UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HYDROGEOLOGY OF WELL-FIELD AREAS NEAR TAMPA, FLORIDA, PHASE 1—DEVELOPMENT AND DOCUMENTATION OF A TWO-DIMENSIONAL FINITE-DIFFERENCE MODEL FOR SIMULATION OF STEADY-STATE GROUND-WATER FLOW

OPEN-FILE REPORT 81-630

Prepared in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

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By C. B. Hutchinson, D. M. Johnson, and J. M. Gerhart

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1981

UNITED STATES DEPARTMENT OF THE INTERIOR

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ABBREVIATIONS AND CONVERSION FACTORS

Factors for converting inch-pound units to International System (SI) units and abbreviation of units

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow	
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m^3/s)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
	Transmissivity	
foot squared per day (ft^2/d)	0.09290	meter squared per day (m^2/d)
	Hydraulic conductivity	
foot per day (ft/d)	0.3048	meter per day (m/d)
	Leakance	
gallon per day per cubic foot [$(gal/d)/ft^3$]	0.1337	meter per day per meter [(m/d)/m]
foot per day per foot [(ft/d)/ft]	1.000	meter per day per meter [(m/d)/m]

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

National Geodetic Vertical Datum of 1929 (NGVD of 1929).--A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "mean sea level."

EXPLANATION OF UNITS

Ground-water term		Original form		Reduced form
Transmissivity, T	=	$(m^3/d)/m$	=	m^2/d
	=	$(ft^3/d)/ft$	=	ft^2/d
	=	$(gal/d)/ft$	=	---
Hydraulic conductivity, K	=	$(m^3/d)/m^2$	=	m/d
	=	$(ft^3/d)ft^2$	=	ft/d
	=	$(gal/d)/ft^2$	=	---
Leakance coefficient, K/b	=	$[(m^3/d)/m^2]/m$	=	m/d/m
	=	$[(ft^3/d)/ft^2]/ft$	=	ft/d/ft
	=	$(gal/d)ft^3$	=	---

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ABSTRACT

A two-dimensional finite-difference model was developed for simulation of steady-state ground-water flow in the Floridan aquifer throughout a 932-square-mile area, which contains nine municipal well fields. The overlying surficial aquifer contains a constant-head water table and is coupled to the Floridan aquifer by a leakage term that represents flow through a confining layer separating the two aquifers. Under the steady-state condition, all storage terms are set to zero. Utilization of the head-controlled flux condition allows head and flow to vary at the model-grid boundaries.

Procedures are described to calibrate the model, test its sensitivity to input-parameter errors, and verify its accuracy for predictive purposes. Also included are attachments that describe setting up and running the model. An example model-interrogation run shows anticipated drawdowns that should result from pumping at the newly constructed Cross Bar Ranch and Morris Bridge well fields.

INTRODUCTION

At least nine municipal well fields have been established or are planned for a 932-mi^2 area north of Tampa, Fla. The well fields are permitted for a combined average withdrawal rate of 178 Mgal/d (Southwest Florida Water Management District, written commun., 1980). In addition, several well fields for large housing subdivisions are being developed or planned. Ground-water withdrawals from the Floridan aquifer in this area may eventually total several hundred million gallons per day.

A ground-water flow model that encompasses the well-field areas is needed to gain an understanding of the hydrology of the area and to facilitate planning for the efficient utilization of water resources while conserving the environment. The model may be interrogated under various water-management alternatives to minimize adverse impacts of pumping, such as excessive drawdown or saltwater encroachment.

The objective of this investigation is to evaluate the hydrogeology of an area encompassing the major well-fields north of Tampa through development of a finite-difference digital ground-water model. The project includes two phases:

1. Develop and document a steady-state model with two-dimensional flow in one active layer.
2. Develop and document a steady-state model with two-dimensional flow in two active layers. The Phase 1 model will be used as a working base.

This report describes Phase 1 and is intended as a guide for using the two-dimensional model. The aquifer system north of Tampa was conceptualized and formulated in the hydrologic model. The computer program and its application to the practical problem are described. The applicability of the model to the field problem is demonstrated through an interrogation run.

The documentation assumes that the reader is familiar with the physics of ground-water flow, numerical methods of solving partial-differential equations, and the FORTRAN IV computer language. It was prepared as part of the hydrogeologic investigation made by the U.S. Geological Survey in cooperation with the Southwest Florida Water Management District.

MODELING INVESTIGATIONS

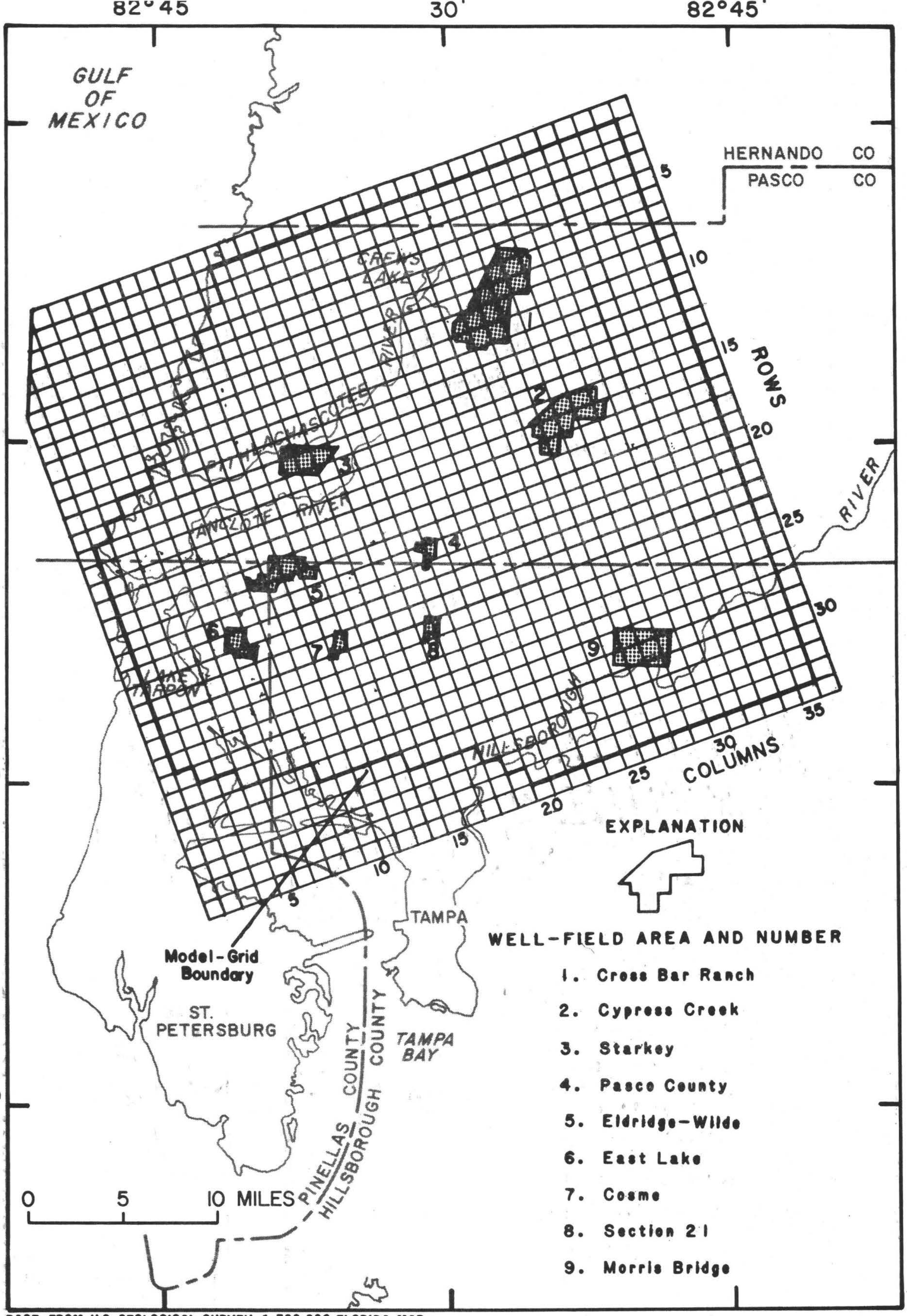
Numerous ground-water flow models of the Floridan aquifer have been or are being constructed, which include all or some of the well-field areas north of Tampa. Robertson and Mallory (1977) constructed a regional model for an 875-mi^2 area that included eight major well fields. Individual well-field models have been constructed for Cypress Creek (Seaburn and Robertson, Inc., 1977; Ryder, 1978), Morris Bridge (Ryder and others, 1980), and Cross Bar Ranch (Leggette, Brashears, and Graham, Inc., 1979) well fields. A well-field model is being constructed by the U.S. Geological Survey for Cross Bar Ranch (D. M. Johnson, U.S. Geological Survey, oral commun., 1980). A coarsely-gridded regional model, covering an area of about 10,000 mi^2 and including the Southwest Florida Water Management District, is currently under construction by the U.S. Geological Survey (P. D. Ryder, U.S. Geological Survey, oral commun., 1980). All of the above modeling reports give detailed information concerning the hydrogeology of the area.

The model documented herein expands the Robertson and Mallory model area, includes subsequent aquifer-test results, and incorporates information from the individual well-field models. The model grid is alined with the coarsely-gridded regional model so that they may be easily interfaced.

HYDROLOGIC MODEL

Description

The modeled area and its relation to the nine municipal well fields are shown in figure 1. The hydrogeologic setting is one of a coastal, karstic environment with the general direction of ground-water movement being west



BASE FROM U.S. GEOLOGICAL SURVEY 1:500,000 FLORIDA MAP

Figure 1.--Model grid and well-field areas near Tampa.

toward the Gulf of Mexico and south toward Tampa Bay. The regional flow regime is modified by pumpage from the well-field areas and ground-water discharge to the stream network.

The model grid comprises an orthogonal array of 34 horizontal rows and 36 vertical columns with each grid being 1 mile square. Along the gulf and Tampa Bay coasts, the grid is modified to generally follow the contour of the shoreline. The head-controlled flux condition, utilized by Wilson and Gerhart (1980) and Ryder and others (1980), combines features of the constant-head and constant-flux conditions and allows both head and flow to vary at the model-grid boundaries. Under the steady-state condition, storage changes are not considered and all storage terms are set to zero.

A generalized conceptual model of the hydrogeologic system is shown schematically in figure 2. The Floridan aquifer is the principal source of ground-water supply in the area. It is confined on the top and bottom and is overlain by the unconfined surficial aquifer. The hydrologic model assumes that:

1. Ground-water movement in the Floridan aquifer is horizontal.
2. Water moves vertically into or out of the Floridan aquifer through the upper confining bed.
3. The confining layers have negligible storage.
4. Changes in ground-water storage in the Floridan aquifer occur instantaneously with changes in hydraulic head.
5. Physical parameters of the system do not change with time.
6. The head in the surficial aquifer, water levels in lakes, and streamflows do not change in response to any imposed stress.
7. Head changes in the Floridan aquifer caused by an imposed stress will eventually stabilize; that is, a condition of steady state will be reached.
8. Head-controlled flux conditions accurately represent the hydrologic conditions of the aquifer near the model-grid boundary.
9. Recharge occurs instantaneously.
10. Movement of the saltwater-freshwater interface has little or no effect on computed heads.

The mathematical model of the hydrologic system is based on the governing equations of ground-water flow that are approximated numerically by a finite-difference method. The resulting system of simultaneous equations is solved by the strongly implicit procedure.

Input Parameters

Input parameters to the steady-state model included pumpage, water-table altitude, aquifer transmissivity, leakance coefficient of the upper confining bed, potentiometric-surface altitude, and distance to the head-controlled flux boundary. Ranges for the input parameters are presented in table 1.

The time period selected for the steady-state calibration was September 1976-May 1977. Since 1971 the U.S. Geological Survey has prepared potentio-

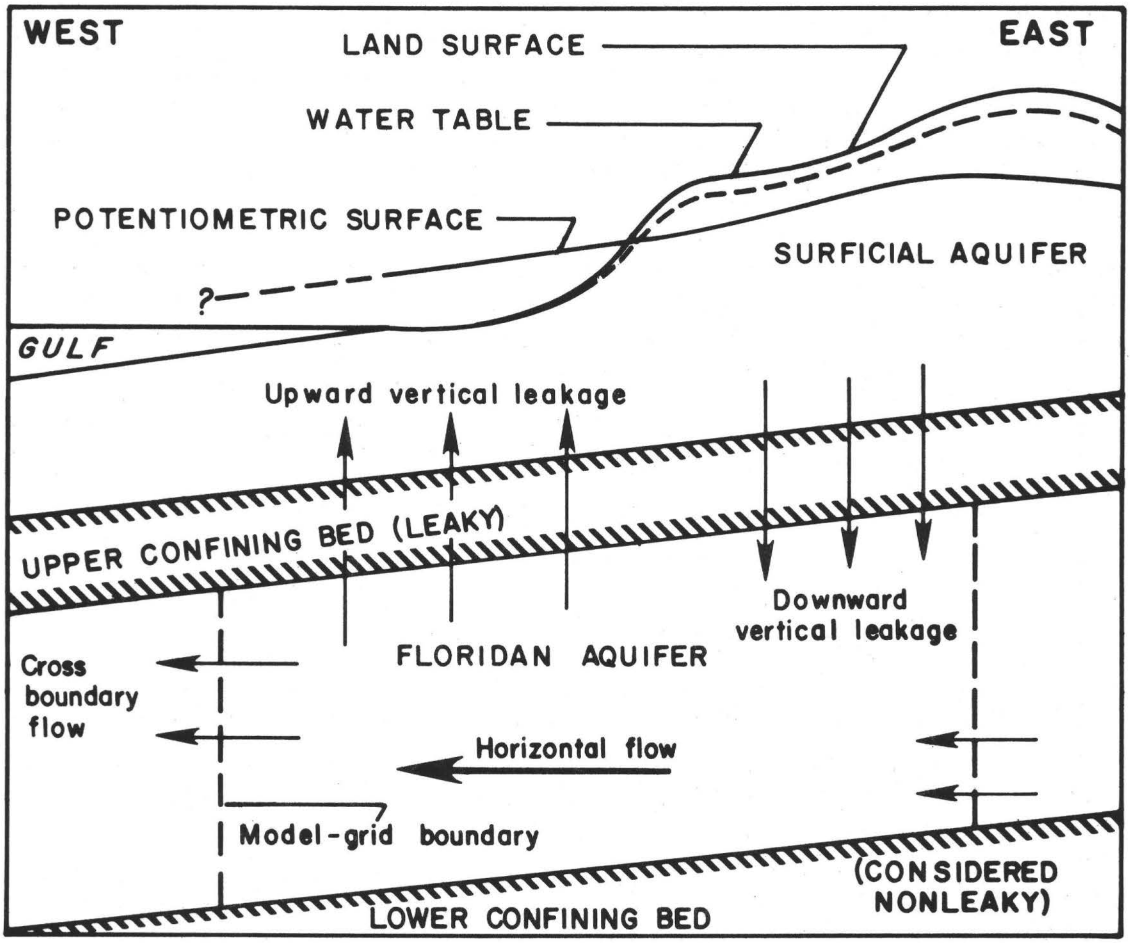


Figure 2.--Generalized conceptual model of the hydrogeologic system (from Wilson and Gerhart, 1980).

Table 1.--Ranges for input parameters to the model

Parameter	Range	Source of data
Nodal pumpage	0-9,600,000 gal/d	SWFWMD water-use permits and pumping reports
Total pumpage	133,670,000 gal/d	
Water-table altitude	0-160 ft	Ryder and Mills (1977a,b)
Transmissivity	50,000-5,000,000 ft^2/d	Wolansky and Corral (personal commun., 1980)
Leakance coefficient	0.00003-0.0009 (ft/d)/ft	Wolansky and Corral (personal commun., 1980)
Potentiometric-surface altitude	0.5-92 ft	Ryder and Mills (1977a,b)
Distance to HCF boundary	1-5 mi	
Storage coefficient	0	

Table 2.--Average pumpage from the Floridan aquifer, September 1976-May 1977

Use	Mgal/d	ft^3/s
Municipal 1/	86.85	134.45
Misc. municipal and treatment 2/	11.45	17.73
Citrus irrigation 3/	23.88	36.96
Misc. crop, pasture, and lake augmentation 4/	11.49	17.78
Total	133.67	206.92

1/ Obtained from pumping records on file at SWFWMD

2/ Computed as 75 percent of the daily pumpage permitted by SWFWMD

3/ Computed by the method outlined in University of Florida, Institute of Food and Agricultural Sciences (1977), using a 75 percent seepage efficiency.

4/ Computed as 50 percent of the daily pumpage permitted by SWFWMD metric-surface maps of the well-field areas for each May and September, representing seasonal low and high water-level periods, respectively. These maps may be considered to represent steady-state levels of the potentiometric surface at the trough and peak of an annual hydrograph. The average potentiometric surface, derived from the two maps for input to the model, was considered to represent the long-term average steady-state potentiometric surface. Of the available maps, those produced for September 1976 and May 1977 (Ryder and Mills, 1977a,b) were considered to be the two consecutive maps with the most up-to-date data control under near-average climatic conditions.

Average withdrawals from the Floridan aquifer for the period September 1976-May 1977 were estimated from records of the Southwest Florida Water Management District. These included withdrawals for municipal supply, miscellaneous municipal supply and treatment, citrus irrigation, and miscellaneous crop, pasture, and lake augmentation (table 2). The distribution of pumpage as input to the model is shown in figure 3. Pumping is distributed mainly along the Gulf of Mexico coast and in the southern part of the modeled area, with the largest withdrawals occurring in the well-field areas.

The water table in the surficial aquifer was estimated from actual measurements in nodes containing wells and was assumed to be at or a few feet below land surface in swampy areas, coastal areas, river flood plains, and near lakes; depths greater than 5 feet below land surface were assumed for sand-ridge areas (fig. 4). The water table lies at or below the potentiometric surface over a 184 mi^2 area (20 percent of the modeled area), indicating that upward flow from the Floridan aquifer to the surficial aquifer occurs primarily in coastal areas and river flood plains.

Aquifer transmissivity and confining bed leakance coefficient were based on analyses of aquifer-test data from the well-field areas (R. M. Wolansky and M. A. Corral, oral commun., 1980). The maps of transmissivity (fig. 5) and confining bed leakance (fig. 6) represent the final products of the calibration process. Values shown on those maps were used as input to the calibrated steady-state model.

Calibration Procedure

The model was calibrated by methodically adjusting various aquifer parameters until simulated heads matched the September 1976-May 1977 average potentiometric surface, which was considered to represent an actual steady-state condition. Error limits for the calibration were arbitrarily set at ± 5 feet.

Once the simulated potentiometric surface matched the actual potentiometric surface within the error limits, the model was considered to be calibrated. Throughout the 932 nodes within the model-grid boundary, the simulated potentiometric surface ranged from +5.0 feet above to -4.9 feet below the actual steady-state potentiometric surface, with a mean of -0.35 foot. The standard deviation of the residuals was ± 1.8 feet, which indicates that the simulated and actual potentiometric surfaces matched within this range at about 68 percent of the nodes. The correlation coefficient was 0.997, which indicates a near-perfect association between the two surfaces. Comparison between actual and model-simulated potentiometric surfaces representing steady-state calibration is shown in figure 7.

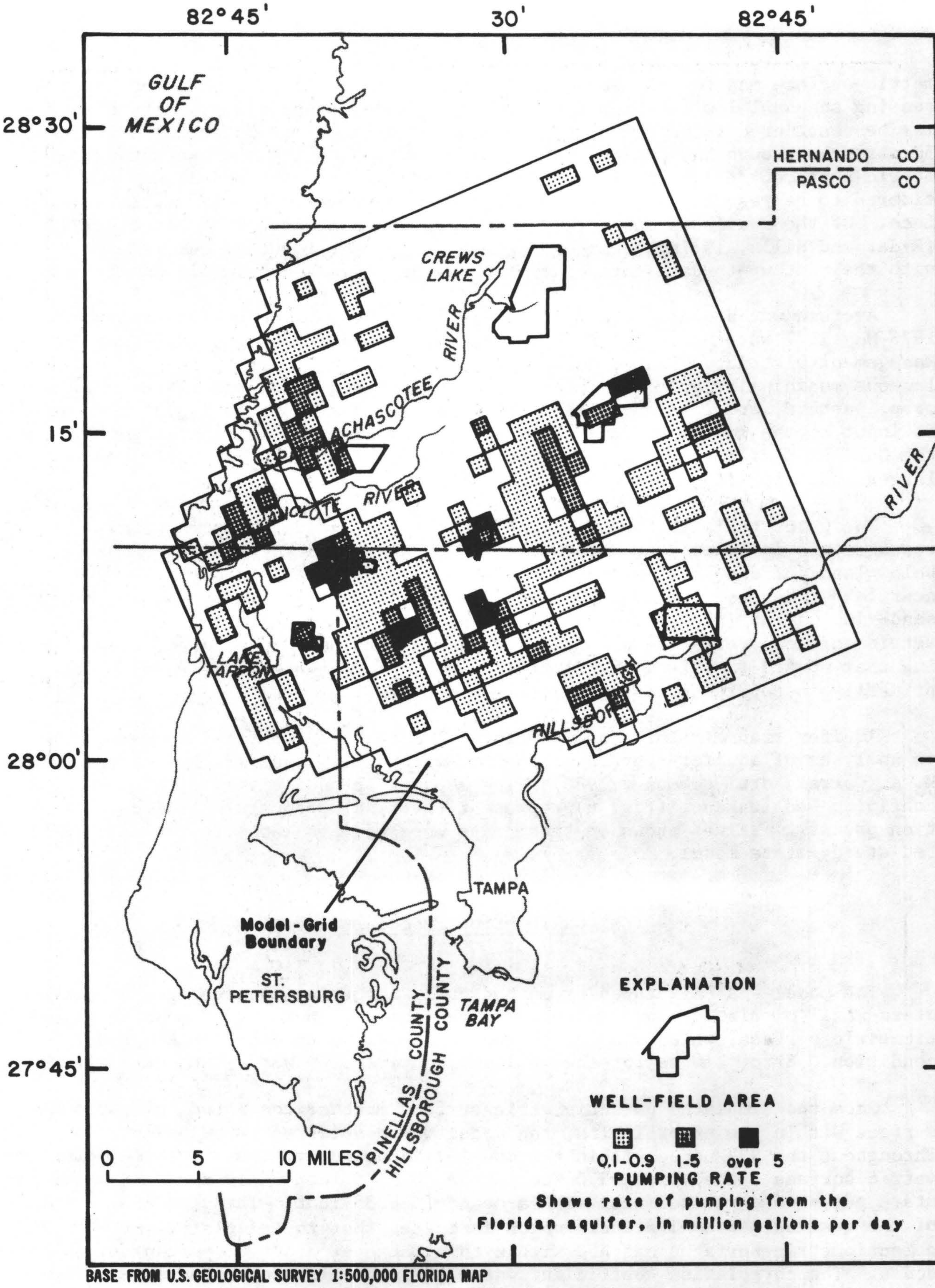


Figure 3.--Distribution of pumpage in the modeled area.

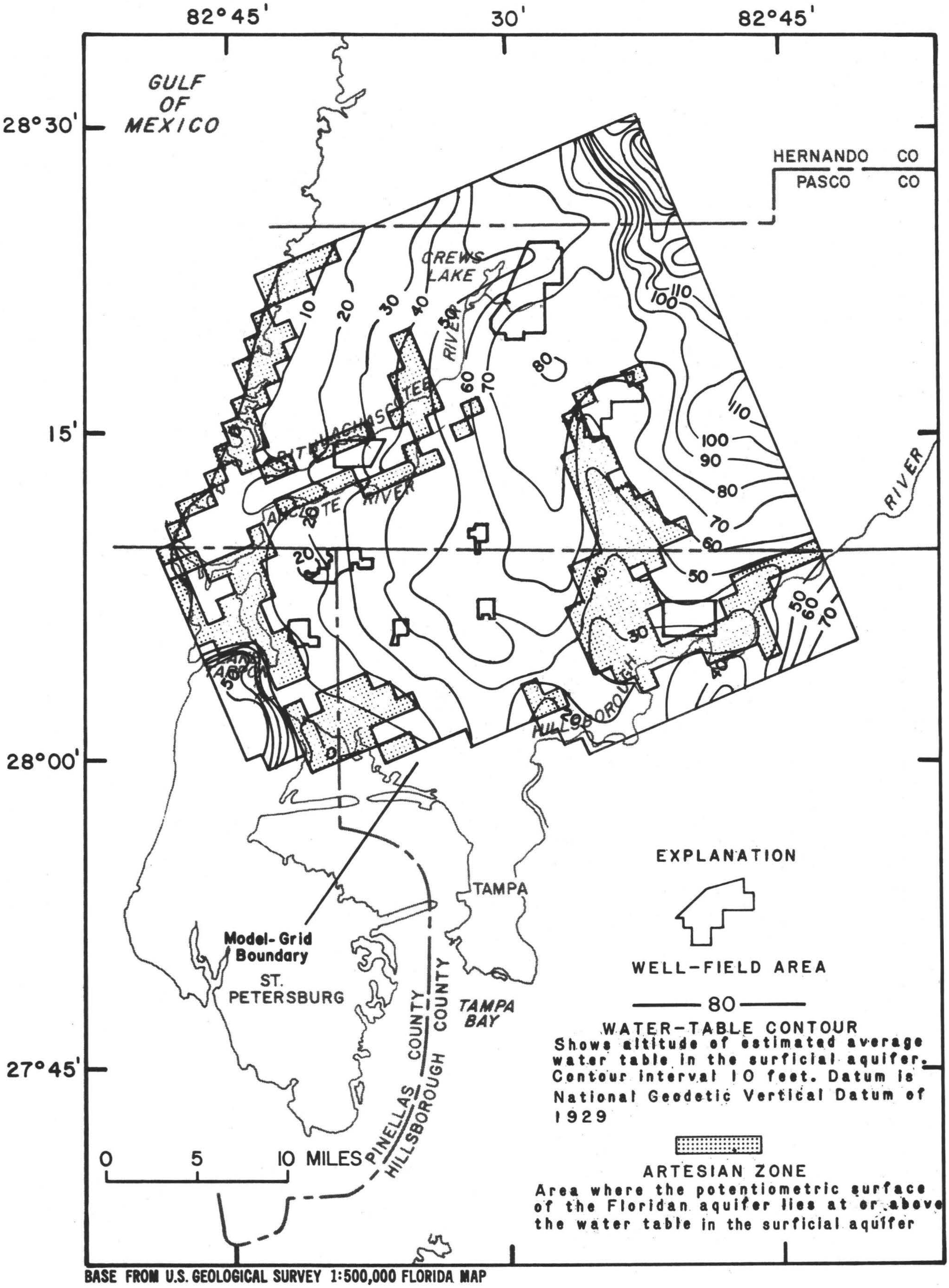
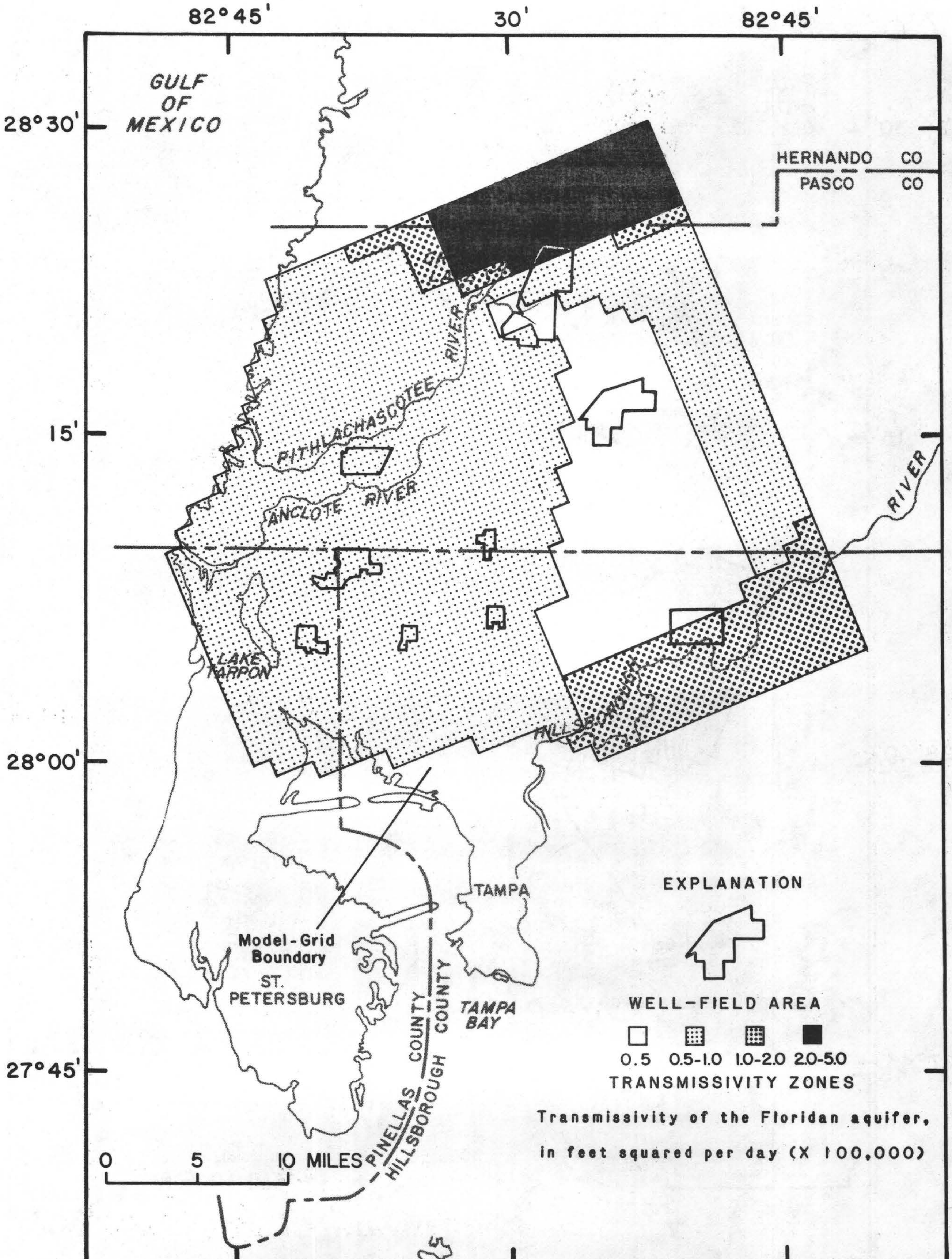


Figure 4.--Water table in the surficial aquifer and modeled artesian zones.



BASE FROM U.S. GEOLOGICAL SURVEY 1:500,000 FLORIDA MAP

Figure 5.--Transmissivity of the Floridan aquifer, as used in the model.

