10D-06	-5.81D-06	-5.58D-06	-5.06D-06	-4.34D-06	-3.75D-06	-2.63D-06
1.250E-03	3	0.00D-01	-4.55D-06	-4.54D-06	-4.51D-06	-4.38D-06	-4.17D-06	-4.02D-06	-3.65D-06	-3.13D-06	-2.71D-06	-1.91D-06
0.000E-01	2	0.00D-01	-6.65D-14	-5.36D-13	-2.37D-13	-1.02D-12	-9.48D-13	-1.81D-13	-4.82D-13	-5.99D-12	-1.27D-12	-3.05D-12
0.000E-01	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01

	I =	1	2	3	4	5	6	7	8	9	10	11
	X =	-2.00E-03	2.00E-03	4.00E-03	7.00E-03	1.10E-02	1.50E-02	1.80E-02	2.20E-02	2.60E-02	2.90E-02	3.30E-02
YV =	J =											
4.350E-02	43	1.30D-12	5.96D-12	1.26D-11	5.04D-12	3.43D-12	1.43D-12	8.99D-12	2.72D-12	5.33D-12	4.83D-12	1.20D-11
4.250E-02	42	-3.54D-07	2.98D-07	9.40D-07	1.36D-06	1.84D-06	2.17D-06	2.28D-06	2.25D-06	2.03D-06	1.77D-06	1.27D-06
4.150E-02	41	-7.33D-07	5.86D-07	1.89D-06	2.74D-06	3.73D-06	4.39D-06	4.61D-06	4.55D-06	4.09D-06	3.57D-06	2.55D-06
4.050E-02	40	-1.13D-06	8.65D-07	2.84D-06	4.14D-06	5.65D-06	6.65D-06	6.99D-06	6.89D-06	6.18D-06	5.39D-06	3.82D-06
3.950E-02	39	-1.55D-06	1.14D-06	3.80D-06	5.55D-06	7.59D-06	8.94D-06	9.39D-06	9.25D-06	8.28D-06	7.20D-06	5.08D-06
3.850E-02	38	-1.97D-06	1.40D-06	4.76D-06	6.97D-06	9.54D-06	1.12D-05	1.18D-05	1.16D-05	1.04D-05	8.99D-06	6.32D-06
3.750E-02	37	-2.39D-06	1.67D-06	5.72D-06	8.38D-06	1.15D-05	1.35D-05	1.42D-05	1.39D-05	1.24D-05	1.07D-05	7.52D-06
3.600E-02	36	-3.00D-06	2.07D-06	7.15D-06	1.05D-05	1.44D-05	1.69D-05	1.77D-05	1.74D-05	1.54D-05	1.33D-05	9.24D-06
3.450E-02	35	-3.55D-06	2.49D-06	8.54D-06	1.25D-05	1.71D-05	2.01D-05	2.10D-05	2.05D-05	1.82D-05	1.56D-05	1.08D-05
3.350E-02	34	-3.88D-06	2.78D-06	9.45D-06	1.39D-05	1.89D-05	2.21D-05	2.31D-05	2.25D-05	1.99D-05	1.70D-05	1.17D-05
3.250E-02	33	-4.18D-06	3.08D-06	1.03D-05	1.51D-05	2.06D-05	2.40D-05	2.51D-05	2.44D-05	2.15D-05	1.83D-05	1.26D-05
3.150E-02	32	-4.43D-06	3.38D-06	1.12D-05	1.63D-05	2.21D-05	2.58D-05	2.69D-05	2.61D-05	2.29D-05	1.95D-05	1.33D-05
3.050E-02	31	-4.65D-06	3.69D-06	1.20D-05	1.75D-05	2.36D-05	2.74D-05	2.85D-05	2.76D-05	2.42D-05	2.06D-05	1.40D-05
2.950E-02	30	-4.82D-06	3.99D-06	1.27D-05	1.85D-05	2.50D-05	2.89D-05	3.00D-05	2.90D-05	2.54D-05	2.15D-05	1.46D-05
2.850E-02	29	-4.95D-06	4.28D-06	1.34D-05	1.95D-05	2.62D-05	3.03D-05	3.14D-05	3.02D-05	2.64D-05	2.22D-05	1.50D-05
2.750E-02	28	-5.04D-06	4.56D-06	1.41D-05	2.04D-05	2.73D-05	3.15D-05	3.25D-05	3.12D-05	2.72D-05	2.28D-05	1.54D-05
2.650E-02	27	-5.10D-06	4.82D-06	1.46D-05	2.12D-05	2.83D-05	3.25D-05	3.35D-05	3.21D-05	2.78D-05	2.33D-05	1.56D-05
2.550E-02	26	-5.14D-06	5.05D-06	1.51D-05	2.18D-05	2.91D-05	3.34D-05	3.44D-05	3.28D-05	2.83D-05	2.36D-05	1.58D-05
2.450E-02	25	-5.16D-06	5.24D-06	1.55D-05	2.24D-05	2.98D-05	3.41D-05	3.50D-05	3.33D-05	2.87D-05	2.38D-05	1.58D-05
2.350E-02	24	-5.15D-06	5.40D-06	1.59D-05	2.28D-05	3.03D-05	3.46D-05	3.55D-05	3.36D-05	2.88D-05	2.39D-05	1.58D-05
2.200E-02	23	-5.14D-06	5.57D-06	1.62D-05	2.33D-05	3.09D-05	3.52D-05	3.60D-05	3.39D-05	2.89D-05	2.37D-05	1.56D-05
2.050E-02	22	-5.11D-06	5.59D-06	1.63D-05	2.35D-05	3.11D-05	3.54D-05	3.60D-05	3.37D-05	2.85D-05	2.33D-05	1.51D-05
1.950E-02	21	-5.09D-06	5.56D-06	1.62D-05	2.34D-05	3.11D-05	3.53D-05	3.59D-05	3.35D-05	2.82D-05	2.29D-05	1.47D-05
1.850E-02	20	-5.07D-06	5.47D-06	1.61D-05	2.33D-05	3.09D-05	3.51D-05	3.56D-05	3.31D-05	2.77D-05	2.23D-05	1.43D-05
1.750E-02	19	-5.06D-06	5.33D-06	1.58D-05	2.30D-05	3.06D-05	3.48D-05	3.52D-05	3.25D-05	2.70D-05	2.17D-05	1.38D-05
1.650E-02	18	-5.05D-06	5.13D-06	1.55D-05	2.26D-05	3.02D-05	3.43D-05	3.46D-05	3.18D-05	2.63D-05	2.10D-05	1.32D-05
1.550E-02	17	-5.04D-06	4.89D-06	1.51D-05	2.21D-05	2.96D-05	3.36D-05	3.39D-05	3.10D-05	2.55D-05	2.02D-05	1.25D-05
1.450E-02	16	-5.03D-06	4.60D-06	1.45D-05	2.15D-05	2.89D-05	3.28D-05	3.31D-05	3.01D-05	2.45D-05	1.93D-05	1.19D-05
1.350E-02	15	-5.02D-06	4.27D-06	1.39D-05	2.08D-05	2.81D-05	3.19D-05	3.21D-05	2.90D-05	2.35D-05	1.83D-05	1.11D-05
1.250E-02	14	-4.99D-06	3.89D-06	1.32D-05	2.00D-05	2.71D-05	3.08D-05	3.09D-05	2.78D-05	2.23D-05	1.73D-05	1.04D-05
1.150E-02	13	-4.95D-06	3.49D-06	1.25D-05	1.90D-05	2.60D-05	2.96D-05	2.96D-05	2.65D-05	2.10D-05	1.62D-05	9.59D-06
1.050E-02	12	-4.89D-06	3.07D-06	1.16D-05	1.80D-05	2.47D-05	2.82D-05	2.81D-05	2.50D-05	1.97D-05	1.50D-05	8.77D-06
9.500E-03	11	-4.80D-06	2.63D-06	1.07D-05	1.68D-05	2.33D-05	2.67D-05	2.65D-05	2.34D-05	1.82D-05	1.38D-05	7.93D-06
8.500E-03	10	-4.66D-06	2.18D-06	9.75D-06	1.55D-05	2.17D-05	2.49D-05	2.47D-05	2.17D-05	1.67D-05	1.25D-05	7.07D-06
7.000E-03	9	-4.38D-06	1.51D-06	8.19D-06	1.34D-05	1.91D-05	2.20D-05	2.17D-05	1.88D-05	1.43D-05	1.05D-05	5.77D-06
5.500E-03	8	-3.89D-06	9.20D-07	6.49D-06	1.10D-05	1.59D-05	1.84D-05	1.81D-05	1.55D-05	1.16D-05	8.36D-06	4.47D-06
4.500E-03	7	-3.47D-06	5.70D-07	5.33D-06	9.25D-06	1.36D-05	1.58D-05	1.55D-05	1.31D-05	9.66D-06	6.89D-06	3.61D-06
3.500E-03	6	-2.93D-06	2.83D-07	4.14D-06	7.40D-06	1.10D-05	1.28D-05	1.26D-05	1.06D-05	7.67D-06	5.40D-06	2.76D-06
2.500E-03	5	-2.27D-06	7.72D-08	2.94D-06	5.43D-06	8.19D-06	9.59D-06	9.36D-06	7.79D-06	5.58D-06	3.87D-06	1.94D-06
1.750E-03	4	-1.67D-06	-9.59D-10	2.05D-06	3.86D-06	5.87D-06	6.90D-06	6.72D-06	5.56D-06	3.95D-06	2.72D-06	1.34D-06
1.250E-03	3	-1.22D-06	-2.38D-08	1.46D-06	2.78D-06	4.25D-06	5.00D-06	4.86D-06	4.01D-06	2.84D-06	1.94D-06	9.52D-07
0.000E-01	2	-1.14D-12	-1.24D-11	-1.50D-11	-1.29D-11	-7.52D-12	-2.46D-12	-9.21D-12	-1.19D-11	-1.86D-11	-1.64D-11	-1.44D-11
0.000E-01	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01

	I =	12	13	14	15	16	17	18	19	20	21	22
	X =	3.60E-02	4.00E-02	4.40E-02	4.70E-02	5.10E-02	5.50E-02	5.80E-02	6.20E-02	6.60E-02	6.90E-02	7.30E-02
YV =	J =											
4.350E-02	43	1.31D-11	1.56D-12	9.36D-12	1.31D-11	6.43D-12	2.54D-12	8.12D-12	7.49D-12	1.29D-11	9.78D-12	2.75D-12
4.250E-02	42	6.41D-07	1.31D-07	-5.74D-07	-1.23D-06	-1.67D-06	-2.09D-06	-2.32D-06	-2.37D-06	-2.26D-06	-2.05D-06	-1.66D-06

