Environment Canada Environnement Canada

Canada

A Deterministic-Probabilistic Model For Contaminant Transport In Groundwater Flow Systems

User's manual For the PC Version of the Code

By
A.S. Crowe and S.G. Shikaze

NWRI Contribution No: 97-136

NATIONAL WATER RESEARCH INSTITUTE
INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

A DETERMINISTIC-PROBABILISTIC MODEL FOR CONTAMINANT TRANSPORT IN GROUNDWATER FLOW SYSTEMS

USER'S MANUAL FOR THE PC VERSION OF THE CODE
(version 1.2)

by

A.S. Crowe and S.G. Shikaze

National Water Research Institute,
Canada Centre for Inland Waters,
Burlington, Ontario, L7R 4A6,
Canada.

November 1997

NWRI Contribution 97-136

Management Perspective

Title: A deterministic-probabilistic model for contaminant transport in groundwater flow systems; user's manual for the PC version of the code (version 1.2)

Authors and affiliations:

Allan S. Crowe and Steven G. Shikaze
Aquatic Ecosystem Restoration Branch,
National Water Research Institute, Canada Centre, Burlington, Ontario L7R 4A6

NWRI Contribution Number: 97-136

Citation: NWRI report

EC Priority/Issue:

The primary EC priority/issue that this groundwater contaminant transport model addresses deals with the toxics that are released into our environment. Specifically, this model is designed to simulate and predicte the transport and fate of contaminants in groundwater flow systems, and their impact on our resources. Such models are necessary for the implementation of management strategies, risk assessments, and remediation efforts which are related to EC's goal of the virtual elimination of contaminants.

Current status:

The conversion of this groundwater contaminant transport model from a main frame computer to a personal computer is complete. This will enable the simulation model to be used in all staff and organizations who have a PC. No further improvements or modifications to this contaminant transport code is planned.

Next steps:

No further improvements or modifications to this contaminant transport code is planned. The code will be made available to those who have the need for this model.

ABSTRACT

With recent advances in personal computer hardware and software, many contaminant transport codes and large contaminant transport problems which were restricted to main frame computers can now be run on personal computers. The Deterministic-Probabilistic Contaminant Transport (DPCT) model is one of these codes which was original designed to run on a main frame computer, and it has now been converted to run on a personal computer. The model is designed to simulate contaminant transport in a vertical cross section, and accounts for advection, dispersion, diffusion, decay and cation exchange for a single component. The model can be used to simulate any type of water table or hydrostratigraphic configuration, and a variety of boundary conditions. The hydraulic head values for the groundwater flow domain are solved utilizing a triangular finite element grid and the Galerkin method of solution for the groundwater flow equation. The transport of contaminants is simulated through a particle tracking procedure which represents the mass in the system with a large number of reference particles. The advective and dispersive movement of the contaminant within a groundwater flow domain are simulated using a random-walk approach to move the reference particles. This report describes the DPCT code and serves as the user's manual for the PC version of the model.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Tables page

1. INTRODUCTION

Computer models are used to simulate the transport of contaminants within a groundwater flow domain were initially developed during the 1970's and 1980's. These codes were designed to run on main frame computers because personal computers were not widely available. Even as personal computers became more common, typical contaminant transport simulations required more computer memory than was available on the personal computers. Recent advances in personal computer hardware and software has enabled many contaminant transport codes and large contaminant transport problems that were restricted to main frame computers to now be run on personal computers.

The Deterministic-Probabilistic Contaminant Transport (DPCT) model is one of these codes. The DPCT code was originally developed for the U.S. Nuclear Regulatory Commission to evaluate possible groundwater contamination resulting from the disposal of waste in various subsurface waste repository scenarios (Schwartz and Crowe, 1980). The code was originally designed to run on a mainframe computer but has been modified to run on a personal computer.

The model documented in this report is designed to simulate contaminant transport in a vertical cross section. It accounts for advection, dispersion, diffusion, decay and cation exchange for a single component. The model is sufficiently general to enable the user to specify virtually any type of water table or geologic configuration, and a variety of boundary conditions. With the information provided in the user's manual, changes to the computer code which may be necessary for specific applications should be relatively easy to make. A major emphasis in the model development has been placed on making it simple to use. To accomplish this goal, a variety of features in the coding, output or program structure have been included. These features are discussed in the following sections. Although care has been taken to insure that the code is free from errors, we would recommend that users check their versions of the model carefully before extensive use for system-related or other errors.

The transport of contaminants is simulated through a particle tracking procedure in which the contaminant mass in the system is represented by a large number of reference particles. The advective or deterministic component of transport is a function of the groundwater flow velocity. The dispersive movement of the contaminant or probabilistic component of transport within a groundwater flow domain is simulated using a random-walk approach to move the reference particles. The hybrid deterministic-probabilistic technique was first developed and applied by Ahlstrom et al. (1977). In addition to the DPCT model, the technique has been used in other codes (Prickett et al., 1981; Crowe and Schwartz, 1988). The DPCT model has been previously discussed in detail (Schwartz, 1978; CGS, 1980). In addition to its demonstrated usefulness in the evaluation of practical problems, the technique has been extended to the evaluation of the fundamental features of transport in a heterogeneous medium (Schwartz, 1977; Smith and Schwartz, 1980).

Several modifications have been made to the DPCT model to enable it to run on a personal computer. The main modifications involved replacing the existing random number generator, which was specific to a main frame computer, with one designed to generate random numbers on a PC, and redefining the input and output devices. Several modifications were also made to the code to aid in the ease of data input, to provide more descriptive output, and to allow more flexibility in the scenarios simulated. For example, a single data entry map defines all values for all the hydrostratigraphic units, a FORTRAN INCLUDE statements simplifies the user's dimensioning of the code's arrays, and the user may enter data using units of feet or meters. Although modifications have been made, we left much of the code, input requirements, and format of the output, the same as in the original code in order to maintain consistency with the original DPCT code. The present user's manual has been changed to reflect the modifications to the original code. However, the user's manual still retains its original format. Changes to the user's manual includes corrections, an elaboration on the theoretical basis for the contaminant transport code, and discussions on the changes to the input, output and dimensioning of the arrays. The example problems listed here are the same problems contained on the original user's manual, but have been rerun on a personal computer.

The purpose of this User's Manual is to describe the personal computer implementation of the Deterministic-Probabilistic Contaminant Transport model. The development and verification of the model are discussed in Section 2. Section 3 consists of a description of the computer program, including a detailed examination of input and output parameters. Section 4 presents sample data sets and simulation results for two waste repositories in order to demonstrate the operation of the model.

This user's manual has been written for version 1.2 of the personal computer version of DPCT.

2. THEORY OF THE MODEL

Advection and dispersion are the primary contaminant transport processes within a groundwater system. Advective transport occurs when mass is transported by the movement of groundwater in which it is dissolved. Thus, the direction and velocity of the contaminant transport is generally assumed to coincide with that of the groundwater. Dispersion refers to phenomena which act to produce solute mixing within a porous medium. The most important causes of dispersion are macroscopic and microscopic mixing due to the structure of the porous medium and molecular diffusion. The net results of this process is first, a spreading of the contaminant in the longitudinal and transverse directions to groundwater flow, and secondly, a dilution in the concentration of a contaminant or a tracer at any point in a groundwater system.

Other important processes influencing the migration of contaminants are ion exchange and decay (radioactive decay, transformation, degradation). Ion exchange refers to the replacement of ions present in solution with those held by electrical charge at the surface of an exchange mineral. The resulting effect is a reduction in the concentration of the contaminant at a point which is equivalent to a reduction in the actual velocity of transport of the contaminant through the medium. Radioactive decay, expressed in terms of a half-life, describes the spontaneous breakdown of radioactive ions in solution over a period of time. Degradation and transformation usually refer to the breakdown of organic compounds by various chemical, biological or physical processes. The degradation rate constant or transformation rate constant is expressed as a half-life of the compound. These an important process which may reduce the concentration of a contaminant in a flow system.

These processes can all be mathematically stated in the following equation, known as the advection-dispersion equation (Domenico and Schwartz, 1990):

$$\frac{\partial}{\partial x_\alpha}\left(D_{\alpha\tau}\frac{\partial C_i}{\partial x_\tau}\right)-\frac{\partial}{\partial x_\alpha}\left(C_i v_\alpha\right)+\sum_{j=1}^{m} R_{ij}=\frac{\partial\left(n C_i\right)}{\partial t} \qquad \alpha,\tau=1,2 \qquad (1)$$

where $D_{\alpha\tau}$ is the hydrodynamic dispersion coefficient $[L^2/T]$, C is the concentration in solution $[M/L^3]$, v_α is the average linear groundwater velocity in the α-direction [L/T], R_{ij} is rate of production of constituent i in reaction j $[MT/L^3]$, n is porosity [0], t is time [T]. A complete discussion of the various terms in equation (1) is given by Bredehoeft. and Pinder (1973), Freeze and Cherry (1979) or Domenico and Schwartz (1990).

Several models of mass transport in an active groundwater system involve a direct numerical solution to equation (1). An alternative method to simulate mass transport is the hybrid deterministic-probabilistic modeling technique (Reddell and Sunada, 1970; Schwartz, 1978). This technique represents a simple, yet versatile and powerful approach which can be applied to domains consisting of complex hydrostratigraphy. The hybrid method addresses the fundamental problem of describing the spread of a large number of moving reference particles within a region. In practice, the reference particles, each with a given quantity of associated mass, are introduced to a region where contaminant inflow occurs. The reference particles are then transported within the domain. It is impossible to produce an exact mathematical description of individual particle motion because several factors contribute to this motion. Statistical features of the motion of the particle assemblage, however, provide a basis for representing an idealized pattern of motion for individual reference particles. Because the position of individual particles is known within the region, one can easily determine the distribution of contaminant mass associated with each particle. This distribution can be expressed simply in terms of concentrations.

Next, we will consider in detail how the transport processes are represented in this approach. The groundwater velocity field is determined by first calculating values of hydraulic head at node points which are located at the intersection of a set of rows and columns. The hydraulic head distribution is determined by solving the following groundwater flow equation:

$$\frac{\partial}{\partial x_\alpha}\left(K_{\alpha\tau}\frac{\partial h}{\partial x_\tau}\right)=0 \qquad \alpha,\tau=1,\ K_{\alpha\tau}=0 \text{ for } \alpha\neq\tau \qquad (2)$$

where $K_{\alpha\tau}$ is the hydraulic conductivity [L/T], h is hydraulic head.

This equation describes the steady state flow of groundwater in a two-dimensional, anisotropic and heterogeneous porous medium. Once these heads are known, average linear groundwater velocities are determined at each element as follows:

$$v_\alpha=\frac{h_{x\alpha,i}-h_{x\alpha,i+1}}{\Delta x_\alpha}\cdot\frac{K_{x\alpha}}{n} \qquad (3)$$

In the model, velocity vectors for groundwater flow in both the x- and z-directions are calculated for each triangular element. The velocity values are assigned to the centroid of an element, located at the midpoint of the cell in the x-direction and one-quarter of the cell width from both the top and bottom of the cell in the z-direction, for the upper and lower elements, respectively. It is assumed that the groundwater flow pattern is unaffected by the mass distribution within the system. This assumption is made for many mass transport models to eliminate the necessity of iterations.

Each particle is displaced to represent the deterministic component of motion or advective transport. A velocity is calculated for each reference particle in the region by interpolating values from the two-dimensional grid of pore velocities. The velocity that is assigned to a particle is an average of the velocity from the element containing the particle and the three surrounding elements, weighted according to the distance from the centroid of the elements to the location of the particle. Reference particles move along their respective vectors a distance that is fixed by the magnitude of the time-step, the pore velocity, and the direction of groundwater flow:

$$x_{x,t} = x_{i,t-1} + v_i \Delta t \qquad (4)$$

where Δt is the size of the time step [T].

The new particle position is, in effect, only temporary because the effects of dispersion have not been considered to this point. Dispersion is taken into account in the particle motion by adding a random component to the deterministic motion. The character of this random motion is related to the dispersive character of the porous medium (Ahlstrom et al., 1977). Relocation of any reference particle is accomplished by calculating displacements in the two coordinate directions with equations of the following form (Ahlstrom et al., 1977):

$$\begin{aligned} x_{1,t} &= x_{1,t-1} + x_1' \cdot \frac{v_1}{\bar{v}} + x_2' \cdot \frac{v_2}{\bar{v}} \\ x_{2,t} &= x_{2,t-1} + x_1' \cdot \frac{v_2}{\bar{v}} + x_2' \cdot \frac{v_1}{\bar{v}} \end{aligned} \qquad (5)$$

where x_1' and x_2' are dispersion lengths [L] and $\bar{v}$ is the average pore velocity [L/T] defined as:

$$\bar{v} = \sqrt{v_1^2 + v_2^2} \qquad (6)$$

The dispersion lengths, or distance that a particle travels due to dispersion, are functions of the longitudinal and transverse dispersivity:

$$x_1' = \sqrt{24 D_L \Delta t}\left(0.5 - [Z]_0^1\right)$$

$$x_2' = \sqrt{24 D_T \Delta t}\left(0.5 - [Z]_0^1\right) \tag{7}$$

where D_L and D_T are the longitudinal and transverse dispersion coefficients, respectively $[L^2/T]$, $[Z]_0^1$ is a random number between 0 and 1.

Readers interested in the derivations of (4) and (5) can refer to an excellent discussion by Ahlstrom et al. (1977). Note that the dispersion process considered here is formulated for an isotropic porous medium. Accordingly, only two parameters, the longitudinal and transverse dispersivity, are required to characterize the dispersive nature of the medium. Because a practical dispersion model for anisotropic media does not exist, the isotropic formulation, occasionally used as a first approximation, has been extended to anisotropic cases.

The reference particles and associated mass represent the contaminant. They are added to the region where contaminants are generated. At the beginning of each new time step, a new set of particles is defined at the contaminant source. These reference particles and those already existing in the region are moved in the manner previously discussed. The rate at which the contaminants enter the system is controlled either by fixing the number of reference particles and adjusting the mass attached to each or by fixing the mass and adjusting the number of reference particles; our method makes use of this second technique.

When only advective and dispersive processes are considered, the quantity of mass associated with each reference particle remains constant. However, when decay or cation exchange occurs, it is necessary to decrease the quantity of mass. The quantity of mass associated with a reference particle at the end of a time period during which decay (radioactive decay, degradation, transformation) is occurring is:

$$m_i^t = m_i^{t-1} \cdot e^{-\lambda \Delta t} \tag{8}$$

where m_i^t is the mass of a particle [M] at the current time step, m_i^{t-1} is the mass of a particle [M] at the previous time step, λ is the decay coefficient [1/T] where $\lambda = \ln(2) / t_{1/2}$.

As is the case with most transport models, cation exchange is approximated as an equilibrium exchange process described in terms of a distribution coefficient. The formulation used here is slightly more general in that instead of the distribution coefficient, the user specifies cation exchange capacity, selectivity coefficient and total cation concentration of the solution. These parameters are related to the distribution coefficient in the following way:

$$K_d = cec \cdot f / C^+ \qquad (9)$$

where K_d is the distribution coefficient $[L^3/M]$, cec is the cation exchange coefficient [M/M], f is the selectivity coefficient and C^+ is the total cation concentration of the solution $[M/L^3]$.

By summing the mass carried by each of the particles in a given cell and by determining the volume of water in the cell, it is possible to calculate contaminant concentrations within the region. Concentrations in each cell are calculated by:

$$C_{i,t} = \left(\frac{\sum_{j=1}^{p} m_j}{n \cdot V} + K_d \cdot \frac{\rho}{n} \cdot C_{i,t-1} \right) \bigg/ \left(1 + K_d \cdot \frac{\rho}{n} \right) \qquad (10)$$

where $C_{i,t}$ is the concentration of the contaminant in cell i at the present time step $[M/L^3]$, p is the number of particles in a cell, m_j is the mass of a particle [M], V is the volume of the cell $[L^3]$, $C_{i,t-1}$ is the concentration of the contaminant in cell i during the previous time step $[M/L^3]$, and ρ is the bulk density $[M/L^3]$.

The solution of both the groundwater flow equation and the advection-dispersion equation is subject to boundary conditions. Two types of flow boundaries can be assigned to the borders of the region: either a constant head boundary or a no-flow boundary. Groundwater can recharge to or discharge from the flow system at nodes only where constant head values are assigned, otherwise, flow is parallel to these boundaries. Mass can exit from the region at zones of groundwater outflow. Moving reference particles intersecting a no-flow boundary are simply reflected instead of passed through the boundary.

3. THE COMPUTER PROGRAM

This section presents a brief description of the model. The first part includes a discussion and the structure of the computer program. The second part presents a description of input and output parameters and variables. A few of the input and output features of the code have changed from the original DPCT code (Schwartz and Crowe, 1980), and the following refers to version 1.2 of the personal computer version of DPCT.

3.1 Model Structure

The basic sequence of operations of the model is illustrated in Figure 3.1. First, all input data are read and printed to provide the user with a data echo. Data required for a simulation are a description of the domain, boundary conditions and hydraulic parameters, the chemical and physical properties of the contaminant and parameters to control the simulation. In the next step, the nodes, coordinates and elements of the linear triangular finite element grid are constructed and values of hydraulic conductivity, porosity, dispersivity and cation exchange capacity are assigned to the appropriate elements and cells.

Following this step, a linear triangular finite element model, based on the Galerkin formulation (e.g. Pinder and Frind, 1972; Pinder, 1973), is used to simulate the steady state head distribution in the region of flow. Only a summary of this procedure is presented below and readers are referred to Pinder and Frind (1972) and Pinder and Grey (1977) for a complete theoretical development and description of this method.

The finite element method provides a direct solution to equation (2) by approximating the differential form of equation (2) by smaller, simpler equations known as shape functions. The shape functions are linear because the shape of the element side is linear (i.e., 2 nodes per side). Higher order elements with quadratic or cubic sides are available, but the added computer storage and execution time costs would not offset a slightly improved solution offered by these functions.

Utilizing the head values, average linear groundwater velocities or pore velocities in the two coordinate directions are calculated at two points within each cell: one in the upper element and one in the lower element comprising a cell. These pore velocity values are calculated by substituting the hydraulic heads and hydraulic conductivities into the Darcy equation and dividing by the effective porosity of the medium.

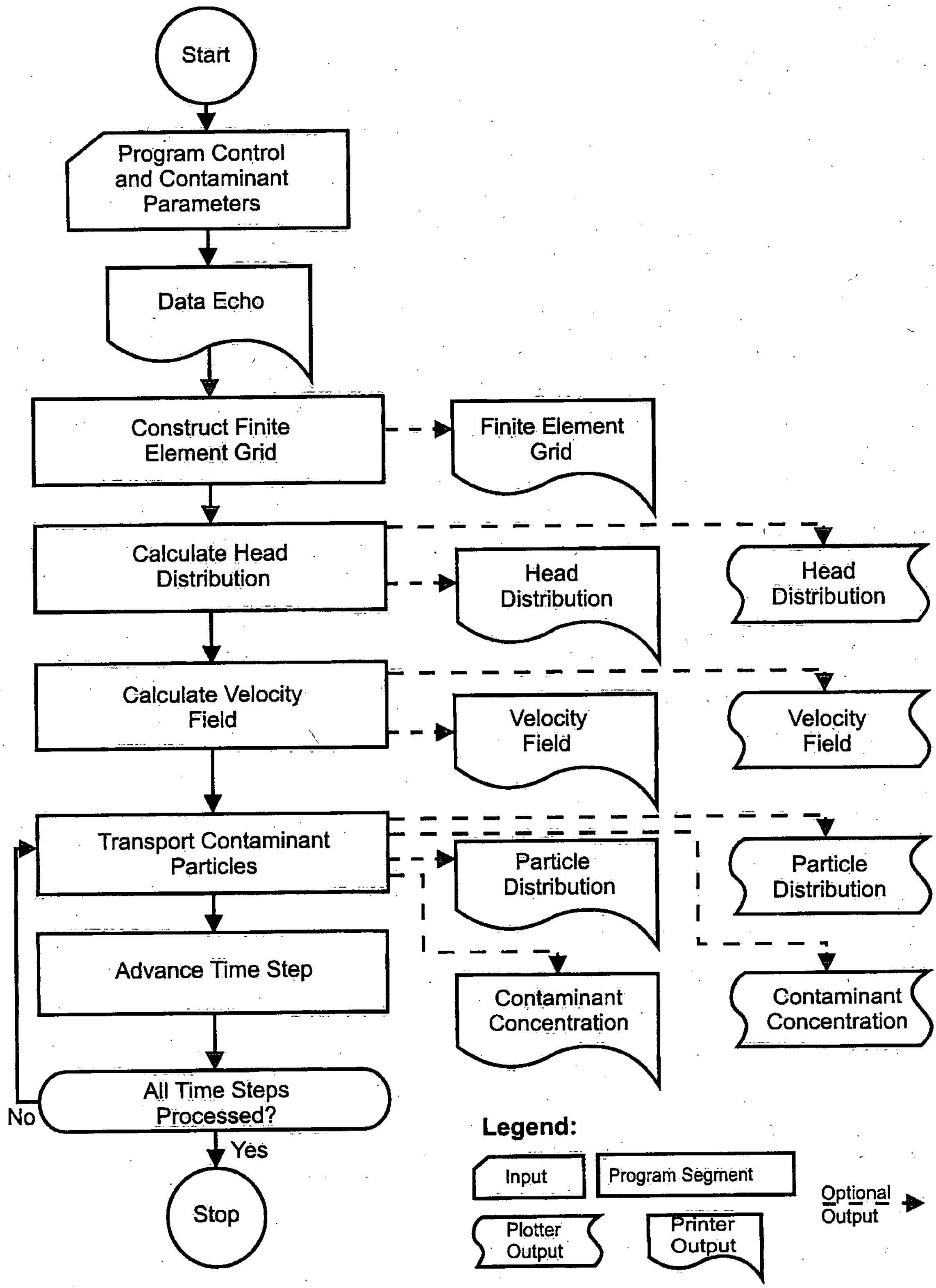


Figure 3.1 Flow chart of the deterministic-probabilistic contaminant transport model.

Finally, the mass transport problem is solved by tracking reference particles with their associated mass through the porous medium. A specified number of particles are added to the region at the contaminant source at the beginning of each time step. By varying the number of particles added during a time step, source functions that are variable in time can be approximated.

At the beginning of each time step, a velocity for each reference particle is obtained by linear interpolation from the surrounding nodal values. Each particle moves to an interim position along respective vectors for a distance that is determined by the magnitude of the time step. The particle is relocated by the random component of motion in the vicinity of the interim position. Finally, the concentration of the contaminant is calculated in each cell within the domain, and printed along with the distribution of reference particles. Care must be taken when choosing an appropriate time-step size. If the step size is too large, moving particles can be moved over very large distances causing particles to end up occasionally at unrealistic locations.

The model is designed to loop through the number of time steps defined by the user. At each time step, a new particle distribution is calculated. Options are available to output various values on the line printer or to plotting files. Data in this latter form can be kept for plotting or other manipulation.

The original DPCT code was programmed in FORTRAN IV and run and tested using the AMDAHL 470V/7 computer at the University of Alberta. The present version of DPCT, modified to run on a personal computer, was programmed in FORTRAN 77, compiled with the Microsoft• FORTRAN Optimizing Compiler (version 5.00), and tested on both 486 and Pentium• PCs. A complete listing of the programming code is presented in Appendix 3. Basically, the computer program consists of nine parts; the main program, seven subroutines: FEGRID, HEADS, SOLVE, VELCTY, TRANS, RANDO, ESCAPE, and one INCLUDE file. These segments are discussed in detail below.

3.1.1 Main Program

The purpose of the main program is to read the input data, provide a data echo, and control the sequence of program steps in the simulation by calling the subroutines. None of the actual simulation steps are carried out in the main program. In order to simplify the use of the PC version of DPTC, a FORTRAN INCLUDE file is used for specifying the array sizes. A more specific description of the input necessary for a simulation is discussed in the following sections.

3.1.2 Subroutine FEGRID

A linear triangular finite element model is used to calculate the steady state head distribution at the nodal points in the cross section. The finite element grid superimposed over the cross section is regular (i.e., constant node spacing in the coordinate directions). Because such a simple grid is easily generated within the model, the data necessary for a simulation is reduced considerably. The only information required to construct the finite element grid is the number of rows and columns of nodes, the horizontal and vertical spacing between nodes and the row number of each column which corresponds to the position of the water table.

The subroutine first fills two vectors with the coordinates of the nodes. Nodes are numbered consecutively from 1, starting at the lower left corner of the region and moving upwards to the position of the water table, and then back to the bottom of the next column, repeating the procedure. Constant head nodes are designated as such within the program, in a separate vector. Following this, the elements are constructed and numbered sequentially upwards from the lower left corner (two elements to a cell) and so on for each column of cells. The element incidences are numbered in a counter-clockwise direction. Finally, the hydraulic conductivity values are assigned to the elements.

3.1.3 Subroutine HEADS

Subroutine HEADS calculates the steady state distribution of hydraulic heads for the cross section. The basic theory of the finite element method which is used to calculate the head values has been discussed previously. The subroutine requires the input of the finite element grid and the hydraulic conductivity of the elements (both from subroutine FEGRID), the location of the water table and any constant head values. The total head values at each node in the groundwater system can be output on either the line printer, or a disk file (for plotting), or both.

Head values are calculated by sequentially progressing through the finite elements in the grid. For each element, an element conductivity matrix is formed from the element shape functions. The individual element conductivity matrix values are then assembled into a global conductivity matrix, accounting for all elements in the grid. The flux vector, which describes the flow across element boundaries is then assembled. Once these steps are complete, the global conductivity matrix, which is a symmetric and banded matrix, is decomposed using the Cholesky square root method, by subroutine SOLVE, to facilitate the solution of unknown head values as a system of linear equations. The equations are solved in subroutine SOLVE to obtain the values for the unknown hydraulic head. The head vector is expanded within subroutine HEADS, with the known constant head values inserted in proper sequential order.

3.1.4 Subroutine SOLVE

Subroutine SOLVE uses a form of the LU decomposition, known as the Cholesky square root method, to decompose the global conductivity matrix and, ultimately, to yield the solution for the hydraulic head distribution. This decomposition method is applied to matrices that are symmetrical. A coefficient matrix of a system of linear equations in such form can be rapidly and efficiently solved. The global conductivity matrix, assembled in subroutine HEADS, is transformed into the upper triangular portion of the matrix (the lower triangular matrix is the same) and stored in the original matrix, thus, economizing storage. A special feature of this particular subroutine is that it is designed to work with banded matrices. In the case of the global conductivity matrix, the width of this diagonal is equal to the bandwidth parameter calculated in the main program. Subroutine SOLVE also decomposes the upper triangular matrix and employs back substitution to solve for the unknowns in a system of linear equations. The terms of the system of equations in matrix form are the decomposed global conductivity matrix (the upper triangular matrix), the flux vector from subroutine HEADS, and the vector of unknown head values which will contain the calculated steady state head distribution. This subroutine corresponds to Weaver's (1967) subroutines DECOMPOSEBAND and SOLVEBAND, and the reader is referred to his work for further details.

3.1.5 Subroutine VELCTY

The movement of the contaminants is controlled primarily by the velocity of groundwater flow. A velocity field is generated in this subroutine from the head values calculated in subroutine HEADS, hydraulic conductivity and porosity values of the various cells. The velocity values calculated are average linear or pore velocitiess, presented as equation (3) in the previous section.

Velocity values in both coordinate directions are calculated for each element from the surrounding nodal head values. Thus, velocity values are calculated for two points in each cell. These points are located at the midpoint of the cell in the x-direction and one quarter of the cell width from both the top and bottom of the cell in the z-direction. Two arrays are used to store the velocity values. Starting at the second row and the second column, velocity values are calculated and inserted into the arrays. Velocity values of cells above the water table are assigned a value of zero. Velocity values are assigned to the first and last columns and first row to control the movement of particles. To prevent the particles from leaving the region across a no-flow boundary, these values are equal to $-v_x$, v_z in the first and last columns and v_x, $-v_z$ in the first row, where v_x is velocity in the x-direction and v_z is the velocity in the z-direction, thus, causing particles to be reflected back across the no-flow boundary and into the groundwater flow system. Along a discharge or recharge boundary, the velocity values are assumed to be equal to those in the adjacent cells, thereby allowing particles to leave the region.

3.1.6 Subroutine TRANS

Subroutine TRANS is the mass transport portion of the model. The subroutine is designed to move the contaminant particles through the groundwater system according to the deterministic-probabilistic modeling techniques discussed in the previous section. It is recommended that a large number of particles be used during a simulation (thousands), in order to provide a distribution of mass which is statistically accurate.

Initially, particles are randomly placed along a horizontal line across the middle of the cell representing the contaminant source (i.e. the position of the particles defined by an x and z coordinate). Particles in the entire system are moved one at a time during any one time step. First, the components of the velocity for each particle are interpolated from the groundwater velocity values at the four surrounding velocity values. The particle is moved with both a deterministic and random motion to represent advective and dispersive transport, respectively. The magnitude of the random motion is determined by the dispersivity, velocity, diffusion coefficient, time-step size and uniformly distributed random numbers.

The position of the particle is checked to determine whether or not it has encountered any boundary conditions (such as a no-flow boundary, movement beyond some confining layer or discharge to the surface). Depending upon the conditions involved, the particle may be relocated.

It is sometimes necessary to limit the movement of particles in some parts of the cross section. A specific example is a case where there are units with extreme contrasts in hydraulic conductivity within the region. Because these two units would have a relatively marked variability in velocity, an appropriate time-step size for the entire region might be too small to produce any contaminant movement in a low velocity unit. Hence, contaminants might only move a very short distance (less than one cell). Thus, it is only possible to simulate particle transport in the very low conductivity units with a large time step. However, using a large time step when the particles are outside of the confining zone could reduce accuracy or improperly locate the particles. To overcome this problem, a feature has been added to the model which will cause particles to remain stationary once they enter specified portions of the entire region (usually the high velocity zones). A particle transport code is available to designate cells where the particles are allowed to move and cells where the particles are effectively removed from further transport within the model. The distribution of particles in either of these zones and the concentration of the particles in the zones of movement are determined and may be output.

Once the mass of each particle has been adjusted to account for decay or cation exchange, concentration values are calculated for each cell. Concentration is determined by summing the total mass of contaminant in the cell and dividing by the volume of water in the cell; DPCT assumes a unit thickness. This sequence of operations is repeated for each particle in the system, after which new particles are added to the source cell at the start of the next simulation cycle.

3.1.7 Subroutine RANDO

The movement of the reference particles is controlled by deterministic (advective transport) and probabilistic (dispersive transport) components of particle motion. One requirement for the calculation of the probabilistic motion is the generation of uniformly distributed random number in the range of 0 to 1. Subroutines that generate random numbers are machine dependent. Subroutine RANDO (Press et al., 1992) generates random numbers in the range of 0 to 1 by the overflow of a single precision integer variable. This subroutine is designed for applications on personal computers that have a 32-bit word. If a computer other than a personal computer is used, it may be necessary to replace this subroutine.

3.1.8 Subroutine ESCAPE

This subroutine calculates the minimum time required for a particle to leave from the midpoint of a cell in either of the coordinate directions. Its principal purpose is to aid in the construction of a controlling matrix to restrict the movement of particles to only some of the cells and to help in the choice of a time step for transport simulations.

A matrix of escape time values is defined for cells in the region. Average velocity values in the coordinate directions for a cell are found by averaging the velocity values of the two elements in the cell. The time to leave the cell in both coordinate directions is found by dividing each of the half-cell dimensions by the appropriate velocity component and choosing the minimum time. A value of 10^{35} is assigned to the cells above the water table. The antilog of the minimum time in either direction represents the escape time for that cell. These values can be written as printer output or as a disk file. In practice, the time step for the transport simulation is determined from these minimum escape times. As a guide, the smallest escape time in the region over which transport will probably occur is chosen, half of that value is then taken and adjusted slightly upwards or downwards to give a rounded value.

3.1.9 INCLUDE File

For simplicity, a FORTRAN INCLUDE file is used for specifying the array sizes. This file is accessed by the main program and all subroutines. Hence, although the user is required to change the dimensions of the arrays in order to run a specific problem, changes in the dimensioning of the arrays only needs to be done in the INCLUDE file. The storage required by the arrays is outlined in Appendix 2.

3.2 Input and Output Operations

3.2.1 Input

Data required as input to the model are discussed in this section. The user has the option of undertaking the simulations using length units of either feet or meters. For example, the grid spacing would have units of feet or meters, hydraulic conductivity has units of ft/day or m/day. The units of time must be in days, and units of mass must be input in milligrams. A user's guide containing a list of input parameters and variables, units for all appropriate input parameters, and the input file setup, is presented in Appendix 2. Appendix 4 contains two example input files.

Sixteen program control parameters (IC) are used in the program to control the nature of the simulation and the type of output required. If the user wishes to choose one of the particular functions, IC should be set to the logical value "T" (a value of "F" indicates that the option or output is not required). The user has the option of running various routines, such as:

IC(1) : run the mass transport routine
IC(7) : calculate the velocity field
IC(9) : calculate the escape time values for a particle to leave a cell
IC(16) : use length units in metres ("T") or feet ("F")

The finite element grid and head distribution are automatically calculated. Several groups of calculations may be output to a printer:

IC(2) : node coordinates
IC(3) : finite element incidences
IC(4) : hydraulic conductivity of the element
IC(5) : total head values
IC(8) : the velocity field
IC(10) : the time step guide
IC(12) : particle and concentration distributions
IC(15) : distribution of non-moving reference particles

Also, the following information may be output to a disk file:

IC(6) : head distribution
IC(11) : time step guide
IC(13) : distribution of reference particles
IC(14) : particle concentration distribution

The grid for the model is a regular array of nodes and elements. This grid is constructed within the program according to the user's input parameters. The user must specify the number of rows (NROW) and columns (NCOL) of nodes and the vertical (DELZ) and horizontal (DELX) spacing between nodes.

The cross section may contain up to 9 different hydrostratigraphic units (NGEOL), with different values of horizontal and vertical hydraulic conductivity (KHORZ, KVERT), porosity (POR), longitudinal dispersivity (DISP), cation exchange capacity (CEC), and the bulk density of the porous medium (BULK). The units are defined as an array (MAPGEO) by assigning a numbered code, from 1 to 9, to represent the presence of a specific hydrostratigraphic unit at each cell within the domain. The codes are entered one row at a time starting with the uppermost row, and having one code value assigned to each cell on that row. Each subsequent lower row in the cross section starts a new line. The values of the parameter assigned to a hydrostratigraphic unit (KHORZ, KVERT, POR, DISP, CEC, BULK) are input with the hydrostratigraphic unit identifier (IDGEO) corresponding to the unit in the cross section. One line is entered for each hydrostratigraphic unit. Also, entered on this line are the codes to indicate whether or not a particle is allowed to move within the specified unit. As illustrated in the example in Appendix 4, a simple graphical representation of the cross section for the particular variable is formed. This style of data input facilitates convenient entry of data for complex settings, rapid alterations, and easy checking of input data.

Several hydrogeologic parameters are required to estimate the steady state head distribution. First, the location of the shape of the region along the upper and lower boundaries must be defined by identifying the row, for each column of nodes, that best approximates the position of the water table (IDWTR) and the base of the cross section (IDBBR). Second, any node within the domain, including the top (i.e., water table), left, right or bottom boundaries or interior portion of the grid, may be set to a constant head condition. Nodes which are assigned a constant head value are identified by their row (II) and column (JJ) location within the grid. The constant head values (CHVAL) are entered along with the row and column identifiers. One advantage of being able to assign constant head values along all the boundaries is to allow the user the flexibility of simulating a smaller piece of a much larger cross section in more detail. Also, the user also enters the angle of inclination of hydraulic conductivity (ANGLE).

Reference particles are introduced to the system at specified cells within the cross section. The number of cells that receive particles as they are introduced (NRCELL), and the location of each of these cells, defined by the cell's column (LCOL) and row (LROW) location, are entered by the user. The number of particles that are added at each time step to all cells (NPER) and the initial mass of each particle (MASSI) must also be input by the user. The user is required to entire a value for the coefficient of bulk diffusion for the contaminant (DIFF). Typical values can be obtained from Domenico and Schwartz (1990). Other input parameters required to simulate the reactions affecting the contaminant during a simulation include the selectivity coefficient for cation exchange (SELC), the half-life of the contaminant (HAFLIF), and the total concentration of the contaminant in solution (SOLUTE). If the contaminant does not undergo decay (radioactive decay, degradation, etc.), enter a value less than 0. For some simulations, as indicated previously, it may be necessary to limit particle motion within parts of the region. A binary code array (PTCI) is used to indicate in which cells particles can be transported (PTCI = "T") and in which cells they cannot (PTCI = "F"). Once a particle enters one of the latter cells, it is, assumed to be lost from the system. However, the location of the particle is known because the total number of particles in each of these types of cells is output.

Parameters that control the length and execution of the simulation require values from the user. The length of the simulation is defined by the number of time steps (NTIME) and the length of the time steps (DELT); DELT is constant throughout a simulation. The user specifies the number of time steps that pass before a set of simulation results is printed (NSKIP). For example, a value of NSKIP = 5 would result in output at time steps 5, 10, 15, etc. Although the simulations would calculate values for each time step, output would not be generated for time steps 1-4, 6-9, 11-14, etc.

3.2.2 Output

The model will produce an echo of the basic input data and a variety of optional output. Appendix 5 shows some examples of the various output, which are discussed below.

The basic output consists of the problem title; the program control parameters; all hydrostratigraphic, and contaminant parameters and variables; a listing of the constant head nodes; the map hydrostratigraphic units, as well as the values of the horizontal and vertical hydraulic conductivity; cation exchange capacity, longitudinal dispersivity, porosity, bulk density, and the particle transport code, assigned to each of the units; and a summary of the element grid parameters.

The optional output includes those values discussed in the previous section, selected by setting IC to the logical value "T". Output is normally directed to a printer or to a disk storage file for later use. Plotting routines have not been included.

The output for the mass transport simulation represents a summary of the distribution and concentration of the particles at selected time steps. User-controlled parameters are available to control the size of the time step (DELT), the total number of time steps (NTIME) and the number of time steps that pass before the results are printed (NSKIP).

4. SIMULATION EXAMPLES

In this section, two examples of simulations of contaminant migration from a buried source are presented. In order to maintain consistency with the original User's Manual (Schwartz and Crowe, 1980), the same examples are presented here. However, because of changes to the code (e.g., a different random number generator) and recompilation and execution on a PC, the results are slightly different. These examples were selected from the many trial simulations that have been used to test the model. The results of other simulations are presented in CGS (1980). The primary purpose of these examples is to illustrate the preparation of a model grid for a cross section, the setup of input data and simulation results for a transport problem.

4.1 Example 1

The geological framework depicted here is typical of a layered sequence of sedimentary rock in which a waste repository may be located (Figure 4.1). The sequence consists of five hydrostatigraphic units with the lower two intersected by a vertical fault zone. The entire sequence is inclined at a slope of approximately 100 feet per 8400 feet. The water table, where it is defined in the upland area, is assumed to follow the trend of the ground surface. The hydraulic conductivity, porosity, longitudinal dispersivity, cation exchange capacity, and bulk density values assigned to the five hydrostratigraphic units and the fault zone are presented in Table 4.1.

Table 4.1. Geological parameters, example 1.

Hydrostrat Unit	Kh[1]	Kv[1]	porosity	longitudinal dispersivity[2]	c.e.c.[3]	bulk density[4]
1	$5.0 \times 10^{+1}$	1.4×10^{0}	3.0×10^{-1}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
2	1.0×10^{-2}	1.0×10^{-3}	3.0×10^{-1}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
3	1.0×10^{-5}	1.0×10^{-6}	3.0×10^{-2}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
4	$4.0 \times 10^{+1}$	$7.0 \times 10^{+1}$	3.0×10^{-1}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
5	5.0×10^{-6}	5.0×10^{-7}	3.0×10^{-2}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
6	4.0×10^{0}	7.0×10^{-1}	3.0×10^{-2}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}

UNITS: 1 : ft/day 2 : ft 3 : mg/kg 4 : g/cm^3

For convenience, the rectangular grid that is imposed over the cross section is also inclined. In order to optimize the number of rows and columns, the cross section is discretized to

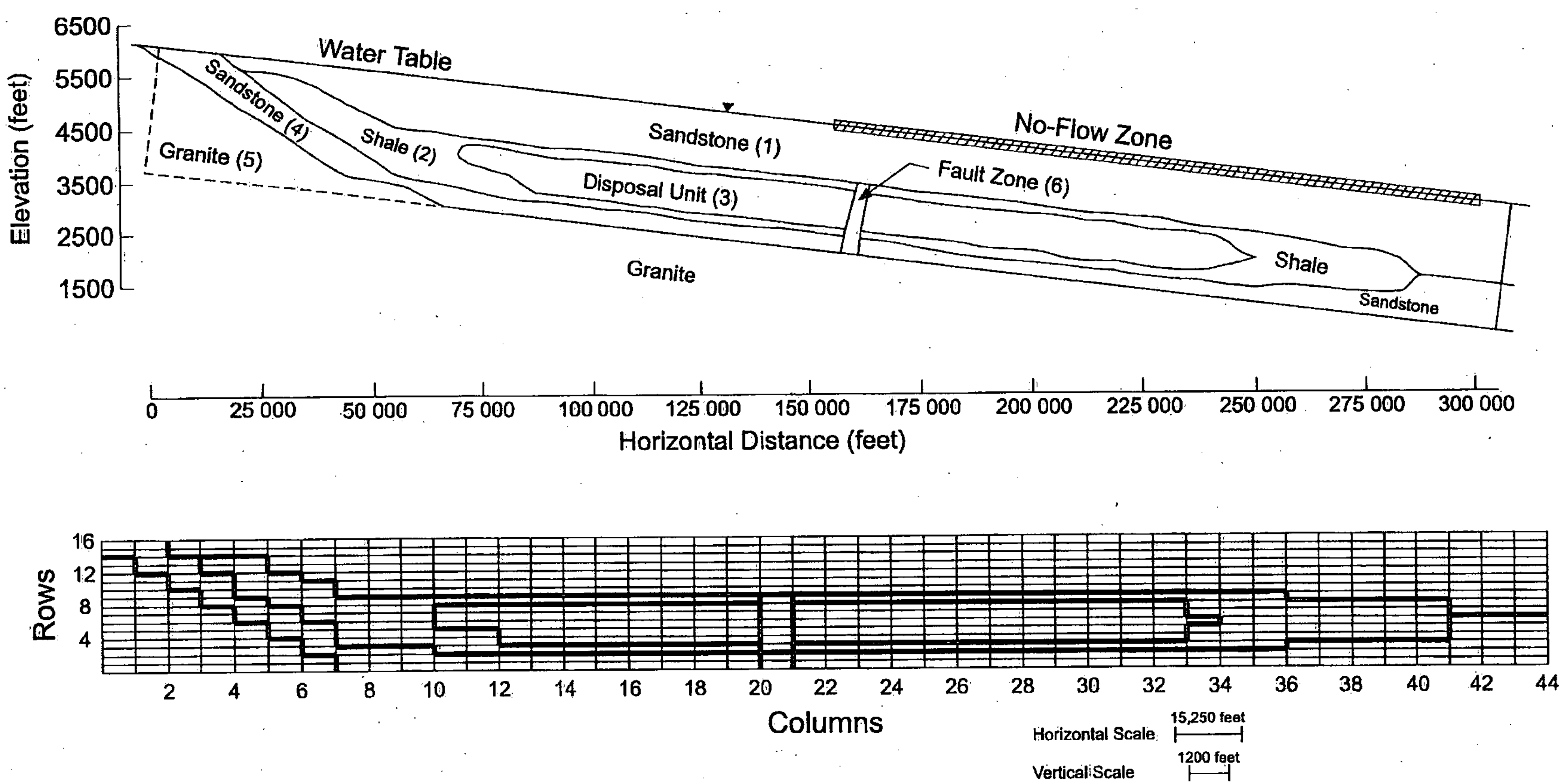


Figure 4.1 Cross-sections showing the geology and the model representation of Example 1.

form a regular rectangular grid of 45 columns and 17 rows with a vertical node spacing of 150 feet and a horizontal node spacing of 6931 feet (Figure 4.1). With the inclined section, only the upper row of nodes (row 17) was necessary to define the shape of the upper boundary. Constant head values (representing a water table) were assigned to the nodes of columns 1 to 23 and column 45. The head is calculated at the other 21 nodes (Table 4.2), which in effect is a zone of no-flow. The other three boundaries are no-flow boundaries.