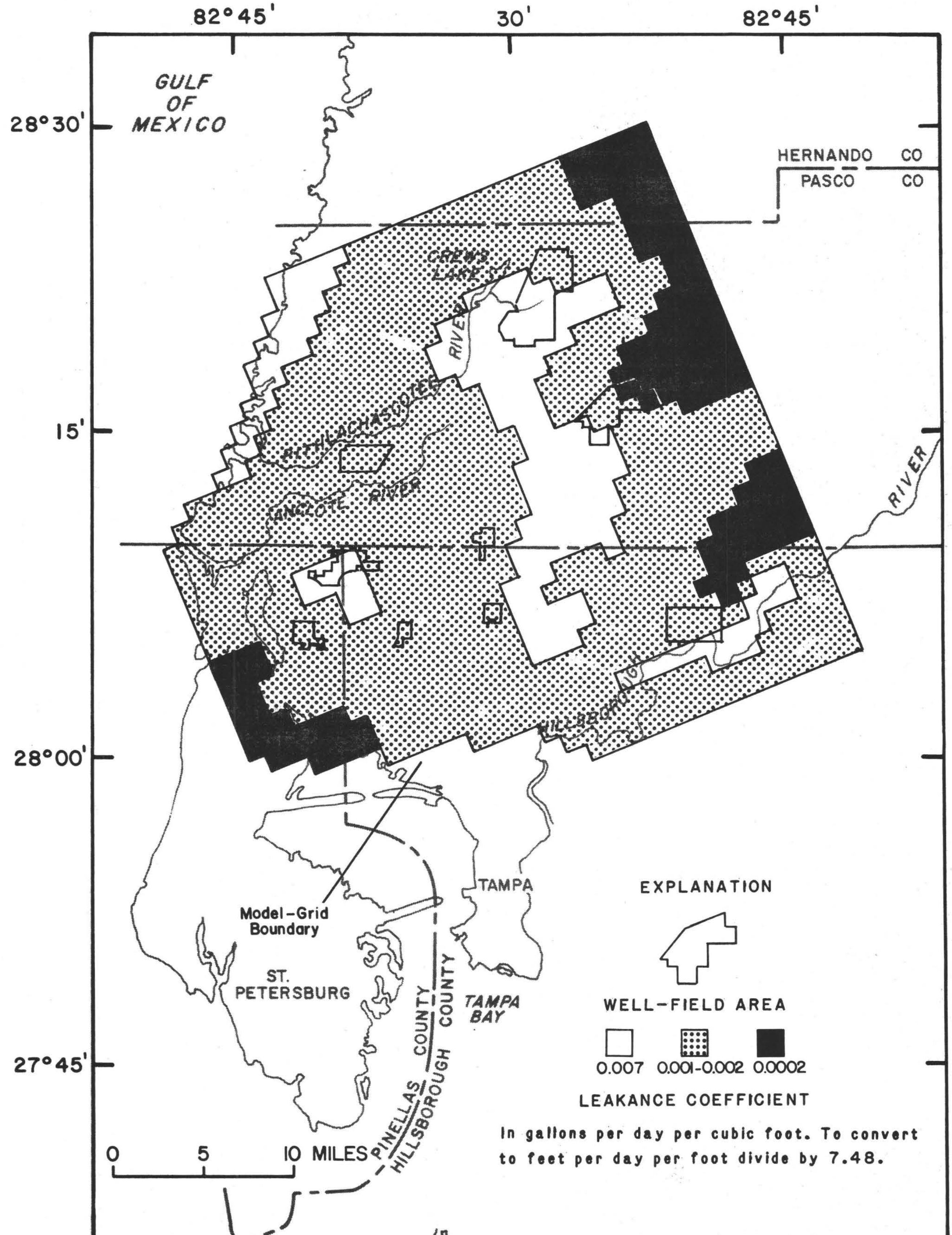


Figure 6.--Leakance coefficient of the upper confining bed, as used in the model.

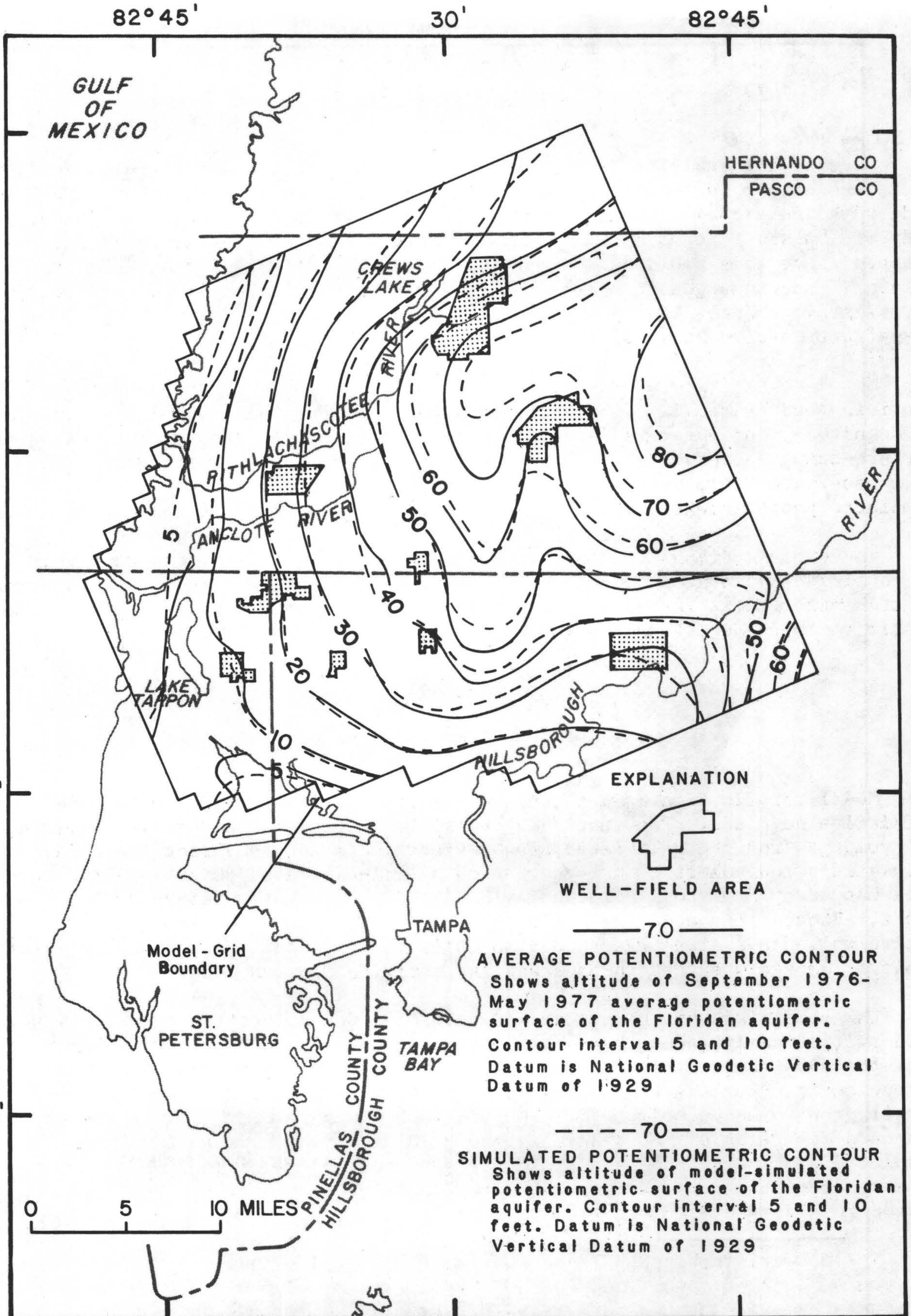


Figure 7.--Comparison of September 1976-May 1977 average and model-simulate potentiometric surfaces, representing steady-state calibration.

Sensitivity Analysis

Sensitivity analysis is a modeling approach that tests the model sensitivity to errors in the input parameters. Separate model simulations are made with individual parameters varied in turn over the tolerance to which they are known. The model was not recalibrated each time parameter values were changed since this would be impractical in terms of time and cost. Exact values of head changes from sensitivity analyses should be viewed critically, but relative changes can provide insight as to the manner in which any parameter may affect results of model simulation.

Model sensitivity was tested by varying transmissivity by ±50 percent, confining bed hydraulic conductivity (leakance coefficient) by ±1/2 an order of magnitude, and water-table altitude by ±5 feet. The effects on potentiometric-surface changes caused by the variations, using the steady-state calibration as a base, are shown in figure 8. The cross sections depict the model-simulated potentiometric surface along rows 10, 20, and 30 of the model.

The cross sections indicate that the model is more sensitive to errors in confining bed hydraulic conductivity and water-table altitude than to errors in transmissivity. The central part of the modeled area is apparently the most sensitive to these errors.

Model Verification

Model verification is a technique for testing the accuracy of a model for predictive purposes. The test case chosen for verification involved removing all pumpage from the calibrated steady-state model and comparing the model-simulated potentiometric surface with an actual-estimated potentiometric surface mapped by Johnston and others (1980) that represents predevelopment conditions. Because the model is a single-layered one, the water table in the active well-field areas was raised manually to represent the prepumping water table. Pumpage was then removed and the verification run made.

The comparison of the actual and simulated potentiometric surfaces was good statistically, thus the model is considered to be adequately verified. Over the 932 nodes within the model-grid boundary the simulated prepumping potentiometric surface ranged from +8.1 feet above to -10.8 feet below the actual prepumping potentiometric surface with a mean of -0.4 foot. The standard deviation of the residuals was ±3.0 feet, which indicates that the simulated and actual potentiometric surfaces matched within this range at about 68 percent of the nodes. The correlation coefficient is 0.991, which indicates a good relation between the two surfaces.

The comparison between the actual and simulated potentiometric surfaces for predevelopment conditions is shown in figure 9. The wide range in model residuals between the two surfaces (+8.1 to -10.8 feet) may be due to several

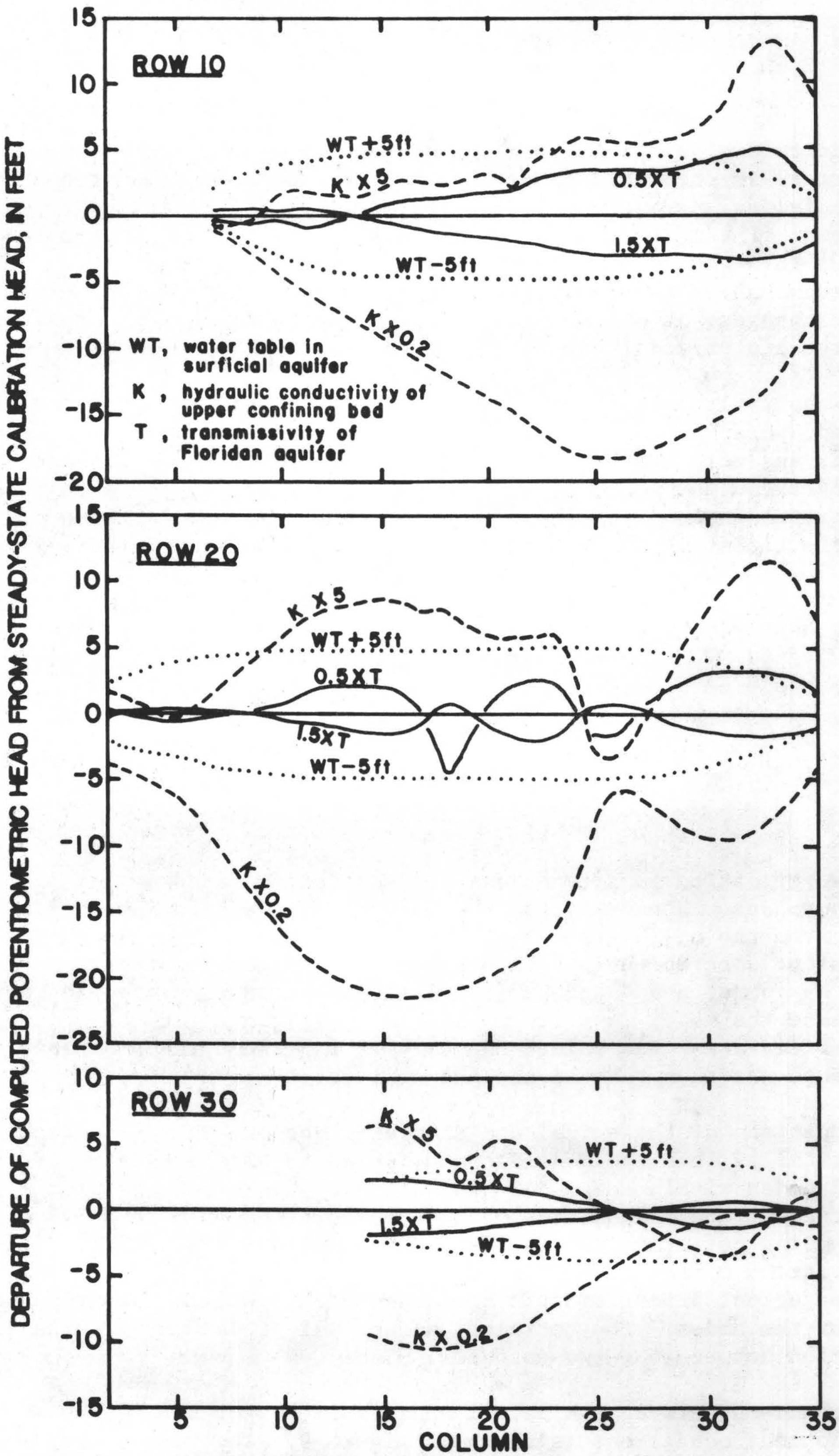


Figure 8.--Effects of varying input parameters on the steady-state calibration.

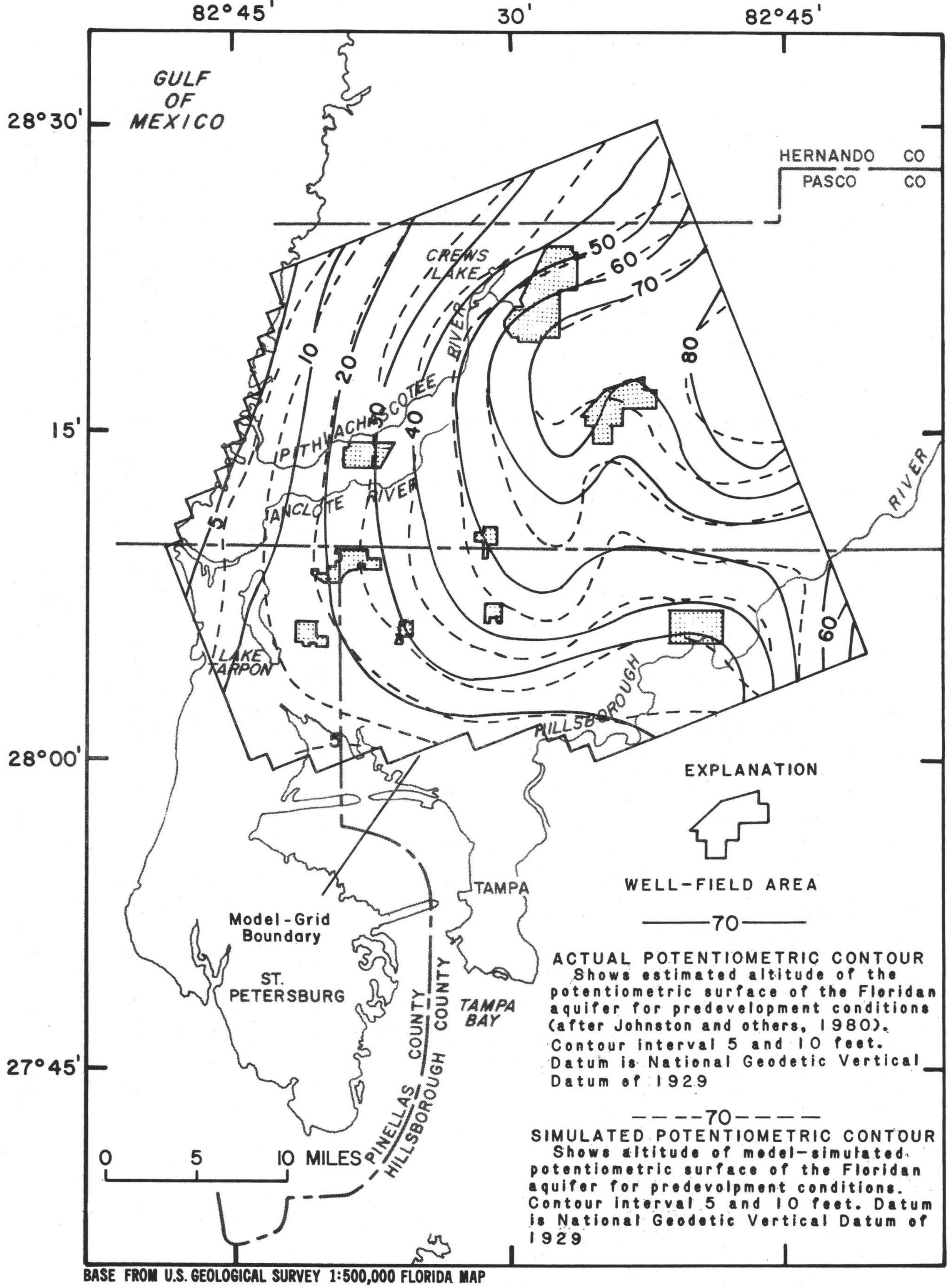


Figure 9.--Comparison of actual-estimated and model-simulated potentiometric surfaces for predevelopment conditions, representing model verification.

factors. For example, the map of the estimated potentiometric surface may be in error where data are sparse and specifically in areas where the predevelopment head is below the average steady-state head. Errors could be greater along the coasts of the Gulf of Mexico and Tampa Bay where upwelling of freshwater results in vertical flow in the aquifer and where channelization may have changed the hydraulic properties of the upper confining bed between the times represented by the predevelopment and September 1976-May 1977 average maps. Although these errors do not represent model-calibration errors, they serve to weaken the statistics of the model verification. The potentiometric surface simulated by the verification run was used as the predevelopment starting head upon which predictive model runs are based.

COMPUTER PROGRAM

The computer program documented here is written for the AMDAHL[1] 470-V6 system installed at the U.S. Geological Survey office in Reston, Va. The basic program is presented in Trescott and others (1976). It was modified by Wilson and Gerhart (1980) to include the head-controlled flux condition, and a version of that program is utilized herein. A complete listing of the computer program is presented in attachment A.

Memory requirements and running time depend upon the size and complexity of the physical situation being simulated. For the field application documented herein, which utilized 1,224 nodes, an average model run required 148 K bytes of core memory on the FORTRAN G, LEVEL 21 compiler, 750 K bytes for executing the program, and about 1 minute of Central Processing Unit time on the Geological Survey's computer.

HEAD-CONTROLLED FLUX CONDITION

Theory

In a recent modeling investigation (Wilson and Gerhart, 1980), a head-controlled flux (HCF) condition was introduced. The HCF condition allows both head and flux to change at the model-grid boundary, thus adding flexibility to the two-dimensional model (Trescott and others, 1976), which previously incorporated only constant-head and constant-flux conditions. Under this condition, flow across the model-grid boundary varies as a function of the potentiometric head at the HCF node.

The HCF condition is useful in certain situations where simulated stresses spread to a model boundary (thus rendering constant head or constant flux unrealistic), and it is undesirable to increase the size of the modeled area by

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[1]The use of brand names in this report is for identification purposes only and does not imply endorsment by the U.S. Geological Survey.

expanding the grid to a point where stress effects are negligible. Although the physical boundaries of the model grid remain stable, the HCF condition calculates a boundary-flow component based on a strip of aquifer as wide as the HCF node edge and extending laterally a specified distance to a point of constant head. Thus, the HCF condition does not expand the model boundary or the grid upon which numerical solutions to the flow equation are calculated.

Figure 10 is a conceptualization of the HCF condition. The assumptions are made that (1) there is a point beyond the model grid (at distance L) where the potentiometric surface (h) will remain constant and is the same as the water-table head (H) and (2) the transmissivity (T), confining-bed leakance (K/b), and water-table head (H) are constant in the aquifer strip between the model-grid boundary and the constant-head boundary. The assumptions allow reasonable finite boundaries to be placed on extensive aquifer systems that lack natural hydrologic boundaries.

Equations solving for boundary discharge under the HCF condition were developed at the U.S. Geological Survey's Northeast Region Research Project Offices (J. V. Tracy, written commun., 1979). The governing equation for steady flow in the region $0 \leq x \leq L$ outside the modeled area is:

$$T \frac{\partial^2 h}{\partial x^2} - \frac{K}{b}(h-H) = 0 \qquad (1)$$

where: h = altitude of the potentiometric surface;
H = altitude of the water table;
K/b = confining-bed leakance;
T = transmissivity.

Under the assumption that the water table is constant in the aquifer strip,

$$\frac{\partial^2 H}{\partial x^2} = 0; \text{ thus } T \frac{\partial^2 h}{\partial x^2} = T \frac{\partial^2 (h-H)}{\partial x^2},$$

and equation 1 can be written, $$T \frac{\partial^2 (h-H)}{\partial x^2} - \frac{K}{b}(h-H) = 0; \qquad (2)$$

if s = h-H equation 2 becomes

$$T \frac{\partial^2 s}{\partial x^2} - \frac{Ks}{b} = 0$$

If equation 2 is solved for s, then Darcy's law may be applied at the model-grid boundary (x = 0) to solve for q_0:

$$q_0 = -T \frac{\partial s}{\partial x} \Big|_{x=0} \qquad (3)$$

Evaluating equation 3 at the model-grid boundary results in an equation:

$$q_0 = -Cs \qquad (4)$$

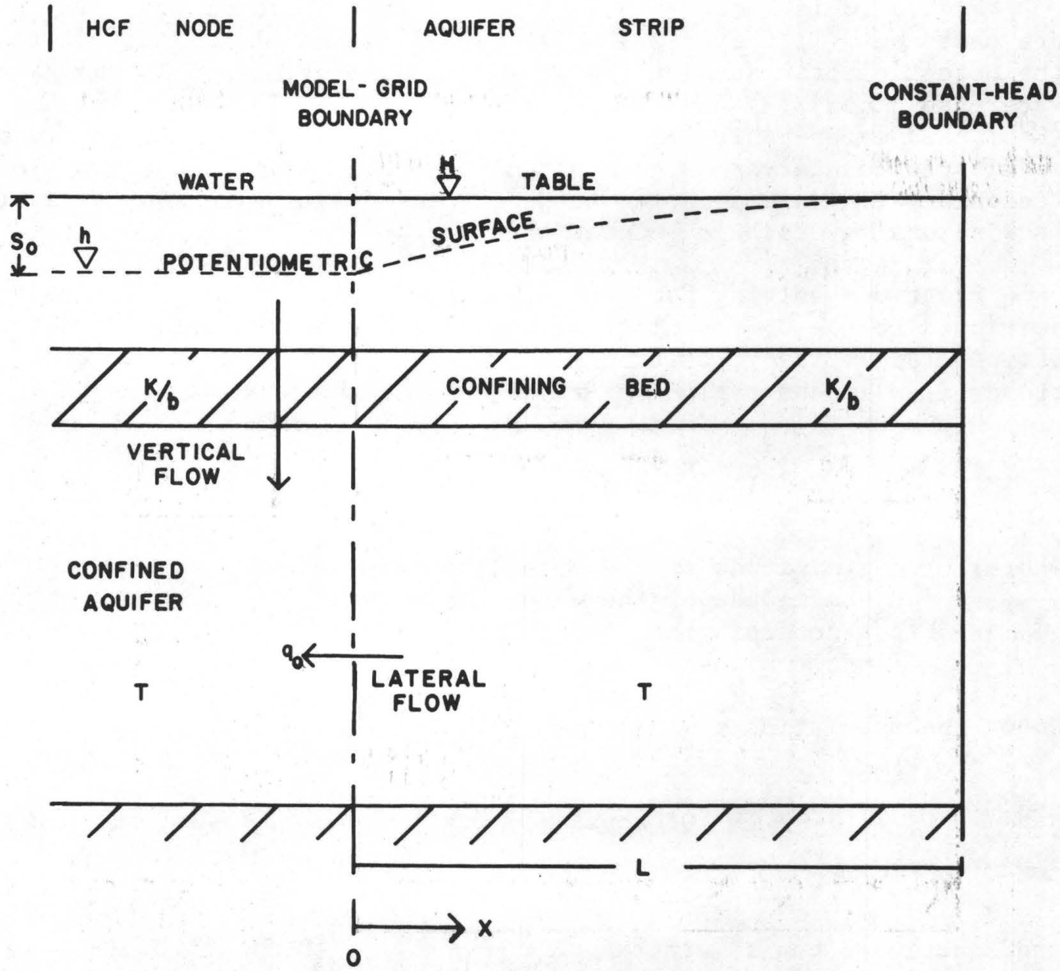

Figure 10.--Conceptualized cross section through two-dimensional model with HCF condition.

where C is a constant comprising transmissivity, leakance, and length of the aquifer strip outside the model-grid boundary.

Equation 4 is a generalized expression for discharge as a function of head--hence the name "head-controlled flux." It is generalized in the sense that the constant C will be different for other system conceptualizations. For example, if the aquifer beyond the model-grid boundary were not leaky, C would be different, but equation 4 would still be valid.

Equation 4 shows that the expression for lateral inflow at a boundary is exactly analogous to vertical leakage; the constant C can be considered as a "leakance." This constant is added to the vertical leakage in the HCF node(s). With this increased vertical leakage, the amount of water flowing into or out of the HCF node is the sum of true vertical leakage and lateral flow at the edge.

Assumptions and Restrictions

An important assumption in using the HCF condition is that of uniform aquifer properties beyond the model-grid boundary. Transmissivity, vertical hydraulic conductivity of the confining bed, confining bed thickness, and so forth, are all considered to be uniform and equal to their respective values in the HCF nodes from which they derive. If few or no data exist in these regions, the HCF condition can be a fair approximation; however, if data do exist and show a wide range of values or an irregular distribution of values, the use of the HCF condition should be heavily qualified.

The boundary flow analytical solution is a steady-state solution; the aquifer storage coefficient does not enter into the calculations. Strictly speaking, therefore, the HCF condition should not be used in transient problems. However, if a transient simulation is made for a reasonably long period of time, the delaying effects of aquifer storage can be ignored, and the HCF condition can be used.

A source of error in the HCF condition is in the estimation of linear flow across the model-grid boundary at the four corners of the model area. Figure 11 indicates that there is a substantial area at each corner in which the amount of boundary flow caused by a head change is ignored.

Use

The programming changes and additions that are necessary to include the HCF condition in the 2-D model are listed in attachment A. The data-deck instructions listed in attachment B are used to specify the HCF condition in a model run.

An HCF node is defined as a node on the edge of the model grid that has an outside edge perpendicular to the main direction of flow that will be caused by a change in head in the HCF node (fig. 11). In irregularly shaped grids, there may be many nodes that could be designated corner nodes (nodes with two

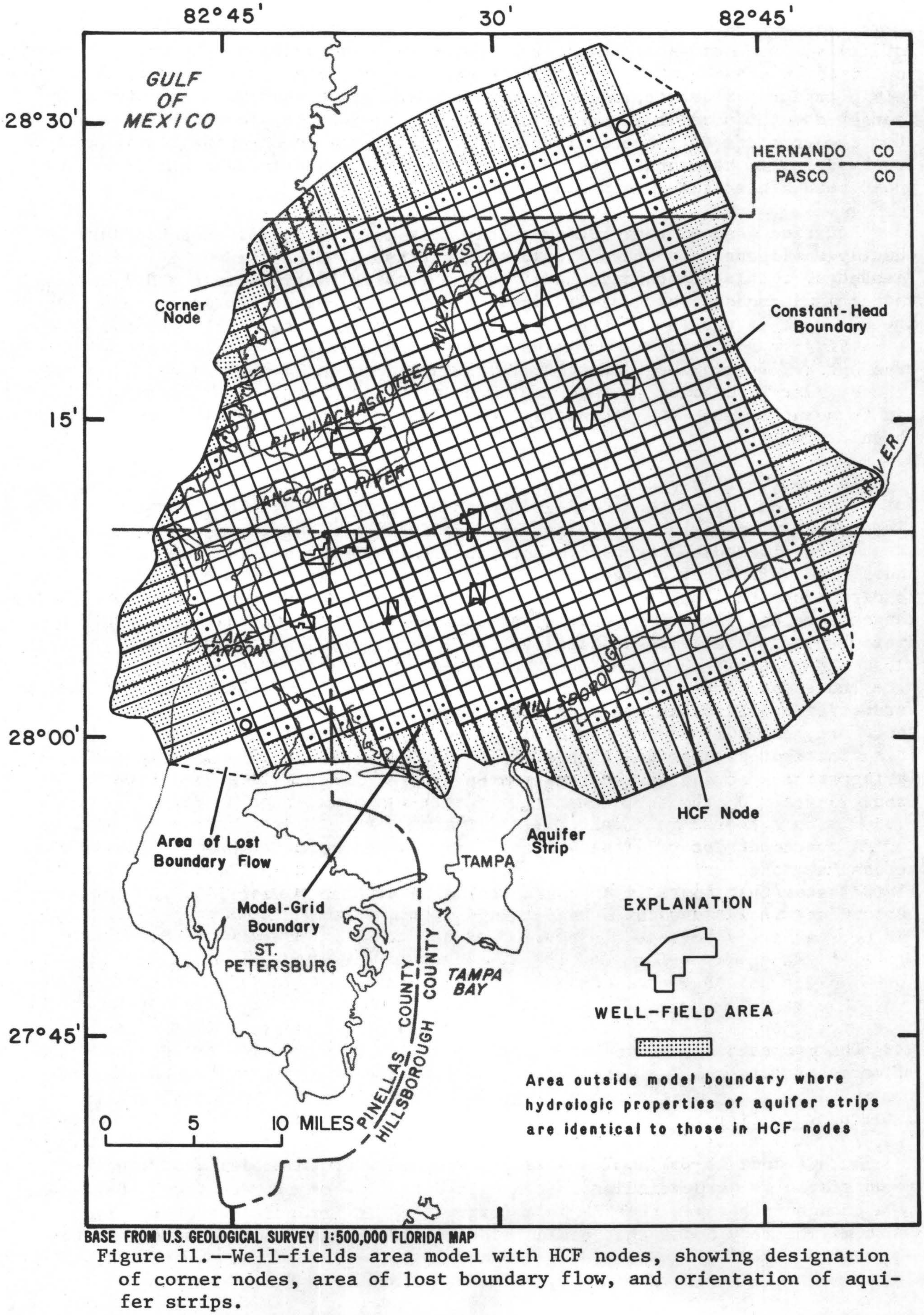

Figure 11.--Well-fields area model with HCF nodes, showing designation of corner nodes, area of lost boundary flow, and orientation of aquifer strips.

edges corresponding to the model-grid boundary). However, to avoid overlapping of the aquifer strips extending out from each boundary node, the program changes outlined in attachment A require that the user designate only four of these possible corners as corner nodes. An additional requirement is that between two corner nodes, a boundary must be convex with respect to the model area. Between two corner nodes, all the aquifer strips extend out in the same direction from the model-grid boundary. The model area in figure 11 is a typical case that conforms to the program changes in attachment A.