4.150E-02	41	1.27D-06	2.39D-07	-1.18D-06	-2.49D-06	-3.36D-06	-4.20D-06	-4.66D-06	-4.75D-06	-4.54D-06	-4.13D-06	-3.36D-06
4.050E-02	40	1.88D-06	3.23D-07	-1.81D-06	-3.77D-06	-5.06D-06	-6.30D-06	-6.99D-06	-7.13D-06	-6.82D-06	-6.22D-06	-5.07D-06
3.950E-02	39	2.47D-06	3.83D-07	-2.46D-06	-5.06D-06	-6.77D-06	-8.40D-06	-9.31D-06	-9.49D-06	-9.10D-06	-8.30D-06	-6.79D-06
3.850E-02	38	3.04D-06	4.21D-07	-3.12D-06	-6.35D-06	-8.46D-06	-1.05D-05	-1.16D-05	-1.18D-05	-1.13D-05	-1.04D-05	-8.51D-06
3.750E-02	37	3.57D-06	4.39D-07	-3.79D-06	-7.63D-06	-1.01D-05	-1.25D-05	-1.38D-05	-1.41D-05	-1.35D-05	-1.24D-05	-1.02D-05
3.600E-02	36	4.33D-06	4.37D-07	-4.78D-06	-9.50D-06	-1.25D-05	-1.55D-05	-1.71D-05	-1.74D-05	-1.68D-05	-1.54D-05	-1.27D-05
3.450E-02	35	4.98D-06	3.93D-07	-5.73D-06	-1.12D-05	-1.48D-05	-1.82D-05	-2.01D-05	-2.05D-05	-1.97D-05	-1.82D-05	-1.51D-05
3.350E-02	34	5.37D-06	3.52D-07	-6.33D-06	-1.23D-05	-1.62D-05	-1.99D-05	-2.19D-05	-2.24D-05	-2.16D-05	-1.99D-05	-1.65D-05
3.250E-02	33	5.71D-06	3.02D-07	-6.89D-06	-1.34D-05	-1.75D-05	-2.15D-05	-2.37D-05	-2.42D-05	-2.34D-05	-2.16D-05	-1.79D-05
3.150E-02	32	6.02D-06	2.43D-07	-7.42D-06	-1.43D-05	-1.87D-05	-2.29D-05	-2.53D-05	-2.59D-05	-2.50D-05	-2.31D-05	-1.92D-05
3.050E-02	31	6.27D-06	1.77D-07	-7.90D-06	-1.52D-05	-1.98D-05	-2.43D-05	-2.68D-05	-2.74D-05	-2.65D-05	-2.45D-05	-2.04D-05
2.950E-02	30	6.47D-06	1.05D-07	-8.33D-06	-1.59D-05	-2.07D-05	-2.54D-05	-2.81D-05	-2.87D-05	-2.78D-05	-2.57D-05	-2.15D-05
2.850E-02	29	6.63D-06	2.49D-08	-8.71D-06	-1.66D-05	-2.16D-05	-2.65D-05	-2.92D-05	-2.99D-05	-2.90D-05	-2.68D-05	-2.24D-05
2.750E-02	28	6.73D-06	-6.18D-08	-9.04D-06	-1.71D-05	-2.23D-05	-2.73D-05	-3.02D-05	-3.09D-05	-3.00D-05	-2.78D-05	-2.32D-05
2.650E-02	27	6.79D-06	-1.56D-07	-9.32D-06	-1.76D-05	-2.28D-05	-2.80D-05	-3.10D-05	-3.18D-05	-3.08D-05	-2.86D-05	-2.39D-05
2.550E-02	26	6.79D-06	-2.56D-07	-9.55D-06	-1.80D-05	-2.33D-05	-2.86D-05	-3.16D-05	-3.24D-05	-3.15D-05	-2.92D-05	-2.45D-05
2.450E-02	25	6.74D-06	-3.64D-07	-9.72D-06	-1.82D-05	-2.36D-05	-2.90D-05	-3.21D-05	-3.29D-05	-3.19D-05	-2.97D-05	-2.49D-05
2.350E-02	24	6.65D-06	-4.78D-07	-9.85D-06	-1.84D-05	-2.37D-05	-2.92D-05	-3.24D-05	-3.32D-05	-3.23D-05	-3.00D-05	-2.51D-05
2.200E-02	23	6.44D-06	-6.58D-07	-9.98D-06	-1.85D-05	-2.38D-05	-2.93D-05	-3.25D-05	-3.34D-05	-3.25D-05	-3.03D-05	-2.54D-05
2.050E-02	22	6.11D-06	-8.49D-07	-9.97D-06	-1.83D-05	-2.35D-05	-2.89D-05	-3.22D-05	-3.31D-05	-3.22D-05	-3.00D-05	-2.52D-05
1.950E-02	21	5.86D-06	-9.78D-07	-9.92D-06	-1.81D-05	-2.32D-05	-2.86D-05	-3.18D-05	-3.27D-05	-3.18D-05	-2.97D-05	-2.50D-05
1.850E-02	20	5.57D-06	-1.11D-06	-9.82D-06	-1.78D-05	-2.28D-05	-2.81D-05	-3.12D-05	-3.21D-05	-3.13D-05	-2.93D-05	-2.46D-05
1.750E-02	19	5.26D-06	-1.23D-06	-9.69D-06	-1.74D-05	-2.23D-05	-2.74D-05	-3.05D-05	-3.14D-05	-3.06D-05	-2.87D-05	-2.42D-05
1.650E-02	18	4.92D-06	-1.36D-06	-9.51D-06	-1.70D-05	-2.17D-05	-2.66D-05	-2.97D-05	-3.06D-05	-2.98D-05	-2.79D-05	-2.36D-05
1.550E-02	17	4.56D-06	-1.47D-06	-9.29D-06	-1.64D-05	-2.09D-05	-2.58D-05	-2.87D-05	-2.96D-05	-2.89D-05	-2.71D-05	-2.29D-05
1.450E-02	16	4.19D-06	-1.58D-06	-9.03D-06	-1.58D-05	-2.01D-05	-2.47D-05	-2.76D-05	-2.84D-05	-2.78D-05	-2.61D-05	-2.21D-05
1.350E-02	15	3.80D-06	-1.67D-06	-8.73D-06	-1.52D-05	-1.92D-05	-2.36D-05	-2.63D-05	-2.71D-05	-2.65D-05	-2.50D-05	-2.12D-05
1.250E-02	14	3.41D-06	-1.75D-06	-8.39D-06	-1.44D-05	-1.83D-05	-2.24D-05	-2.50D-05	-2.58D-05	-2.52D-05	-2.38D-05	-2.02D-05
1.150E-02	13	3.02D-06	-1.81D-06	-8.00D-06	-1.36D-05	-1.72D-05	-2.11D-05	-2.35D-05	-2.42D-05	-2.38D-05	-2.24D-05	-1.92D-05
1.050E-02	12	2.63D-06	-1.84D-06	-7.58D-06	-1.28D-05	-1.61D-05	-1.97D-05	-2.19D-05	-2.26D-05	-2.22D-05	-2.10D-05	-1.80D-05
9.500E-03	11	2.24D-06	-1.85D-06	-7.10D-06	-1.19D-05	-1.49D-05	-1.82D-05	-2.02D-05	-2.09D-05	-2.05D-05	-1.94D-05	-1.67D-05
8.500E-03	10	1.88D-06	-1.83D-06	-6.58D-06	-1.09D-05	-1.36D-05	-1.66D-05	-1.85D-05	-1.91D-05	-1.87D-05	-1.78D-05	-1.53D-05
7.000E-03	9	1.35D-06	-1.75D-06	-5.73D-06	-9.32D-06	-1.15D-05	-1.41D-05	-1.57D-05	-1.62D-05	-1.59D-05	-1.52D-05	-1.31D-05
5.500E-03	8	9.04D-07	-1.56D-06	-4.72D-06	-7.57D-06	-9.33D-06	-1.13D-05	-1.26D-05	-1.30D-05	-1.29D-05	-1.23D-05	-1.07D-05
4.500E-03	7	6.41D-07	-1.39D-06	-3.99D-06	-6.34D-06	-7.78D-06	-9.44D-06	-1.05D-05	-1.09D-05	-1.07D-05	-1.02D-05	-8.96D-06
3.500E-03	6	4.17D-07	-1.17D-06	-3.21D-06	-5.04D-06	-6.16D-06	-7.47D-06	-8.31D-06	-8.59D-06	-8.48D-06	-8.13D-06	-7.14D-06
2.500E-03	5	2.38D-07	-8.93D-07	-2.37D-06	-3.69D-06	-4.48D-06	-5.42D-06	-6.03D-06	-6.23D-06	-6.16D-06	-5.92D-06	-5.22D-06
1.750E-03	4	1.42D-07	-6.50D-07	-1.69D-06	-2.61D-06	-3.17D-06	-3.83D-06	-4.26D-06	-4.41D-06	-4.35D-06	-4.19D-06	-3.70D-06
1.250E-03	3	9.09D-08	-4.74D-07	-1.22D-06	-1.88D-06	-2.27D-06	-2.75D-06	-3.06D-06	-3.16D-06	-3.13D-06	-3.01D-06	-2.66D-06
0.000E-01	2	-6.99D-12	-4.16D-12	-9.53D-12	-1.68D-12	-3.76D-12	-2.41D-12	-5.05D-12	-6.59D-12	-2.69D-12	-7.03D-12	-8.43D-12
0.000E-01	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01

	I =	23	24	25	26	27	28	29	30	31	32	33
	X =	7.70E-02	8.00E-02	8.40E-02	8.80E-02	9.10E-02	9.50E-02	9.90E-02	1.02E-01	1.06E-01	1.09E-01	1.13E-01
YV =	J =											
4.350E-02	43	5.80D-12	7.25D-12	1.08D-11	5.46D-12	1.04D-12	6.38D-12	2.59D-12	6.17D-12	1.18D-11	0.00D-01	
4.250E-02	42	-1.15D-06	-7.00D-07	-7.30D-08	5.56D-07	9.87D-07	1.52D-06	1.92D-06	2.10D-06	2.16D-06	0.00D-01	
4.150E-02	41	-2.34D-06	-1.43D-06	-1.71D-07	1.10D-06	1.98D-06	3.06D-06	3.89D-06	4.25D-06	4.37D-06	0.00D-01	
4.050E-02	40	-3.55D-06	-2.20D-06	-2.92D-07	1.64D-06	2.97D-06	4.62D-06	5.88D-06	6.43D-06	6.62D-06	0.00D-01	
3.950E-02	39	-4.78D-06	-2.98D-06	-4.35D-07	2.16D-06	3.95D-06	6.19D-06	7.89D-06	8.65D-06	8.90D-06	0.00D-01	
3.850E-02	38	-6.01D-06	-3.78D-06	-5.97D-07	2.66D-06	4.92D-06	7.74D-06	9.90D-06	1.09D-05	1.12D-05	0.00D-01	
3.750E-02	37	-7.25D-06	-4.58D-06	-7.73D-07	3.14D-06	5.87D-06	9.28D-06	1.19D-05	1.31D-05	1.35D-05	0.00D-01	
3.600E-02	36	-9.07D-06	-5.78D-06	-1.05D-06	3.84D-06	7.26D-06	1.15D-05	1.48D-05	1.63D-05	1.68D-05	0.00D-01	
3.450E-02	35	-1.08D-05	-6.93D-06	-1.34D-06	4.46D-06	8.55D-06	1.36D-05	1.76D-05	1.94D-05	2.00D-05	0.00D-01	
3.350E-02	34	-1.19D-05	-7.66D-06	-1.52D-06	4.86D-06	9.37D-06	1.50D-05	1.93D-05	2.13D-05	2.20D-05	0.00D-01	
3.250E-02	33	-1.29D-05	-8.36D-06	-1.71D-06	5.22D-06	1.01D-05	1.62D-05	2.10D-05	2.31D-05	2.39D-05	0.00D-01	
3.150E-02	32	-1.39D-05	-9.01D-06	-1.88D-06	5.55D-06	1.08D-05	1.74D-05	2.25D-05	2.48D-05	2.56D-05	0.00D-01	
3.050E-02	31	-1.47D-05	-9.60D-06	-2.04D-06	5.85D-06	1.15D-05	1.85D-05	2.39D-05	2.64D-05	2.73D-05	0.00D-01	
2.950E-02	30	-1.55D-05	-1.01D-05	-2.20D-06	6.11D-06	1.21D-05	1.94D-05	2.51D-05	2.78D-05	2.88D-05	0.00D-01	
2.850E-02	29	-1.62D-05	-1.06D-05	-2.35D-06	6.33D-06	1.26D-05	2.02D-05	2.62D-05	2.91D-05	3.01D-05	0.00D-01	
2.750E-02	28	-1.68D-05	-1.11D-05	-2.48D-06	6.50D-06	1.30D-05	2.10D-05	2.72D-05	3.02D-05	3.12D-05	0.00D-01	
2.650E-02	27	-1.74D-05	-1.14D-05	-2.62D-06	6.62D-06	1.33D-05	2.16D-05	2.80D-05	3.11D-05	3.23D-05	0.00D-01	
2.550E-02	26	-1.78D-05	-1.17D-05	-2.75D-06	6.70D-06	1.36D-05	2.20D-05	2.87D-05	3.19D-05	3.31D-05	0.00D-01	
2.450E-02	25	-1.81D-05	-1.20D-05	-2.87D-06	6.72D-06	1.37D-05	2.24D-05	2.92D-05	3.26D-05	3.38D-05	0.00D-01	
2.350E-02	24	-1.83D-05	-1.22D-05	-3.00D-06	6.70D-06	1.38D-05	2.26D-05	2.96D-05	3.30D-05	3.43D-05	0.00D-01	
2.200E-02	23	-1.85D-05	-1.24D-05	-3.18D-06	6.58D-06	1.38D-05	2.28D-05	3.00D-05	3.35D-05	3.49D-05	0.00D-01	