Table 4.2. Constant head values along the water table, example 1.

row	column	head (ft)	row	column	head (ft)	row	column	head (ft)
17	1	6100.	17	2	6075.	17	3	6050.
17	4	6025.	17	5	5925.	17	6	5750.
17	7	5600.	17	8	5525.	17	9	5500.
17	10	5475.	17	11	5415.	17	12	5355.
17	13	5295.	17	14	5235.	17	15	5175.
17	16	5115.	17	17	5055.	17	18	4995.
17	19	5935.	17	20	4875.	17	21	4815.
17	22	4715.	17	23	4615.	17	45	2500.

The contaminant chosen for this example does not undergo degradation or decay, hence a value of -1 is entered to indicate an infinite half-life. One cell, located at column 16 and row 6, was chosen to be the source of contaminants. The initial quantity of mass added to each of the moving particles is 500,000 mg. Parameters defining the properties of the contaminant and characteristics of the contaminant interactions with the porous medium are listed in Table 4.3.

Table 4.3. Contaminant parameters, example 1.

radioactive half-life:	∞	days
total concentration in solution:	0.1	mg/L
selectivity coefficient for exchange:	0.0	
bulk diffusion coefficient:	2.8×10^{-4}	ft
initial mass added:	500,000.0	mg

The contaminant is added to the system as a set of particles located randomly along the mid-line of the waste repository cell. For the case presented here, the movement of particles is simulated through 25 time steps, each with a size of 1.825×10^{7} days. One hundred particles are added to the waste repository at the beginning of each time step and moving particle and concentration distributions are written after every five time steps.

Because much of the initial particle movement is in low hydraulic conductivity units, a large time step is utilized for the simulation. However, problems will arise when particles enter the zones with much higher hydraulic conductivities. Thus, the movement of particles, as defined by the particle transport code, is only permitted in the disposal unit. Once particles have exited from this unit, it can be assumed that they have essentially reached the biosphere. The input file for this case is contained in Appendix 4.

The resultant head distribution and particle distribution are shown in Figure 4.2. In addition, Appendix 5 contains the printed output for this example. The results presented here are only for illustrative purposes. A more complete discussion of their significance can be found elsewhere (CGS, 1980).

4.2 Example 2

The second geologic system that is used to illustrate the input data is depicted in Figure 4.3. The cross section represents a granite mass (pluton) underlying a layered sequence of siltstone and shale. The granite has a distributed fracture system which is assumed to be sufficiently dense to be considered as a representative porous medium at the scale of the simulation. This granite is selected as a host rock for a waste repository. The rectangular grid that is used to discretize the cross section is shown in Figure 4.3. The geologic parameters for the Example 2 are summarized in Table 4.4.

Table 4.4. Geological parameters, example 2.

Hydrostrat Unit	Kh[1]	Kv[1]	porosity	longitudinal dispersivity[2]	c.e.c.[3]	bulk density[4]
1	0.0	0.0	0.0	0.0	0.0	0.0
2	1.0×10^{-2}	1.0×10^{-2}	3.0×10^{-1}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
3	5.0×10^{-2}	5.0×10^{-2}	3.0×10^{-1}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
4	1.0×10^{-1}	1.0×10^{-1}	3.0×10^{-1}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}
5	1.3×10^{-1}	1.3×10^{-1}	1.0×10^{-4}	5.0×10^{0}	1.0×10^{-1}	1.0×10^{0}

UNITS: 1 : ft/day 2 : ft 3 : mg/kg 4 : g/cm^3

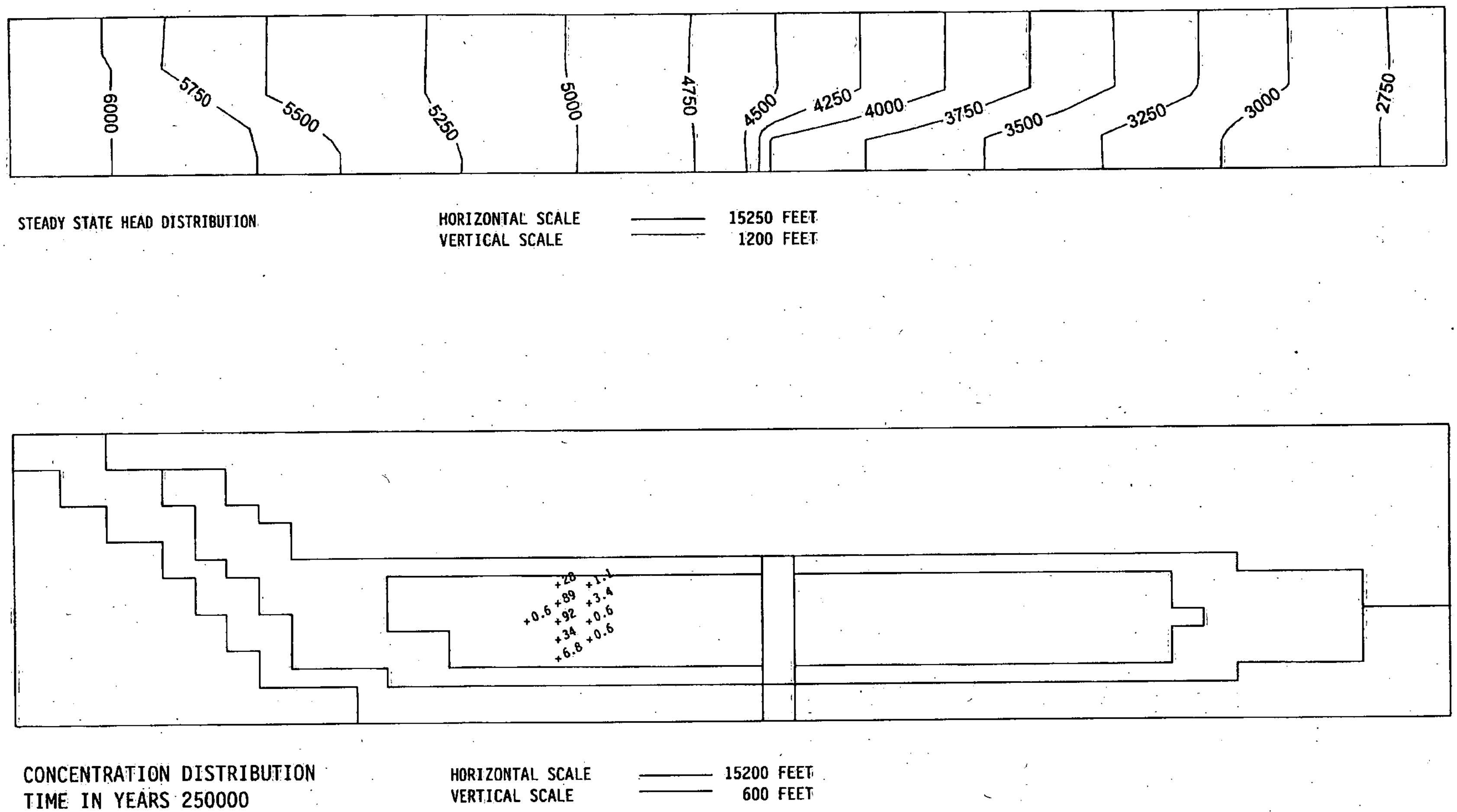


Figure 4.2 Cross-sections showing the distribution of hydraulic head and contaminant concentration, Example 1.

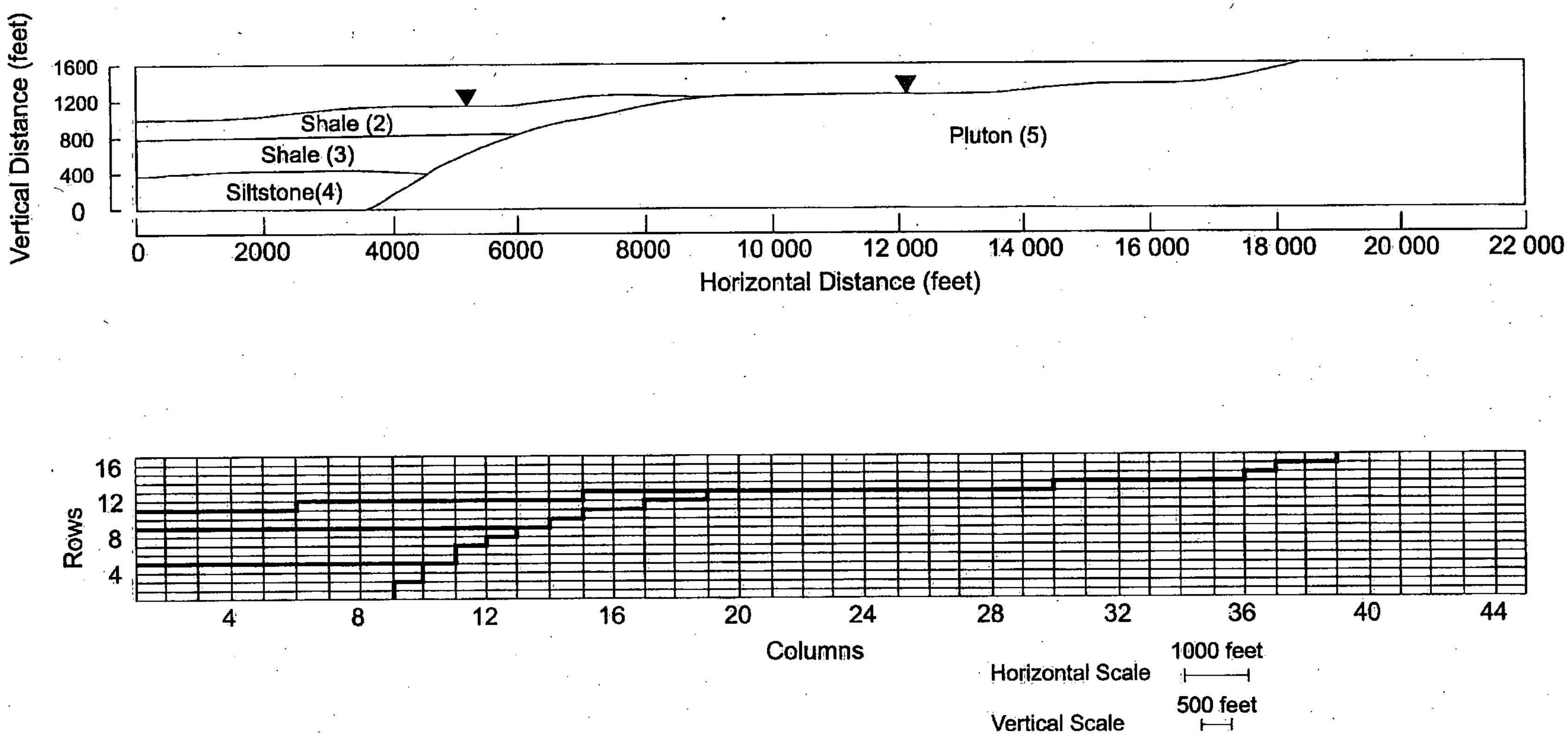


Figure 4.3 Cross-sections showing the geology and the model representation of Example 2.

As in Example 1, the rectangular grid is comprised of 45 columns and 17 rows of nodes. However, the node spacing in the horizontal and vertical directions is now 500 feet and 150 feet, respectively. The sloping water table is represented by decreasing the row position of the upper boundary of the flow system. Constant head values are assigned to all 45 nodes along the water table (Table 4.5). Cells above the water table (i.e., outside of the flow region) have a value of zero assigned to the hydraulic conductivity, porosity, longitudinal dispersivity and cation exchange capacity.

Table 4.5. Constant head values along the water table, example 2.

row	column	head (ft)	row	column	head (ft)	row	column	head (ft)
11	1	3800.	11	2	3810.	11	3	3820.
11	4	3830.	11	5	3840.	12	6	3850.
12	7	3862.	12	8	3874.	12	9	3887.
12	10	3900.	12	11	3915.	12	12	3930.
12	13	3945.	12	14	3960.	13	15	3985.
13	16	3990.	13	17	3994.	13	18	3995.
13	19	3996.	13	20	3997.	13	21	3998.
13	22	3999.	13	23	4000.	13	24	4001.
13	25	4002.	13	26	4003.	13	27	4010.
13	28	4025.	13	29	4040.	14	30	4055.
14	31	4070.	14	32	4095.	14	33	4110.
14	34	4125.	14	35	4140.	15	36	4070.
16	37	4240.	16	38	4295.	17	39	4350.
17	40	4360.	17	41	4390.	17	42	4403.
17	43	4410.	17	44	4415.	17	45	4420.

The waste depository is located in the cell located at column 35 and row 3. As in the first example, the contaminant is assumed to not undergo decay or transformation. Hence, the infinite half-life of the contaminant is represented in the simulation by assigning a value of -1 in the input data set. The parameters defining the properties of the contaminant and the character of the chemical interactions are listed in Table 4.6.

In this case, the simulation moves through 25 time steps with 100 reference particles added to the depository at the beginning of each time step. The size of the time step is 1.50 days. Results are listed every 5 time steps. The reference particles are allowed to move only in the granitic host rock, as indicated by the particle transport code.

Table 4.6. Contaminant parameters, example 2.

radioactive half-life:	∞	days
total concentration in solution:	0.1	mg/L
selectivity coefficient for exchange:	0.0	
bulk diffusion coefficient:	2.8×10^{-4}	ft
initial mass added:	141.0	mg

The input file for this case is contained in Appendix 4. The resultant head distribution and particle distribution is illustrated on Figure 4.4. The printed output is not provided for this example. Further discussion of the results of this example can be found in CGS (1980).

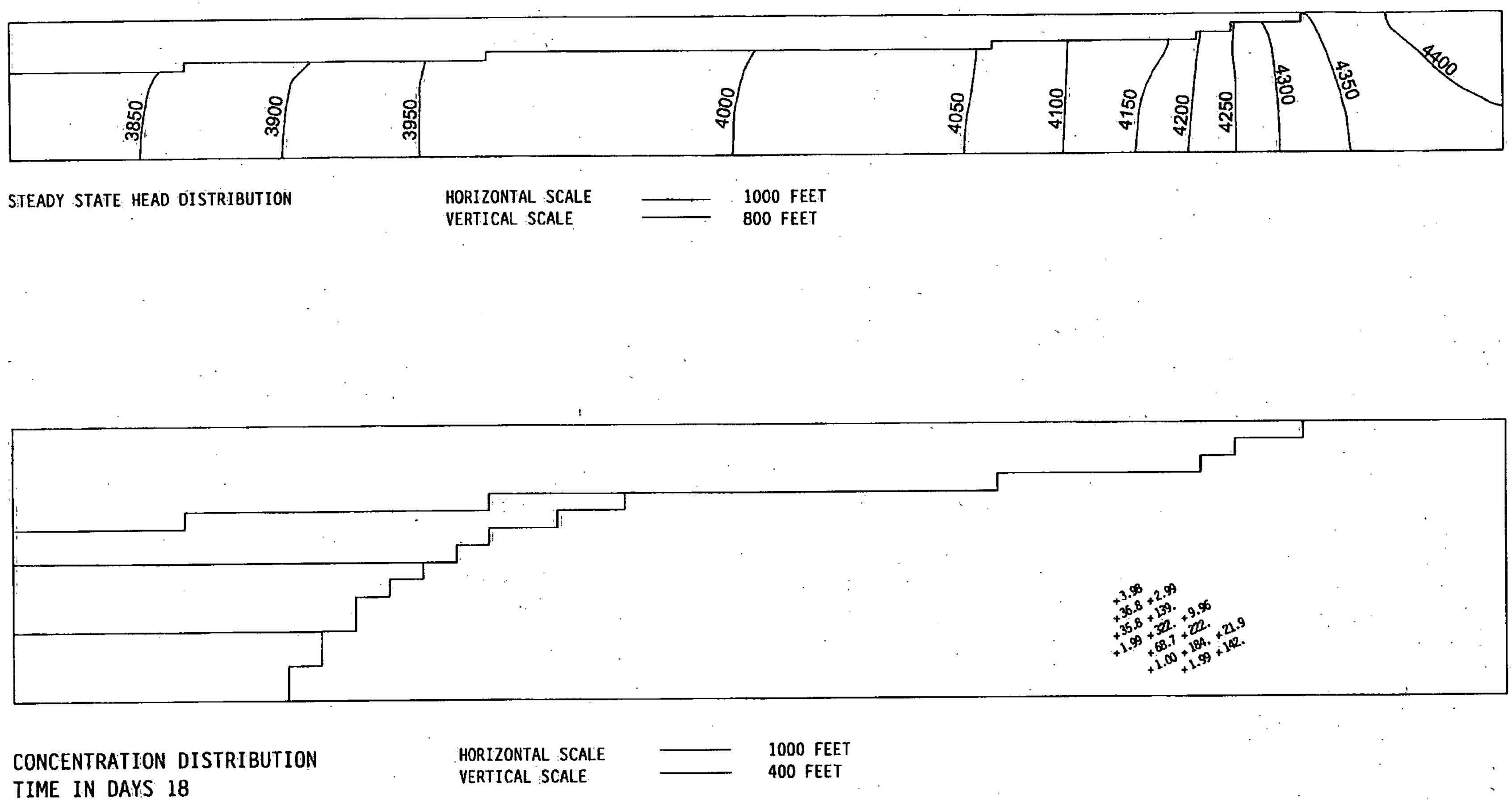


Figure 4.4 Cross-sections showing the distribution of hydraulic head and contaminant concentration, Example 2.

5. REFERENCES

Ahlstrom, S. W., H. P. Foote, R. C. Arnett, C. R. Cole and R. J. Serne. 1977. Multicomponent Mass Transport Model: Theory and Numerical Implementation (Discrete-Parcel-Random Walk Version). Battelle PNL, Report 2127.

Bredehoeft, J. D. and G. F. Pinder. 1973. Mass Transport in Flowing Groundwater. Water Resources Research, 9(1):194-210.

CGS, Inc. 1980. Scenario Development and Evaluation Related to the Risk Assessment of High Level Radioactive Waste Repositories, Final Report. CGS, Inc., Urbana, Illinois, U.S.A.

Crowe, A.S. and F.W. Schwartz. 1988. A computer program to simulate groundwater flow and contaminant transport in the vicinity of active and reclaimed strip mines: a user's guide. Alberta Geological Survey Information Series 119, Edmonton, Alberta, 398 pp.

Domenico, P.A. and F.W. Schwartz. 1990. Physical and Chemical Hydrogeology. John Wiley and Sons Inc., New York, New York, 824 pp.

Freeze, R. A. and J. A. Cherry. 1979. Groundwater. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 604.

Pinder, G. F. 1973. A Galerkin Finite Element Simulation of Groundwater Contamination on Long Island, New York. Water Resources Research, 9:1657-1664.

Pinder, G. F. and E. 0. Frind. 1972. Application of Galerkin's Procedure to Aquifer Analysis. Water Resources Research, 8(1):108-170.

Pinder, G. F. and W. G. Grey. 1977. Finite Element Simulation in Surface and Subsurface Hydrology. Academic Press, New York, 295 pp.

Press, W. H., A. A. Teuklosky, W. T. Vetterling and B. P. Flannery. 1992. Numerical Recipes in FORTRAN; The Art of Scientific Computing. 2nd Edition. Cambridge University Press, 963 pp.

Prickett, T. A., T. G. Naymik and C. G. Lonquist. 1981. A random-walk solute transport model for selected ground-water quality evaluations. Illinois State Water Survey Bulletin 65, Champaign, Illinois, 103 pp.

Reddell, D. L. and D. K. Sunada. 1970. Numerical Simulation of Dispersion in Groundwater Aquifers. Colorado State University Hydrology Paper 41, 79 pp.

Schwartz, F. W. 1977. Macroscopic dispersion in porous media: the controlling factors. Water Resources Research, 13(4):743-752.

Schwartz, F. W. 1978. Application of Probabilistic-Deterministic Modeling to Problems of Mass Transport in Groundwater System. Third International Hydrology Symposium, Ft. Collins, pp. 281-296.

Schwartz, F.W. and A.S. Crowe. 1980. A Deterministic-Probabilistic Model for Contaminant Transport; User Manual. Prepared for the Probabilistic Analysis Staff of the Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission report NUREG/CR-1609 CGS/NR85U060, 158 pp.

Smith, L. and F. W. Schwartz. 1980. Mass Transport 1: A Stochastic Analysis of Macroscopic Dispersion. Water Resources Research, 16(2):303-313.

Weaver, J., Jr. 1967. Computer Programs for Structural Analysis. D. Van Nostrand Co. Ltd., Princeton, N.J.

APPENDIX 1:

DEFINITIONS

DEFINITIONS

A number of terms are used extensively throughout this manual and the computer program. To clarify their meaning, a brief definition of each of these terms is presented below:

parameter: a value that remains constant during the simulation (defined or read only once, at the beginning of the simulation).

variable: a value that changes during the course of the simulation (these values are typically read or determined within the program at each time-step).

row : a string of nodes, elements, cells, etc., on the same horizontal level (see Figure A-1).

column : a string of nodes, cells, elements, etc., on the same vertical level (see Figure A-1).

x - direction: analogous to horizontal direction.

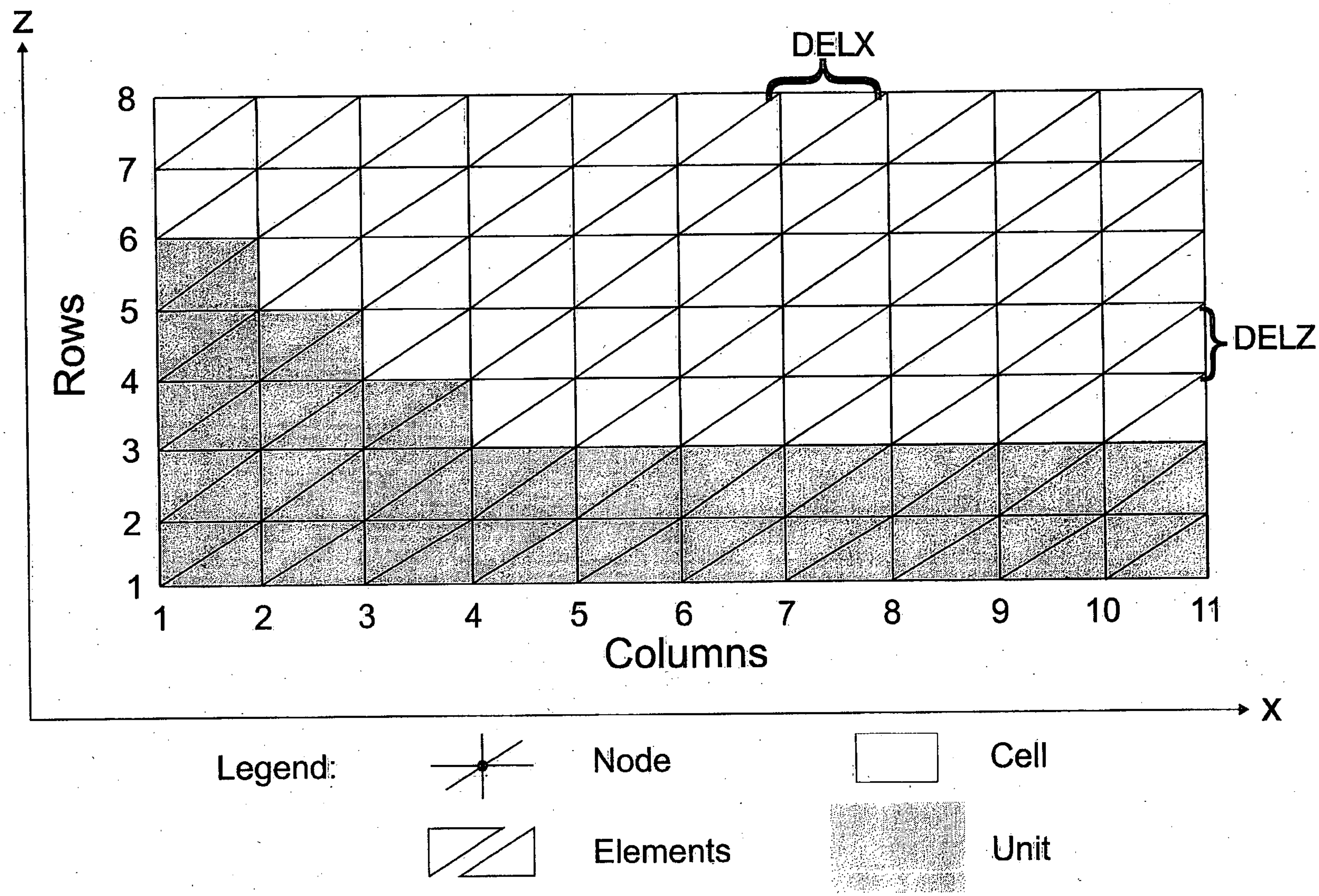
z - direction: analogous to vertical direction.

cell: a block of the cross section bounded by four corner nodes (see Figure A-1).

node: a point at the intersection of the grid lines in the cross section, defined by a row or column number, x or z coordinate (see Figure A-1).

element: a triangular portion of a cell, used by the finite element method to calculate the head distribution (see Figure A-1).

unit: a group of cells that have a common geological or hydrogeological property, similar to an actual stratigraphic unit (see Figure A-1).


Z
DELX
8
7
6
5
4
3
2
1
Rows
DELZ
1 2 3 4 5 6 7 8 9 10 11
Columns
X
Legend:
Node
Cell
Elements
Unit

APPENDIX 2:

USER'S GUIDE

Dimensioning of the Arrays

The include file '*dpct.inc*' contains array variables that must be properly dimensioned in order for the code to run. This include file contains several PARAMETER statements which can be modified to handle problems of different size. Any changes in the size of the domain can be made directly in the '*dpct.inc*' file, and modifications to the program itself are unnecessary. The PARAMETER statements shown below are the only statements that will have to be changed for larger problems. Note that some of the PARAMETER statements do not have values associated with them; rather, they contain simple equations based on the values of other constants specified previously. These PARAMETER statements that contain equations (i.e., maxnxe, maxnze, maxnn, maxne) should not be changed. The PARAMETER statements do not have to match exactly with the size of the problem; they must simply be at least as large as the problem. The following information provides a basis for dimensioning the arrays in the '*dpct.inc*' file:

```
PARAMETER(maxnx = 45,maxnz = 10)
PARAMETER(maxnxe = maxnx-1, maxnze = (maxnz - 1)*2)
PARAMETER(maxnn = maxnx * maxnz, maxne = maxnxe * maxnze)
PARAMETER(mxzone =10)
PARAMETER(mxchd = 20)
PARAMETER(maxbnd =12)
PARAMETER(maxtim = 25)
PARAMETER(maxpart = 25)
PARAMETER(maxnrc =1)
```

where: maxnx = maximum number of columns of nodes
maxnz = maximum number of rows of nodes
maxnxe = maximum number of columns of elements
maxnze = maximum number of rows of elements
maxnn = maximum total number of nodes
maxne = maximum total number of elements
mxzone = maximum number of zones
mxchd = maximum number of constant head nodes
maxtim = maximum number of time steps
maxbnd = maximum bandwidth
maxpart = maximum number of particles
maxnrc = maximum number of cells that initially receive particles

Arrays

The following is a list of arrays that require the above constants as defined by the PARAMETER statements. These arrays are dimensioned in the '*dpct.inc*' file, but size of the arrays does not have to be changed by the user for problems of various sizes.

```
REAL*8 G(maxnn, maxbnd), GC(maxnn, mxchd), HEAD(maxnn), F(maxnn)

REAL KX(maxne), KZ(maxne),CHEAD(mxchd), VX(maxnxe, maxnze), VZ(maxnxe, maxnze), X(maxnn),
     Z(maxnn), DISP(mxzone), POR(mxzone), CEC(mxzone), KHORZ(mxzone), KVERT(mxzone),
     BULK, (mxzone),PHI(maxnx, maxnz),XPOS(maxpart), ZPOS(maxpart), MASS(maxpart),
     CONC(maxnxe, maxnze), CONCR(maxnxe, maxnze), CONCP(maxnxe, maxnze), EXT(maxnxe,
     maxnze), CHVAL(maxnx, maxnz)

INTEGER*2 IDBBR(maxnx), IDWTR(maxnx), LC(maxnx), MAPGEO(maxnxe, maxnze),
      NPCELL(maxnxe, maxnze), NPGONE(maxnxe, maxnze), LROW(maxnrc), LCOL(maxnrc),
      IN(maxne,3), NPER(maxnrc, maxtim)

LOGICAL*1 TYPE(maxnn),PTC(maxnxe, maxnze),IC(16)
```

Input Variables

Problem Identifier

TITLE : Any title up to 80 characters

Program Control Parameters

This list of control parameters contains logical variables (T/F).

IC(1) : Run the mass transport routine
IC(2) : Print the nodal coordinates
IC(3) : Print the finite element incidences
IC(4) : Print the elemental hydraulic conductivities
IC(5) : Print the total head values
IC(6) : Output the total heads to a plotting file
IC(7) : Calculate the velocity field
IC(8) : Print the velocity field
IC(9) : Run the particle escape time routine
IC(10) : Print the particle escape time field
IC(11) : Output the time-step guide field for plotting
IC(12) : Print the particle and concentration distributions
IC(13) : Output the reference particle distribution for plotting
IC(14) : Output the concentration distribution for plotting
IC(15) : Print the distribution of non-moving reference particles
IC(16) : Length units in metres (T) or feet (F)

Cross-Section Parameters

NROW : Number of columns of nodes
NCOL : Number of rows of nodes
NGEOL : Number of geological units
DELX : Horizontal node spacing (m or ft)
DELZ : Vertical node spacing (m or ft)
IDWTR : Row number (of each column of nodes) that defines the position of the water table
IDBBR : Row number (of each column of nodes) that defines the bottom of the flow system
MAPGEO : Code identifying cells in each unit

Hydraulic Parameters

NCHEAD : Number of constant head nodes
ANGLE : Angle of inclination of Kh and Kv from a horizontal plane (degrees)
II : Column location of constant head node
JJ : Row location of constant head node
CHVAL : Constant head value
I : Geological unit number
KHORZ : Horizontal hydraulic conductivity (m/d or ft/d)
KVERT : Vertical hydraulic conductivity (m/d or ft/d)
POR : Porosity

Contaminant Parameters

NRCELL	: Number of cells which initially receive contaminants
SOLUTE	: Total concentration of the contaminant in solution (mg/L)
SELC	: Selectivity coefficient for exchange
BULK	: Bulk density of the geologic medium (g/cm^3)
HAFLIF	: Half-life of the contaminant; negative value if no decay (days)
MASSI	: Initial mass of the particles (mg)
LCOL	: Column identifier for cells which initially receive the contaminant
LROW	: Row identifier for cells which initially receive the contaminant
NPER	: Number of contaminant particles added during each time step
DISP	: Longitudinal dispersivity (m or ft)
DIFF	: Coefficient of bulk diffusion (m^2/d or ft^2/d)
CEC	: Cation exchange capacity (mg/kg)
PTCI	: Particle transport code identifier for the geological units

Time-Step Parameters

NTIME	: Total number of time steps
NSKIP	: Number of time steps that pass before results are printed
DELT	: Size of the time step (days)

Input File Instructions

The variables and parameters that are input into the program must conform to the order, format and columns of the following lines (example input files are presented in Appendix 4):

LINE	VARIABLE	FORMAT	COLUMNS
1	TITLE	20A4	1 - 80
2	IC	16L2	1 - 2, 3 - 4, 5 - 6, ...
3	NROW	I5	1 - 5
	NCOL	I5	6 - 10
	NRCELL	I5	11 - 15
	NTIME	I5	16 - 20
	NSKIP	I5	21 - 25
	NCHEAD	I5	26 - 30
	NGEOL	I5	31 - 35
4	DELX	F10.0	1 - 10
	DELZ	F10.0	11 - 20
	DELT	F10.0	21 - 30
	ANGLE	F10.0	31 - 40
5	SOLUTE	F10.0	1 - 10
	SELC	F10.0	11 - 20
	HAFLIF	F10.0	21 - 30
	MASSI	F10.0	31 - 40
	DIFF	F10.0	41 - 50
6[1]	LCOL	I5	1 - 5
	LROW	I5	6 - 10
	NPER[2]	14I5	11 - 15, 16 - 20, 21 - 25, ...
		16I5	1 - 5, 6 - 10, 11 - 15, ...
7	IDWTR	25I3	1 - 3, 4 - 6, 7 - 9, ...
8	IDBBR	25I3	1 - 3, 4 - 6, 7 - 9, ...
9[3]	II	I3	1 - 3, 13 - 15, 25 - 27, 37 - 39, 49 - 51, 61 - 63
	JJ	I3	4 - 6, 16 - 18, 28 - 30, 40 - 42, 52 - 54, 64 - 66
	CHVAL	F6.0	7 - 12, 19 - 24, 31 - 36, 43 - 48, 55 - 60, 67 - 72
10	IDGEO	I5	1 - 5
	KHORZ	E10.5	6 - 15
	KVERT	E10.5	16 - 25
	POR	E10.5	26 - 35
	DISP	E10.5	36 - 45
	CEC	E10.5	46 - 55
	PTCI	L5	56 - 60
	BULK	E10.5	61 - 71
11[4]	MAPGEO	80I1	1, 2, 3, ...

Notes:
(1) Repeat line 6 for each receiving cell (NRCELL)
(2) Repeat NPER for each time step (NTIME)
(3) Repeat entries for each constant head node (NCHEAD). Start a new line after each 6 entries.
(4) Continue on following line if the number of columns is greater than 80. Enter a different line for each row. Start with the uppermost row. One value for each cell in the domain.

APPENDIX 3:

COMPUTER PROGRAM LISTING

```
***************************************************************************
*                                                                         *
*  PROGRAM: DPCT.FOR                                                      *
*                                                                         *
*   A DETERMINISTIC-PROBABILISTIC MODEL FOR CONTAMINANT TRANSPORT         *
*   IN A TWO-DIMENSIONAL CROSS-SECTION UTILIZING LINEAR TRIANGULAR        *
*   FINITE ELEMENTS                                                       *
*                                                                         *
*   ORIGINAL DPCT CODE PROGRAMMED:  APRIL, 1980                           *
*   P.C version 1.2              :  NOVEMBER 1997                         *
*                                                                         *
***************************************************************************
C
C       PROGRAM VARIABLES AND PARAMETERS
C
C  ANGLE : ANGLE OF INCLINATION OF Kh AND Kv FROM A HORIZONTAL PLANE (degrees)
C  BULK  : BULK DENSITY OF THE GEOLOGIC MEDIUM (mg/ft3  OR  mg/m3)
C  CEC   : CATION EXCHANGE CAPACITY ASSIGNED TO EACH GEOLOGICAL UNIT (mg/mg)
C  CHEAD : VECTOR CONTAINING ALL CONSTANT HEAD VALUES
C  CHVAL : CONSTANT HEAD VALUE AT A GIVEN ROW AND COLUMN THAT IS READ IN
C  DELT  : SIZE OF THE TIME-STEP (days)
C  DELX  : HORIZONTAL NODE SPACING (meters or feet)
C  DELZ  : VERTICAL NODE SPACING (meters or feet)
C  DISP  : LONGITUDINAL DISPERSIVITY OF A HYDROSTRATIGRAPHIC UNIT (meters or fee
C  DIFF  : COEFFICIENT OF BULK DIFFUSION (m2/d or ft2/d)
C  EXT   : MINIMUM TIME REQUIRED FOR A PARTICLE TO LEAVE A CELL UNDER THE
C          INFLUENCE OF GROUNDWATER FLOW ONLY
C  HAFLIF: HALF-LIFE OF THE CONTAMINANT; -VE VALUE IF NO DECAY (days)
C  HEAD  : HYDRAULIC HEAD VALUES
C  IBANDE: ESTIMATED BANDWIDTH
C  IC(1) : CODE TO RUN THE MASS TRANSPORT PROBLEM
C  IC(2) : CODE TO PRINT NODE CO-ORDINATES
C  IC(3) : CODE TO PRINT ELEMENT INCIDENCES
C  IC(4) : CODE TO PRINT ELEMENT PERMEABILITY
C  IC(5) : CODE TO PRINT TOTAL HEAD VALUES
C  IC(6) : CODE TO OUTPUT HEAD VALUES FOR PLOTTING
C  IC(7) : CODE TO CALCULATE THE VELOCITY FIELD
C  IC(8) : CODE TO PRINT THE VELOCITY FIELD
C  IC(9) : CODE TO RUN THE TIME-STEP GUIDE
C  IC(10): CODE TO PRINT THE TIME-STEP GUIDE FIELD
C  IC(11): CODE TO OUTPUT THE TIME-STEP GUIDE FIELD FOR PLOTTING
C  IC(12): CODE TO PRINT PARTICLE AND CONCENTRATION DISTRIBUTIONS
C  IC(13): CODE TO OUTPUT THE REFERENCE PARTICLE DISTRIBUTION FOR PLOTTING
C  IC(14): CODE TO OUTPUT THE CONCENTRATION DISTRIBUTION FOR PLOTTING
C  IC(15): CODE TO PRINT THE DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES
C  IC(16): CODE TO USE DISTANCE UNITS OF METERS ("T") OR FEET ("F")
C  IDBBR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE DOMAIN BASE(
C  IDWTR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE WATER TABLE
C  IN    : FINITE ELEMENT INCIDENCES
C  IDGEO : HYDROSTRATIGRAPHIC UNIT IDENTIFIER
C  KHORZ : HORIZONTAL HYDRAULIC CONDUCTIVITY ASSIGNED TO A GEOLOGIC UNIT (m/d or
C  KVERT : VERTICAL HYDRAULIC CONDUCTIVITY ASSIGNED TO A GEOLOGIC UNIT (m/d or f
C  KX    : HORIZONTAL HYDRAULIC CONDUCTIVITY OF AN ELEMENT
C  KZ    : VERTICAL HYDRAULIC CONDUCTIVITY OF AN ELEMENT
C  LCOL  : COLUMN IDENTIFIER FOR CELLS WHICH INITIALLY RECEIVE THE CONTAMINANT
C  LROW  : ROW IDENTIFIER FOR CELLS WHICH INITIALLY RECEIVE THE CONTAMINANT
C  MAPGEO: CODE IDENTIFYING CELLS IN EACH HYDROSTRATIGRAPHIC UNIT
C  MASSI : INITIAL MASS OF THE PARTICLES (mg)
C  NCHEAD: NUMBER OF CONSTANT HEAD NODES
C  NCOL  : NUMBER OF COLUMNS OF NODES
C  NELME : ESTIMATED NUMBER OF ELEMENTS IN THE FINITE ELEMENT GRID
C  NELM  : ACTUAL NUMBER OF ELEMENTS IN THE FINITE ELEMENT GRID
C  NGEOL : NUMBER OF GEOLOGICAL UNITS
C  NHCELL: NUMBER OF CELLS IN THE HORIZONTAL DIRECTION
C  NNODE : ACTUAL NUMBER OF NODES IN THE FINITE ELEMENT GRID
C  NNODEE: ESTIMATED NUMBER OF NODES IN THE FINITE ELEMENT GRID
C  NPER  : NUMBER OF CONTAMINANT PARTICLES ADDED DURING EACH TIME-STEP
C  NROW  : NUMBER OF ROWS OF NODES
C  NRCELL: NUMBER OF CELLS WHICH INITIALLY RECEIVE CONTAMINANTS
C  NTIME : TOTAL NUMBER OF TIME-STEPS
C  NSKIP : NUMBER OF TIME-STEPS THAT PASS BEFORE RESULTS ARE PRINTED
C  NVCELL: NUMBER OF CELLS IN THE VERTICAL DIRECTION
C  NVELM : NUMBER OF ELEMENTS IN THE VERTICAL DIRECTION
C  POR   : POROSITY VALUE ASSIGNED TO A HYDROSTRATIGRAPHIC UNIT
C  PTC   : PARTICLE TRANSPORT ARRAY WHICH IDENTIFIES CELLS WHERE PARTICLES
C          ARE ALLOWED TO MOVE (T = MOVEMENT; F = NO MOVEMENT)
C  PTCI  : PARTICLE TRANSPORT CODE IDENTIFIER FOR THE HYDROSTRATIGRAPHIC UNITS
C  SELC  : SELECTIVITY COEFFICIENT FOR EXCHANGE (mass/mass)
C  SOLUTE: TOTAL CONCENTRATION OF THE CONTAMINANT IN SOLUTION (mg/L)
C  TITLE : PROBLEM IDENTIFIER (ANY TITLE WITH UP TO 80 CHARACTERS)
C  TYPE  : NODE TYPE IDENTIFIER (T=CONSTANT HEAD; F=VARIABLE HEAD)
C  UNITS : DISTANCE UNITS USED IN A SIMULATION (ft OR m)
C  UNITF : LABEL FOR DISTANCE UNITS IN FEET
C  UNITM : LABEL FOR DISTANCE UNITS IN METERS
C  VX     : GROUNDWATER VELOCITY IN THE HORIZONTAL DIRECTION
C  VZ     : GROUNDWATER VELOCITY IN THE VERTICAL DIRECTION
C  X      : X CO-ORDINATE OF A NODE
C  Z      : Z CO-ORDINATE OF A NODE
```

```fortran
C
*****************************************************************************
      REAL TITLE(20)
      logical*1 ptci(10)
      INTEGER*2 II(6),JJ(6)

      include 'dpct.inc'

      CHARACTER*4 UNITS, UNITF, UNITM
      DATA UNITF/'(ft)'/, UNITM/'(m) '/
      DATA CHVAL/maxnn*-1.0E+35/

C  INPUT AND OUTPUT UNIT DEVICE NUMBERS
      OPEN(5,FILE='INPUT')
      OPEN(6,FILE='OUTPUT')
      OPEN(7,FILE='CON')
      OPEN(10,FILE='HEADS.OUT')
      OPEN(11,FILE='PARTICLE.OUT')
      OPEN(12,FILE='CONC.OUT')
      OPEN(13,FILE='ESCAPE.OUT')

C  READ AND WRITE PROBLEM TITLE
      READ (5,101) TITLE
  101 FORMAT (20A4)
      WRITE(6,102)TITLE
  102 FORMAT(1X,75('*')//1X,20A4//1X,75('*')//)

C  READ AND WRITE OUTPUT OPTION CODES
      READ(5,103)(IC(I),I=1,16)
  103 FORMAT(80L2)
      WRITE(6,104)
  104 FORMAT(/' OUTPUT LISTINGS AND PROBLEM CONTROL')
      WRITE(6,106)(IC(I),I=1,8)
  106 FORMAT(/L6,': RUN THE MASS TRANSPORT ROUTINE'/L6,': PRINT THE ',
     1        'NODE CO-ORDINATES'/L6,': PRINT THE ELEMENT INCIDENCES'/L6,
     2        ': PRINT THE ELEMENT HYDRAULIC CONDUCTIVITIES'/L6,
     3        ': PRINT THE TOTAL HEAD VALUES'//L6,': OUTPUT THE HEAD ',
     4        'VALUES TO A PLOTTING FILE'/L6,': CALCULATE THE VELOCITY ',
     5        'FIELD'/L6,': PRINT THE VELOCITY FIELD')
       WRITE(6,107)(IC(I),I=9,15)
  107 FORMAT(L6,': RUN THE TIME-STEP GUIDE ROUTINE'/L6,': PRINT THE',
     &      ' TIME-STEP GUIDE'//L6,': OUTPUT THE TIME-STEP GUIDE TO A ',
     &      'PLOTTING FILE'/L6,': PRINT THE PARTICLE AND CONCENTRATION ',
     &      'DISTRIBUTION'/L6,': OUTPUT THE PARTICLE DISTRIBUTION TO A ',
     &      'PLOTTING FILE'/L6,': OUTPUT THE CONCENTRATION DISTRIBUTION',
     &      ' TO A PLOTTING FILE'/L6,': PRINT THE DISTRIBUTION OF',
     &      ' NON-MOVING REFERENCE PARTICLES')
       IF(IC(16))THEN
         WRITE(6,108)IC(16)
  108    FORMAT(L6,': USING DISTANCE UNITS OF METERS'///)
         UNITS = UNITM
       ENDIF
       IF(.NOT.IC(16))THEN
         WRITE(6,109)IC(16)
  109    FORMAT(L6,': USING DISTANCE UNITS OF FEET'///)
         UNITS = UNITF
       ENDIF

C  READ AND WRITE CROSS-SECTION GRID PARAMETERS
       READ(5,110)NROW,NCOL,NRCELL,NTIME,NSKIP,NCHEAD,NGEOL
  110 FORMAT(16I5)
       READ(5,111)DELX,DELZ,DELT,ANGLE
  111 FORMAT(8F10.0)
       WRITE(6,112)NROW,NCOL,NGEOL,DELX,UNITS,DELZ,UNITS,NCHEAD,ANGLE
  112 FORMAT(' CROSS-SECTION SUMMARY'//I15,' : NUMBER OF ROWS'/I15,
     &        ' : NUMBER OF COLUMNS'/I15,' : NUMBER OF GEOLOGICAL UNITS'/
     &        F15.2,' : HORIZONTAL NODE SPACING ',A4/F15.2,' : VERTICAL',
     &        ' NODE SPACING ',A4/I15,' : NUMBER OF CONSTANT HEAD NODES'/
     &        F15.2,' : ANGLE OF INCLINATION OF Kh AND Kv FROM THE',
     &        ' HORIZONTAL (degrees)'/)

C  READ AND WRITE CONTAMINANT PARAMETERS
       READ(5,111)SOLUTE,SELC,HAFLIF,MASSI,DIFF
       WRITE(6,113)HAFLIF,NSKIP,NTIME,SOLUTE,SELC,DELT,MASSI,NRCELL
  113 FORMAT(///1X,'CONTAMINANT PARAMETERS'//
     &        F15.2,' : HALF-LIFE (days)'/
     &        I15,' : NUMBER OF STEPS BETWEEN LISTINGS'/
     &        I15,' : NUMBER OF STEPS IN TIME'/
     &        F15.2,' : TOTAL CONCENTRATION IN SOLUTION (mg/L)'/
     &        F15.2,' : SELECTIVITY COEFFICIENT FOR EXCHANGE'/
     &        F15.2,' : SIZE OF THE TIME-STEP (days)'/
     &        F15.2,' : INITIAL MASS ADDED PER PARTICLE (mg)'/
     &        I15,' : NUMBER OF CELLS RECEIVING PARTICLES')
       IF(IC(16))WRITE(6,114)DIFF
  114 FORMAT(F15.2,' : COEFFICIENT OF BULK DIFFISION (m2/d)'//)
       IF(.NOT.IC(16))WRITE(6,115)DIFF
  115 FORMAT(F15.2,' : COEFFICIENT OF BULK DIFFISION (ft2/d)'//)

C  READ AND WRITE PARTICLES ADDED TO SYSTEM PER TIME-STEP
```

```
      IF(NRCELL.GT.0)THEN
        WRITE(6,117)
117     FORMAT(/' NUMBER OF PARTICLES ADDED TO THE SYSTEM PER TIME-',
     &            'STEP'//8X,'ROW  COL',8X,'PARTICLES ADDED PER STEP')
        DO 120 I=1,NRCELL
          READ(5,110)LCOL(I),LROW(I),(NPER(I,J),J=1,NTIME)
120     CONTINUE
        DO 116 I=1,NRCELL
          K=15
          IF(NTIME.LT.15)K=NTIME
          WRITE(6,118)LROW(I),LCOL(I),(NPER(I,J),J=1,K)
118       FORMAT(6X,I5,I5,I10,14I7)
          IF(NTIME.GT.15)WRITE(6,119)(NPER(I,J),J=16,NTIME)
119       FORMAT(6X,I20,14I7)
116     CONTINUE
      ENDIF

C  READ AND WRITE THE ROW WHICH DEFINES THE POSITION OF THE WATER TABLE
      READ(5,121)(IDWTR(I),I=1,NCOL)
  121 FORMAT(25I3)
      WRITE(6,123)
  123 FORMAT(///1X,'ROW AND COLUMN NUMBERS OF THE WATER TABLE'/)
      WRITE(6,126)
  126 FORMAT(1X,10('COL ROW    '))
      WRITE(6,124)(I,IDWTR(I),I=1,NCOL)
  124 FORMAT(1X,I3,I4,3X,I3,I4,3X,I3,I4,3X,I3,I4,3X,I3,I4,3X,I3,I4,3X,
     &       I3,I4,3X,I3,I4,3X,I3,I4,3X,I3,I4)

C  READ AND WRITE THE ROW THAT DEFINES THE POSITON OF THE BOTTOM BOUNDARY
      READ(5,121)(IDBBR(I),I=1,NCOL)
      WRITE(6,122)
  122 FORMAT(/////' ROW AND COLUMN NUMBERS OF THE BOTTOM BOUNDARY'/)
      WRITE(6,126)
      WRITE(6,124)(I,IDBBR(I),I=1,NCOL)

C  READ AND WRITE CONSTANT HEAD VALUES AND THEIR ROW AND COLUMN LOCATIONS
      IF(NCHEAD.GT.0)THEN
        WRITE(6,131)
  131   FORMAT(////' CONSTANT HEAD VALUES'//6('   COL ROW    HEAD',4X))
        KSTP=6
        NCH=0
  134   NCH=NCH+6
        IF(NCH.GT.NCHEAD)KSTP=6-(NCH-NCHEAD)
        READ(5,132)(II(K),JJ(K),CHVAL(II(K),JJ(K)),K=1,KSTP)
  132   FORMAT(6(I3,I3,F6.0))
        WRITE(6,133)(II(K),JJ(K),CHVAL(II(K),JJ(K)),K=1,KSTP)
  133   FORMAT(1X,I5,I4,F10.3,I8,I4,F10.3,I8,I4,F10.3,I8,I4,F10.3,
     &         I8,I4,F10.3,I8,I4,F10.3)
      IF(NCH.LT.NCHEAD)GO TO 134
      ENDIF

C  ESTIMATE PARAMETERS FOR EXECUTION TIME DIMENSIONING OF ARRAYS
      NVCELL=NROW-1
      NHCELL=NCOL-1
      NNODEE=NROW*NCOL
      NELME=(NROW-1)*(NCOL-1)*2
      NVELM=NROW+NROW-2
      IBANDE=NROW+2

C  READ & WRITE HYDROGEOLOGICAL PARAMETERS FOR THE HYDROSTRATIGRAPHIC UNITS
      WRITE(6,161)
  161 FORMAT(1H1,' PARAMETERS FOR THE HYDROSTRATIGRAPHIC UNITS'/
     &      /' UNIT',13X,'Kh',12X,'Kv',7X,'POROSITY',9X,'DISPER',
     &      12X,'CEC','       PTCI*','     BULK')
      IF(IC(16))WRITE(6,162)
  162   FORMAT(17X,'(m/d)',9X,'(m/d)',21X,'(m2/d)',12X)
      DO 165 K=1,NGEOL
        READ(5,166)IDGEO,KHORZ(IDGEO),KVERT(IDGEO),POR(IDGEO),
     1  DISP(IDGEO),CEC(IDGEO),PTCI(IDGEO),BULK(IDGEO)
        WRITE(6,167)IDGEO,KHORZ(IDGEO),KVERT(IDGEO),POR(IDGEO),
     1         DISP(IDGEO),CEC(IDGEO),PTCI(IDGEO),BULK(IDGEO)
  165 CONTINUE
  166 FORMAT(I5,5E10.5,L5,E10.5)
  167 FORMAT(I5,5E15.5,L8,E15.5)
      WRITE(6,168)
  168 FORMAT(//15X,' * T=MOVEMENT ALLOWED'/18X'F=MOVEMENT NOT ALLOWED')

C  READ AND WRITE THE MAP OF THE HYDROSTRATIGRAPHIC UNITS
      WRITE(6,171)
  171 FORMAT(///1X,' MAP OF HYDROSTRATIGRAPHIC UNITS'/)
      DO 170 J=NVCELL,1,-1
        READ(5,178)(MAPGEO(I,J),I=1,NHCELL)
        WRITE(6,175)(MAPGEO(I,J),I=1,NHCELL)
  170 CONTINUE
  175 FORMAT(1X,80I1)
  178 FORMAT(80I1)

C  CONSTRUCT THE PARTICLE TRANSPORT CODE
      DO 180 J=1,NVCELL
      DO 180 I=1,NHCELL
```

```
          PTC(I,J)=PTCI(MAPGEO(I,J))
  180 CONTINUE

C  START THE VARIOUS SIMULATIONS
      write(7,*)' START THE VARIOUS SIMULATIONS'

C  CALCULATE NODE CO-ORDINATES AND ASSIGN NODE TYPES
      write(7,*)' START OF "CALL FEGRID"'
      CALL FEGRID

C  CALCULATE THE TOTAL HEAD VALUES AT EACH NODE
      write(7,*)' START OF "CALL HEADS"'
      CALL HEADS

C  CALCULATE THE VELOCITY FIELD AND OUTPUT VALUES
      write(7,*)' START OF "CALL VELCTY"'
      IF(IC(7))CALL VELCTY

C   CALCULATE THE TIME-STEPS AND OUTPUT VALUES
      write(7,*)' START OF "CALL ESCAPE"'
      IF(IC(9))CALL ESCAPE

C  MASS TRANSPORT FUNCTION
      IF(IC(1))CALL TRANS

      STOP
      END
*******************************************************************************
      SUBROUTINE FEGRID
*******************************************************************************
C
C  SUBROUTINE TO SET UP THE NODES, CO-ORDINATES, ELEMENTS AND ELEMENT
C  INCIDENCES THAT COMPRISE THE LINEAR TRIANGULAR FINITE ELEMENT GRID
C
C******************************************************************************
C
C          SUBROUTINE PARAMETERS AND VARIABLES
C
C  CHEAD : VECTOR CONTAINING ALL CONSTANT HEAD VALUES
C  CHVAL : CONSTANT HEAD VALUE AT A GIVEN ROW AND COLUMN THAT IS READ IN
C  DELX  : HORIZONTAL NODE SPACING, IN METERS
C  DELZ  : VERTICAL NODE SPACING, IN METERS
C  ELMENT: ELEMENT NUMBER COUNTER
C  IDBBR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE DOMAIN BASE
C  IDWTR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE WATER TABLE
C  IGT   : NODE NUMBER COUNTER
C  IN    : FINITE ELEMENT INCIDENCES
C  KHORZ : HORIZONTAL HYDRAULIC CONDUCTIVITY ASSIGNED TO A GEOLOGIC UNIT
C  KVERT : VERTICAL HYDRAULIC CONDUCTIVITY ASSIGNED TO A GEOLOGIC UNIT
C  KX    : HORIZONTAL HYDRAULIC CONDUCTIVITY OF AN ELEMENT
C  KZ    : VERTICAL HYDRAULIC CONDUCTIVITY OF AN ELEMENT
C  MAPGEO: MAP OF THE GEOLOGICAL UNITS
C  NCHEAD: NUMBER OF CONSTANT HEAD NODES
C  NCOL  : NUMBER OF COLUMNS OF NODES
C  NELM  : ACTUAL NUMBER OF ELEMENTS IN THE FINITE ELEMENT GRID
C  NELME : ESTIMATED NUMBER OF ELEMENTS IN THE FINITE ELEMENT GRID
C  NFS   : UPPERMOST ROW OF A COLUMN, DEFINING THE POSITION OF THE WATER TABLE
C  NHCELL: NUMBER OF CELLS, HORIZONTAL DIRECTION
C  NNODE : ACTUAL NUMBER OF NODES IN THE FINITE ELEMENT GRID
C  NNODEE: ESTIMATED NUMBER OF NODES IN THE FINITE ELEMENT GRID
C  NROW  : NUMBER OF ROWS OF NODES
C  TYPE  : NODE TYPE IDENTIFIER (T=CONSTANT HEAD; F=VARIABLE HEAD)
C  X     : X CO-ORDINATE OF A NODE
C  Z     : Z CO-ORDINATE OF A NODE
C
*******************************************************************************
      integer*2 elment
      include 'dpct.inc'

C  SET X AND Z CO-ORDINATES OF THE NODES AND DESIGNATE WHICH ARE
C  CONSTANT HEAD NODES
      IGT=0
      K=0
      DO 20 I=1,NCOL
        JSTR=IDBBR(I)
        JSTP=IDWTR(I)
        XXX=FLOAT(I-1)*DELX
        DO 25 J=JSTR,JSTP
          IGT=IGT+1
          X(IGT)=XXX
          Z(IGT)=FLOAT(J-1)*DELZ
          TYPE(IGT)=.FALSE.
          IF(CHVAL(I,J).GT.-1.0E+34)THEN
            TYPE(IGT)=.TRUE.
            K=K+1
            CHEAD(K)=CHVAL(I,J)
          ENDIF
   25   CONTINUE
   20 CONTINUE
      NNODE=IGT
```

```
C  OUTPUT NODE CO-ORDINATES AND NODE TYPES
      IF(IC(2))THEN
        WRITE(6,27)
   27   FORMAT(1H1//' FINITE ELEMENT GRID NODE CO-ORDINATES'//,1X,
     &        3('NODE  TYPE',10X,'X',13X,'Z',11X)/)
        WRITE(6,28)(IGT,TYPE(IGT),X(IGT),Z(IGT),IGT=1,NNODE)
   28   FORMAT(1X,I4,L6,2F14.3,8X,I4,L6,2F14.3,8X,I4,L6,2F14.3)
      ENDIF

C  CALCULATE ELEMENT INCIDENCES AND ASSIGN HYDRAULIC CONDUCTIVITIES
      ELMENT=0
      IGT=0
      DO 35 I=1,NHCELL
        JSTR=IDBBR(I)-1
   31   JSTR=JSTR+1
        IGT=IGT+1
        IF(JSTR.LT.IDBBR(I+1))GO TO 31
        JSTP=IDWTR(I)-1
        IF(IDWTR(I+1).LT.IDWTR(I))JSTP=IDWTR(I+1)-1
        DO 30 J=JSTR,JSTP
          IGTC=IDWTR(I)-IDBBR(I+1)+1
          ELMENT=ELMENT+1
          IN(ELMENT,1)=IGT
          IN(ELMENT,2)=IGT+IGTC
          IN(ELMENT,3)=IGT+IGTC+1
          KX(ELMENT)=KHORZ(MAPGEO(I,J))
          KZ(ELMENT)=KVERT(MAPGEO(I,J))
          ELMENT=ELMENT+1
          IN(ELMENT,1)=IGT
          IN(ELMENT,2)=IGT+IGTC+1
          IN(ELMENT,3)=IGT+1
          KX(ELMENT)=KHORZ(MAPGEO(I,J))
          KZ(ELMENT)=KVERT(MAPGEO(I,J))
          IGT=IGT+1
   30   CONTINUE
        IF(IDWTR(I+1).LT.IDWTR(I))IGT=IGT+(IDWTR(I)-IDWTR(I+1))
   35 CONTINUE
      NELM=ELMENT

C  OUTPUT ELEMENT INCIDENCES AND HYDRAULIC CONDUCTIVITIES
      IF(IC(3))THEN
        WRITE(6,41)
   41   FORMAT(1H1/' ELEMENT INCIDENCES'///1X,
     &        4('ELEMENT INCIDENCES',4X),'ELEMENT INCIDENCES'/)
        WRITE(6,42)(ELMENT,(IN(ELMENT,J),J=1,3),ELMENT=1,NELM)
   42   FORMAT(I6,':',3I4,I9,':',3I4,I9,':',3I4,I9,':',3I4,I9,':',3I4)
      ENDIF
      IF(IC(4))THEN
        IF(IC(16))WRITE(6,43)
   43     FORMAT(1H1/' ELEMENT HYDRAULIC CONDUCTIVITIES (m/d)'/)
        IF(.NOT.IC(16))WRITE(6,44)
   44     FORMAT(1H1/' ELEMENT HYDRAULIC CONDUCTIVITIES (ft/d)'/)
        WRITE(6,45)
   45   FORMAT(12X,'HYDRAUL. COND.',2(27X,'HYDRAUL. COND.'))
        WRITE(6,46)
   46   FORMAT(1X,3('ELEMENT    (HORZ.  VERT.)          ',5X)/)
        WRITE(6,47)(ELMENT,KX(ELMENT),KZ(ELMENT),ELMENT=1,NELM)
   47   FORMAT(1X,I5,':  ',E10.4,1X,E10.4,I17,':  ',E10.4,1X,
     &         E10.4,I17,':  ',E10.4,1X,E10.4)
      ENDIF
      RETURN
      END
**************************************************************************
      SUBROUTINE HEADS
**************************************************************************
C
C  SUBROUTINE WHICH CALCULATES THE STEADY-STATE HYDRAULIC HEAD DISTRIBUTION
C  IN A TWO-DIMENSIONAL CROSS-SECTION COMPRISED OF LINEAR TRIANGULAR
C  FINITE ELEMENTS.
C  THIS FINITE ELEMENT PROGRAM IS MODIFIED FROM VERGE AND FRIND (????)
C
**************************************************************************
C
C  SUBROUTINE PARAMETERS AND VARIABLES
C
C  ANGLE : ANGLE OF INCLINATION OF Kh AND Kv FROM A HORIZONTAL PLANE
C  ANGLER: ANGLE OF INCLINATION IN RADIANS
C  BX    : HORIZONTAL SHAPE FUNCTION
C  BZ    : VERTICAL SHAPE FUNCTION
C  CHEAD : CONSTANT HEAD VALUES
C  ELAREA: AREA OF A FINITE ELEMENT
C  F     : FLUX VECTOR
C  G     : GLOBAL CONDUCTIVITY MATRIX
C  GE    : ELEMENT CONDUCTIVITY MATRIX
C  HEAD  : HYDRAULIC HEAD VALUES
C  IDBBR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE DOMAIN BASE
C  IDWTR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE WATER TABLE
C  IN    : ELEMENT INCIDENCES
C  N     : NUMBER OF DEGREES OF FREEDOM (NODES WITH UNKNOWN HEAD VALUES)
```

```
C  IBANDE: ESTIMATED BANDWIDTH
C  IBAND : ACTUAL BANDWIDTH
C  NCHEAD: TOTAL NUMBER OF CONSTANT HEAD NODES
C  NCOL  : NUMBER OF COLUMNS OF NODES
C  NELME : ESTIMATED NUMBER OF ELEMENTS IN THE FINITE ELEMENT GRID
C  NELM  : ACTUAL NUMBER OF ELEMENTS IN THE FINITE ELEMENT GRID
C  NNODE : NUMBER OF NODES
C  NNODEE: ESTIMATED NUMBER OF NODES IN THE FINITE ELEMENT GRID
C  NROW  : NUMBER OF ROWS OF NODES
C  PHI   : MATRIX OF HEAD VALUES FOR OUTPUT TO A PLOTTING FILE
C  TYPE  : NODE TYPE IDENTIFIER
C
***********************************************************************************

      REAL*8 NX(3),NZ(3),BX,BZ,ELAREA,GE(3,3),XI(3),ZI(3)
      INTEGER ELMENT
      include 'dpct.inc'

C  IDENTIFY CONSTANT HEAD NODES
      K=0
      DO 20 IGT=1,NNODE
        IF(TYPE(IGT))K=K+1
        LC(IGT)=K
   20 CONTINUE
      NUHEAD=NNODE-NCHEAD

C  OUTPUT FINITE ELEMENT GRID SUMMARY
      WRITE(6, 24)NNODE,NELM,IBANDE,NCHEAD,NUHEAD
   24 FORMAT(1H1///1X,'FINITE ELEMENT GRID SUMMARY'//9X,
     &       'NUMBER OF NODES',I19/9X,'NUMBER OF ELEMENTS',I16/9X,
     &       'ESTIMATED BANDWIDTH',I15/9X,'NUMBER OF CONSTANT-HEAD NODES',
     &       I5/9X,'NUMBER OF DEGREES OF FREEDOM',I6)

C  CLEAR ARRAYS
      DO 30 I=1,NUHEAD
        DO 40 J=1,IBANDE
          G(I,J)=0.
   40   CONTINUE
        DO 35 J=1,NCHEAD
          GC(I,J)=0.
   35   CONTINUE
   30 CONTINUE

C  LOOP OVER ELEMENTS
      IBAND=0
      DO 70 ELMENT=1,NELM

C  ELEMENT CONDUCTIVITY MATRIX
        ANGLER=ANGLE*3.141593/180.
        COSA=COS(ANGLER)
        SINA=SIN(ANGLER)
        DO 50 I=1,3
          J=IN(ELMENT,I)
          XI(I)=COSA*X(J)+SINA*Z(J)
          ZI(I)=COSA*Z(J)-SINA*X(J)
   50   CONTINUE

C  BASIS FUNCTIONS
        NX(1)=ZI(2)-ZI(3)
        NX(2)=ZI(3)-ZI(1)
        NX(3)=ZI(1)-ZI(2)
        NZ(1)=XI(3)-XI(2)
        NZ(2)=XI(1)-XI(3)
        NZ(3)=XI(2)-XI(1)
        ELAREA=(XI(1)*ZI(2)-XI(2)*ZI(1)) + (XI(2)*ZI(3)-XI(3)*ZI(2)) +
     &         (XI(3)*ZI(1)-XI(1)*ZI(3))
        BZ= .5*KZ(ELMENT)/ELAREA
        BX= .5*KX(ELMENT)/ELAREA
        DO 55 I=1,3
        DO 55 J=1,3
          GE(I,J)=BX*NX(I)*NX(J)+BZ*NZ(I)*NZ(J)
   55 CONTINUE

C  GLOBAL CONDUCTANCE MATRIX
        DO 60 I=1,3
          KI=IN(ELMENT,I)
          IF(TYPE(KI))GO TO 60
          IIT=KI-LC(KI)
          DO 65 J=1,3
            KJ=IN(ELMENT,J)
            IF(TYPE(KJ))THEN
              JJT=LC(KJ)
              GC(IIT,JJT)=GC(IIT,JJT)+GE(I,J)
            ELSE
              JJT=KJ-LC(KJ)-IIT+1
              IF(JJT.LT.1)GO TO 65
              IF(JJT.GT.IBAND)IBAND=JJT
              IF(JJT.LE.IBANDE)THEN
                G(IIT,JJT)=G(IIT,JJT)+GE(I,J)
              ELSE
```

```
                WRITE(6,991)ELMENT,JJT
 991            FORMAT(///' *****************  ERROR  ****************'/
     &                 ' ELEMENT',I4,' REQUIRES BANDWIDTH OF',I4)
              ENDIF
            ENDIF
   65     CONTINUE
   60   CONTINUE

C  END OF ELEMENT LOOP
   70 CONTINUE

      WRITE(6,151)IBAND
 151  FORMAT(9X,'FINAL BANDWIDTH',15X,I4)
      IF(IBAND.GT.IBANDE)THEN
        WRITE(6,993)IBANDE,IBAND
 993    FORMAT(///' ******************  ERROR  ******************'/
     &         ' THE ESTIMATED BANDWIDTH IS TOO SMALL. INCREASE IT',
     &         ' FROM',I4,' TO THE REQUIRED BANDWIDTH OF ',I4/)
        STOP
      ENDIF
      IBANDE=IBAND

C  FLUX VECTOR
      DO 80 I=1,NUHEAD
        F(I)=0.0
        DO 85 K=1,NCHEAD
          F(I)=F(I)-GC(I,K)*CHEAD(K)
   85   CONTINUE
   80 CONTINUE

C  SOLVE FOR HEAD VALUES
      CALL SOLVE(NUHEAD)

C  EXPAND HEAD VECTOR
      KK=NCHEAD
      DO 90 IGT=NNODE,1,-1
        IF(TYPE(IGT))THEN
          HEAD(IGT)=CHEAD(KK)
          KK=KK-1
        ELSE
          K=IGT-LC(IGT)
          HEAD(IGT)=HEAD(K)
        ENDIF
   90 CONTINUE

C  OUTPUT STEADY-STATE HYDRAULIC HEAD DISTRIBUTION
      IF(IC(5))THEN
        IF(IC(16))WRITE(6,101)
 101    FORMAT(1H1///1X,'STEADY-STATE HYDRAULIC HEAD DISTRIBUTION',
     &         '(meters above an datum)'//)
        IF(.NOT.IC(16))WRITE(6,102)
 102    FORMAT(1H1///1X,'STEADY-STATE HYDRAULIC HEAD DISTRIBUTION',
     &         '(feet above an datum)'//)
        WRITE(6,103)
 103    FORMAT(1X,5(' NODE  TOTAL-HEAD',5X)/)
        WRITE(6,104)(IGT,HEAD(IGT),IGT=1,NNODE)
 104    FORMAT(1X,I5,F13.3,I10,F13.3,I10,F13.3,I10,F13.3,I10,F13.3)
      ENDIF

C  PREPARE DATA FOR HEAD PLOT
      IF(.NOT.IC(6))RETURN
      IGT=0
      DO 95 I=1,NCOL
      DO 95 J=1,NROW
        IF(J.GT.IDWTR(I).OR. J.LT.IDBBR(I))THEN
          PHI(I,J)=1.0E+35
        ELSE
          IGT=IGT+1
          PHI(I,J)=HEAD(IGT)
        ENDIF
   95 CONTINUE
      DO 97 J=1,NROW
        WRITE(10,825)(PHI(I,J),I=1,NCOL)
 825    FORMAT(10E12.5)
   97 CONTINUE
      RETURN
      END
*******************************************************************************
      SUBROUTINE SOLVE(N)
*******************************************************************************
*
*  SUBROUTINE WHICH DECOMPOSES THE GLOBAL CONDUCTIVITY MATRIX BY THE
*  CHOLESKY SQUARE ROOT METHOD FOR SYMMETRIC, BANDED MATRICES AND
*  SOLVES FOR THE UNKNOWNS IN A SYSTEM OF LINEAR EQUATIONS BY BACK
*  SUBSTITUTION OF THE DECOMPOSED GLOBAL CONDUCTIVITY MATRIX
*
*******************************************************************************
      REAL*8 TEMP,SUM
      include 'dpct.inc'

```

```
C  DECOMPOSE THE GLOBAL CONDUCTIVITY MATRIX
      DO 20 I=1,N
        IP=N-I+1
        IF(IBANDE.LT.IP)IP=IBANDE
        DO 20 J=1,IP
        IQ=IBANDE-J
        IF((I-1).LT.IQ)IQ=I-1
        SUM=G(I,J)
        IF(IQ.GE.1)THEN
          DO 25 K=1,IQ
            IIt=I-K
            JZ=J+K
            SUM=SUM-G(IIt,K+1)*G(IIt,JZ)
   25     CONTINUE
        ENDIF
        IF(J.NE.1)THEN
          G(I,J)=SUM*TEMP
          GO TO 20
        ENDIF
        IF(SUM.LE.0.)THEN
          WRITE(6,999)I
  999     FORMAT(///10X,'DECOMPOSITION FAILED AT ROW',I6,
     &          '  :  EXECUTION TERMINATED')
          STOP
        ELSE
          TEMP=1./DSQRT(SUM)
          G(I,J)=TEMP
        ENDIF
   20 CONTINUE

C  SOLVE FOR THE HEADS
      DO 40 I=1,N
        J=I-IBANDE+1
        IF((I+1).LE.IBANDE)J=1
        SUM=F(I)
        K1=I-1
        IF(J.LE.K1)THEN
          DO 50 K=J,K1
            IIt=I-K+1
            SUM=SUM-G(K,IIt)*HEAD(K)
   50     CONTINUE
        ENDIF
        HEAD(I)=SUM*G(I,1)
   40 CONTINUE
      DO 60 I=N,1,-1
        J=I+IBANDE-1
        IF(J.GT.N)J=N
        SUM=HEAD(I)
        K2=I+1
        IF(K2.LE.J)THEN
          DO 70 K=K2,J
            KK=K-I+1
            SUM=SUM-G(I,KK)*HEAD(K)
   70     CONTINUE
        ENDIF
        HEAD(I)=SUM*G(I,1)
   60 CONTINUE
      RETURN
      END
*******************************************************************************
      SUBROUTINE VELCTY
*******************************************************************************
*
*  SUBROUTINE WHICH CALCULATES THE HORIZONTAL AND VERTICAL AVERAGE
*  LINEAR GROUNDWATER VELOCITIES FOR EACH FINITE ELEMENT IN THE CROSS-SECTION
*
*******************************************************************************
C
C   SUBROUTINE PARAMETERS AND VARIABLES
C
C  DELX  : HORIZONTAL NODE SPACING, IN METERS
C  DELZ  : VERTICAL NODE SPACING, IN METERS
C  ELMENT: ELEMENT NUMBER COUNTER
C  HEAD  : CALCULATED HEAD DISTRIBUTION
C  ICC   : HORIZONTAL ELEMENT COUNTER
C  IRR   : VERTICAL ELEMENT COUNTER
C  IDBBR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE DOMAIN BASE
C  IDWTR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE WATER TABLE
C  IN    : FINITE ELEMENT INCIDENCES
C  IGT   : NODE NUMBER COUNTER
C  KX    : HORIZONTAL HYDRAULIC CONDUCTIVITY OF AN ELEMENT
C  KZ    : VERTICAL HYDRAULIC CONDUCTIVITY OF AN ELEMENT
C  MAPGEO: CODE IDENTIFYING THE GEOLOGIC UNITS
C  NCOL  : NUMBER OF COLUMNS OF NODES
C  NELME : ESTIMATED NUMBER OF ELEMENTS IN THE FINITE ELEMENT GRID
C  NHCELL: NUMBER OF CELLS IN THE HORIZONTAL DIRECTION
C  NNODEE: ESTIMATED NUMBER OF NODES IN THE FINITE ELEMENT GRID
C  NROW  : NUMBER OF ROWS OF NODES
C  NVELM : NUMBER OF ELEMENTS IN THE VERTICAL DIRECTION
C  POR   : POROSITY VALUE ASSIGNED TO A GEOLOGIC UNIT
```

```
C  VX    : GROUNDWATER VELOCITY IN THE HORIZONTAL DIRECTION
C  VZ    : GROUNDWATER VELOCITY IN THE VERTICAL DIRECTION
C
C*******************************************************************************

      include 'dpct.inc'

      IGT=0
      ELMENT=0
      ICC=0
      DO 20 I=1,NHCELL
        IRR=0
        ICC=ICC+1
        DO 25 J=1,NVCELL
          IF(J.LT.IDBBR(I) .OR. J.GE.IDWTR(I))GO TO 26
          IGT=IGT+1
          IF(J.LT.IDBBR(I+1) .OR. J.GE.IDWTR(I+1))GO TO 26
          IRR=IRR+1
          ELMENT=ELMENT+1
          IGTC=IDWTR(I)-IDBBR(I+1)+1
          I1=IGT
          I2=IGT+IGTC
          I3=IGT+IGTC+1
          VX(ICC,IRR)=((HEAD(I1)-HEAD(I2))/DELX)*KX(ELMENT)/
     &                POR(MAPGEO(I,J))
          VZ(ICC,IRR)=((HEAD(I2)-HEAD(I3))/DELZ)*KZ(ELMENT)/
     &                POR(MAPGEO(I,J))
          IRR=IRR+1
          ELMENT=ELMENT+1
          I1=IGT
          I2=IGT+IGTC+1
          I3=IGT+1
          VX(ICC,IRR)=((HEAD(I3)-HEAD(I2))/DELX)*KX(ELMENT)/
     &                POR(MAPGEO(I,J))
          VZ(ICC,IRR)=((HEAD(I1)-HEAD(I3))/DELZ)*KZ(ELMENT)/
     &                POR(MAPGEO(I,J))
          GO TO 25
   26     IRR=IRR+2
          VX(ICC,IRR)=0.0
          VZ(ICC,IRR)=0.0
          VX(ICC,IRR-1)=0.0
          VZ(ICC,IRR-1)=0.0
   25   CONTINUE
        IGT=IGT+1
   20 CONTINUE

C  PRINT THE VELOCITY FIELD
      IF(.NOT.IC(8))RETURN
      IF(IC(16))WRITE(6,101)
  101 FORMAT(1H1/' VELOCITY FIELD (meters/day)')
      IF(.NOT.IC(16))WRITE(6,102)
  102 FORMAT(1H1/' VELOCITY FIELD (feet/day)')
      I2=0
   42 I2=I2+9
      I1=I2-8
      IF(NHCELL.LT.I2)I2=NHCELL
      WRITE(6,104)(I,I=I1,I2)
  104 FORMAT(//1X,8X,'COLUMN:',I3,8I13)
      DO 80 J=NVELM,1,-1
        WRITE(6,106)J,(VX(I,J),I=I1,I2)
  106   FORMAT(/1X,'ROW',I3,'  HORZ:',9(3X,E10.4))
        WRITE(6,107)(VZ(I,J),I=I1,I2)
  107   FORMAT(1X,8X,'VERT:',9(3X,E10.4))
   80 CONTINUE
      IF(I2.LT.NHCELL)GO TO 42
C
      RETURN
      END
*******************************************************************************
      SUBROUTINE TRANS
*******************************************************************************
*
*  SUBROUTINE WHICH TRANSPORTS PARTICLES THROUGH THE CROSS-SECTION BY MOVING
*  THE PARTICLES FROM ONE CELL TO THE NEXT BY RANDOM MOTION WITHIN THE
*  VELOCITY FIELD
*
*******************************************************************************
C
C     SUBROUTINE PARAMETERS AND VARIABLES
C
C  AT    : CONCENTRATION OF THE CONTAMINANT IN THE SYSTEM (ONE VALUE PER CELL)
C  BULK  : BULK DENSITY OF EACH GEOLOGIC UNIT (mg/ft3  or  mg/m3)
C  CEC   : CATION EXCHANGE CAPACITY VALUES ASSIGNED TO A GEOLOGIC UNIT
C  CONC  : CURRENT CONCENTRATION OF THE CONTAMINANT IN THE SYSTEM
C  CONCP : PREVIOUS CONCENTRATION OF THE CONTAMINANT IN THE SYSTEM
C  CONCR : CONCENTRATION OF THE CONTAMINANT IN A RECEIVING CELL
C  DELT  : SIZE OF THE TIME-STEP (days)
C  DELX  : HORIZONTAL NODE SPACING (meters  or  feet)
C  DELXH : 1/2 HORIZONTAL NODE SPACING
C  DELZ  : VERTICAL NODE SPACING (meters  or  feet)
```

```
C  DELZH : 1/2 VERTICAL NODE SPACING
C  DELZQ : 1/4 VERTICAL NODE SPACING
C  DIFF  : COEFFICIENT OF BULK DIFFUSION (m2/d or ft2/d)
C  DISP  : LONGITUDINAL DISPERSIVITY VALUES FOR EACH GEOLOGIC UNIT (meters or fe
C  DISPLO: PARTICLE DISPLAYMENT IN LONGITUDINAL DIRECTION DUE TO DISPERSION
C  DISPTR: PARTICLE DISPLAYMENT IN TRANSVERSE DIRECTION DUE TO DISPERSION
C  DIST  : DISTANCE A PARTICLE MOVES
C  HAFLIF: HALF-LIFE OF THE CONTAMINANT (days)
C  IDBBR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE DOMAIN BASE
C  IDWTR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE WATER TABLE
C  ITIME : TIME-STEP COUNTER
C  IPART : PARTICLE COUNTER
C  IXE   : COLUMN NUMBER OF THE ELEMENT WHICH CONTAINS THE PARTICLE
C  IXEP  : PREVIOUS COLUMN NUMBER OF THE ELEMENT CONTAINING THE PARTICLE
C  IZE   : ROW NUMBER OF THE ELEMENT WHICH CONTAINS THE PARTICLE
C  IZEP  : PREVIOUS ROW NUMBER OF THE ELEMENT CONTAINING THE PARTICLE
C  IY    : RANDOM NUMBER GENERATOR SEED
C  KD    : DISTRIBUTION COEFFICIENT
C  KNPER : NUMBER OF PARTICLES ADDED AT A PARTICULAR TIME-STEP
C  KTIME : COUNTER TO DETERMINE THE NUMBER OF TIME-STEPS THAT PASS
C          BEFORE RESULTS ARE OUTPUT
C  LCOL  : COLUMN IDENTIFIER FOR CELLS WHICH INITIALLY RECEIVE THE CONTAMINANT
C  LROW  : ROW IDENTIFIER FOR CELLS WHICH INITIALLY RECEIVE THE CONTAMINANT
C  LPDH  : UNIT NUMBER ASSIGNED TO THE DEVICE INTO WHICH THE DISTRIBUTION
C          OF PARTICLES ARE STORED FOR PLOTTING
C  MAPGEO: CODE IDENTIFYING THE HYDROSTRATIGRAPHIC UNITS
C  MASS  : MASS ASIGNED TO EACH PARTICLE
C  MASSI : INITIAL MASS OF THE PARTICLES (mg)
C  NCOL  : NUMBER OF COLUMNS OF NODES
C  NHCELL: NUMBER OF CELLS IN THE HORIZONTAL DIRECTION
C  NVCELL: NUMBER OF CELLS IN THE VERTICAL DIRECTION
C  NPART : TOTAL NUMBER OF PARTICLES CURRENTLY IN SYSTEM
C  NPER  : NUMBER OF CONTAMINANT PARTICLES ADDED DURING EACH TIME-STEP
C  NPGONE: DISTRIBUTION OF THE PARTICLES THAT HAVE LEFT THE CONFINING
C          BED (NUMBER OF PARTICLES PER CELL)
C  NPCELL: DISTRIBUTION OF PARTICLES IN THE CONFINING BED (TOTAL NUMBER
C          OF PARTICLES PER CELL)
C  NROW  : NUMBER OF ROWS OF NODES
C  NRCELL: NUMBER OF CELLS WHICH INITIALLY RECEIVE CONTAMINANTS
C  NTIME : TOTAL NUMBER OF TIME-STEPS
C  NSKIP : NUMBER OF TIME-STEPS THAT PASS BEFORE RESULTS ARE PRINTED
C  NXX   : TOTAL NUMBER OF PARTICLES THAT HAVE LEFT THE CONFINING BED
C  NXY   : TOTAL NUMBER OF PARTICLES THAT HAVE LEFT THE FLOW SYSTEM
C  NVELM : NUMBER OF ELEMENTS IN THE VERTICAL DIRECTION
C  POR   : POROSITY VALUES ASSIGNED TO A GEOLOGIC UNIT
C  PTC   : PARTICLE TRANSPORT CODE (IDENTIFIES CELLS WHERE PARTICLES
C          ARE ALLOWED TO MOVE)
C  RDC   : DECAY RATE COEFFICIENT
C  RNSEED: RANDOM NUMBER GENERATOR SEED
C  RONE  : RANDOM NUMBER USED TO CALCULATE THE DISPERSION OF A PARTICLE
C  RTWO  : RANDOM NUMBER USED TO CALCULATE THE DISPERSION OF A PARTICLE
C  SOLUTE: TOTAL CONCENTRATION OF THE CONTAMINANT IN SOLUTION
C  TIME  : TOTAL TIME THAT HAS PASSED, IN DAYS
C  UNITS : DISTANCE UNITS USED IN A SIMULATION (ft OR m)
C  UNITF : LABEL FOR DISTANCE UNITS IN FEET
C  UNITM : LABEL FOR DISTANCE UNITS IN METERS
C  VEL   : AVERAGE VELOCITY OF A PARTICLE
C  VELX  : HORIZONTAL VELOCITY OF A PARTICLE
C  VELZ  : VERTICAL VELOCITY OF A PARTICLE
C  VOLUME: VOLUME OF A CELL (m3 OR ft3)
C  VX    : GROUNDWATER VELOCITY IN THE HORIZONTAL DIRECTION
C  VZ    : GROUNDWATER VELOCITY IN THE VERTICAL DIRECTION
C  XMAX  : TOTAL LENGTH OF THE CROSS-SECTION
C  XPOSP : FORMER X CO-ORDINATE OF A PARTICLE
C  XPOS  : X CO-ORDINATE OF THE LOCATION OF A PARTICLE
C  YEAR  : TOTAL TIME THAT HAS PASSED, IN YEARS
C  YFL   : RANDOM NUMBER
C  ZMAX  : TOTAL HEIGHT OF THE CROSS-SECTION
C  ZPOSP : FORMER Z CO-ORDINATE OF A PARTICLE
C  ZPOS  : Z CO-ORDINATE OF THE LOCATION OF A PARTICLE
C
********************************************************************************

      REAL*8 VX1,VX2,VX3,VX4,VZ1,VZ2,VZ3,VZ4,KD,VOLUME
      REAL RANO
      INTEGER RNSEED
      CHARACTER*4 UNITS, UNITF, UNITM
      DATA UNITF/'(ft)'/, UNITM/'(m) '/

      include 'dpct.inc'

      IF(IC(16))THEN
        UNITS = UNITM
C  CONVERT m3 TO LITERS
        VOLUME = DELX*DELZ*1000.0
      ENDIF
      IF(.NOT.IC(16))THEN
        UNITS = UNITF
C  CONVERT ft3 TO LITERS
        VOLUME = DELX*DELZ*28.317
```

```
      ENDIF
      VOL1 = 1.0

C  CHECK FOR ERROR IN THE INPUT DATA
      IF(.NOT.IC(7))THEN
        WRITE(6,991)
  991   FORMAT(///' ******************   ERROR  ******************'/
     &    ' THE VELOCITY FIELD MUST BE CALCULATED BEFORE THE'/
     &    ' MASS TRANSPORT ROUTINE CAN BE RUN; RESET IC(7)=T'/)
        STOP
      ENDIF
      IF(NRCELL.EQ.0)THEN
        WRITE(6,992)
  992   FORMAT(///' ******************   ERROR  ******************'/
     &    ' A SOUCE CELL FOR THE CONTAMINANT AND THE NUMBER'/
     &    ' OF PARTICLES ENTERED DURING EACH TIME STEP MUST'/
     &    ' BE SPECIFIED BEFORE THE MASS TRANSPORT ROUTINE'/
     &    ' CAN BE RUN; RESET NRCELL >0 AND ENTER PARTICLES'/)
        STOP
      ENDIF
      DELXH=.5*DELX
      DELZH=.5*DELZ
      DELZQ=.25*DELZ
      DELZT=DELZ+DELZ
      XMAX=FLOAT(NHCELL)*DELX
      RNSEED = 54781
      TIME=0.0
      KTIME=0
      NXY=0
      NXX=0
      ITIME=1
      RDC=0.0
      IF(HAFLIF.GT.0.0)RDC=ALOG(2.0)/HAFLIF
      WRITE(6,101)
  101 FORMAT(1H1,'  ****   BEGIN MASS TRANSPORT SIMULATION   ****')
      DO 10 I=1,NHCELL
      DO 10 J=1,NVCELL
        CONCR(I,J)=1.0
        NPGONE(I,J)=0
   10 CONTINUE

C  LOOP THROUGH THE SIMULATION

C  ADD NEW PARTICLES TO GRID AND RANDOMLY PLACE THEM IN THE SOURCE CELL
      NPART=0
    1 DO 20 K=1,NRCELL
        KNPER=NPER(K,ITIME)
        write(7,1002)ITIME,knper
1002    format(' time step:',i3,'    particles added:',i10)
        DO 25 J=1,KNPER
          NPART=NPART+1
        write(7,1001)NPART, ITIME
1001    format('  adding particle:',i3,'  at time step:',i3)
          RONE = RAN0(RNSEED)
          XPOS(NPART)=FLOAT(LCOL(K)-1)*DELX+RONE*DELX
          LLRR=LROW(K)
          ZPOS(NPART)=FLOAT(LLRR)*DELZ-.4*DELZ
          MASS(NPART)=MASSI
   25   CONTINUE
   20 CONTINUE

C  CLEAR CONCENTRATION AND PARTICLE COUNTER ARRAYS
      DO 30 I=1,NHCELL
      DO 30 J=1,NVCELL
        CONC(I,J)=0.0
        NPCELL(I,J)=0
   30 CONTINUE

      TIME=TIME+DELT
      KTIME=KTIME+1

C  MOVE PARTICLES ONE AT A TIME
      DO 50 IPART=1,NPART

C  CHECK TO SEE IF A PARTICLE HAS LEFT THE FLOW SYSTEM
      IF (XPOS(IPART).LT.0.0) GO TO 50

C  FIND POSITION OF THE PARTICLE
      IXE=IFIX(XPOS(IPART)/DELX)+1
      IZE=IFIX(ZPOS(IPART)/DELZ)+1
      IXEP=IXE
      IZEP=IZE
      XPOSP=XPOS(IPART)
      ZPOSP=ZPOS(IPART)

C  CALCULATE THE MASS OF A PARTICLE
      MASS(IPART)=MASS(IPART)*(CONCR(IXE,IZE)*VOL1)

C  INTERPOLATE VELOCITIES AT THE LOCATION OF EACH PARTICLE
      ITEST=0
```

```
      IZCE=IFIX(ZPOS(IPART)/DELZH)+1
      AA=XPOS(IPART)-DELX*(IXE-.5)
      IXN=IFIX(AA/ABS(AA))+IXE
      AA=ZPOS(IPART)-(DELZH*(IZCE-1)-DELZQ)
      IZCN=IFIX(AA/ABS(AA))+IZCE
C  FIND VELOCITY OF ELEMENT CONTAINING THE PARTICLE
      VX1=VX(IXE,IZCE)
      VZ1=VZ(IXE,IZCE)
C  FIND VELOCITY IN THE ELEMENT ABOVE OR BELOW THE PARTICLE
      IZNN=(IZCN+1)/2
      IF(IZNN.LT.IDBBR(IXE) .OR. IZNN.LT.IDBBR(IXE+1))THEN
        VX2=VX1
        VZ2=-VZ1
        IF(CHVAL(IXE,IZE).GT.-1.E34 .AND. CHVAL(IXE+1,IZE).GT.-1.E34)
     &        VZ2=VZ1
      ELSEIF(IZNN.GE.IDWTR(IXE) .OR. IZNN.GE.IDWTR(IXE+1))THEN
        VX2=VX1
        VZ2=-VZ1
        IF(CHVAL(IXE,IZE+1).GT.-1.E34 .AND. CHVAL(IXE+1,IZE+1).GT.
     &        -1.0E+34)VZ2=VZ1
      ELSE
        VX2=VX(IXE,IZCN)
        VZ2=VZ(IXE,IZCN)
        ITEST=1
      ENDIF
C  FIND VELOCITY IN THE ELEMENT TO THE LEFT OR RIGHT OF THE PARTICLE
      IF(IXN.LT.1)GO TO 63
      IF(IXN.GE.NCOL)GO TO 64
      IF(IZE.LT.IDBBR(IXN) .AND. IXN.GT.IXE)GO TO 64
      IF(IZE.LT.IDBBR(IXN) .AND. IXN.LT.IXE)GO TO 63
      IF(IZE.GE.IDWTR(IXN) .AND. IXN.LT.IXE)GO TO 63
      IF(IZE.GE.IDWTR(IXN) .AND. IXN.GT.IXE)GO TO 64
      VX3=VX(IXN,IZCE)
      VZ3=VZ(IXN,IZCE)
C  CHECK FOR BOUNDARY
      IF(ITEST.EQ.0)GO TO 67
      VX4=VX(IXN,IZCN)
      VZ4=VZ(IXN,IZCN)
      GO TO 66
   63 VX3=-VX1
      VZ3=VZ1
      IF(CHVAL(IXE,IZE).GT.-1.0E+34 .AND.
     &   CHVAL(IXE,IZE+1).GT.-1.0E+34)VX3=VX1
      GO TO 67
   64 VX3=-VX1
      VZ3=VZ1
      IF(CHVAL(IXN,IZE).GT.-1.0E+34 .AND.
     &   CHVAL(IXN,IZE+1).GT.-1.0E+34)VX3=VX1
C  FIND VELOCITY OF CELL DIAGONAL TO PARTICLE
   67 VX4=VX3
      VZ4=VZ2

C  FIND AVERAGE HORIZONTAL VELOCITY OF THE PARTICLE
   66 ZLOC=(ZPOS(IPART)-(IZCE*DELZH-DELZQ))/DELZH
      XLOC=(XPOS(IPART)-(IXE*DELX-DELXH))/DELX
      A24=XLOC*(VX4-VX2)
      A13=XLOC*(VX3-VX1)
      VX24=VX2+A24
      VX13=VX1+A13
      VELX=VX13+ZLOC*(VX24-VX13)
      IF(IXE.GE.IXN)THEN
        VX24=VX2-A24
        VX13=VX1-A13
        VELX=VX13-ZLOC*(VX24-VX13)
      ENDIF
C  FIND THE AVERAGE VERTICAL VELOCITY OF THE PARTICLE
      A12=ZLOC*(VZ2-VZ1)
      A34=ZLOC*(VZ4-VZ3)
      VZ12=VZ1+A12
      VZ34=VZ3+A34
      VELZ=VZ12+XLOC*(VZ34-VZ12)
      IF(IZCE.GE.IZCN)THEN
        VZ12=VZ1-A12
        VZ34=VZ3-A34
        VELZ=VZ12-XLOC*(VZ34-VZ12)
      ENDIF
C  FIND NET VELOCITY OF THE PARTICLE
      VEL=SQRT(VELX*VELX+VELZ*VELZ)

C  MOVE PARTICLE TO A NEW POSITION BY ADVECTIVE MOTION
      XPOS(IPART) = XPOSP + DELT*VELX
      ZPOS(IPART) = ZPOSP + DELT*VELZ

C  GENERATE RANDOM NUMBERS TO RANDOMLY MOVE THE PARTICLES BY DISPERSION
      RONE=RANO(RNSEED)
      RTWO=RANO(RNSEED)
      RONE=0.5-RONE
      RTWO=0.5-RTWO

C  CALCULATE THE DISPERSIVE LENGTHS FOR A PARTICLE
```

```
      DISPLO=SQRT(24.0*(DISP(MAPGEO(IXE,IZE))*VEL + DIFF)*DELT)
      DISPTR=SQRT(24.0*(0.25*DISP(MAPGEO(IXE,IZE))*VEL + DIFF)*DELT)

C  MOVE PARTICLES TO A NEW POSITION BY DISPERSIVE MOTION
      XPOS(IPART)=XPOS(IPART) + (DISPLO*VELX*RONE+DISPTR*VELZ*RTWO)/VEL
      ZPOS(IPART)=ZPOS(IPART) + (DISPLO*VELZ*RONE+DISPTR*VELX*RTWO)/VEL

C  FIND ROW AND COLUMN NUMBER OF THE CELL WHICH CONTAINS THE PARTICLE
      IXE=IFIX(XPOS(IPART)/DELX)+1
      IZE=IFIX(ZPOS(IPART)/DELZ)+1
      IF(XPOS(IPART).LT.0.)IXE=0.0
      IF(ZPOS(IPART).LT.0.)IZE=0.0
      IF(IABS(IXE).GT.NCOL+NCOL .OR. IABS(IZE).GT.NROW+NROW)THEN
        WRITE(6,46)IXE,IZE
   46   FORMAT(//'*******************  ERROR  *******************'/
     &   ' A PARTICLE HAS MOVED TOO FAR BEYOND THE EDGE OF'/
     &   ' THE REGION; THE CALCULATED ROW AND COLUMN ARE:',
     &   2I10/' CHECK PARTICLE TRANSPORT CODE'/)
        STOP
      ENDIF

C  CHECK BOUNDARY CONDITIONS ON PARTICLE MOTION
   40 IF(IXE.LT.1 .OR. IXE.GE.NCOL)GO TO 41
      IF(IZE.GE.IDWTR(IXE) .OR. IZE.GE.IDWTR(IXE+1))GO TO 41
      IF(IZE.GE.IDBBR(IXE) .AND. IZE.GE.IDBBR(IXE+1))GO TO 49
C  DETERMINE IF PARTICLE MOVED HORIZONTALLY OR VERTICALLY OUT OF THE ELEMENT
   41 A=1.E35
      IF(IZEP.GT.IZE)A=ZPOSP-(IZEP-1)*DELZ
      IF(IZEP.LT.IZE)A=IZEP*DELZ-ZPOSP
      B=1.E+35
      IF(IXEP.GT.IXE)B=XPOSP-(IXEP-1)*DELX
      IF(IXEP.LT.IXE)B=IXEP*DELX-XPOSP
      MOVHOR=.TRUE.
      IF(A/VELZ .LT. B/VELX)MOVHOR=.FALSE.
      IF(MOVHOR .AND. IXE.LT.IXEP)GO TO 42
      IF(MOVHOR .AND. IXE.GT.IXEP)GO TO 43
      IF(.NOT.MOVHOR .AND. IZE.LT.IZEP)GO TO 44
      IF(.NOT.MOVHOR .AND. IZE.GT.IZEP)GO TO 45
C  ADJUST FOR VERTICAL MOVEMENT OUT OF THE ELEMENT
   45 IF(CHVAL(IXEP,IZEP+1).GT.-1.0E+34 .AND. CHVAL(IXEP+1,IZEP+1).GT.
     &   -1.0E+34)GO TO 53
      ZPOS(IPART)=2.*(IZEP+1)*DELZ-ZPOS(IPART)
      GO TO 48
   44 IF(CHVAL(IXEP,IZEP).GT.-1.0E+34 .AND. CHVAL(IXEP+1,IZEP).GT.
     &    -1.0E+34)GO TO 53
      ZPOS(IPART)=2.*(IZEP-1)*DELZ-ZPOS(IPART)
      GO TO 48
C  ADJUST FOR HORIZONTAL MOVEMENT OUT OF THE ELEMENT
   43 IF(CHVAL(IXEP+1,IZEP).GT.-1.0E+34 .AND. CHVAL(IXEP+1,IZEP+1).GT.
     &   -1.0E+34)GO TO 53
      XPOS(IPART)=2.*(IXEP+1)*DELX-XPOS(IPART)
      GO TO 48
   42 IF(CHVAL(IXEP,IZEP).GT.-1.0E+34 .AND. CHVAL(IXEP,IZEP+1).GT.
     &       -1.0E+34)GO TO 53
      XPOS(IPART)=2.*(IXEP-1)*DELX-XPOS(IPART)
C  FIND THE NEW POSITION OF THE PARTICLE
   48 IXE=IFIX(XPOS(IPART)/DELX)+1
      IZE=IFIX(ZPOS(IPART)/DELZ)+1
      GO TO 40

C  CHECK TO SEE IF THE PARTICLE IS IN A REGION OF NO MOVEMENT
   49 IF(.NOT.PTC(IXE,IZE))GO TO 52
      NPCELL(IXE,IZE)=NPCELL(IXE,IZE)+1
      IF(RDC.GT.0.0)MASS(IPART)=MASS(IPART)*EXP(-RDC*DELT)
C  CONC(IXE,IZE) BELOW IS ACTUAL TOTAL MASS PER CELL
      CONC(IXE,IZE) = CONC(IXE,IZE) + MASS(IPART)
      GO TO 50
   52 NXX=NXX+1
      NPGONE(IXE,IZE)=NPGONE(IXE,IZE)+1
      XPOS(IPART)=-1.0
      GO TO 50
C  PARTICLE HAS LEFT THE FLOW SYSTEM
   53 NXY=NXY+1
      XPOS(IPART)=-1.

C  END PARTICLE MOVEMENT LOOP
   50 CONTINUE

C  CALCULATE CONCENTRATION (mg/L) AND DISTRIBUTION OF PARTICLES IN A CELL
      DO 80 I=1,NHCELL
      DO 80 J=1,NVCELL
        IF(CONC(I,J).NE.0.0)THEN
        KD = SELC*CEC(MAPGEO(I,J))/SOLUTE
        CONCI=CONC(I,J)/(POR(MAPGEO(I,J))*VOLUME)
        BULKP=BULK(MAPGEO(I,J))/POR(MAPGEO(I,J))
C  CONC(I,J) BELOW IS CONVERTED FROM A MASS/CELL TO A CONCENTRATION/CELL
        CONC(I,J)=(CONCI + KD*BULKP*CONCP(I,J))/(1. + KD*BULKP)
        CONCR(I,J)=CONC(I,J)/CONCI
        CONCP(I,J)=CONC(I,J)
        ENDIF
```

```
      80 CONTINUE

C  WRITE SIMULATION RESULTS
      YEAR=TIME/365.0
      IK=KTIME/NSKIP*NSKIP
      IF(IK.NE.KTIME .AND. KTIME.NE.NTIME)GO TO 90
      WRITE(6,130)YEAR,TIME
  130 FORMAT(1H1,'ELASPED TIME IN YEARS:',F13.2/
     &       ' ELAPSED TIME IN DAYS:',F13.2/)
      WRITE(6,131)NPART
  131 FORMAT(/' TOTAL NUMBER OF PARTICLES ADDED:',2X,I5/)
      DO 245 K=1,NRCELL
      WRITE(6,141)NPER(K,ITIME),LROW(K),LCOL(K)
  245 CONTINUE
  141 FORMAT(1X,I5,' PARTICLES ADDED AT ROW',I3,', COLUMN',I3)

C  PRINT THE DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES
      IF(IC(15))THEN
        WRITE(6,145)
  145   FORMAT(///' DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES'/)
        WRITE(6,146)NXX,NPART
  146   FORMAT(I9,' OUT OF',I5,' PARTICLES HAVE LEFT THE CONFINING BED')
        WRITE(6,147)NXY,NPART
  147   FORMAT(I9,' OUT OF',I5,' PARTICLES HAVE LEFT THE FLOW SYSTEM'//)
        DO 250 I=1,NHCELL
          WRITE(6,150)(NPGONE(I,J),J=1,NVCELL)
  250   CONTINUE
  150   FORMAT(1X,25I5)
      ENDIF

C  PRINT THE DISTRIBUTION OF REFERENCE PARTICLES
      IF(IC(12))THEN
        WRITE(6,130)YEAR,TIME
        WRITE(6,160)
  160   FORMAT(//' DISTRIBUTION OF REFERENCE PARTICLES'//)
        DO 255 I=1,NHCELL
          WRITE(6,150)(NPCELL(I,J),J=1,NVCELL)
  255   CONTINUE
C  PRINT THE CONCENTRATION DISTRIBUTION
        WRITE(6,130)YEAR,TIME
        WRITE(6,170)
  170   FORMAT(//' CONCENTRATION DISTRIBUTION (mg/L)'//)
        DO 260 I=1,NHCELL
          WRITE(6,172)(CONC(I,J),J=1,NVCELL)
  260   CONTINUE
  172   FORMAT(1X,20F6.2)
      ENDIF

C  OUTPUT DISTRIBUTION OF PARTICLES TO A PLOTTING FILE
      IF(IC(13))THEN
        WRITE(11,851)YEAR
  851   FORMAT(1F10.1)
        DO 810 J=1,NVCELL
          WRITE(11,852)(NPCELL(I,J),I=1,NHCELL)
  810   CONTINUE
  852   FORMAT(10I10)
      ENDIF

C  OUTPUT CONCENTRATION DISTRIBUTION TO A PLOTTING FILE
      IF(IC(14))THEN
        WRITE(12,851)YEAR
        DO 820 J=1,NVCELL
          WRITE(12,822)(CONC(I,J),I=1,NHCELL)
  820   CONTINUE
  822   FORMAT(10E10.4)
      ENDIF

C  END OF SIMULATION LOOP
   90 ITIME=ITIME+1
      IF(ITIME.LE.NTIME)GO TO 1
      RETURN
      END
*********************************************************************
      SUBROUTINE ESCAPE
*********************************************************************
*
*  SUBROUTINE WHICH CALCULATES THE MINIMUM TIME REQUIRED FOR A PARTICLE TO
*  LEAVE A CELL UNDER THE INFLUENCE OF THE GROUNDWATER VELOCITY FIELD ONLY.
*
*********************************************************************
C
C  SUBROUTINE PARAMETERS AND VARIABLES
C
C  DELX  : HORIZONTAL NODE SPACING, IN METERS
C  DELZ  : VERTICAL NODE SPACING, IN METERS
C  EXT   : MINIMUM TIME REQUIRED FOR A PARTICLE TO LEAVE A CELL UNDER THE
C          INFLUENCE OF GROUNDWATER FLOW ONLY
C  IDWTR : ROW NUMBERS (1/COL) THAT DEFINES THE POSITION OF THE WATER TABLE
C  NCOL  : NUMBER OF COLUMNS OF NODES
C  NHCELL: NUMBER OF CELLS IN THE HORIZONTAL DIRECTION
```

```
C  NROW  : NUMBER OF ROWS OF NODES
C  NVCELL: NUMBER OF CELLS IN THE VERTICAL DIRECTION
C  NVELM : NUMBER OF ELEMENTS IN THE VERTICAL DIRECTION
C  VX    : GROUNDWATER VELOCITY IN THE HORIZONTAL DIRECTION
C  VXX   : AVERAGE HORIZONTAL GROUNDWATER VELOCITY IN A CELL
C  VZ    : GROUNDWATER VELOCITY IN THE VERTICAL DIRECTION
C  VZZ   : AVERAGE VERTICAL GROUNDWATER VELOCITY IN A CELL
C
**********************************************************************************

      include 'dpct.inc'

      DO 30 I=1,NHCELL
        IRR=0
        DO 30 J=1,NVCELL
          IF(J.GE.IDWTR(I) .OR. J.GE.IDWTR(I+1))GO TO 31
          IRR=IRR+2
          IF(J.LT.IDBBR(I) .OR. J.LT.IDBBR(I+1))GO TO 31
          VXX=0.5*(VX(I,IRR)+VX(I,IRR-1))
          VZZ=0.5*(VZ(I,IRR)+VZ(I,IRR-1))
          if(abs(vxx).lt.1.e-15)vxx=1.e-15
          if(abs(vzz).lt.1.e-15)vzz=1.e-15
          VXX=DELX*0.5/ABS(VXX)
          VZZ=DELZ*0.5/ABS(VZZ)
          EXT(I,J)=AMIN1(VXX,VZZ)
          EXT(I,J)=ALOG10(EXT(I,J))
          GO TO 30
   31     EXT(I,J)=35.0
   30 CONTINUE

C  OUTPUT PARTICLE TIME-STEP GUIDE FIELD
      IF(IC(10))THEN
        WRITE(6,101)
  101   FORMAT(1H1,' TIME FOR PARTICLES TO LEAVE EACH CELL'/1X,
     &    '(ALL VALUES EXPRESSED AS ANTILOG BASE 10)')
        K=0
    7   K=K+25
        KM=K-24
        IF(NHCELL.LT.K)K=NHCELL
        WRITE(6,102)(I,I=KM,K)
  102   FORMAT(//1X,'COLUMN:',25I5/)
        DO 80 J=NVCELL,1,-1
          WRITE(6,104)(EXT(I,J),I=KM,K)
  104     FORMAT(8X,25F5.1)
   80   CONTINUE
        IF(K.GE.NHCELL)THEN
          WRITE(6,106)
  106     FORMAT(1H1)
        ELSE
          WRITE(6,105)
  105     FORMAT(1X///)
          GO TO 7
        ENDIF
      ENDIF

C   OUTPUT PARTICLE TIME-STEP GUIDE TO THE PLOTTING FILE
      IF(IC(11))THEN
        DO 830 J=1,NVCELL
          WRITE(13,811)(EXT(I,J),I=1,NHCELL)
  830   CONTINUE
  811   FORMAT(15F7.3)
      ENDIF
      RETURN
      END
**********************************************************************************
      FUNCTION RANO(RNSEED)                                                      *
**********************************************************************************
*                                                                                *
*  FUNCTION WHICH GENERATES RANDOM NUMBERS BETWEEN 0 AND 1                       *
*                                                                                *
*   The original random number generator is replaced by a random number          *
*   generator which will generate random numbers on a P.C. (May, 1997)           *
*   "RANO" from page 270 of:  W.H. Press, A.A. Teuklosky, W.T. Vetterling,       *
*   and B.P. Flannery, 1992. Numerical Recipes in FORTRAN; The Art of            *
*   Scientific Computing, 2nd Edition, Cambridge University Press.               *
*                                                                                *
**********************************************************************************
      INTEGER RNSEED, IA, IM, IQ, IR, MASK, K
      REAL RANO, AM
      PARAMETER (IA=16807, IM=2147483647, AM=1./IM,
     &           IQ=127773, IR=2836, MASK=123459876)
      RNSEED = IEOR(RNSEED,MASK)
      K = RNSEED/IQ
      RNSEED = IA*(RNSEED-K*IQ) - IR*K
      IF(RNSEED.LT.0)RNSEED = RNSEED + IM
      RANO = AM*RNSEED
      RNSEED = IEOR(RNSEED,MASK)
      RETURN
      END
```