If the HCF condition is chosen, a printout of values of flow rates at each HCF node will precede the printout of the first time step information. The amount of the total leakage that is due to lateral HCF flow into or out of the model-grid boundary nodes is included in the mass balance printout.

Finally, if the HCF condition is to be used in a steady-state calibration, the potentiometric heads in the nodes adjacent to the HCF nodes and just across the boundary from them must be included in the STRT matrix. The transmissivities in these nodes must still be zero, however, since they are beyond the model-grid boundary.

LIMITATIONS OF MODEL APPLICATION

A conceptual approach to ground-water modeling was used in the application of this model. The hydrogeologic system was first conceptualized, then its parameters identified, and finally it was transformed to the mathematical analog. The mathematical model approximates the physical processes that control the conceptual model, but it should be recognized as only an approximate representation of the prototype.

The hydrogeology has been simplified to the extent that an operational mathematical model could be constructed, and the mathematical solution is an approximation of the solution to the differential equation. Because the model grid is on a coarse regional scale of 1 mi^2, the localized impact of pumping small quantities of water will not be accurately depicted. Also, because of mathematical approximations associated with simulating boundary flow, the impact of pumping large quantities of water near the model-grid boundary may not be accurately depicted. Additional computational errors may be introduced in coastal areas because the model does not consider movement of the freshwater-saltwater interface and the resultant displacement of one fluid for the other. Because the water table is held at a constant level in the model, computed leakage to the Floridan aquifer will be greater than actual leakage; therefore, the model computes minimum drawdowns. Finally, because the model assumes a steady-state condition, the solution is not time dependent, and the time required for the computed heads to stabilize cannot be determined.

Ideally, the model should represent all the characteristics of the prototype, but realistically, it represents a few of the more important characteristics of the hydrologic system. The model simulates ground-water flow only on a megascopic scale.

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ATTACHMENT A: COMPUTER PROGRAM LISTING

The program by Trescott and others (1976) for computing two-dimensional ground-water flow has been modified to a 2126-card program. Subroutines of the line successive overrelaxation and alternating-direction implicit numerical solution methods were deleted from the program since the strongly implicit procedure was used in the well-field areas model. The "Y" array was redimensioned to save computer core space. Finally, program modifications were made to accommodate the head-controlled flux condition.

The listing is line numbered for easy referral. Program modifications are denoted by asterisks.

ATTACHMENT A: COMPUTER-PROGRAM LISTING

[modified from Trescott and others (1976); * denotes a program modification]

```
C     ******************************************************************00000010
C                         FINITE-DIFFERENCE MODEL                       00000020
C                                   FOR                                 00000030
C                    SIMULATION OF GROUND-WATER FLOW                    00000040
C                           IN TWO DIMENSIONS                           00000050
C                                                                       00000060
C             BY P. C. TRESCOTT, G. F. PINDER AND S. P. LARSON          00000070
C                        U. S. GEOLOGICAL SURVEY                        00000080
C                           SEPTEMBER  1975                             00000090
C     ******************************************************************00000100
C     MAIN PROGRAM TO DIMENSION DIGITAL MODEL AND CONTROL SEQUENCE      00000110
C     OF COMPUTATIONS                                                   00000120
C     ------------------------------------------------------------------00000130
C     SPECIFICATIONS:                                                   00000140
      REAL *4KEEP,M,HEADNG(32)                                          00000150
      REAL *8PHI,G,BE,TEMP,Z,YY                                         00000160
      INTEGER R,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,00000170
     1CONTR,LEAK,RECH,SIP,ADI                                           00000180
C                                                                       00000190
      DIMENSION Y(45000), L(46), IFMT1(9), IFMT2(9), IFMT3(9), IFMT5(9),00000200*
     1NAME(108),YY(1)                                                   00000210
      EQUIVALENCE (YY(1),Y(1))                                          00000220
C                                                                       00000230
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)             00000240*
      COMMON /ARSIZE/ IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IH,IMAX,IMX1,I00000250*
     1WT,IHCF,LPRINT,IQ,JQ,NHCF                                         00000260*
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE00000270
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,00000280
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,00000290
     3IERR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI00000300
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT                         00000310*
      COMMON /XLT/ BFINT,BFOUTT,XNINT,XNOUTT                            00000320
C                                                                       00000330
      DATA IFMT1/4H(1H0,4H,I5,,4H10E1,4H1.3/,4H(1H ,4H,5X,,4H10E1,4H1.3)00000340
     1,4H)   /                                                          00000350
      DATA IFMT2/4H('0',4H,I2,,4H2X,2,4H0F6.,4H1/(5,4HX,20,4HF6.1,4H))  00000360
     1,4H    /                                                          00000370
      DATA IFMT3/4H(1H0,4H,I5,,4H14F9,4H.5/(,4H1H ,,4H5X,1,4H4F9.,4H5)) 00000380
     1,4H    /                                                          00000390
      DATA IFMT5/4H('0',4H,I2,,4H2X,1,4H0F12,4H.4,3,4H(/5X,4H,10F,4H12.400000400*
     1,4H))  /                                                          00000410*
      DATA NAME/2*4H    ,4H STO,4HRAGE,4H COE,4HFFIC,4HIENT,4*4H    ,4H 00000420
     1   T,4HRANS,4HMISS,4HIVIT,4HY   ,2*4H    ,4H   A,4HQUIF,4HER H,4HYD00000430
     2RA,4HULIC,4H CON,4HDUCT,4HIVIT,4HY    ,4H    ,4H   A,4HQUIF,4HER B,00000440
     34HASE ,4HELEV,4HATIO,4HN   ,3*4H    ,4H   S,4HPECI,4HFIC ,4HYIEL,400000450
     4HD   ,4*4H    ,4HAQUI,4HFER ,4HTOP ,4HELEV,4HATIO,4HN    ,4H    ,4H00000460
     5CONF,4HININ,4HG BE,4HD HY,4HDRAU,4HLIC ,4HCOND,4HUCTI,4HVITY,3*4H 00000470
     6    ,4H RIV,4HER H,4HEAD ,4*4H    ,4H   C,4HONFI,4HNING,4H BED,4H T00000480
     7HI,4HCKNE,4HSS  ,2*4H    ,4H   L,4HAND ,4HSURF,4HACE ,4HELEV,4HATI00000490
     80,4HN    ,3*4H    ,4H ARE,4HAL R,4HECHA,4HRGE ,4HRATE,2*4H    ,4H 00000500*
     9    ,4HDIST,4HANCE,4H BEY,4HOND ,4HBOUN,4HDARY,2*4H               00000510*
      DEFINE FILE 2(14,1221,U,KKK)                                      00000520
C     ..................................................................00000530
C                                                                       00000540
C     ---READ TITLE,PROGRAM OPTIONS AND PROGRAM SIZE---                 00000550
   10 READ (R,370) HEADNG                                               00000560
      WRITE (P,360) HEADNG                                              00000570
      READ (R,380) WATER,LEAK,CONVRT,EVAP,RECH,NUMS,CHCK,PNCH,IDK1,IDK2,00000580
```

```
     1NUM,HEAD
      WRITE (P,390) WATER,LEAK,CONVRT,EVAP,RECH,NUMS,CHCK,PNCH,IDK1,IDK2
     1,NUM,HEAD
      IF (NUMS.EQ.CHK(11).OR.NUMS.EQ.CHK(12).OR.NUMS.EQ.CHK(13)) GO TO 2
     10
      WRITE (P,350)
      STOP
   20 READ(R,320) DIML,DIMW,NW,ITMAX,IDO,IFLOW,ILEAK,IWT,IHCF,LPRINT,NHC
     1F,ACT
      WRITE (P,340) DIML,DIMW,NW,ITMAX
C
C     ---COMPUTE DIMENSIQNS FOR ARRAYS---
      IZ=DIML
      JZ=DIMW
      IH=MAX0(1,NW)
      IMAX=MAX0(DIML,DIMW)
      ISIZ=DIML*DIMW
      ISUM=2*ISIZ+1
      IMX1=ITMAX+1
      L(1)=1
      DO 30 I=2,4
      L(I)=ISUM
   30 ISUM=ISUM+2*IMAX
      DO 40 I=5,16
      L(I)=ISUM
   40 ISUM=ISUM+ISIZ
      IF (WATER.NE.CHK(2)) GO TO 60
      DO 50 I=17,19
      L(I)=ISUM
   50 ISUM=ISUM+ISIZ
      IP=DIML
      JP=DIMW
      GO TO 80
   60 DO 70 I=17,19
      L(I)=ISUM
   70 ISUM=ISUM+1
      IP=1
      JP=1
   80 IF (LEAK.NE.CHK(9)) GO TO 100
      DO 90 I=20,22
      L(I)=ISUM
   90 ISUM=ISUM+ISIZ
      IR=DIML
      JR=DIMW
      GO TO 120
  100 DO 110 I=20,22
      L(I)=ISUM
  110 ISUM=ISUM+1
      IR=1
      JR=1
  120 IF (CONVRT.NE.CHK(7)) GO TO 130
      L(23)=ISUM
      ISUM=ISUM+ISIZ
      IC=DIML
      JC=DIMW
      GO TO 140
  130 L(23)=ISUM
      ISUM=ISUM+1
```

```
      IC=1
      JC=1
  140 IF (EVAP.NE.CHK(6)) GO TO 150
      L(24)=ISUM
      ISUM=ISUM+ISIZ
      IL=DIML
      JL=DIMW
      GO TO 160
  150 L(24)=ISUM
      ISUM=ISUM+1
      IL=1
      JL=1
  160 IF (NUMS.NE.CHK(11)) GO TO 180
      DO 170 I=25,28
      L(I)=ISUM
  170 ISUM=ISUM+ISIZ
      IS=DIML
      JS=DIMW
      GO TO 200
  180 DO 190 I=25,28
      L(I)=ISUM
  190 ISUM=ISUM+1
      IS=1
      JS=1
  200 DO 210 I=29,31
      L(I)=ISUM
  210 ISUM=ISUM+DIMW
      DO 220 I=32,33
      L(I)=ISUM
  220 ISUM=ISUM+DIML
      L(34)=ISUM
      ISUM=ISUM+IH
      L(35)=ISUM
      ISUM=ISUM+2*IH
      IF (MOD(ISUM,2).EQ.0) ISUM=ISUM+1
  230 L(36)=ISUM
      ISUM=ISUM+2*IMAX
      L(37)=ISUM
      ISUM=ISUM+IMX1
      L(38)=ISUM
      ISUM=ISUM+ISIZ
      L(39)=ISUM
      ISUM=ISUM+ISIZ
      L(40)=ISUM
      ISUM=ISUM+ISIZ
      L(41)=ISUM
      ISUM=ISUM+ISIZ
      L(42)=ISUM
      IF(IHCF.EQ.0)GO TO 231
      ISUM=ISUM+ISIZ
      L(43)=ISUM
      ISUM=ISUM+ISIZ
      IQ=DIML
      JQ=DIMW
      L(44)=ISUM
      GO TO 232
  231 ISUM=ISUM+1
      L(43)=ISUM
```

```
      ISUM=ISUM+1
      IQ=1
      JQ=1
      NHCF=1
      L(44)=ISUM
  232 ISUM=ISUM+NHCF
      WRITE (P,330) ISUM
C
C     ---PASS INTIIAL ADDRESSES OF ARRAYS TO SUBROUTINES---
      CALL DATAI(Y(L(1)),Y(L(7)),Y(L(8)),Y(L(9)),Y(L(10)),Y(L(11)),Y(L(1
     12)),Y(L(13)),Y(L(14)),Y(L(15)),Y(L(16)),Y(L(17)),Y(L(18)),Y(L(19))
     2,Y(L(20)),Y(L(21)),Y(L(22)),Y(L(23)),Y(L(24)),Y(L(29)),Y(L(32)),Y(
     3L(34)),Y(L(35)),Y(L(38)),Y(L(39)),Y(L(40)),Y(L(41)),Y(L(42)),Y(L(4
     43)),Y(L(44)))
      CALL STEP(Y(L(1)),Y(L(5)),Y(L(7)),Y(L(8)),Y(L(9)),Y(L(14)),Y(L(17)
     1),Y(L(18)),Y(L(23)),Y(L(29)),Y(L(30)),Y(L(32)),Y(L(34)),Y(L(35)),Y
     2(L(37)),Y(L(20)))
      IF (NUMS.EQ.CHK(11)) CALL SOLVE1(Y(L(1)),Y(L(2)),Y(L(3)),Y(L(4)),Y
     1(L(5)),Y(L(6)),Y(L(7)),Y(L(9)),Y(L(12)),Y(L(13)),Y(L(14)),Y(L(15))
     2,Y(L(16)),Y(L(25)),Y(L(26)),Y(L(27)),Y(L(28)),Y(L(29)),Y(L(31)),Y(
     3L(32)),Y(L(33)),Y(L(37)),Y(L(10)),Y(L(11)),Y(L(24)),Y(L(19)),Y(L(2
     43)),Y(L(20)),Y(L(22)),Y(L(21)))
      CALL COEF(Y(L(1)),Y(L(5)),Y(L(6)),Y(L(7)),Y(L(8)),Y(L(9)),Y(L(10))
     1,Y(L(11)),Y(L(12)),Y(L(14)),Y(L(15)),Y(L(16)),Y(L(17)),Y(L(18)),Y(
     2L(19)),Y(L(20)),Y(L(21)),Y(L(22)),Y(L(23)),Y(L(24)),Y(L(29)),Y(L(3
     32)),Y(L(43)),Y(L(44)))
      CALL CHECKI(Y(L(1)),Y(L(5)),Y(L(6)),Y(L(7)),Y(L(9)),Y(L(10)),Y(L(1
     11)),Y(L(12)),Y(L(13)),Y(L(14)),Y(L(15)),Y(L(17)),Y(L(18)),Y(L(19))
     2,Y(L(20)),Y(L(21)),Y(L(22)),Y(L(23)),Y(L(24)),Y(L(29)),Y(L(32)),
     3IFLOW,ILEAK,Y(L(38)),Y(L(39)),Y(L(40)),Y(L(41)),Y(L(42)),Y(L(43)),
     4Y(L(44)))
      CALL PRNTAI(Y(L(1)),Y(L(8)),Y(L(9)),Y(L(12)),Y(L(14)),Y(L(29)),Y(L
     1(32)))
C     ...................................................................
C
C     ---START COMPUTATIONS---
C     ************************
C     ---READ AND WRITE DATA FOR GROUPS II AND III---
      BFINT=0.
      BFOUTT=0.
      XNINT=0.
      XNOUTT=0.
      CALL DATAIN
      CALL ARRAY(Y(L(12)),IFMT3,NAME(1),2)
      IF (WATER.EQ.CHK(2)) GO TO 240
      CALL ARRAY(Y(L(9)),IFMT3,NAME(10),3)
      GO TO 250
  240 CALL ARRAY(Y(L(17)),IFMT1,NAME(19),4)
      CALL ARRAY(Y(L(18)),IFMT2,NAME(28),5)
      CALL ARRAY(Y(L(19)),IFMT3,NAME(37),6)
  250 IF (CONVRT.EQ.CHK(7)) CALL ARRAY(Y(L(23)),IFMT2,NAME(46),7)
      IF (LEAK.NE.CHK(9)) GO TO 260
      CALL ARRAY(Y(L(20)),IFMT1,NAME(55),8)
      IF(IWT.EQ.1)CALL ARRAY(Y(L(21)),IFMT5,NAME(64),9)
      IF(IWT.EQ.0)CALL ARRAY(Y(L(21)),IFMT2,NAME(64),9)
      CALL ARRAY(Y(L(22)),IFMT2,NAME(73),10)
      IF(IHCF.EQ.1.OR.IHCF.EQ.2) CALL ARRAY(Y(L(38)),IFMT5,NAME(100),13)
      IF(IHCF.EQ.1.OR.IHCF.EQ.2) CALL ARRAY(Y(L(39)),IFMT5,NAME(100),13)
```

```
      IF(IHCF.EQ.1.OR.IHCF.EQ.2) CALL ARRAY(Y(L(40)),IFMT5,NAME(100),13)
      IF(IHCF.EQ.1.OR.IHCF.EQ.2) CALL ARRAY(Y(L(41)),IFMT5,NAME(100),13)
  260 IF (EVAP.EQ.CHK(6)) CALL ARRAY(Y(L(24)),IFMT2,NAME(82),11)
      IF (RECH.EQ.CHK(10)) CALL ARRAY(Y(L(13)),IFMT1,NAME(91),12)
      CALL MDAT
C
C     ---INITIALIZE TRANSMISSIVITY VALUES IN WATER TABLE PROBLEM---
      KT=0
      IF (WATER.EQ.CHK(2)) CALL TRANS
C
C     ---COMPUTE ITERATION PARAMETERS---
      IF (NUMS.EQ.CHK(11)) CALL ITER1
C
C     ---INITIALIZE PARAMETERS FOR ALPHAMERIC MAP---
      IF (CONTR.EQ.CHK(3)) CALL MAP
C
C     ---COMPUTE T COEFFICIENTS FOR ARTESIAN PROBLEM---
      IF (WATER.NE.CHK(2)) CALL TCOF
C
C     ---READ TIME PARAMETERS AND PUMPING DATA FOR A NEW PUMPING PERIOD-
  270 CALL NEWPER
C
      KT=0
      IFINAL=0
      IERR=0
C
C     ---START NEW TIME STEP COMPUTATIONS---
  280 CALL NEWSTP
C
C     ---COMPUTE TRANSIENT PART OF LEAKAGE TERM---
      IF (LEAK.EQ.CHK(9).AND.SS.NE.0.) CALL CLAY
C
C     ---ENTER APPROPIATE SOLUTION ROUTINE AND COMPUTE SOLUTION---
      IF (NUMS.EQ.CHK(11)) CALL NEWITA
C
C     ---CHECK FOR STEADY STATE AND PRINT OUTPUT AT DESIGNATED
C     TIME STEPS---
      CALL STEADY
C
C     ---LAST TIME STEP IN PUMPING PERIOD ?---
      IF (IFINAL.NE.1) GO TO 280
C
C     ---CHECK FOR NEW PUMPING PERIOD---
      IF (KP.LT.NPER) GO TO 270
C
C     ---DISK OUTPUT IF DESIRED---
      IF (IDK2.NE.CHK(15)) GO TO 290
      CALL DISK
C
C     ---PUNCHED OUTPUT IF DESIRED---
  290 IF (PNCH.NE.CHK(1)) GO TO 300
      CALL PUNCH
C
C     ---CHECK FOR NEW PROBLEM---
  300 READ (R,320,END=310) NEXT
      IF (NEXT.EQ.0) GO TO 10
  310 STOP
C     ..............................................................
```

```
C
C      ---FORMATS---
C       -----------------------------------------------------------------
C
C
  320 FORMAT(11I5,G10.0)
  330 FORMAT ('0',54X,'WORDS OF Y VECTOR USED =',I7)
  340 FORMAT ('0',62X,'NUMBER OF ROWS =',I5/60X,'NUMBER OF COLUMNS =',I5
     1/9X,'NUMBER OF WELLS FOR WHICH DRAWDOWN IS COMPUTED AT A SPECIFIED
     2 RADIUS =',I5,/,39X,'MAXIMUM PERMITTED NUMBER OF ITERATIONS =',I5)
  350 FORMAT ('-',36X,'NO EQUATION SOLVING SCHEME SPECIFIED, EXECUTION T
     1ERMINATED'/37X,58('*'))
  360 FORMAT ('1',60X,'U. S. G. S.'//55X,'FINITE-DIFFERENCE MODEL'/65X,'
     1FOR'/51X,'SIMULATION OF GROUND-WATER FLOW'//60X,'JANUARY, 1975'//1
     233('*')/'0',32A4//133('*'))
  370 FORMAT (20A4)
  380 FORMAT (16(A4,1X))
  390 FORMAT ('-SIMULATION OPTIONS:   ',13(A4,4X))
      END
```