2.050E-02	22	-1.85D-05	-1.24D-05	-3.36D-06	6.32D-06	1.36D-05	2.26D-05	2.99D-05	3.36D-05	3.50D-05	0.00D-01
1.950E-02	21	-1.84D-05	-1.24D-05	-3.48D-06	6.09D-06	1.33D-05	2.23D-05	2.97D-05	3.35D-05	3.49D-05	0.00D-01
1.850E-02	20	-1.82D-05	-1.24D-05	-3.60D-06	5.82D-06	1.30D-05	2.20D-05	2.94D-05	3.33D-05	3.47D-05	0.00D-01
1.750E-02	19	-1.79D-05	-1.23D-05	-3.71D-06	5.52D-06	1.26D-05	2.15D-05	2.90D-05	3.29D-05	3.44D-05	0.00D-01
1.650E-02	18	-1.75D-05	-1.21D-05	-3.81D-06	5.17D-06	1.21D-05	2.09D-05	2.84D-05	3.23D-05	3.38D-05	0.00D-01
1.550E-02	17	-1.71D-05	-1.19D-05	-3.90D-06	4.80D-06	1.16D-05	2.03D-05	2.77D-05	3.17D-05	3.32D-05	0.00D-01
1.450E-02	16	-1.66D-05	-1.16D-05	-3.98D-06	4.39D-06	1.10D-05	1.95D-05	2.69D-05	3.09D-05	3.24D-05	0.00D-01
1.350E-02	15	-1.60D-05	-1.13D-05	-4.04D-06	3.97D-06	1.03D-05	1.86D-05	2.59D-05	2.99D-05	3.15D-05	0.00D-01
1.250E-02	14	-1.53D-05	-1.09D-05	-4.08D-06	3.52D-06	9.62D-06	1.77D-05	2.49D-05	2.88D-05	3.04D-05	0.00D-01
1.150E-02	13	-1.45D-05	-1.05D-05	-4.09D-06	3.07D-06	8.87D-06	1.67D-05	2.37D-05	2.76D-05	2.92D-05	0.00D-01
1.050E-02	12	-1.37D-05	-9.98D-06	-4.07D-06	2.62D-06	8.09D-06	1.55D-05	2.24D-05	2.62D-05	2.78D-05	0.00D-01
9.500E-03	11	-1.28D-05	-9.42D-06	-4.01D-06	2.17D-06	7.29D-06	1.43D-05	2.09D-05	2.47D-05	2.62D-05	0.00D-01
8.500E-03	10	-1.18D-05	-8.79D-06	-3.90D-06	1.74D-06	6.46D-06	1.31D-05	1.93D-05	2.30D-05	2.45D-05	0.00D-01
7.000E-03	9	-1.03D-05	-7.75D-06	-3.66D-06	1.13D-06	5.20D-06	1.11D-05	1.67D-05	2.02D-05	2.16D-05	0.00D-01
5.500E-03	8	-8.41D-06	-6.46D-06	-3.23D-06	6.22D-07	3.95D-06	8.86D-06	1.37D-05	1.68D-05	1.81D-05	0.00D-01
4.500E-03	7	-7.09D-06	-5.52D-06	-2.86D-06	3.39D-07	3.14D-06	7.33D-06	1.16D-05	1.43D-05	1.55D-05	0.00D-01
3.500E-03	6	-5.68D-06	-4.47D-06	-2.40D-06	1.21D-07	2.35D-06	5.76D-06	9.30D-06	1.16D-05	1.26D-05	0.00D-01
2.500E-03	5	-4.18D-06	-3.33D-06	-1.84D-06	-2.15D-08	1.61D-06	4.15D-06	6.83D-06	8.61D-06	9.43D-06	0.00D-01
1.750E-03	4	-2.97D-06	-2.39D-06	-1.35D-06	-6.10D-08	1.09D-06	2.92D-06	4.86D-06	6.17D-06	6.78D-06	0.00D-01
1.250E-03	3	-2.14D-06	-1.73D-06	-9.83D-07	-6.25D-08	7.67D-07	2.09D-06	3.50D-06	4.46D-06	4.92D-06	0.00D-01
0.000E-01	2	-3.60D-12	-7.70D-12	-6.97D-12	-4.95D-13	-1.11D-11	-1.39D-11	-1.95D-11	-3.73D-13	-9.37D-12	0.00D-01
0.000E-01	1	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01	0.00D-01
	I =	34	35	36	37	38	39	40	41	42	43
	X =	1.17E-01	1.20E-01	1.24E-01	1.28E-01	1.31E-01	1.35E-01	1.39E-01	1.42E-01	1.44E-01	1.48E-01

--*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- HYDRAULIC HEAD...........(P) AT STEP 571, TIME = 1.8000E 04 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*

Y =	J =											
4.400E-02	43	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.300E-02	42	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.200E-02	41	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.100E-02	40	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.000E-02	39	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.900E-02	38	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.800E-02	37	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.700E-02	36	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.500E-02	35	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.400E-02	34	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.300E-02	33	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.200E-02	32	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.100E-02	31	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.000E-02	30	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.900E-02	29	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.800E-02	28	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.700E-02	27	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.600E-02	26	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.500E-02	25	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.400E-02	24	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.300E-02	23	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.100E-02	22	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.000E-02	21	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.900E-02	20	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.800E-02	19	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.700E-02	18	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.600E-02	17	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.500E-02	16	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.400E-02	15	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.300E-02	14	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.200E-02	13	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.100E-02	12	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-02	11	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
9.000E-03	10	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
8.000E-03	9	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
6.000E-03	8	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02

5.000E-03	7	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.000E-03	6	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.000E-03	5	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.000E-03	4	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.500E-03	3	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-03	2	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
-1.000E-03	1	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02

	I =	1	2	3	4	5	6	7	8	9	10	11
	X =	-2.00E-03	2.00E-03	4.00E-03	7.00E-03	1.10E-02	1.50E-02	1.80E-02	2.20E-02	2.60E-02	2.90E-02	3.30E-02
Y =	J =											
4.400E-02	43	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.300E-02	42	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.200E-02	41	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.100E-02	40	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.000E-02	39	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.900E-02	38	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.800E-02	37	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.700E-02	36	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.500E-02	35	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.400E-02	34	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.300E-02	33	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.200E-02	32	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.100E-02	31	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.000E-02	30	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.900E-02	29	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.800E-02	28	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.700E-02	27	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.600E-02	26	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.500E-02	25	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.400E-02	24	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.300E-02	23	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.100E-02	22	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.000E-02	21	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.900E-02	20	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.800E-02	19	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.700E-02	18	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.600E-02	17	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.500E-02	16	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.400E-02	15	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.300E-02	14	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.200E-02	13	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.100E-02	12	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-02	11	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
9.000E-03	10	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
8.000E-03	9	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
6.000E-03	8	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
5.000E-03	7	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.000E-03	6	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.000E-03	5	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.000E-03	4	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.500E-03	3	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-03	2	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
-1.000E-03	1	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02

	I =	12	13	14	15	16	17	18	19	20	21	22
	X =	3.60E-02	4.00E-02	4.40E-02	4.70E-02	5.10E-02	5.50E-02	5.80E-02	6.20E-02	6.60E-02	6.90E-02	7.30E-02
Y =	J =											
4.400E-02	43	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.300E-02	42	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.200E-02	41	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.100E-02	40	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.000E-02	39	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.900E-02	38	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.800E-02	37	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.700E-02	36	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02

3.500E-02	35	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.400E-02	34	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.300E-02	33	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.200E-02	32	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.100E-02	31	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.000E-02	30	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.900E-02	29	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.800E-02	28	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.700E-02	27	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.600E-02	26	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.500E-02	25	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.400E-02	24	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.300E-02	23	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.100E-02	22	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.000E-02	21	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.900E-02	20	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.800E-02	19	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.700E-02	18	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.600E-02	17	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.500E-02	16	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.400E-02	15	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.300E-02	14	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.200E-02	13	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.100E-02	12	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-02	11	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
9.000E-03	10	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
8.000E-03	9	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
6.000E-03	8	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
5.000E-03	7	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.000E-03	6	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.000E-03	5	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.000E-03	4	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.500E-03	3	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-03	2	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
-1.000E-03	1	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02

	I =	23	24	25	26	27	28	29	30	31	32	33
	X =	7.70E-02	8.00E-02	8.40E-02	8.80E-02	9.10E-02	9.50E-02	9.90E-02	1.02E-01	1.06E-01	1.09E-01	1.13E-01
Y =	J =											
4.400E-02	43	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
4.300E-02	42	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
4.200E-02	41	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
4.100E-02	40	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
4.000E-02	39	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.900E-02	38	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.800E-02	37	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.700E-02	36	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.500E-02	35	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.400E-02	34	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.300E-02	33	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.200E-02	32	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.100E-02	31	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
3.000E-02	30	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.900E-02	29	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.800E-02	28	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.700E-02	27	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.600E-02	26	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.500E-02	25	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.400E-02	24	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.300E-02	23	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.100E-02	22	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
2.000E-02	21	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
1.900E-02	20	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
1.800E-02	19	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
1.700E-02	18	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	
1.600E-02	17	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	

Y	J										
1.500E-02	16	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.400E-02	15	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.300E-02	14	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.200E-02	13	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.100E-02	12	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-02	11	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
9.000E-03	10	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
8.000E-03	9	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
6.000E-03	8	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
5.000E-03	7	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
4.000E-03	6	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
3.000E-03	5	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
2.000E-03	4	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.500E-03	3	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
1.000E-03	2	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
-1.000E-03	1	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02	4.40D-02
	I =	34	35	36	37	38	39	40	41	42	43
	X =	1.17E-01	1.20E-01	1.24E-01	1.28E-01	1.31E-01	1.35E-01	1.39E-01	1.42E-01	1.44E-01	1.48E-01

--*-*-*-*-*-*-*-*-*-*-*-*-*-*-*- TEMPERATURE..............(T) AT STEP 571, TIME = 1.8000E 04 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*