APPENDIX 4:

LISTING OF THE INCLUDE FILE

```
C*********************************************************************
C
C  DPCT.INC
C
C  INCLUDE for the DPCT code
C     - created August 7, 1997
C
C*********************************************************************
C  LIST OF PARAMETERS:
C
C  maxnx   : NUMBER OF COLUMNS OF NODES
C  maxnz   : NUMBER OF ROWS OF NODES
C  mxzone  : NUMBER OF HYDROSTRATIGRAPHIC UNITS
C  mxchd   : NUMBER OF CONSTANT HEAD NODES
C  maxbnd  : BANDWIDTH FOR THE PROBLEM
C  maxtim  : NUMBER OF TIME STEPS IN THE SIMULATION
C  maxpart: NUMBER OF PARTICLES USED IN THE SIMULATION
C  maxnrc  : NUMBER OF CELLS WHICH RECEIVE PARTICLES
C  maxnn   : NUMBER OF NODES IN THE PROBLEM (calculated by dpct)
C  maxne   : NUMBER OF ELEMENTS IN THE PROBLEM (calculated by dpct)
C  maxnxe  : NUMBER OF ELEMENTS IN THE X-DIRECTION (calculated by dpct)
C  maxnez  : NUMBER OF ELEMENTS IN THE Z-DIRECTION (calculated by dpct)
C
C*********************************************************************

C  USER SUPPLIED VALUES:
      PARAMETER(maxnx=45,maxnz=20)
      PARAMETER(mxzone=10)
      PARAMETER(mxchd=45)
      PARAMETER(maxbnd=22)
      PARAMETER(maxtim=25)
      PARAMETER(maxpart=25000)
      PARAMETER(maxnrc=1)

C  DPCT CALCULATED VALUES
      PARAMETER(maxnxe=maxnx-1,maxnze=(maxnz-1)*2)
      PARAMETER(maxnn=maxnx*maxnz,maxne=maxnxe*maxnze)

      REAL*8 G(maxnn,maxbnd), GC(maxnn,mxchd), HEAD(maxnn), F(maxnn)

      REAL KX(maxne), KZ(maxne), CHEAD(mxchd),
     1     VX(maxnxe,maxnze), VZ(maxnxe,maxnze)

      REAL DISP(mxzone), POR(mxzone), CEC(mxzone), BULK(mxzone),
     1     KHORZ(mxzone), VERT(mxzone), MASSI

      REAL X(maxnn), Z(maxnn), PHI(maxnx,maxnz),
     1     XPOS(maxpart), ZPOS(maxpart), MASS(maxpart)

      REAL CONCR(maxnxe,maxnze), CONC(maxnxe,maxnze),
     1     CONCP(maxnxe,maxnze), EXT(maxnxe,maxnze)

      REAL CHVAL(maxnx,maxnz)

      INTEGER*2 IDBBR(maxnx), IDWTR(maxnx), LC(maxnx)

      INTEGER*2 MAPGEO(maxnxe,maxnze), NPCELL(maxnxe,maxnze),
     1          NPGONE(maxnxe,maxnze)

      INTEGER*2 LROW(maxnrc), LCOL(maxnrc), IN(maxne,3),
     1          NPER(maxnrc,maxtim)

      LOGICAL*1 TYPE(maxnn), PTC(maxnxe,maxnze), IC(16)

      COMMON DELX,DELZ,NROW,NCOL,NNODE,NELM,NVELM,NHCELL,NVCELL,NNODEE,
     1       NELME,IBANDE

      COMMON /ONE/ MAPGEO,KHORZ,KVERT,IDBBR,CHVAL,IC,IDWTR,CHEAD,
     1             X,Z,TYPE,IN,KX,KZ
      COMMON /TWO/ANGLE,G,F,HEAD,LC,PHI,NCHEAD,GC
      COMMON /THREE/POR,VX,VZ,EXT
      COMMON /FOUR/ LCOL,LROW,PTC,NPER,DISP,CEC,DELT,NTIME,NRCELL,
     1             CONCR,NPGONE,CONC,NPCELL,CONCP,SOLUTE,SELC,BULK,
     2             HAFLIF,NSKIP,MASSI,XPOS,ZPOS,MASS,DIFF
```

APPENDIX 5:

EXAMPLE INPUT DATA SETS

```
RADIOACTIVE WASTE REPOSITORY: EXAMPLE 1.
 T T T T T F T T T T T T T T T T F
   17   45    1   25    5   24    6
    6931.0      150.0 1825.E+04       0.00
       0.1        0.0       -1.0  500000.0    0.00028
   16    6  100  100  100  100  100  100  100  100  100  100  100  100  100  100
  100  100  100  100  100  100  100  100  100  100  100
 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17
 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17
  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
  1 17 6100.  2 17 6075.  3 17 6050.  4 17 6025.  5 17 5925.  6 17 5750.
  7 17 5600.  8 17 5525.  9 17 5500. 10 17 5475. 11 17 5415. 12 17 5355.
 13 17 5295. 14 17 5235. 15 17 5175. 16 17 5115. 17 17 5055. 18 17 4995
 19 17 4935. 20 17 4875. 21 17 4815. 22 17 4715. 23 17 4615. 45 17 2500.
    1   0.5E+02   .14E+01   3.0E-01   0.5E+01   1.0E-01     F    1.0E-00
    2   0.1E-01   0.1E-02   3.0E-01   0.5E+01   1.0E-01     F    1.0E-00
    3   0.1E-04   0.1E-05   3.0E-02   0.5E+01   1.0E-01     T    1.0E-00
    4   0.4E+02   0.7E+02   3.0E-01   0.5E+01   1.0E-01     F    1.0E-00
    5   0.5E-05   0.5E-06   3.0E-02   0.5E+01   1.0E-01     F    1.0E-00
    6   0.4E+01   0.7E-00   3.0E-02   0.5E+01   1.0E-01     F    1.0E-00
441111111111111111111111111111111111111111111
441111111111111111111111111111111111111111111
344221111111111111111111111111111111111111111
344221111111111111111111111111111111111111111
334422111111111111111111111111111111111111111
334422211111111111111111111111111111111111111
333422211111111111111111111111111111111111111
333442222222222222222222522222222222222111111
333344222333333333333333533333333333322222211
333344222333333333333333533333333333322222211
333334422233333333333335333333333333222222444
333334422233333333333335333333333333222222444
333333422222233333333335333333333333222222444
333333444422222222222225222222222222224444444
333333333444444444444446444444444444444444444
333333333444444444444446444444444444444444444
```

```
RADIOACTIVE WASTE REPOSITORY: EXAMPLE 2.
 T T T T T F T T T T T T T T T F
   17   45    1   12    1   45    5
     500.0     100.0       1.5      0.00
       0.1       0.0      -1.0     141.0   0.00028
   35    3  100  100  100  100  100  100  100  100  100  100  100  100
 11 11 11 11 11 12 12 12 12 12 12 12 12 12 13 13 13 13 13 13 13 13 13 13 13
 13 13 13 13 14 14 14 14 14 14 15 16 16 17 17 17 17 17 17 17
  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
  1 11 3800.  2 11 3810.  3 11 3820.  4 11 3830.  5 11 3840.  6 12 3850.
  7 12 3862.  8 12 3874.  9 12 3887. 10 12 3900. 11 12 3915. 12 12 3930.
 13 12 3945. 14 12 3960. 15 13 3985. 16 13 3990. 17 13 3994. 18 13 3995.
 19 13 3996. 20 13 3997. 21 13 3998. 22 13 3999. 23 13 4000. 24 13 4001.
 25 13 4002. 26 13 4003. 27 13 4010. 28 13 4025. 29 13 4040. 30 14 4055.
 31 14 4070. 32 14 4095. 33 14 4110. 34 14 4125. 35 14 4140. 36 15 4190.
 37 16 4240. 38 16 4295. 39 17 4350. 40 17 4360. 41 17 4390. 42 17 4403.
 43 17 4410. 44 17 4415. 45 17 4420.
    1   0.0E+00   0.0E+00   0.0E-00   0.0E+00   0.0E-00    F   1.0E+00
    2   1.0E-02   1.0E-02   3.0E-01   0.5E+01   1.0E-01    F   1.0E+00
    3   5.0E-02   5.0E-02   3.0E-01   0.5E+01   1.0E-01    F   1.0E+00
    4   1.0E-01   1.0E-01   3.0E-01   0.5E+01   1.0E-01    F   1.0E+00
    5   1.3E-01   1.3E-01   1.0E-04   0.5E+01   1.0E-01    T   1.0E+00
111111111111111111111111111111111111111555555
111111111111111111111111111111111111155555555
111111111111111111111111111111111111555555555
111111111111111111111111111111555555555555555
111111111111112222555555555555555555555555555
111112222222222255555555555555555555555555555
222222222222225555555555555555555555555555555
222222222222255555555555555555555555555555555
333333333333555555555555555555555555555555555
333333333335555555555555555555555555555555555
333333333355555555555555555555555555555555555
333333333355555555555555555555555555555555555
444444444555555555555555555555555555555555555
444444444555555555555555555555555555555555555
444444445555555555555555555555555555555555555
444444445555555555555555555555555555555555555
```

APPENDIX 6:

EXAMPLE PRINTED OUTPUT

****

RADIOACTIVE WASTE REPOSITORY: EXAMPLE 1.

****

OUTPUT LISTINGS AND PROBLEM CONTROL

```
T: RUN THE MASS TRANSPORT ROUTINE
T: PRINT THE NODE CO-ORDINATES
T: PRINT THE ELEMENT INCIDENCES
T: PRINT THE ELEMENT HYDRAULIC CONDUCTIVITIES
T: PRINT THE TOTAL HEAD VALUES

F: OUTPUT THE HEAD VALUES TO A PLOTTING FILE
T: CALCULATE THE VELOCITY FIELD
T: PRINT THE VELOCITY FIELD
T: RUN THE TIME-STEP GUIDE ROUTINE
T: PRINT THE TIME-STEP GUIDE

T: OUTPUT THE TIME-STEP GUIDE TO A PLOTTING FILE
T: PRINT THE PARTICLE AND CONCENTRATION DISTRIBUTION
T: OUTPUT THE PARTICLE DISTRIBUTION TO A PLOTTING FILE
T: OUTPUT THE CONCENTRATION DISTRIBUTION TO A PLOTTING FILE
T: PRINT THE DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES
F: USING DISTANCE UNITS OF FEET
```

CROSS-SECTION SUMMARY

```
      17 : NUMBER OF ROWS
      45 : NUMBER OF COLUMNS
       6 : NUMBER OF GEOLOGICAL UNITS
 6931.00 : HORIZONTAL NODE SPACING (ft)
  150.00 : VERTICAL NODE SPACING (ft)
      24 : NUMBER OF CONSTANT HEAD NODES
     .00 : ANGLE OF INCLINATION OF Kh AND Kv FROM THE HORIZONTAL (degrees)
```

CONTAMINANT PARAMETERS

```
       -1.00 : HALF-LIFE (days)
           5 : NUMBER OF STEPS BETWEEN LISTINGS
          25 : NUMBER OF STEPS IN TIME
         .10 : TOTAL CONCENTRATION IN SOLUTION (mg/L)
         .00 : SELECTIVITY COEFFICIENT FOR EXCHANGE
 18250000.00 : SIZE OF THE TIME-STEP (days)
   500000.00 : INITIAL MASS ADDED PER PARTICLE (mg)
           1 : NUMBER OF CELLS RECEIVING PARTICLES
         .00 : COEFFICIENT OF BULK DIFFISION (ft2/d)
```

NUMBER OF PARTICLES ADDED TO THE SYSTEM PER TIME-STEP

```
ROW  COL       PARTICLES ADDED PER STEP
  6   16       100   100   100   100   100   100   100   100   100   100   100   100   100   100   100
               100   100   100   100   100   100   100   100   100   100
```

ROW AND COLUMN NUMBERS OF THE WATER TABLE

COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW
1	17	2	17	3	17	4	17	5	17	6	17	7	17	8	17	9	17	10	17
11	17	12	17	13	17	14	17	15	17	16	17	17	17	18	17	19	17	20	17
21	17	22	17	23	17	24	17	25	17	26	17	27	17	28	17	29	17	30	17
31	17	32	17	33	17	34	17	35	17	36	17	37	17	38	17	39	17	40	17
41	17	42	17	43	17	44	17	45	17										

ROW AND COLUMN NUMBERS OF THE BOTTOM BOUNDARY

COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW	COL	ROW
1	1	2	1	3	1	4	1	5	1	6	1	7	1	8	1	9	1	10	1
11	1	12	1	13	1	14	1	15	1	16	1	17	1	18	1	19	1	20	1
21	1	22	1	23	1	24	1	25	1	26	1	27	1	28	1	29	1	30	1
31	1	32	1	33	1	34	1	35	1	36	1	37	1	38	1	39	1	40	1
41	1	42	1	43	1	44	1	45	1										

CONSTANT HEAD VALUES

COL	ROW	HEAD	COL	ROW	HEAD	COL	ROW	HEAD	COL	ROW	HEAD	COL	ROW	HEAD	COL	ROW	HEAD
1	17	6100.000	2	17	6075.000	3	17	6050.000	4	17	6025.000	5	17	5925.000	6	17	5750.000
7	17	5600.000	8	17	5525.000	9	17	5500.000	10	17	5475.000	11	17	5415.000	12	17	5355.000
13	17	5295.000	14	17	5235.000	15	17	5175.000	16	17	5115.000	17	17	5055.000	18	17	4995.000
19	17	4935.000	20	17	4875.000	21	17	4815.000	22	17	4715.000	23	17	4615.000	45	17	2500.000

PARAMETERS FOR THE HYDROSTRATIGRAPHIC UNITS

UNIT	Kh	Kv	POROSITY	DISPER	CEC	PTCI*	BULK
1	.50000E+02	.14000E+01	.30000E+00	.50000E+01	.10000E+00	F	.10000E+01
2	.10000E-01	.10000E-02	.30000E+00	.50000E+01	.10000E+00	F	.10000E+01
3	.10000E-04	.10000E-05	.30000E-01	.50000E+01	.10000E+00	T	.10000E+01
4	.40000E+02	.70000E+02	.30000E+00	.50000E+01	.10000E+00	F	.10000E+01
5	.50000E-05	.50000E-06	.30000E-01	.50000E+01	.10000E+00	F	.10000E+01
6	.40000E+01	.70000E+00	.30000E-01	.50000E+01	.10000E+00	F	.10000E+01

* T=MOVEMENT ALLOWED
F=MOVEMENT NOT ALLOWED

MAP OF HYDROSTRATIGRAPHIC UNITS

```
44111111111111111111111111111111111111111111
44111111111111111111111111111111111111111111
34422111111111111111111111111111111111111111
34422111111111111111111111111111111111111111
33442211111111111111111111111111111111111111
33442221111111111111111111111111111111111111
33342221111111111111111111111111111111111111
33344222222222222222225222222222222221111111
33334422223333333333335333333333333222222111
33334422223333333333335333333333333222222111
33333442223333333333335333333333333222222444
33333442223333333333335333333333333222222444
33333342222233333333335333333333333222222444
33333344442222222222225222222222222224444444
33333333344444444444446444444444444444444444
33333333344444444444446444444444444444444444
```

FINITE ELEMENT GRID NODE CO-ORDINATES

NODE	TYPE	X	Z	NODE	TYPE	X	Z	NODE	TYPE	X	Z
1	F	.000	.000	2	F	.000	150.000	3	F	.000	300.000
4	F	.000	450.000	5	F	.000	600.000	6	F	.000	750.000
7	F	.000	900.000	8	F	.000	1050.000	9	F	.000	1200.000
10	F	.000	1350.000	11	F	.000	1500.000	12	F	.000	1650.000
13	F	.000	1800.000	14	F	.000	1950.000	15	F	.000	2100.000
16	F	.000	2250.000	17	T	.000	2400.000	18	F	6931.000	.000
19	F	6931.000	150.000	20	F	6931.000	300.000	21	F	6931.000	450.000
22	F	6931.000	600.000	23	F	6931.000	750.000	24	F	6931.000	900.000
25	F	6931.000	1050.000	26	F	6931.000	1200.000	27	F	6931.000	1350.000
28	F	6931.000	1500.000	29	F	6931.000	1650.000	30	F	6931.000	1800.000
31	F	6931.000	1950.000	32	F	6931.000	2100.000	33	F	6931.000	2250.000
34	T	6931.000	2400.000	35	F	13862.000	.000	36	F	13862.000	150.000
37	F	13862.000	300.000	38	F	13862.000	450.000	39	F	13862.000	600.000
40	F	13862.000	750.000	41	F	13862.000	900.000	42	F	13862.000	1050.000
43	F	13862.000	1200.000	44	F	13862.000	1350.000	45	F	13862.000	1500.000
46	F	13862.000	1650.000	47	F	13862.000	1800.000	48	F	13862.000	1950.000
49	F	13862.000	2100.000	50	F	13862.000	2250.000	51	T	13862.000	2400.000
52	F	20793.000	.000	53	F	20793.000	150.000	54	F	20793.000	300.000
55	F	20793.000	450.000	56	F	20793.000	600.000	57	F	20793.000	750.000
58	F	20793.000	900.000	59	F	20793.000	1050.000	60	F	20793.000	1200.000
61	F	20793.000	1350.000	62	F	20793.000	1500.000	63	F	20793.000	1650.000
64	F	20793.000	1800.000	65	F	20793.000	1950.000	66	F	20793.000	2100.000
67	F	20793.000	2250.000	68	T	20793.000	2400.000	69	F	27724.000	.000
70	F	27724.000	150.000	71	F	27724.000	300.000	72	F	27724.000	450.000
73	F	27724.000	600.000	74	F	27724.000	750.000	75	F	27724.000	900.000
76	F	27724.000	1050.000	77	F	27724.000	1200.000	78	F	27724.000	1350.000
79	F	27724.000	1500.000	80	F	27724.000	1650.000	81	F	27724.000	1800.000
82	F	27724.000	1950.000	83	F	27724.000	2100.000	84	F	27724.000	2250.000
85	T	27724.000	2400.000	86	F	34655.000	.000	87	F	34655.000	150.000
88	F	34655.000	300.000	89	F	34655.000	450.000	90	F	34655.000	600.000
91	F	34655.000	750.000	92	F	34655.000	900.000	93	F	34655.000	1050.000
94	F	34655.000	1200.000	95	F	34655.000	1350.000	96	F	34655.000	1500.000
97	F	34655.000	1650.000	98	F	34655.000	1800.000	99	F	34655.000	1950.000
100	F	34655.000	2100.000	101	F	34655.000	2250.000	102	T	34655.000	2400.000
103	F	41586.000	.000	104	F	41586.000	150.000	105	F	41586.000	300.000
106	F	41586.000	450.000	107	F	41586.000	600.000	108	F	41586.000	750.000
109	F	41586.000	900.000	110	F	41586.000	1050.000	111	F	41586.000	1200.000
112	F	41586.000	1350.000	113	F	41586.000	1500.000	114	F	41586.000	1650.000
115	F	41586.000	1800.000	116	F	41586.000	1950.000	117	F	41586.000	2100.000
118	F	41586.000	2250.000	119	T	41586.000	2400.000	120	F	48517.000	.000
121	F	48517.000	150.000	122	F	48517.000	300.000	123	F	48517.000	450.000
124	F	48517.000	600.000	125	F	48517.000	750.000	126	F	48517.000	900.000
127	F	48517.000	1050.000	128	F	48517.000	1200.000	129	F	48517.000	1350.000
130	F	48517.000	1500.000	131	F	48517.000	1650.000	132	F	48517.000	1800.000
133	F	48517.000	1950.000	134	F	48517.000	2100.000	135	F	48517.000	2250.000
136	T	48517.000	2400.000	137	F	55448.000	.000	138	F	55448.000	150.000
139	F	55448.000	300.000	140	F	55448.000	450.000	141	F	55448.000	600.000
142	F	55448.000	750.000	143	F	55448.000	900.000	144	F	55448.000	1050.000
145	F	55448.000	1200.000	146	F	55448.000	1350.000	147	F	55448.000	1500.000
148	F	55448.000	1650.000	149	F	55448.000	1800.000	150	F	55448.000	1950.000
151	F	55448.000	2100.000	152	F	55448.000	2250.000	153	T	55448.000	2400.000
154	F	62379.000	.000	155	F	62379.000	150.000	156	F	62379.000	300.000

157	F	62379.000	450.000	158	F	62379.000	600.000	159	F	62379.000	750.000
160	F	62379.000	900.000	161	F	62379.000	1050.000	162	F	62379.000	1200.000
163	F	62379.000	1350.000	164	F	62379.000	1500.000	165	F	62379.000	1650.000
166	F	62379.000	1800.000	167	F	62379.000	1950.000	168	F	62379.000	2100.000
169	F	62379.000	2250.000	170	T	62379.000	2400.000	171	F	69310.000	.000
172	F	69310.000	150.000	173	F	69310.000	300.000	174	F	69310.000	450.000
175	F	69310.000	600.000	176	F	69310.000	750.000	177	F	69310.000	900.000
178	F	69310.000	1050.000	179	F	69310.000	1200.000	180	F	69310.000	1350.000
181	F	69310.000	1500.000	182	F	69310.000	1650.000	183	F	69310.000	1800.000
184	F	69310.000	1950.000	185	F	69310.000	2100.000	186	F	69310.000	2250.000
187	T	69310.000	2400.000	188	F	76241.000	.000	189	F	76241.000	150.000
190	F	76241.000	300.000	191	F	76241.000	450.000	192	F	76241.000	600.000
193	F	76241.000	750.000	194	F	76241.000	900.000	195	F	76241.000	1050.000
196	F	76241.000	1200.000	197	F	76241.000	1350.000	198	F	76241.000	1500.000
199	F	76241.000	1650.000	200	F	76241.000	1800.000	201	F	76241.000	1950.000
202	F	76241.000	2100.000	203	F	76241.000	2250.000	204	T	76241.000	2400.000
205	F	83172.000	.000	206	F	83172.000	150.000	207	F	83172.000	300.000
208	F	83172.000	450.000	209	F	83172.000	600.000	210	F	83172.000	750.000
211	F	83172.000	900.000	212	F	83172.000	1050.000	213	F	83172.000	1200.000
214	F	83172.000	1350.000	215	F	83172.000	1500.000	216	F	83172.000	1650.000
217	F	83172.000	1800.000	218	F	83172.000	1950.000	219	F	83172.000	2100.000
220	F	83172.000	2250.000	221	T	83172.000	2400.000	222	F	90103.000	.000
223	F	90103.000	150.000	224	F	90103.000	300.000	225	F	90103.000	450.000
226	F	90103.000	600.000	227	F	90103.000	750.000	228	F	90103.000	900.000
229	F	90103.000	1050.000	230	F	90103.000	1200.000	231	F	90103.000	1350.000
232	F	90103.000	1500.000	233	F	90103.000	1650.000	234	F	90103.000	1800.000
235	F	90103.000	1950.000	236	F	90103.000	2100.000	237	F	90103.000	2250.000
238	T	90103.000	2400.000	239	F	97034.000	.000	240	F	97034.000	150.000
241	F	97034.000	300.000	242	F	97034.000	450.000	243	F	97034.000	600.000
244	F	97034.000	750.000	245	F	97034.000	900.000	246	F	97034.000	1050.000
247	F	97034.000	1200.000	248	F	97034.000	1350.000	249	F	97034.000	1500.000
250	F	97034.000	1650.000	251	F	97034.000	1800.000	252	F	97034.000	1950.000
253	F	97034.000	2100.000	254	F	97034.000	2250.000	255	T	97034.000	2400.000
256	F	103965.000	.000	257	F	103965.000	150.000	258	F	103965.000	300.000
259	F	103965.000	450.000	260	F	103965.000	600.000	261	F	103965.000	750.000
262	F	103965.000	900.000	263	F	103965.000	1050.000	264	F	103965.000	1200.000
265	F	103965.000	1350.000	266	F	103965.000	1500.000	267	F	103965.000	1650.000
268	F	103965.000	1800.000	269	F	103965.000	1950.000	270	F	103965.000	2100.000
271	F	103965.000	2250.000	272	T	103965.000	2400.000	273	F	110896.000	.000
274	F	110896.000	150.000	275	F	110896.000	300.000	276	F	110896.000	450.000
277	F	110896.000	600.000	278	F	110896.000	750.000	279	F	110896.000	900.000
280	F	110896.000	1050.000	281	F	110896.000	1200.000	282	F	110896.000	1350.000
283	F	110896.000	1500.000	284	F	110896.000	1650.000	285	F	110896.000	1800.000
286	F	110896.000	1950.000	287	F	110896.000	2100.000	288	F	110896.000	2250.000
289	T	110896.000	2400.000	290	F	117827.000	.000	291	F	117827.000	150.000
292	F	117827.000	300.000	293	F	117827.000	450.000	294	F	117827.000	600.000
295	F	117827.000	750.000	296	F	117827.000	900.000	297	F	117827.000	1050.000
298	F	117827.000	1200.000	299	F	117827.000	1350.000	300	F	117827.000	1500.000
301	F	117827.000	1650.000	302	F	117827.000	1800.000	303	F	117827.000	1950.000
304	F	117827.000	2100.000	305	F	117827.000	2250.000	306	T	117827.000	2400.000
307	F	124758.000	.000	308	F	124758.000	150.000	309	F	124758.000	300.000
310	F	124758.000	450.000	311	F	124758.000	600.000	312	F	124758.000	750.000
313	F	124758.000	900.000	314	F	124758.000	1050.000	315	F	124758.000	1200.000
316	F	124758.000	1350.000	317	F	124758.000	1500.000	318	F	124758.000	1650.000
319	F	124758.000	1800.000	320	F	124758.000	1950.000	321	F	124758.000	2100.000
322	F	124758.000	2250.000	323	T	124758.000	2400.000	324	F	131689.000	.000
325	F	131689.000	150.000	326	F	131689.000	300.000	327	F	131689.000	450.000
328	F	131689.000	600.000	329	F	131689.000	750.000	330	F	131689.000	900.000
331	F	131689.000	1050.000	332	F	131689.000	1200.000	333	F	131689.000	1350.000
334	F	131689.000	1500.000	335	F	131689.000	1650.000	336	F	131689.000	1800.000
337	F	131689.000	1950.000	338	F	131689.000	2100.000	339	F	131689.000	2250.000
340	T	131689.000	2400.000	341	F	138620.000	.000	342	F	138620.000	150.000
343	F	138620.000	300.000	344	F	138620.000	450.000	345	F	138620.000	600.000
346	F	138620.000	750.000	347	F	138620.000	900.000	348	F	138620.000	1050.000
349	F	138620.000	1200.000	350	F	138620.000	1350.000	351	F	138620.000	1500.000
352	F	138620.000	1650.000	353	F	138620.000	1800.000	354	F	138620.000	1950.000
355	F	138620.000	2100.000	356	F	138620.000	2250.000	357	T	138620.000	2400.000
358	F	145551.000	.000	359	F	145551.000	150.000	360	F	145551.000	300.000
361	F	145551.000	450.000	362	F	145551.000	600.000	363	F	145551.000	750.000
364	F	145551.000	900.000	365	F	145551.000	1050.000	366	F	145551.000	1200.000
367	F	145551.000	1350.000	368	F	145551.000	1500.000	369	F	145551.000	1650.000
370	F	145551.000	1800.000	371	F	145551.000	1950.000	372	F	145551.000	2100.000
373	F	145551.000	2250.000	374	T	145551.000	2400.000	375	F	152482.000	.000
376	F	152482.000	150.000	377	F	152482.000	300.000	378	F	152482.000	450.000
379	F	152482.000	600.000	380	F	152482.000	750.000	381	F	152482.000	900.000
382	F	152482.000	1050.000	383	F	152482.000	1200.000	384	F	152482.000	1350.000
385	F	152482.000	1500.000	386	F	152482.000	1650.000	387	F	152482.000	1800.000
388	F	152482.000	1950.000	389	F	152482.000	2100.000	390	F	152482.000	2250.000
391	T	152482.000	2400.000	392	F	159413.000	.000	393	F	159413.000	150.000
394	F	159413.000	300.000	395	F	159413.000	450.000	396	F	159413.000	600.000
397	F	159413.000	750.000	398	F	159413.000	900.000	399	F	159413.000	1050.000
400	F	159413.000	1200.000	401	F	159413.000	1350.000	402	F	159413.000	1500.000
403	F	159413.000	1650.000	404	F	159413.000	1800.000	405	F	159413.000	1950.000
406	F	159413.000	2100.000	407	F	159413.000	2250.000	408	F	159413.000	2400.000
409	F	166344.000	.000	410	F	166344.000	150.000	411	F	166344.000	300.000
412	F	166344.000	450.000	413	F	166344.000	600.000	414	F	166344.000	750.000
415	F	166344.000	900.000	416	F	166344.000	1050.000	417	F	166344.000	1200.000
418	F	166344.000	1350.000	419	F	166344.000	1500.000	420	F	166344.000	1650.000
421	F	166344.000	1800.000	422	F	166344.000	1950.000	423	F	166344.000	2100.000
424	F	166344.000	2250.000	425	F	166344.000	2400.000	426	F	173275.000	.000