DATAI

```
      SUBROUTINE DATAI(PHI,STRT,SURI,T,TR,TC,S,QRE,WELL,TL,SL,PERM,BOTTO
     1M,SY,RATE,RIVER,M,TOP,GRND,DELX,DELY,WR,NWR,DIST1,DIST2,DIST3,DIST *
     24,XRIVX,XRATEX,TLHCF)                                              *
C     ------------------------------------------------------------------
C     READ AND WRITE INPUT DATA
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI,DBLE,XLABEL,YLABEL,TITLE,XN1,MESUR
      REAL *4M
      INTEGER R,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,
     1CONTR,LEAK,RECH,SIP,ADI
C
      DIMENSION PHI(IZ,JZ), STRT(IZ,JZ), SURI(IZ,JZ), T(IZ,JZ), TR(IZ,JZ
     1), TC(IZ,JZ), S(IZ,JZ), QRE(IZ,JZ), WELL(IZ,JZ), TL(IZ,JZ), SL(IZ,
     2JZ), PERM(IP,JP), BOTTOM(IP,JP), SY(IP,JP), RATE(IR,JR), RIVER(IR,
     3JR), M(IR,JR), TOP(IC,JC), GRND(IL,JL), DELX(JZ), DELY(IZ), WR(IH)
     4,NWR(IH,2),A(IZ,JZ),IN(9),IFMT(9),DIST1(IZ,JZ),DIST2(IZ,JZ),DIST3( *
     5IZ,JZ),DIST4(IZ,JZ),XRIVX(IQ,JQ),XRATEX(IQ,JQ),TLHCF(NHCF,3)       *
C
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)              *
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,
     3IERR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT                          *
      COMMON /CK/ ETFLXT,STORT,QRET,CHST,CHDT,FLUXT,PUMPT,CFLUXT,FLXNT
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(5),XN1,MESUR,PRNT(122),BLANK
     1(60),DIGIT(122),VF1(6),VF2(6),VF3(7),XSCALE,DINCH,SYM(17),XN(100),
     2YN(13),NA(4),N1,N2,N3,YSCALE,FACT1,FACT2
      COMMON /ARSIZE/ IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IH,IMAX,IMX1,I *
     1WT,IHCF,LPRINT,IQ,JQ,NHCF                                          *
      RETURN
C     ..................................................................
C     ********************
      ENTRY DATAIN
C     ********************
C
C     ---READ AND WRITE SCALAR PARAMETERS---
      READ (R,500) CONTR,XSCALE,YSCALE,DINCH,FACT1,FACT2,MESUR
      IF (CONTR.EQ.CHK(3)) WRITE (P,610) XSCALE,YSCALE,MESUR,MESUR,DINCH
     1,FACT1,FACT2
      READ (R,490) NPER,KTH,ERR,EROR,SS,QET,ETDIST,LENGTH,HMAX,FACTX,FAC
     1TY
      IF (ETDIST.LE.0.) ETDIST=1.
      WRITE (P,520) NPER,KTH,ERR,EROR,SS,QET,ETDIST,FACTX,FACTY
C
C     ---READ CUMULATIVE MASS BALANCE PARAMETERS---
      READ (R,600) SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ETFL
     1XT,FLXNT
      IF (IDK1.EQ.CHK(14)) GO TO 20
      IF (SUM.EQ.0.0) GO TO 40
      WRITE (P,480) SUM
C     ..................................................................
C
C     ---HEAD DATA TO CONTINUE PREVIOUS COMPUTATIONS READ HERE---
C     ------FROM CARDS:
      DO 10 I=1,DIML
```

```
      READ (R,540) (PHI(I,J),J=1,DIMW)
   10 WRITE (P,530) I,(PHI(I,J),J=1,DIMW)
      GO TO 40
C     ------READ AND WRITE DATA FROM UNIT 4 ON DISK RATHER THAN CARDS:
   20 READ (4) PHI,SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ETFL
     1XT,FLXNT
      WRITE (P,480) SUM
      DO 30 I=1,DIML
   30 WRITE (P,530) I,(PHI(I,J),J=1,DIMW)
      REWIND 4
C     .............................. STRT (STARTING HEAD) ............
   40 READ (R,490) FACT,IVAR,IPRN,IRECS,IRECD
      IF (IRECS.EQ.1) READ (2'1) STRT
      IF ((IVAR.EQ.1.OR.IRECS.EQ.1).AND.IPRN.NE.1) WRITE (P,470)
      DO 80 I=1,DIML
      IF (IVAR.EQ.1) READ (R,540) (STRT(I,J),J=1,DIMW)
      DO 70 J=1,DIMW
      IF (IRECS.EQ.1) GO TO 60
      IF (IVAR.NE.1) GO TO 50
      STRT(I,J)=STRT(I,J)*FACT
      GO TO 60
   50 STRT(I,J)=FACT
   60 SURI(I,J)=STRT(I,J)
      T(I,J)=0.
      TL(I.J)=0.
      SL(I,J)=0.
      TR(I,J)=0.
      TC(I.J)=0.
      WELL(I.J)=0.0
      QRE(I,J)=0.
   70 IF (SUM.EQ.0.0.AND.IDK1.NE.CHK(14)) PHI(I,J)=STRT(I,J)
      IF (IVAR.EQ.0.AND.IRECS.EQ.0.OR.IPRN.EQ.1) GO TO 80
      WRITE (P,530) I,(STRT(I,J),J=1,DIMW)
   80 CONTINUE
      IF (IVAR.NE.1.AND.IRECS.NE.1) WRITE (P,420) FACT
      IF (IRECD.EQ.1) WRITE (2'1) STRT
      RETURN
C
C     ---READ REMAINING ARRAYS FROM CARDS OR DISK (AS SPECIFIED IN THE
C        OPTIONS) AND WRITE THEM ON DISK IF SPECIFIED IN THE OPTIONS---
C     **************
      ENTRY ARRAY(A,IFMT,IN,IRN)
C     **************
      READ(R,490) FACT,IVAR,IPRN, IRECS, IRECD
      IK=4*IRECS+2*IVAR+IPRN+1
      GO TO (90,90,110,110,140,140), IK
   90 DO 100 I=1,DIML
      DO 100 J=1,DIMW
  100 A(I,J)=FACT
      WRITE (P,430) IN,FACT
      GO TO 160
  110 IF (IK.EQ.3) WRITE (P,440) IN
      DO 130 I=1,DIML
      IF(IWT.EQ.1.AND.IRN.EQ.9) READ(R,509) (A(I,J),J=1,DIMW)
      IF(IWT.EQ.1.AND.IRN.NE.9) READ(R,510) (A(I,J),J=1,DIMW)
      IF(IWT.EQ.0)READ(R.510)(A(I,J),J=1,DIMW)
      DO 120 J=1, DIMW
  120 A(I,J)=A(I,J)*FACT
```

```
  130 IF (IK.EQ.3) WRITE (P,IFMT) I,(A(I,J),J=1,DIMW)
      GO TO 160
  140 READ (2'IRN) A
      IF (IK.EQ.6) GO TO 160
      WRITE (P,440) IN
      DO 150 I=1,DIML
  150 WRITE (P,IFMT) I,(A(I,J),J=1,DIMW)
  160 IF (IRECD.EQ.1) WRITE (2'IRN) A
      RETURN
C
C     ---INSERT ZERO VALUES IN THE T OR PERM MATRIX AROUND THE
C        BORDER OF THE MODEL---
C     **************
      ENTRY MDAT
C     **************
      DO 180 I=1,DIML
      DO 180 J=1,DIMW
      IF (WATER.EQ.CHK(2)) GO TO 170
      IF (I.EQ.1.OR.I.EQ.DIML.OR.J.EQ.1.OR.J.EQ.DIMW) T(I,J)=0.
      GO TO 180
  170 IF (I.EQ.1.OR.I.EQ.DIML.OR.J.EQ.1.OR.J.EQ.DIMW) PERM(I,J)=0.
  180 CONTINUE
C     ............................... DELX,DELY ......................
      READ (R,490) FACT,IVAR,IPRN,IRECS,IRECD
      IF (IRECS.EQ.1) GO TO 210
      IF (IVAR.EQ.1) READ (R,490) DELX
      DO 200 J=1,DIMW
      IF (IVAR.NE.1) GO TO 190
      DELX(J)=DELX(J)*FACT
      GO TO 200
  190 DELX(J)=FACT
  200 CONTINUE
      GO TO 220
  210 READ (2'13) DELX
  220 IF (IRECD.EQ.1) WRITE (2'13) DELX
      IF (IVAR.EQ.1.OR.IRECS.EQ.1.AND.IPRN.NE.1) WRITE (P,550) DELX
      IF (IVAR.NE.1.AND.IRECS.NE.1) WRITE (P,450) FACT
      READ (R,490) FACT,IVAR,IPRN,IRECS,IRECD
      IF (IRECS.EQ.1) GO TO 250
      IF (IVAR.EQ.1) READ (R,490) DELY
      DO 240 I=1,DIML
      IF (IVAR.NE.1) GO TO 230
      DELY(I)=DELY(I)*FACT
      GO TO 240
  230 DELY(I)=FACT
  240 CONTINUE
      GO TO 260
  250 READ (2'14) DELY
  260 IF (IRECD.EQ.1) WRITE (2'14) DELY
      IF (IVAR.EQ.1.OR.IRECS.EQ.1.AND.IPRN.NE.1) WRITE (P,560) DELY
      IF (IVAR.NE.1.AND.IRECS.NE.1) WRITE (P,460) FACT
C
C     ---CHECK TO SEE IF HCF OPTION IS TO BE USED---
C
      IF(IHCF.EQ.0) GO TO 265
C
C     ---DEFINITION OF VARIABLES---
C
```

```
C       COFNL   =  COEFFICIENT OF LEAKAGE OCCURRING IN BOUNDARY NODE
C                       (FT**2/SEC)
C       COFHCF  =  COEFFICIENT OF HORIZONTAL FLOW OCCURRING BETWEEN
C                       BOUNDARY NODE AND POINT BEYOND BOUNDARY (FT**2/SEC)
C       COFTOT  =  SUM OF 2 COEFFICIENTS (FT**2/SEC)
C       QB1     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE ABOVE IT AT START OF STEADY-STATE SIMULATION
C                       (FT**3/SEC)
C       QB2     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE TO LEFT OF IT AT START OF STEADY-STATE
C                       SIMULATION (FT**3/SEC)
C       QB3     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE BENEATH IT AT START OF STEADY-STATE SIMULATION
C                       (FT**3/SEC)
C       QB4     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE TO RIGHT OF IT AT START OF STEADY-STATE
C                       SIMULATION (FT**3/SEC)
C       QBINIT  =  HORIZONTAL FLOW OCCURRING ACROSS OUTER EDGE(EDGES) OF
C                       BOUNDARY NODE AT START OF STEADY-STATE SIMULATION
C                       (FT**3/SEC)
C       HQ1     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE ABOVE IT AT START OF TRANSIENT SIMULATION
C                       (FT**3/SEC)
C       HQ2     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE TO LEFT OF IT AT START OF TRANSIENT SIMULATION
C                       (FT**3/SEC)
C       HQ3     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE BENEATH IT AT START OF TRANSIENT SIMULATION
C                       (FT**3/SEC)
C       HQ4     =  HORIZONTAL FLOW OCCURRING BETWEEN BOUNDARY NODE AND
C                       NODE TO RIGHT OF IT AT START OF TRANSIENT
C                       SIMULATION (FT**3/SEC)
C       HQTOT   =  SUM OF 4 HORIZONTAL FLOW COMPONENTS (FT**3/SEC)
C       XRATEX  =  ORIGINAL VERTICAL HYDRAULIC CONDUCTIVITY (FT/SEC)
C       XRIVX   =  ORIGINAL ELEVATION OF WATER TABLE (FT)
C       RATE    =  ADJUSTED VERTICAL HYDRAULIC CONDUCTIVITY (FT/SEC)
C       RIVER   =  ADJUSTED ELEVATION OF WATER TABLE (FT)
C       STRT    =  STARTING HEAD (FT)
C       T       =  TRANSMISSIVITY (FT**2/SEC)
C       S       =  STORAGE COEFFICIENT
C       M       =  THICKNESS OF CONFINING BED (FT)
C       DELX    =  GRID-SPACING IN X-DIRECTION (FT)
C       DELY    =  GRID-SPACING IN Y-DIRECTION (FT)
C       TR      =  INTERNODAL TRANSMISSIVITY ALONG ROWS (FT/SEC)
C       TC      =  INTERNODAL TRANSMISSIVITY ALONG COLUMNS (FT/SEC)
C       DIST    =  DISTANCE BETWEEN BOUNDARY NODE AND POINT BEYOND MODEL
C                       AREA WHERE HEAD IS CONSTANT (FT)
C
C       ---SAVE RATE , RIVER---
C
        DO 690 I=1,DIML
        DO 690 J=1,DIMW
        XRATEX(I,J)=RATE(I,J)
        IF(DIST1(I,J)+DIST2(I,J)+DIST3(I,J)+DIST4(I,J).NE.0.0)
       1XRATEX(I,J)=-XRATEX(I,J)
  690   XRIVX(I,J)=RIVER(I,J)
C
C       ---WRITE HEADING FOR TABLE OF CALCULATED VALUES---
```

```
C
C     IF(IHCF.EQ.1) WRITE(P,692)
C     IF(IHCF.EQ.2) WRITE(P,694)
  692 FORMAT('1',3X,'I',3X,'J',5X,'COFNL',6X,'COFHF1',6X,'COFHF2',6X,'CO
     1FHF3',6X,'COFHF4',5X,'RATE',6X,'RIVER',4X,'XRATEX',5X,'XRIVX',4X,'
     2QBINIT')
  694 FORMAT('1',3X,'I',3X,'J',5X,'COFNL',6X,'COFHF1',6X,'COFHF2',6X,'CO
     1FHF3',6X,'COFHF4',4X,'HQ1',8X,'HQ2',8X,'HQ3',8X,'HQ4',9X,'RATE',6X
     2,'XRATEX')
C
C     ---SET UP LOOP TO DO CALCULATIONS AT EACH BOUNDARY NODE---
C
      III=DIML-1
      JJJ=DIMW-1
      DO 860 I=2,III
      DO 860 J=2,JJJ
      AREA=DELX(J)*DELY(I)
      IF(XRATEX(I,J).GE.0.0)GO TO 860
C
C     ---INITIALIZE VARIABLES---
C
      COFNL=0.
      COFHCF=0.
      COFTOT=0.
      HQ1=0.
      HQ2=0.
      HQ3=0.
      HQ4=0.
      HQTOT=0.
      AAA=0.
      BB1=0.
      BB2=0.
      BB3=0.
      BB4=0.
      QB1=0.
      QB2=0.
      QB3=0.
      QB4=0.
      THF=0.
      COFHF1=0.
      COFHF2=0.
      COFHF3=0.
      COFHF4=0.
      QBINIT=0.
C
C     ---CALCULATE INITIAL BOUNDARY FLOWS FOR STEADY-STATE CASE---
C
      IF(IHCF.NE.1) GO TO 698
      IF(DIST1(I,J).NE.0.)QB1=2.*T(I,J)*(STRT(I-1,J)-STRT(I,J))*DELX(J)/
     1(DELY(I-1)+DELY(I))
      IF(DIST2(I,J).NE.0.)QB2=2.*T(I,J)*(STRT(I,J-1)-STRT(I,J))*DELY(I)/
     1(DELX(J-1)+DELX(J))
      IF(DIST3(I,J).NE.0.)QB3=2.*T(I,J)*(STRT(I+1,J)-STRT(I,J))*DELX(J)/
     1(DELY(I+1)+DELY(I))
      IF(DIST4(I,J).NE.0.)QB4=2.*T(I,J)*(STRT(I,J+1)-STRT(I,J))*DELY(I)/
     1(DELX(J+1)+DELX(J))
      QBINIT=QB1+QB2+QB3+QB4
C
```

```
C     ---CALCULATE COEFFICIENTS---
C
  698 COFNL=ABS(XRATEX(I,J))*AREA/M(I,J)
      AAA=SQRT(T(I,J)*ABS(XRATEX(I,J))/M(I,J))
      IF(DIST1(I,J).EQ.0)GO TO 880
      BB1=EXP((-2.)*SQRT(ABS(XRATEX(I,J))*(DIST1(I,J)**2)/M(I,J)*T(I,J))
     1)
      COFHF1=AAA*(1.+BB1)*(DELX(J)/(1.-BB1))
  880 IF(DIST2(I,J).EQ.0)GO TO 890
      BB2=EXP((-2.)*SQRT(ABS(XRATEX(I,J))*(DIST2(I,J)**2)/M(I,J)*T(I,J))
     1)
      COFHF2=AAA*(1.+BB2)*(DELY(I)/(1.-BB2))
  890 IF(DIST3(I,J).EQ.0)GO TO 900
      BB3=EXP((-2.)*SQRT(ABS(XRATEX(I,J))*(DIST3(I,J)**2)/M(I,J)*T(I,J))
     1)
      COFHF3=AAA*(1.+BB3)*(DELX(J)/(1.-BB3))
  900 IF(DIST4(I,J).EQ.0)GO TO 790
      BB4=EXP((-2.)*SQRT(ABS(XRATEX(I,J))*(DIST4(I,J)**2)/M(I,J)*T(I,J))
     1)
      COFHF4=AAA*(1.+BB4)*(DELY(I)/(1.-BB4))
C
C     ---CALCULATE NEW VERTICAL HYDRAULIC CONDUCTIVITY---
C
  790 IF(DIST1(I,J).NE.0.)THF=THF+COFHF1
      IF(DIST2(I,J).NE.0.)THF=THF+COFHF2
      IF(DIST3(I,J).NE.0.)THF=THF+COFHF3
      IF(DIST4(I,J).NE.0.)THF=THF+COFHF4
      COFTOT=COFNL+THF
      RATE(I,J)=COFTOT*ABS(XRATEX(I,J))/COFNL
C
C     ---CHECK IF STEADY-STATE OR TRANSIENT CASE---
C
  791 IF(IHCF.EQ.2) GO TO 795
C
C     ---CALCULATE NEW WATER-TABLE HEAD FOR STEADY-STATE CASE---
C
      RIVER(I,J)=STRT(I,J)+ABS(XRATEX(I,J))*(XRIVX(I,J)-STRT(I,J))/RATE(
     1I,J)+M(I,J)*QBINIT/(RATE(I,J)*AREA)
C     WRITE(P,792) I,J,COFNL,COFHF1,COFHF2,COFHF3,COFHF4,
C    1RATE(I,J),RIVER(I,J),XRATEX(I,J),XRIVX(I,J),QBINIT
  792 FORMAT(' ',2X,I2,2X,I2,1X,5F11.6,E11.3,F9.3,E11.3,2F9.3)
      GO TO 860
C
C     ---WATER-TABLE HEAD , TRANSIENT CASE---
C
C
C     ---CALCULATE HORIZONTAL FLOW COMPONENTS---
C
  795 IF(T(I-1,J).EQ.0..OR.S(I-1,J).LT.0.) GO TO 800
      TC(I-1,J)=(2.*T(I-1,J)*T(I,J))/(DELY(I)*T(I-1,J)+DELY(I-1)*T(I,J))
     1*FACTY
      HQ1=(STRT(I-1,J)-STRT(I,J))*TC(I-1,J)*DELX(J)
  800 IF(T(I,J-1).EQ.0..OR.S(I,J-1).LT.0.) GO TO 810
      TR(I,J-1)=(2.*T(I,J-1)*T(I,J))/(DELX(J)*T(I,J-1)+DELX(J-1)*T(I,J))
     1*FACTX
      HQ2=(STRT(I,J-1)-STRT(I,J))*TR(I,J-1)*DELY(I)
  810 IF(T(I+1,J).EQ.0..OR.S(I+1,J).LT.0.) GO TO 820
      TC(I,J)=(2.*T(I,J)*T(I+1,J))/(DELY(I)*T(I+1,J)+DELY(I+1)*T(I,J))*F
```

```
     1ACTY
      HQ3=(STRT(I+1,J)-STRT(I,J))*TC(I,J)*DELX(J)
  820 IF(T(I,J+1).EQ.0..OR.S(I,J+1).LT.0.) GO TO 830
      TR(I,J)=(2.*T(I,J)*T(I,J+1))/(DELX(J)*T(I,J+1)+DELX(J+1)*T(I,J))*F
     1ACTX
      HQ4=(STRT(I,J+1)-STRT(I,J))*TR(I,J)*DELY(I)
C
C     ---CALCULATE NET HORIZONTAL FLOW---
C
  830 HQTOT=HQ1+HQ2+HQ3+HQ4
C
C     ---CALCULATE NEW WATER-TABLE HEAD FOR TRANSIENT CASE---
C
      RIVER(I,J)=STRT(I,J)-M(I,J)*HQTOT/(RATE(I,J)*AREA)
C     WRITE(P,840) I,J,COFNL,COFHF1,COFHF2,COFHF3,COFHF4,
C    1HQ1,HQ2,HQ3,HQ4,RATE(I,J),XRATEX(I,J)
  840 FORMAT(' ',2X,I2,2X,I2,1X,9F11.6,E11.3,1X,E11.3)
  860 CONTINUE
C
C     ---RE-INITIALIZE INTERNODAL TRANSMISSIVITIES---
C
      DO 870 I=1,DIML
      DO 870 J=1,DIMW
      TR(I,J)=0.
  870 TC(I,J)=0.
C
C     ---INITIALIZE VARIABLES---
  265 JN01=DIMW-1
      IN01=DIML-1
      IF (LEAK.NE.CHK(9).OR.SS.NE.0.) GO TO 280
      DO 270 I=2,IN01
      DO 270 J=2,JN01
      IF (M(I,J).EQ.0.) GO TO 270
      TL(I,J)=RATE(I,J)/M(I,J)
  270 CONTINUE
      IF(IHCF.EQ.0)GO TO 280
      K=0
      DO 272 I=2,IN01
      DO 272 J=2,JN01
      IF(XRATEX(I,J).GE.0.)GO TO 272
      K=K+1
      TLHCF(K,1)=ABS(XRATEX(I,J))/M(I,J)
      TLHCF(K,2)=I
      TLHCF(K,3)=J
  272 CONTINUE
  280 ETQB=0.0
      ETQD=0.0
      SUBS=0.0
      U=1.0
      TT=0.0
      IM=MIN0(6*DIMW+4,124)
      IM=(132-IM)/2
      VF5(3)=DIGIT(IM)
      VF6(3)=DIGIT(IM)
      VF4(3)=DIGIT(IM)
      VF4(8)=DIGIT(IM+5)
      WIDTH=0.
      DO 290 J=2,JN01
```

```
  290 WIDTH=WIDTH+DELX(J)
      YDIM=0.
      DO 300 I=2,INO1
  300 YDIM=YDIM+DELY(I)
      RETURN
C     ..............................................................
C
C     ---READ TIME PARAMETERS AND PUMPING DATA FOR A NEW PUMPING PERIOD-
C     **************************
      ENTRY NEWPER
C     **************************
C
      READ (R,490) KP,KPM1,NWEL,TMAX,NUMT,CDLT,DELT,ICKRIV
C
C     ---COMPUTE ACTUAL DELT AND NUMT---
      DT=DELT/24.
      TM=0.0
      DO 310 I=1,NUMT
      DT=CDLT*DT
      TM=TM+DT
      IF (TM.GE.TMAX) GO TO 320
  310 CONTINUE
      GO TO 330
  320 DELT=TMAX/TM*DELT
      NUMT=I
  330 WRITE (P,570) KP,TMAX,NUMT,DELT,CDLT
      DELT=DELT*3600.
      TMAX=TMAX*86400.
C
C     ---INITIALIZE SUMP, STRT, SL, WELL AND WR---
      WRITE (P,580) NWEL
      IF (KP.GT.KPM1) SUMP=0.
      DO 350 I=1,DIML
      DO 350 J=1,DIMW
      IF (KP.EQ.KPM1) GO TO 340
      STRT(I,J)=PHI(I,J)
  340 IF (LEAK.NE.CHK(9)) GO TO 350
      IF (M(I,J).EQ.0.) GO TO 350
      SL(I,J)=RATE(I,J)/M(I,J)*(RIVER(I,J)-STRT(I,J))
  350 WELL(I,J)=0.
      IF (NW.EQ.0) GO TO 370
      DO 360 I=1,NW
  360 WR(I)=0.
  370 IF(NWEL.EQ.0) GO TO 404
C
C     ---READ AND WRITE WELL PUMPING RATES AND WELL RADII---
      KW=0
      DO 400 II=1,NWEL
      READ (R,490) I,J,WELL(I,J),RADIUS
      IF (RADIUS.EQ.0.) GO TO 380
      KW=KW+1
      IF (KW.GT.NW) GO TO 380
      NWR(KW,1)=I
      NWR(KW,2)=J
      WR(KW)=RADIUS
      WRITE (P,590) I,J,WELL(I,J),WR(KW)
      GO TO 390
  380 WRITE (P,590) I,J,WELL(I,J)
```

```
  390 WELL(I,J)=WELL(I,J)/(DELX(J)*DELY(I))
  400 CONTINUE
C
C     ---CHECK IF TRANSIENT CASE---
C
      IF(IHCF.NE.2.OR.KP.NE.1)GO TO 410
C
C     ---RE-CALCULATE AND WRITE WATER-TABLE HEAD FOR TRANSIENT CASE
C                   IF WELL LOCATED IN BOUNDARY NODE---
C
      WRITE(P,406)
      DO 403 I=1,DIML
      DO 403 J=1,DIMW
      IF(XRATEX(I,J).GE.0.0)GO TO 403
      IF(WELL(I,J).EQ.0.) GO TO 402
      RIVER(I,J)=RIVER(I,J)-M(I,J)*WELL(I,J)/RATE(I,J)
      SL(I,J)=RATE(I,J)/M(I,J)*(RIVER(I,J)-STRT(I,J))
  402 WELCFS=WELL(I,J)*DELX(J)*DELY(I)
      WRITE(P,407) I,J,RIVER(I,J),XRIVX(I,J),WELCFS
  403 CONTINUE
      GO TO 410
  404 IF(IHCF.NE.2.OR.KP.NE.1)GO TO 410
C
C     ---WRITE WATER-TABLE HEAD FOR TRANSIENT CASE IF NO WELL LOCATED
C                   IN BOUNDARY NODE---
C
      WRITE(P,408)
      DO 405 I=1,DIML
      DO 405 J=1,DIMW
      IF(XRATEX(I,J).GE.0.0)GO TO 405
      WRITE(P,409) I,J,RIVER(I,J),XRIVX(I,J)
  405 CONTINUE
  410 RETURN
  406 FORMAT('1',7X,'ROW',2X,'COL',5X,'RIVER',7X,'XRIVX',6X,'WELCFS')
  407 FORMAT(' ',8X,I2,3X,I2,3X,F9.3,3X,F9.3,3X,F7.2)
  408 FORMAT('1',7X,'ROW',2X,'COL',5X,'RIVER',7X,'XRIVX')
  409 FORMAT(' ',8X,I2,3X,I2,3X,F9.3,3X,F9.3)
C     ..................................................................
C
C     FORMATS:
C
C     ------------------------------------------------------------------
C
C
  420 FORMAT ('0',63X,'STARTING HEAD =',G15.7)
  430 FORMAT ('0',41X,9A4,'=',G15.7)
  440 FORMAT ('1',49X,9A4,/,65X,'MATRIX',/,50X,36('-'))
  450 FORMAT ('0',72X,'DELX =',G15.7)
  460 FORMAT ('0',72X,'DELY =',G15.7)
  470 FORMAT ('1',60X,'STARTING HEAD MATRIX'/61X,20('-'))
  480 FORMAT ('1',40X,' CONTINUATION - HEAD AFTER ',G20.7,' SEC PUMPING
     1'/42X,58('-'))
 490  FORMAT(8G10.0)
  500 FORMAT (A4,6X,5G10.0,A8)
  509 FORMAT(8F10.4)
  510 FORMAT (20F4.0)
  520 FORMAT ('0',51X,'NUMBER OF PUMPING PERIODS =',I5/49X,'TIME STEPS B
     1ETWEEN PRINTOUTS =',I5//51X,'ERROR CRITERION FOR CLOSURE =',G15.7/
```

```
241X,'           STEADY STATE ERROR CRITERION =',G15.7//44X,'SPECIFIC *
3 STORAGE OF CONFINING BED =',G15.7/54X,'EVAPOTRANSPIRATION RATE =' *
4,G15.7/56X,'EFFECTIVE DEPTH OF ET =',G15.7//22X,'MULTIPLICATION FA *
5CTOR FOR TRANSMISSIVITY IN X DIRECTION =',G15.7/63X,'IN Y DIRECTIO *
6N =',G15.7)                                                         *
530 FORMAT ('0',I2,2X,20F6.1/(5X,20F6.1))
540 FORMAT (8F10.4)
550 FORMAT (1H1,46X,40HGRID SPACING IN PROTOTYPE IN X DIRECTION/47X,4
   1('-')//('0',12F10.0))
560 FORMAT (1H-,46X,40HGRID SPACING IN PROTOTYPE IN Y DIRECTION/47X,4
   1('-')//('0',12F10.0))
570 FORMAT ('-',50X,'PUMPING PERIOD NO.',I4,':',F10.2,' DAYS'/51X,38('
   1-')//53X,'NUMBER OF TIME STEPS=',I6//59X,'DELT IN HOURS =',F10.3//
   253X,'MULTIPLIER FOR DELT =',F10.3)
580 FORMAT ('-',63X,I4,' WELLS'/65X,9('-')//50X,'I',9X,'J     PUMPING R
   1ATE  WELL RADIUS'/)
590 FORMAT (41X,2I10,2F13.2)
600 FORMAT (4G20.10)
610 FORMAT ('0',30X,'ON ALPHAMERIC MAP:'/40X,'MULTIPLICATION FACTOR FO
   1R X DIMENSION =',G15.7/40X,'MULTIPLICATION FACTOR FOR Y DIMENSION 
   2=',G15.7/55X,'MAP SCALE IN UNITS OF  ',A11/50X,'NUMBER OF ',A8,' P
   3ER INCH =',G15.7/43X,'MULTIPLICATION FACTOR FOR DRAWDOWN =',G15.7/
   447X,'MULTIPLICATION FACTOR FOR HEAD =',G15.7)
    END
```

STEP

```
      SUBROUTINE STEP(PHI,KEEP,STRT,SURI,T,WELL,PERM,BOTTOM,TOP,DELX,DDN
     1,DELY,WR,NWR,TEST3,RATE)
C     ------------------------------------------------------------------
C     INITIALIZE DATA FOR TIME STEP, CHECK FOR STEADY STATE,
C     PRINT AND  PUNCH RESULTS
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI,DBLE,DABS,TEST2,DMAX1,XLABEL,YLABEL,XN1,MESUR,TITLE
      REAL *4MINS,M,KEEP
      INTEGER R,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,
     1CONTR,LEAK,RECH,SIP,ADI
C
      DIMENSION PHI(IZ,JZ), KEEP(IZ,JZ), STRT(IZ,JZ), SURI(IZ,JZ), T(IZ,
     1JZ), BOTTOM(IP,JP), WELL(IZ,JZ), PERM(IP,JP), TOP(IC,JC), DELX(JZ)
     2, DDN(JZ), DELY(IZ), WR(IH), NWR(IH,2), ITTO(200), TEST3(IMX1),
     3RATE(IZ,JZ)
C
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,
     3IERR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT
      COMMON /CK/ ETFLXT,STORT,QRET,CHST,CHDT,FLUXT,PUMPT,CFLUXT,FLXNT
      COMMON /ARSIZE/ IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IH,IMAX,IMX1,I0
     1WT,IHCF,LPRINT,IQ,JQ,NHCF
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(5),XN1,MESUR,PRNT(122),BLANK
     1(60),DIGIT(122),VF1(6),VF2(6),VF3(7),XSCALE,DINCH,SYM(17),XN(100),
     2YN(13),NA(4),N1,N2,N3,YSCALE,FACT1,FACT2
C
      DATA PIE/3.141593/,YYY/Z00000000/
      RETURN
C     ..................................................................
C
C     ---START A NEW TIME STEP---
C     ********************
      ENTRY NEWSTP
C     ********************
      KT=KT+1
      KOUNT=0
      DO 10 I=1,DIML
      DO 10 J=1,DIMW
   10 KEEP(I,J)=PHI(I,J)
      DELT=CDLT*DELT
      SUM=SUM+DELT
      SUMP=SUMP+DELT
      DAYSP=SUMP/86400.
      YRSP=DAYSP/365.
      HRS=SUM/3600.
      MINS=HRS*60.
      DAYS=HRS/24.
      YRS=DAYS/365.
      RETURN
C     ..................................................................
C
C     ---CHECK FOR STEADY STATE---
C     *********************
```

```
      ENTRY STEADY
C     **********************
      TEST2=0.
      DO 20 I=2,INO1
      DO 20 J=2,JNO1
   20 TEST2=DMAX1(TEST2,DABS(DBLE(KEEP(I,J))-PHI(I,J)))
      IF (TEST2.GE.EROR) GO TO 30
      WRITE (P,330) KT
      IFINAL=1
      GO TO 40
   30 IF (KT.EQ.NUMT) IFINAL=1
C
C     ---ENTRY FOR TERMINATING COMPUTATIONS IF MAXIMUM ITERATIONS
C     EXCEEDED---
C     **********************
      ENTRY TERM1
C     **********************
   40 IF (KT.GT.200) WRITE (P,400)
      ITTO(KT)=KOUNT
      IF (KOUNT.LE.ITMAX) GO TO 80
      IERR=2
      KOUNT=KOUNT-1
      ITTO(KT)=KOUNT
      IF (KT.EQ.1) GO TO 60
C
C     ---WRITE ON DISK OR PUNCH CARDS AS SPECIFIED IN THE OPTIONS---
      XXX=SUM-DELT
      IF (IDK2.EQ.CHK(15)) WRITE (4) ((KEEP(I,J),YYY,I=1,DIML),J=1,DIMW)
     1,XXX,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ETFLXT,FLXNT
      IF (PNCH.NE.CHK(1)) GO TO 80
      WRITE (PU,360) XXX,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ET
     1FLXT,FLXNT
      DO 50 I=1,DIML
   50 WRITE (PU,350) (KEEP(I,J),J=1,DIMW)
      GO TO 80
   60 IF (IDK2.EQ.CHK(15)) WRITE (4) PHI,SUM,SUMP,PUMPT,CFLUXT,QRET,CHST
     1,CHDT,FLUXT,STORT,ETFLXT,FLXNT
      IF (PNCH.NE.CHK(1)) GO TO 80
      WRITE (PU,360) SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ET
     1FLXT,FLXNT
      DO 70 I=1,DIML
   70 WRITE (PU,350) (PHI(I,J),J=1,DIMW)
C
   80 IF (CHCK.EQ.CHK(5)) CALL CHECK
      IF (IERR.EQ.2) GO TO 90
C
C     ---PRINT OUTPUT AT DESIGNATED TIME STEPS---'
      IF (MOD(KT,KTH).NE.0.AND.IFINAL.NE.1) RETURN
   90 WRITE (P,340) KT,DELT,SUM,MINS,HRS,DAYS,YRS,DAYSP,YRSP
      IF (CHCK.EQ.CHK(5)) CALL CWRITE
      IF (TT.NE.0.) WRITE (P,320) TMIN,TT
      KOUNT=KOUNT+1
      WRITE (P,300) (TEST3(J),J=1,KOUNT)
      WRITE (P,290) TEST2
      I3=1
      I5=0
  100 I5=I5+40
      I4=MIN0(KT,I5)
```

```
      WRITE (P,390) (I,I=I3,I4)
      WRITE (P,380)
      WRITE (P,370) (ITTO(I),I=I3,I4)
      WRITE (P,380)
      IF (KT.LE.I5) GO TO 110
      I3=I3+40
      GO TO 100
C
C     ---PRINT ALPHAMERIC MAPS---
  110 IF (CONTR.NE.CHK(3)) GO TO 120
      IF (FACT1.NE.0.) CALL PRNTA(1)
      IF (FACT2.NE.0.) CALL PRNTA(2)
  120 IF (HEAD.NE.CHK(8)) GO TO 140
C
C     ---PRINT HEAD MATRIX---
      WRITE (P,310)
      DO 130 I=1,DIML
  130 WRITE (P,VF4) I,(PHI(I,J),J=1,DIMW)
  140 IF (NUM.NE.CHK(4)) GO TO 170
C
C     ---PRINT DRAWDOWN---
      IF(IDO.EQ.1)GO TO 1000
      WRITE (P,280)
C     ********************
      ENTRY DRDN
C     ********************
      DO 160 I=1,DIML
      DO 150 J=1,DIMW
      DDN(J)=SURI(I,J)-PHI(I,J)
      IF (T(I,J).EQ.0.0) GO TO 150
C     REMOVE C FROM COL 1 OF NEXT CARD TO PUNCH DRAWDOWN IN CALCOMP FORM
C     WRITE(7,811)I,J,DDN(J)
  150 CONTINUE
  160 WRITE (P,VF4) I,(DDN(J),J=1,DIMW)
      IF(IDO.EQ.0)GO TO 170
 1000 ICOUNT=0
  799 IDIMW=DIMW/2
      IK=1
      IJ=1
  800 IJ1=IJ+2
      IF(ICOUNT.EQ.0)WRITE(P,410) (XLAB(I),I=IJ,IJ1)
      IF(ICOUNT.EQ.1)WRITE(P,500) (XLAB(I),I=IJ,IJ1)
      WRITE(P,810) (DIGIT(I),I=IK,IDIMW)
      DO 165 I=1,DIML
      DO 155 J=IK,IDIMW
      IF(ICOUNT.LT.1)DDN(J)=SURI(I,J)-PHI(I,J)
      IF(ICOUNT.EQ.1)DDN(J)=RATE(I,J)/ACT
  155 CONTINUE
      IF(ICOUNT.LT.1)WRITE(P,VF5) I,(DDN(J),J=IK,IDIMW)
  165 IF(ICOUNT.EQ.1)WRITE(P,VF6) I,(DDN(J),J=IK,IDIMW)
      WRITE(P,810) (DIGIT(I),I=IK,IDIMW)
      IF(IK.GE.2)GO TO 169
      IK=IK+IDIMW
      IJ=IJ+3
      IDIMW=DIMW
      GO TO 800
  169 ICOUNT=ICOUNT+1
      IF(ICOUNT.LE.1)GO TO 799
```

```
  170 IF (NW.EQ.0.OR.IERR.EQ.1) GO TO 230
C     ......................................................................
C
C     ---COMPUTE APPROXIMATE HEAD FOR PUMPING WELLS---
      WRITE (P,260)
      DO 220 KW=1,NW
      IF (WR(KW).EQ.0.) GO TO 220
      I=NWR(KW,1)
      J=NWR(KW,2)
C
C     COMPUTE EFFECTIVE RADIUS OF WELL IN MODEL---
      RE=(DELX(J)+DELY(I))/9.62
      IF (WATER.NE.CHK(2)) GO TO 180
      IF (CONVRT.NE.CHK(7)) GO TO 190
      IF (PHI(I,J).LT.TOP(I,J)) GO TO 190
C
C     ---COMPUTATION FOR WELL IN ARTESIAN AQUIFER---
  180 HW=PHI(I,J)+WELL(I,J)*ALOG(RE/WR(KW))/(2.*PIE*T(I,J))*DELX(J)*DELY
     1(I)
      GO TO 210
C
C     ---COMPUTATION FOR WELL IN WATER TABLE AQUIFER
  190 HED=PHI(I,J)-BOTTOM(I,J)
      ARG=HED*HED+WELL(I,J)*ALOG(RE/WR(KW))/(PIE*PERM(I,J))*DELX(J)*DELY
     1(I)
      IF (ARG.GT.0.) GO TO 200
      WRITE (P,270) I,J
      GO TO 220
  200 HW=SQRT(ARG)+BOTTOM(I,J)
C
C     ---COMPUTE DRAWDOWN AT THE WELL AND PRINT RESULTS---
  210 DRAW=SURI(I,J)-HW
      WRITE (P,250) I,J,WR(KW),HW,DRAW
  220 CONTINUE
  230 IF (IERR.NE.2) RETURN
      STOP
C
C     ---DISK OUTPUT---
C     ****************
      ENTRY DISK
C     ****************
      WRITE (4) PHI,SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ETF
     1LXT,FLXNT
      RETURN
C     ......................................................................
C
C     ---PUNCHED OUTPUT---
C     ********************
      ENTRY PUNCH
C     ********************
      WRITE (PU,360) SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ET
     1FLXT,FLXNT
      DO 240 I=1,DIML
  240 WRITE (PU,350) (PHI(I,J),J=1,DIMW)
      RETURN
C
C     ......................................................................
C
```

```
C     FORMATS:
C
C
C     ------------------------------------------------------------------
C
C
  250 FORMAT (' ',43X,2I5,3F11.2)
  260 FORMAT ('-',50X,'HEAD AND DRAWDOWN IN PUMPING WELLS'/51X,34('-')//
     148X,'I     J    WELL RADIUS     HEAD     DRAWDOWN'//)
  270 FORMAT (' ',43X,2I5,'  WELL IS DRY')
  280 FORMAT (1H1,60X,'DRAWDOWN'/61X,8('-'))
  290 FORMAT ('0MAXIMUM CHANGE IN HEAD FOR THIS TIME STEP =',F10.3/' ',5
     13('-'))
  300 FORMAT ('0MAXIMUM HEAD CHANGE FOR EACH ITERATION:'/' ',39('-')/('M
     1',10F12.4))
  310 FORMAT ('1',60X,'HEAD MATRIX'/61X,11('-'))
  320 FORMAT ('0DIMENSIONLESS TIME FOR THIS STEP RANGES FROM',G15.7,'  T
     1O',G15.7)
  330 FORMAT ('-*****STEADY STATE AT TIME STEP',I4,'*****')
  340 FORMAT (1H1,44X,57('-')/45X,'I',14X,'TIME STEP NUMBER =',I9,14X,'I
     1'/45X,57('-')//50X,29HSIZE OF TIME STEP IN SECONDS=,F14.2//55X,'TO
     2TAL SIMULATION TIME IN SECONDS=',F14.2/80X,8HMINUTES=,F14.2/82X,6H
     3HOURS=,F14.2/83X,5HDAYS=,F14.2/82X,'YEARS=',F14.2///45X,'DURATION 
     4OF CURRENT PUMPING PERIOD IN DAYS=',F14.2/82X,'YEARS=',F14.2//)
  350 FORMAT (8F10.4)
  360 FORMAT (4G20.10)
  370 FORMAT ('0ITERATIONS:',40I3)
  380 FORMAT (' ',10('-'))
  390 FORMAT ('0TIME STEP :',40I3)
  400 FORMAT ('0',10('*'),'THE NUMBER OF TIME STEPS EXCEEDS THE DIMENSIO
     1N OF THE VECTOR ITTO AND MAY CAUSE UNEXPECTED RESULTS IN ADDITIONA
     2L'/'0COMPUTATION.  AVOID PROBLEMS BY INCREASING THE DIMENSION OF T
     3HE VECTOR ITTO IN STEP',10('*'))
  500 FORMAT(1H1,46X,'VERTICAL HYDRAULIC CONDUCTIVITY MULTIPLIER',          *
     &2X,3A4/47X,56('-'))                                                   *
  410 FORMAT(1H1,60X,'DRAWDOWN',2X,3A4/61X,21('-'))                         *
  810 FORMAT(1H0,12X,20(A4,2X))                                             *
  811 FORMAT(2I5,F5.1)                                                      *
      END
```