Y =	J =											
4.400E-02	43	2.50D 01	1.67D 01	1.67D 01	1.67D 01	1.67D 01	1.66D 01	1.66D 01	1.66D 01	1.65D 01	1.65D 01	1.65D 01
4.300E-02	42	1.70D 01	1.70D 01	1.70D 01	1.70D 01	1.70D 01	1.70D 01	1.71D 01	1.71D 01	1.71D 01	1.72D 01	1.72D 01
4.200E-02	41	1.73D 01	1.73D 01	1.73D 01	1.73D 01	1.74D 01	1.74D 01	1.75D 01	1.76D 01	1.77D 01	1.78D 01	1.79D 01
4.100E-02	40	1.76D 01	1.76D 01	1.76D 01	1.76D 01	1.77D 01	1.78D 01	1.79D 01	1.81D 01	1.83D 01	1.84D 01	1.87D 01
4.000E-02	39	1.79D 01	1.79D 01	1.79D 01	1.79D 01	1.80D 01	1.82D 01	1.83D 01	1.85D 01	1.88D 01	1.90D 01	1.93D 01
3.900E-02	38	1.82D 01	1.82D 01	1.82D 01	1.82D 01	1.83D 01	1.85D 01	1.87D 01	1.90D 01	1.93D 01	1.96D 01	2.00D 01
3.800E-02	37	1.84D 01	1.84D 01	1.84D 01	1.85D 01	1.86D 01	1.88D 01	1.91D 01	1.94D 01	1.98D 01	2.01D 01	2.06D 01
3.700E-02	36	1.87D 01	1.87D 01	1.87D 01	1.88D 01	1.89D 01	1.92D 01	1.94D 01	1.98D 01	2.03D 01	2.07D 01	2.12D 01
3.500E-02	35	1.91D 01	1.91D 01	1.92D 01	1.93D 01	1.95D 01	1.98D 01	2.01D 01	2.06D 01	2.11D 01	2.16D 01	2.23D 01
3.400E-02	34	1.94D 01	1.94D 01	1.94D 01	1.95D 01	1.97D 01	2.01D 01	2.04D 01	2.09D 01	2.15D 01	2.21D 01	2.28D 01
3.300E-02	33	1.96D 01	1.96D 01	1.96D 01	1.97D 01	2.00D 01	2.03D 01	2.07D 01	2.12D 01	2.19D 01	2.25D 01	2.33D 01
3.200E-02	32	1.98D 01	1.98D 01	1.98D 01	2.00D 01	2.02D 01	2.06D 01	2.10D 01	2.16D 01	2.23D 01	2.29D 01	2.37D 01
3.100E-02	31	2.00D 01	2.00D 01	2.00D 01	2.02D 01	2.04D 01	2.09D 01	2.12D 01	2.19D 01	2.26D 01	2.33D 01	2.41D 01
3.000E-02	30	2.02D 01	2.02D 01	2.03D 01	2.04D 01	2.07D 01	2.11D 01	2.15D 01	2.22D 01	2.29D 01	2.36D 01	2.45D 01
2.900E-02	29	2.04D 01	2.04D 01	2.05D 01	2.06D 01	2.09D 01	2.13D 01	2.18D 01	2.24D 01	2.32D 01	2.39D 01	2.49D 01
2.800E-02	28	2.06D 01	2.06D 01	2.07D 01	2.08D 01	2.11D 01	2.16D 01	2.20D 01	2.27D 01	2.35D 01	2.42D 01	2.52D 01
2.700E-02	27	2.08D 01	2.08D 01	2.09D 01	2.10D 01	2.13D 01	2.18D 01	2.22D 01	2.30D 01	2.38D 01	2.45D 01	2.55D 01
2.600E-02	26	2.10D 01	2.10D 01	2.11D 01	2.12D 01	2.15D 01	2.20D 01	2.25D 01	2.32D 01	2.40D 01	2.47D 01	2.57D 01
2.500E-02	25	2.12D 01	2.12D 01	2.13D 01	2.14D 01	2.17D 01	2.22D 01	2.27D 01	2.34D 01	2.43D 01	2.50D 01	2.59D 01
2.400E-02	24	2.14D 01	2.14D 01	2.14D 01	2.16D 01	2.19D 01	2.24D 01	2.29D 01	2.36D 01	2.45D 01	2.52D 01	2.61D 01
2.300E-02	23	2.16D 01	2.16D 01	2.16D 01	2.18D 01	2.21D 01	2.26D 01	2.31D 01	2.38D 01	2.47D 01	2.54D 01	2.63D 01
2.100E-02	22	2.20D 01	2.20D 01	2.20D 01	2.22D 01	2.25D 01	2.30D 01	2.34D 01	2.42D 01	2.50D 01	2.57D 01	2.66D 01
2.000E-02	21	2.21D 01	2.21D 01	2.22D 01	2.24D 01	2.27D 01	2.32D 01	2.36D 01	2.43D 01	2.51D 01	2.58D 01	2.67D 01
1.900E-02	20	2.23D 01	2.23D 01	2.24D 01	2.25D 01	2.29D 01	2.33D 01	2.38D 01	2.45D 01	2.53D 01	2.59D 01	2.68D 01
1.800E-02	19	2.25D 01	2.25D 01	2.26D 01	2.27D 01	2.30D 01	2.35D 01	2.39D 01	2.46D 01	2.54D 01	2.61D 01	2.69D 01
1.700E-02	18	2.27D 01	2.27D 01	2.28D 01	2.29D 01	2.32D 01	2.37D 01	2.41D 01	2.48D 01	2.55D 01	2.62D 01	2.70D 01
1.600E-02	17	2.29D 01	2.29D 01	2.30D 01	2.31D 01	2.34D 01	2.38D 01	2.42D 01	2.49D 01	2.56D 01	2.63D 01	2.71D 01
1.500E-02	16	2.31D 01	2.31D 01	2.32D 01	2.33D 01	2.36D 01	2.40D 01	2.44D 01	2.50D 01	2.58D 01	2.63D 01	2.72D 01
1.400E-02	15	2.33D 01	2.33D 01	2.33D 01	2.35D 01	2.38D 01	2.42D 01	2.45D 01	2.51D 01	2.58D 01	2.64D 01	2.72D 01
1.300E-02	14	2.35D 01	2.35D 01	2.35D 01	2.37D 01	2.39D 01	2.43D 01	2.47D 01	2.53D 01	2.59D 01	2.65D 01	2.72D 01
1.200E-02	13	2.37D 01	2.37D 01	2.37D 01	2.38D 01	2.41D 01	2.45D 01	2.48D 01	2.54D 01	2.60D 01	2.65D 01	2.73D 01
1.100E-02	12	2.39D 01	2.39D 01	2.39D 01	2.40D 01	2.43D 01	2.46D 01	2.49D 01	2.55D 01	2.61D 01	2.66D 01	2.73D 01
1.000E-02	11	2.40D 01	2.40D 01	2.41D 01	2.42D 01	2.44D 01	2.48D 01	2.51D 01	2.56D 01	2.62D 01	2.66D 01	2.73D 01
9.000E-03	10	2.42D 01	2.42D 01	2.43D 01	2.44D 01	2.46D 01	2.49D 01	2.52D 01	2.57D 01	2.62D 01	2.67D 01	2.74D 01
8.000E-03	9	2.44D 01	2.44D 01	2.44D 01	2.45D 01	2.47D 01	2.50D 01	2.53D 01	2.58D 01	2.63D 01	2.67D 01	2.74D 01
6.000E-03	8	2.47D 01	2.47D 01	2.47D 01	2.48D 01	2.50D 01	2.53D 01	2.55D 01	2.59D 01	2.64D 01	2.68D 01	2.74D 01
5.000E-03	7	2.48D 01	2.48D 01	2.48D 01	2.49D 01	2.51D 01	2.53D 01	2.56D 01	2.60D 01	2.64D 01	2.68D 01	2.74D 01
4.000E-03	6	2.49D 01	2.49D 01	2.50D 01	2.50D 01	2.52D 01	2.54D 01	2.57D 01	2.60D 01	2.65D 01	2.68D 01	2.74D 01
3.000E-03	5	2.50D 01	2.50D 01	2.50D 01	2.51D 01	2.53D 01	2.55D 01	2.57D 01	2.61D 01	2.65D 01	2.68D 01	2.74D 01
2.000E-03	4	2.51D 01	2.51D 01	2.51D 01	2.52D 01	2.53D 01	2.55D 01	2.57D 01	2.61D 01	2.65D 01	2.68D 01	2.74D 01
1.500E-03	3	2.51D 01	2.51D 01	2.51D 01	2.52D 01	2.53D 01	2.56D 01	2.58D 01	2.61D 01	2.65D 01	2.68D 01	2.74D 01
1.000E-03	2	2.51D 01	2.51D 01	2.51D 01	2.52D 01	2.54D 01	2.56D 01	2.58D 01	2.61D 01	2.65D 01	2.68D 01	2.74D 01

-1.000E-03	1	2.50D 01	2.51D 01	2.51D 01	2.52D 01	2.54D 01	2.56D 01	2.58D 01	2.61D 01	2.65D 01	2.68D 01	2.74D 01
	I =	1	2	3	4	5	6	7	8	9	10	11
	X =	-2.00E-03	2.00E-03	4.00E-03	7.00E-03	1.10E-02	1.50E-02	1.80E-02	2.20E-02	2.60E-02	2.90E-02	3.30E-02
Y =	J =											
4.400E-02	43	1.64D 01	1.64D 01	1.63D 01	1.63D 01	1.63D 01	1.62D 01	1.62D 01	1.62D 01	1.63D 01	1.63D 01	1.63D 01
4.300E-02	42	1.73D 01	1.73D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01
4.200E-02	41	1.81D 01	1.82D 01	1.84D 01	1.84D 01	1.85D 01	1.86D 01	1.86D 01	1.86D 01	1.86D 01	1.85D 01	1.84D 01
4.100E-02	40	1.88D 01	1.91D 01	1.93D 01	1.95D 01	1.96D 01	1.98D 01	1.98D 01	1.98D 01	1.97D 01	1.95D 01	1.93D 01
4.000E-02	39	1.96D 01	1.99D 01	2.03D 01	2.05D 01	2.07D 01	2.08D 01	2.09D 01	2.08D 01	2.07D 01	2.05D 01	2.02D 01
3.900E-02	38	2.03D 01	2.08D 01	2.12D 01	2.14D 01	2.17D 01	2.19D 01	2.19D 01	2.19D 01	2.17D 01	2.15D 01	2.11D 01
3.800E-02	37	2.10D 01	2.15D 01	2.20D 01	2.23D 01	2.27D 01	2.29D 01	2.29D 01	2.29D 01	2.27D 01	2.24D 01	2.20D 01
3.700E-02	36	2.17D 01	2.23D 01	2.28D 01	2.32D 01	2.36D 01	2.38D 01	2.38D 01	2.38D 01	2.35D 01	2.33D 01	2.27D 01
3.500E-02	35	2.29D 01	2.36D 01	2.43D 01	2.47D 01	2.51D 01	2.54D 01	2.55D 01	2.54D 01	2.51D 01	2.47D 01	2.41D 01
3.400E-02	34	2.34D 01	2.42D 01	2.49D 01	2.53D 01	2.58D 01	2.61D 01	2.62D 01	2.60D 01	2.57D 01	2.54D 01	2.47D 01
3.300E-02	33	2.39D 01	2.48D 01	2.55D 01	2.60D 01	2.64D 01	2.67D 01	2.68D 01	2.67D 01	2.63D 01	2.59D 01	2.53D 01
3.200E-02	32	2.44D 01	2.53D 01	2.60D 01	2.65D 01	2.70D 01	2.73D 01	2.73D 01	2.72D 01	2.68D 01	2.64D 01	2.57D 01
3.100E-02	31	2.48D 01	2.57D 01	2.65D 01	2.70D 01	2.75D 01	2.78D 01	2.78D 01	2.77D 01	2.73D 01	2.69D 01	2.62D 01
3.000E-02	30	2.52D 01	2.61D 01	2.69D 01	2.74D 01	2.79D 01	2.82D 01	2.82D 01	2.81D 01	2.77D 01	2.73D 01	2.65D 01
2.900E-02	29	2.56D 01	2.65D 01	2.73D 01	2.78D 01	2.83D 01	2.85D 01	2.86D 01	2.84D 01	2.80D 01	2.76D 01	2.68D 01
2.800E-02	28	2.59D 01	2.68D 01	2.76D 01	2.81D 01	2.86D 01	2.89D 01	2.89D 01	2.87D 01	2.83D 01	2.79D 01	2.71D 01
2.700E-02	27	2.62D 01	2.71D 01	2.79D 01	2.84D 01	2.89D 01	2.91D 01	2.92D 01	2.90D 01	2.86D 01	2.81D 01	2.74D 01
2.600E-02	26	2.64D 01	2.74D 01	2.82D 01	2.86D 01	2.91D 01	2.94D 01	2.94D 01	2.92D 01	2.88D 01	2.83D 01	2.76D 01
2.500E-02	25	2.67D 01	2.76D 01	2.84D 01	2.88D 01	2.93D 01	2.95D 01	2.96D 01	2.94D 01	2.89D 01	2.85D 01	2.77D 01
2.400E-02	24	2.69D 01	2.78D 01	2.86D 01	2.90D 01	2.95D 01	2.97D 01	2.97D 01	2.95D 01	2.91D 01	2.86D 01	2.79D 01
2.300E-02	23	2.70D 01	2.79D 01	2.87D 01	2.92D 01	2.96D 01	2.98D 01	2.98D 01	2.96D 01	2.92D 01	2.87D 01	2.80D 01
2.100E-02	22	2.73D 01	2.82D 01	2.89D 01	2.94D 01	2.98D 01	3.00D 01	3.00D 01	2.98D 01	2.93D 01	2.89D 01	2.82D 01
2.000E-02	21	2.74D 01	2.83D 01	2.90D 01	2.95D 01	2.99D 01	3.01D 01	3.01D 01	2.98D 01	2.94D 01	2.90D 01	2.83D 01
1.900E-02	20	2.75D 01	2.84D 01	2.91D 01	2.95D 01	3.00D 01	3.01D 01	3.01D 01	2.99D 01	2.94D 01	2.90D 01	2.83D 01
1.800E-02	19	2.76D 01	2.84D 01	2.92D 01	2.96D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.95D 01	2.90D 01	2.84D 01
1.700E-02	18	2.77D 01	2.85D 01	2.92D 01	2.96D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.95D 01	2.91D 01	2.84D 01
1.600E-02	17	2.77D 01	2.85D 01	2.92D 01	2.97D 01	3.01D 01	3.02D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.85D 01
1.500E-02	16	2.78D 01	2.86D 01	2.92D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.85D 01
1.400E-02	15	2.78D 01	2.86D 01	2.93D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.85D 01
1.300E-02	14	2.78D 01	2.86D 01	2.93D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.85D 01
1.200E-02	13	2.78D 01	2.86D 01	2.93D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.86D 01
1.100E-02	12	2.79D 01	2.86D 01	2.93D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.86D 01
1.000E-02	11	2.79D 01	2.86D 01	2.92D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.86D 01
9.000E-03	10	2.79D 01	2.86D 01	2.92D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.86D 01
8.000E-03	9	2.79D 01	2.85D 01	2.92D 01	2.97D 01	3.01D 01	3.03D 01	3.02D 01	3.00D 01	2.95D 01	2.91D 01	2.86D 01
6.000E-03	8	2.78D 01	2.85D 01	2.92D 01	2.96D 01	3.01D 01	3.03D 01	3.02D 01	2.99D 01	2.95D 01	2.91D 01	2.86D 01
5.000E-03	7	2.78D 01	2.85D 01	2.91D 01	2.96D 01	3.01D 01	3.03D 01	3.02D 01	2.99D 01	2.95D 01	2.91D 01	2.86D 01
4.000E-03	6	2.78D 01	2.85D 01	2.91D 01	2.96D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.95D 01	2.91D 01	2.86D 01
3.000E-03	5	2.78D 01	2.85D 01	2.91D 01	2.96D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.95D 01	2.91D 01	2.86D 01
2.000E-03	4	2.78D 01	2.84D 01	2.91D 01	2.96D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.95D 01	2.91D 01	2.86D 01
1.500E-03	3	2.78D 01	2.84D 01	2.91D 01	2.95D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.95D 01	2.91D 01	2.86D 01
1.000E-03	2	2.78D 01	2.84D 01	2.91D 01	2.95D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.94D 01	2.91D 01	2.86D 01
-1.000E-03	1	2.78D 01	2.84D 01	2.91D 01	2.95D 01	3.00D 01	3.02D 01	3.02D 01	2.99D 01	2.94D 01	2.91D 01	2.86D 01
	I =	12	13	14	15	16	17	18	19	20	21	22
	X =	3.60E-02	4.00E-02	4.40E-02	4.70E-02	5.10E-02	5.50E-02	5.80E-02	6.20E-02	6.60E-02	6.90E-02	7.30E-02
Y =	J =											
4.400E-02	43	1.64D 01	1.64D 01	1.65D 01	1.65D 01	1.66D 01	1.66D 01	1.66D 01	1.66D 01	1.66D 01	1.66D 01	1.66D 01
4.300E-02	42	1.73D 01	1.73D 01	1.72D 01	1.71D 01	1.71D 01	1.71D 01	1.70D 01	1.70D 01	1.71D 01	1.71D 01	1.71D 01
4.200E-02	41	1.82D 01	1.81D 01	1.79D 01	1.77D 01	1.76D 01	1.75D 01	1.74D 01	1.74D 01	1.75D 01	1.75D 01	1.77D 01
4.100E-02	40	1.91D 01	1.88D 01	1.85D 01	1.83D 01	1.81D 01	1.79D 01	1.78D 01	1.78D 01	1.79D 01	1.80D 01	1.82D 01
4.000E-02	39	1.99D 01	1.96D 01	1.92D 01	1.88D 01	1.86D 01	1.83D 01	1.82D 01	1.82D 01	1.83D 01	1.84D 01	1.87D 01
3.900E-02	38	2.07D 01	2.03D 01	1.98D 01	1.93D 01	1.90D 01	1.87D 01	1.86D 01	1.85D 01	1.87D 01	1.88D 01	1.92D 01
3.800E-02	37	2.14D 01	2.10D 01	2.04D 01	1.98D 01	1.94D 01	1.91D 01	1.89D 01	1.89D 01	1.90D 01	1.92D 01	1.96D 01
3.700E-02	36	2.21D 01	2.16D 01	2.09D 01	2.03D 01	1.99D 01	1.94D 01	1.92D 01	1.92D 01	1.94D 01	1.96D 01	2.01D 01
3.500E-02	35	2.34D 01	2.28D 01	2.19D 01	2.11D 01	2.06D 01	2.01D 01	1.99D 01	1.98D 01	2.00D 01	2.03D 01	2.09D 01
3.400E-02	34	2.39D 01	2.33D 01	2.24D 01	2.15D 01	2.10D 01	2.04D 01	2.02D 01	2.01D 01	2.03D 01	2.07D 01	2.13D 01
3.300E-02	33	2.44D 01	2.37D 01	2.28D 01	2.19D 01	2.13D 01	2.07D 01	2.04D 01	2.04D 01	2.07D 01	2.10D 01	2.17D 01
3.200E-02	32	2.49D 01	2.42D 01	2.32D 01	2.23D 01	2.17D 01	2.10D 01	2.07D 01	2.07D 01	2.09D 01	2.13D 01	2.20D 01
3.100E-02	31	2.53D 01	2.45D 01	2.35D 01	2.26D 01	2.20D 01	2.13D 01	2.10D 01	2.10D 01	2.12D 01	2.16D 01	2.23D 01
3.000E-02	30	2.56D 01	2.49D 01	2.39D 01	2.29D 01	2.23D 01	2.16D 01	2.13D 01	2.13D 01	2.15D 01	2.19D 01	2.26D 01