427	F	173275.000	150.000	428	F	173275.000	300.000	429	F	173275.000	450.000
430	F	173275.000	600.000	431	F	173275.000	750.000	432	F	173275.000	900.000
433	F	173275.000	1050.000	434	F	173275.000	1200.000	435	F	173275.000	1350.000
436	F	173275.000	1500.000	437	F	173275.000	1650.000	438	F	173275.000	1800.000
439	F	173275.000	1950.000	440	F	173275.000	2100.000	441	F	173275.000	2250.000
442	F	173275.000	2400.000	443	F	180206.000	.000	444	F	180206.000	150.000
445	F	180206.000	300.000	446	F	180206.000	450.000	447	F	180206.000	600.000
448	F	180206.000	750.000	449	F	180206.000	900.000	450	F	180206.000	1050.000
451	F	180206.000	1200.000	452	F	180206.000	1350.000	453	F	180206.000	1500.000
454	F	180206.000	1650.000	455	F	180206.000	1800.000	456	F	180206.000	1950.000
457	F	180206.000	2100.000	458	F	180206.000	2250.000	459	F	180206.000	2400.000
460	F	187137.000	.000	461	F	187137.000	150.000	462	F	187137.000	300.000
463	F	187137.000	450.000	464	F	187137.000	600.000	465	F	187137.000	750.000
466	F	187137.000	900.000	467	F	187137.000	1050.000	468	F	187137.000	1200.000
469	F	187137.000	1350.000	470	F	187137.000	1500.000	471	F	187137.000	1650.000
472	F	187137.000	1800.000	473	F	187137.000	1950.000	474	F	187137.000	2100.000
475	F	187137.000	2250.000	476	F	187137.000	2400.000	477	F	194068.000	.000
478	F	194068.000	150.000	479	F	194068.000	300.000	480	F	194068.000	450.000
481	F	194068.000	600.000	482	F	194068.000	750.000	483	F	194068.000	900.000
484	F	194068.000	1050.000	485	F	194068.000	1200.000	486	F	194068.000	1350.000
487	F	194068.000	1500.000	488	F	194068.000	1650.000	489	F	194068.000	1800.000
490	F	194068.000	1950.000	491	F	194068.000	2100.000	492	F	194068.000	2250.000
493	F	194068.000	2400.000	494	F	200999.000	.000	495	F	200999.000	150.000
496	F	200999.000	300.000	497	F	200999.000	450.000	498	F	200999.000	600.000
499	F	200999.000	750.000	500	F	200999.000	900.000	501	F	200999.000	1050.000
502	F	200999.000	1200.000	503	F	200999.000	1350.000	504	F	200999.000	1500.000
505	F	200999.000	1650.000	506	F	200999.000	1800.000	507	F	200999.000	1950.000
508	F	200999.000	2100.000	509	F	200999.000	2250.000	510	F	200999.000	2400.000
511	F	207930.000	.000	512	F	207930.000	150.000	513	F	207930.000	300.000
514	F	207930.000	450.000	515	F	207930.000	600.000	516	F	207930.000	750.000
517	F	207930.000	900.000	518	F	207930.000	1050.000	519	F	207930.000	1200.000
520	F	207930.000	1350.000	521	F	207930.000	1500.000	522	F	207930.000	1650.000
523	F	207930.000	1800.000	524	F	207930.000	1950.000	525	F	207930.000	2100.000
526	F	207930.000	2250.000	527	F	207930.000	2400.000	528	F	214861.000	.000
529	F	214861.000	150.000	530	F	214861.000	300.000	531	F	214861.000	450.000
532	F	214861.000	600.000	533	F	214861.000	750.000	534	F	214861.000	900.000
535	F	214861.000	1050.000	536	F	214861.000	1200.000	537	F	214861.000	1350.000
538	F	214861.000	1500.000	539	F	214861.000	1650.000	540	F	214861.000	1800.000
541	F	214861.000	1950.000	542	F	214861.000	2100.000	543	F	214861.000	2250.000
544	F	214861.000	2400.000	545	F	221792.000	.000	546	F	221792.000	150.000
547	F	221792.000	300.000	548	F	221792.000	450.000	549	F	221792.000	600.000
550	F	221792.000	750.000	551	F	221792.000	900.000	552	F	221792.000	1050.000
553	F	221792.000	1200.000	554	F	221792.000	1350.000	555	F	221792.000	1500.000
556	F	221792.000	1650.000	557	F	221792.000	1800.000	558	F	221792.000	1950.000
559	F	221792.000	2100.000	560	F	221792.000	2250.000	561	F	221792.000	2400.000
562	F	228723.000	.000	563	F	228723.000	150.000	564	F	228723.000	300.000
565	F	228723.000	450.000	566	F	228723.000	600.000	567	F	228723.000	750.000
568	F	228723.000	900.000	569	F	228723.000	1050.000	570	F	228723.000	1200.000
571	F	228723.000	1350.000	572	F	228723.000	1500.000	573	F	228723.000	1650.000
574	F	228723.000	1800.000	575	F	228723.000	1950.000	576	F	228723.000	2100.000
577	F	228723.000	2250.000	578	F	228723.000	2400.000	579	F	235654.000	.000
580	F	235654.000	150.000	581	F	235654.000	300.000	582	F	235654.000	450.000
583	F	235654.000	600.000	584	F	235654.000	750.000	585	F	235654.000	900.000
586	F	235654.000	1050.000	587	F	235654.000	1200.000	588	F	235654.000	1350.000
589	F	235654.000	1500.000	590	F	235654.000	1650.000	591	F	235654.000	1800.000
592	F	235654.000	1950.000	593	F	235654.000	2100.000	594	F	235654.000	2250.000
595	F	235654.000	2400.000	596	F	242585.000	.000	597	F	242585.000	150.000
598	F	242585.000	300.000	599	F	242585.000	450.000	600	F	242585.000	600.000
601	F	242585.000	750.000	602	F	242585.000	900.000	603	F	242585.000	1050.000
604	F	242585.000	1200.000	605	F	242585.000	1350.000	606	F	242585.000	1500.000
607	F	242585.000	1650.000	608	F	242585.000	1800.000	609	F	242585.000	1950.000
610	F	242585.000	2100.000	611	F	242585.000	2250.000	612	F	242585.000	2400.000
613	F	249516.000	.000	614	F	249516.000	150.000	615	F	249516.000	300.000
616	F	249516.000	450.000	617	F	249516.000	600.000	618	F	249516.000	750.000
619	F	249516.000	900.000	620	F	249516.000	1050.000	621	F	249516.000	1200.000
622	F	249516.000	1350.000	623	F	249516.000	1500.000	624	F	249516.000	1650.000
625	F	249516.000	1800.000	626	F	249516.000	1950.000	627	F	249516.000	2100.000
628	F	249516.000	2250.000	629	F	249516.000	2400.000	630	F	256447.000	.000
631	F	256447.000	150.000	632	F	256447.000	300.000	633	F	256447.000	450.000
634	F	256447.000	600.000	635	F	256447.000	750.000	636	F	256447.000	900.000
637	F	256447.000	1050.000	638	F	256447.000	1200.000	639	F	256447.000	1350.000
640	F	256447.000	1500.000	641	F	256447.000	1650.000	642	F	256447.000	1800.000
643	F	256447.000	1950.000	644	F	256447.000	2100.000	645	F	256447.000	2250.000
646	F	256447.000	2400.000	647	F	263378.000	.000	648	F	263378.000	150.000
649	F	263378.000	300.000	650	F	263378.000	450.000	651	F	263378.000	600.000
652	F	263378.000	750.000	653	F	263378.000	900.000	654	F	263378.000	1050.000
655	F	263378.000	1200.000	656	F	263378.000	1350.000	657	F	263378.000	1500.000
658	F	263378.000	1650.000	659	F	263378.000	1800.000	660	F	263378.000	1950.000
661	F	263378.000	2100.000	662	F	263378.000	2250.000	663	F	263378.000	2400.000
664	F	270309.000	.000	665	F	270309.000	150.000	666	F	270309.000	300.000
667	F	270309.000	450.000	668	F	270309.000	600.000	669	F	270309.000	750.000
670	F	270309.000	900.000	671	F	270309.000	1050.000	672	F	270309.000	1200.000
673	F	270309.000	1350.000	674	F	270309.000	1500.000	675	F	270309.000	1650.000
676	F	270309.000	1800.000	677	F	270309.000	1950.000	678	F	270309.000	2100.000
679	F	270309.000	2250.000	680	F	270309.000	2400.000	681	F	277240.000	.000
682	F	277240.000	150.000	683	F	277240.000	300.000	684	F	277240.000	450.000
685	F	277240.000	600.000	686	F	277240.000	750.000	687	F	277240.000	900.000
688	F	277240.000	1050.000	689	F	277240.000	1200.000	690	F	277240.000	1350.000
691	F	277240.000	1500.000	692	F	277240.000	1650.000	693	F	277240.000	1800.000
694	F	277240.000	1950.000	695	F	277240.000	2100.000	696	F	277240.000	2250.000

697	F	277240.000	2400.000	698	F	284171.000	.000	699	F	284171.000	150.000
700	F	284171.000	300.000	701	F	284171.000	450.000	702	F	284171.000	600.000
703	F	284171.000	750.000	704	F	284171.000	900.000	705	F	284171.000	1050.000
706	F	284171.000	1200.000	707	F	284171.000	1350.000	708	F	284171.000	1500.000
709	F	284171.000	1650.000	710	F	284171.000	1800.000	711	F	284171.000	1950.000
712	F	284171.000	2100.000	713	F	284171.000	2250.000	714	F	284171.000	2400.000
715	F	291102.000	.000	716	F	291102.000	150.000	717	F	291102.000	300.000
718	F	291102.000	450.000	719	F	291102.000	600.000	720	F	291102.000	750.000
721	F	291102.000	900.000	722	F	291102.000	1050.000	723	F	291102.000	1200.000
724	F	291102.000	1350.000	725	F	291102.000	1500.000	726	F	291102.000	1650.000
727	F	291102.000	1800.000	728	F	291102.000	1950.000	729	F	291102.000	2100.000
730	F	291102.000	2250.000	731	F	291102.000	2400.000	732	F	298033.000	.000
733	F	298033.000	150.000	734	F	298033.000	300.000	735	F	298033.000	450.000
736	F	298033.000	600.000	737	F	298033.000	750.000	738	F	298033.000	900.000
739	F	298033.000	1050.000	740	F	298033.000	1200.000	741	F	298033.000	1350.000
742	F	298033.000	1500.000	743	F	298033.000	1650.000	744	F	298033.000	1800.000
745	F	298033.000	1950.000	746	F	298033.000	2100.000	747	F	298033.000	2250.000
748	F	298033.000	2400.000	749	F	304964.000	.000	750	F	304964.000	150.000
751	F	304964.000	300.000	752	F	304964.000	450.000	753	F	304964.000	600.000
754	F	304964.000	750.000	755	F	304964.000	900.000	756	F	304964.000	1050.000
757	F	304964.000	1200.000	758	F	304964.000	1350.000	759	F	304964.000	1500.000
760	F	304964.000	1650.000	761	F	304964.000	1800.000	762	F	304964.000	1950.000
763	F	304964.000	2100.000	764	F	304964.000	2250.000	765	T	304964.000	2400.000

ELEMENT INCIDENCES

ELEMENT	INCIDENCES	ELEMENT	INCIDENCES	ELEMENT	INCIDENCES	ELEMENT	INCIDENCES	ELEMENT	INCIDENCES
1:	1 18 19	2:	1 19 2	3:	2 19 20	4:	2 20 3	5:	3 20 21
6:	3 21 4	7:	4 21 22	8:	4 22 5	9:	5 22 23	10:	5 23 6
11:	6 23 24	12:	6 24 7	13:	7 24 25	14:	7 25 8	15:	8 25 26
16:	8 26 9	17:	9 26 27	18:	9 27 10	19:	10 27 28	20:	10 28 11
21:	11 28 29	22:	11 29 12	23:	12 29 30	24:	12 30 13	25:	13 30 31
26:	13 31 14	27:	14 31 32	28:	14 32 15	29:	15 32 33	30:	15 33 16
31:	16 33 34	32:	16 34 17	33:	18 35 36	34:	18 36 19	35:	19 36 37
36:	19 37 20	37:	20 37 38	38:	20 38 21	39:	21 38 39	40:	21 39 22
41:	22 39 40	42:	22 40 23	43:	23 40 41	44:	23 41 24	45:	24 41 42
46:	24 42 25	47:	25 42 43	48:	25 43 26	49:	26 43 44	50:	26 44 27
51:	27 44 45	52:	27 45 28	53:	28 45 46	54:	28 46 29	55:	29 46 47
56:	29 47 30	57:	30 47 48	58:	30 48 31	59:	31 48 49	60:	31 49 32
61:	32 49 50	62:	32 50 33	63:	33 50 51	64:	33 51 34	65:	35 52 53
66:	35 53 36	67:	36 53 54	68:	36 54 37	69:	37 54 55	70:	37 55 38
71:	38 55 56	72:	38 56 39	73:	39 56 57	74:	39 57 40	75:	40 57 58
76:	40 58 41	77:	41 58 59	78:	41 59 42	79:	42 59 60	80:	42 60 43
81:	43 60 61	82:	43 61 44	83:	44 61 62	84:	44 62 45	85:	45 62 63
86:	45 63 46	87:	46 63 64	88:	46 64 47	89:	47 64 65	90:	47 65 48
91:	48 65 66	92:	48 66 49	93:	49 66 67	94:	49 67 50	95:	50 67 68
96:	50 68 51	97:	52 69 70	98:	52 70 53	99:	53 70 71	100:	53 71 54
101:	54 71 72	102:	54 72 55	103:	55 72 73	104:	55 73 56	105:	56 73 74
106:	56 74 57	107:	57 74 75	108:	57 75 58	109:	58 75 76	110:	58 76 59
111:	59 76 77	112:	59 77 60	113:	60 77 78	114:	60 78 61	115:	61 78 79
116:	61 79 62	117:	62 79 80	118:	62 80 63	119:	63 80 81	120:	63 81 64
121:	64 81 82	122:	64 82 65	123:	65 82 83	124:	65 83 66	125:	66 83 84
126:	66 84 67	127:	67 84 85	128:	67 85 68	129:	69 86 87	130:	69 87 70
131:	70 87 88	132:	70 88 71	133:	71 88 89	134:	71 89 72	135:	72 89 90
136:	72 90 73	137:	73 90 91	138:	73 91 74	139:	74 91 92	140:	74 92 75
141:	75 92 93	142:	75 93 76	143:	76 93 94	144:	76 94 77	145:	77 94 95
146:	77 95 78	147:	78 95 96	148:	78 96 79	149:	79 96 97	150:	79 97 80
151:	80 97 98	152:	80 98 81	153:	81 98 99	154:	81 99 82	155:	82 99 100
156:	82 100 83	157:	83 100 101	158:	83 101 84	159:	84 101 102	160:	84 102 85
161:	86 103 104	162:	86 104 87	163:	87 104 105	164:	87 105 88	165:	88 105 106
166:	88 106 89	167:	89 106 107	168:	89 107 90	169:	90 107 108	170:	90 108 91
171:	91 108 109	172:	91 109 92	173:	92 109 110	174:	92 110 93	175:	93 110 111
176:	93 111 94	177:	94 111 112	178:	94 112 95	179:	95 112 113	180:	95 113 96
181:	96 113 114	182:	96 114 97	183:	97 114 115	184:	97 115 98	185:	98 115 116
186:	98 116 99	187:	99 116 117	188:	99 117 100	189:	100 117 118	190:	100 118 101
191:	101 118 119	192:	101 119 102	193:	103 120 121	194:	103 121 104	195:	104 121 122
196:	104 122 105	197:	105 122 123	198:	105 123 106	199:	106 123 124	200:	106 124 107
201:	107 124 125	202:	107 125 108	203:	108 125 126	204:	108 126 109	205:	109 126 127
206:	109 127 110	207:	110 127 128	208:	110 128 111	209:	111 128 129	210:	111 129 112
211:	112 129 130	212:	112 130 113	213:	113 130 131	214:	113 131 114	215:	114 131 132
216:	114 132 115	217:	115 132 133	218:	115 133 116	219:	116 133 134	220:	116 134 117
221:	117 134 135	222:	117 135 118	223:	118 135 136	224:	118 136 119	225:	120 137 138
226:	120 138 121	227:	121 138 139	228:	121 139 122	229:	122 139 140	230:	122 140 123
231:	123 140 141	232:	123 141 124	233:	124 141 142	234:	124 142 125	235:	125 142 143
236:	125 143 126	237:	126 143 144	238:	126 144 127	239:	127 144 145	240:	127 145 128
241:	128 145 146	242:	128 146 129	243:	129 146 147	244:	129 147 130	245:	130 147 148
246:	130 148 131	247:	131 148 149	248:	131 149 132	249:	132 149 150	250:	132 150 133
251:	133 150 151	252:	133 151 134	253:	134 151 152	254:	134 152 135	255:	135 152 153
256:	135 153 136	257:	137 154 155	258:	137 155 138	259:	138 155 156	260:	138 156 139
261:	139 156 157	262:	139 157 140	263:	140 157 158	264:	140 158 141	265:	141 158 159
266:	141 159 142	267:	142 159 160	268:	142 160 143	269:	143 160 161	270:	143 161 144
271:	144 161 162	272:	144 162 145	273:	145 162 163	274:	145 163 146	275:	146 163 164
276:	146 164 147	277:	147 164 165	278:	147 165 148	279:	148 165 166	280:	148 166 149
281:	149 166 167	282:	149 167 150	283:	150 167 168	284:	150 168 151	285:	151 168 169
286:	151 169 152	287:	152 169 170	288:	152 170 153	289:	154 171 172	290:	154 172 155
291:	155 172 173	292:	155 173 156	293:	156 173 174	294:	156 174 157	295:	157 174 175
296:	157 175 158	297:	158 175 176	298:	158 176 159	299:	159 176 177	300:	159 177 160
301:	160 177 178	302:	160 178 161	303:	161 178 179	304:	161 179 162	305:	162 179 180

306: 162 180 163	307: 163 180 181	308: 163 181 164	309: 164 181 182	310: 164 182 165
311: 165 182 183	312: 165 183 166	313: 166 183 184	314: 166 184 167	315: 167 184 185
316: 167 185 168	317: 168 185 186	318: 168 186 169	319: 169 186 187	320: 169 187 170
321: 171 188 189	322: 171 189 172	323: 172 189 190	324: 172 190 173	325: 173 190 191
326: 173 191 174	327: 174 191 192	328: 174 192 175	329: 175 192 193	330: 175 193 176
331: 176 193 194	332: 176 194 177	333: 177 194 195	334: 177 195 178	335: 178 195 196
336: 178 196 179	337: 179 196 197	338: 179 197 180	339: 180 197 198	340: 180 198 181
341: 181 198 199	342: 181 199 182	343: 182 199 200	344: 182 200 183	345: 183 200 201
346: 183 201 184	347: 184 201 202	348: 184 202 185	349: 185 202 203	350: 185 203 186
351: 186 203 204	352: 186 204 187	353: 188 205 206	354: 188 206 189	355: 189 206 207
356: 189 207 190	357: 190 207 208	358: 190 208 191	359: 191 208 209	360: 191 209 192
361: 192 209 210	362: 192 210 193	363: 193 210 211	364: 193 211 194	365: 194 211 212
366: 194 212 195	367: 195 212 213	368: 195 213 196	369: 196 213 214	370: 196 214 197
371: 197 214 215	372: 197 215 198	373: 198 215 216	374: 198 216 199	375: 199 216 217
376: 199 217 200	377: 200 217 218	378: 200 218 201	379: 201 218 219	380: 201 219 202
381: 202 219 220	382: 202 220 203	383: 203 220 221	384: 203 221 204	385: 205 222 223
386: 205 223 206	387: 206 223 224	388: 206 224 207	389: 207 224 225	390: 207 225 208
391: 208 225 226	392: 208 226 209	393: 209 226 227	394: 209 227 210	395: 210 227 228
396: 210 228 211	397: 211 228 229	398: 211 229 212	399: 212 229 230	400: 212 230 213
401: 213 230 231	402: 213 231 214	403: 214 231 232	404: 214 232 215	405: 215 232 233
406: 215 233 216	407: 216 233 234	408: 216 234 217	409: 217 234 235	410: 217 235 218
411: 218 235 236	412: 218 236 219	413: 219 236 237	414: 219 237 220	415: 220 237 238
416: 220 238 221	417: 222 239 240	418: 222 240 223	419: 223 240 241	420: 223 241 224
421: 224 241 242	422: 224 242 225	423: 225 242 243	424: 225 243 226	425: 226 243 244
426: 226 244 227	427: 227 244 245	428: 227 245 228	429: 228 245 246	430: 228 246 229
431: 229 246 247	432: 229 247 230	433: 230 247 248	434: 230 248 231	435: 231 248 249
436: 231 249 232	437: 232 249 250	438: 232 250 233	439: 233 250 251	440: 233 251 234
441: 234 251 252	442: 234 252 235	443: 235 252 253	444: 235 253 236	445: 236 253 254
446: 236 254 237	447: 237 254 255	448: 237 255 238	449: 239 256 257	450: 239 257 240
451: 240 257 258	452: 240 258 241	453: 241 258 259	454: 241 259 242	455: 242 259 260
456: 242 260 243	457: 243 260 261	458: 243 261 244	459: 244 261 262	460: 244 262 245
461: 245 262 263	462: 245 263 246	463: 246 263 264	464: 246 264 247	465: 247 264 265
466: 247 265 248	467: 248 265 266	468: 248 266 249	469: 249 266 267	470: 249 267 250
471: 250 267 268	472: 250 268 251	473: 251 268 269	474: 251 269 252	475: 252 269 270
476: 252 270 253	477: 253 270 271	478: 253 271 254	479: 254 271 272	480: 254 272 255
481: 256 273 274	482: 256 274 257	483: 257 274 275	484: 257 275 258	485: 258 275 276
486: 258 276 259	487: 259 276 277	488: 259 277 260	489: 260 277 278	490: 260 278 261
491: 261 278 279	492: 261 279 262	493: 262 279 280	494: 262 280 263	495: 263 280 281
496: 263 281 264	497: 264 281 282	498: 264 282 265	499: 265 282 283	500: 265 283 266
501: 266 283 284	502: 266 284 267	503: 267 284 285	504: 267 285 268	505: 268 285 286
506: 268 286 269	507: 269 286 287	508: 269 287 270	509: 270 287 288	510: 270 288 271
511: 271 288 289	512: 271 289 272	513: 273 290 291	514: 273 291 274	515: 274 291 292
516: 274 292 275	517: 275 292 293	518: 275 293 276	519: 276 293 294	520: 276 294 277
521: 277 294 295	522: 277 295 278	523: 278 295 296	524: 278 296 279	525: 279 296 297
526: 279 297 280	527: 280 297 298	528: 280 298 281	529: 281 298 299	530: 281 299 282
531: 282 299 300	532: 282 300 283	533: 283 300 301	534: 283 301 284	535: 284 301 302
536: 284 302 285	537: 285 302 303	538: 285 303 286	539: 286 303 304	540: 286 304 287
541: 287 304 305	542: 287 305 288	543: 288 305 306	544: 288 306 289	545: 290 307 308
546: 290 308 291	547: 291 308 309	548: 291 309 292	549: 292 309 310	550: 292 310 293
551: 293 310 311	552: 293 311 294	553: 294 311 312	554: 294 312 295	555: 295 312 313
556: 295 313 296	557: 296 313 314	558: 296 314 297	559: 297 314 315	560: 297 315 298
561: 298 315 316	562: 298 316 299	563: 299 316 317	564: 299 317 300	565: 300 317 318
566: 300 318 301	567: 301 318 319	568: 301 319 302	569: 302 319 320	570: 302 320 303
571: 303 320 321	572: 303 321 304	573: 304 321 322	574: 304 322 305	575: 305 322 323
576: 305 323 306	577: 307 324 325	578: 307 325 308	579: 308 325 326	580: 308 326 309
581: 309 326 327	582: 309 327 310	583: 310 327 328	584: 310 328 311	585: 311 328 329
586: 311 329 312	587: 312 329 330	588: 312 330 313	589: 313 330 331	590: 313 331 314
591: 314 331 332	592: 314 332 315	593: 315 332 333	594: 315 333 316	595: 316 333 334
596: 316 334 317	597: 317 334 335	598: 317 335 318	599: 318 335 336	600: 318 336 319
601: 319 336 337	602: 319 337 320	603: 320 337 338	604: 320 338 321	605: 321 338 339
606: 321 339 322	607: 322 339 340	608: 322 340 323	609: 324 341 342	610: 324 342 325
611: 325 342 343	612: 325 343 326	613: 326 343 344	614: 326 344 327	615: 327 344 345
616: 327 345 328	617: 328 345 346	618: 328 346 329	619: 329 346 347	620: 329 347 330
621: 330 347 348	622: 330 348 331	623: 331 348 349	624: 331 349 332	625: 332 349 350
626: 332 350 333	627: 333 350 351	628: 333 351 334	629: 334 351 352	630: 334 352 335
631: 335 352 353	632: 335 353 336	633: 336 353 354	634: 336 354 337	635: 337 354 355
636: 337 355 338	637: 338 355 356	638: 338 356 339	639: 339 356 357	640: 339 357 340
641: 341 358 359	642: 341 359 342	643: 342 359 360	644: 342 360 343	645: 343 360 361
646: 343 361 344	647: 344 361 362	648: 344 362 345	649: 345 362 363	650: 345 363 346
651: 346 363 364	652: 346 364 347	653: 347 364 365	654: 347 365 348	655: 348 365 366
656: 348 366 349	657: 349 366 367	658: 349 367 350	659: 350 367 368	660: 350 368 351
661: 351 368 369	662: 351 369 352	663: 352 369 370	664: 352 370 353	665: 353 370 371
666: 353 371 354	667: 354 371 372	668: 354 372 355	669: 355 372 373	670: 355 373 356
671: 356 373 374	672: 356 374 357	673: 358 375 376	674: 358 376 359	675: 359 376 377
676: 359 377 360	677: 360 377 378	678: 360 378 361	679: 361 378 379	680: 361 379 362
681: 362 379 380	682: 362 380 363	683: 363 380 381	684: 363 381 364	685: 364 381 382
686: 364 382 365	687: 365 382 383	688: 365 383 366	689: 366 383 384	690: 366 384 367
691: 367 384 385	692: 367 385 368	693: 368 385 386	694: 368 386 369	695: 369 386 387
696: 369 387 370	697: 370 387 388	698: 370 388 371	699: 371 388 389	700: 371 389 372
701: 372 389 390	702: 372 390 373	703: 373 390 391	704: 373 391 374	705: 375 392 393
706: 375 393 376	707: 376 393 394	708: 376 394 377	709: 377 394 395	710: 377 395 378
711: 378 395 396	712: 378 396 379	713: 379 396 397	714: 379 397 380	715: 380 397 398
716: 380 398 381	717: 381 398 399	718: 381 399 382	719: 382 399 400	720: 382 400 383
721: 383 400 401	722: 383 401 384	723: 384 401 402	724: 384 402 385	725: 385 402 403
726: 385 403 386	727: 386 403 404	728: 386 404 387	729: 387 404 405	730: 387 405 388
731: 388 405 406	732: 388 406 389	733: 389 406 407	734: 389 407 390	735: 390 407 408
736: 390 408 391	737: 392 409 410	738: 392 410 393	739: 393 410 411	740: 393 411 394
741: 394 411 412	742: 394 412 395	743: 395 412 413	744: 395 413 396	745: 396 413 414
746: 396 414 397	747: 397 414 415	748: 397 415 398	749: 398 415 416	750: 398 416 399
751: 399 416 417	752: 399 417 400	753: 400 417 418	754: 400 418 401	755: 401 418 419

756: 401 419 402	757: 402 419 420	758: 402 420 403	759: 403 420 421	760: 403 421 404
761: 404 421 422	762: 404 422 405	763: 405 422 423	764: 405 423 406	765: 406 423 424
766: 406 424 407	767: 407 424 425	768: 407 425 408	769: 409 426 427	770: 409 427 410
771: 410 427 428	772: 410 428 411	773: 411 428 429	774: 411 429 412	775: 412 429 430
776: 412 430 413	777: 413 430 431	778: 413 431 414	779: 414 431 432	780: 414 432 415
781: 415 432 433	782: 415 433 416	783: 416 433 434	784: 416 434 417	785: 417 434 435
786: 417 435 418	787: 418 435 436	788: 418 436 419	789: 419 436 437	790: 419 437 420
791: 420 437 438	792: 420 438 421	793: 421 438 439	794: 421 439 422	795: 422 439 440
796: 422 440 423	797: 423 440 441	798: 423 441 424	799: 424 441 442	800: 424 442 425
801: 426 443 444	802: 426 444 427	803: 427 444 445	804: 427 445 428	805: 428 445 446
806: 428 446 429	807: 429 446 447	808: 429 447 430	809: 430 447 448	810: 430 448 431
811: 431 448 449	812: 431 449 432	813: 432 449 450	814: 432 450 433	815: 433 450 451
816: 433 451 434	817: 434 451 452	818: 434 452 435	819: 435 452 453	820: 435 453 436
821: 436 453 454	822: 436 454 437	823: 437 454 455	824: 437 455 438	825: 438 455 456
826: 438 456 439	827: 439 456 457	828: 439 457 440	829: 440 457 458	830: 440 458 441
831: 441 458 459	832: 441 459 442	833: 443 460 461	834: 443 461 444	835: 444 461 462
836: 444 462 445	837: 445 462 463	838: 445 463 446	839: 446 463 464	840: 446 464 447
841: 447 464 465	842: 447 465 448	843: 448 465 466	844: 448 466 449	845: 449 466 467
846: 449 467 450	847: 450 467 468	848: 450 468 451	849: 451 468 469	850: 451 469 452
851: 452 469 470	852: 452 470 453	853: 453 470 471	854: 453 471 454	855: 454 471 472
856: 454 472 455	857: 455 472 473	858: 455 473 456	859: 456 473 474	860: 456 474 457
861: 457 474 475	862: 457 475 458	863: 458 475 476	864: 458 476 459	865: 460 477 478
866: 460 478 461	867: 461 478 479	868: 461 479 462	869: 462 479 480	870: 462 480 463
871: 463 480 481	872: 463 481 464	873: 464 481 482	874: 464 482 465	875: 465 482 483
876: 465 483 466	877: 466 483 484	878: 466 484 467	879: 467 484 485	880: 467 485 468
881: 468 485 486	882: 468 486 469	883: 469 486 487	884: 469 487 470	885: 470 487 488
886: 470 488 471	887: 471 488 489	888: 471 489 472	889: 472 489 490	890: 472 490 473
891: 473 490 491	892: 473 491 474	893: 474 491 492	894: 474 492 475	895: 475 492 493
896: 475 493 476	897: 477 494 495	898: 477 495 478	899: 478 495 496	900: 478 496 479
901: 479 496 497	902: 479 497 480	903: 480 497 498	904: 480 498 481	905: 481 498 499
906: 481 499 482	907: 482 499 500	908: 482 500 483	909: 483 500 501	910: 483 501 484
911: 484 501 502	912: 484 502 485	913: 485 502 503	914: 485 503 486	915: 486 503 504
916: 486 504 487	917: 487 504 505	918: 487 505 488	919: 488 505 506	920: 488 506 489
921: 489 506 507	922: 489 507 490	923: 490 507 508	924: 490 508 491	925: 491 508 509
926: 491 509 492	927: 492 509 510	928: 492 510 493	929: 494 511 512	930: 494 512 495
931: 495 512 513	932: 495 513 496	933: 496 513 514	934: 496 514 497	935: 497 514 515
936: 497 515 498	937: 498 515 516	938: 498 516 499	939: 499 516 517	940: 499 517 500
941: 500 517 518	942: 500 518 501	943: 501 518 519	944: 501 519 502	945: 502 519 520
946: 502 520 503	947: 503 520 521	948: 503 521 504	949: 504 521 522	950: 504 522 505
951: 505 522 523	952: 505 523 506	953: 506 523 524	954: 506 524 507	955: 507 524 525
956: 507 525 508	957: 508 525 526	958: 508 526 509	959: 509 526 527	960: 509 527 510
961: 511 528 529	962: 511 529 512	963: 512 529 530	964: 512 530 513	965: 513 530 531
966: 513 531 514	967: 514 531 532	968: 514 532 515	969: 515 532 533	970: 515 533 516
971: 516 533 534	972: 516 534 517	973: 517 534 535	974: 517 535 518	975: 518 535 536
976: 518 536 519	977: 519 536 537	978: 519 537 520	979: 520 537 538	980: 520 538 521
981: 521 538 539	982: 521 539 522	983: 522 539 540	984: 522 540 523	985: 523 540 541
986: 523 541 524	987: 524 541 542	988: 524 542 525	989: 525 542 543	990: 525 543 526
991: 526 543 544	992: 526 544 527	993: 528 545 546	994: 528 546 529	995: 529 546 547
996: 529 547 530	997: 530 547 548	998: 530 548 531	999: 531 548 549	1000: 531 549 532
1001: 532 549 550	1002: 532 550 533	1003: 533 550 551	1004: 533 551 534	1005: 534 551 552
1006: 534 552 535	1007: 535 552 553	1008: 535 553 536	1009: 536 553 554	1010: 536 554 537
1011: 537 554 555	1012: 537 555 538	1013: 538 555 556	1014: 538 556 539	1015: 539 556 557
1016: 539 557 540	1017: 540 557 558	1018: 540 558 541	1019: 541 558 559	1020: 541 559 542
1021: 542 559 560	1022: 542 560 543	1023: 543 560 561	1024: 543 561 544	1025: 545 562 563
1026: 545 563 546	1027: 546 563 564	1028: 546 564 547	1029: 547 564 565	1030: 547 565 548
1031: 548 565 566	1032: 548 566 549	1033: 549 566 567	1034: 549 567 550	1035: 550 567 568
1036: 550 568 551	1037: 551 568 569	1038: 551 569 552	1039: 552 569 570	1040: 552 570 553
1041: 553 570 571	1042: 553 571 554	1043: 554 571 572	1044: 554 572 555	1045: 555 572 573
1046: 555 573 556	1047: 556 573 574	1048: 556 574 557	1049: 557 574 575	1050: 557 575 558
1051: 558 575 576	1052: 558 576 559	1053: 559 576 577	1054: 559 577 560	1055: 560 577 578
1056: 560 578 561	1057: 562 579 580	1058: 562 580 563	1059: 563 580 581	1060: 563 581 564
1061: 564 581 582	1062: 564 582 565	1063: 565 582 583	1064: 565 583 566	1065: 566 583 584
1066: 566 584 567	1067: 567 584 585	1068: 567 585 568	1069: 568 585 586	1070: 568 586 569
1071: 569 586 587	1072: 569 587 570	1073: 570 587 588	1074: 570 588 571	1075: 571 588 589
1076: 571 589 572	1077: 572 589 590	1078: 572 590 573	1079: 573 590 591	1080: 573 591 574
1081: 574 591 592	1082: 574 592 575	1083: 575 592 593	1084: 575 593 576	1085: 576 593 594
1086: 576 594 577	1087: 577 594 595	1088: 577 595 578	1089: 579 596 597	1090: 579 597 580
1091: 580 597 598	1092: 580 598 581	1093: 581 598 599	1094: 581 599 582	1095: 582 599 600
1096: 582 600 583	1097: 583 600 601	1098: 583 601 584	1099: 584 601 602	1100: 584 602 585
1101: 585 602 603	1102: 585 603 586	1103: 586 603 604	1104: 586 604 587	1105: 587 604 605
1106: 587 605 588	1107: 588 605 606	1108: 588 606 589	1109: 589 606 607	1110: 589 607 590
1111: 590 607 608	1112: 590 608 591	1113: 591 608 609	1114: 591 609 592	1115: 592 609 610
1116: 592 610 593	1117: 593 610 611	1118: 593 611 594	1119: 594 611 612	1120: 594 612 595
1121: 596 613 614	1122: 596 614 597	1123: 597 614 615	1124: 597 615 598	1125: 598 615 616
1126: 598 616 599	1127: 599 616 617	1128: 599 617 600	1129: 600 617 618	1130: 600 618 601
1131: 601 618 619	1132: 601 619 602	1133: 602 619 620	1134: 602 620 603	1135: 603 620 621
1136: 603 621 604	1137: 604 621 622	1138: 604 622 605	1139: 605 622 623	1140: 605 623 606
1141: 606 623 624	1142: 606 624 607	1143: 607 624 625	1144: 607 625 608	1145: 608 625 626
1146: 608 626 609	1147: 609 626 627	1148: 609 627 610	1149: 610 627 628	1150: 610 628 611
1151: 611 628 629	1152: 611 629 612	1153: 613 630 631	1154: 613 631 614	1155: 614 631 632
1156: 614 632 615	1157: 615 632 633	1158: 615 633 616	1159: 616 633 634	1160: 616 634 617
1161: 617 634 635	1162: 617 635 618	1163: 618 635 636	1164: 618 636 619	1165: 619 636 637
1166: 619 637 620	1167: 620 637 638	1168: 620 638 621	1169: 621 638 639	1170: 621 639 622
1171: 622 639 640	1172: 622 640 623	1173: 623 640 641	1174: 623 641 624	1175: 624 641 642
1176: 624 642 625	1177: 625 642 643	1178: 625 643 626	1179: 626 643 644	1180: 626 644 627
1181: 627 644 645	1182: 627 645 628	1183: 628 645 646	1184: 628 646 629	1185: 630 647 648
1186: 630 648 631	1187: 631 648 649	1188: 631 649 632	1189: 632 649 650	1190: 632 650 633
1191: 633 650 651	1192: 633 651 634	1193: 634 651 652	1194: 634 652 635	1195: 635 652 653
1196: 635 653 636	1197: 636 653 654	1198: 636 654 637	1199: 637 654 655	1200: 637 655 638
1201: 638 655 656	1202: 638 656 639	1203: 639 656 657	1204: 639 657 640	1205: 640 657 658

1206: 640 658 641	1207: 641 658 659	1208: 641 659 642	1209: 642 659 660	1210: 642 660 643
1211: 643 660 661	1212: 643 661 644	1213: 644 661 662	1214: 644 662 645	1215: 645 662 663
1216: 645 663 646	1217: 647 664 665	1218: 647 665 648	1219: 648 665 666	1220: 648 666 649
1221: 649 666 667	1222: 649 667 650	1223: 650 667 668	1224: 650 668 651	1225: 651 668 669
1226: 651 669 652	1227: 652 669 670	1228: 652 670 653	1229: 653 670 671	1230: 653 671 654
1231: 654 671 672	1232: 654 672 655	1233: 655 672 673	1234: 655 673 656	1235: 656 673 674
1236: 656 674 657	1237: 657 674 675	1238: 657 675 658	1239: 658 675 676	1240: 658 676 659
1241: 659 676 677	1242: 659 677 660	1243: 660 677 678	1244: 660 678 661	1245: 661 678 679
1246: 661 679 662	1247: 662 679 680	1248: 662 680 663	1249: 664 681 682	1250: 664 682 665
1251: 665 682 683	1252: 665 683 666	1253: 666 683 684	1254: 666 684 667	1255: 667 684 685
1256: 667 685 668	1257: 668 685 686	1258: 668 686 669	1259: 669 686 687	1260: 669 687 670
1261: 670 687 688	1262: 670 688 671	1263: 671 688 689	1264: 671 689 672	1265: 672 689 690
1266: 672 690 673	1267: 673 690 691	1268: 673 691 674	1269: 674 691 692	1270: 674 692 675
1271: 675 692 693	1272: 675 693 676	1273: 676 693 694	1274: 676 694 677	1275: 677 694 695
1276: 677 695 678	1277: 678 695 696	1278: 678 696 679	1279: 679 696 697	1280: 679 697 680
1281: 681 698 699	1282: 681 699 682	1283: 682 699 700	1284: 682 700 683	1285: 683 700 701
1286: 683 701 684	1287: 684 701 702	1288: 684 702 685	1289: 685 702 703	1290: 685 703 686
1291: 686 703 704	1292: 686 704 687	1293: 687 704 705	1294: 687 705 688	1295: 688 705 706
1296: 688 706 689	1297: 689 706 707	1298: 689 707 690	1299: 690 707 708	1300: 690 708 691
1301: 691 708 709	1302: 691 709 692	1303: 692 709 710	1304: 692 710 693	1305: 693 710 711
1306: 693 711 694	1307: 694 711 712	1308: 694 712 695	1309: 695 712 713	1310: 695 713 696
1311: 696 713 714	1312: 696 714 697	1313: 698 715 716	1314: 698 716 699	1315: 699 716 717
1316: 699 717 700	1317: 700 717 718	1318: 700 718 701	1319: 701 718 719	1320: 701 719 702
1321: 702 719 720	1322: 702 720 703	1323: 703 720 721	1324: 703 721 704	1325: 704 721 722
1326: 704 722 705	1327: 705 722 723	1328: 705 723 706	1329: 706 723 724	1330: 706 724 707
1331: 707 724 725	1332: 707 725 708	1333: 708 725 726	1334: 708 726 709	1335: 709 726 727
1336: 709 727 710	1337: 710 727 728	1338: 710 728 711	1339: 711 728 729	1340: 711 729 712
1341: 712 729 730	1342: 712 730 713	1343: 713 730 731	1344: 713 731 714	1345: 715 732 733
1346: 715 733 716	1347: 716 733 734	1348: 716 734 717	1349: 717 734 735	1350: 717 735 718
1351: 718 735 736	1352: 718 736 719	1353: 719 736 737	1354: 719 737 720	1355: 720 737 738
1356: 720 738 721	1357: 721 738 739	1358: 721 739 722	1359: 722 739 740	1360: 722 740 723
1361: 723 740 741	1362: 723 741 724	1363: 724 741 742	1364: 724 742 725	1365: 725 742 743
1366: 725 743 726	1367: 726 743 744	1368: 726 744 727	1369: 727 744 745	1370: 727 745 728
1371: 728 745 746	1372: 728 746 729	1373: 729 746 747	1374: 729 747 730	1375: 730 747 748
1376: 730 748 731	1377: 732 749 750	1378: 732 750 733	1379: 733 750 751	1380: 733 751 734
1381: 734 751 752	1382: 734 752 735	1383: 735 752 753	1384: 735 753 736	1385: 736 753 754
1386: 736 754 737	1387: 737 754 755	1388: 737 755 738	1389: 738 755 756	1390: 738 756 739
1391: 739 756 757	1392: 739 757 740	1393: 740 757 758	1394: 740 758 741	1395: 741 758 759
1396: 741 759 742	1397: 742 759 760	1398: 742 760 743	1399: 743 760 761	1400: 743 761 744
1401: 744 761 762	1402: 744 762 745	1403: 745 762 763	1404: 745 763 746	1405: 746 763 764
1406: 746 764 747	1407: 747 764 765	1408: 747 765 748		