SOLVE1

```
      SUBROUTINE SOLVE1(PHI,BE,G,TEMP,KEEP,PHE,STRT,T,S,QRE,WELL,TL,SL,D
     1EL,ETA,V,XI,DELX,BET,DELY,ALF,TEST3,TR,TC,GRND,SY,TOP,RATE,M,RIVER
     2)
C     ------------------------------------------------------------------
C      SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI,DBLE,RHOP(20),G,BE,TEMP,DABS,W,TEST2,DMAX1,RHO,B,D,F,H,
     1B1,E,CH,GH,BH,DH,EH,FH,HH,ALFA,BETA,GAMA,RES
      REAL *4KEEP,M
      INTEGER R,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,
     1CONTR,LEAK,RECH,SIP,IORDER(21),ADI
C
      DIMENSION PHI(1), BE(1), G(1), TEMP(1), KEEP(1), PHE(1), STRT(1),
     1T(1), S(1), QRE(1), WELL(1), TL(1), SL(1), DEL(1), ETA(1), V(1), X
     2I(1), DELX(1), BET(1), DELY(1), ALF(1), TEST3(1), TR(1), TC(1), GR
     3ND(1), SY(1), TOP(1), RATE(1), M(1), RIVER(1)
C
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)                *
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,
     3IFRR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT                            *
      RETURN
C     ..................................................................
C
C     ---COMPUTE AND PRINT ITERATION PARAMETERS---
C     ********************
      ENTRY ITER1
C     ********************
C     ---INITIALIZE ORDER OF ITERATION PARAMETERS (OR REPLACE WITH A
C     READ STATEMENT)---
      DATA IORDER/1,2,3,4,5,1,2,3,4,5,11*1/
      I2=INO1-1
      J2=JNO1-1
      L2=LENGTH/2
      PL2=L2-1.
      W=0.
      PI=0.
C
C     ---COMPUTE AVERAGE MAXIMUM PARAMETER FOR PROBLEM---
      DO 10 I=2,INO1
      DO 10 J=2,JNO1
      N=I+DIML*(J-1)
      IF (T(N).EQ.0.) GO TO 10
      PI=PI+1.
      DX=DELX(J)/WIDTH
      DY=DELY(I)/YDIM
      W=W+1.-AMIN1(2.*DX*DX/(1.+FACTY*DX*DX/(FACTX*DY*DY)),2.*DY*DY/(1.+
     1FACTX*DY*DY/(FACTY*DX*DX)))
   10 CONTINUE
      W=W/PI
C
C     ---COMPUTE PARAMETERS IN GEOMETRIC SEQUENCE---
      PJ=-1.
      DO 20 I=1,L2
```

```
      PJ=PJ+1.
   20 TEMP(I)=1.-(1.-W)**(PJ/PL2)
C
C     ---ORDER SEQUENCE OF PARAMETERS---
      DO 30 J=1,LENGTH
   30 RHOP(J)=TEMP(IORDER(J))
      WRITE (P,370) HMAX
      WRITE (P,380) LENGTH,(RHOP(J),J=1,LENGTH)
      RETURN
C     ..................................................................
C
C     ---INITIALIZE DATA FOR A NEW ITERATION---
   40 KOUNT=KOUNT+1
      IF (KOUNT.LE.ITMAX) GO TO 50
      WRITE (P,360)
      CALL TERM1
   50 IF (MOD(KOUNT.LENGTH)) 60,60,70
C     ************************
      ENTRY NEWITA
C     ************************
   60 NTH=0
   70 NTH=NTH+1
      W=RHOP(NTH)
      TEST3(KOUNT+1)=0.
      TEST=0.
      N=DIML*DIMW
      DO 80 I=1.N
      PHE(I)=PHI(I)
      DEL(I)=0.
      ETA(I)=0.
      V(I)=0.
   80 XI(I)=0.
      BIGI=0.0
C
C     ---COMPUTE TRANSMISSIVITY AND T COEFFICIENTS IN WATER TABLE
C     OR WATER TABLE-ARTESIAN SIMUATION---
      IF (WATER.NE.CHK(2)) GO TO 90
      CALL TRANS
C
C     ---CHOOSE SIP NORMAL OR REVERSE ALGORITHM---
   90 IF (MOD(KOUNT,2)) 100,230,100
C     ..................................................................
C     ---ORDER EQUATIONS WITH ROW 1 FIRST - 3X3 EXAMPLE:
C              1 2 3
C              4 5 6
C              7 8 9
C     ..................................................................
  100 DO 210 I=2,INO1
      DO 210 J=2,JNO1
      N=I+DIML*(J-1)
      NL=N-DIML
      NR=N+DIML
      NA=N-1
      NB=N+1
C
C     ---SKIP COMPUTATIONS IF NODE IS OUTSIDE AQUIFER BOUNDARY---
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 210
C
```

```
C     ---COMPUTE COEFFICIENTS---
      D=TR(NL)/DELX(J)
      F=TR(N)/DELX(J)
      B=TC(NA)/DELY(I)
      H=TC(N)/DELY(I)
      IF (EVAP.NE.CHK(6)) GO TO 120
C
C     ---COMPUTE EXPLICIT AND IMPLICIT PARTS OF ET RATE---
      ETQB=0.
      ETQD=0.0
      IF (PHE(N).LE.GRND(N)-ETDIST) GO TO 120
      IF (PHE(N).GT.GRND(N)) GO TO 110
      ETQB=QET/ETDIST
      ETQD=ETQB*(ETDIST-GRND(N))
      GO TO 120
  110 ETQD=QET
C
C     ---COMPUTE STORAGE TERM---
  120 IF (CONVRT.EQ.CHK(7)) GO TO 130
      RHO=S(N)/DELT
      IF (WATER.EQ.CHK(2)) RHO=SY(N)/DELT
      GO TO 200
C
C     ---COMPUTE STORAGE COEFFICIENT FOR CONVERSION PROBLEM---
  130 SUBS=0.0
      IF (KEEP(N).GE.TOP(N).AND.PHE(N).GE.TOP(N)) GO TO 170
      IF (KEEP(N).LT.TOP(N).AND.PHE(N).LT.TOP(N)) GO TO 160
      IF (KEEP(N)-PHE(N)) 140,150,150
  140 SUBS=(SY(N)-S(N))/DELT*(KEEP(N)-TOP(N))
      GO TO 170
  150 SUBS=(S(N)-SY(N))/DELT*(KEEP(N)-TOP(N))
  160 RHO=SY(N)/DELT
      GO TO 180
  170 RHO=S(N)/DELT
  180 IF (LEAK.NE.CHK(9)) GO TO 200
C
C     ---COMPUTE NET LEAKAGE TERM FOR CONVERSION SIMULATION---
      IF (RATE(N).EQ.0..OR.M(N).EQ.0.) GO TO 200
      HED1=AMAX1(STRT(N),TOP(N))
      U=1.
      HED2=0.
      IF (PHE(N).GE.TOP(N)) GO TO 190
      HED2=TOP(N)
      U=0.
  190 SL(N)=RATE(N)/M(N)*(RIVER(N)-HED1)+TL(N)*(HED1-HED2-STRT(N))
  200 CONTINUE
C
C     ---SIP 'NORMAL' ALGORITHM---
C     ---FORWARD SUBSTITUTE, COMPUTING INTERMEDIATE VECTOR V---
      E=-B-D-F-H-RHO-TL(N)*U-ETQB
      CH=DEL(NA)*B/(1.+W*DEL(NA))
      GH=ETA(NL)*D/(1.+W*ETA(NL))
      BH=B-W*CH
      DH=D-W*GH
      EH=E+W*CH+W*GH
      FH=F-W*CH
      HH=H-W*GH
      ALFA=BH
```

```
      BETA=DH
      GAMA=EH-ALFA*ETA(NA)-BETA*DEL(NL)
      DEL(N)=FH/GAMA
      ETA(N)=HH/GAMA
      RES=-D*PHI(NL)-F*PHI(NR)-H*PHI(NB)-B*PHI(NA)-E*PHI(N)-RHO*KEEP(N)-
     1SL(N)-QRE(N)-WELL(N)+ETQD-SUBS-TL(N)*STRT(N)
      V(N)=(HMAX*RES-ALFA*V(NA)-BETA*V(NL))/GAMA
  210 CONTINUE
C
C     ---BACK SUBSTITUTE FOR VECTOR XI---
      DO 220 I=1,I2
      I3=DIML-I
      DO 220 J=1,J2
      J3=DIMW-J
      N=I3+DIML*(J3-1)
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 220
      XI(N)=V(N)-DEL(N)*XI(N+DIML)-ETA(N)*XI(N+1)
C
C     ---COMPARE MAGNITUDE OF CHANGE WITH CLOSURE CRITERION---
      TCHK=ABS(XI(N))
      IF (TCHK.GT.BIGI) BIGI=TCHK
      PHI(N)=PHI(N)+XI(N)
  220 CONTINUE
      IF (BIGI.GT.ERR) TEST=1.
      TEST3(KOUNT+1)=BIGI
      IF (TEST.EQ.1.) GO TO 40
      RETURN
C
C     ..................................................................
C     ---ORDER EQUATIONS WITH THE LAST ROW FIRST - 3X3  EXAMPLE:
C               7 8 9
C               4 5 6
C               1 2 3
C     ..................................................................
  230 DO 340 II=1,I2
      I=DIML-II
      DO 340 J=2,JNO1
      N=I+DIML*(J-1)
      NL=N-DIML
      NR=N+DIML
      NA=N-1
      NB=N+1
C
C     ---SKIP COMPUTATIONS IF NODE IS OUTSIDE AQUIFER BOUNDARY---
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 340
C
C     ---COMPUTE COEFFICIENTS---
      D=TR(NL)/DELX(J)
      F=TR(N)/DELX(J)
      B=TC(NA)/DELY(I)
      H=TC(N)/DELY(I)
      IF (EVAP.NE.CHK(6)) GO TO 250
C
C     ---COMPUTE EXPLICIT AND IMPLICIT PARTS OF ET RATE---
      ETQB=0.
      ETQD=0.0
      IF (PHE(N).LE.GRND(N)-ETDIST) GO TO 250
      IF (PHE(N).GT.GRND(N)) GO TO 240
```

```
      ETQB=QET/ETDIST
      ETQD=ETQB*(ETDIST-GRND(N))
      GO TO 250
  240 ETQD=QET
C
C     ---COMPUTE STORAGE TERM---
  250 IF (CONVRT.EQ.CHK(7)) GO TO 260
      RHO=S(N)/DELT
      IF (WATER.EQ.CHK(2)) RHO=SY(N)/DELT
      GO TO 330
C
C     ---COMPUTE STORAGE COEFFICIENT FOR CONVERSION PROBLEM---
  260 SUBS=0.0
      IF (KEEP(N).GE.TOP(N).AND.PHE(N).GE.TOP(N)) GO TO 300
      IF (KEEP(N).LT.TOP(N).AND.PHE(N).LT.TOP(N)) GO TO 290
      IF (KEEP(N)-PHE(N)) 270,280,280
  270 SUBS=(SY(N)-S(N))/DELT*(KEEP(N)-TOP(N))
      GO TO 300
  280 SUBS=(S(N)-SY(N))/DELT*(KEEP(N)-TOP(N))
  290 RHO=SY(N)/DELT
      GO TO 310
  300 RHO=S(N)/DELT
  310 IF (LEAK.NE.CHK(9)) GO TO 330
C
C     ---COMPUTE NET LEAKAGE TERM FOR CONVERSION SIMULATION---
      IF (RATE(N).EQ.0..OR.M(N).EQ.0.) GO TO 330
      HED1=AMAX1(STRT(N),TOP(N))
      U=1.
      HED2=0.
      IF (PHE(N).GE.TOP(N)) GO TO 320
      HED2=TOP(N)
      U=0.
  320 SL(N)=RATE(N)/M(N)*(RIVER(N)-HED1)+TL(N)*(HED1-HED2-STRT(N))
  330 CONTINUE
C
C     ---SIP 'REVERSE' ALGORITHM---
C     ---FORWARD SUBSTITUTE, COMPUTING INTERMEDIATE VECTOR V---
      E=-B-D-F-H-RHO-TL(N)*U-ETQB
      CH=DEL(NB)*H/(1.+W*DEL(NB))
      GH=ETA(NL)*D/(1.+W*ETA(NL))
      BH=H-W*CH
      DH=D-W*GH
      EH=E+W*CH+W*GH
      FH=F-W*CH
      HH=B-W*GH
      ALFA=BH
      BETA=DH
      GAMA=EH-ALFA*ETA(NB)-BETA*DEL(NL)
      DEL(N)=FH/GAMA
      ETA(N)=HH/GAMA
      RES=-D*PHI(NL)-F*PHI(NR)-H*PHI(NB)-B*PHI(NA)-E*PHI(N)-RHO*KEEP(N)-
     1SL(N)-QRE(N)-WELL(N)+ETQD-SUBS-TL(N)*STRT(N)
      V(N)=(HMAX*RES-ALFA*V(NB)-BETA*V(NL))/GAMA
  340 CONTINUE
C
C     ---BACK SUBSTITUTE FOR VECTOR XI---
      DO 350 I3=2,IN01
      DO 350 J=1,J2
```

```
      J3=DIMW-J
      N=I3+DIML*(J3-1)
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 350
      XI(N)=V(N)-DEL(N)*XI(N+DIML)-ETA(N)*XI(N-1)
C
C     ---COMPARE MAGNITUDE OF CHANGE WITH CLOSURE CRITERION---
      TCHK=ABS(XI(N))
      IF (TCHK.GT.BIGI) BIGI=TCHK
      PHI(N)=PHI(N)+XI(N)
  350 CONTINUE
      IF (BIGI.GT.ERR) TEST=1.
      TEST3(KOUNT+1)=BIGI
      IF (TEST.EQ.1.) GO TO 40
      RETURN
C
C     .................................................................
C
C     ---FORMATS---
C
C     -----------------------------------------------------------------
C
C
  360 FORMAT ('0EXCEEDED PERMITTED NUMBER OF ITERATIONS'/' ',39('*'))
  370 FORMAT ('-',44X,'SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE'/45X,
     143('_'),//,61X,'BETA=',F5.2)
  380 FORMAT (1H0,I5,22H ITERATION PARAMETERS:,6D15.7/(/28X,6D15.7/))
      END
```

```
      SUBROUTINE COEF(PHI,KEEP,PHE,STRT,SURI,T,TR,TC,S,WELL,TL,SL,PERM,B
     1OTTOM,SY,RATE,RIVER,M,TOP,GRND,DELX,DELY,XRATEX,TLHCF)
C     ------------------------------------------------------------------
C     COMPUTE COEFFICIENTS
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI,DBLE,RHO,B,D,F,H
      REAL *4KEEP,M
      INTEGER R,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,
     1CONTR,LEAK,RECH,SIP,ADI
C
      DIMENSION TLHCF(NHCF,3)
      DIMENSION PHI(1), KEEP(1), PHE(1), STRT(1), SURI(1), T(1), TR(1),
     1TC(1), S(1), WELL(1), TL(1), SL(1), PERM(1), BOTTOM(1), SY(1), RAT
     2E(1), RIVER(1), M(1), TOP(1), GRND(1), DELX(1), DELY(1),XRATEX(1)
C
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,
     3IERR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT
      COMMON /ARSIZE/ IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IH,IMAX,IMX1,I
     1WT,IHCF,LPRINT,IQ,JQ,NHCF
C
      DATA PIE/3.141593/
      RETURN
C     ..................................................................
C
C     ---COMPUTE COEFFICIENTS FOR TRANSIENT PART OF LEAKAGE TERM---
C     ********************
      ENTRY CLAY
C     ********************
      TMIN=1.E30
      TT=0.0
      PRATE=0.
      ICK=1
      IK=0
      DO 50 I=1,DIML
      DO 50 J=1,DIMW
      N=I+DIML*(J-1)
      IF(IHCF.EQ.0)GO TO 5
      IF(XRATEX(N).LT.0.0)ICK=-1
    5 RAT=RATE(N)
      IF(ICK.LT.0)RAT=ABS(XRATEX(N))
C
C     ---SKIP COMPUTATIONS IF T, RATE OR M = 0. OR IF CONSTANT
C        HEAD BOUNDARY---
      IF(RATE(N).LE.0..OR.T(N).EQ.0..OR.M(N).EQ.0..OR.S(N).LT.0.)GO TO
     1 50
C
C     ---IF VALUE FOR TL(N  ) WILL EQUAL VALUE FOR PREVIOUS NODE,
C     SKIP PART OF COMPUTATIONS---
      IF(RAT*M(N).EQ.PRATE) GO TO 40
      DIMT=RAT*SUMP/(M(N)*M(N)*SS*3)
      IF (DIMT.GT.TT) TT=DIMT
      IF (DIMT.LT.TMIN) TMIN=DIMT
```

```
      PPT=PIE*PIE*DIMT
C
C     ---RECOMPUTE PPT IF DIMT WITHIN RANGE FOR SHORT TIME COMPUTATION--
      IF (DIMT.LT.1.0E-03) PPT=1.0/DIMT
      CC=(2.3-PPT)/(2.*PPT)
C
C     ---COMPUTE SUM OF EXPONENTIALS---
      SUMN=0.0
      DO 20 K=1,200
      POWER=K*K*PPT
      IF (POWER.LE.150.) GO TO 10
      POWER=150
   10 PEX=EXP(-POWER)
      SUMN=SUMN+PEX
      IF (PEX.GT.0.00009) GO TO 20
      IF (K.GT.CC) GO TO 30
   20 CONTINUE
C
C     ---COMPUTE DENOMINATER DEPENDING ON VALUE OF DIMT---
   30 DENOM=1.0
      IF (DIMT.LT.1.0E-03) DENOM=SQRT(PIE*DIMT)
C
C     ---HEAD VALUES ARE NOT INCLUDED IN COMPUTATION OF Q FACTOR SINCE
C        LEAKAGE IS CONSIDERED IMPLICITLY---
   40 Q1=RAT/(M(N)*DENOM)
      TL(N)=Q1+2.*Q1*SUMN
      IF(ICK.GT.0)GO TO 45
      IK=IK+1
      TLHCF(IK,1)=TL(N)
      TLHCF(IK,2)=I
      TLHCF(IK,3)=J
      ICK=1
      GO TO 5
   45 PRATE=RAT*M(N)
   50 CONTINUE
      TMIN=TMIN*3.0
      TT=TT*3.0
      RETURN
C     ...................................................................
C
C     ---COMPUTE TRANSMISSIVITY IN WT OR WT-ARTESIAN CONVERSION PROBLEM-
C     ********************
      ENTRY TRANS
C     ********************
      DO 60 I=1,DIML
      DO 60 J=1,DIMW
      N=I+DIML*(J-1)
      IF (PERM(N).EQ.0.) GO TO 60
      HED=PHI(N)
      IF (CONVRT.EQ.CHK(7)) HED=AMIN1(SNGL(PHI(N)),TOP(N))
      T(N)=PERM(N)*(HED-BOTTOM(N))
      IF (T(N).GT.0.) GO TO 60
      IF (WELL(N).LT.0.) GO TO 70
C
C     ---THE FOLLOWING STATEMENTS APPLY WHEN NODES (EXCEPT WELL NODES)
C     GO DRY---
      PERM(N)=0.
      T(N)=0.0
```

```
      TR(N-DIML)=0.
      TR(N)=0.
      TC(N-1)=0.
      TC(N)=0.
      PHI(N)=SURI(N)
      WRITE (P,150) I,J
   60 CONTINUE
      IF (KT.EQ.0) RETURN
      GO TO 90
C
C     ---START PROGRAM TERMINATION WHEN A WELL GOES DRY---
   70 WRITE (P,120) I,J
      WRITE (P,130)
      IERR=1
      CALL DRDN
      DO 80 I=2,INO1
      DO 80 J=2,JNO1
      N=I+DIML*(J-1)
   80 PHI(N)=KEEP(N)
      SUM=SUM-DELT
      SUMP=SUMP-DELT
      KT=KT-1
      IF (KT.EQ.0) STOP
      IF (IDK2.EQ.CHK(15)) CALL DISK
      IF (PNCH.EQ.CHK(1)) CALL PUNCH
      IF (MOD(KT,KTH).EQ.0) STOP
      WRITE (P,140) KT,SUM
      CALL DRDN
      IF (CHCK.EQ.CHK(5)) CALL CWRITE
      STOP
C
C     ---COMPUTE T COEFFICIENTS---
C     ********************
      ENTRY TCOF
C     ********************
   90 DO 110 I=1,INO1
      DO 110 J=1.JNO1
      N=I+DIML*(J-1)
      NR=N+DIML
      NB=N+1
      IF (T(N).EQ.0.) GO TO 110
      IF (T(NR).EQ.0.) GO TO 100
      TR(N)=(2.*T(NR)*T(N))/(T(N)*DELX(J+1)+T(NR)*DELX(J))*FACTX
  100 IF (T(NB).EQ.0.) GO TO 110
      TC(N)=(2.*T(NB)*T(N))/(T(N)*DELY(I+1)+T(NB)*DELY(I))*FACTY
  110 CONTINUE
      RETURN
C
C     ---FORMATS---
C
C     ----------------------------------------------------------------
C
C
  120 FORMAT ('-************WELL',I3,',',I3,' GOES DRY**************')
  130 FORMAT ('1',50X,'DRAWDOWN WHEN WELL WENT DRY')
  140 FORMAT ('1',32X,'DRAWDOWN FOR TIME STEP',I3,'; SIMULATION TIME =',
     11PE15.7,' SECONDS')
  150 FORMAT ('-',20('*'),' NODE ',I4,',',I4,' GOES DRY ',20('*'))
```

```
                    COEF
      END                                                              00016180
```