2.900E-02	29	2.59D 01	2.52D 01	2.42D 01	2.32D 01	2.25D 01	2.19D 01	2.15D 01	2.15D 01	2.18D 01	2.22D 01	2.29D 01
2.800E-02	28	2.62D 01	2.55D 01	2.44D 01	2.34D 01	2.28D 01	2.22D 01	2.18D 01	2.18D 01	2.20D 01	2.24D 01	2.32D 01
2.700E-02	27	2.65D 01	2.57D 01	2.47D 01	2.37D 01	2.31D 01	2.24D 01	2.21D 01	2.20D 01	2.23D 01	2.27D 01	2.34D 01
2.600E-02	26	2.67D 01	2.59D 01	2.49D 01	2.39D 01	2.33D 01	2.27D 01	2.23D 01	2.23D 01	2.25D 01	2.29D 01	2.37D 01
2.500E-02	25	2.68D 01	2.61D 01	2.51D 01	2.42D 01	2.35D 01	2.29D 01	2.26D 01	2.25D 01	2.28D 01	2.32D 01	2.39D 01
2.400E-02	24	2.70D 01	2.63D 01	2.53D 01	2.44D 01	2.38D 01	2.31D 01	2.28D 01	2.28D 01	2.30D 01	2.34D 01	2.41D 01
2.300E-02	23	2.71D 01	2.64D 01	2.55D 01	2.46D 01	2.40D 01	2.34D 01	2.30D 01	2.30D 01	2.32D 01	2.36D 01	2.43D 01
2.100E-02	22	2.74D 01	2.67D 01	2.58D 01	2.49D 01	2.44D 01	2.38D 01	2.35D 01	2.35D 01	2.37D 01	2.40D 01	2.47D 01
2.000E-02	21	2.75D 01	2.68D 01	2.60D 01	2.51D 01	2.46D 01	2.40D 01	2.37D 01	2.37D 01	2.39D 01	2.42D 01	2.49D 01
1.900E-02	20	2.75D 01	2.69D 01	2.61D 01	2.53D 01	2.48D 01	2.42D 01	2.40D 01	2.39D 01	2.41D 01	2.45D 01	2.51D 01
1.800E-02	19	2.76D 01	2.70D 01	2.62D 01	2.55D 01	2.50D 01	2.45D 01	2.42D 01	2.42D 01	2.43D 01	2.46D 01	2.52D 01
1.700E-02	18	2.77D 01	2.71D 01	2.63D 01	2.56D 01	2.52D 01	2.47D 01	2.44D 01	2.44D 01	2.46D 01	2.48D 01	2.54D 01
1.600E-02	17	2.77D 01	2.72D 01	2.65D 01	2.58D 01	2.53D 01	2.49D 01	2.46D 01	2.46D 01	2.48D 01	2.50D 01	2.56D 01
1.500E-02	16	2.78D 01	2.73D 01	2.66D 01	2.59D 01	2.55D 01	2.51D 01	2.48D 01	2.48D 01	2.50D 01	2.52D 01	2.57D 01
1.400E-02	15	2.79D 01	2.73D 01	2.67D 01	2.61D 01	2.57D 01	2.53D 01	2.51D 01	2.50D 01	2.52D 01	2.54D 01	2.59D 01
1.300E-02	14	2.79D 01	2.74D 01	2.68D 01	2.62D 01	2.59D 01	2.55D 01	2.53D 01	2.52D 01	2.54D 01	2.56D 01	2.60D 01
1.200E-02	13	2.79D 01	2.75D 01	2.69D 01	2.64D 01	2.60D 01	2.57D 01	2.55D 01	2.54D 01	2.56D 01	2.58D 01	2.62D 01
1.100E-02	12	2.80D 01	2.75D 01	2.70D 01	2.65D 01	2.62D 01	2.58D 01	2.57D 01	2.56D 01	2.57D 01	2.59D 01	2.63D 01
1.000E-02	11	2.80D 01	2.76D 01	2.71D 01	2.66D 01	2.63D 01	2.60D 01	2.58D 01	2.58D 01	2.59D 01	2.61D 01	2.64D 01
9.000E-03	10	2.80D 01	2.77D 01	2.72D 01	2.67D 01	2.65D 01	2.62D 01	2.60D 01	2.60D 01	2.61D 01	2.62D 01	2.66D 01
8.000E-03	9	2.81D 01	2.77D 01	2.72D 01	2.68D 01	2.66D 01	2.63D 01	2.62D 01	2.62D 01	2.62D 01	2.64D 01	2.67D 01
6.000E-03	8	2.81D 01	2.78D 01	2.74D 01	2.70D 01	2.68D 01	2.66D 01	2.65D 01	2.64D 01	2.65D 01	2.66D 01	2.69D 01
5.000E-03	7	2.81D 01	2.78D 01	2.74D 01	2.71D 01	2.69D 01	2.67D 01	2.66D 01	2.66D 01	2.66D 01	2.67D 01	2.70D 01
4.000E-03	6	2.82D 01	2.78D 01	2.75D 01	2.72D 01	2.70D 01	2.68D 01	2.67D 01	2.67D 01	2.67D 01	2.68D 01	2.70D 01
3.000E-03	5	2.82D 01	2.79D 01	2.75D 01	2.72D 01	2.70D 01	2.69D 01	2.68D 01	2.67D 01	2.68D 01	2.69D 01	2.71D 01
2.000E-03	4	2.82D 01	2.79D 01	2.75D 01	2.72D 01	2.71D 01	2.69D 01	2.68D 01	2.68D 01	2.69D 01	2.69D 01	2.71D 01
1.500E-03	3	2.82D 01	2.79D 01	2.75D 01	2.73D 01	2.71D 01	2.69D 01	2.68D 01	2.68D 01	2.69D 01	2.70D 01	2.72D 01
1.000E-03	2	2.82D 01	2.79D 01	2.75D 01	2.73D 01	2.71D 01	2.69D 01	2.69D 01	2.68D 01	2.69D 01	2.70D 01	2.72D 01
-1.000E-03	1	2.82D 01	2.79D 01	2.75D 01	2.73D 01	2.71D 01	2.69D 01	2.69D 01	2.68D 01	2.69D 01	2.70D 01	2.72D 01

	I =	23	24	25	26	27	28	29	30	31	32	33
	X =	7.70E-02	8.00E-02	8.40E-02	8.80E-02	9.10E-02	9.50E-02	9.90E-02	1.02E-01	1.06E-01	1.09E-01	1.13E-01
Y =	J =											
4.400E-02	43	1.65D 01	1.65D 01	1.64D 01	1.64D 01	1.63D 01	1.63D 01	1.63D 01	1.62D 01	1.62D 01	2.50D 01	
4.300E-02	42	1.72D 01	1.72D 01	1.73D 01	1.73D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	1.74D 01	
4.200E-02	41	1.78D 01	1.79D 01	1.81D 01	1.83D 01	1.84D 01	1.85D 01	1.86D 01	1.86D 01	1.86D 01	1.86D 01	
4.100E-02	40	1.84D 01	1.86D 01	1.89D 01	1.92D 01	1.93D 01	1.95D 01	1.97D 01	1.98D 01	1.98D 01	1.98D 01	
4.000E-02	39	1.90D 01	1.93D 01	1.97D 01	2.00D 01	2.03D 01	2.06D 01	2.08D 01	2.09D 01	2.09D 01	2.09D 01	
3.900E-02	38	1.96D 01	1.99D 01	2.04D 01	2.09D 01	2.12D 01	2.15D 01	2.18D 01	2.19D 01	2.20D 01	2.20D 01	
3.800E-02	37	2.01D 01	2.05D 01	2.11D 01	2.17D 01	2.20D 01	2.25D 01	2.28D 01	2.29D 01	2.30D 01	2.30D 01	
3.700E-02	36	2.07D 01	2.11D 01	2.18D 01	2.24D 01	2.28D 01	2.33D 01	2.37D 01	2.38D 01	2.39D 01	2.39D 01	
3.500E-02	35	2.16D 01	2.22D 01	2.30D 01	2.37D 01	2.43D 01	2.48D 01	2.53D 01	2.55D 01	2.55D 01	2.55D 01	
3.400E-02	34	2.21D 01	2.27D 01	2.35D 01	2.43D 01	2.49D 01	2.55D 01	2.60D 01	2.62D 01	2.62D 01	2.62D 01	
3.300E-02	33	2.25D 01	2.31D 01	2.40D 01	2.49D 01	2.54D 01	2.61D 01	2.66D 01	2.68D 01	2.69D 01	2.69D 01	
3.200E-02	32	2.28D 01	2.35D 01	2.45D 01	2.54D 01	2.60D 01	2.66D 01	2.71D 01	2.74D 01	2.74D 01	2.74D 01	
3.100E-02	31	2.32D 01	2.39D 01	2.49D 01	2.58D 01	2.64D 01	2.71D 01	2.76D 01	2.78D 01	2.79D 01	2.79D 01	
3.000E-02	30	2.35D 01	2.43D 01	2.53D 01	2.62D 01	2.68D 01	2.75D 01	2.80D 01	2.83D 01	2.84D 01	2.84D 01	
2.900E-02	29	2.38D 01	2.46D 01	2.56D 01	2.65D 01	2.72D 01	2.79D 01	2.84D 01	2.86D 01	2.87D 01	2.87D 01	
2.800E-02	28	2.41D 01	2.49D 01	2.59D 01	2.68D 01	2.75D 01	2.82D 01	2.87D 01	2.90D 01	2.90D 01	2.90D 01	
2.700E-02	27	2.44D 01	2.51D 01	2.61D 01	2.71D 01	2.77D 01	2.85D 01	2.90D 01	2.92D 01	2.93D 01	2.93D 01	
2.600E-02	26	2.46D 01	2.54D 01	2.64D 01	2.73D 01	2.80D 01	2.87D 01	2.92D 01	2.95D 01	2.95D 01	2.95D 01	
2.500E-02	25	2.48D 01	2.56D 01	2.66D 01	2.75D 01	2.82D 01	2.89D 01	2.94D 01	2.97D 01	2.97D 01	2.97D 01	
2.400E-02	24	2.50D 01	2.58D 01	2.68D 01	2.77D 01	2.83D 01	2.90D 01	2.96D 01	2.98D 01	2.99D 01	2.99D 01	
2.300E-02	23	2.52D 01	2.59D 01	2.69D 01	2.79D 01	2.85D 01	2.92D 01	2.97D 01	2.99D 01	3.00D 01	3.00D 01	
2.100E-02	22	2.56D 01	2.62D 01	2.72D 01	2.81D 01	2.87D 01	2.94D 01	2.99D 01	3.01D 01	3.02D 01	3.02D 01	
2.000E-02	21	2.57D 01	2.64D 01	2.73D 01	2.82D 01	2.88D 01	2.94D 01	3.00D 01	3.02D 01	3.03D 01	3.03D 01	
1.900E-02	20	2.59D 01	2.65D 01	2.74D 01	2.82D 01	2.88D 01	2.95D 01	3.00D 01	3.03D 01	3.03D 01	3.03D 01	
1.800E-02	19	2.60D 01	2.66D 01	2.75D 01	2.83D 01	2.89D 01	2.95D 01	3.01D 01	3.03D 01	3.04D 01	3.04D 01	
1.700E-02	18	2.61D 01	2.67D 01	2.75D 01	2.84D 01	2.89D 01	2.96D 01	3.01D 01	3.03D 01	3.04D 01	3.04D 01	
1.600E-02	17	2.63D 01	2.68D 01	2.76D 01	2.84D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.04D 01	3.04D 01	
1.500E-02	16	2.64D 01	2.69D 01	2.77D 01	2.84D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01	
1.400E-02	15	2.65D 01	2.70D 01	2.77D 01	2.85D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01	
1.300E-02	14	2.66D 01	2.71D 01	2.78D 01	2.85D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01	
1.200E-02	13	2.67D 01	2.72D 01	2.78D 01	2.85D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01	
1.100E-02	12	2.68D 01	2.72D 01	2.79D 01	2.85D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01	
1.000E-02	11	2.69D 01	2.73D 01	2.79D 01	2.85D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01	