ELEMENT HYDRAULIC CONDUCTIVITIES (ft/d)

	HYDRAUL.	COND.		HYDRAUL.	COND.		HYDRAUL.	COND.
ELEMENT	(HORZ.	VERT.)	ELEMENT	(HORZ.	VERT.)	ELEMENT	(HORZ.	VERT.)
1:	.1000E-04	.1000E-05	2:	.1000E-04	.1000E-05	3:	.1000E-04	.1000E-05
4:	.1000E-04	.1000E-05	5:	.1000E-04	.1000E-05	6:	.1000E-04	.1000E-05
7:	.1000E-04	.1000E-05	8:	.1000E-04	.1000E-05	9:	.1000E-04	.1000E-05
10:	.1000E-04	.1000E-05	11:	.1000E-04	.1000E-05	12:	.1000E-04	.1000E-05
13:	.1000E-04	.1000E-05	14:	.1000E-04	.1000E-05	15:	.1000E-04	.1000E-05
16:	.1000E-04	.1000E-05	17:	.1000E-04	.1000E-05	18:	.1000E-04	.1000E-05
19:	.1000E-04	.1000E-05	20:	.1000E-04	.1000E-05	21:	.1000E-04	.1000E-05
22:	.1000E-04	.1000E-05	23:	.1000E-04	.1000E-05	24:	.1000E-04	.1000E-05
25:	.1000E-04	.1000E-05	26:	.1000E-04	.1000E-05	27:	.1000E-04	.1000E-05
28:	.1000E-04	.1000E-05	29:	.4000E+02	.7000E+02	30:	.4000E+02	.7000E+02
31:	.4000E+02	.7000E+02	32:	.4000E+02	.7000E+02	33:	.1000E-04	.1000E-05
34:	.1000E-04	.1000E-05	35:	.1000E-04	.1000E-05	36:	.1000E-04	.1000E-05
37:	.1000E-04	.1000E-05	38:	.1000E-04	.1000E-05	39:	.1000E-04	.1000E-05
40:	.1000E-04	.1000E-05	41:	.1000E-04	.1000E-05	42:	.1000E-04	.1000E-05
43:	.1000E-04	.1000E-05	44:	.1000E-04	.1000E-05	45:	.1000E-04	.1000E-05
46:	.1000E-04	.1000E-05	47:	.1000E-04	.1000E-05	48:	.1000E-04	.1000E-05
49:	.1000E-04	.1000E-05	50:	.1000E-04	.1000E-05	51:	.1000E-04	.1000E-05
52:	.1000E-04	.1000E-05	53:	.1000E-04	.1000E-05	54:	.1000E-04	.1000E-05
55:	.1000E-04	.1000E-05	56:	.1000E-04	.1000E-05	57:	.4000E+02	.7000E+02
58:	.4000E+02	.7000E+02	59:	.4000E+02	.7000E+02	60:	.4000E+02	.7000E+02
61:	.4000E+02	.7000E+02	62:	.4000E+02	.7000E+02	63:	.4000E+02	.7000E+02
64:	.4000E+02	.7000E+02	65:	.1000E-04	.1000E-05	66:	.1000E-04	.1000E-05
67:	.1000E-04	.1000E-05	68:	.1000E-04	.1000E-05	69:	.1000E-04	.1000E-05
70:	.1000E-04	.1000E-05	71:	.1000E-04	.1000E-05	72:	.1000E-04	.1000E-05
73:	.1000E-04	.1000E-05	74:	.1000E-04	.1000E-05	75:	.1000E-04	.1000E-05
76:	.1000E-04	.1000E-05	77:	.1000E-04	.1000E-05	78:	.1000E-04	.1000E-05
79:	.1000E-04	.1000E-05	80:	.1000E-04	.1000E-05	81:	.1000E-04	.1000E-05
82:	.1000E-04	.1000E-05	83:	.1000E-04	.1000E-05	84:	.1000E-04	.1000E-05
85:	.4000E+02	.7000E+02	86:	.4000E+02	.7000E+02	87:	.4000E+02	.7000E+02
88:	.4000E+02	.7000E+02	89:	.4000E+02	.7000E+02	90:	.4000E+02	.7000E+02
91:	.4000E+02	.7000E+02	92:	.4000E+02	.7000E+02	93:	.5000E+02	.1400E+01
94:	.5000E+02	.1400E+01	95:	.5000E+02	.1400E+01	96:	.5000E+02	.1400E+01
97:	.1000E-04	.1000E-05	98:	.1000E-04	.1000E-05	99:	.1000E-04	.1000E-05
100:	.1000E-04	.1000E-05	101:	.1000E-04	.1000E-05	102:	.1000E-04	.1000E-05
103:	.1000E-04	.1000E-05	104:	.1000E-04	.1000E-05	105:	.1000E-04	.1000E-05
106:	.1000E-04	.1000E-05	107:	.1000E-04	.1000E-05	108:	.1000E-04	.1000E-05
109:	.1000E-04	.1000E-05	110:	.1000E-04	.1000E-05	111:	.1000E-04	.1000E-05
112:	.1000E-04	.1000E-05	113:	.4000E+02	.7000E+02	114:	.4000E+02	.7000E+02
115:	.4000E+02	.7000E+02	116:	.4000E+02	.7000E+02	117:	.4000E+02	.7000E+02
118:	.4000E+02	.7000E+02	119:	.4000E+02	.7000E+02	120:	.4000E+02	.7000E+02
121:	.1000E-01	.1000E-02	122:	.1000E-01	.1000E-02	123:	.1000E-01	.1000E-02
124:	.1000E-01	.1000E-02	125:	.5000E+02	.1400E+01	126:	.5000E+02	.1400E+01

127:	.5000E+02	.1400E+01	128:	.5000E+02	.1400E+01	129:	.1000E-04	.1000E-05
130:	.1000E-04	.1000E-05	131:	.1000E-04	.1000E-05	132:	.1000E-04	.1000E-05
133:	.1000E-04	.1000E-05	134:	.1000E-04	.1000E-05	135:	.1000E-04	.1000E-05
136:	.1000E-04	.1000E-05	137:	.1000E-04	.1000E-05	138:	.1000E-04	.1000E-05
139:	.1000E-04	.1000E-05	140:	.1000E-04	.1000E-05	141:	.4000E+02	.7000E+02
142:	.4000E+02	.7000E+02	143:	.4000E+02	.7000E+02	144:	.4000E+02	.7000E+02
145:	.4000E+02	.7000E+02	146:	.4000E+02	.7000E+02	147:	.1000E-01	.1000E-02
148:	.1000E-01	.1000E-02	149:	.1000E-01	.1000E-02	150:	.1000E-01	.1000E-02
151:	.1000E-01	.1000E-02	152:	.1000E-01	.1000E-02	153:	.1000E-01	.1000E-02
154:	.1000E-01	.1000E-02	155:	.1000E-01	.1000E-02	156:	.1000E-01	.1000E-02
157:	.5000E+02	.1400E+01	158:	.5000E+02	.1400E+01	159:	.5000E+02	.1400E+01
160:	.5000E+02	.1400E+01	161:	.1000E-04	.1000E-05	162:	.1000E-04	.1000E-05
163:	.1000E-04	.1000E-05	164:	.1000E-04	.1000E-05	165:	.1000E-04	.1000E-05
166:	.1000E-04	.1000E-05	167:	.1000E-04	.1000E-05	168:	.1000E-04	.1000E-05
169:	.4000E+02	.7000E+02	170:	.4000E+02	.7000E+02	171:	.4000E+02	.7000E+02
172:	.4000E+02	.7000E+02	173:	.4000E+02	.7000E+02	174:	.4000E+02	.7000E+02
175:	.4000E+02	.7000E+02	176:	.4000E+02	.7000E+02	177:	.1000E-01	.1000E-02
178:	.1000E-01	.1000E-02	179:	.1000E-01	.1000E-02	180:	.1000E-01	.1000E-02
181:	.1000E-01	.1000E-02	182:	.1000E-01	.1000E-02	183:	.1000E-01	.1000E-02
184:	.1000E-01	.1000E-02	185:	.5000E+02	.1400E+01	186:	.5000E+02	.1400E+01
187:	.5000E+02	.1400E+01	188:	.5000E+02	.1400E+01	189:	.5000E+02	.1400E+01
190:	.5000E+02	.1400E+01	191:	.5000E+02	.1400E+01	192:	.5000E+02	.1400E+01
193:	.1000E-04	.1000E-05	194:	.1000E-04	.1000E-05	195:	.1000E-04	.1000E-05
196:	.1000E-04	.1000E-05	197:	.4000E+02	.7000E+02	198:	.4000E+02	.7000E+02
199:	.4000E+02	.7000E+02	200:	.4000E+02	.7000E+02	201:	.4000E+02	.7000E+02
202:	.4000E+02	.7000E+02	203:	.4000E+02	.7000E+02	204:	.4000E+02	.7000E+02
205:	.1000E-01	.1000E-02	206:	.1000E-01	.1000E-02	207:	.1000E-01	.1000E-02
208:	.1000E-01	.1000E-02	209:	.1000E-01	.1000E-02	210:	.1000E-01	.1000E-02
211:	.1000E-01	.1000E-02	212:	.1000E-01	.1000E-02	213:	.1000E-01	.1000E-02
214:	.1000E-01	.1000E-02	215:	.5000E+02	.1400E+01	216:	.5000E+02	.1400E+01
217:	.5000E+02	.1400E+01	218:	.5000E+02	.1400E+01	219:	.5000E+02	.1400E+01
220:	.5000E+02	.1400E+01	221:	.5000E+02	.1400E+01	222:	.5000E+02	.1400E+01
223:	.5000E+02	.1400E+01	224:	.5000E+02	.1400E+01	225:	.1000E-04	.1000E-05
226:	.1000E-04	.1000E-05	227:	.1000E-04	.1000E-05	228:	.1000E-04	.1000E-05
229:	.4000E+02	.7000E+02	230:	.4000E+02	.7000E+02	231:	.1000E-01	.1000E-02
232:	.1000E-01	.1000E-02	233:	.1000E-01	.1000E-02	234:	.1000E-01	.1000E-02
235:	.1000E-01	.1000E-02	236:	.1000E-01	.1000E-02	237:	.1000E-01	.1000E-02
238:	.1000E-01	.1000E-02	239:	.1000E-01	.1000E-02	240:	.1000E-01	.1000E-02
241:	.1000E-01	.1000E-02	242:	.1000E-01	.1000E-02	243:	.5000E+02	.1400E+01
244:	.5000E+02	.1400E+01	245:	.5000E+02	.1400E+01	246:	.5000E+02	.1400E+01
247:	.5000E+02	.1400E+01	248:	.5000E+02	.1400E+01	249:	.5000E+02	.1400E+01
250:	.5000E+02	.1400E+01	251:	.5000E+02	.1400E+01	252:	.5000E+02	.1400E+01
253:	.5000E+02	.1400E+01	254:	.5000E+02	.1400E+01	255:	.5000E+02	.1400E+01
256:	.5000E+02	.1400E+01	257:	.1000E-04	.1000E-05	258:	.1000E-04	.1000E-05
259:	.1000E-04	.1000E-05	260:	.1000E-04	.1000E-05	261:	.4000E+02	.7000E+02
262:	.4000E+02	.7000E+02	263:	.1000E-01	.1000E-02	264:	.1000E-01	.1000E-02
265:	.1000E-01	.1000E-02	266:	.1000E-01	.1000E-02	267:	.1000E-01	.1000E-02
268:	.1000E-01	.1000E-02	269:	.1000E-01	.1000E-02	270:	.1000E-01	.1000E-02
271:	.1000E-01	.1000E-02	272:	.1000E-01	.1000E-02	273:	.1000E-01	.1000E-02
274:	.1000E-01	.1000E-02	275:	.5000E+02	.1400E+01	276:	.5000E+02	.1400E+01
277:	.5000E+02	.1400E+01	278:	.5000E+02	.1400E+01	279:	.5000E+02	.1400E+01
280:	.5000E+02	.1400E+01	281:	.5000E+02	.1400E+01	282:	.5000E+02	.1400E+01
283:	.5000E+02	.1400E+01	284:	.5000E+02	.1400E+01	285:	.5000E+02	.1400E+01
286:	.5000E+02	.1400E+01	287:	.5000E+02	.1400E+01	288:	.5000E+02	.1400E+01
289:	.4000E+02	.7000E+02	290:	.4000E+02	.7000E+02	291:	.4000E+02	.7000E+02
292:	.4000E+02	.7000E+02	293:	.4000E+02	.7000E+02	294:	.4000E+02	.7000E+02
295:	.1000E-01	.1000E-02	296:	.1000E-01	.1000E-02	297:	.1000E-01	.1000E-02
298:	.1000E-01	.1000E-02	299:	.1000E-01	.1000E-02	300:	.1000E-01	.1000E-02
301:	.1000E-01	.1000E-02	302:	.1000E-01	.1000E-02	303:	.1000E-01	.1000E-02
304:	.1000E-01	.1000E-02	305:	.1000E-01	.1000E-02	306:	.1000E-01	.1000E-02
307:	.5000E+02	.1400E+01	308:	.5000E+02	.1400E+01	309:	.5000E+02	.1400E+01
310:	.5000E+02	.1400E+01	311:	.5000E+02	.1400E+01	312:	.5000E+02	.1400E+01
313:	.5000E+02	.1400E+01	314:	.5000E+02	.1400E+01	315:	.5000E+02	.1400E+01
316:	.5000E+02	.1400E+01	317:	.5000E+02	.1400E+01	318:	.5000E+02	.1400E+01
319:	.5000E+02	.1400E+01	320:	.5000E+02	.1400E+01	321:	.4000E+02	.7000E+02
322:	.4000E+02	.7000E+02	323:	.4000E+02	.7000E+02	324:	.4000E+02	.7000E+02
325:	.1000E-01	.1000E-02	326:	.1000E-01	.1000E-02	327:	.1000E-01	.1000E-02
328:	.1000E-01	.1000E-02	329:	.1000E-04	.1000E-05	330:	.1000E-04	.1000E-05
331:	.1000E-04	.1000E-05	332:	.1000E-04	.1000E-05	333:	.1000E-04	.1000E-05
334:	.1000E-04	.1000E-05	335:	.1000E-04	.1000E-05	336:	.1000E-04	.1000E-05
337:	.1000E-01	.1000E-02	338:	.1000E-01	.1000E-02	339:	.5000E+02	.1400E+01
340:	.5000E+02	.1400E+01	341:	.5000E+02	.1400E+01	342:	.5000E+02	.1400E+01
343:	.5000E+02	.1400E+01	344:	.5000E+02	.1400E+01	345:	.5000E+02	.1400E+01
346:	.5000E+02	.1400E+01	347:	.5000E+02	.1400E+01	348:	.5000E+02	.1400E+01
349:	.5000E+02	.1400E+01	350:	.5000E+02	.1400E+01	351:	.5000E+02	.1400E+01
352:	.5000E+02	.1400E+01	353:	.4000E+02	.7000E+02	354:	.4000E+02	.7000E+02
355:	.4000E+02	.7000E+02	356:	.4000E+02	.7000E+02	357:	.1000E-01	.1000E-02
358:	.1000E-01	.1000E-02	359:	.1000E-01	.1000E-02	360:	.1000E-01	.1000E-02
361:	.1000E-04	.1000E-05	362:	.1000E-04	.1000E-05	363:	.1000E-04	.1000E-05
364:	.1000E-04	.1000E-05	365:	.1000E-04	.1000E-05	366:	.1000E-04	.1000E-05
367:	.1000E-04	.1000E-05	368:	.1000E-04	.1000E-05	369:	.1000E-01	.1000E-02
370:	.1000E-01	.1000E-02	371:	.5000E+02	.1400E+01	372:	.5000E+02	.1400E+01
373:	.5000E+02	.1400E+01	374:	.5000E+02	.1400E+01	375:	.5000E+02	.1400E+01
376:	.5000E+02	.1400E+01	377:	.5000E+02	.1400E+01	378:	.5000E+02	.1400E+01
379:	.5000E+02	.1400E+01	380:	.5000E+02	.1400E+01	381:	.5000E+02	.1400E+01
382:	.5000E+02	.1400E+01	383:	.5000E+02	.1400E+01	384:	.5000E+02	.1400E+01
385:	.4000E+02	.7000E+02	386:	.4000E+02	.7000E+02	387:	.4000E+02	.7000E+02
388:	.4000E+02	.7000E+02	389:	.1000E-01	.1000E-02	390:	.1000E-01	.1000E-02
391:	.1000E-04	.1000E-05	392:	.1000E-04	.1000E-05	393:	.1000E-04	.1000E-05
394:	.1000E-04	.1000E-05	395:	.1000E-04	.1000E-05	396:	.1000E-04	.1000E-05

397:	.1000E-04	.1000E-05	398:	.1000E-04	.1000E-05	399:	.1000E-04	.1000E-05
400:	.1000E-04	.1000E-05	401:	.1000E-01	.1000E-02	402:	.1000E-01	.1000E-02
403:	.5000E+02	.1400E+01	404:	.5000E+02	.1400E+01	405:	.5000E+02	.1400E+01
406:	.5000E+02	.1400E+01	407:	.5000E+02	.1400E+01	408:	.5000E+02	.1400E+01
409:	.5000E+02	.1400E+01	410:	.5000E+02	.1400E+01	411:	.5000E+02	.1400E+01
412:	.5000E+02	.1400E+01	413:	.5000E+02	.1400E+01	414:	.5000E+02	.1400E+01
415:	.5000E+02	.1400E+01	416:	.5000E+02	.1400E+01	417:	.4000E+02	.7000E+02
418:	.4000E+02	.7000E+02	419:	.4000E+02	.7000E+02	420:	.4000E+02	.7000E+02
421:	.1000E-01	.1000E-02	422:	.1000E-01	.1000E-02	423:	.1000E-04	.1000E-05
424:	.1000E-04	.1000E-05	425:	.1000E-04	.1000E-05	426:	.1000E-04	.1000E-05
427:	.1000E-04	.1000E-05	428:	.1000E-04	.1000E-05	429:	.1000E-04	.1000E-05
430:	.1000E-04	.1000E-05	431:	.1000E-04	.1000E-05	432:	.1000E-04	.1000E-05
433:	.1000E-01	.1000E-02	434:	.1000E-01	.1000E-02	435:	.5000E+02	.1400E+01
436:	.5000E+02	.1400E+01	437:	.5000E+02	.1400E+01	438:	.5000E+02	.1400E+01
439:	.5000E+02	.1400E+01	440:	.5000E+02	.1400E+01	441:	.5000E+02	.1400E+01
442:	.5000E+02	.1400E+01	443:	.5000E+02	.1400E+01	444:	.5000E+02	.1400E+01
445:	.5000E+02	.1400E+01	446:	.5000E+02	.1400E+01	447:	.5000E+02	.1400E+01
448:	.5000E+02	.1400E+01	449:	.4000E+02	.7000E+02	450:	.4000E+02	.7000E+02
451:	.4000E+02	.7000E+02	452:	.4000E+02	.7000E+02	453:	.1000E-01	.1000E-02
454:	.1000E-01	.1000E-02	455:	.1000E-04	.1000E-05	456:	.1000E-04	.1000E-05
457:	.1000E-04	.1000E-05	458:	.1000E-04	.1000E-05	459:	.1000E-04	.1000E-05
460:	.1000E-04	.1000E-05	461:	.1000E-04	.1000E-05	462:	.1000E-04	.1000E-05
463:	.1000E-04	.1000E-05	464:	.1000E-04	.1000E-05	465:	.1000E-01	.1000E-02
466:	.1000E-01	.1000E-02	467:	.5000E+02	.1400E+01	468:	.5000E+02	.1400E+01
469:	.5000E+02	.1400E+01	470:	.5000E+02	.1400E+01	471:	.5000E+02	.1400E+01
472:	.5000E+02	.1400E+01	473:	.5000E+02	.1400E+01	474:	.5000E+02	.1400E+01
475:	.5000E+02	.1400E+01	476:	.5000E+02	.1400E+01	477:	.5000E+02	.1400E+01
478:	.5000E+02	.1400E+01	479:	.5000E+02	.1400E+01	480:	.5000E+02	.1400E+01
481:	.4000E+02	.7000E+02	482:	.4000E+02	.7000E+02	483:	.4000E+02	.7000E+02
484:	.4000E+02	.7000E+02	485:	.1000E-01	.1000E-02	486:	.1000E-01	.1000E-02
487:	.1000E-04	.1000E-05	488:	.1000E-04	.1000E-05	489:	.1000E-04	.1000E-05
490:	.1000E-04	.1000E-05	491:	.1000E-04	.1000E-05	492:	.1000E-04	.1000E-05
493:	.1000E-04	.1000E-05	494:	.1000E-04	.1000E-05	495:	.1000E-04	.1000E-05
496:	.1000E-04	.1000E-05	497:	.1000E-01	.1000E-02	498:	.1000E-01	.1000E-02
499:	.5000E+02	.1400E+01	500:	.5000E+02	.1400E+01	501:	.5000E+02	.1400E+01
502:	.5000E+02	.1400E+01	503:	.5000E+02	.1400E+01	504:	.5000E+02	.1400E+01
505:	.5000E+02	.1400E+01	506:	.5000E+02	.1400E+01	507:	.5000E+02	.1400E+01
508:	.5000E+02	.1400E+01	509:	.5000E+02	.1400E+01	510:	.5000E+02	.1400E+01
511:	.5000E+02	.1400E+01	512:	.5000E+02	.1400E+01	513:	.4000E+02	.7000E+02
514:	.4000E+02	.7000E+02	515:	.4000E+02	.7000E+02	516:	.4000E+02	.7000E+02
517:	.1000E-01	.1000E-02	518:	.1000E-01	.1000E-02	519:	.1000E-04	.1000E-05
520:	.1000E-04	.1000E-05	521:	.1000E-04	.1000E-05	522:	.1000E-04	.1000E-05
523:	.1000E-04	.1000E-05	524:	.1000E-04	.1000E-05	525:	.1000E-04	.1000E-05
526:	.1000E-04	.1000E-05	527:	.1000E-04	.1000E-05	528:	.1000E-04	.1000E-05
529:	.1000E-01	.1000E-02	530:	.1000E-01	.1000E-02	531:	.5000E+02	.1400E+01
532:	.5000E+02	.1400E+01	533:	.5000E+02	.1400E+01	534:	.5000E+02	.1400E+01
535:	.5000E+02	.1400E+01	536:	.5000E+02	.1400E+01	537:	.5000E+02	.1400E+01
538:	.5000E+02	.1400E+01	539:	.5000E+02	.1400E+01	540:	.5000E+02	.1400E+01
541:	.5000E+02	.1400E+01	542:	.5000E+02	.1400E+01	543:	.5000E+02	.1400E+01
544:	.5000E+02	.1400E+01	545:	.4000E+02	.7000E+02	546:	.4000E+02	.7000E+02
547:	.4000E+02	.7000E+02	548:	.4000E+02	.7000E+02	549:	.1000E-01	.1000E-02
550:	.1000E-01	.1000E-02	551:	.1000E-04	.1000E-05	552:	.1000E-04	.1000E-05
553:	.1000E-04	.1000E-05	554:	.1000E-04	.1000E-05	555:	.1000E-04	.1000E-05
556:	.1000E-04	.1000E-05	557:	.1000E-04	.1000E-05	558:	.1000E-04	.1000E-05
559:	.1000E-04	.1000E-05	560:	.1000E-04	.1000E-05	561:	.1000E-01	.1000E-02
562:	.1000E-01	.1000E-02	563:	.5000E+02	.1400E+01	564:	.5000E+02	.1400E+01
565:	.5000E+02	.1400E+01	566:	.5000E+02	.1400E+01	567:	.5000E+02	.1400E+01
568:	.5000E+02	.1400E+01	569:	.5000E+02	.1400E+01	570:	.5000E+02	.1400E+01
571:	.5000E+02	.1400E+01	572:	.5000E+02	.1400E+01	573:	.5000E+02	.1400E+01
574:	.5000E+02	.1400E+01	575:	.5000E+02	.1400E+01	576:	.5000E+02	.1400E+01
577:	.4000E+02	.7000E+02	578:	.4000E+02	.7000E+02	579:	.4000E+02	.7000E+02
580:	.4000E+02	.7000E+02	581:	.1000E-01	.1000E-02	582:	.1000E-01	.1000E-02
583:	.1000E-04	.1000E-05	584:	.1000E-04	.1000E-05	585:	.1000E-04	.1000E-05
586:	.1000E-04	.1000E-05	587:	.1000E-04	.1000E-05	588:	.1000E-04	.1000E-05
589:	.1000E-04	.1000E-05	590:	.1000E-04	.1000E-05	591:	.1000E-04	.1000E-05
592:	.1000E-04	.1000E-05	593:	.1000E-01	.1000E-02	594:	.1000E-01	.1000E-02
595:	.5000E+02	.1400E+01	596:	.5000E+02	.1400E+01	597:	.5000E+02	.1400E+01
598:	.5000E+02	.1400E+01	599:	.5000E+02	.1400E+01	600:	.5000E+02	.1400E+01
601:	.5000E+02	.1400E+01	602:	.5000E+02	.1400E+01	603:	.5000E+02	.1400E+01
604:	.5000E+02	.1400E+01	605:	.5000E+02	.1400E+01	606:	.5000E+02	.1400E+01
607:	.5000E+02	.1400E+01	608:	.5000E+02	.1400E+01	609:	.4000E+02	.7000E+02
610:	.4000E+02	.7000E+02	611:	.4000E+02	.7000E+02	612:	.4000E+02	.7000E+02
613:	.1000E-01	.1000E-02	614:	.1000E-01	.1000E-02	615:	.1000E-04	.1000E-05
616:	.1000E-04	.1000E-05	617:	.1000E-04	.1000E-05	618:	.1000E-04	.1000E-05
619:	.1000E-04	.1000E-05	620:	.1000E-04	.1000E-05	621:	.1000E-04	.1000E-05
622:	.1000E-04	.1000E-05	623:	.1000E-04	.1000E-05	624:	.1000E-04	.1000E-05
625:	.1000E-01	.1000E-02	626:	.1000E-01	.1000E-02	627:	.5000E+02	.1400E+01
628:	.5000E+02	.1400E+01	629:	.5000E+02	.1400E+01	630:	.5000E+02	.1400E+01
631:	.5000E+02	.1400E+01	632:	.5000E+02	.1400E+01	633:	.5000E+02	.1400E+01
634:	.5000E+02	.1400E+01	635:	.5000E+02	.1400E+01	636:	.5000E+02	.1400E+01
637:	.5000E+02	.1400E+01	638:	.5000E+02	.1400E+01	639:	.5000E+02	.1400E+01
640:	.5000E+02	.1400E+01	641:	.4000E+02	.7000E+02	642:	.4000E+02	.7000E+02
643:	.4000E+02	.7000E+02	644:	.4000E+02	.7000E+02	645:	.1000E-01	.1000E-02
646:	.1000E-01	.1000E-02	647:	.1000E-04	.1000E-05	648:	.1000E-04	.1000E-05
649:	.1000E-04	.1000E-05	650:	.1000E-04	.1000E-05	651:	.1000E-04	.1000E-05
652:	.1000E-04	.1000E-05	653:	.1000E-04	.1000E-05	654:	.1000E-04	.1000E-05
655:	.1000E-04	.1000E-05	656:	.1000E-04	.1000E-05	657:	.1000E-01	.1000E-02
658:	.1000E-01	.1000E-02	659:	.5000E+02	.1400E+01	660:	.5000E+02	.1400E+01
661:	.5000E+02	.1400E+01	662:	.5000E+02	.1400E+01	663:	.5000E+02	.1400E+01
664:	.5000E+02	.1400E+01	665:	.5000E+02	.1400E+01	666:	.5000E+02	.1400E+01

667:	.5000E+02	.1400E+01	668:	.5000E+02	.1400E+01	669:	.5000E+02	.1400E+01
670:	.5000E+02	.1400E+01	671:	.5000E+02	.1400E+01	672:	.5000E+02	.1400E+01
673:	.4000E+02	.7000E+02	674:	.4000E+02	.7000E+02	675:	.4000E+02	.7000E+02
676:	.4000E+02	.7000E+02	677:	.1000E-01	.1000E-02	678:	.1000E-01	.1000E-02
679:	.1000E-04	.1000E-05	680:	.1000E-04	.1000E-05	681:	.1000E-04	.1000E-05
682:	.1000E-04	.1000E-05	683:	.1000E-04	.1000E-05	684:	.1000E-04	.1000E-05
685:	.1000E-04	.1000E-05	686:	.1000E-04	.1000E-05	687:	.1000E-04	.1000E-05
688:	.1000E-04	.1000E-05	689:	.1000E-01	.1000E-02	690:	.1000E-01	.1000E-02
691:	.5000E+02	.1400E+01	692:	.5000E+02	.1400E+01	693:	.5000E+02	.1400E+01
694:	.5000E+02	.1400E+01	695:	.5000E+02	.1400E+01	696:	.5000E+02	.1400E+01
697:	.5000E+02	.1400E+01	698:	.5000E+02	.1400E+01	699:	.5000E+02	.1400E+01
700:	.5000E+02	.1400E+01	701:	.5000E+02	.1400E+01	702:	.5000E+02	.1400E+01
703:	.5000E+02	.1400E+01	704:	.5000E+02	.1400E+01	705:	.4000E+01	.7000E+00
706:	.4000E+01	.7000E+00	707:	.4000E+01	.7000E+00	708:	.4000E+01	.7000E+00
709:	.5000E-05	.5000E-06	710:	.5000E-05	.5000E-06	711:	.5000E-05	.5000E-06
712:	.5000E-05	.5000E-06	713:	.5000E-05	.5000E-06	714:	.5000E-05	.5000E-06
715:	.5000E-05	.5000E-06	716:	.5000E-05	.5000E-06	717:	.5000E-05	.5000E-06
718:	.5000E-05	.5000E-06	719:	.5000E-05	.5000E-06	720:	.5000E-05	.5000E-06
721:	.5000E-05	.5000E-06	722:	.5000E-05	.5000E-06	723:	.5000E+02	.1400E+01
724:	.5000E+02	.1400E+01	725:	.5000E+02	.1400E+01	726:	.5000E+02	.1400E+01
727:	.5000E+02	.1400E+01	728:	.5000E+02	.1400E+01	729:	.5000E+02	.1400E+01
730:	.5000E+02	.1400E+01	731:	.5000E+02	.1400E+01	732:	.5000E+02	.1400E+01
733:	.5000E+02	.1400E+01	734:	.5000E+02	.1400E+01	735:	.5000E+02	.1400E+01
736:	.5000E+02	.1400E+01	737:	.4000E+02	.7000E+02	738:	.4000E+02	.7000E+02
739:	.4000E+02	.7000E+02	740:	.4000E+02	.7000E+02	741:	.1000E-01	.1000E-02
742:	.1000E-01	.1000E-02	743:	.1000E-04	.1000E-05	744:	.1000E-04	.1000E-05
745:	.1000E-04	.1000E-05	746:	.1000E-04	.1000E-05	747:	.1000E-04	.1000E-05
748:	.1000E-04	.1000E-05	749:	.1000E-04	.1000E-05	750:	.1000E-04	.1000E-05
751:	.1000E-04	.1000E-05	752:	.1000E-04	.1000E-05	753:	.1000E-01	.1000E-02
754:	.1000E-01	.1000E-02	755:	.5000E+02	.1400E+01	756:	.5000E+02	.1400E+01
757:	.5000E+02	.1400E+01	758:	.5000E+02	.1400E+01	759:	.5000E+02	.1400E+01
760:	.5000E+02	.1400E+01	761:	.5000E+02	.1400E+01	762:	.5000E+02	.1400E+01
763:	.5000E+02	.1400E+01	764:	.5000E+02	.1400E+01	765:	.5000E+02	.1400E+01
766:	.5000E+02	.1400E+01	767:	.5000E+02	.1400E+01	768:	.5000E+02	.1400E+01
769:	.4000E+02	.7000E+02	770:	.4000E+02	.7000E+02	771:	.4000E+02	.7000E+02
772:	.4000E+02	.7000E+02	773:	.1000E-01	.1000E-02	774:	.1000E-01	.1000E-02
775:	.1000E-04	.1000E-05	776:	.1000E-04	.1000E-05	777:	.1000E-04	.1000E-05
778:	.1000E-04	.1000E-05	779:	.1000E-04	.1000E-05	780:	.1000E-04	.1000E-05
781:	.1000E-04	.1000E-05	782:	.1000E-04	.1000E-05	783:	.1000E-04	.1000E-05
784:	.1000E-04	.1000E-05	785:	.1000E-01	.1000E-02	786:	.1000E-01	.1000E-02
787:	.5000E+02	.1400E+01	788:	.5000E+02	.1400E+01	789:	.5000E+02	.1400E+01
790:	.5000E+02	.1400E+01	791:	.5000E+02	.1400E+01	792:	.5000E+02	.1400E+01
793:	.5000E+02	.1400E+01	794:	.5000E+02	.1400E+01	795:	.5000E+02	.1400E+01
796:	.5000E+02	.1400E+01	797:	.5000E+02	.1400E+01	798:	.5000E+02	.1400E+01
799:	.5000E+02	.1400E+01	800:	.5000E+02	.1400E+01	801:	.4000E+02	.7000E+02
802:	.4000E+02	.7000E+02	803:	.4000E+02	.7000E+02	804:	.4000E+02	.7000E+02
805:	.1000E-01	.1000E-02	806:	.1000E-01	.1000E-02	807:	.1000E-04	.1000E-05
808:	.1000E-04	.1000E-05	809:	.1000E-04	.1000E-05	810:	.1000E-04	.1000E-05
811:	.1000E-04	.1000E-05	812:	.1000E-04	.1000E-05	813:	.1000E-04	.1000E-05
814:	.1000E-04	.1000E-05	815:	.1000E-04	.1000E-05	816:	.1000E-04	.1000E-05
817:	.1000E-01	.1000E-02	818:	.1000E-01	.1000E-02	819:	.5000E+02	.1400E+01
820:	.5000E+02	.1400E+01	821:	.5000E+02	.1400E+01	822:	.5000E+02	.1400E+01
823:	.5000E+02	.1400E+01	824:	.5000E+02	.1400E+01	825:	.5000E+02	.1400E+01
826:	.5000E+02	.1400E+01	827:	.5000E+02	.1400E+01	828:	.5000E+02	.1400E+01
829:	.5000E+02	.1400E+01	830:	.5000E+02	.1400E+01	831:	.5000E+02	.1400E+01
832:	.5000E+02	.1400E+01	833:	.4000E+02	.7000E+02	834:	.4000E+02	.7000E+02
835:	.4000E+02	.7000E+02	836:	.4000E+02	.7000E+02	837:	.1000E-01	.1000E-02
838:	.1000E-01	.1000E-02	839:	.1000E-04	.1000E-05	840:	.1000E-04	.1000E-05
841:	.1000E-04	.1000E-05	842:	.1000E-04	.1000E-05	843:	.1000E-04	.1000E-05
844:	.1000E-04	.1000E-05	845:	.1000E-04	.1000E-05	846:	.1000E-04	.1000E-05
847:	.1000E-04	.1000E-05	848:	.1000E-04	.1000E-05	849:	.1000E-01	.1000E-02
850:	.1000E-01	.1000E-02	851:	.5000E+02	.1400E+01	852:	.5000E+02	.1400E+01
853:	.5000E+02	.1400E+01	854:	.5000E+02	.1400E+01	855:	.5000E+02	.1400E+01
856:	.5000E+02	.1400E+01	857:	.5000E+02	.1400E+01	858:	.5000E+02	.1400E+01
859:	.5000E+02	.1400E+01	860:	.5000E+02	.1400E+01	861:	.5000E+02	.1400E+01
862:	.5000E+02	.1400E+01	863:	.5000E+02	.1400E+01	864:	.5000E+02	.1400E+01
865:	.4000E+02	.7000E+02	866:	.4000E+02	.7000E+02	867:	.4000E+02	.7000E+02
868:	.4000E+02	.7000E+02	869:	.1000E-01	.1000E-02	870:	.1000E-01	.1000E-02
871:	.1000E-04	.1000E-05	872:	.1000E-04	.1000E-05	873:	.1000E-04	.1000E-05
874:	.1000E-04	.1000E-05	875:	.1000E-04	.1000E-05	876:	.1000E-04	.1000E-05
877:	.1000E-04	.1000E-05	878:	.1000E-04	.1000E-05	879:	.1000E-04	.1000E-05
880:	.1000E-04	.1000E-05	881:	.1000E-01	.1000E-02	882:	.1000E-01	.1000E-02
883:	.5000E+02	.1400E+01	884:	.5000E+02	.1400E+01	885:	.5000E+02	.1400E+01
886:	.5000E+02	.1400E+01	887:	.5000E+02	.1400E+01	888:	.5000E+02	.1400E+01
889:	.5000E+02	.1400E+01	890:	.5000E+02	.1400E+01	891:	.5000E+02	.1400E+01
892:	.5000E+02	.1400E+01	893:	.5000E+02	.1400E+01	894:	.5000E+02	.1400E+01
895:	.5000E+02	.1400E+01	896:	.5000E+02	.1400E+01	897:	.4000E+02	.7000E+02
898:	.4000E+02	.7000E+02	899:	.4000E+02	.7000E+02	900:	.4000E+02	.7000E+02
901:	.1000E-01	.1000E-02	902:	.1000E-01	.1000E-02	903:	.1000E-04	.1000E-05
904:	.1000E-04	.1000E-05	905:	.1000E-04	.1000E-05	906:	.1000E-04	.1000E-05
907:	.1000E-04	.1000E-05	908:	.1000E-04	.1000E-05	909:	.1000E-04	.1000E-05
910:	.1000E-04	.1000E-05	911:	.1000E-04	.1000E-05	912:	.1000E-04	.1000E-05
913:	.1000E-01	.1000E-02	914:	.1000E-01	.1000E-02	915:	.5000E+02	.1400E+01
916:	.5000E+02	.1400E+01	917:	.5000E+02	.1400E+01	918:	.5000E+02	.1400E+01
919:	.5000E+02	.1400E+01	920:	.5000E+02	.1400E+01	921:	.5000E+02	.1400E+01
922:	.5000E+02	.1400E+01	923:	.5000E+02	.1400E+01	924:	.5000E+02	.1400E+01
925:	.5000E+02	.1400E+01	926:	.5000E+02	.1400E+01	927:	.5000E+02	.1400E+01
928:	.5000E+02	.1400E+01	929:	.4000E+02	.7000E+02	930:	.4000E+02	.7000E+02
931:	.4000E+02	.7000E+02	932:	.4000E+02	.7000E+02	933:	.1000E-01	.1000E-02
934:	.1000E-01	.1000E-02	935:	.1000E-04	.1000E-05	936:	.1000E-04	.1000E-05