CHECKI

```
      SUBROUTINE CHECKI(PHI,KEEP,PHE,STRT,T,TR,TC,S,QRE,WELL,TL,PERM,BOT
     1TOM,SY,RATE,RIVER,M,TOP,GRND,DELX,DELY,IFLOW,ILEAK,DIST1,DIST2,DIS
     1T3,DIST4,XRIVX,XRATEX,TLHCF)
C     ------------------------------------------------------------------
C     COMPUTE A MASS BALANCE
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI,DBLE
      REAL *4KEEP,M
      INTEGER R,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,
     1CONTR,LEAK,RECH,SIP,ADI
C
      DIMENSION PHI(IZ,JZ), KEEP(IZ,JZ), PHE(IZ,JZ), STRT(IZ,JZ), T(IZ,J
     1Z), TR(IZ,JZ), TC(IZ,JZ), S(IZ,JZ), QRE(IZ,JZ), WELL(IZ,JZ), TL(IZ
     2,JZ), PERM(IZ,JZ), BOTTOM(IP,JP), SY(IP,JP), RATE(IR,JR), RIVER(IR
     3,JR), M(IR,JR), TOP(IC,JC), GRND(IL,JL), DELX(JZ), DELY(IZ)
      DIMENSION CHDTOT(50,50),XXLEAK(50,50),XBFLUX(196,3),XNFLUX(196,3)
      DIMENSION DIST1(IZ,JZ),DIST2(IZ,JZ),DIST3(IZ,JZ),DIST4(IZ,JZ),XRIV
     1X(IQ,JQ),XRATEX(IQ,JQ),TLHCF(NHCF,3)
C
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,
     3IERR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT
      COMMON /CK/ ETFLXT,STORT,QRET,CHST,CHDT,FLUXT,PUMPT,CFLUXT,FLXNT
      COMMON /ARSIZE/ IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IH,IMAX,IMX1,I
     1WT,IHCF,LPRINT,IQ,JQ,NHCF
      COMMON /XLT/ BFINT,BFOUTT,XNINT,XNOUTT
      RETURN
C     ..................................................................
C     ********************
      ENTRY CHECK
C     ********************
C     ---INITIALIZE VARIABLES---
      PUMP=0.
      STOR=0.
      FLUXS=0.0
      CHD1=0.0
      CHD2=0.0
      QREFLX=0.
      CFLUX=0.
      FLUX=0.
      ETFLUX=0.
      FLXN=0.0
      XXXX=0.
      FXNF=0.
      ICK=0
      DO 1 I=1,DIML
      DO 1 J=1,DIMW
      XXLEAK(I,J)=0.0
    1 CHDTOT(I,J)=0.0
      IDIML=DIML-1
      IDIMW=DIMW-1
C     ..................................................................
C
```

```
C     ---COMPUTE RATES,STORAGE AND PUMPAGE FOR THIS STEP---
      DO 240 I=2,IDIML
      DO 240 J=2,IDIMW
      XSS=0.0
      CHD11=0.0
      CHD22=0.0
      IF (T(I,J).EQ.0.) GO TO 240
      AREA=DELX(J)*DELY(I)
      IF (S(I,J).GE.0.) GO TO 120
C
C     ---COMPUTE FLOW RATES TO AND FROM CONSTANT HEAD BOUNDARIES---
      IF (S(I,J-1).LT.0..OR.T(I,J-1).EQ.0.) GO TO 30
      X=(STRT(I,J)-PHI(I,J-1))*TR(I,J-1)*DELY(I)
      IF (X) 10,30,20
   10 CHD11=CHD11+X
      GO TO 30
   20 CHD22=CHD22+X
   30 IF (S(I,J+1).LT.0..OR.T(I,J+1).EQ.0.) GO TO 60
      X=(STRT(I,J)-PHI(I,J+1))*TR(I,J)*DELY(I)
      IF (X) 40,60,50
   40 CHD11=CHD11+X
      GO TO 60
   50 CHD22=CHD22+X
   60 IF (S(I-1,J).LT.0..OR.T(I-1,J).EQ.0.) GO TO 90
      X=(STRT(I,J)-PHI(I-1,J))*TC(I-1,J)*DELX(J)
      IF (X) 70,90,80
   70 CHD11=CHD11+X
      GO TO 90
   80 CHD22=CHD22+X
   90 IF (S(I+1,J).LT.0..OR.T(I+1,J).EQ.0.) GO TO 112
      X=(STRT(I,J)-PHI(I+1,J))*TC(I,J)*DELX(J)
      IF (X) 100,112,110
  100 CHD11=CHD11+X
      GO TO 112
  110 CHD22=CHD22+X
  112 CHD1=CHD1+CHD11
      CHD2=CHD2+CHD22
      CHDTOT(I,J)=CHD11+CHD22
      GO TO 240
C
C     ---RECHARGE AND WELLS---
  120 QREFLX=QREFLX+QRE(I,J)*AREA
      IF (WELL(I,J)) 130,150,140
  130 PUMP=PUMP+WELL(I,J)*AREA
      GO TO 150
  140 CFLUX=CFLUX+WELL(I,J)*AREA
  150 IF (EVAP.NE.CHK(6)) GO TO 190
C
C     ---COMPUTE ET RATE---
      IF (PHI(I,J).GE.GRND(I,J)-ETDIST) GO TO 160
      ETQ=0.0
      GO TO 180
  160 IF (PHI(I,J).LE.GRND(I,J)) GO TO 170
      ETQ=QET
      GO TO 180
  170 ETQ=QET/ETDIST*(PHI(I,J)+ETDIST-GRND(I,J))
  180 ETFLUX=ETFLUX-ETQ*AREA
C
```

```
C       ---COMPUTE VOLUME FROM STORAGE---
  190 STORE=S(I,J)
      IF (WATER.EQ.CHK(2)) STORE=SY(I,J)
      IF (CONVRT.NE.CHK(7)) GO TO 230
      X=KEEP(I,J)-PHI(I,J)
      IF (X) 200,210,210
  200 HED1=PHI(I,J)
      HED2=KEEP(I,J)
      X=ABS(X)
      GO TO 220
  210 HED1=KEEP(I,J)
      HED2=PHI(I,J)
  220 STORE=S(I,J)
      IF (HED1-TOP(I,J).LE.0.) STORE=SY(I,J)
      IF ((HED1-TOP(I,J))*(HED2-TOP(I,J)).LT.0.0) STORE=(HED1-TOP(I,J))/
     1X*S(I,J)+(TOP(I,J)-HED2)/X*SY(I,J)
  230 STOR=STOR+STORE*(KEEP(I,J)-PHI(I,J))*AREA
C
C       ---COMPUTE LEAKAGE RATE---
      IF (LEAK.NE.CHK(9)) GO TO 240
      IF (M(I,J).EQ.0.) GO TO 240
      HED1=STRT(I,J)
      IF (CONVRT.EQ.CHK(7)) HED1=AMAX1(STRT(I,J),TOP(I,J))
      HED2=PHI(I,J)
      IF (CONVRT.EQ.CHK(7)) HED2=AMAX1(SNGL(PHI(I,J)),TOP(I,J))
      XX=RATE(I,J)*(RIVER(I,J)-HED1)*AREA/M(I,J)
      YY=TL(I,J)*(HED1-HED2)*AREA
      IF(XRATEX(I,J).GE.0.)FLUX=FLUX+XX
      XNET=XX+YY
      XXLEAK(I,J)=XNET/AREA
      IF(XRATEX(I,J).GE.0.)FLUXS=FLUXS+XNET
      IF (XRATEX(I,J).GE.0..AND.XNET.LT.0.) FLXN=FLXN-XNET
C
C       ---CHECK IF HCF OPTION IS IN USE---
C
      IF(IHCF.EQ.0) GO TO 240
      IF(XRATEX(I,J).GE.0.0)GO TO 240
      ICK=ICK+1
C
C       ---CALCULATE ACTUAL LEAKAGE RATE---
C
      DO 232 IH=1,NHCF
      IF(I.NE.TLHCF(IH,2).OR.J.NE.TLHCF(IH,3))GO TO 232
      YSS=TLHCF(IH,1)*(HED1-HED2)*AREA
      GO TO 233
  232 CONTINUE
  233 XSS=ABS(XRATEX(I,J))*(XRIVX(I,J)-HED1)*AREA/M(I,J)
      FLUX=FLUX+XSS
      XNESS=XSS+YSS
      XNFLUX(ICK,1)=XNESS/AREA
      XNFLUX(ICK,2)=I
      XNFLUX(ICK,3)=J
      XBFLUX(ICK,1)=XNET-XNESS
      FXNF=FXNF+XBFLUX(ICK,1)
      IF(XBFLUX(ICK,1).LT.0.0)XXXX=XXXX-XBFLUX(ICK,1)
      XBFLUX(ICK,2)=I
      XBFLUX(ICK,3)=J
      FLUXS=FLUXS+XNESS
```

```
      IF(XNESS.LT.0.0)FLXN=FLXN-XNESS
      XBFLUX(ICK,1)=XBFLUX(ICK,1)/AREA
  240 CONTINUE
C     ...............................................................
C
C     ---COMPUTE CUMULATIVE VOLUMES, TOTALS, AND DIFFERENCES---
      STORT=STORT+STOR
      STOR=STOR/DELT
      ETFLXT=ETFLXT-ETFLUX*DELT
      FLUXT=FLUXT+FLUXS*DELT
      FLXNT=FLXNT+FLXN*DELT
      BFOUT=BFOUT+XXXX*DELT
      BFINT=BFINT+FXNF*DELT
      BFTOT=BFOUT+BFINT
      FLXPT=FLUXT+FLXNT
      QRET=QRET+QREFLX*DELT
      CHDT=CHDT-CHD1*DELT
      CHST=CHST+CHD2*DELT
      PUMPT=PUMPT-PUMP*DELT
      CFLUXT=CFLUXT+CFLUX*DELT
      TOTL1=STORT+QRET+CFLUXT+CHST+FLXPT+BFTOT
      TOTL2=CHDT+PUMPT+ETFLXT+FLXNT+BFOUT
      SUMR=QREFLX+CFLUX+CHD2+CHD1+PUMP+ETFLUX+FLUXS+STOR+FXNF
      DIFF=TOTL2-TOTL1
      PERCNT=0.0
      IF (TOTL2.EQ.0.) GO TO 250
      PERCNT=DIFF/TOTL2*100.
  250 RETURN
C     ...............................................................
C
C     ---PRINT RESULTS---
C     ************************
      ENTRY CWRITE
C     ************************
C
      WRITE (P,260) STOR,QREFLX,STORT,CFLUX,QRET,PUMP,CFLUXT,ETFLUX,CHST
     1,BFTOT,CHD2,FLXPT,CHD1,TOTL1,FLUX,FLUXS,ETFLXT,FXNF,CHDT,SUMR,BFOU
     2T,PUMPT,FLXNT,TOTL2,DIFF,PERCNT
      IF(CHD1.EQ.0..AND.CHD2.EQ.0.)GO TO 252
      IF(IFLOW.EQ.0)GO TO 252
      WRITE(P,270)
      WRITE(P,271)
      DO 251 I=1,DIML
      DO 251 J=1,DIMW
      IF(CHDTOT(I,J).NE.0.)WRITE(P,281) I,J,CHDTOT(I,J)
  251 CONTINUE
  252 IF(FLUXS.EQ.0..OR.ILEAK.EQ.0) GO TO 258
      DO 254 K=1,NHCF
      I=XNFLUX(K,2)
      J=XNFLUX(K,3)
      XXLEAK(I,J)=XNFLUX(K,1)
  254 CONTINUE
      DO 261 I=1,DIML
      DO 261 J=1,DIMW
  261 XXLEAK(I,J)=XXLEAK(I,J)*3.784E08
      WRITE(P,301)
      DO 253 I=1,DIML
C
```

```
C       REMOVE C FROM COL 1 OF NEXT CARD TO PUNCH RATE OF VERTICAL LEAKAGE00018510 *
C       IN INCHES PER YEAR                                                00018520 *
        WRITE(7,275)(XXLEAK(I,J),J=1,DIMW)                                00018530 *
  253 WRITE(P,280) I,(XXLEAK(I,J),J=1,DIMW)                               00018540 *
        WRITE(P,272)                                                      00018550 *
        WRITE(P,271)                                                      00018560 *
        DO 257 K=1,NHCF                                                   00018570 *
        I=XBFLUX(K,2)                                                     00018580 *
        J=XBFLUX(K,3)                                                     00018590 *
        WRITE(P,281) I,J,XBFLUX(K,1)                                      00018600 *
C       --REMOVE C FROM COL 1 OF NEXT CARD TO PUNCH HCF FLOW--            00018610 *
        WRITE(7,281)I,J,XBFLUX(K,1)                                       00018620 *
  257 CONTINUE                                                            00018630 *
  258 RETURN                                                              00018640 *
C                                                                         00018650
C       ---FORMATS---                                                     00018660
C                                                                         00018670
C       ------------------------------------------------------------------00018680
C                                                                         00018690
C                                                                         00018700
  260 FORMAT ('0',10X,'CUMULATIVE MASS BALANCE:',16X,'L**3',23X,'RATES F00018710
     1OR THIS TIME STEP:',16X,'L**3/T'/11X,24('-'),43X,25('-')//20X,'SOU00018720
     2RCES:',69X,'STORAGE =',F20.4/20X,8('-'),68X,'RECHARGE =',F20.4/27X00018730
     3,'STORAGE =',F20.2,35X,'CONSTANT FLUX =',F20.4/26X,'RECHARGE =',F200018740
     40.2,41X,'PUMPING =',F20.4/21X,'CONSTANT FLUX =',F20.2,30X,'EVAPOTR00018750
     5ANSPIRATION =',F20.4/21X,'CONSTANT HEAD =',F20.2,34X,'CONSTANT HEA00018760
     6D:'/26X,'HCF FLOW =',F20.2,46X,'IN =',F20.4/27X,'LEAKAGE =',F20.2,00018770 *
     745X,'OUT =',F20.4/21X,'TOTAL SOURCES =',F20.2,40X,'LEAKAGE:'/20X,'00018780 *
     8DISCHARGES:',45X,'FROM PREVIOUS PUMPING PERIOD =',F20.4/20X,11('-'00018790 *
     9),68X,'TOTAL =',F20.4/16X,'EVAPOTRANSPIRATION =',F20.2,40X,'HCF FL00018800 *
     $OW =',F20.4/21X,'CONSTANT HEAD =',F20.2,36X,'SUM OF RATES =',F20.400018810 *
     $/26X,'HCF FLOW =',F20.2/19X,'QUANTITY PUMPED =',F20.2/27X,'LEAKAGE00018820 *
     $ =',F20.2/19X,'TOTAL DISCHARGE =',F20.2//17X,'DISCHARGE-SOURCES ='00018830 *
     $,F20.2/15X,'PERCENT DIFFERENCE =',F20.2)                            00018840 *
  270 FORMAT('1',5X,'RATE OF FLOW INTO(+) AND OUT OF(-) SYSTEM THROUGH C00018850 *
     1ONSTANT HEAD BOUNDARIES (VALUES IN CFS)')                           00018860 *
  271 FORMAT(//,5X,'ROW',4X,'COLUMN',4X,'RATE')                           00018870 *
  272 FORMAT('1',5X,'RATE OF HORIZONTAL FLOW INTO(+) AND OUT OF(-) SYSTE00018880 *
     1M THROUGH HCF NODES')                                               00018890 *
  275 FORMAT(8F10.2)                                                      00018900 *
  280 FORMAT('0',2X,I2,2X,10F12.2/(7X,10F12.2))                           00018910 *
  281 FORMAT(5X,I2,7X,I2,5X,E12.3)                                        00018920 *
  301 FORMAT('1',5X,'RATE OF VERTICAL LEAKAGE - DOWNWARD(+), UPWARD(-)    00018930 *
     1- INCHES PER YEAR')                                                 00018940 *
      END                                                                 00018950
```

PRNTAI

```
      SUBROUTINE PRNTAI(PHI,SURI,T,S,WELL,DELX,DELY)
C     ------------------------------------------------------------------
C     PRINT MAPS OF DRAWDOWN AND HYDRAULIC HEAD
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI,Z,XLABEL,YLABEL,TITLE,XN1,MESUR
      REAL *4K
      INTEGER F,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,
     1CONTR,LEAK,RECH,SIP,ADI
C
      DIMENSION PHI(IZ,JZ), SURI(IZ,JZ), S(IZ,JZ), WELL(IZ,JZ), DELX(JZ)
     1, DELY(IZ), T(IZ,JZ)
C
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,
     3IERR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(5),XN1,MESUR,PRNT(122),BLANK
     1(60),DIGIT(122),VF1(6),VF2(6),VF3(7),XSCALE,DINCH,SYM(17),XN(100),
     2YN(13),NA(4),N1,N2,N3,YSCALE,FACT1,FACT2
      COMMON /ARSIZE/ IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IH,IMAX,IMX1,I
     1WT,IHCF,LPRINT,IQ,JQ,NHCF
      RETURN
C     ..................................................................
C
C     ---INITIALIZE VARIABLES FOR PLOT---
C     ********************
      ENTRY MAP
C     ********************
   10 XSF=DINCH*XSCALE
      YSF=DINCH*YSCALE
      NYD=YDIM/YSF
      IF (NYD*YSF.LE.YDIM-DELY(INO1)/2.) NYD=NYD+1
      IF (NYD.LE.12) GO TO 20
      DINCH=YDIM/(12.*YSCALE)
      WRITE (P,310) DINCH
      IF (YSCALE.LT.1.0) WRITE (P,320)
      GO TO 10
   20 NXD=WIDTH/XSF
      IF (NXD*XSF.LE.WIDTH-DELX(JNO1)/2.) NXD=NXD+1
      N4=NXD*N1+1
      N5=NXD+1
      N6=NYD+1
      N8=N2*NYD+1
      NA(1)=N4/2-1
      NA(2)=N4/2
      NA(3)=N4/2+3
      NC=(N3-N8-10)/2
      ND=NC+N8
      NE=MAX0(N5,N6)
      VF1(3)=DIGIT(ND)
      VF2(3)=DIGIT(ND)
      VF3(3)=DIGIT(NC)
      XLABEL(3)=MESUR
      YLABEL(6)=MESUR
```

```
      DO 40 I=1,NE
      NNX=N5-I
      NNY=I-1
      IF (NNY.GE.N6) GO TO 30
      YN(I)=YSF*NNY/YSCALE
   30 IF (NNX.LT.0) GO TO 40
      XN(I)=XSF*NNX/YSCALE
   40 CONTINUE
      RETURN
C     ..................................................................
C
C     ********************
      ENTRY PRNTA(NG)
C     ********************
C     ---VARIABLES INITIALIZED EACH TIME A PLOT IS REQUESTED---
      DIST=WIDTH-DELX(JNO1)/2.
      JJ=JNO1
      LL=1
      Z=NXD*XSF
      IF (NG.EQ.1) WRITE (P,280) (TITLE(I),I=1,2)
      IF (NG.EQ.2) WRITE (P,280) (TITLE(I),I=3,5)
      DO 270 I=1,N4
C
C     ---LOCATE X AXES---
      IF (I.EQ.1.OR.I.EQ.N4) GO TO 50
      PRNT(1)=SYM(12)
      PRNT(N8)=SYM(12)
      IF ((I-1)/N1*N1.NE.I-1) GO TO 70
      PRNT(1)=SYM(14)
      PRNT(N8)=SYM(14)
      GO TO 70
C
C     ---LOCATE Y AXES---
   50 DO 60 J=1,N8
      IF ((J-1)/N2*N2.EQ.J-1) PRNT(J)=SYM(14)
   60 IF ((J-1)/N2*N2.NE.J-1) PRNT(J)=SYM(13)
C
C     ---COMPUTE LOCATION OF NODES AND DETERMINE APPROPRIATE SYMBOL---
   70 IF (DIST.LT.0..OR.DIST.LT.Z-XN1*XSF) GO TO 220
      YLEN=DELY(2)/2.
      DO 200 L=2,INO1
      J=YLEN*N2/YSF+1.5
      IF (T(L,JJ).EQ.0.) GO TO 140
      IF (S(L,JJ).LT.0.) GO TO 190
      INDX3=0
      GO TO (80,90), NG
   80 K=(SURI(L,JJ)-PHI(L,JJ))*FACT1
C     -TO CYCLE SYMBOLS FOR DRAWDOWN, REMOVE C FROM COL. 1 OF NEXT CARD-
C     K=AMOD(K,10.)
      GO TO 100
   90 K=PHI(L,JJ)*FACT2
  100 IF (K) 110,140,120
  110 IF (J-2.GT.0) PRNT(J-2)=SYM(13)
      N=-K
      IF (N.LT.100) GO TO 130
      GO TO 170
  120 N=K
      IF (N.LT.100) GO TO 130
```

```
      IF (N.GT.999) GO TO 170
      INDX3=N/100
      IF (J-2.GT.0) PRNT(J-2)=SYM(INDX3)
      N=N-INDX3*100
  130 INDX1=MOD(N,10)
      IF (INDX1.EQ.0) INDX1=10
C     -TO CYCLE SYMBOLS FOR DRAWDOWN, REMOVE C FROM COL. 1 OF NEXT CARD-
C     IF (NG.EQ.1) GO TO 150
      INDX2=N/10
      IF (INDX2.GT.0) GO TO 160
      INDX2=10
      IF (INDX3.EQ.0) INDX2=15
      GO TO 160
  140 INDX1=15
  150 INDX2=15
  160 IF (J-1.GT.0) PRNT(J-1)=SYM(INDX2)
      PRNT(J)=SYM(INDX1)
      GO TO 200
  170 DO 180 II=1,3
      JI=J-3+II
  180 IF (JI.GT.0) PRNT(JI)=SYM(11)
  190 IF (S(L,JJ).LT.0.) PRNT(J)=SYM(16)
  200 YLEN=YLEN+(DELY(L)+DELY(L+1))/2.
  210 DIST=DIST-(DELX(JJ)+DELX(JJ-1))/2.
      JJ=JJ-1
      IF (JJ.EQ.0) GO TO 220
      IF (DIST.GT.Z-XN1*XSF) GO TO 210
  220 CONTINUE
C
C     ---PRINT AXES,LABELS, AND SYMBOLS---
      IF (I-NA(LL).EQ.0) GO TO 240
      IF ((I-1)/N1*N1-(I-1)) 250,230,250
  230 WRITE (P,VF1) (BLANK(J),J=1,NC),(PRNT(J),J=1,N8),XN(1+(I-1)/6)
      GO TO 260
  240 WRITE (P,VF2) (BLANK(J),J=1,NC),(PRNT(J),J=1,N8),XLABEL(LL)
      LL=LL+1
      GO TO 260
  250 WRITE (P,VF2) (BLANK(J),J=1,NC),(PRNT(J),J=1,N8)
C
C     ---COMPUTE NEW VALUE FOR Z AND INITIALIZE PRNT---
  260 Z=Z-2.*XN1*XSF
      DO 270 J=1,N8
  270 PRNT(J)=SYM(15)
C
C     ---NUMBER AND LABEL Y AXIS AND PRINT LEGEND---
      WRITE (P,VF3) (BLANK(J),J=1,NC),(YN(I),I=1,N6)
      WRITE (P,300) (YLABEL(I),I=1,6)
      IF (NG.EQ.1) WRITE (P,290) FACT1
      IF (NG.EQ.2) WRITE (P,290) FACT2
      RETURN
C
C     ---FORMATS---
C
C     -----------------------------------------------------------------
C
C
  280 FORMAT ('1',53X,4A8//)
  290 FORMAT ('0EXPLANATION'/' ',11('-')//' R = CONSTANT HEAD BOUNDARY'/
```

```
   1' *** = VALUE EXCEEDED 3 FIGURES'/' MULTIPLICATION FACTOR =',F8.3)
300 FORMAT ('0',39X,6A8)
310 FORMAT ('0',25X,10('*'),' TO FIT MAP WITHIN 12 INCHES, DINCH REVIS
   1ED TO',G15.7,1X,10('*'))
320 FORMAT ('0',45X,'NOTE: GENERALLY SCALE SHOULD BE > OR = 1.0')
    END
```

BLK DATA

```
      BLOCK DATA
C     ----------
      REAL *8XLABEL,YLABEL,TITLE,XN1,MESUR,RHO,B,D,F,H
      INTEGER R,P,PU,DIML,DIMW,CHK,WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,
     1CONTR,LEAK,RECH,SIP,ADI
C
      COMMON /DPARAM/ RHO,B,D,F,H
      COMMON /SARRAY/ VF4(11),CHK(15),VF5(7),XLAB(6),VF6(7)              *
      COMMON /SPARAM/ WATER,CONVRT,EVAP,CHCK,PNCH,NUM,HEAD,CONTR,EROR,LE
     1AK,RECH,SIP,U,SS,TT,TMIN,ETDIST,QET,ERR,TMAX,CDLT,HMAX,YDIM,WIDTH,
     2NUMS,LSOR,ADI,DELT,SUM,SUMP,SUBS,STORE,TEST,ETQB,ETQD,FACTX,FACTY,
     3IERR,KOUNT,IFINAL,NUMT,KT,KP,NPER,KTH,ITMAX,LENGTH,NWEL,NW,DIML,DI
     4MW,JNO1,INO1,R,P,PU,I,J,IDK1,IDK2,IDO,ACT                          *
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(5),XN1,MESUR,PRNT(122),BLANK
     1(60),DIGIT(122),VF1(6),VF2(6),VF3(7),XSCALE,DINCH,SYM(17),XN(100),
     2YN(13),NA(4),N1,N2,N3,YSCALE,FACT1,FACT2
      COMMON /ARSIZE/ IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IH,IMAX,IMX1,I
     1WT,IHCF,LPRINT,IQ,JQ,NHCF                                          *
C     ******************************************************************
C
      DATA IZ,JZ,IP,JP,IR,JR,IC,JC,IL,JL,IS,JS,IMAX/13*20/,IH/1/
      DATA CHK/'PUNC','WATE','CONT','NUME','CHEC','EVAP','CONV','HEAD','
     1LEAK','RECH','SIP ','LSOR','ADI','DK1 ','DK2 '/,R,P,PU/5,6,7/,B,D,
     2F,H/4*0.D0/
      DATA SYM/'1','2','3','4','5','6','7','8','9','0','*','|','-','+','
     1 ','R','W'/
      DATA PRNT/122*' '/,N1,N2,N3,XN1/6,10,133,.833333333D-1/,BLANK/60*'
     1 '/,NA(4)/1000/
      DATA XLABEL/' X DIS- ','TANCE IN',' MILES '/,YLABEL/'DISTANCE',' 
     1FROM OR','IGIN IN ','Y DIRECT','ION, IN ','MILES    '/,TITLE/'PLOT 
     2OF ','DRAWDOWN','PLOT OF ','HYDRAULI','C HEAD'/
      DATA DIGIT/'1','2','3','4','5','6','7','8','9','10','11','12','13'
     1,'14','15','16','17','18','19','20','21','22','23','24','25','26',
     2'27','28','29','30','31','32','33','34','35','36','37','38','39','
     340','41','42','43','44','45','46','47','48','49','50','51','52','5
     43','54','55','56','57','58','59','60','61','62','63','64','65','66
     5','67','68','69','70','71','72','73','74','75','76','77','78',' 79
     6','80','81','82','83','84','85','86','87','88','89','90','91','92'
     7,'93','94','95','96','97','98','99','100','101','102','103',' 104'
     8,'105','106','107','108','109','110','111','112','113','114','115'
     9,'116','117','118','119','120','121','122'/
      DATA VF1/'(1H ',',',','    ','A1,F','10.2',')'/
      DATA VF2/'(1H ',',',','    ','A1,1','X,A8',')'/
      DATA VF3/'(1H0',',',','    ','A1,F','3.1,','12F1','0.2)'/
      DATA VF4/'(1H0',',',','    ','X,I2',',2X,','20F6','.1/(','    ','X,2
     10','F6.1','))'/
      DATA VF5/'(1H0',',',','    ','X,I2',',2X,','20F6','.1)'/           *
      DATA XLAB/' FIR','ST H','ALF ','SECO','ND H','ALF '/               *
      DATA VF6/'(1H0',',',','    ','X,I2',',2X,','20F6','.3)'/           *
C     ******************************************************************
      END
```

ATTACHMENT B: DATA-DECK INSTRUCTIONS

Data-deck instructions have been modified from those presented in Trescott and others (1976). Coding instructions for the line successive overrelaxation and alternating-direction implicit numerical solution methods were deleted since the strongly implicit procedure was used. Many modifications relate to setting up the data deck to accommodate the head-controlled flux condition. All data-deck modifications are denoted by an asterisk. A procedure is outlined for approximating the minimum dimension of vector Y, which controls storage requirements in the model.

ATTACHMENT B: DATA-DECK INSTRUCTIONS

[modified from Trescott and others (1976); * denotes modification]

Group I: Title simulation options, and problem dimensions

This group of cards, which are read by the main program, contains data required to dimension the model. To specify an option on card 3, punch the characters underlined in the definition, starting in the first column of the field. For any option not used, leave the appropriate columns blank.

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITIONS
1	1-80	20A4		
			HEADING	Any title the user wishes to print on one line at the start of output.
2	1-48	12A4		
3	1-5	A4,1X	WATER	WATE for water table or combined water-table-artesian aquifer.
	6-10	A4,1X	LEAK	LEAK for an aquifer system including leakage from a stream or confining bed.
	11-15	A4,1X	CONVRT	CONV for combined artesian-water-table aquifer.
	16-20	A4,1X	EVAP	EVAP to permit discharge by evapotranspiration.
	21-25	A4,1X	RECH	RECH to include a constant recharge rate.
	*26-30	A4,1X	NUMS	SIP to designate the equation-solving scheme.
	31-35	A4,1X	CHCK	CHEC to compute a mass balance.
	36-40	A4,1X	PNCH	PUNC for punched output at the end of the simulation.
	41-45	A4,1X	IDK1	DK1 to read initial head and mass balance parameters from disk (unit 4).
	46-50	A4,1X	IDK2	DK2 to save (write) computed head, elapsed time, and mass balance parameters on disk (unit 4).
	51-55	A4,1X	NUM	NUME to print drawdown in numeric form.
	56-60	A4,1X	HEAD	HEAD to print the head matrix.
4	1-5	I5	DIML	Number of rows.
	6-10	I5	DIMW	Number of columns.
	11-15	I5	NW	Number of pumping wells for which drawdown is to be computed at a "real" well radius.
	16-20	I5	ITMAX	Maximum number of iterations per time step.
	*21-25	I5	IDO	=0 print out drawdown in one table; =1 print out drawdown and PERM in

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITIONS
4-cont	*26-30	I5	IFLOW	=1, print out flow rates thru constant head nodes; =0, no print out.
	*31-35	I5	ILEAK	=1, print out leakage rates; =0, no print out.
	*36-40	I5	IWT	=0 if RIVER is in 20F4.0 format.
	*41-45	I5	IHCF	=0, no HCF condition. =1, steady state with HCF condition. =2, transient state with HCF condition.
	*46-50	I5	LPRINT	=1, print out leakage for each time step at each node, =0, no print out.
	*51-55	I5	NHCF	Number of HCF nodes.
	*43-52	G10.0	ACT	If IDO=1 put in FACT for PERM =1.

Note.--Steady-state simulations often require more than 50 iterations. Transient time steps usually require less than 30 iterations.

Note.--If actual values for PERM are to be printed, ACT=1.

Group II: Scalar parameters

The parameters required in every problem are underlined. The other parameters are required as noted; when not required, their location on the card can be left blank. The G format is used to read E, F, and I data. Minimize mistakes by always right-justifying data in the field. If F format data do not contain significant figures to the right of the decimal point, the decimal point can be omitted. Default typing of variables applies.

CARD	COLUMNS	FORMAT	VARIABLES	DEFINITIONS
1	1-4	A4	CONTR	CONT to generate a map of drawdown and (or) hydraulic head; for no maps insert a blank card.
	11-20	G10.0	XSCALE	Factor to convert model length unit to unit used in x direction on maps (that is, to convert from feet to miles, XSCALE=5280).
	21-30	G10.0	YSCALE	Factor to convert model length unit used in Y direction on maps.
	31-40	G10.0	DINCH	Number of map units per inch.
	41-50	G10.0	FACT1	Factor to adjust value of drawdown printed.
	51-60	G10.0	FACT2	Factor to adjust value of head printed.

Value of drawdown or head	FACT1 or FACT2	Printed value
	.01	0
	.1	5
52.57	1	52
	10	525
	100	***

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITION
1-cont	61-68	A8	MESUR	Name of map length unit.
2	1-10	G10.0	NPER	Number of pumping periods for this simulation.
	11-20	G10.0	KTH	Number of time steps between printouts.

Note.--To print only the results for the final time step in a pumping period, make KTH greater than the expected number of time steps. The program always prints the results for the final time step.

	21-30	G10.0	ERR	Error criterion for closure (ft).

Note.--When the head change at all nodes on subsequent iterations is less than this value (for example, 0.01 foot), the program has reached a solution for the time step.

	31-40	G10.0	EROR	Steady-state error criterion (ft).

Note.--If the head change between time steps in transient simulations is less than this amount, the pumping period is terminated.

	41-50	G10.0	SS	Specific storage of confining bed (1/ft).

Note.--SS has a finite value only in transient simulations where leakage is a function of storage in the confining bed.

	51-60	G10.0	QET	Maximum evapotranspiration rate (ft/s).
	67-70	G10.0	ETDIST	Depth at which ET ceases below land surface (ft).

Note.--QET and ETDIST are required only for simulations including evapotranspiration.

	71-80	G10.0	LENGTH	Number of SIP iteration parameters. '10' is usually coded.
3	1-10	G10.0	HMAX	Value of B'.

Note.--See the discussion of the numerical methods in Trescott and others (1976) for information on iteration parameters.

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITION
3-cont	11-20	G10.0	FACTX	Multiplication factor for transmissivity in X direction.
	21-30	G10.0	FACTY	Multiplication factor for transmissivity in Y direction.

Note.--FACTX=FACTY= 1 for isotropic aquifers.

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITION
4	1-20	G20.10	SUM	Parameters in which elapsed time and cumlative volumes for mass balance are stored. For the start of a simulation insert three blank cards. For continuation of a previous run from punched output, remove the three blank cards and insert the first three cards of the punched output from the previous run. If continuation is from interim storage on disk, the three blank cards should remain.
	21-40	G20.10	SUMP	
	41-60	G20.10	PUMPT	
	61-80	G20.10	CFLUXT	
5	1-20	G20.10	QRET	
	21-40	G20.10	CHST	
	41-60	G20.10	CHDT	
	61-80	G20.10	FLUXT	
6	1-20	G20.10	STORT	
	21-40	G20.10	ETFLXT	
	41-60	G20.10	FLXNT	

Group III: Array data

Each of the following data sets, except the first one (PHI), consists of a parameter card and, if the data set contains variable data, may include a set of data cards. Default typing applies except for M(I,J), which is a real array. Each parameter card contains five variables defined as follows:

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITION
Every parameter card.	1-10	G10.0	FACT	If IVAR=0, FACT is the value assigned to every element of the matrix; If IVAR=1, FACT is the multiplication factor for the following set of cards.
	11-20	G10.0	IVAR	=0 if no data cards are to be read for this matrix; =1 if data cards for this matrix follow.
	21-30	G10.0	IPRN	=0 if input data for this matrix are to be printed. =1 if input data for the matrix are not to be printed.
	31-40	G10.0	IRECS	=0 if the matrix is being read from cards or if each element is being set equal to FACT. =1 if the matrix is to be read from disk (unit 2).
	41-50	G10.0	IRECD	=0 if the matrix is not to be stored on disk. =1 if the matrix being read from cards or set equal to fact is to be stored on disk (unit 2) for later retrieval.

To save the storage coefficient matrix on disk (provided unit 2 has been defined on a DD statement, set FACT=1, IVAR=1, IPRN=IRECS=0, IRECD=1, and include the set of data cards. After this has been processed successfully, subsequent runs need only include a parameter card with the following: FACT=IVAR=IPRN=0, IRECS=1, IRECD=0. The set of data cards are not included and the storage coefficient matrix is input via unit 2 from disk storage.

When data cards are included, start each row on a new card. To prepare a set of data cards for an array that is a function of space, the general procedure is to overlay the finite-difference grid on a contoured map of the parameter and record the average value of the parameter for each finite-difference block on coding forms according to the appropriate format. In general, record only significant digits and no decimal points (except for data set 2); use the multiplication factor to convert the data to their appropriate values. For example, if vertical conductivity of the confining bed (RATE) ranges from 2×10^{-9} to 9×10^{-8} ft/s, coded values should range from 2 to 90; the multiplication factor (FACT) would be 1.0 E-9.

Arrays needed in every simulation are underlined. Omit parameter cards and data cards not used in the simulation (however, see the footnote for the S matrix).

DATA SET	COLUMNS	FORMAT	VARIABLE	DEFINITION
1	1-80	8F10.4	PHI(I,J)	Head values for continuation of a previous run (ft).

Note.--For a new simulation this data set is omitted. Do not include a parameter card with this data set.

DATA SET	COLUMNS	FORMAT	VARIABLE	DEFINITION
2	1-80	8F10.4	<u>STRT (I,J)</u>	Starting head matrix (ft).

Note.--If HCF is selected, code in the actual map value of STRT in the next node outside the model-grid boundary.

DATA SET	COLUMNS	FORMAT	VARIABLE	DEFINITION
3	1-80	20F4.0	<u>S(I,J)</u>	Storage coefficient (dimensionless).

Note.--Always required. In addition to specifying storage coefficient values for artesian aquifers, this matrix is used to locate constant-head boundaries by coding a negative number at constant-head nodes. At these nodes T or PERM must be greater than zero. For a problem with no constant-head nodes and that does not require S values, insert a blank parameter card.

DATA SET	COLUMNS	FORMAT	VARIABLE	DEFINITION
4	1-80	20F4.0	T(I,J)	Transmissivity (ft^2/s).

Note.--(1) Required for artesian aquifer simulation only.
(2) Zero values must be placed around the perimeter of the T or PERM matrix for reasons inherent in the computational scheme. If IVAR=0, zero values are automatically inserted around the border of the model.

DATA SET	COLUMNS	FORMAT	VARIABLE	DEFINITION
5	1-80	20F4.0	PERM (I,J)	Hydraulic conductivity (ft/s) (see note 2 for data set 4).
6	1-80	20F4.0	BOTTOM (I,J)	Elevation of bottom of aquifer (ft).
7	1-80	20F4.0	SY (I,J)	Specific yield (dimensionless).