9.000E-03	10	2.70D 01	2.74D 01	2.79D 01	2.85D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01
8.000E-03	9	2.71D 01	2.74D 01	2.80D 01	2.86D 01	2.90D 01	2.96D 01	3.01D 01	3.04D 01	3.05D 01	3.05D 01
6.000E-03	8	2.72D 01	2.75D 01	2.80D 01	2.86D 01	2.90D 01	2.96D 01	3.01D 01	3.03D 01	3.05D 01	3.05D 01
5.000E-03	7	2.73D 01	2.76D 01	2.80D 01	2.86D 01	2.90D 01	2.96D 01	3.01D 01	3.03D 01	3.05D 01	3.05D 01
4.000E-03	6	2.73D 01	2.76D 01	2.81D 01	2.86D 01	2.90D 01	2.95D 01	3.00D 01	3.03D 01	3.04D 01	3.04D 01
3.000E-03	5	2.74D 01	2.76D 01	2.81D 01	2.86D 01	2.90D 01	2.95D 01	3.00D 01	3.03D 01	3.04D 01	3.04D 01
2.000E-03	4	2.74D 01	2.77D 01	2.81D 01	2.86D 01	2.90D 01	2.95D 01	3.00D 01	3.03D 01	3.04D 01	3.04D 01
1.500E-03	3	2.74D 01	2.77D 01	2.81D 01	2.86D 01	2.90D 01	2.95D 01	3.00D 01	3.03D 01	3.04D 01	3.04D 01
1.000E-03	2	2.74D 01	2.77D 01	2.81D 01	2.86D 01	2.90D 01	2.95D 01	3.00D 01	3.03D 01	3.04D 01	3.04D 01
-1.000E-03	1	2.74D 01	2.77D 01	2.81D 01	2.86D 01	2.90D 01	2.95D 01	3.00D 01	3.03D 01	3.04D 01	2.50D 01

I =	34	35	36	37	38	39	40	41	42	43
X =	1.17E-01	1.20E-01	1.24E-01	1.28E-01	1.31E-01	1.35E-01	1.39E-01	1.42E-01	1.44E-01	1.48E-01

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NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)
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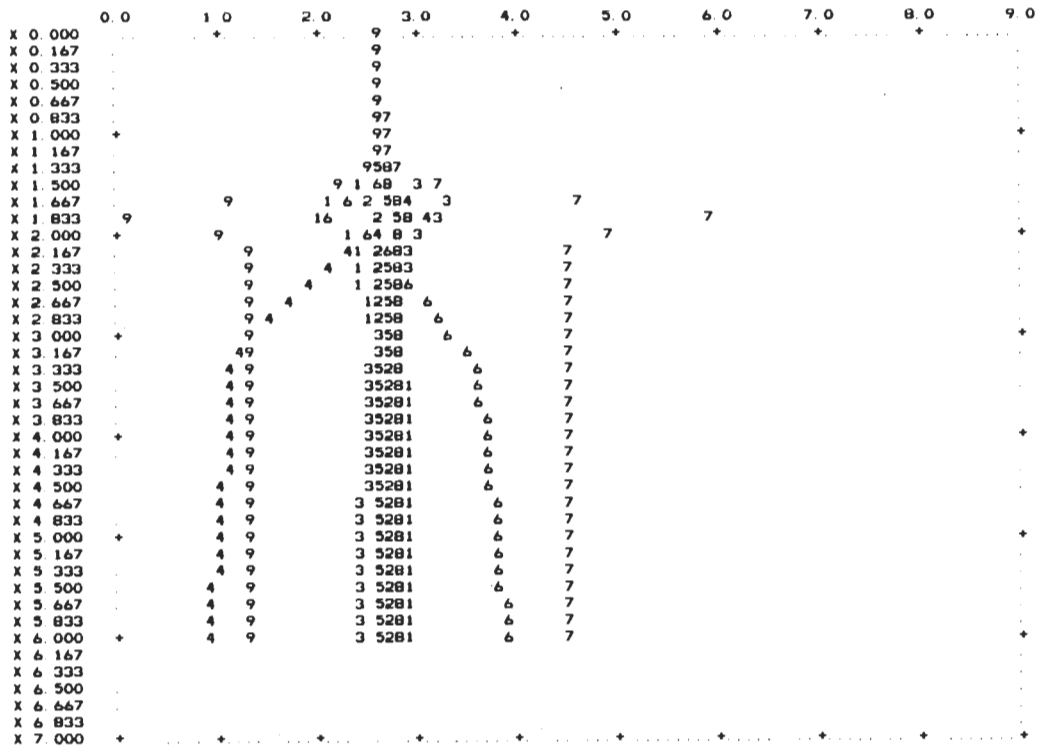
PROGRAM CONSTANTS, CONTROL PARAMETERS, AND REFERENCE VALUES
--------------------------------------------------------------
    START TIME ..............................(TIME) =  1.800E 04
    MAX. SPECIFIED TIME AT THIS STAGE .(TIMAX) =  1.800E 04
    STARTING TIME STEP ..................(DT) =  5.000E 01
    TIME STEP GROWTH FACTOR ...........(DTFAC) =  1.000E 00
    MAXIMUM TIME STEP ...................(DTMAX) =  5.000E 01
    MAXIMUM NUMBER OF STEPS ..........(MXSTEP) =      10000
    FLUID SPECIFIC HEAT.....................(CF) =  4.174E 06
    VISCOSITY COEFFICIENT...............(VSCN) =  1.436E 03
    BASE TEMPERATURE FOR VISCOSITY.......(TMU) =  2.685E 01
    HYDRAULIC CONDUCTIVITY INDEX .......(IKH) =      3
    RADIAL GEOMETRY INDEX...............(IRAD) =      1
    TIME HISTORY PLOT FILE UNIT.......(NPLT1) =      7
    CONTOUR PLOT FILE UNIT.............(NPLT2) =      8
    VELOCITY FIELD PLOT FILE UNIT......(NPLT3) =      9
    MASS FLUX PLOT FILE UNIT...........(NPLT4) =     11