937:	.1000E-04	.1000E-05	938:	.1000E-04	.1000E-05	939:	.1000E-04	.1000E-05
940:	.1000E-04	.1000E-05	941:	.1000E-04	.1000E-05	942:	.1000E-04	.1000E-05
943:	.1000E-04	.1000E-05	944:	.1000E-04	.1000E-05	945:	.1000E-01	.1000E-02
946:	.1000E-01	.1000E-02	947:	.5000E+02	.1400E+01	948:	.5000E+02	.1400E+01
949:	.5000E+02	.1400E+01	950:	.5000E+02	.1400E+01	951:	.5000E+02	.1400E+01
952:	.5000E+02	.1400E+01	953:	.5000E+02	.1400E+01	954:	.5000E+02	.1400E+01
955:	.5000E+02	.1400E+01	956:	.5000E+02	.1400E+01	957:	.5000E+02	.1400E+01
958:	.5000E+02	.1400E+01	959:	.5000E+02	.1400E+01	960:	.5000E+02	.1400E+01
961:	.4000E+02	.7000E+02	962:	.4000E+02	.7000E+02	963:	.4000E+02	.7000E+02
964:	.4000E+02	.7000E+02	965:	.1000E-01	.1000E-02	966:	.1000E-01	.1000E-02
967:	.1000E-04	.1000E-05	968:	.1000E-04	.1000E-05	969:	.1000E-04	.1000E-05
970:	.1000E-04	.1000E-05	971:	.1000E-04	.1000E-05	972:	.1000E-04	.1000E-05
973:	.1000E-04	.1000E-05	974:	.1000E-04	.1000E-05	975:	.1000E-04	.1000E-05
976:	.1000E-04	.1000E-05	977:	.1000E-01	.1000E-02	978:	.1000E-01	.1000E-02
979:	.5000E+02	.1400E+01	980:	.5000E+02	.1400E+01	981:	.5000E+02	.1400E+01
982:	.5000E+02	.1400E+01	983:	.5000E+02	.1400E+01	984:	.5000E+02	.1400E+01
985:	.5000E+02	.1400E+01	986:	.5000E+02	.1400E+01	987:	.5000E+02	.1400E+01
988:	.5000E+02	.1400E+01	989:	.5000E+02	.1400E+01	990:	.5000E+02	.1400E+01
991:	.5000E+02	.1400E+01	992:	.5000E+02	.1400E+01	993:	.4000E+02	.7000E+02
994:	.4000E+02	.7000E+02	995:	.4000E+02	.7000E+02	996:	.4000E+02	.7000E+02
997:	.1000E-01	.1000E-02	998:	.1000E-01	.1000E-02	999:	.1000E-04	.1000E-05
1000:	.1000E-04	.1000E-05	1001:	.1000E-04	.1000E-05	1002:	.1000E-04	.1000E-05
1003:	.1000E-04	.1000E-05	1004:	.1000E-04	.1000E-05	1005:	.1000E-04	.1000E-05
1006:	.1000E-04	.1000E-05	1007:	.1000E-04	.1000E-05	1008:	.1000E-04	.1000E-05
1009:	.1000E-01	.1000E-02	1010:	.1000E-01	.1000E-02	1011:	.5000E+02	.1400E+01
1012:	.5000E+02	.1400E+01	1013:	.5000E+02	.1400E+01	1014:	.5000E+02	.1400E+01
1015:	.5000E+02	.1400E+01	1016:	.5000E+02	.1400E+01	1017:	.5000E+02	.1400E+01
1018:	.5000E+02	.1400E+01	1019:	.5000E+02	.1400E+01	1020:	.5000E+02	.1400E+01
1021:	.5000E+02	.1400E+01	1022:	.5000E+02	.1400E+01	1023:	.5000E+02	.1400E+01
1024:	.5000E+02	.1400E+01	1025:	.4000E+02	.7000E+02	1026:	.4000E+02	.7000E+02
1027:	.4000E+02	.7000E+02	1028:	.4000E+02	.7000E+02	1029:	.1000E-01	.1000E-02
1030:	.1000E-01	.1000E-02	1031:	.1000E-04	.1000E-05	1032:	.1000E-04	.1000E-05
1033:	.1000E-04	.1000E-05	1034:	.1000E-04	.1000E-05	1035:	.1000E-04	.1000E-05
1036:	.1000E-04	.1000E-05	1037:	.1000E-04	.1000E-05	1038:	.1000E-04	.1000E-05
1039:	.1000E-04	.1000E-05	1040:	.1000E-04	.1000E-05	1041:	.1000E-01	.1000E-02
1042:	.1000E-01	.1000E-02	1043:	.5000E+02	.1400E+01	1044:	.5000E+02	.1400E+01
1045:	.5000E+02	.1400E+01	1046:	.5000E+02	.1400E+01	1047:	.5000E+02	.1400E+01
1048:	.5000E+02	.1400E+01	1049:	.5000E+02	.1400E+01	1050:	.5000E+02	.1400E+01
1051:	.5000E+02	.1400E+01	1052:	.5000E+02	.1400E+01	1053:	.5000E+02	.1400E+01
1054:	.5000E+02	.1400E+01	1055:	.5000E+02	.1400E+01	1056:	.5000E+02	.1400E+01
1057:	.4000E+02	.7000E+02	1058:	.4000E+02	.7000E+02	1059:	.4000E+02	.7000E+02
1060:	.4000E+02	.7000E+02	1061:	.1000E-01	.1000E-02	1062:	.1000E-01	.1000E-02
1063:	.1000E-04	.1000E-05	1064:	.1000E-04	.1000E-05	1065:	.1000E-04	.1000E-05
1066:	.1000E-04	.1000E-05	1067:	.1000E-04	.1000E-05	1068:	.1000E-04	.1000E-05
1069:	.1000E-04	.1000E-05	1070:	.1000E-04	.1000E-05	1071:	.1000E-04	.1000E-05
1072:	.1000E-04	.1000E-05	1073:	.1000E-01	.1000E-02	1074:	.1000E-01	.1000E-02
1075:	.5000E+02	.1400E+01	1076:	.5000E+02	.1400E+01	1077:	.5000E+02	.1400E+01
1078:	.5000E+02	.1400E+01	1079:	.5000E+02	.1400E+01	1080:	.5000E+02	.1400E+01
1081:	.5000E+02	.1400E+01	1082:	.5000E+02	.1400E+01	1083:	.5000E+02	.1400E+01
1084:	.5000E+02	.1400E+01	1085:	.5000E+02	.1400E+01	1086:	.5000E+02	.1400E+01
1087:	.5000E+02	.1400E+01	1088:	.5000E+02	.1400E+01	1089:	.4000E+02	.7000E+02
1090:	.4000E+02	.7000E+02	1091:	.4000E+02	.7000E+02	1092:	.4000E+02	.7000E+02
1093:	.1000E-01	.1000E-02	1094:	.1000E-01	.1000E-02	1095:	.1000E-04	.1000E-05
1096:	.1000E-04	.1000E-05	1097:	.1000E-04	.1000E-05	1098:	.1000E-04	.1000E-05
1099:	.1000E-04	.1000E-05	1100:	.1000E-04	.1000E-05	1101:	.1000E-04	.1000E-05
1102:	.1000E-04	.1000E-05	1103:	.1000E-04	.1000E-05	1104:	.1000E-04	.1000E-05
1105:	.1000E-01	.1000E-02	1106:	.1000E-01	.1000E-02	1107:	.5000E+02	.1400E+01
1108:	.5000E+02	.1400E+01	1109:	.5000E+02	.1400E+01	1110:	.5000E+02	.1400E+01
1111:	.5000E+02	.1400E+01	1112:	.5000E+02	.1400E+01	1113:	.5000E+02	.1400E+01
1114:	.5000E+02	.1400E+01	1115:	.5000E+02	.1400E+01	1116:	.5000E+02	.1400E+01
1117:	.5000E+02	.1400E+01	1118:	.5000E+02	.1400E+01	1119:	.5000E+02	.1400E+01
1120:	.5000E+02	.1400E+01	1121:	.4000E+02	.7000E+02	1122:	.4000E+02	.7000E+02
1123:	.4000E+02	.7000E+02	1124:	.4000E+02	.7000E+02	1125:	.1000E-01	.1000E-02
1126:	.1000E-01	.1000E-02	1127:	.1000E-01	.1000E-02	1128:	.1000E-01	.1000E-02
1129:	.1000E-01	.1000E-02	1130:	.1000E-01	.1000E-02	1131:	.1000E-04	.1000E-05
1132:	.1000E-04	.1000E-05	1133:	.1000E-01	.1000E-02	1134:	.1000E-01	.1000E-02
1135:	.1000E-01	.1000E-02	1136:	.1000E-01	.1000E-02	1137:	.1000E-01	.1000E-02
1138:	.1000E-01	.1000E-02	1139:	.5000E+02	.1400E+01	1140:	.5000E+02	.1400E+01
1141:	.5000E+02	.1400E+01	1142:	.5000E+02	.1400E+01	1143:	.5000E+02	.1400E+01
1144:	.5000E+02	.1400E+01	1145:	.5000E+02	.1400E+01	1146:	.5000E+02	.1400E+01
1147:	.5000E+02	.1400E+01	1148:	.5000E+02	.1400E+01	1149:	.5000E+02	.1400E+01
1150:	.5000E+02	.1400E+01	1151:	.5000E+02	.1400E+01	1152:	.5000E+02	.1400E+01
1153:	.4000E+02	.7000E+02	1154:	.4000E+02	.7000E+02	1155:	.4000E+02	.7000E+02
1156:	.4000E+02	.7000E+02	1157:	.1000E-01	.1000E-02	1158:	.1000E-01	.1000E-02
1159:	.1000E-01	.1000E-02	1160:	.1000E-01	.1000E-02	1161:	.1000E-01	.1000E-02
1162:	.1000E-01	.1000E-02	1163:	.1000E-01	.1000E-02	1164:	.1000E-01	.1000E-02
1165:	.1000E-01	.1000E-02	1166:	.1000E-01	.1000E-02	1167:	.1000E-01	.1000E-02
1168:	.1000E-01	.1000E-02	1169:	.1000E-01	.1000E-02	1170:	.1000E-01	.1000E-02
1171:	.5000E+02	.1400E+01	1172:	.5000E+02	.1400E+01	1173:	.5000E+02	.1400E+01
1174:	.5000E+02	.1400E+01	1175:	.5000E+02	.1400E+01	1176:	.5000E+02	.1400E+01
1177:	.5000E+02	.1400E+01	1178:	.5000E+02	.1400E+01	1179:	.5000E+02	.1400E+01
1180:	.5000E+02	.1400E+01	1181:	.5000E+02	.1400E+01	1182:	.5000E+02	.1400E+01
1183:	.5000E+02	.1400E+01	1184:	.5000E+02	.1400E+01	1185:	.4000E+02	.7000E+02
1186:	.4000E+02	.7000E+02	1187:	.4000E+02	.7000E+02	1188:	.4000E+02	.7000E+02
1189:	.4000E+02	.7000E+02	1190:	.4000E+02	.7000E+02	1191:	.1000E-01	.1000E-02
1192:	.1000E-01	.1000E-02	1193:	.1000E-01	.1000E-02	1194:	.1000E-01	.1000E-02
1195:	.1000E-01	.1000E-02	1196:	.1000E-01	.1000E-02	1197:	.1000E-01	.1000E-02
1198:	.1000E-01	.1000E-02	1199:	.1000E-01	.1000E-02	1200:	.1000E-01	.1000E-02
1201:	.5000E+02	.1400E+01	1202:	.5000E+02	.1400E+01	1203:	.5000E+02	.1400E+01
1204:	.5000E+02	.1400E+01	1205:	.5000E+02	.1400E+01	1206:	.5000E+02	.1400E+01

1207:	.5000E+02	.1400E+01	1208:	.5000E+02	.1400E+01	1209:	.5000E+02	.1400E+01
1210:	.5000E+02	.1400E+01	1211:	.5000E+02	.1400E+01	1212:	.5000E+02	.1400E+01
1213:	.5000E+02	.1400E+01	1214:	.5000E+02	.1400E+01	1215:	.5000E+02	.1400E+01
1216:	.5000E+02	.1400E+01	1217:	.4000E+02	.7000E+02	1218:	.4000E+02	.7000E+02
1219:	.4000E+02	.7000E+02	1220:	.4000E+02	.7000E+02	1221:	.4000E+02	.7000E+02
1222:	.4000E+02	.7000E+02	1223:	.1000E-01	.1000E-02	1224:	.1000E-01	.1000E-02
1225:	.1000E-01	.1000E-02	1226:	.1000E-01	.1000E-02	1227:	.1000E-01	.1000E-02
1228:	.1000E-01	.1000E-02	1229:	.1000E-01	.1000E-02	1230:	.1000E-01	.1000E-02
1231:	.1000E-01	.1000E-02	1232:	.1000E-01	.1000E-02	1233:	.5000E+02	.1400E+01
1234:	.5000E+02	.1400E+01	1235:	.5000E+02	.1400E+01	1236:	.5000E+02	.1400E+01
1237:	.5000E+02	.1400E+01	1238:	.5000E+02	.1400E+01	1239:	.5000E+02	.1400E+01
1240:	.5000E+02	.1400E+01	1241:	.5000E+02	.1400E+01	1242:	.5000E+02	.1400E+01
1243:	.5000E+02	.1400E+01	1244:	.5000E+02	.1400E+01	1245:	.5000E+02	.1400E+01
1246:	.5000E+02	.1400E+01	1247:	.5000E+02	.1400E+01	1248:	.5000E+02	.1400E+01
1249:	.4000E+02	.7000E+02	1250:	.4000E+02	.7000E+02	1251:	.4000E+02	.7000E+02
1252:	.4000E+02	.7000E+02	1253:	.4000E+02	.7000E+02	1254:	.4000E+02	.7000E+02
1255:	.1000E-01	.1000E-02	1256:	.1000E-01	.1000E-02	1257:	.1000E-01	.1000E-02
1258:	.1000E-01	.1000E-02	1259:	.1000E-01	.1000E-02	1260:	.1000E-01	.1000E-02
1261:	.1000E-01	.1000E-02	1262:	.1000E-01	.1000E-02	1263:	.1000E-01	.1000E-02
1264:	.1000E-01	.1000E-02	1265:	.5000E+02	.1400E+01	1266:	.5000E+02	.1400E+01
1267:	.5000E+02	.1400E+01	1268:	.5000E+02	.1400E+01	1269:	.5000E+02	.1400E+01
1270:	.5000E+02	.1400E+01	1271:	.5000E+02	.1400E+01	1272:	.5000E+02	.1400E+01
1273:	.5000E+02	.1400E+01	1274:	.5000E+02	.1400E+01	1275:	.5000E+02	.1400E+01
1276:	.5000E+02	.1400E+01	1277:	.5000E+02	.1400E+01	1278:	.5000E+02	.1400E+01
1279:	.5000E+02	.1400E+01	1280:	.5000E+02	.1400E+01	1281:	.4000E+02	.7000E+02
1282:	.4000E+02	.7000E+02	1283:	.4000E+02	.7000E+02	1284:	.4000E+02	.7000E+02
1285:	.4000E+02	.7000E+02	1286:	.4000E+02	.7000E+02	1287:	.1000E-01	.1000E-02
1288:	.1000E-01	.1000E-02	1289:	.1000E-01	.1000E-02	1290:	.1000E-01	.1000E-02
1291:	.1000E-01	.1000E-02	1292:	.1000E-01	.1000E-02	1293:	.1000E-01	.1000E-02
1294:	.1000E-01	.1000E-02	1295:	.1000E-01	.1000E-02	1296:	.1000E-01	.1000E-02
1297:	.5000E+02	.1400E+01	1298:	.5000E+02	.1400E+01	1299:	.5000E+02	.1400E+01
1300:	.5000E+02	.1400E+01	1301:	.5000E+02	.1400E+01	1302:	.5000E+02	.1400E+01
1303:	.5000E+02	.1400E+01	1304:	.5000E+02	.1400E+01	1305:	.5000E+02	.1400E+01
1306:	.5000E+02	.1400E+01	1307:	.5000E+02	.1400E+01	1308:	.5000E+02	.1400E+01
1309:	.5000E+02	.1400E+01	1310:	.5000E+02	.1400E+01	1311:	.5000E+02	.1400E+01
1312:	.5000E+02	.1400E+01	1313:	.4000E+02	.7000E+02	1314:	.4000E+02	.7000E+02
1315:	.4000E+02	.7000E+02	1316:	.4000E+02	.7000E+02	1317:	.4000E+02	.7000E+02
1318:	.4000E+02	.7000E+02	1319:	.4000E+02	.7000E+02	1320:	.4000E+02	.7000E+02
1321:	.4000E+02	.7000E+02	1322:	.4000E+02	.7000E+02	1323:	.4000E+02	.7000E+02
1324:	.4000E+02	.7000E+02	1325:	.5000E+02	.1400E+01	1326:	.5000E+02	.1400E+01
1327:	.5000E+02	.1400E+01	1328:	.5000E+02	.1400E+01	1329:	.5000E+02	.1400E+01
1330:	.5000E+02	.1400E+01	1331:	.5000E+02	.1400E+01	1332:	.5000E+02	.1400E+01
1333:	.5000E+02	.1400E+01	1334:	.5000E+02	.1400E+01	1335:	.5000E+02	.1400E+01
1336:	.5000E+02	.1400E+01	1337:	.5000E+02	.1400E+01	1338:	.5000E+02	.1400E+01
1339:	.5000E+02	.1400E+01	1340:	.5000E+02	.1400E+01	1341:	.5000E+02	.1400E+01
1342:	.5000E+02	.1400E+01	1343:	.5000E+02	.1400E+01	1344:	.5000E+02	.1400E+01
1345:	.4000E+02	.7000E+02	1346:	.4000E+02	.7000E+02	1347:	.4000E+02	.7000E+02
1348:	.4000E+02	.7000E+02	1349:	.4000E+02	.7000E+02	1350:	.4000E+02	.7000E+02
1351:	.4000E+02	.7000E+02	1352:	.4000E+02	.7000E+02	1353:	.4000E+02	.7000E+02
1354:	.4000E+02	.7000E+02	1355:	.4000E+02	.7000E+02	1356:	.4000E+02	.7000E+02
1357:	.5000E+02	.1400E+01	1358:	.5000E+02	.1400E+01	1359:	.5000E+02	.1400E+01
1360:	.5000E+02	.1400E+01	1361:	.5000E+02	.1400E+01	1362:	.5000E+02	.1400E+01
1363:	.5000E+02	.1400E+01	1364:	.5000E+02	.1400E+01	1365:	.5000E+02	.1400E+01
1366:	.5000E+02	.1400E+01	1367:	.5000E+02	.1400E+01	1368:	.5000E+02	.1400E+01
1369:	.5000E+02	.1400E+01	1370:	.5000E+02	.1400E+01	1371:	.5000E+02	.1400E+01
1372:	.5000E+02	.1400E+01	1373:	.5000E+02	.1400E+01	1374:	.5000E+02	.1400E+01
1375:	.5000E+02	.1400E+01	1376:	.5000E+02	.1400E+01	1377:	.4000E+02	.7000E+02
1378:	.4000E+02	.7000E+02	1379:	.4000E+02	.7000E+02	1380:	.4000E+02	.7000E+02
1381:	.4000E+02	.7000E+02	1382:	.4000E+02	.7000E+02	1383:	.4000E+02	.7000E+02
1384:	.4000E+02	.7000E+02	1385:	.4000E+02	.7000E+02	1386:	.4000E+02	.7000E+02
1387:	.4000E+02	.7000E+02	1388:	.4000E+02	.7000E+02	1389:	.5000E+02	.1400E+01
1390:	.5000E+02	.1400E+01	1391:	.5000E+02	.1400E+01	1392:	.5000E+02	.1400E+01
1393:	.5000E+02	.1400E+01	1394:	.5000E+02	.1400E+01	1395:	.5000E+02	.1400E+01
1396:	.5000E+02	.1400E+01	1397:	.5000E+02	.1400E+01	1398:	.5000E+02	.1400E+01
1399:	.5000E+02	.1400E+01	1400:	.5000E+02	.1400E+01	1401:	.5000E+02	.1400E+01
1402:	.5000E+02	.1400E+01	1403:	.5000E+02	.1400E+01	1404:	.5000E+02	.1400E+01
1405:	.5000E+02	.1400E+01	1406:	.5000E+02	.1400E+01	1407:	.5000E+02	.1400E+01
1408:	.5000E+02	.1400E+01						

FINITE ELEMENT GRID SUMMARY

NUMBER OF NODES	765
NUMBER OF ELEMENTS	1408
ESTIMATED BANDWIDTH	19
NUMBER OF CONSTANT-HEAD NODES	24
NUMBER OF DEGREES OF FREEDOM	741
FINAL BANDWIDTH	19

STEADY-STATE HYDRAULIC HEAD DISTRIBUTION(feet above an datum)

NODE	TOTAL-HEAD	NODE	TOTAL-HEAD	NODE	TOTAL-HEAD	NODE	TOTAL-HEAD	NODE	TOTAL-HEAD
1	6085.871	2	6085.936	3	6086.131	4	6086.457	5	6086.917
6	6087.513	7	6088.249	8	6089.130	9	6090.161	10	6091.349
11	6092.703	12	6094.230	13	6095.942	14	6097.850	15	6099.973
16	6099.980	17	6100.000	18	6072.017	19	6072.039	20	6072.106
21	6072.217	22	6072.372	23	6072.568	24	6072.805	25	6073.081
26	6073.394	27	6073.740	28	6074.117	29	6074.520	30	6074.946

31	6074.953	32	6074.973	33	6074.987	34	6075.000	35	6048.611
36	6048.624	37	6048.664	38	6048.730	39	6048.822	40	6048.938
41	6049.079	42	6049.242	43	6049.428	44	6049.633	45	6049.859
46	6049.866	47	6049.889	48	6049.905	49	6049.922	50	6049.959
51	6050.000	52	6019.530	53	6019.556	54	6019.632	55	6019.759
56	6019.938	57	6020.168	58	6020.450	59	6020.784	60	6021.173
61	6021.184	62	6021.217	63	6021.240	64	6021.266	65	6021.315
66	6021.348	67	6022.571	68	6025.000	69	5979.597	70	5979.625
71	5979.710	72	5979.851	73	5980.051	74	5980.311	75	5980.634
76	5980.648	77	5980.691	78	5980.721	79	5980.774	80	5980.806
81	5980.816	82	5951.266	83	5922.397	84	5923.054	85	5925.000
86	5927.707	87	5927.678	88	5927.592	89	5927.447	90	5927.241
91	5927.251	92	5927.283	93	5927.302	94	5927.317	95	5927.329
96	5862.668	97	5798.228	98	5733.849	99	5735.935	100	5742.426
101	5746.485	102	5750.000	103	5888.053	104	5888.051	105	5888.044
106	5888.055	107	5888.085	108	5888.105	109	5888.125	110	5888.153
111	5888.161	112	5792.495	113	5697.437	114	5602.396	115	5603.476
116	5604.152	117	5603.864	118	5602.508	119	5600.000	120	5849.186
121	5849.434	122	5850.178	123	5850.193	124	5850.240	125	5850.267
126	5850.274	127	5742.998	128	5635.853	129	5528.000	130	5528.326
131	5529.622	132	5530.169	133	5530.003	134	5529.106	135	5527.450
136	5525.000	137	5704.690	138	5704.688	139	5704.682	140	5704.682
141	5671.535	142	5638.141	143	5604.259	144	5569.646	145	5534.554
146	5499.234	147	5499.246	148	5499.324	149	5499.440	150	5499.576
151	5499.719	152	5499.861	153	5500.000	154	5560.890	155	5560.903
156	5560.941	157	5560.953	158	5545.775	159	5530.205	160	5514.344
161	5498.295	162	5482.164	163	5466.063	164	5466.217	165	5466.707
166	5467.545	167	5468.753	168	5470.366	169	5472.428	170	5475.000
171	5513.267	172	5513.270	173	5513.279	174	5513.292	175	5503.665
176	5484.326	177	5464.558	178	5444.325	179	5423.587	180	5413.096
181	5413.134	182	5413.264	183	5413.481	184	5413.777	185	5414.140
186	5414.555	187	5415.000	188	5442.070	189	5442.070	190	5442.070
191	5442.030	192	5441.987	193	5420.147	194	5398.323	195	5376.495
196	5354.641	197	5354.598	198	5354.608	199	5354.637	200	5354.685
201	5354.748	202	5354.824	203	5354.910	204	5355.000	205	5370.870
206	5370.870	207	5370.870	208	5371.180	209	5371.471	210	5352.280
211	5333.137	212	5314.028	213	5294.934	214	5294.916	215	5294.918
216	5294.924	217	5294.934	218	5294.947	219	5294.963	220	5294.981
221	5295.000	222	5299.662	223	5299.662	224	5299.662	225	5299.650
226	5286.827	227	5273.932	228	5260.982	229	5247.997	230	5234.995
231	5234.982	232	5234.983	233	5234.984	234	5234.986	235	5234.989
236	5234.992	237	5234.996	238	5235.000	239	5228.454	240	5228.454
241	5228.454	242	5228.444	243	5217.757	244	5207.070	245	5196.383
246	5185.695	247	5175.006	248	5174.995	249	5174.996	250	5174.996
251	5174.996	252	5174.997	253	5174.998	254	5174.999	255	5175.000
256	5157.247	257	5157.247	258	5157.247	259	5157.238	260	5148.791
261	5140.344	262	5131.897	263	5123.450	264	5115.003	265	5114.995
266	5114.995	267	5114.995	268	5114.996	269	5114.997	270	5114.998
271	5114.999	272	5115.000	273	5086.039	274	5086.039	275	5086.039
276	5086.033	277	5079.823	278	5073.613	279	5067.404	280	5061.194
281	5054.985	282	5054.979	283	5054.979	284	5054.981	285	5054.983
286	5054.987	287	5054.991	288	5054.995	289	5055.000	290	5014.832
291	5014.832	292	5014.832	293	5014.828	294	5010.842	295	5006.856
296	5002.870	297	4998.886	298	4994.902	299	4994.899	300	4994.902
301	4994.909	302	4994.921	303	4994.937	304	4994.956	305	4994.978
306	4995.000	307	4943.625	308	4943.625	309	4943.625	310	4943.623
311	4941.796	312	4939.971	313	4938.148	314	4936.329	315	4934.516
316	4934.518	317	4934.530	318	4934.565	319	4934.622	320	4934.698
321	4934.790	322	4934.892	323	4935.000	324	4872.418	325	4872.418
326	4872.418	327	4872.418	328	4872.448	329	4872.484	330	4872.532
331	4872.599	332	4872.691	333	4872.707	334	4872.761	335	4872.922
336	4873.185	337	4873.540	338	4873.975	339	4874.470	340	4875.000
341	4801.211	342	4801.211	343	4801.211	344	4801.212	345	4801.755
346	4802.319	347	4802.926	348	4803.598	349	4804.356	350	4804.411
351	4804.607	352	4805.199	353	4806.202	354	4807.641	355	4809.551
356	4811.983	357	4815.000	358	4730.004	359	4730.004	360	4730.004
361	4730.001	362	4726.501	363	4723.013	364	4719.547	365	4716.107
366	4712.694	367	4712.705	368	4712.759	369	4712.920	370	4713.183
371	4713.539	372	4713.974	373	4714.470	374	4715.000	375	4658.797
376	4658.797	377	4658.797	378	4659.110	379	4648.429	380	4639.092
381	4630.678	382	4622.775	383	4614.979	384	4614.510	385	4614.522
386	4614.557	387	4614.614	388	4614.691	389	4614.784	390	4614.889
391	4615.000	392	3946.641	393	3946.641	394	3946.641	395	3946.485
396	4061.882	397	4175.937	398	4289.074	399	4401.705	400	4514.237
401	4514.871	402	4514.872	403	4514.876	404	4514.882	405	4514.889
406	4514.895	407	4514.901	408	4514.903	409	3875.432	410	3875.432
411	3875.432	412	3875.539	413	3983.441	414	4091.336	415	4199.222
416	4307.101	417	4414.977	418	4415.086	419	4415.087	420	4415.087
421	4415.087	422	4415.088	423	4415.088	424	4415.089	425	4415.089
426	3804.220	427	3804.220	428	3804.220	429	3804.322	430	3906.496
431	4008.669	432	4110.842	433	4213.015	434	4315.188	435	4315.290
436	4315.290	437	4315.290	438	4315.290	439	4315.290	440	4315.290
441	4315.290	442	4315.290	443	3733.006	444	3733.006	445	3733.006
446	3733.102	447	3829.561	448	3926.020	449	4022.479	450	4118.938
451	4215.397	452	4215.493	453	4215.493	454	4215.493	455	4215.493
456	4215.493	457	4215.493	458	4215.493	459	4215.493	460	3661.788
461	3661.788	462	3661.788	463	3661.879	464	3752.624	465	3843.370
466	3934.115	467	4024.861	468	4115.606	469	4115.697	470	4115.697
471	4115.697	472	4115.697	473	4115.697	474	4115.697	475	4115.697
476	4115.697	477	3590.569	478	3590.569	479	3590.569	480	3590.654

481	3675.686	482	3760.719	483	3845.751	484	3930.784	485	4015.816
486	4015.901	487	4015.901	488	4015.901	489	4015.901	490	4015.901
491	4015.901	492	4015.901	493	4015.901	494	3519.347	495	3519.347
496	3519.347	497	3519.426	498	3598.746	499	3678.066	500	3757.386
501	3836.706	502	3916.027	503	3916.106	504	3916.106	505	3916.106
506	3916.106	507	3916.106	508	3916.106	509	3916.106	510	3916.106
511	3448.123	512	3448.123	513	3448.123	514	3448.196	515	3521.805
516	3595.413	517	3669.021	518	3742.629	519	3816.238	520	3816.311
521	3816.311	522	3816.311	523	3816.311	524	3816.311	525	3816.311
526	3816.311	527	3816.311	528	3376.897	529	3376.897	530	3376.897
531	3376.965	532	3444.861	533	3512.758	534	3580.655	535	3648.552
536	3716.449	537	3716.517	538	3716.517	539	3716.517	540	3716.517
541	3716.517	542	3716.517	543	3716.517	544	3716.517	545	3305.669
546	3305.669	547	3305.669	548	3305.731	549	3367.917	550	3430.103
551	3492.289	552	3554.475	553	3616.661	554	3616.723	555	3616.723
556	3616.723	557	3616.723	558	3616.723	559	3616.723	560	3616.723
561	3616.723	562	3234.439	563	3234.439	564	3234.439	565	3234.496
566	3290.970	567	3347.446	568	3403.922	569	3460.398	570	3516.873
571	3516.929	572	3516.929	573	3516.930	574	3516.930	575	3516.930
576	3516.930	577	3516.930	578	3516.930	579	3163.208	580	3163.208
581	3163.208	582	3163.259	583	3213.803	584	3264.555	585	3315.724
586	3366.497	587	3417.081	588	3417.135	589	3417.136	590	3417.136
591	3417.136	592	3417.137	593	3417.137	594	3417.137	595	3417.137
596	3091.976	597	3091.976	598	3091.976	599	3092.035	600	3092.262
601	3092.705	602	3311.888	603	3313.116	604	3315.699	605	3317.330
606	3317.332	607	3317.336	608	3317.342	609	3317.347	610	3317.351
611	3317.354	612	3317.355	613	3020.742	614	3020.742	615	3020.742
616	3044.747	617	3068.980	618	3093.511	619	3143.263	620	3168.215
621	3192.898	622	3217.378	623	3217.416	624	3217.477	625	3217.544
626	3217.606	627	3217.656	628	3217.688	629	3217.699	630	2948.872
631	2948.869	632	2948.860	633	2948.848	634	2981.993	635	3014.992
636	3047.917	637	3080.722	638	3113.476	639	3114.915	640	3116.195
641	3117.218	642	3118.017	643	3118.616	644	3119.032	645	3119.276
646	3119.357	647	2900.348	648	2900.348	649	2900.348	650	2900.348
651	2926.299	652	2952.253	653	2978.213	654	3004.182	655	3030.163
656	3030.209	657	3030.289	658	3030.384	659	3030.478	660	3030.561
661	3030.625	662	3030.666	663	3030.679	664	2851.371	665	2851.371
666	2851.371	667	2851.372	668	2869.791	669	2888.213	670	2906.637
671	2925.064	672	2943.493	673	2943.510	674	2943.534	675	2943.563
676	2943.592	677	2943.619	678	2943.640	679	2943.654	680	2943.659
681	2802.067	682	2802.067	683	2802.067	684	2802.067	685	2812.863
686	2823.674	687	2834.517	688	2845.405	689	2856.335	690	2856.399
691	2856.530	692	2856.690	693	2856.853	694	2856.997	695	2857.110
696	2857.181	697	2857.206	698	2752.572	699	2752.572	700	2752.570
701	2752.567	702	2752.572	703	2752.602	704	2752.655	705	2756.696
706	2762.379	707	2765.350	708	2767.757	709	2769.678	710	2771.172
711	2772.288	712	2773.061	713	2773.515	714	2773.664	715	2707.355
716	2707.355	717	2707.356	718	2707.357	719	2707.360	720	2707.363
721	2707.366	722	2707.578	723	2707.797	724	2707.965	725	2708.075
726	2708.128	727	2708.133	728	2708.107	729	2708.067	730	2708.032
731	2708.018	732	2659.771	733	2659.769	734	2659.762	735	2659.750
736	2659.733	737	2659.711	738	2659.684	739	2658.078	740	2656.200
741	2654.090	742	2651.802	743	2649.409	744	2647.008	745	2644.733
746	2642.757	747	2641.311	748	2640.697	749	2630.342	750	2630.334
751	2630.310	752	2630.271	753	2630.216	754	2630.145	755	2630.058
756	2624.826	757	2618.481	758	2610.875	759	2601.823	760	2591.098
761	2578.423	762	2563.453	763	2545.764	764	2524.831	765	2500.000

VELOCITY FIELD (feet/day)

	COLUMN:	1	2	3	4	5	6	7	8	9
ROW 32	HORZ:	.4809E+00	.4809E+00	.6012E+00	.2405E+01	.4208E+01	.3607E+01	.1803E+01	.6012E+00	.6012E+00
	VERT:	-.3122E-01	-.2088E-01	-.1288E-02	-.7558E-01	-.6054E-01	-.1093E+00	.7804E-01	.7622E-01	-.4336E-02
ROW 31	HORZ:	.4808E+00	.4815E+00	.6586E+00	.2393E+01	.4246E+01	.3462E+01	.1805E+01	.6634E+00	.6596E+00
	VERT:	-.2088E-01	-.6440E-01	-.7558E-01	-.6054E-01	-.1093E+00	.7804E-01	.7622E-01	-.4336E-02	-.8000E-01
ROW 30	HORZ:	.4808E+00	.4815E+00	.6586E+00	.2393E+01	.4246E+01	.3462E+01	.1805E+01	.6634E+00	.6596E+00
	VERT:	-.1041E-01	-.2087E-01	-.1138E-02	-.3804E-01	-.2044E-01	-.1263E+00	.4217E-01	.5152E-01	-.4418E-02
ROW 29	HORZ:	.4809E+00	.4819E+00	.6871E+00	.2379E+01	.4328E+01	.3332E+01	.1798E+01	.7067E+00	.7058E+00
	VERT:	-.2087E-01	-.5688E-01	-.3804E-01	-.2044E-01	-.1263E+00	.4217E-01	.5152E-01	-.4418E-02	-.6416E-01
ROW 28	HORZ:	.1202E-05	.4819E+00	.5497E+00	.4759E-03	.8655E-03	.3332E+01	.1798E+01	.7067E+00	.7058E+00
	VERT:	-.4718E-06	-.3129E-01	-.2606E-01	-.7335E-06	.6415E-03	-.2019E+00	.8966E-02	.2791E-01	-.4436E-02
ROW 27	HORZ:	.1101E-05	.4818E+00	.5500E+00	.3369E-03	.1036E-02	.3169E+01	.1783E+01	.7317E+00	.7412E+00
	VERT:	-.4470E-08	-.2606E-01	-.5135E-01	.6415E-03	-.1442E-03	.8966E-02	.2791E-01	-.4436E-02	-.5018E-01
ROW 26	HORZ:	.1101E-05	.4818E+00	.5500E+00	.3369E-03	.1036E-02	.3169E+01	.1783E+01	.7317E+00	.7412E+00
	VERT:	-.4241E-06	-.1043E-01	-.2458E-01	-.1073E-05	.6567E-03	-.6490E-01	-.2103E-01	.5153E-02	-.4230E-02
ROW 25	HORZ:	.1010E-05	.4820E+00	.5506E+00	.1945E-03	.1188E-02	.3135E+01	.1763E+01	.7389E+00	.7670E+00
	VERT:	-.1490E-08	-.2458E-01	-.7514E-01	.6567E-03	-.4636E-04	-.2103E-01	.5153E-02	-.4230E-02	-.3761E-01
ROW 24	HORZ:	.1010E-05	.1205E-05	.5506E+00	.7782E+00	.1188E-02	.6270E-03	.1763E+01	.7389E+00	.7670E+00
	VERT:	-.3804E-06	-.9475E-07	-.3576E-01	-.4106E-01	-.2211E-06	.1431E-02	-.3359E-01	-.1701E-01	-.3623E-02

ROW 23	HORZ:	.9479E-06	.1186E-05	.5507E+00	.7778E+00	.8781E-03	.9418E-03	.1750E+01	.7286E+00	.7843E+00
	VERT:	-.9475E-07	-.5109E-08	-.4106E-01	-.1548E-01	.1431E-02	-.2399E-04	-.1701E-01	-.3623E-02	-.2607E-01
ROW 22	HORZ:	.9479E-06	.1186E-05	.5507E+00	.7778E+00	.8781E-03	.9418E-03	.3500E-03	.7286E+00	.7843E+00
	VERT:	-.3394E-06	-.8960E-07	-.1192E-01	-.3615E-01	-.7016E-06	.1432E-02	.2112E-02	-.4033E-01	-.2417E-02
ROW 21	HORZ:	.8939E-06	.1167E-05	.5510E+00	.7780E+00	.5680E-03	.7946E-03	.8133E-03	.6993E+00	.7942E+00
	VERT:	-.8960E-07	-.1704E-08	-.3615E-01	-.4911E-01	.1432E-02	.2112E-02	-.2881E-04	-.2417E-02	-.1523E-01
ROW 20	HORZ:	.8939E-06	.1167E-05	.1377E-05	.7780E+00	.5680E-03	.7946E-03	.8133E-03	.6993E+00	.7942E+00
	VERT:	-.3007E-06	-.8370E-07	-.5016E-07	-.5055E-01	-.1182E-05	.1437E-02	.2112E-02	-.1012E-01	-.3616E-03
ROW 19	HORZ:	.8469E-06	.1159E-05	.1368E-05	.7784E+00	.2568E-03	.6485E-03	.1272E-02	.6917E+00	.7977E+00
	VERT:	-.8370E-07	-.5016E-07	-.7221E-08	-.8276E-01	.1437E-02	.2112E-02	-.7227E-05	-.3616E-03	-.4794E-02
ROW 18	HORZ:	.8469E-06	.1159E-05	.1368E-05	.7784E+00	.1027E+01	.6485E-03	.1272E-02	.1383E-03	.1595E-03
	VERT:	-.2640E-06	-.7694E-07	-.4564E-07	-.1685E-01	-.4711E-01	-.2762E-06	.2126E-02	.2397E-02	.7849E-03
ROW 17	HORZ:	.8064E-06	.1153E-05	.1359E-05	.7788E+00	.1027E+01	.1883E-03	.1213E-02	.4872E-03	.2520E-03
	VERT:	-.7694E-07	-.4564E-07	-.2408E-08	-.4711E-01	-.1933E-01	.2126E-02	.2397E-02	.7849E-03	.3578E-03
ROW 16	HORZ:	.8064E-06	.1153E-05	.1359E-05	.1947E-05	.1027E+01	.7532E+00	.1213E-02	.4872E-03	.2520E-03
	VERT:	-.2291E-06	-.6944E-07	-.4117E-07	-.8646E-07	-.6663E-01	-.2373E-01	-.1714E-06	.2381E-02	.7798E-03
ROW 15	HORZ:	.7718E-06	.1146E-05	.1369E-05	.1930E-05	.1026E+01	.7531E+00	.6981E-03	.8337E-03	.3431E-03
	VERT:	-.6944E-07	-.4117E-07	-.8646E-07	-.9519E-08	-.2373E-01	-.1200E-01	.2381E-02	.7798E-03	.3585E-03
ROW 14	HORZ:	.7718E-06	.1146E-05	.1369E-05	.1930E-05	.1026E+01	.7531E+00	.6981E-03	.8337E-03	.3431E-03
	VERT:	-.1957E-06	-.6134E-07	-.3637E-07	-.7431E-07	-.2221E-01	-.2965E-01	-.6367E-06	.2384E-02	.7692E-03
ROW 13	HORZ:	.7428E-06	.1141E-05	.1377E-05	.1915E-05	.1026E+01	.7533E+00	.1820E-03	.1183E-02	.4324E-03
	VERT:	-.6134E-07	-.3637E-07	-.7431E-07	-.3173E-08	-.2965E-01	-.4457E-01	.2384E-02	.7692E-03	.3566E-03
ROW 12	HORZ:	.7428E-06	.1141E-05	.1377E-05	.1915E-05	.2566E-05	.7533E+00	.7281E+00	.1183E-02	.4324E-03
	VERT:	-.1636E-06	-.5272E-07	-.3126E-07	-.6267E-07	-.7162E-07	-.4890E-01	-.3071E-01	-.1563E-06	.7529E-03
ROW 11	HORZ:	.7188E-06	.1136E-05	.1384E-05	.1917E-05	.2552E-05	.7531E+00	.7279E+00	.1020E-02	.5191E-03
	VERT:	-.5272E-07	-.3126E-07	-.6267E-07	-.7162E-07	-.6985E-08	-.3071E-01	-.1094E-01	.7529E-03	.3525E-03
ROW 10	HORZ:	.7188E-06	.1136E-05	.1384E-05	.1917E-05	.2552E-05	.7531E+00	.7279E+00	.1020E-02	.5191E-03
	VERT:	-.1325E-06	-.4368E-07	-.2591E-07	-.5113E-07	-.5788E-07	-.1630E-01	-.3125E-01	-.6058E-06	.7421E-03
ROW 9	HORZ:	.6995E-06	.1133E-05	.1389E-05	.1918E-05	.2540E-05	.7532E+00	.7280E+00	.8594E-03	.6048E-03
	VERT:	-.4368E-07	-.2591E-07	-.5113E-07	-.5788E-07	-.2329E-08	-.3125E-01	-.4240E-01	.7421E-03	.3460E-03
ROW 8	HORZ:	.6995E-06	.1133E-05	.1389E-05	.1918E-05	.2540E-05	.1883E-05	.7280E+00	.8594E-03	.6048E-03
	VERT:	-.1022E-06	-.3430E-07	-.2036E-07	-.3967E-07	-.4443E-07	.4582E-07	-.4729E-01	-.1055E-05	.7366E-03
ROW 7	HORZ:	.6849E-06	.1130E-05	.1393E-05	.1919E-05	.2520E-05	.1894E-05	.7284E+00	.6998E-03	.6912E-03
	VERT:	-.3430E-07	-.2036E-07	-.3967E-07	-.4443E-07	.4582E-07	-.6756E-08	-.7388E-01	.7366E-03	.3373E-03
ROW 6	HORZ:	.6849E-06	.1130E-05	.1393E-05	.1919E-05	.2520E-05	.1894E-05	.7284E+00	.2799E+01	.2765E+01
	VERT:	-.7254E-07	-.2468E-07	-.1466E-07	-.2829E-07	-.3142E-07	.3227E-07	-.1576E-01	-.2240E-01	.3654E-03
ROW 5	HORZ:	.6745E-06	.1127E-05	.1396E-05	.1920E-05	.2506E-05	.1902E-05	.7284E+00	.2799E+01	.2765E+01
	VERT:	-.2468E-07	-.1466E-07	-.2829E-07	-.3142E-07	.3227E-07	-.2252E-08	-.2240E-01	.3654E-03	-.1967E-01
ROW 4	HORZ:	.6745E-06	.1127E-05	.1396E-05	.1920E-05	.2506E-05	.1902E-05	.1821E-05	.6997E-05	.6913E-05
	VERT:	-.4335E-07	-.1488E-07	-.8837E-08	-.1695E-07	-.1873E-07	.1919E-07	.1462E-08	-.1654E-06	.1362E-08
ROW 3	HORZ:	.6683E-06	.1126E-05	.1398E-05	.1920E-05	.2498E-05	.1906E-05	.1857E-05	.6961E-05	.6915E-05
	VERT:	-.1488E-07	-.8837E-08	-.1695E-07	-.1873E-07	.1919E-07	.1462E-08	-.1654E-06	.1362E-08	-.8498E-08
ROW 2	HORZ:	.6683E-06	.1126E-05	.1398E-05	.1920E-05	.2498E-05	.1906E-05	.1857E-05	.6961E-05	.6915E-05
	VERT:	-.1442E-07	-.4971E-08	-.2953E-08	-.5648E-08	-.6223E-08	.6368E-08	.4100E-09	-.5497E-07	.3627E-09
ROW 1	HORZ:	.6663E-06	.1126E-05	.1399E-05	.1921E-05	.2496E-05	.1907E-05	.1869E-05	.6949E-05	.6916E-05
	VERT:	-.4971E-08	-.2953E-08	-.5648E-08	-.6223E-08	.6368E-08	.4100E-09	-.5497E-07	.3627E-09	-.2832E-08

	COLUMN:	10	11	12	13	14	15	16	17	18
ROW 32	HORZ:	.1443E+01	.1443E+01	.1443E+01	.1443E+01	.1443E+01	.1443E+01	.1443E+01	.1443E+01	.1443E+01
	VERT:	-.8000E-01	-.1384E-01	-.2807E-02	-.5833E-03	-.1227E-03	-.3153E-04	-.3556E-04	-.1468E-03	-.6988E-03
ROW 31	HORZ:	.1392E+01	.1434E+01	.1441E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1443E+01	.1445E+01
	VERT:	-.1384E-01	-.2807E-02	-.5833E-03	-.1227E-03	-.3153E-04	-.3556E-04	-.1468E-03	-.6988E-03	-.3358E-02
ROW 30	HORZ:	.1392E+01	.1434E+01	.1441E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1443E+01	.1445E+01
	VERT:	-.6416E-01	-.1292E-01	-.2659E-02	-.5538E-03	-.1166E-03	-.2994E-04	-.3377E-04	-.1394E-03	-.6635E-03
ROW 29	HORZ:	.1352E+01	.1426E+01	.1439E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1444E+01	.1447E+01
	VERT:	-.1292E-01	-.2659E-02	-.5538E-03	-.1166E-03	-.2994E-04	-.3377E-04	-.1394E-03	-.6635E-03	-.3183E-02
ROW 28	HORZ:	.1352E+01	.1426E+01	.1439E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1444E+01	.1447E+01
	VERT:	-.5018E-01	-.1131E-01	-.2376E-02	-.4964E-03	-.1045E-03	-.2683E-04	-.3027E-04	-.1250E-03	-.5949E-03
ROW 27	HORZ:	.1322E+01	.1419E+01	.1438E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1444E+01	.1449E+01
	VERT:	-.1131E-01	-.2376E-02	-.4964E-03	-.1045E-03	-.2683E-04	-.3027E-04	-.1250E-03	-.5949E-03	-.2846E-02