Note.--Data sets 5, 6, and 7 are required for water table or combined artesian-water-table simulations.

DATA SET	COLUMNS	FORMAT	VARIABLE	DEFINITION
8	1-80	20F4.0	TOP (I,J)	Elevation of top of aquifer (ft).

Note.--Required only in combined artesian-water-table simulations.

DATA SET	COLUMN	FORMAT	VARIABLE	DEFINITION
9	180	20F4.0	RATE (I,J)	Hydraulic conductivity of confining bed (ft/s).
10	*1-80	20F4.0 or 8F10.4	RIVER (I,J)	Head on the other side of confining bed (ft).
11	1-80	20F4.0	M (I,J)	Thickness of confining bed (ft).

Note.--Data sets 9, 10, and 11 are required in simulations with leakage. If the confining bed or streambed does not extend over the entire aquifer use the M matrix to locate the confining bed. If RATE and RIVER do not vary over the extent of the confining bed, they can be initialized to a uniform value.

12	*1-80	20F4.0	DIST1 (I,J)	Distance above top of grid to point of no head change beyond boundary (ft).
13	*1-80	20F4.0	DIST2 (I,J)	Distance to left of grid beyond boundary to point of no head change (ft).
14	*1-80	20F4.0	DIST3 (I,J)	Distance below bottom of grid beyond boundary to point of no head change (ft).
15	*1-80	20F4.0	DIST4 (I,J)	Distance to right of grid beyond boundary to point of no head change (ft).

Note.--If IHCF on card 4, group I, was left blank, omit data sets 12-15.

16	1-80	20F4.0	GRND (I,J)	Land elevation (ft).

Note.--Required for simulations with evapotranspiration.

17	1-80	20F4.0	QRE (I,J)	Recharge rate (ft/s).

Note.--Omit if not used.

18	1-80	8G10.0	DELX (J)	Grid spacing in X direction (ft).
19	1-80	8G10.0	DELY (I)	Grid spacing in Y direction (ft).

Group IV: Parameters that change with the pumping period

The program has two options for the simulation period:

1. To simulate a given number of time steps, set TMAX to value larger than the expected simulation period. The program will use NUMT, CDLT, and DELT as coded.
2. To simulate a given pumping period, set NUMT larger than the number required for the simulation period (for example, 100). The program will compute the exact DELT (which will be DELT CODED) and NUMT to arrive exactly at TMAX on the last time step.

Default typing applies.

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITION
1	1-10	G10.0	KP	Number of the pumping period.
	11-20	G10.0	KPM1	Number of the previous pumping period.

Note.--In general KPM1=0 if KP=1
KPM1=1 if KP=2, etc.

This causes the time parameter used in ENTRY CLAY to be set to zero and STRT to be initialized to PHI. However, for continuation of a previous pumping period KPM1=KP, and STRT and time parameter are not affected.

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITION
	21-30	G10.0	NWEL	Number of wells for this pumping period.
	31-40	G10.0	TMAX	Number of days in this pumping period.
	41-50	G10.0	NUMT	Number of time steps.
	51-60	G10.0	CDLT	Multiplying factor for DELT.

Note.--1.5 is commonly used.

CARD	COLUMNS	FORMAT	VARIABLE	DEFINITION
	61-70	G10.0	DELT	Initial time step in hours.

If NWEL=0 the following set of cards is omitted.

DATA SET	COLUMNS	FORMAT	VARIABLE	DEFINITIONS
1 (NWEL cards)	1-10	G10.0	I	Row location of well.
	11-20	G10.0	J	Column location of well.
	21-30	G10.0	WELL (I,J)	Pumping rate (ft^3/s), negative for a pumping well.
	31-40	G10.0	RADIUS	Real well radius (ft).

Note.--Radius is required only for those wells, if any, where computation of drawdown at a real well radius is to be made.

For each additional pumping period, another set of group IV cards is required (that is, NPER sets of group IV cards are required).

If another simulation is included in the same job, insert a blank card before the next group I cards.

The Y dimension on line 200 of the program must be large enough to meet storage requirements including all options. By using the procedure outlined below the minimum dimension of vector Y can be approximated.

Step 1 - Determine dimensions of input vectors.
IZ = Number of rows.
JZ - Number of columns.
IMAX = The larger of the two values, IZ or JZ.
IH = NW value from Card 4 Group 1. IF NW=1 then IH=1.
ITMAX = Maximum number of iterations per time step.
NHCF = Number of HCF nodes. If no HCF nodes NHCF = 1.
Step 2. - Compute dimensions of internally computed vectors.

IF THESE OPTIONS WERE SELECTED ON CARD 3 GROUP I THEN

If these options were selected on Card 3 Group I	Then	Otherwise
WATE	IP=IZ	IP=1
	JP=IZ	JP=1
LEAK	IR=IZ	IR=1
	JR=IZ	JR=1
CONV	IC=IZ	IC=1
	JC=JZ	JC=1
EVAP	IL=IZ	IL=1
	JL=JZ	JL-1
LEAK and IHCF $\neq$ 0 on Card 4 Group 1	IQ=IZ	IQ=IZ
	JQ=JZ	JQ=JZ

Step 3 - Sum dimensions of optioned arrays to obtain dimension of vector Y.

Array	Sequence number in vector Y	Dimension
PHI	1	IZ*JZ
BE	2	2*IMAX
G	3	2*IMAX
TEMP	4	2*IMAX
KEEP	5	IZ*JZ
PHE	6	IZ*JZ
STRT	7	IZ*JZ
SURI	8	IZ*JZ
T	9	IZ*JZ
TR	10	IZ*JZ
TC	11	IZ*JZ
S	12	IZ*JZ
WELL	13	IZ*JZ
GHDTOT	14	IZ*JZ
DEL	15	IZ*JZ
ETA	16	IZ*JZ
V	17	IZ*JZ
XI	18	IZ*JZ
ORE	19	IZ*JZ
PERM	20	IP*JP
BOTTOM	21	IP*JP
SY	22	IP*JP
TL	23	IR*JR
SL	24	IR*JR
XXLEAK	25	IR*JR
RATE	26	IR*JR
RIVER	27	IR*JR
M	28	IR*JR
XRIVX	29	IR*JR
XRATEX	30	IR*JR
XBFLUX	31	NHCF*3
XWFLUX	32	NHCF*3
TOP	33	IC*JC
GRWD	34	IL*JL
DELX	35	JZ
DDW	36	JZ
BET	37	JZ
DELY	38	IZ
ALF	39	IZ
WR	40	IH
NWR	41	IH*2
TEST 3	42	IMAX*1
DIST 1	43	IQ*JQ
DIST 2	44	IQ*JQ
DIST 3	45	IQ*JQ
DIST 4	46	IQ*JQ
TLHCF	47	NHCF*3

ATTACHMENT C: APPLICATION TO A FIELD PROBLEM--
PUMPING FROM WELL-FIELD AREAS NEAR TAMPA

The following pages illustrate the data input and model output of an application of the model to a field problem. The example illustrates many of the options available in the program.

The field problem involves determining anticipated drawdowns that should occur as a result of pumping from the newly constructed Cross Bar Ranch and Morris Bridge well fields at their anticipated average permitted capacities. The Cross Bar Ranch well field is permitted by the Southwest Florida Water Management District for 30 Mgal/d from 17 wells and the Morris Bridge well field is expected to be permitted for 20 Mgal/d from 20 wells. Within each well field all wells were assumed to pump at the same rate and were assigned to the square-mile grid in which they occur. Thus, pumpage was distributed as a function of well location rather than evenly throughout each well field.

Attachment D illustrates the data deck for the model interrogation. Attachment E illustrates the model output generated by the data deck. Attachment F is a map of drawdown traced from a CALCOMP (California Computer Products, 1971) plot of the model output.

ATTACHMENT D: SAMPLE INPUT DATA DECK FOR WELL-FIELD PUMPAGE FIELD PROBLEM

The sample input data deck contains 974 cards. Each card is keyed to the Data Deck Instructions (Attachment B) by group number, card number, and variable name.

There are 4 groups of cards in the data deck:

Group I. This group contains data that dimensions the model into a 34 x 36 array and provides several job-control options including the HCF condition.

Group II. This group contains scalar parameters for mapping computed drawdowns or water levels. It also provides tolerances for computational errors.

Group III. This group contains the data matricies including starting potentiometric surface (which is actually the computed potentiometric surface from the calibrated model), transmissivity, hydraulic conductivity of the confining bed, water table, thickness of confining bed, distances beyond model-grid boundary for the HCF condition, and grid spacing. To reduce programming time and the number of data cards, a "leakance coefficient" array replaces the confining bed hydraulic conductivity array and the confining bed thickness is set uniformly at 1 foot, thus requiring a single parameter card for bed thickness.

Group IV. This group controls the distribution of pumpage over the model area. The model computes drawdown and new potentiometric-surface elevations that will result from imposing pumpage upon the system.

Groups I, II, and III remain unchanged from the calibrated model. To determine the effects of pumping stresses on the system, Group IV is the only group in which cards are changed.

ATTACHMENT D: SAMPLE INPUT DATA DECK FOR WELL-FIELD PUMPAGE FIELD PROBLEM

GROUP	CARD	VARIABLE	DATA SET							
I	1	HEADING	NORTH TAMPA WELL-FIELD AREA 2-DIMENSIONAL MODEL (FL-33200)							
	2	HEADING	PUMPAGE: XBAR=30 MGAL/D; MORRIS BRIDGE=20 MGAL/D							
	3		LEAK		SIP	CHEC		NUME HEAD		
	4		34 36	100		1	1 1	110		
II	1		CONT	5280	5280	2	1	1	MILES	
	2		1	1	.01					10
	3		1	1	1					
	4									
	5									
	6									
III			1	1	0	0	0			
	2	STRT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	0.0	0.0	0.0320	1.2900	2.0984	2.3012
			4.7641	7.4365	10.2183	13.7904	16.4669	16.7058	20.2247	20.8251
			23.1492	24.7954	26.2124	28.7300	31.9569	34.7123	36.4823	37.6747
			38.0780	38.5864	40.4573	0.0				
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	0.0	0.0	1.2413	2.6766	4.1687	6.0830
			8.5701	10.9157	13.3964	16.4779	19.4555	21.3894	23.6660	25.2857
			27.0801	28.7541	30.3997	32.4155	34.7336	36.7149	38.1411	39.3428
			40.2432	41.2488	42.8720	45.5000				
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	0.0	0.0129	2.4554	4.4990	6.8295	9.5679
			12.0527	14.4667	17.1321	20.3233	23.3111	25.3473	27.3210	29.0140
			30.6167	32.1862	33.6912	35.4565	37.2739	38.8762	40.1365	41.2371
			42.1859	43.1582	44.1582	44.9481				
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	0.2828	2.9123	4.8458	7.2539	10.0913	12.7673
			15.6390	18.4403	21.1409	24.3772	26.8693	28.7878	30.6581	32.2585
			33.6821	35.1785	36.5989	38.1226	39.6444	41.0859	42.2873	43.3013
			44.1723	44.8986	45.4661	45.9679				
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.0	0.2528	2.7722	4.6622	7.0671	10.0329	13.1860	16.1778
			19.2678	22.2113	25.2548	28.2007	29.9962	31.8432	33.7201	35.1941
			36.5600	37.9583	39.2546	40.6070	42.0204	43.3826	44.5541	45.6167
			46.2854	46.7630	46.7812	45.2981				
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.2781	2.4051	4.4020	6.8593	9.8360	12.9978	16.3443	19.7524
			23.0755	26.3210	29.4587	31.9319	33.7605	35.7739	37.1193	38.3580
			39.6633	40.7499	41.8844	43.3037	44.6094	45.8656	46.9948	48.1512
			48.7706	49.4071	49.9242	49.9298				
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.0139	3.4040	6.4393	9.5701	12.7221	16.0188	19.4824	23.1412
			26.8493	30.3361	33.5922	36.4946	39.2379	41.6504	43.4108	44.7115
			46.2919	47.4318	47.9502	48.6261	49.5444	50.5087	51.5217	51.9041
			52.2488	53.1735	54.8784	58.3911				
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2128
			3.1395	5.6250	8.9014	12.0876	15.4301	18.8755	22.4837	26.2568
			30.1037	33.8994	37.6689	41.4651	45.3023	48.3132	50.9932	53.5869
			55.4800	56.3441	56.3866	56.2922	56.8914	57.4321	57.6974	57.8867
			57.9381	58.9090	61.3807	66.5200				
			0.0	0.0	0.0	0.0	0.0	0.0	-0.2727	2.8283
			5.1413	8.3649	11.4420	14.5799	17.9667	21.5543	25.2579	29.2090
			33.1808	37.2358	41.4382	45.9687	50.1340	53.9745	57.2817	60.8149
			62.7745	63.6553	63.7958	63.7859	64.1124	64.3921	64.0451	65.0835
			65.7001	65.9312	68.4696	74.2862				
			0.0	0.0	0.0	0.0	0.0	-0.5064	2.5292	4.6378
			7.3678	10.5727	13.6136	16.7726	20.1781	23.8224	27.8157	31.9249

35.9555	40.0918	44.5707	49.3808	53.5319	58.3531	62.2239	65.7572
67.6961	68.7051	68.9471	68.8070	68.9720	69.2290	69.2705	70.3469
71.0625	71.3337	72.9665	76.0813				
0.0	0.0	0.0	0.0	-0.5064	2.5327	4.3707	6.7792
9.5251	12.5319	15.6208	18.8119	22.2925	25.9607	29.9944	34.1081
38.1373	42.3753	46.9591	51.7824	56.8135	61.6416	65.7774	68.4975
70.2606	71.1134	71.4259	71.2279	71.4590	71.8671	72.5300	73.9648
74.2266	74.7400	75.3649	75.1742				
0.0	0.0	-0.3934	1.9745	3.5924	4.6483	6.4985	9.0385
11.3648	14.2324	17.4802	20.7798	24.2543	27.9695	31.8511	35.9067
40.0064	44.3580	48.9827	53.8298	58.7851	64.0474	67.7749	70.2063
71.6614	71.9494	72.1584	72.4172	73.0054	73.7139	74.5894	75.7396
76.5993	77.5014	78.0531	77.6711				
0.0	-0.2954	1.6045	2.9617	4.5872	6.2885	8.3581	10.9144
13.3098	16.1834	19.4662	22.9078	26.3669	30.0485	33.8769	37.7700
41.7447	45.9903	50.5412	55.2665	60.0625	65.1141	68.8190	70.7975
71.5773	72.0698	72.2296	72.6747	73.4233	74.5046	75.9505	77.4541
78.7195	79.9322	80.7710	80.5092				
-0.1661	1.1246	2.3396	3.7961	5.3360	7.2337	9.4130	11.9775
14.6941	17.7476	21.1089	24.6456	28.1807	31.8658	35.7021	39.4033
43.1812	47.3162	51.7496	56.3035	60.8511	65.4004	68.9944	70.7073
70.9676	71.1223	71.3813	72.0700	73.2436	74.9055	76.9701	78.8388
80.3373	81.9429	83.8781	86.6902				
-0.2230	1.3361	2.7536	4.2817	6.0084	8.0462	10.4942	13.4885
16.5478	19.8171	23.1918	26.7037	30.1071	33.5154	37.0240	40.6465
44.4028	48.3815	52.6871	57.1423	61.3789	65.3413	68.5190	70.1567
69.8831	69.2757	69.3267	70.6560	72.5630	74.8348	77.4516	79.6938
81.4854	83.5214	85.9667	89.0697				
0.2314	1.7286	3.2684	4.8436	6.6120	8.8157	11.6910	14.9931
18.2574	21.6385	25.0404	28.5939	32.0416	35.3678	38.7167	42.1951
45.6911	49.4066	53.4372	57.6146	61.6241	65.2645	67.9644	69.0444
68.2689	66.2120	67.0581	69.1112	71.5947	74.4670	77.6104	80.2243
82.2913	84.6017	87.2948	90.5432				
0.7454	2.2873	3.9007	5.5551	7.3359	9.7348	13.0260	16.4136
19.7606	23.1542	26.6220	30.1799	33.6211	37.0013	40.3663	43.6291
46.8432	50.2858	54.0928	57.9672	61.7110	65.3168	67.2098	67.5069
65.6576	63.3803	64.6015	67.6595	70.6741	73.8868	77.4817	80.4883
82.8519	85.2976	88.1387	91.9247				
1.6271	3.0486	4.6009	6.2073	7.9641	10.4521	13.9057	17.4423
20.9467	24.3734	28.0678	31.5432	34.9752	38.5301	41.8013	44.8265
47.8684	51.1959	54.6920	58.2051	61.5396	64.6665	65.9589	65.4912
61.9862	60.7750	62.6305	66.3619	70.0051	73.5784	77.6531	80.8415
83.2333	85.5775	88.0524	89.9488				
2.2948	3.8057	5.3197	6.8547	8.5797	11.2219	14.4498	17.9399
21.4682	25.0980	29.0342	32.5335	35.9630	39.5635	42.8566	45.8660
48.8333	51.9609	55.1160	58.2844	61.1587	63.5619	64.5688	62.8172
59.0424	58.5220	61.1203	65.2132	69.2384	73.0345	77.0608	80.0693
82.4116	84.6170	86.9821	89.2296				
2.7941	4.7766	6.1766	7.5356	9.0708	11.5529	14.5447	18.0159
21.6957	25.5515	29.7269	33.1759	36.6548	40.2499	43.5763	46.5703
49.3771	52.3321	55.2995	58.2102	60.7863	62.6111	63.0765	60.2704
56.3982	56.4421	59.6901	63.6634	67.8994	71.7615	75.3958	78.0244
80.1253	82.0282	84.0418	86.2135				
3.9207	5.8206	7.2161	8.3457	9.4669	11.5614	14.4667	17.8854
21.5902	25.5229	29.6013	33.2071	36.9479	40.6328	43.8548	46.8078
49.5770	52.3694	55.2142	58.0140	60.0038	61.1493	60.6870	57.9167
54.0765	54.4092	57.6508	61.6257	65.5716	69.6026	72.9892	74.9897
76.5991	78.0053	79.4417	80.7702				
5.4711	6.8478	7.9576	8.8793	9.7893	11.5498	14.1730	17.3348
20.8459	24.8145	28.7199	32.5258	36.3267	40.1095	43.4211	46.3627
48.9797	51.7964	54.5976	57.1878	58.6218	59.1320	57.8478	55.0768
51.6579	52.7020	55.4922	59.2174	62.9182	66.5071	69.2804	71.1714
72.2882	72.9289	73.4705	73.7586				
6.3082	7.6333	8.5130	9.2061	9.8380	11.3442	13.6028	16.4757
19.7462	23.5445	27.4223	31.3102	35.1604	38.8658	42.3238	45.3217
47.9394	50.6122	53.4212	55.4175	56.3045	55.6984	53.8949	51.4094

			49.1458 50.3761 52.9861 56.3655 59.6898 62.7983 65.2390 66.8006
			67.4471 67.7582 67.4215 65.2876
			8.0078 8.3657 8.8273 9.2575 9.4748 10.6685 12.6118 15.1560
			18.2088 21.7789 25.5633 29.4468 33.1944 37.0095 40.6410 43.6155
			46.1137 48.5227 51.0416 52.7392 53.3221 52.1335 49.5969 47.4208
			46.7461 48.0795 50.2129 53.2935 56.1204 58.7136 60.6607 62.0505
			62.7539 63.0519 62.9468 63.3082
			8.1973 8.4461 8.4479 8.3480 8.4331 9.4440 11.0936 13.3464
			16.1796 19.5316 23.1914 27.1708 30.8225 34.7355 38.3669 41.2550
			43.6683 45.7844 48.0529 49.8870 50.0939 48.2284 45.0389 43.5155
			43.6414 45.1644 47.2013 50.0197 52.4684 54.4095 56.2187 57.5887
			58.3549 58.6290 58.6010 58.3920
			8.0000 8.0439 7.5013 7.0649 7.1199 7.8752 9.2243 11.1185
			13.7739 16.9203 20.5229 24.3999 28.0474 31.8676 35.3142 38.1955
			40.3963 42.1452 44.0144 45.4082 44.9186 41.7250 40.1671 39.5615
			40.0887 41.4264 43.6104 46.1092 48.3933 50.0927 51.8245 53.3424
			54.3319 55.0253 55.5220 55.9550
			0.0 7.3719 5.9486 5.0864 5.1923 5.7711 6.8366 8.5048
			10.9702 13.9639 17.4020 21.1839 24.8642 28.3938 31.6602 34.1537
			36.1787 37.5604 38.8802 39.2122 38.3687 35.9705 35.0437 35.0739
			35.9085 37.4187 39.4708 41.5904 43.6233 45.6102 47.3058 49.2809
			50.9643 52.3216 52.7867 52.3109
			0.0 0.0 4.9815 2.0335 2.8542 3.2135 3.8800 5.1481
			7.8753 10.6789 14.1060 17.7303 21.3335 24.6282 27.4136 29.3945
			30.9398 31.9005 32.5776 31.8301 31.0358 29.9171 29.8115 30.2991
			31.2055 32.7712 34.6700 36.5849 38.8422 41.3283 43.6859 45.8349
			48.2996 50.3186 50.5874 48.3014
			0.0 0.0 0.0 0.0 0.1903 0.3740 0.3694 0.3640
			4.8091 6.7318 10.3847 13.7833 17.4289 20.4842 22.5758 23.9142
			24.8328 25.6694 26.4408 25.8222 25.7140 25.4745 25.7505 26.4999
			27.6281 29.1746 31.1753 33.3010 35.5863 38.0814 41.2026 44.6312
			48.0519 50.5418 51.1136 48.8090
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.1627 1.1561 6.8397 8.7239 13.1955 15.9167 16.8742 17.6390
			18.1856 19.5841 21.2091 22.2980 22.8230 23.1926 23.6937 24.4669
			25.6717 27.2088 29.1553 31.4685 34.1788 37.1146 40.6074 45.1195
			49.5257 52.8484 54.4022 53.1198
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.0 0.0 0.0 0.0 0.0 8.4480 9.4056 9.8606
			9.6156 13.3426 16.2560 19.0692 20.3143 21.1457 21.8901 22.7470
			24.1375 25.9116 27.9779 30.3120 33.2019 36.6190 41.3212 46.8760
			52.1823 56.6536 60.0975 62.3649
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.0 3.4991 11.8420 15.4251 17.4303 18.6428 19.5470 20.5675
			22.0141 23.8540 26.2361 29.3996 32.6102 37.0142 42.8749 49.0679
			55.2304 60.8132 66.3266 71.3819
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.0 0.0 5.8801 13.1236 14.5125 15.9684 16.8997 17.6055
			18.9912 20.8255 23.3429 27.1830 30.9751 37.0388 44.3485 51.2947
			58.2226 64.4448 72.3763 80.0000
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
			0.0 0.0 0.0 9.1048 11.2057 13.4823 13.9188 13.4780
			14.8879 16.2636 18.7810 24.0049 26.5331 35.5594 45.7536 52.7128
			61.1591 65.8108 78.3758 0.0
III	3	S	0 0 0 0 0
III			.01 1 0 0 0
	4	T	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
			0 0 0 0 0 0 0 0 0 0 0 0 81 115 115 115 115 250 250 250
			250 250 320 320 400 400 500 500 500 600 600 600 600 600 600 0
			0 0 0 0 0 0 0 0 0 0 0 0 81 81 81 115 115 115 115 115
			250 250 320 320 400 400 500 500 500 500 500 600 600 600 600 0
			0 0 0 0 0 0 0 0 0 0 0 81 81 81 81 81 81 115 115 115

				250	250	320	320	400	400	400	500	500	500	500	500	500	600	600	0				
				0	0	0	0	0	0	0	0	0	0	81	81	81	81	81	81	81	81	81	115
				250	250	320	320	320	400	400	400	400	400	500	500	500	500	500	0				
				0	0	0	0	0	0	0	0	0	81	81	81	81	81	81	81	81	81	81	115
				115	115	250	250	250	320	320	320	320	320	320	400	400	400	400	0				
				0	0	0	0	0	0	0	0	0	81	81	81	81	81	81	81	81	81	81	81
				81	81	81	81	81	81	81	115	115	115	115	250	250	250	250	0				
				0	0	0	0	0	0	0	0	81	81	81	81	81	81	81	81	81	81	81	81
				81	81	81	58	58	81	81	81	81	81	115	115	115	115	115	0				
				0	0	0	0	0	0	0	81	81	81	81	81	81	81	81	81	81	81	81	81
				81	81	81	58	58	58	58	81	81	81	81	81	81	81	81	0				
				0	0	0	0	0	0	81	81	81	81	81	81	81	81	81	81	81	81	81	81
				81	81	81	81	81	58	58	58	58	81	81	81	81	81	81	0				
				0	0	0	0	0	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
				81	81	81	81	81	81	58	58	58	58	81	81	81	81	81	0				
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				81	81	81	81	81	81	58	58	58	58	58	81	81	81	81	0				
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				81	81	81	81	81	58	58	58	58	58	58	81	81	115	115	0				
				0	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
				81	81	81	81	81	58	58	58	58	58	58	115	115	115	115	0				
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				81	81	81	81	81	58	58	58	58	58	58	115	115	115	115	0				
				0	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
				81	81	81	81	58	58	58	58	58	58	58	115	115	115	115	0				
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				81	81	81	81	58	58	58	58	58	58	58	81	81	81	81	0				
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				81	81	81	58	58	58	58	58	58	58	58	81	81	81	81	0				
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				81	81	58	58	58	58	58	58	58	58	58	81	81	81	81	0				
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				81	81	58	58	58	58	58	58	58	58	58	81	81	81	81	0				
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				81	58	58	58	58	58	58	58	58	58	58	81	81	81	81	0				
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				81	58	58	58	58	58	58	58	58	58	58	81	81	81	81	0				
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				58	58	58	58	58	58	58	58	58	58	58	81	81	115	150	0				
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				58	58	58	58	58	58	58	58	58	58	58	81	115	150	150	0				
				0	0	0	0	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	58
				58	58	58	58	58	58	58	58	58	58	150	150	150	150	150	0				
				0	0	0	0	0	0	0	0	81	81	81	81	81	81	81	81	81	81	81	150
				150	150	150	150	150	150	150	231	231	231	150	150	150	150	150	0				
				0	0	0	0	0	0	0	0	0	0	0	0	0	81	81	81	81	81	81	231
				231	231	231	231	231	231	231	231	231	231	231	150	150	150	150	0				
				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	81	231
				231	231	231	231	231	231	231	231	231	231	150	150	150	150	150	0				
				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	231	231
				231	231	231	231	231	231	231	231	231	150	150	150	150	150	150	0				
				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	231
				231	231	231	231	231	231	231	150	150	150	150	150	150	150	150	0				
				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
III				3.5E-10				1															
	9	RATE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
				0	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30	30	10	10	10
				10	10	10	10	10	10	10	10	10	10	1	1	1	1	1	0				