         VALUES AT REFERENCE GRID NODE(13,13)
         X-VELOCITY COMPONENT.....(U) =  1.785D-05
         Y-VELOCITY COMPONENT.....(V) =  3.493D-06
         HYDRAULIC HEAD.  .  .....(P) =  4.399D-02
         TEMPERATURE.  .  .  .....(T) =  2.859D 01
         CONCENTRATION.  .  .  ...(C) =  0.000D-01
         POROSITY.  .  .  .  .  .(POR) =  3.940E-01
         ZONE NUMBER.  .  .  .  (ZONE) =  2.000E 00
         ELEMENT VOLUME.  .  .  (VOL) =  1.600E-07
         DENSITY DEFICIT  .  .(DRHO) = -9.819D-04
         STORATIVITY.  .  .  .(STOR) =  1.000E 04
         X-PERMEABILITY  .  .  (DPX) =  7.764E-02
         Y-PERMEABILITY.  .  .  (DPY) =  7.828E-02
         PRESSURE SOURCE.  .  .(SP) =  0.000E-01
         PREVIOUS VALUE OF P...(POLD) =  4.399D-02
         HEAT CAPACITY OF ROCK...(CP) =  2.765E 06
         X-THERMAL CONDUCTIVITY.(DTX) =  8.851E-01
         Y-THERMAL CONDUCTIVITY.(DTY) =  8.851E-01
         THERMAL SOURCE.  .  .  (ST) =  2.726E-03
         PREVIOUS VALUE OF T...(TOLD) =  2.858E 01
         RETARDATION FACTOR.  .  (RD) =  1.000E 00
         X-MASS DISPERSION COEF.(DCX) =  0.000E-01
         Y-MASS DISPERSION COEF.(DCY) =  0.000E-01
         MASS SOURCE  .  .  .  .(SC) =  0.000E-01
         MASS DECAY RATE.  .  .(CR) =  0.000E-01
         PREVIOUS VALUE OF C..(COLD) =  0.000E-01
         X-CELL FACE  .  .  .(AREAX) =  3.800E-05
         Y-CELL FACE.  .  .  .(AREAY) =  1.600E-04
         HORIZONTAL FLOW.  .(FLOWX) =  6.783D-10
         VERTICAL FLOW.  .  .(FLOWY) =  5.588D-10
         INITIAL DENSITY.  .(ROZERO) =  0.000E-01
```

NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)

SYMBOL	NAME	MIN. VALUE	MAX. VALUE	SCALE
X	TIME	1.000E-01	1.800E 04	3.000E 03
1	U(3, 3)	-1.297E-05	5.355E-06	
2	U(3,21)	-3.085E-06	4.328E-07	
3	U(3,39)	-4.088E-06	1.370E-05	
4	U(21, 3)	-3.473E-05	1.135E-05	
5	U(21,21)	-1.868E-06	2.808E-06	
6	U(21,39)	-1.163E-05	2.462E-05	
7	U(39, 3)	-1.446E-08	6.668E-05	
8	U(39,21)	-1.204E-07	5.651E-06	
9	U(39,39)	-5.290E-05	8.491E-09	
ABOVE	Y-AXES	-5.290E-05	6.668E-05	2.000E-05

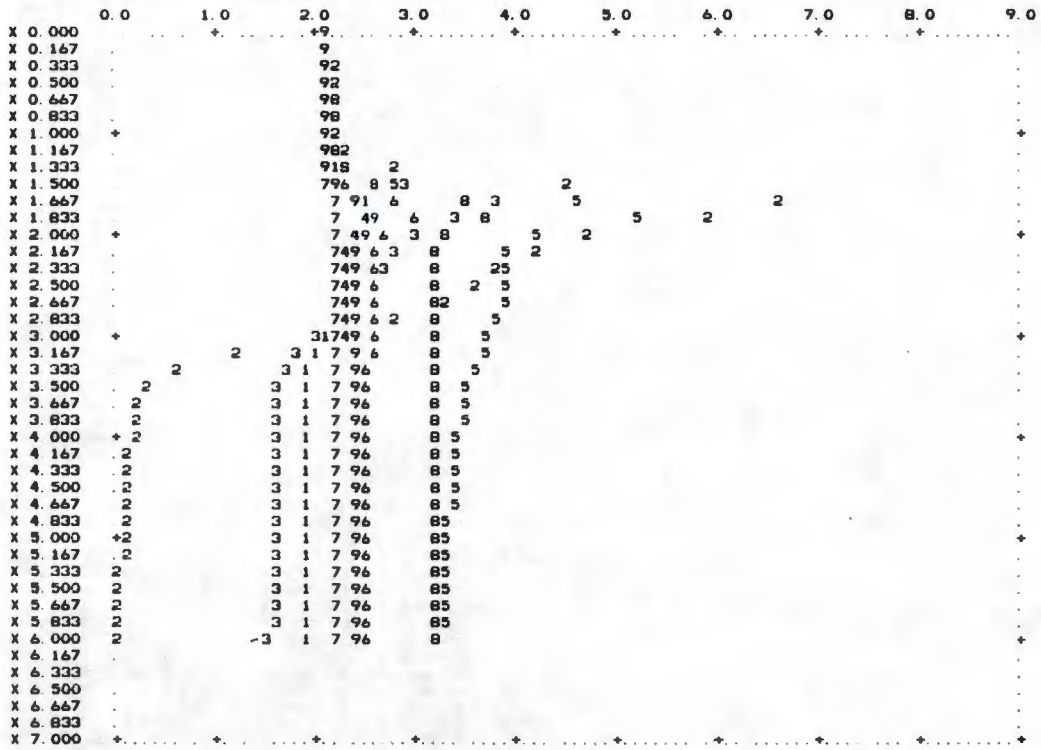
NOTE 1. ACTUAL VALUE = MIN. VALUE + PRINTED VALUE * SCALE
2. SCALE IS IN UNITS PER INCH



NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)

SYMBOL	NAME	MIN. VALUE	MAX. VALUE	SCALE
X	TIME	1.000E-01	1.800E 04	3.000E 03
1	V(3, 3)	-4.544E-06	1.041E-05	
2	V(3,21)	-4.184E-05	9.246E-05	
3	V(3,39)	-1.090E-05	3.665E-05	
4	V(21, 3)	-2.307E-08	8.814E-06	
5	V(21,21)	2.989E-07	6.839E-05	
6	V(21,39)	-3.931E-06	2.216E-05	
7	V(39, 3)	-3.651E-06	3.344E-06	
8	V(39,21)	6.825E-08	3.630E-05	
9	V(39,39)	-4.128E-06	1.281E-05	
ABOVE	Y-AXES	-4.184E-05	9.246E-05	2.000E-05

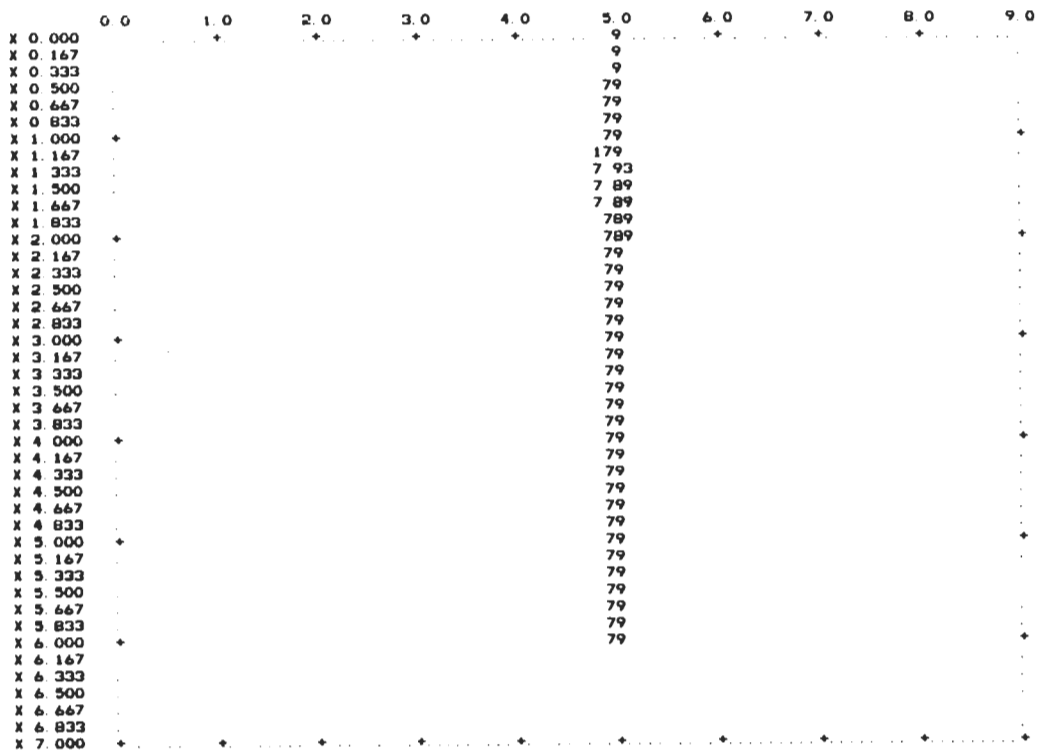
NOTE 1. ACTUAL VALUE = MIN. VALUE + PRINTED VALUE * SCALE
2. SCALE IS IN UNITS PER INCH



NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)

SYMBOL	NAME	MIN. VALUE	MAX. VALUE	SCALE
X	TIME	1.000E-01	1.800E 04	3.000E 03
1	P(3, 3)	4.396E-02	4.400E-02	
2	P(3,21)	4.400E-02	4.401E-02	
3	P(3,39)	4.399E-02	4.403E-02	
4	P(21, 3)	4.396E-02	4.400E-02	
5	P(21,21)	4.400E-02	4.401E-02	
6	P(21,39)	4.400E-02	4.402E-02	
7	P(39, 3)	4.396E-02	4.400E-02	
8	P(39,21)	4.400E-02	4.401E-02	
9	P(39,39)	4.400E-02	4.402E-02	
ABOVE	Y-AXES	4.300E-02	4.403E-02	2.000E-04

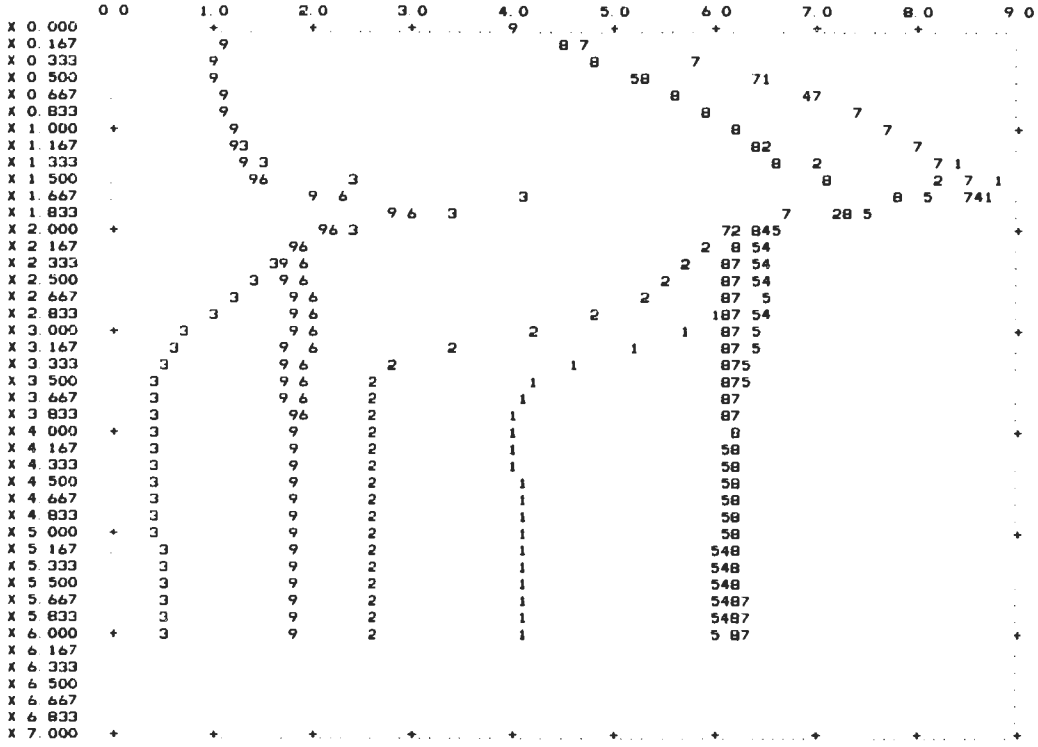
NOTE 1. ACTUAL VALUE = MIN. VALUE + PRINTED VALUE * SCALE
2. SCALE IS IN UNITS PER INCH



NATURAL CONVECTION WITH INTERNAL HEATING (Rayleigh Number = 68)

SYMBOL	NAME	MIN. VALUE	MAX. VALUE	SCALE
X	TIME	1.000E-01	1.800E 04	3.000E 03
1	T(3, 3)	2.503E 01	3.472E 01	
2	T(3,21)	2.215E 01	3.423E 01	
3	T(3,39)	1.789E 01	2.530E 01	
4	T(21, 3)	2.503E 01	3.428E 01	
5	T(21,21)	2.503E 01	3.337E 01	
6	T(21,39)	1.896E 01	2.503E 01	
7	T(39, 3)	2.503E 01	3.419E 01	
8	T(39,21)	2.503E 01	3.272E 01	
9	T(39,39)	1.896E 01	2.503E 01	
ABOVE	Y-AXES	1.700E 01	3.472E 01	2.000E 00

NOTE 1. ACTUAL VALUE = MIN. VALUE + PRINTED VALUE * SCALE
2. SCALE IS IN UNITS PER INCH



```
*****************************************************************************

                THIS OUTPUT IS PRODUCED BY THE COMPUTATIONAL MODEL

                ------------------ P O R F L O -------------------

              FOR TRANSIENT OR ASYMPTOTICALLY STEADY STATE ANALYSIS
                OF FLUID FLOW, THERMAL ENERGY AND MASS TRANSPORT
                      IN POROUS OR EQUIVALENT POROUS MEDIA
                  WITH ANISOTROPIC AND INHOMOGENIOUS PROPERTIES
                  IN 2-D CARTESIAN OR 3-D AXI-SYMMETRIC GEOMETRY