ROW 26	HORZ:	.1322E+01	.1419E+01	.1438E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1444E+01	.1449E+01
	VERT:	-.3761E-01	-.9200E-02	-.1974E-02	-.4141E-03	-.8723E-04	-.2237E-04	-.2525E-04	-.1044E-03	-.4965E-03
ROW 25	HORZ:	.1300E+01	.1414E+01	.1437E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1444E+01	.1450E+01
	VERT:	-.9200E-02	-.1974E-02	-.4141E-03	-.8723E-04	-.2237E-04	-.2525E-04	-.1044E-03	-.4965E-03	-.2368E-02
ROW 24	HORZ:	.1300E+01	.1414E+01	.1437E+01	.1442E+01	.1443E+01	.1443E+01	.1443E+01	.1444E+01	.1450E+01
	VERT:	-.2607E-01	-.6737E-02	-.1477E-02	-.3112E-03	-.6555E-04	-.1677E-04	-.1895E-04	-.7849E-04	-.3733E-03
ROW 23	HORZ:	.1285E+01	.1410E+01	.1436E+01	.1441E+01	.1443E+01	.1443E+01	.1443E+01	.1445E+01	.1451E+01
	VERT:	-.6737E-02	-.1477E-02	-.3112E-03	-.6555E-04	-.1677E-04	-.1895E-04	-.7849E-04	-.3733E-03	-.1775E-02
ROW 22	HORZ:	.1285E+01	.1410E+01	.1436E+01	.1441E+01	.1443E+01	.1443E+01	.1443E+01	.1445E+01	.1451E+01
	VERT:	-.1523E-01	-.4039E-02	-.9124E-03	-.1929E-03	-.4058E-04	-.1032E-04	-.1169E-04	-.4867E-04	-.2316E-03
ROW 21	HORZ:	.1276E+01	.1407E+01	.1435E+01	.1441E+01	.1442E+01	.1443E+01	.1443E+01	.1445E+01	.1452E+01
	VERT:	-.4039E-02	-.9124E-03	-.1929E-03	-.4058E-04	-.1032E-04	-.1169E-04	-.4867E-04	-.2316E-03	-.1099E-02
ROW 20	HORZ:	.1276E+01	.1407E+01	.1435E+01	.1441E+01	.1442E+01	.1443E+01	.1443E+01	.1445E+01	.1452E+01
	VERT:	-.4794E-02	-.1206E-02	-.3072E-03	-.6509E-04	-.1357E-04	-.3343E-05	-.3842E-05	-.1641E-04	-.7845E-04
ROW 19	HORZ:	.1274E+01	.1407E+01	.1435E+01	.1441E+01	.1442E+01	.1443E+01	.1443E+01	.1445E+01	.1452E+01
	VERT:	-.1206E-02	-.3072E-03	-.6509E-04	-.1357E-04	-.3343E-05	-.3842E-05	-.1641E-04	-.7845E-04	-.3721E-03
ROW 18	HORZ:	.2547E-03	.2813E-03	.2870E-03	.2882E-03	.2885E-03	.2886E-03	.2886E-03	.2889E-03	.2904E-03
	VERT:	.3578E-03	.2332E-03	.9669E-06	.4122E-06	.2863E-06	.2368E-06	.1869E-06	.1346E-06	.7270E-07
ROW 17	HORZ:	.2817E-03	.3316E-03	.2871E-03	.2883E-03	.2885E-03	.2886E-03	.2886E-03	.2890E-03	.2904E-03
	VERT:	.2332E-03	.9669E-06	.4122E-06	.2863E-06	.2368E-06	.1869E-06	.1346E-06	.7270E-07	-.3466E-07
ROW 16	HORZ:	.2817E-03	.3316E-05	.2871E-05	.2883E-05	.2885E-05	.2886E-05	.2886E-05	.2890E-05	.2904E-05
	VERT:	.3585E-03	.4608E-05	.4856E-05	.4243E-05	.2889E-05	.2375E-05	.1877E-05	.1380E-05	.8852E-06
ROW 15	HORZ:	.2596E-03	.3262E-05	.3004E-05	.3176E-05	.2996E-05	.2994E-05	.2994E-05	.2997E-05	.3009E-05
	VERT:	.4608E-03	.4856E-05	.4243E-05	.2889E-05	.2375E-05	.1877E-05	.1380E-05	.8852E-06	.4029E-06
ROW 14	HORZ:	.2596E-03	.3262E-05	.3004E-05	.3176E-05	.2996E-05	.2994E-05	.2994E-05	.2997E-05	.3009E-05
	VERT:	.3566E-03	.4496E-05	.4851E-05	.4247E-05	.2886E-05	.2375E-05	.1877E-05	.1380E-05	.8855E-06
ROW 13	HORZ:	.2394E-03	.3185E-05	.3135E-05	.3470E-05	.3107E-05	.3101E-05	.3102E-05	.3104E-05	.3113E-05
	VERT:	.4496E-03	.4851E-05	.4247E-05	.2886E-05	.2375E-05	.1877E-05	.1380E-05	.8855E-06	.4041E-06
ROW 12	HORZ:	.2394E-03	.3185E-05	.3135E-05	.3470E-05	.3107E-05	.3101E-05	.3102E-05	.3104E-05	.3113E-05
	VERT:	.3525E-03	.4393E-05	.4850E-05	.4254E-05	.2878E-05	.2375E-05	.1877E-05	.1380E-05	.8857E-06
ROW 11	HORZ:	.2206E-03	.3087E-05	.3264E-05	.3768E-05	.3216E-05	.3209E-05	.3209E-05	.3211E-05	.3217E-05
	VERT:	.4393E-03	.4850E-05	.4254E-05	.2878E-05	.2375E-05	.1877E-05	.1380E-05	.8857E-06	.4051E-06
ROW 10	HORZ:	.2206E-03	.3087E-05	.3264E-05	.3768E-05	.3216E-05	.3209E-05	.3209E-05	.3211E-05	.3217E-05
	VERT:	.3460E-03	.4298E-05	.4853E-05	.4265E-05	.2866E-05	.2375E-05	.1877E-05	.1380E-05	.8858E-06
ROW 9	HORZ:	.2025E-03	.2966E-05	.3391E-05	.4071E-05	.3322E-05	.3317E-05	.3317E-05	.3318E-05	.3321E-05
	VERT:	.4298E-03	.4853E-05	.4265E-05	.2866E-05	.2375E-05	.1877E-05	.1380E-05	.8858E-06	.4057E-06
ROW 8	HORZ:	.2025E-03	.2966E-03	.3391E-03	.4071E-05	.3322E-05	.3317E-05	.3317E-05	.3318E-05	.3321E-05
	VERT:	.3373E-03	.2139E-03	.9457E-06	-.6470E-07	.2849E-05	.2375E-05	.1877E-05	.1380E-05	.8859E-06
ROW 7	HORZ:	.2292E-03	.3427E-03	.3407E-03	.3440E-05	.3425E-05	.3424E-05	.3424E-05	.3424E-05	.3424E-05
	VERT:	.2139E-03	.9457E-06	-.6470E-05	.2849E-05	.2375E-05	.1877E-05	.1380E-05	.8859E-06	.4060E-06
ROW 6	HORZ:	.9169E+00	.3427E-03	.3407E-03	.3440E-03	.3425E-03	.3424E-03	.3424E-03	.3424E-03	.3424E-03
	VERT:	-.1967E-01	-.2772E-06	.9028E-06	-.6886E-05	.2681E-06	.2374E-06	.1877E-06	.1380E-06	.8858E-07
ROW 5	HORZ:	.9169E+00	.3425E-03	.3424E-03	.3425E-03	.3425E-03	.3425E-03	.3425E-03	.3425E-03	.3425E-03
	VERT:	-.1941E-01	.9028E-06	-.6886E-05	.2681E-06	.2374E-06	.1877E-06	.1380E-06	.8858E-07	.4061E-07
ROW 4	HORZ:	.9169E+00	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.5949E-01	-.1472E-01	-.9650E-06	-.5163E-05	.2005E-06	.1781E-06	.1408E-06	.1035E-06	.6643E-07
ROW 3	HORZ:	.9163E+00	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.1472E-01	-.9650E-06	-.5163E-05	.2005E-06	.1781E-06	.1408E-06	.1035E-06	.6643E-07	.3046E-07
ROW 2	HORZ:	.9163E+00	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.1983E-01	-.4907E-02	-.7595E-06	-.1721E-05	.6665E-07	.5935E-07	.4692E-07	.3449E-07	.2215E-07
ROW 1	HORZ:	.9161E+00	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.4907E-02	-.7595E-06	-.1721E-05	.6665E-07	.5935E-07	.4692E-07	.3449E-07	.2215E-07	.1015E-07

	COLUMN:	19	20	21	22	23	24	25	26	27
ROW 32	HORZ:	.1443E+01	.1443E+01	.2405E+01	.2405E+01	.2407E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.3358E-02	-.1648E-01	-.9387E-01	-.1649E-01	-.3464E-02	-.7367E-04	-.3998E-05	-.4218E-06	-.1717E-06
ROW 31	HORZ:	.1453E+01	.1503E+01	.2345E+01	.2395E+01	.2404E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1648E-01	-.9387E-01	-.1649E-01	-.3464E-02	-.7367E-04	-.3998E-05	-.4218E-06	-.1717E-06	-.1454E-06
ROW 30	HORZ:	.1453E+01	.1503E+01	.2345E+01	.2395E+01	.2404E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.3183E-02	-.1541E-01	-.7564E-01	-.1542E-01	-.3252E-02	-.1655E-03	-.1089E-04	-.1210E-05	-.5113E-06

ROW 29	HORZ:	.1462E+01	.1549E+01	.2298E+01	.2385E+01	.2402E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1541E-01	-.7564E-01	-.1542E-01	-.3252E-02	-.1655E-03	-.1089E-04	-.1210E-05	-.5113E-06	-.4359E-06
ROW 28	HORZ:	.1462E+01	.1549E+01	.2298E+01	.2385E+01	.2402E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.2846E-02	-.1353E-01	-.5943E-01	-.1354E-01	-.2889E-02	-.2082E-03	-.1535E-04	-.1847E-05	-.8404E-06
ROW 27	HORZ:	.1471E+01	.1585E+01	.2263E+01	.2377E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1353E-01	-.5943E-01	-.1354E-01	-.2889E-02	-.2082E-03	-.1535E-04	-.1847E-05	-.8404E-06	-.7256E-06
ROW 26	HORZ:	.1471E+01	.1585E+01	.2263E+01	.2377E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.2368E-02	-.1106E-01	-.4475E-01	-.1107E-01	-.2392E-02	-.2093E-03	-.1682E-04	-.2276E-05	-.1155E-05
ROW 25	HORZ:	.1477E+01	.1611E+01	.2237E+01	.2370E+01	.2398E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1106E-01	-.4475E-01	-.1107E-01	-.2392E-02	-.2093E-03	-.1682E-04	-.2276E-05	-.1155E-05	-.1014E-05
ROW 24	HORZ:	.1477E+01	.1611E+01	.2237E+01	.2370E+01	.2398E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1775E-02	-.8175E-02	-.3120E-01	-.8180E-02	-.1786E-02	-.1772E-03	-.1531E-04	-.2480E-05	-.1453E-05
ROW 23	HORZ:	.1482E+01	.1628E+01	.2219E+01	.2365E+01	.2397E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.8175E-02	-.3120E-01	-.8180E-02	-.1786E-02	-.1772E-03	-.1531E-04	-.2480E-05	-.1453E-05	-.1302E-05
ROW 22	HORZ:	.1482E+01	.1628E+01	.2219E+01	.2365E+01	.2397E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1099E-02	-.5011E-02	-.1842E-01	-.5014E-02	-.1100E-02	-.1208E-03	-.1130E-04	-.2487E-05	-.1736E-05
ROW 21	HORZ:	.1485E+01	.1639E+01	.2209E+01	.2362E+01	.2396E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.5011E-02	-.1842E-01	-.5014E-02	-.1100E-02	-.1208E-03	-.1130E-04	-.2487E-05	-.1736E-05	-.1588E-05
ROW 20	HORZ:	.1485E+01	.1639E+01	.2209E+01	.2362E+01	.2396E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.3721E-03	-.1688E-02	-.6094E-02	-.1689E-02	-.3655E-03	-.4995E-04	-.5614E-05	-.2359E-05	-.2009E-05
ROW 19	HORZ:	.1486E+01	.1642E+01	.2205E+01	.2361E+01	.2396E+01	.2399E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1688E-02	-.6094E-02	-.1689E-02	-.3655E-03	-.4995E-04	-.5614E-05	-.2359E-05	-.2009E-05	-.1874E-05
ROW 18	HORZ:	.2973E-03	.3285E-03	.4410E-03	.4723E-03	.2396E-05	.4799E-03	.4800E-03	.4800E-03	.4800E-03
	VERT:	-.3466E-07	-.3412E-06	-.1232E-05	-.2395E-06	.5212E-07	-.1408E-04	-.2425E-05	-.2271E-05	-.2144E-05
ROW 17	HORZ:	.2973E-03	.3286E-03	.4408E-03	.4699E-03	.2422E-05	.4774E-03	.4799E-03	.4799E-03	.4799E-03
	VERT:	-.3412E-06	-.1232E-05	-.2395E-06	.1042E-04	-.7038E-07	-.2425E-05	-.2271E-05	-.2144E-05	-.2017E-05
ROW 16	HORZ:	.2973E-05	.3286E-05	.4408E-05	.4699E-05	.2422E-05	.4774E-05	.4799E-05	.4799E-05	.4799E-05
	VERT:	.4029E-06	-.2042E-07	-.1685E-06	.7584E-06	.8662E-06	-.2501E-04	-.2397E-04	-.2271E-04	-.2144E-04
ROW 15	HORZ:	.3065E-05	.3319E-05	.4208E-05	.4489E-05	.5316E-05	.4550E-05	.4525E-05	.4524E-05	.4524E-05
	VERT:	-.2042E-07	-.1685E-06	.7584E-06	.1732E-05	-.1250E-04	-.2397E-04	-.2271E-04	-.2144E-04	-.2017E-04
ROW 14	HORZ:	.3065E-05	.3319E-05	.4208E-05	.4489E-05	.5316E-05	.4550E-05	.4525E-05	.4524E-05	.4524E-05
	VERT:	.4041E-06	-.1493E-07	-.1493E-06	.7645E-06	.8781E-06	-.2503E-04	-.2397E-04	-.2271E-04	-.2144E-04
ROW 13	HORZ:	.3156E-05	.3348E-05	.4010E-05	.4274E-05	.8214E-05	.4321E-05	.4250E-05	.4250E-05	.4250E-05
	VERT:	-.1493E-07	-.1493E-06	.7645E-06	.1756E-05	-.1251E-04	-.2397E-04	-.2271E-04	-.2144E-04	-.2017E-04
ROW 12	HORZ:	.3156E-05	.3348E-05	.4010E-05	.4274E-05	.8214E-05	.4321E-05	.4250E-05	.4250E-05	.4250E-05
	VERT:	.4051E-06	-.1078E-07	-.1349E-06	.7702E-06	.9350E-06	-.2514E-04	-.2397E-04	-.2271E-04	-.2144E-04
ROW 11	HORZ:	.3246E-05	.3374E-05	.3814E-05	.4036E-05	.1114E-04	.4069E-05	.3976E-05	.3975E-05	.3975E-05
	VERT:	-.1078E-07	-.1349E-06	.7702E-06	.1870E-05	-.1257E-04	-.2397E-04	-.2271E-04	-.2144E-04	-.2017E-04
ROW 10	HORZ:	.3246E-05	.3374E-05	.3814E-05	.4036E-05	.1114E-04	.4069E-05	.3976E-05	.3975E-05	.3975E-05
	VERT:	.4057E-06	-.7989E-08	-.1254E-06	.7750E-06	.1037E-05	-.2535E-04	-.2398E-04	-.2271E-04	-.2144E-04
ROW 9	HORZ:	.3335E-05	.3400E-05	.3619E-05	.3755E-05	.1410E-04	.3772E-05	.3701E-05	.3700E-05	.3700E-05
	VERT:	-.7989E-08	-.1254E-06	.7750E-06	.2075E-05	-.1267E-04	-.2398E-04	-.2271E-04	-.2144E-04	-.2017E-04
ROW 8	HORZ:	.3335E-05	.3400E-05	.3619E-05	.3755E-05	.1410E-04	.3772E-05	.3701E-05	.3700E-05	.3700E-05
	VERT:	.4060E-06	-.6589E-08	-.1207E-06	.7779E-06	.1187E-05	-.2564E-04	-.2398E-04	-.2271E-04	-.2144E-04
ROW 7	HORZ:	.3424E-05	.3425E-05	.3425E-05	.3409E-05	.1714E-04	.3412E-05	.3425E-05	.3425E-05	.3425E-05
	VERT:	-.6589E-08	-.1207E-06	.7779E-06	.2373E-05	-.1282E-04	-.2398E-04	-.2271E-04	-.2144E-04	-.2017E-04
ROW 6	HORZ:	.3424E-03	.3425E-03	.3425E-03	.3409E-03	.1714E-04	.3412E-03	.3425E-03	.3425E-03	.3425E-03
	VERT:	.4061E-07	-.5888E-09	-.1187E-07	.6118E-07	-.3476E-07	.3469E-05	-.2384E-05	-.2270E-05	-.2143E-05
ROW 5	HORZ:	.3425E-03	.3425E-03	.3425E-03	.3425E-03	.1712E-04	.3425E-03	.3425E-03	.3425E-03	.3425E-03
	VERT:	-.5888E-09	-.1187E-07	.6118E-07	-.6952E-05	.1735E-07	-.2384E-05	-.2270E-05	-.2143E-05	-.2016E-05
ROW 4	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+02	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	.3046E-07	-.4400E-09	-.8895E-08	.4468E-07	-.1064E-05	.8051E-05	-.1787E-05	-.1703E-05	-.1607E-05
ROW 3	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+02	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.4400E-09	-.8895E-08	.4468E-07	-.1064E-04	.8051E-06	-.1787E-05	-.1703E-05	-.1607E-05	-.1512E-05
ROW 2	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+02	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	.1015E-07	-.1500E-09	-.2965E-08	.1458E-07	-.3545E-06	.2683E-05	-.5952E-06	-.5675E-06	-.5358E-06
ROW 1	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+02	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.1500E-09	-.2965E-08	.1458E-07	-.3545E-05	.2683E-06	-.5952E-06	-.5675E-06	-.5358E-06	-.5041E-06
	COLUMN:	28	29	30	31	32	33	34	35	36

ROW 32	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2399E+01	.2396E+01
	VERT:	-.1454E-06	-.1351E-06	-.1259E-06	-.1169E-06	-.1088E-06	-.1133E-06	-.2885E-06	-.2715E-05	-.3264E-04
ROW 31	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2399E+01	.2397E+01
	VERT:	-.1351E-06	-.1259E-06	-.1169E-06	-.1088E-06	-.1133E-06	-.2885E-06	-.2715E-05	-.3264E-04	-.3421E-03
ROW 30	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2399E+01	.2397E+01
	VERT:	-.4359E-06	-.4052E-06	-.3777E-06	-.3507E-06	-.3263E-06	-.3372E-06	-.8280E-06	-.7684E-05	-.9324E-04
ROW 29	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2397E+01
	VERT:	-.4052E-06	-.3777E-06	-.3507E-06	-.3263E-06	-.3372E-06	-.8280E-06	-.7684E-05	-.9324E-04	-.9952E-03
ROW 28	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2397E+01
	VERT:	-.7256E-06	-.6752E-06	-.6296E-06	-.5845E-06	-.5432E-06	-.5530E-06	-.1261E-05	-.1134E-04	-.1402E-03
ROW 27	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2398E+01
	VERT:	-.6752E-06	-.6296E-06	-.5845E-06	-.5432E-06	-.5530E-06	-.1261E-05	-.1134E-04	-.1402E-03	-.1553E-02
ROW 26	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2398E+01
	VERT:	-.1014E-05	-.9452E-06	-.8814E-06	-.8182E-06	-.7592E-06	-.7571E-06	-.1537E-05	-.1300E-04	-.1657E-03
ROW 25	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.9452E-06	-.8814E-06	-.8182E-06	-.7592E-06	-.7571E-06	-.1537E-05	-.1300E-04	-.1657E-03	-.1943E-02
ROW 24	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01
	VERT:	-.1302E-05	-.1215E-05	-.1133E-05	-.1052E-05	-.9743E-06	-.9481E-06	-.1635E-05	-.1231E-04	-.1640E-03
ROW 23	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2401E+01
	VERT:	-.1215E-05	-.1133E-05	-.1052E-05	-.9743E-06	-.9481E-06	-.1635E-05	-.1231E-04	-.1640E-03	-.2085E-02
ROW 22	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2401E+01
	VERT:	-.1588E-05	-.1485E-05	-.1385E-05	-.1285E-05	-.1188E-05	-.1127E-05	-.1565E-05	-.9253E-05	-.1327E-03
ROW 21	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2403E+01
	VERT:	-.1485E-05	-.1385E-05	-.1285E-05	-.1188E-05	-.1127E-05	-.1565E-05	-.9253E-05	-.1327E-03	-.1877E-02
ROW 20	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2403E+01
	VERT:	-.1874E-05	-.1755E-05	-.1637E-05	-.1519E-05	-.1402E-05	-.1298E-05	-.1374E-05	-.4264E-05	-.7425E-04
ROW 19	HORZ:	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2400E+01	.2403E+01
	VERT:	-.1755E-05	-.1637E-05	-.1519E-05	-.1402E-05	-.1298E-05	-.1374E-05	-.4264E-05	-.7425E-04	-.1198E-02
ROW 18	HORZ:	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4800E-03	.4807E-03
	VERT:	-.2017E-05	-.1890E-05	-.1763E-05	-.1636E-05	-.1509E-05	-.1382E-05	-.1255E-05	-.1207E-05	-.3623E-04
ROW 17	HORZ:	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4799E-03	.4876E-03	.5906E-03
	VERT:	-.1890E-05	-.1763E-05	-.1636E-05	-.1509E-05	-.1382E-05	-.1255E-05	-.1207E-05	-.3623E-04	-.5440E-03
ROW 16	HORZ:	.4799E-05	.4799E-05	.4799E-05	.4799E-05	.4799E-05	.4799E-05	.4799E-05	.4876E-05	.5906E-03
	VERT:	-.2017E-04	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1124E-04	-.5740E-04
ROW 15	HORZ:	.4524E-05	.4524E-05	.4524E-05	.4524E-05	.4524E-05	.4524E-05	.4516E-05	.2567E-05	.6969E-03
	VERT:	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1124E-04	-.5740E-06	-.5485E-03
ROW 14	HORZ:	.4524E-05	.4524E-05	.4524E-05	.4524E-05	.4524E-05	.4524E-05	.4516E-05	.2567E-05	.6969E-03
	VERT:	-.2017E-04	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1128E-04	-.2728E-04
ROW 13	HORZ:	.4250E-05	.4250E-05	.4250E-05	.4250E-05	.4250E-05	.4250E-05	.4242E-05	.1845E-06	.8110E-03
	VERT:	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1128E-04	-.2728E-06	-.5545E-03
ROW 12	HORZ:	.4250E-05	.4250E-05	.4250E-05	.4250E-05	.4250E-05	.4250E-05	.4242E-05	.1845E-06	.8110E-05
	VERT:	-.2017E-04	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1137E-04	-.4871E-04
ROW 11	HORZ:	.3975E-05	.3975E-05	.3975E-05	.3975E-05	.3975E-05	.3975E-05	.3986E-05	.8265E-05	-.3878E-07
	VERT:	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1137E-04	-.4871E-04	-.1106E-04
ROW 10	HORZ:	.3975E-05	.3975E-05	.3975E-05	.3975E-05	.3975E-05	.3975E-05	.3986E-05	.8265E-05	-.3878E-05
	VERT:	-.2017E-04	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1128E-04	-.9851E-05
ROW 9	HORZ:	.3700E-05	.3700E-05	.3700E-05	.3700E-05	.3700E-05	.3701E-05	.3711E-05	.5845E-05	.1120E-03
	VERT:	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1128E-04	-.9851E-07	-.5451E-03
ROW 8	HORZ:	.3700E-05	.3700E-05	.3700E-05	.3700E-05	.3700E-05	.3701E-05	.3711E-05	.5845E-05	.1120E-03
	VERT:	-.2017E-04	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1123E-04	-.5035E-05
ROW 7	HORZ:	.3425E-05	.3426E-05	.3426E-05	.3426E-05	.3426E-05	.3426E-05	.3426E-05	.3425E-05	.2274E-03
	VERT:	-.1890E-04	-.1763E-04	-.1636E-04	-.1509E-04	-.1382E-04	-.1255E-04	-.1123E-04	-.5035E-07	-.5385E-03
ROW 6	HORZ:	.3425E-03	.3426E-03	.3426E-03	.3426E-03	.3426E-03	.3426E-03	.3426E-03	.3425E-03	.2274E-03
	VERT:	-.2016E-05	-.1889E-05	-.1763E-05	-.1636E-05	-.1509E-05	-.1382E-05	-.1255E-05	-.1124E-05	-.1309E-05
ROW 5	HORZ:	.3425E-03	.3425E-03	.3425E-03	.3425E-03	.3426E-03	.3426E-03	.3426E-03	.3426E-03	.3426E-03
	VERT:	-.1889E-05	-.1763E-05	-.1636E-05	-.1509E-05	-.1382E-05	-.1255E-05	-.1124E-05	-.1309E-05	-.5334E-03
ROW 4	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.1512E-05	-.1417E-05	-.1322E-05	-.1227E-05	-.1131E-05	-.1036E-05	-.9411E-06	-.8429E-06	-.1026E-05
ROW 3	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.1417E-05	-.1322E-05	-.1227E-05	-.1131E-05	-.1036E-05	-.9411E-06	-.8429E-06	-.1026E-05	-.3983E-03

ROW 2	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.5041E-06	-.4723E-06	-.4406E-06	-.4089E-06	-.3772E-06	-.3454E-06	-.3137E-06	-.2810E-06	-.3537E-06
ROW 1	HORZ:	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01	.1370E+01
	VERT:	-.4723E-06	-.4406E-06	-.4089E-06	-.3772E-06	-.3454E-06	-.3137E-06	-.2810E-06	-.3537E-06	-.1323E-03

	COLUMN:	37	38	39	40	41	42	43	44
ROW 32	HORZ:	.2365E+01	.2132E+01	.2093E+01	.2079E+01	.2009E+01	.1579E+01	.1619E+01	.3383E+01
	VERT:	-.3421E-03	-.2515E-02	-.4312E-03	-.1478E-03	-.7576E-03	-.4656E-02	.4358E-03	.1909E-01
ROW 31	HORZ:	.2366E+01	.2131E+01	.2092E+01	.2079E+01	.2012E+01	.1575E+01	.1604E+01	.2801E+01
	VERT:	-.2515E-02	-.4312E-03	-.1478E-03	-.7576E-03	-.4656E-02	.4358E-03	.1909E-01	.7725E+00
ROW 30	HORZ:	.2366E+01	.2131E+01	.2092E+01	.2079E+01	.2012E+01	.1575E+01	.1604E+01	.2801E+01
	VERT:	-.9952E-03	-.7615E-02	-.1263E-02	-.4284E-03	-.2218E-02	-.1412E-01	.1081E-02	.4499E-01
ROW 29	HORZ:	.2372E+01	.2126E+01	.2092E+01	.2081E+01	.2021E+01	.1563E+01	.1570E+01	.2332E+01
	VERT:	-.7615E-02	-.1263E-02	-.4284E-03	-.2218E-02	-.1412E-01	.1081E-02	.4499E-01	.6513E+00
ROW 28	HORZ:	.2372E+01	.2126E+01	.2092E+01	.2081E+01	.2021E+01	.1563E+01	.1570E+01	.2332E+01
	VERT:	-.1553E-02	-.1293E-01	-.2003E-02	-.6651E-03	-.3509E-02	-.2404E-01	.1245E-02	.6148E-01
ROW 27	HORZ:	.2380E+01	.2117E+01	.2091E+01	.2083E+01	.2037E+01	.1543E+01	.1524E+01	.1954E+01
	VERT:	-.1293E-01	-.2003E-02	-.6651E-03	-.3509E-02	-.2404E-01	.1245E-02	.6148E-01	.5503E+00
ROW 26	HORZ:	.2380E+01	.2117E+01	.2091E+01	.2083E+01	.2037E+01	.1543E+01	.1524E+01	.1954E+01
	VERT:	-.1943E-02	-.1862E-01	-.2583E-02	-.8319E-03	-.4504E-02	-.3472E-01	.8251E-03	.7079E-01
ROW 25	HORZ:	.2393E+01	.2105E+01	.2089E+01	.2086E+01	.2060E+01	.1516E+01	.1470E+01	.1649E+01
	VERT:	-.1862E-01	-.2583E-02	-.8319E-03	-.4504E-02	-.3472E-01	.8251E-03	.7079E-01	.4657E+00
ROW 24	HORZ:	.2393E+01	.2105E+01	.2089E+01	.2086E+01	.2060E+01	.1516E+01	.1470E+01	.1649E+01
	VERT:	-.2085E-02	-.2486E-01	-.2923E-02	-.9080E-03	-.5055E-02	-.4650E-01	-.1708E-03	.7468E-01
ROW 23	HORZ:	.2411E+01	.2088E+01	.2088E+01	.2089E+01	.2092E+01	.1480E+01	.1412E+01	.1402E+01
	VERT:	-.2486E-01	-.2923E-02	-.9080E-03	-.5055E-02	-.4650E-01	-.1708E-03	.7468E-01	.3943E+00
ROW 22	HORZ:	.2411E+01	.2088E+01	.2088E+01	.2089E+01	.2092E+01	.1480E+01	.1412E+01	.1402E+01
	VERT:	-.1877E-02	-.3185E-01	-.2931E-02	-.8810E-03	-.4982E-02	-.5975E-01	-.1644E-02	.7446E-01
ROW 21	HORZ:	.2434E+01	.2066E+01	.2086E+01	.2092E+01	.2135E+01	.1435E+01	.1353E+01	.1202E+01
	VERT:	-.3185E-01	-.2931E-02	-.8810E-03	-.4982E-02	-.5975E-01	-.1644E-02	.7446E-01	.3336E+00
ROW 20	HORZ:	.2434E+01	.2066E+01	.2086E+01	.2092E+01	.2135E+01	.1435E+01	.1353E+01	.1202E+01
	VERT:	-.1198E-02	-.3982E-01	-.2488E-02	-.7511E-03	-.4062E-02	-.7489E-01	-.3418E-02	.7119E-01
ROW 19	HORZ:	.2464E+01	.2037E+01	.2085E+01	.2095E+01	.2189E+01	.1380E+01	.1296E+01	.1039E+01
	VERT:	-.3982E-01	-.2488E-02	-.7511E-03	-.4062E-02	-.7489E-01	-.3418E-02	.7119E-01	.2816E+00
ROW 18	HORZ:	.4928E-03	.2037E+01	.2085E+01	.2095E+01	.2189E+01	.1380E+01	.1296E+01	.1039E+01
	VERT:	-.5440E-03	-.4477E-01	-.1451E-02	-.5367E-03	-.2012E-02	-.9241E-01	-.5244E-02	.6564E-01
ROW 17	HORZ:	.3820E-03	.2003E+01	.2084E+01	.2096E+01	.2259E+01	.1313E+01	.1241E+01	.9070E+00
	VERT:	-.3198E-04	-.1451E-02	-.5367E-03	-.2012E-02	-.9241E-01	-.5244E-02	.6564E-01	.2366E+00
ROW 16	HORZ:	.3820E-03	.4007E-03	.4168E-03	.4192E-03	.4519E-03	.1313E+01	.1241E+01	.9070E+00
	VERT:	-.5485E-03	-.7279E-03	-.5774E-03	-.4095E-03	-.2429E-03	-.1768E+00	-.6798E-02	.5842E-01
ROW 15	HORZ:	.4208E-03	.3681E-03	.3805E-03	.3831E-03	.4266E-03	.1181E+01	.1190E+01	.7996E+00
	VERT:	-.7279E-03	-.5774E-03	-.4095E-03	-.2429E-03	-.1263E-03	-.6798E-02	.5842E-01	.1974E+00
ROW 14	HORZ:	.4208E-03	.3681E-03	.3805E-03	.3831E-03	.4266E-03	.1181E+01	.1190E+01	.7996E+00
	VERT:	-.5545E-03	-.7290E-03	-.5771E-03	-.4095E-03	-.2420E-03	-.1257E+00	-.6599E-02	.4996E-01
ROW 13	HORZ:	.4585E-03	.3352E-03	.3442E-03	.3469E-03	.3937E-03	.1089E+01	.1147E+01	.7124E+00
	VERT:	-.7290E-03	-.5771E-03	-.4095E-03	-.2420E-03	-.8980E-04	-.6599E-02	.4996E-01	.1628E+00
ROW 12	HORZ:	.4585E-03	.3352E-03	.3442E-03	.3469E-03	.3937E-03	.8712E+00	.9173E+00	.5699E+00
	VERT:	-.1106E-02	-.7317E-03	-.5769E-03	-.4094E-03	-.2409E-03	-.8341E-01	-.5478E-02	.4151E-01
ROW 11	HORZ:	.3776E-03	.3017E-03	.3080E-03	.3104E-03	.3418E-03	.8703E+00	.9167E+00	.5688E+00
	VERT:	-.7317E-03	-.5769E-03	-.4094E-03	-.2409E-03	-.1192E-05	-.5478E-02	.4151E-01	.1350E+00
ROW 10	HORZ:	.3776E-03	.3017E-03	.3080E-03	.3104E-03	.3418E-03	.8703E+00	.9167E+00	.5688E+00
	VERT:	-.5451E-03	-.7333E-03	-.5768E-03	-.4094E-03	-.2403E-03	-.4575E-01	-.4474E-02	.3398E-01
ROW 9	HORZ:	.4183E-03	.2679E-03	.2718E-03	.2738E-03	.2900E-03	.8698E+00	.9162E+00	.5678E+00
	VERT:	-.7333E-03	-.5768E-03	-.4094E-03	-.2403E-03	-.6536E-06	-.4474E-02	.3398E-01	.1104E+00
ROW 8	HORZ:	.4183E-03	.2679E-03	.2718E-03	.2738E-03	.2900E-03	.8698E+00	.9162E+00	.5678E+00
	VERT:	-.5385E-03	-.7366E-03	-.5767E-03	-.4093E-03	-.2399E-03	-.8121E-02	-.3468E-02	.2644E-01
ROW 7	HORZ:	.4612E-03	.2332E-03	.2355E-03	.2371E-03	.2381E-03	.8697E+00	.9158E+00	.5671E+00
	VERT:	-.7366E-03	-.5767E-03	-.4093E-03	-.2399E-03	-.1160E-06	-.3468E-02	.2644E-01	.8583E-01
ROW 6	HORZ:	.4612E-03	.9330E+00	.9422E+00	.9485E+00	.9522E+00	.8697E+00	.9158E+00	.5671E+00
	VERT:	-.5334E-03	.1870E-01	-.4773E-03	-.3411E-03	-.1992E-03	.4455E-02	-.2470E-02	.1889E-01

ROW 5	HORZ:	.3457E-03	.9332E+00	.9422E+00	.9485E+00	.9522E+00	.8698E+00	.9156E+00	.5666E+00
	VERT:	.2672E-06	-.4773E-03	-.3411E-03	-.1992E-03	.4455E-02	-.2470E-02	.1889E-01	.6128E-01
ROW 4	HORZ:	.1383E+01	.9332E+00	.9422E+00	.9485E+00	.9522E+00	.8698E+00	.9156E+00	.5666E+00
	VERT:	-.3983E-03	.1458E-01	-.2837E-03	-.2047E-03	-.1190E-03	.2672E-02	-.1479E-02	.1134E-01
ROW 3	HORZ:	.1383E+01	.9334E+00	.9422E+00	.9485E+00	.9522E+00	.8698E+00	.9154E+00	.5662E+00
	VERT:	.1458E-01	-.2837E-03	-.2047E-03	-.1190E-03	.2672E-02	-.1479E-02	.1134E-01	.3676E-01
ROW 2	HORZ:	.1383E+01	.9334E+00	.9422E+00	.9485E+00	.9522E+00	.8698E+00	.9154E+00	.5662E+00
	VERT:	-.1323E-03	.4860E-02	-.9412E-04	-.6822E-04	-.3960E-04	.8903E-03	-.4925E-03	.3779E-02
ROW 1	HORZ:	.1383E+01	.9335E+00	.9422E+00	.9485E+00	.9521E+00	.8699E+00	.9154E+00	.5661E+00
	VERT:	.4860E-02	-.9412E-04	-.6822E-04	-.3960E-04	.8903E-03	-.4925E-03	.3779E-02	.1225E-01

TIME FOR PARTICLES TO LEAVE EACH CELL
(ALL VALUES EXPRESSED AS ANTILOG BASE 10)

COLUMN: 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3.5	3.2	3.3	3.0	2.9	3.0	3.0	3.3	3.3	3.2	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.1	3.1	3.2	3.2	3.2	3.2
3.7	3.3	3.6	3.2	2.9	3.0	3.2	3.5	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.2	3.2	3.2	3.2	3.2	3.2
8.5	3.4	3.3	5.4	5.5	2.9	3.3	3.7	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3	3.2	3.2	3.2	3.2	3.2
8.5	3.6	3.2	5.4	5.4	3.0	3.3	3.7	3.6	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3	3.2	3.2	3.2	3.2	3.2
8.5	9.2	3.3	3.4	5.0	5.0	3.3	3.7	3.7	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3	3.2	3.2	3.2	3.2	3.2
8.5	9.2	3.5	3.2	5.0	4.6	4.9	3.5	3.6	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3	3.2	3.2	3.2	3.2	3.2
8.6	9.0	9.4	3.1	5.0	4.6	4.9	3.7	3.6	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3	3.2	3.2	3.2	3.2	3.2
8.6	9.1	9.4	3.4	3.4	4.8	4.5	4.7	5.1	5.4	5.8	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.0	6.9	6.9	9.2	6.9	6.9
8.7	9.1	9.1	9.2	3.2	3.6	4.8	4.7	5.1	5.3	7.2	7.2	7.3	7.5	7.5	7.7	7.8	8.1	8.6	8.9	8.4	7.8	7.1	6.5	6.5
8.8	9.2	9.1	9.3	3.5	3.3	4.8	4.7	5.1	5.3	7.2	7.2	7.3	7.5	7.5	7.7	7.8	8.1	8.6	9.0	8.4	7.8	7.1	6.5	6.5
8.8	9.3	9.2	9.0	9.1	3.3	3.6	5.3	5.1	5.3	7.2	7.2	7.3	7.5	7.5	7.7	7.8	8.1	8.6	9.0	8.4	7.8	7.1	6.5	6.5
8.9	9.3	9.3	9.1	9.1	3.5	3.3	5.3	5.1	5.3	7.2	7.2	7.3	7.5	7.5	7.7	7.8	8.1	8.6	9.0	8.4	7.7	7.1	6.5	6.5
9.0	9.4	9.4	9.3	9.1	9.3	3.1	5.3	5.1	5.4	5.8	7.0	7.7	7.5	7.5	7.7	7.8	8.1	8.6	9.0	8.4	7.7	7.1	6.5	6.5
9.2	9.5	9.4	9.3	9.1	9.3	3.6	3.1	3.1	3.6	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	8.3	7.0	7.0
9.4	9.5	9.4	9.3	9.1	9.3	9.0	8.7	8.7	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	2.4	3.4	3.4
9.7	9.5	9.4	9.3	9.1	9.3	9.3	8.7	8.7	3.6	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	2.4	3.4	3.4

COLUMN: 26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.3	3.3	2.3
3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.3	3.3	2.3
3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.3	3.4	2.4
3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.4	3.3	2.4
3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.4	3.3	2.5
3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.4	3.3	2.6
3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.3	3.3	2.6
6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.6	5.4	5.4	3.2	3.2	3.2	3.2	3.2	3.4	2.7
6.5	6.6	6.6	6.6	6.6	6.7	6.7	6.8	6.8	7.1	5.4	5.1	5.1	5.2	5.4	5.6	2.9	3.5	2.8
6.5	6.6	6.6	6.6	6.6	6.7	6.7	6.8	6.8	7.1	5.4	5.1	5.1	5.2	5.4	5.7	3.1	3.5	2.8
6.5	6.6	6.6	6.6	6.6	6.7	6.7	6.8	6.8	6.4	6.4	4.9	5.1	5.2	5.4	5.8	3.2	3.6	2.9
6.5	6.6	6.6	6.6	6.6	6.7	6.7	6.8	6.8	7.1	5.4	5.1	5.1	5.2	5.4	5.8	3.5	3.6	3.0
6.5	6.6	6.6	6.6	6.6	6.7	6.7	6.8	6.8	7.1	5.4	5.1	5.1	5.2	5.4	5.8	3.6	3.6	3.1
7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	5.4	5.4	3.6	3.6	3.6	3.6	3.6	3.6	3.3
3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.5
3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.8

**** BEGIN MASS TRANSPORT SIMULATION ****

ELASPED TIME IN YEARS: 250000.00
ELAPSED TIME IN DAYS: 91250000.00

TOTAL NUMBER OF PARTICLES ADDED: 500

100 PARTICLES ADDED AT ROW 6, COLUMN 16

DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES

48 OUT OF 500 PARTICLES HAVE LEFT THE CONFINING BED
0 OUT OF 500 PARTICLES HAVE LEFT THE FLOW SYSTEM

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	38	3	0	0	0	0	0	0
0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 250000.00
ELAPSED TIME IN DAYS: 91250000.00

DISTRIBUTION OF REFERENCE PARTICLES

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	12	60	162	157	50	0	0	0	0	0	0	0	0
0	0	0	0	1	1	6	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 250000.00
ELAPSED TIME IN DAYS: 91250000.00

CONCENTRATION DISTRIBUTION (mg/L)

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.57	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	6.79	33.97	91.71	88.88	28.31	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.57	.57	3.40	1.13	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

ELAPSED TIME IN YEARS: 500000.00
ELAPSED TIME IN DAYS: 182500000.00

TOTAL NUMBER OF PARTICLES ADDED: 1000

100 PARTICLES ADDED AT ROW 6, COLUMN 16

DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES

251 OUT OF 1000 PARTICLES HAVE LEFT THE CONFINING BED
0 OUT OF 1000 PARTICLES HAVE LEFT THE FLOW SYSTEM

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	7	1	0	0	0	0	0	0
0	0	14	0	0	0	0	0	183	24	0	0	0	0	0	0
0	0	0	0	0	0	0	0	16	6	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 500000.00
ELAPSED TIME IN DAYS: 182500000.00

DISTRIBUTION OF REFERENCE PARTICLES

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	2	2	1	4	0	0	0	0	0	0	0	0
0	0	0	27	103	231	236	110	0	0	0	0	0	0	0	0
0	0	0	1	3	8	10	11	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 500000.00
ELAPSED TIME IN DAYS: 182500000.00

CONCENTRATION DISTRIBUTION (mg/L)

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	1.13	1.13	.57	2.26	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	15.29	58.31	130.78	133.61	62.27	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.57	1.70	4.53	5.66	6.23	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

ELASPED TIME IN YEARS: 750000.10
ELAPSED TIME IN DAYS: 273750000.00

TOTAL NUMBER OF PARTICLES ADDED: 1500

100 PARTICLES ADDED AT ROW 6. COLUMN 16

DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES

564 OUT OF 1500 PARTICLES HAVE LEFT THE CONFINING BED
0 OUT OF 1500 PARTICLES HAVE LEFT THE FLOW SYSTEM

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	12	8	0	0	0	0	0	0
0	0	39	0	0	0	0	0	404	47	0	0	0	0	0	0
0	1	0	0	0	0	0	0	43	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 750000.10
ELAPSED TIME IN DAYS: 273750000.00

DISTRIBUTION OF REFERENCE PARTICLES

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0
0	0	0	26	145	256	295	160	0	0	0	0	0	0	0	0
0	0	0	0	5	9	17	16	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 750000.10
ELAPSED TIME IN DAYS: 273750000.00

CONCENTRATION DISTRIBUTION (mg/L)

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.57	3.40	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	14.72	82.09	144.93	167.01	90.58	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	2.83	5.10	9.62	9.06	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

.00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00

ELASPED TIME IN YEARS: 999999.80
ELAPSED TIME IN DAYS: 364999900.00

TOTAL NUMBER OF PARTICLES ADDED: 2000

100 PARTICLES ADDED AT ROW 6. COLUMN 16

DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES

962 OUT OF 2000 PARTICLES HAVE LEFT THE CONFINING BED
0 OUT OF 2000 PARTICLES HAVE LEFT THE FLOW SYSTEM

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	22	11	0	0	0	0	0	0
0	1	72	0	0	0	0	0	678	73	0	0	0	0	0	0
0	1	2	0	0	0	0	0	86	15	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 999999.80
ELAPSED TIME IN DAYS: 364999900.00

DISTRIBUTION OF REFERENCE PARTICLES

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0
0	0	0	24	158	316	300	182	0	0	0	0	0	0	0	0
0	0	0	0	4	11	18	21	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 999999.80
ELAPSED TIME IN DAYS: 364999900.00

CONCENTRATION DISTRIBUTION (mg/L)

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.57	.00	1.70	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	13.59	89.45	178.90	169.84	103.04	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	2.26	6.23	10.19	11.89	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

ELASPED TIME IN YEARS: 1250000.00
ELAPSED TIME IN DAYS: 456249900.00

TOTAL NUMBER OF PARTICLES ADDED: 2500

100 PARTICLES ADDED AT ROW 6, COLUMN 16

DISTRIBUTION OF NON-MOVING REFERENCE PARTICLES

1422 OUT OF 2500 PARTICLES HAVE LEFT THE CONFINING BED
0 OUT OF 2500 PARTICLES HAVE LEFT THE FLOW SYSTEM

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	2	0	0	0	0	0	28	16	0	0	0	0	0	0
0	3	110	0	0	0	0	0	998	112	0	0	0	0	0	0
0	1	4	0	0	0	0	0	128	20	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 1250000.00
ELAPSED TIME IN DAYS: 456249900.00

DISTRIBUTION OF REFERENCE PARTICLES

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	2	5	1	0	0	0	0	0	0	0	0
0	0	0	43	132	326	316	192	0	0	0	0	0	0	0	0
0	0	0	3	5	15	17	21	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ELASPED TIME IN YEARS: 1250000.00
ELAPSED TIME IN DAYS: 456249900.00

CONCENTRATION DISTRIBUTION (mg/L)

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	1.13	2.83	.57	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	24.34	74.73	184.56	178.90	108.70	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	1.70	2.83	8.49	9.62	11.89	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PRINTED IN CANADA ON RECYCLED PAPER
IMPRIMÉ AU CANADA SUR DU PAPIER RECYCLÉ

National Water Research Institute
Environment Canada
Canada Centre for Inland Waters
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario
L7R 4A6 Canada

National Hydrology Research Centre
11 Innovation Boulevard
Saskatoon, Saskatchewan
S7N 3H5 Canada

NATIONAL WATER RESEARCH INSTITUTE
INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Institut national de recherche sur les eaux
Environnement Canada
Centre canadien des eaux intérieures
Case postale 5050
867, chemin Lakeshore
Burlington, Ontario
L7R 4A6 Canada

Centre national de recherche en hydrologie
11, boul. Innovation
Saskatoon, Saskatchewan
S7N 3H5 Canada

Environment Canada Environnement Canada

Canada