                         VERSION 5.6 , DATED:  7 JAN. 1983

                DATE RUN - MON. OCT 24 1983   TIME RUN - 18:27:29

*****************************************************************************

-----------------------------------------------------------------------------
RECORD OF INPUT DATA STREAM
-----------------------------------------------------------------------------
*** RECORD NO 104 DATA INPUT *****  QUIT
```

APPENDIX E

POSTPROCESSOR GRAPHICS

The PORFLO compatible interactive contour postprocessor provides the capability of contouring h, T, and C over any subset of a domain at user-specified time planes. The PORFLO compatible interactive pathline postprocessor allows plotting of groundwater trajectories emanating from selected nodes at a user-specified time plane. Together these two packages offer a substantial complement of options for rapid and convenient display and examination of results from PORFLO simulations.

Sample contour plots are shown in Figures E-1 and E-2. Figure E-1 shows the steady-state temperature distribution for the Buretta case, while Figure E-2 is a plot of the steady-state head distribution for the same. Forward and reverse streamlines starting from a row of nodes at the steady-state time plane for the Buretta case are shown in Figure E-3. These plots are typical of working-quality plots that one may obtain to characterize PORFLO results. Furthermore, they are representative of commonly used plotting options, of which a broad range is available.

Other graphic postprocessors also exist, but are not illustrated here. In particular, a program is available to plot time history of h, T, and C at selected nodes over a specified increment of simulation time. Another program provides a means of plotting the cross-sectional profiles of h, T, and C along horizontal or vertical segments of grid lines at user-specified times. Both of these supplemental processors use the same plot file as the contouring package. A fifth postprocessor uses the mass flux plot file as input and provides the user the options of plotting time history of mass flux or fractional radionuclide release rate at the user-specified horizontal and vertical flux boundaries.

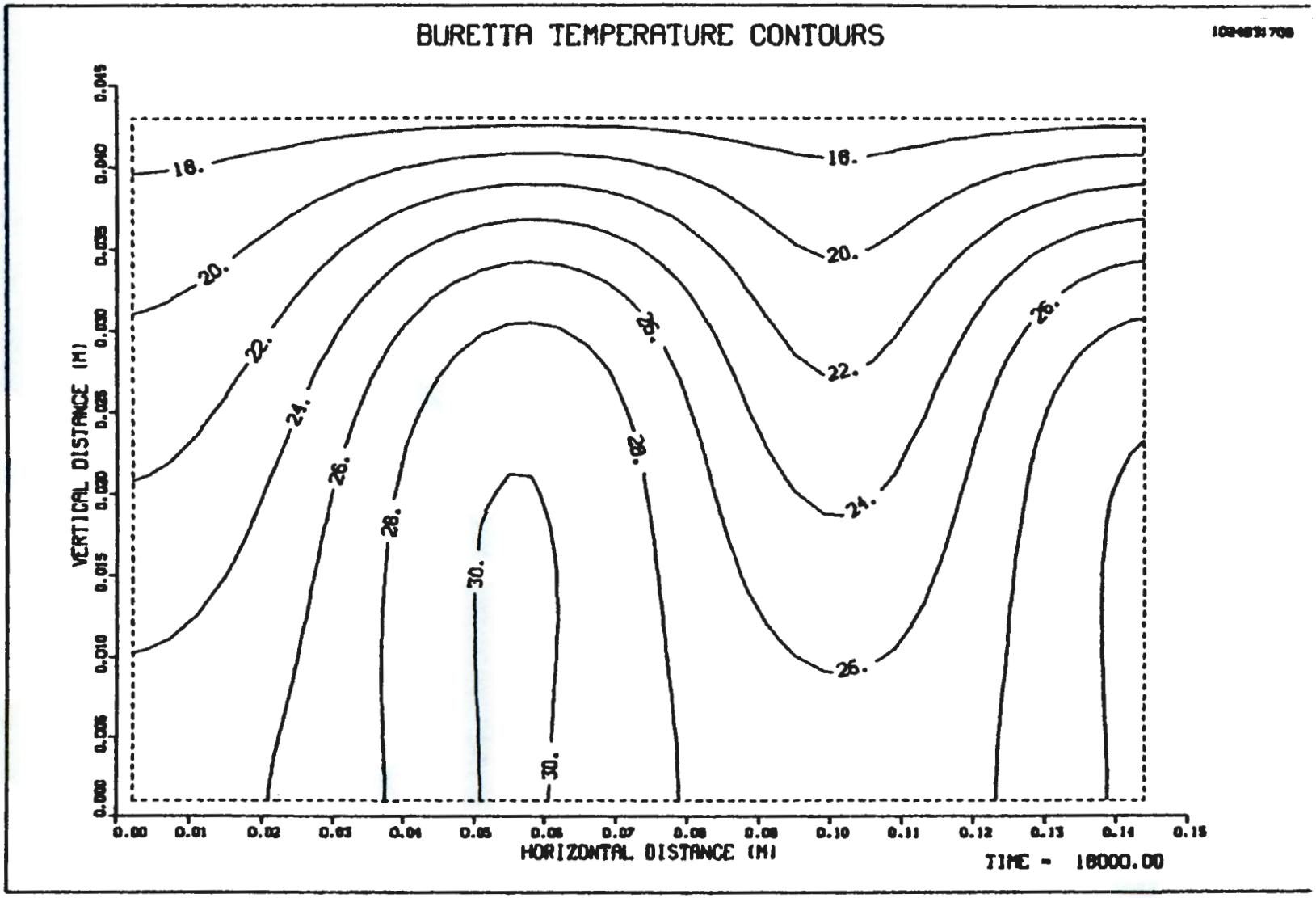


FIGURE E-1. Buretta Temperature Contours.

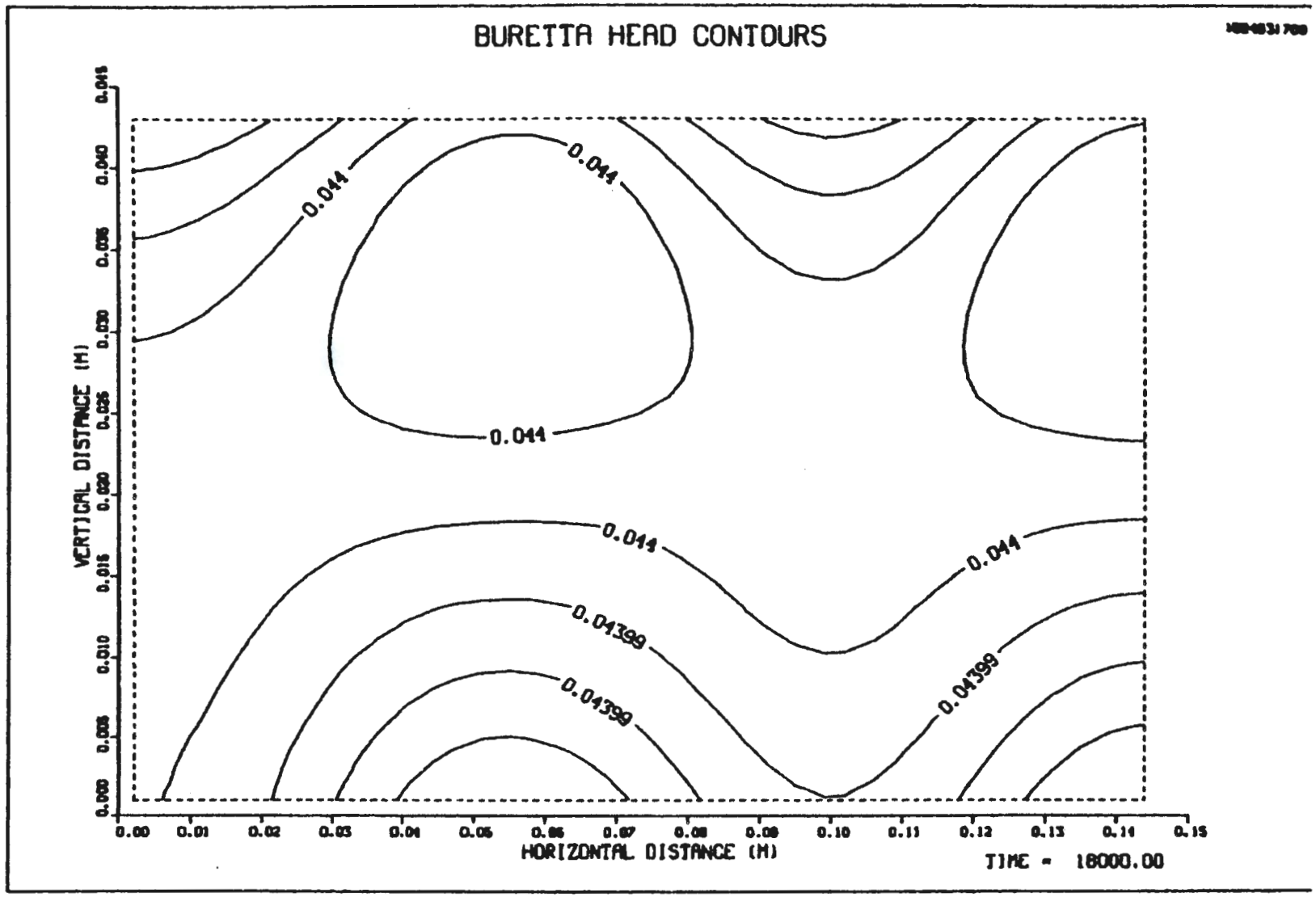


FIGURE E-2. Buretta Head Contours.

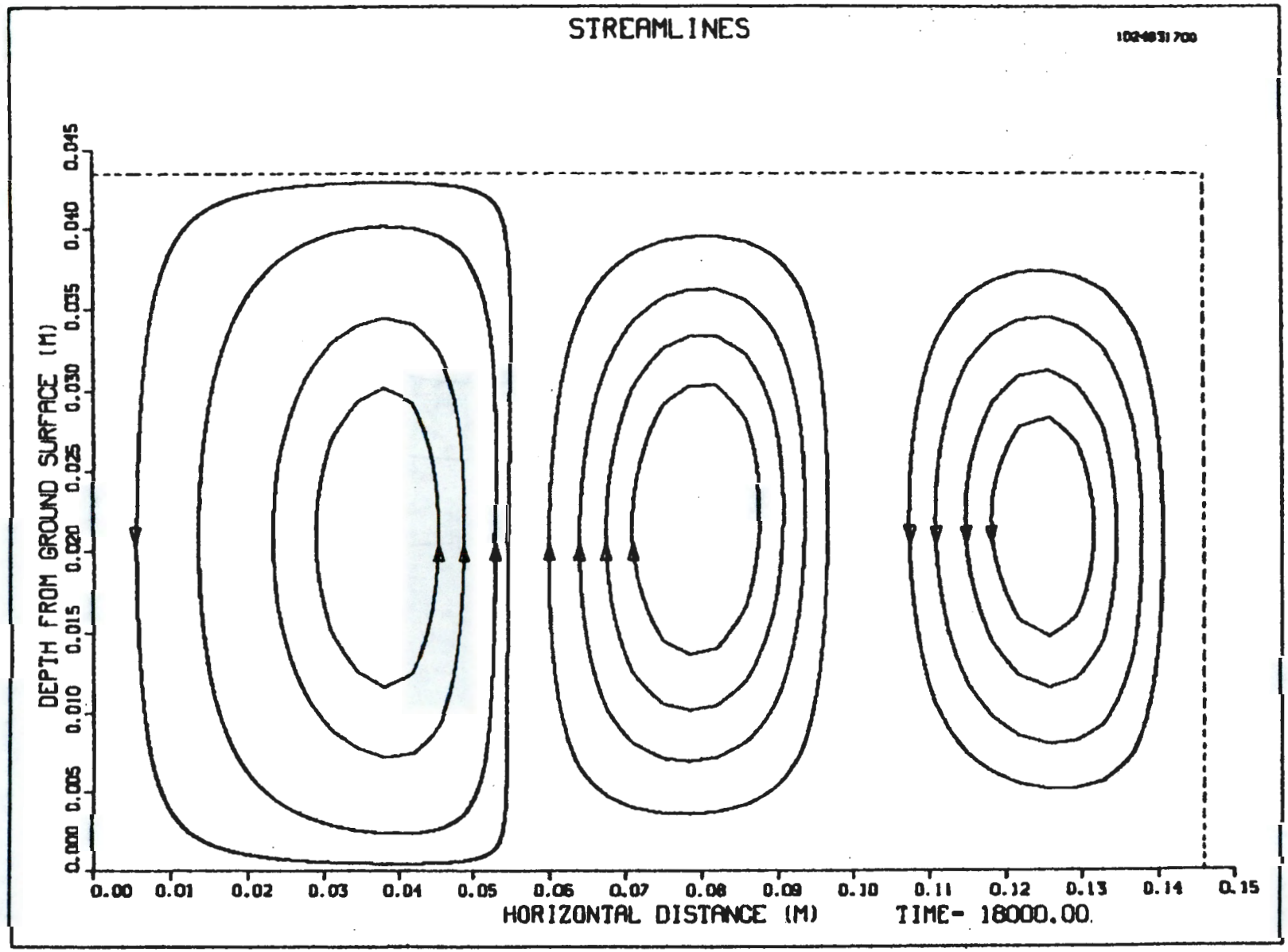


FIGURE E-3. Streamlines.

APPENDIX F

JOB CONTROL

Following is an example of a batch job control stream for a PORFLO simulation in a PRIME operating environment:

```
EAT DAYFILE
COMO DAYFILE
DATE
EAT REPORT.OUT
OPEN INPUT.DAT 1 3
OPEN REPORT.OUT 2 3
OPEN PLOT.NPLT1 3 3
OPEN PLOT.NPLT2 4 3
OPEN PLOT.NPLT3 5 3
OPEN PLOT.NPLT4 7 3
SEG #PORFLO
DATE
TIME
COMO -END
LOGOUT
```

Note that in the above command stream the filenames are generic. Moreover, the plot files must be opened explicitly regardless of whether or not the plotting options are used.

APPENDIX G

CHECKLIST FOR ASSISTANCE

Versions of PORFLO have been tested for a wide range of problems over a long period of time. Most of the logic built into the model has evolved over a number of years, and the model is expected to provide trouble-free operation. However, for any model of such complexity, it is possible that problems will be encountered in its application. On the basis of the experience gained so far, it can be stated that most of these problems are likely to arise from a lack of familiarity with the various features of the model and their interaction with each other. The checklist given below is designed to provide some assistance in this manner.

If the computed results are not as expected:

- Check that the free format data input records do not contain invalid separators.
- Check that all the keywords are spelled correctly.
- Check that none of the numeric fields are separated by more than ten blanks.
- Check that none of the real numbers specified with an exponent option have any embedded blanks between the number and the exponent.
- Check that the comments embedded between the numeric fields do not contain any numeric characters or minus signs.
- Ensure that the grid coordinates are in <u>algebraically ascending</u> order without any exception.
- Check that the grid coordinate values printed out by the program are as desired.
- Check that all the physical input including the boundary and initial conditions, the hydraulic and thermal conductivities, etc., are correctly specified.
- Check that the grid and time steps employed are not in gross violation of one or more of the criteria given in the text.
- Examine the basis on which the expectations were founded to ensure that they are valid.
- If none of the above helps, contact the authors of this users guide.

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