			0	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30	10	10	10	10
			10	10	10	10	10	10	10	10	10	10	1	1	1	1	1	0				
			0	0	0	0	0	0	0	0	0	0	0	30	30	30	30	10	10	10	10	10
			10	10	10	10	10	10	10	10	10	10	1	1	1	1	1	0				
			0	0	0	0	0	0	0	0	0	0	30	30	30	30	10	10	10	10	10	10
			10	10	10	10	10	10	10	10	10	10	10	10	1	1	1	0				
			0	0	0	0	0	0	0	0	0	30	30	30	30	10	10	10	10	10	10	10
			10	10	10	10	10	10	10	10	10	10	10	10	1	1	1	0				
			0	0	0	0	0	0	0	0	0	30	30	10	10	10	10	10	10	10	10	10
			10	10	30	30	30	30	10	10	10	10	10	10	1	1	1	0				
			0	0	0	0	0	0	0	0	30	30	10	10	10	10	10	10	10	10	10	10
			30	30	30	30	30	30	30	10	10	10	10	10	1	1	1	0				
			0	0	0	0	0	0	0	30	30	10	10	10	10	10	10	10	10	10	10	30
			30	30	30	30	30	30	30	30	30	30	10	10	10	1	1	0				
			0	0	0	0	0	0	30	30	10	10	10	10	10	10	10	10	10	10	10	30
			30	30	30	30	30	30	30	30	30	30	10	10	10	1	1	0				
			0	0	0	0	0	30	30	10	10	10	10	10	10	10	10	10	10	10	10	10
			30	30	30	30	30	30	30	10	10	10	10	10	1	1	1	0				
			0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			10	30	30	30	30	10	10	10	10	10	10	1	1	1	1	0				
			0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			10	30	30	30	10	10	10	10	10	1	1	1	1	1	1	0				
			0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			10	30	30	30	10	10	10	10	1	1	1	1	1	1	1	0				
			0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			10	10	30	30	10	10	10	10	1	1	1	1	1	1	1	0				
			0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			10	10	30	30	30	30	10	10	10	1	1	1	1	1	1	0				
			0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			10	30	30	30	30	30	30	10	10	10	5	1	1	1	1	0				
			0	10	10	10	10	10	10	30	30	30	30	10	10	10	10	10	10	10	10	10
			10	30	30	30	30	30	30	10	10	10	5	5	5	5	5	0				
			0	10	10	10	10	10	10	30	30	30	30	10	10	10	10	10	10	10	10	10
			10	30	30	30	30	30	30	10	10	10	5	5	5	5	5	0				
			0	10	10	10	10	10	10	10	10	30	30	10	10	10	10	10	10	10	10	10
			30	30	30	30	30	30	10	10	10	5	5	5	5	5	5	0				
			0	1	1	1	10	10	10	10	10	30	30	10	10	10	10	10	10	10	10	30
			30	30	30	30	30	30	10	10	10	10	10	5	5	5	5	0				
			0	1	1	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	30
			30	30	30	30	30	10	10	10	10	10	5	5	5	1	1	0				
			0	1	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	30	30
			30	10	10	10	30	10	10	10	10	10	5	5	1	1	1	0				
			0	1	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	30	30
			10	10	10	10	10	10	10	10	10	5	1	1	1	1	1	0				
			0	1	1	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	30	30
			30	30	10	10	10	10	10	10	10	1	1	1	1	1	1	0				
			0	1	1	1	1	1	1	10	10	10	10	10	10	10	10	10	10	10	30	30
			30	30	10	10	10	10	10	10	10	1	1	1	1	1	1	0				
			0	0	1	1	1	1	1	1	10	10	10	10	10	10	10	10	10	10	30	30
			30	10	10	10	10	10	10	10	1	1	1	10	10	10	10	0				
			0	0	0	0	1	1	1	1	10	10	10	10	10	10	10	10	10	10	10	10
			10	10	10	10	10	10	10	10	10	1	10	30	30	10	10	0				
			0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
			10	10	10	10	10	10	10	10	10	10	30	30	30	10	10	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10
			10	10	30	30	30	30	30	30	30	30	30	10	10	10	10	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10
			10	10	10	10	10	10	10	30	30	30	10	10	10	10	10	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
			10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
			10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
III					1		1			0		0			0							
	10	RIVER	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	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.	2.	5.	7.	17.	19.	26.
24.	24.	29.	37.	40.	44.	48.	50.	55.	62.	80.	85.	112.	124.	119.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	4.	12.	19.	22.	24.	24.
27.	34.	39.	42.	44.	46.	48.	52.	57.	64.	84.	84.	112.	130.	160.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	6.	11.	14.	17.	24.	22.	25.
29.	34.	41.	43.	45.	47.	49.	53.	57.	62.	79.	84.	112.	130.	155.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	4.	9.	14.	14.	19.	24.	27.	29.
31.	40.	42.	44.	46.	48.	50.	53.	58.	60.	62.	69.	95.	120.	120.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	4.	9.	11.	16.	22.	24.	28.	32.	34.
39.	44.	46.	48.	48.	48.	48.	53.	55.	60.	61.	62.	77.	115.	129.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	5.	11.	13.	16.	19.	25.	33.	36.	37.	41.
45.	49.	50.	50.	54.	54.	56.	62.	63.	63.	63.	71.	82.	115.	105.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	9.	11.	16.	19.	23.	27.	32.	36.	40.	45.
51.	52.	56.	62.	64.	66.	63.	63.	69.	69.	69.	86.	112.	124.	105.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	2.	14.	14.	15.	19.	24.	25.	31.	35.	40.	44.	50.
55.	59.	62.	68.	68.	72.	71.	72.	73.	72.	71.	95.	100.	110.	115.	0.				
0.	0.	0.	0.	0.	0.	0.	2.	4.	14.	14.	16.	19.	22.	30.	37.	40.	42.	48.	54.
52.	64.	67.	74.	75.	75.	75.	75.	75.	77.	77.	87.	93.	124.	124.	0.				
0.	0.	0.	0.	0.	0.	2.	3.	10.	14.	16.	17.	22.	24.	32.	38.	39.	42.	48.	53.
61.	66.	74.	74.	76.	76.	76.	76.	76.	77.	78.	99.	119.	119.	119.	0.				
0.	0.	0.	0.	0.	2.	3.	14.	6.	9.	16.	18.	21.	26.	29.	35.	39.	45.	51.	58.
62.	72.	74.	76.	79.	79.	76.	76.	79.	79.	78.	89.	94.	99.	114.	0.				
0.	0.	0.	2.	6.	9.	11.	19.	14.	16.	21.	26.	27.	31.	35.	39.	42.	46.	52.	58.
62.	71.	76.	76.	79.	81.	76.	76.	75.	76.	78.	84.	84.	99.	109.	0.				
0.	0.	3.	6.	3.	6.	6.	7.	8.	11.	16.	22.	26.	32.	41.	42.	42.	47.	53.	58.
63.	69.	76.	76.	76.	76.	76.	74.	74.	79.	84.	84.	90.	94.	101.	0.				
0.	1.	1.	2.	4.	5.	5.	13.	16.	21.	24.	29.	30.	31.	33.	37.	42.	46.	53.	62.
66.	72.	73.	77.	74.	72.	63.	68.	68.	72.	75.	84.	93.	94.	99.	0.				
0.	0.	2.	2.	2.	2.	7.	16.	19.	24.	26.	32.	36.	37.	38.	43.	45.	48.	53.	60.
66.	72.	73.	75.	72.	60.	61.	66.	69.	71.	75.	80.	94.	99.	97.	0.				
0.	0.	3.	5.	3.	4.	16.	20.	22.	25.	27.	33.	36.	38.	43.	46.	46.	47.	54.	60.
65.	72.	73.	73.	68.	56.	60.	67.	68.	70.	75.	89.	99.	97.	99.	0.				
0.	2.	4.	5.	2.	2.	16.	19.	23.	25.	30.	35.	37.	45.	47.	46.	46.	51.	56.	61.
65.	71.	71.	72.	56.	54.	58.	66.	71.	72.	91.	104.	104.	104.	114.	0.				
0.	2.	4.	5.	2.	10.	16.	19.	22.	25.	31.	36.	37.	45.	48.	49.	51.	55.	57.	62.
65.	67.	71.	66.	52.	52.	58.	68.	74.	76.	96.	104.	109.	109.	120.	0.				
0.	9.	5.	5.	2.	10.	12.	18.	23.	26.	34.	38.	39.	45.	50.	52.	51.	55.	58.	62.
64.	68.	71.	62.	48.	50.	59.	65.	76.	85.	91.	96.	104.	104.	109.	0.				
0.	49.	54.	32.	2.	5.	12.	19.	25.	27.	33.	38.	45.	52.	52.	54.	56.	57.	60.	62.
64.	66.	66.	61.	46.	48.	54.	64.	67.	79.	87.	89.	93.	95.	104.	0.				
0.	49.	39.	27.	5.	6.	12.	17.	20.	30.	33.	37.	41.	50.	52.	54.	51.	57.	61.	63.
64.	65.	63.	58.	43.	46.	52.	62.	67.	75.	80.	88.	89.	89.	101.	0.				
0.	49.	44.	12.	6.	9.	12.	17.	19.	27.	32.	37.	43.	46.	51.	54.	54.	57.	59.	61.
62.	63.	60.	52.	42.	42.	50.	58.	63.	69.	79.	84.	83.	83.	86.	0.				
0.	54.	69.	19.	7.	9.	12.	15.	18.	24.	29.	34.	36.	42.	51.	53.	52.	53.	55.	55.
64.	61.	49.	38.	39.	47.	46.	56.	58.	69.	72.	76.	72.	73.	76.	0.				
0.	69.	64.	24.	3.	7.	9.	12.	15.	20.	23.	34.	32.	42.	51.	51.	53.	52.	53.	56.
57.	56.	37.	34.	38.	47.	46.	56.	58.	63.	66.	71.	68.	68.	68.	0.				
0.	79.	49.	24.	0.	3.	7.	8.	13.	16.	22.	30.	30.	40.	45.	52.	52.	49.	49.	53.
53.	37.	36.	36.	39.	38.	45.	51.	56.	58.	57.	61.	63.	66.	65.	0.				
0.	0.	29.	14.	0.	3.	4.	4.	9.	13.	16.	24.	29.	33.	43.	44.	50.	47.	45.	44.
43.	29.	30.	32.	35.	38.	43.	45.	47.	51.	53.	50.	52.	58.	59.	0.				
0.	0.	0.	0.	0.	1.	1.	3.	7.	11.	16.	22.	27.	32.	39.	39.	43.	39.	42.	39.
35.	26.	30.	32.	30.	34.	36.	36.	40.	41.	38.	38.	40.	43.	48.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	2.	6.	11.	21.	25.	32.	36.	34.	30.	25.	32.	35.
36.	22.	22.	26.	27.	28.	30.	31.	33.	31.	34.	36.	44.	48.	53.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	32.	33.	32.	27.	19.	19.	34.
32.	26.	23.	22.	23.	22.	23.	23.	29.	29.	32.	42.	48.	57.	61.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	19.	19.	34.
39.	34.	32.	21.	29.	37.	35.	24.	26.	28.	33.	44.	59.	67.	70.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	14.	21.
37.	30.	24.	29.	34.	34.	35.	48.	43.	36.	39.	49.	65.	70.	76.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	21.
22.	24.	30.	29.	34.	41.	51.	48.	34.	41.	51.	64.	70.	73.	78.	0.				
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.				
III	11	M		1			0			0		0			0							
III				528			1															
	12	DIST1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	18	24	27	31	34	37	40	42
			44	46	48	50	50	50	50	50	50	50	50	50	50	50	50	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
				528			1															
III	13	DIST2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	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	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	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	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	10	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	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	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
III				528			1															
	14	DIST3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	20	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	16	18	21	28	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	27	40	50	40	30	0	0	0	0	0	0	0

			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	40	50	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
			50	50	50	50	50	50	50	50	50	48	45	42	37	32	26	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
III				528			1															
	15	DIST4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	10	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	12	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	18	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0				

			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	14	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0				
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
III	18	DELX	5280																			
III	19	DELY	5280																			
IV	1		1	18	1	1	1	24														
			7	27	-5.44																	
			7	28	-8.16																	
			8	25	-2.72																	
			8	26	-8.16																	
			8	27	-5.44																	
			8	28	-2.72																	
			9	25	-2.72																	
			9	26	-5.44																	
			10	26	-5.44																	
			27	26	-3.10																	
			27	27	-1.55																	
			28	26	-3.10																	
			28	27	-4.65																	
			28	28	-4.65																	
			29	26	-1.55																	
			29	27	-4.65																	
			29	28	-4.65																	
			29	28	-3.10																	

ATTACHMENT E: SAMPLE MODEL OUTPUT FOR WELL-FIELD PUMPAGE FIELD PROBLEM

The sample model printout lists the data arrays; computes a mass balance for the system; lists arrays of computed leakage, boundary fluxes, drawdowns, and hydraulic head; and maps drawdown and hydraulic head. In addition to the printout, the model punches cards containing the computed hydraulic head.

ATTACHMENT E: SAMPLE MODEL OUTPUT FOR WELL-FIELD PUMPAGE FIELD PROBLEM

U. S. G. S.

FINITE-DIFFERENCE MODEL
FOR
SIMULATION OF GROUND-WATER FLOW

JANUARY 1975

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

NORTH TAMPA WELL-FIELD AREA 2-DIMENSIONAL MODEL (FL-33200)          PUMPAGE: XBAR=30 MGAL/D; MORRIS BRIDGE=20 MGAL/D

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SIMULATION OPTIONS:          LEAK                         SIP     CHEC                        NUME     HEAD

                                                      NUMBER OF ROWS =  34
                                                   NUMBER OF COLUMNS =  36
     NUMBER OF WELLS FOR WHICH DRAWDOWN IS COMPUTED AT A SPECIFIED RADIUS =   0
                                 MAXIMUM PERMITTED NUMBER OF ITERATIONS = 100

                                               WORDS OF Y VECTOR USED = 33732

                      ON ALPHAMERIC MAP:
                           MULTIPLICATION FACTOR FOR X DIMENSION =  5280.000
                           MULTIPLICATION FACTOR FOR Y DIMENSION =  5280.000
                                       MAP SCALE IN UNITS OF         MILES
                                  NUMBER OF     MILES PER INCH =  2.000000
                             MULTIPLICATION FACTOR FOR DRAWDOWN =  1.000000
                                 MULTIPLICATION FACTOR FOR HEAD =  1.000000

                                       NUMBER OF PUMPING PERIODS =   1
                                     TIME STEPS BETWEEN PRINTOUTS =   1

                                      ERROR CRITERION FOR CLOSURE =  .1000000E-01
                                     STEADY STATE ERROR CRITERION =  .0

                                   SPECIFIC STORAGE OF CONFINING BED =  .0
                                           EVAPOTRANSPIRATION RATE =  .0
                                              EFFECTIVE DEPTH OF ET =  1.000000

          MULTIPLICATION FACTOR FOR TRANSMISSIVITY IN X DIRECTION =  1.000000
                                                   IN Y DIRECTION =  1.000000
```

STARTING HEAD MATRIX

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	1.3	2.1	2.3	4.8	7.4	10.2	13.8
	16.5	16.7	20.2	20.8	23.1	24.8	26.2	26.7	32.0	34.7	36.5	37.7	38.1	38.6	40.5	0.0				
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	1.2	2.7	4.2	6.1	8.6	10.9	13.4	16.5
	19.5	21.4	23.7	25.3	27.1	28.8	30.4	32.4	34.7	36.7	38.1	39.3	40.2	41.2	42.9	45.5				
3	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	4.5	6.8	9.6	12.1	14.5	17.1	20.3
	23.3	25.3	27.3	29.0	30.6	32.2	33.7	35.5	37.3	38.9	40.1	41.2	42.2	43.2	44.2	44.9				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.9	4.8	7.3	10.1	12.8	15.6	18.4	21.1	24.4
	26.9	28.8	30.7	32.3	33.7	35.2	36.6	38.1	39.6	41.1	42.3	43.3	44.2	44.9	45.5	46.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.8	4.7	7.1	10.0	13.2	16.2	19.3	22.2	25.3	28.2
	30.0	31.8	33.7	35.2	36.6	38.0	39.3	40.6	42.0	43.4	44.6	45.6	46.3	46.8	46.8	45.3				
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.4	4.4	6.9	9.8	13.0	16.3	19.8	23.1	26.3	29.5	31.9
	33.8	35.8	37.1	38.4	39.7	40.7	41.9	43.3	44.6	45.9	47.0	48.2	48.8	49.4	49.9	49.9				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	6.4	9.6	12.7	16.0	19.5	23.1	26.8	30.3	33.6	36.5
	39.2	41.7	43.4	44.7	46.3	47.4	48.0	48.6	49.5	50.5	51.5	51.9	52.2	53.2	54.9	58.4				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	3.1	5.6	8.9	12.1	15.4	18.9	22.5	26.3	30.1	33.9	37.7	41.5
	45.3	48.3	51.0	53.6	55.5	56.3	56.4	56.3	56.9	57.4	57.7	57.9	57.9	58.9	61.4	66.5				
9	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	2.8	5.1	8.4	11.4	14.6	18.0	21.6	25.3	29.2	33.2	37.2	41.4	46.0
	50.1	54.0	57.3	60.8	62.8	63.7	63.8	63.8	64.1	64.4	64.0	65.1	65.7	65.9	68.5	74.3				
10	0.0	0.0	0.0	0.0	0.0	-0.5	2.5	4.6	7.4	10.6	13.6	16.8	20.2	23.8	27.8	31.9	36.0	40.1	44.6	49.4
	53.5	58.4	62.2	65.8	67.7	68.7	68.9	68.8	69.0	69.2	69.3	70.3	71.1	71.3	73.0	76.1				
11	0.0	0.0	0.0	0.0	-0.5	2.5	4.4	6.8	9.5	12.5	15.6	18.8	22.3	26.0	30.0	34.1	38.1	42.4	47.0	51.8
	56.8	61.6	65.8	68.5	70.3	71.1	71.4	71.2	71.5	71.9	72.5	74.0	74.2	74.7	75.4	75.2				
12	0.0	0.0	-0.4	2.0	3.6	4.6	6.5	9.0	11.4	14.2	17.5	20.8	24.3	28.0	31.9	35.9	40.0	44.4	49.0	53.8
	58.8	64.0	67.8	70.2	71.7	71.9	72.2	72.4	73.0	73.7	74.6	75.7	76.6	77.5	78.1	77.7				
13	0.0	-0.3	1.6	3.0	4.6	6.3	8.4	10.9	13.3	16.2	19.5	22.9	26.4	30.0	33.9	37.8	41.7	46.0	50.5	55.3
	60.1	65.1	68.8	70.8	71.6	72.1	72.2	72.7	73.4	74.5	76.0	77.5	78.7	79.9	80.8	80.5				
14	-0.2	1.1	2.3	3.8	5.3	7.2	9.4	12.0	14.7	17.7	21.1	24.6	28.2	31.9	35.7	39.4	43.2	47.3	51.7	56.3
	60.9	65.4	69.0	70.7	71.0	71.1	71.4	72.1	73.2	74.9	77.0	78.8	80.3	81.9	83.9	86.7				
15	-0.2	1.3	2.8	4.3	6.0	8.0	10.5	13.5	16.5	19.8	23.2	26.7	30.1	33.5	37.0	40.6	44.4	48.4	52.7	57.1
	61.4	65.3	68.5	70.2	69.9	69.3	69.3	70.7	72.6	74.8	77.5	79.7	81.5	83.5	86.0	89.1				
16	0.2	1.7	3.3	4.8	6.6	8.8	11.7	15.0	18.3	21.6	25.0	28.6	32.0	35.4	38.7	42.2	45.7	49.4	53.4	57.6
	61.6	65.3	68.0	69.0	68.3	66.2	67.1	69.1	71.6	74.5	77.6	80.2	82.3	84.6	87.3	90.5				
17	0.7	2.3	3.9	5.6	7.3	9.7	13.0	16.4	19.8	23.2	26.6	30.2	33.6	37.0	40.4	43.6	46.8	50.3	54.1	58.0
	61.7	65.3	67.2	67.5	65.7	63.4	64.6	67.7	70.7	73.9	77.5	80.5	82.9	85.3	88.1	91.9				
18	1.6	3.0	4.6	6.2	8.0	10.5	13.9	17.4	20.9	24.4	28.1	31.5	35.0	38.5	41.8	44.8	47.9	51.2	54.7	58.2
	61.5	64.7	66.0	65.5	62.0	60.8	62.6	66.4	70.0	73.6	77.7	80.8	83.2	85.6	88.1	89.9				
19	2.3	3.8	5.3	6.9	8.6	11.2	14.4	17.9	21.5	25.1	29.0	32.5	36.0	39.6	42.9	45.9	48.8	52.0	55.1	58.3
	61.2	63.6	64.6	62.8	59.0	58.5	61.1	65.2	69.2	73.0	77.1	80.1	82.4	84.6	87.0	89.2				
20	2.8	4.8	6.2	7.5	9.1	11.6	14.5	16.0	21.7	25.6	29.7	33.2	36.7	40.2	43.6	46.6	49.4	52.3	55.3	58.2
	60.8	62.6	63.1	60.3	56.4	56.4	59.7	63.7	67.9	71.8	75.4	78.0	80.1	82.0	84.0	86.2				

21	3.9	5.8	7.2	8.3	9.5	11.6	14.5	17.9	21.6	25.5	29.6	33.2	36.9	40.6	43.9	46.8	49.6	52.4	55.2	58.0
	60.0	61.1	60.7	57.9	54.1	54.4	57.7	61.6	65.6	69.6	73.0	75.0	76.6	78.0	79.4	80.8				
22	5.5	6.8	8.0	8.9	9.8	11.5	14.2	17.3	20.8	24.8	28.7	32.5	36.3	40.1	43.4	46.4	49.0	51.8	54.6	57.2
	58.6	59.1	57.8	55.1	51.7	52.7	55.5	59.2	62.9	66.5	69.3	71.2	72.3	72.9	73.5	73.8				
23	6.3	7.6	8.5	9.2	9.8	11.3	13.6	16.5	19.7	23.5	27.4	31.3	35.2	38.9	42.3	45.3	47.9	50.6	53.4	55.4
	56.3	55.7	53.9	51.4	49.1	50.4	53.0	56.4	59.7	62.8	65.2	66.8	67.4	67.8	67.4	65.3				
24	8.0	8.4	8.8	9.3	9.5	10.7	12.6	15.2	18.2	21.8	25.6	29.4	33.2	37.0	40.6	43.6	46.1	48.5	51.0	52.7
	53.3	52.1	49.6	47.4	46.7	48.1	50.2	53.3	56.1	58.7	60.7	62.1	62.8	63.1	62.9	63.3				
25	8.2	8.4	8.4	8.3	8.4	9.4	11.1	13.3	16.2	19.5	23.2	27.2	30.8	34.7	38.4	41.3	43.7	45.8	48.1	49.9
	50.1	48.2	45.0	43.5	43.6	45.2	47.2	50.0	52.5	54.4	56.2	57.6	58.4	58.6	58.6	58.4				
26	8.0	8.0	7.5	7.1	7.1	7.9	9.2	11.1	13.8	16.9	20.5	24.4	28.0	31.9	35.3	38.2	40.4	42.1	44.0	45.4
	44.9	41.7	40.2	39.6	40.1	41.4	43.6	46.1	48.4	50.1	51.8	53.3	54.3	55.0	55.5	56.0				
27	0.0	7.4	5.9	5.1	5.2	5.8	6.8	8.5	11.0	14.0	17.4	21.2	24.9	28.4	31.7	34.2	36.2	37.6	38.9	39.2
	38.4	36.0	35.0	35.1	35.9	37.4	39.5	41.6	43.6	45.6	47.3	49.3	51.0	52.3	52.8	52.3				
28	0.0	0.0	5.0	2.0	2.9	3.2	3.9	5.1	7.9	10.7	14.1	17.7	21.3	24.6	27.4	29.4	30.9	31.9	32.6	31.8
	31.0	29.9	29.8	30.3	31.2	32.8	34.7	36.6	38.8	41.3	43.7	45.8	48.3	50.3	50.6	48.3				
29	0.0	0.0	0.0	0.0	0.2	0.4	0.4	0.4	4.8	6.7	10.4	13.8	17.4	20.5	22.6	23.9	24.8	25.7	26.4	25.8
	25.7	25.5	25.8	26.5	27.6	29.2	31.2	33.3	35.6	38.1	41.2	44.6	48.1	50.5	51.1	48.8				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	6.8	8.7	13.2	15.9	16.9	17.6	18.2	19.6	21.2	22.3
	22.8	23.2	23.7	24.5	25.7	27.2	29.2	31.5	34.2	37.1	40.6	45.1	49.5	52.8	54.4	53.1				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	9.4	9.9	9.6	13.3	16.3	19.1
	20.3	21.1	21.9	22.7	24.1	25.9	28.0	30.3	33.2	36.6	41.3	46.9	52.2	56.7	60.1	62.4				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	11.8	15.4
	17.4	18.6	19.5	20.6	22.0	23.9	26.2	29.4	32.6	37.0	42.9	49.1	55.2	60.8	66.3	71.4				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	13.1
	14.5	16.0	16.9	17.6	19.0	20.8	23.3	27.2	31.0	37.0	44.3	51.3	58.2	64.4	72.4	80.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
	11.2	13.5	13.9	13.5	14.9	16.3	18.8	24.0	26.5	35.6	45.8	52.7	61.2	65.8	78.4	0.0				

STORAGE COEFFICIENT = .0

TRANSMISSIVITY
MATRIX

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						
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	0.81000	1.15000
	1.15000	1.15000	1.15000	2.50000	2.50000	2.50000	2.50000	2.50000	3.20000	3.20000	4.00000	4.00000	5.00000	5.00000
	5.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	0.0						
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000
	0.81000	1.15000	1.15000	1.15000	1.15000	1.15000	2.50000	2.50000	3.20000	3.20000	4.00000	4.00000	5.00000	5.00000
	5.00000	5.00000	5.00000	6.00000	6.00000	6.00000	6.00000	0.0						
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	1.15000	1.15000	1.15000	2.50000	2.50000	3.20000	3.20000	4.00000	4.00000	4.00000	5.00000
	5.00000	5.00000	5.00000	5.00000	5.00000	6.00000	6.00000	0.0						
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	1.15000	2.50000	2.50000	3.20000	3.20000	3.20000	4.00000	4.00000	4.00000
	4.00000	4.00000	5.00000	5.00000	5.00000	5.00000	5.00000	0.0						
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	1.15000	1.15000	1.15000	2.50000	2.50000	2.50000	3.20000	3.20000	3.20000
	3.20000	3.20000	3.20000	4.00000	4.00000	4.00000	4.00000	0.0						
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	1.15000
	1.15000	1.15000	1.15000	2.50000	2.50000	2.50000	2.50000	0.0						
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.81000	0.81000	0.81000
	0.81000	0.81000	1.15000	1.15000	1.15000	1.15000	1.15000	0.0						
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.0						
10	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000
	0.58000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.0						
11	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000
	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.81000	0.0						
12	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
13	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	1.15000	1.15000	0.0						
14	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	1.15000	1.15000	1.15000	1.15000	0.0						
15	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000

	0.58000	0.58000	0.58000	1.15000	1.15000	1.15000	1.15000	0.0						
16	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	1.15000	1.15000	1.15000	1.15000	0.0						
17	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
18	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
19	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
20	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
21	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
22	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
23	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
24	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	0.81000	0.0						
25	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	0.81000	1.15000	0.0						
26	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	0.81000	1.15000	1.50000	0.0						
27	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	0.58000	0.81000	1.15000	1.50000	1.50000	0.0						
28	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000	0.58000
	0.58000	0.58000	1.50000	1.50000	1.50000	1.50000	1.50000	0.0						
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000	0.81000	0.81000	0.81000	0.81000	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	2.31000
	2.31000	2.31000	1.50000	1.50000	1.50000	1.50000	1.50000	0.0						
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81000
	0.81000	0.81000	0.81000	0.81000	0.81000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000
	2.31000	2.31000	2.31000	1.50000	1.50000	1.50000	1.50000	0.0						
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.81000	0.81000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000
	2.31000	2.31000	1.50000	1.50000	1.50000	1.50000	1.50000	0.0						

32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000
	2.310	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	0.0						
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	2.31000	1.50000
	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	0.0						
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						

CONFINING BED HYDRAULIC CONDUCTIVITY MATRIX

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				
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	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-09	0.350E-09	0.350E-09	0.0				
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.105E-07
	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-09	0.350E-09	0.350E-09	0.0				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-09	0.350E-09	0.350E-09	0.0				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.105E-07	0.105E-07
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-09	0.350E-09	0.350E-09	0.0				
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.105E-07	0.105E-07	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07
	0.350E-08	0.350E-08	0.350E-08	0.350E-09	0.350E-09	0.0				
10	0.0	0.0	0.0	0.0	0.0	0.0	0.105E-07	0.105E-07	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07
	0.350E-08	0.350E-08	0.350E-08	0.350E-09	0.350E-09	0.0				
11	0.0	0.0	0.0	0.0	0.0	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-09	0.350E-09	0.350E-09	0.0				
12	0.0	0.0	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08

	0.350E-08	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
13	0.0	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-09
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
14	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-09	0.350E-09
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
15	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-09	0.350E-09
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
16	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-09
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
17	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08
	0.175E-08	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
18	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08
	0.175E-08	0.175E-08	0.175E-08	0.175E-08	0.175E-08	0.0				
19	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08
	0.175E-08	0.175E-08	0.175E-08	0.175E-08	0.175E-08	0.0				
20	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.175E-08
	0.175E-08	0.175E-08	0.175E-08	0.175E-08	0.175E-08	0.0				
21	0.0	0.350E-09	0.350E-09	0.350E-09	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.175E-08	0.175E-08	0.175E-08	0.175E-08	0.0				
22	0.0	0.350E-09	0.350E-09	0.350E-09	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07
	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.175E-08	0.175E-08	0.175E-08	0.350E-09	0.350E-09	0.0				
23	0.0	0.350E-09	0.350E-09	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.175E-08	0.175E-08	0.350E-09	0.350E-09	0.350E-09	0.0				
24	0.0	0.350E-09	0.350E-09	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.175E-08
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
25	0.0	0.350E-09	0.350E-09	0.350E-09	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07
	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-09
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				

26	0.0	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07
	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-09
	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.0				
27	0.0	0.0	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-09	0.350E-09
	0.350E-09	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.0				
28	0.0	0.0	0.0	0.0	0.350E-09	0.350E-09	0.350E-09	0.350E-09	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-09
	0.350E-08	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.0				
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.105E-07	0.105E-07	0.105E-07	0.350E-08	0.350E-08	0.0				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07	0.105E-07
	0.105E-07	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.0				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.105E-07	0.105E-07	0.105E-07
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.0				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.0				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08
	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.350E-08	0.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

RIVER HEAD
MATRIX

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				
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	1.0	2.0	5.0	7.0	17.0	19.0	26.0
	24.0	24.0	29.0	37.0	40.0	44.0	48.0	50.0	55.0	62.0	80.0	85.0	112.0	124.0	119.0	0.0				
3	0.0	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	4.0	12.0	19.0	22.0	24.0	24.0
	27.0	34.0	39.0	42.0	44.0	46.0	48.0	52.0	57.0	64.0	84.0	84.0	112.0	130.0	160.0	0.0				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	6.0	11.0	14.0	17.0	24.0	22.0	25.0
	29.0	34.0	41.0	43.0	45.0	47.0	49.0	53.0	57.0	62.0	79.0	84.0	112.0	130.0	155.0	0.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	4.0	9.0	14.0	14.0	19.0	24.0	27.0	29.0
	31.0	40.0	42.0	44.0	46.0	48.0	50.0	53.0	58.0	60.0	62.0	69.0	95.0	120.0	120.0	0.0				
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	4.0	9.0	11.0	16.0	22.0	24.0	28.0	32.0	34.0
	39.0	44.0	46.0	48.0	48.0	48.0	48.0	53.0	55.0	60.0	61.0	62.0	77.0	115.0	129.0	0.0				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	5.0	11.0	13.0	16.0	19.0	25.0	33.0	36.0	37.0	41.0
	45.0	49.0	50.0	50.0	54.0	54.0	56.0	62.0	63.0	63.0	63.0	71.0	82.0	115.0	105.0	0.0				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	9.0	11.0	16.0	19.0	23.0	27.0	32.0	36.0	40.0	45.0
	51.0	52.0	56.0	62.0	64.0	66.0	63.0	63.0	69.0	69.0	69.0	86.0	112.0	124.0	105.0	0.0				
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	14.0	14.0	15.0	19.0	24.0	25.0	31.0	35.0	40.0	44.0	50.0
	55.0	59.0	62.0	68.0	68.0	72.0	71.0	72.0	73.0	72.0	71.0	95.0	100.0	110.0	115.0	0.0				
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	4.0	14.0	14.0	16.0	19.0	22.0	30.0	37.0	40.0	42.0	48.0	54.0
	52.0	64.0	67.0	74.0	75.0	75.0	75.0	75.0	75.0	77.0	77.0	87.0	93.0	124.0	124.0	0.0				
11	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.0	10.0	14.0	16.0	17.0	22.0	24.0	32.0	38.0	39.0	42.0	48.0	53.0
	61.0	66.0	74.0	74.0	76.0	76.0	76.0	76.0	76.0	77.0	78.0	99.0	119.0	119.0	119.0	0.0				
12	0.0	0.0	0.0	0.0	0.0	2.0	3.0	14.0	6.0	9.0	16.0	18.0	21.0	26.0	29.0	35.0	39.0	45.0	51.0	58.0
	62.0	72.0	74.0	76.0	79.0	79.0	76.0	76.0	79.0	79.0	78.0	89.0	94.0	99.0	114.0	0.0				
13	0.0	0.0	0.0	2.0	6.0	9.0	11.0	19.0	14.0	16.0	21.0	26.0	27.0	31.0	35.0	39.0	42.0	46.0	52.0	58.0
	62.0	71.0	76.0	76.0	79.0	81.0	76.0	76.0	75.0	76.0	78.0	84.0	84.0	99.0	109.0	0.0				
14	0.0	0.0	3.0	6.0	3.0	6.0	6.0	7.0	8.0	11.0	16.0	22.0	26.0	32.0	41.0	42.0	42.0	47.0	53.0	58.0
	63.0	69.0	76.0	76.0	76.0	76.0	76.0	74.0	74.0	79.0	84.0	84.0	90.0	94.0	101.0	0.0				
15	0.0	1.0	1.0	2.0	4.0	5.0	5.0	13.0	16.0	21.0	24.0	29.0	30.0	31.0	33.0	37.0	42.0	46.0	53.0	62.0
	66.0	72.0	73.0	77.0	74.0	72.0	63.0	68.0	68.0	72.0	75.0	84.0	93.0	94.0	99.0	0.0				
16	0.0	0.0	2.0	2.0	2.0	2.0	7.0	16.0	19.0	24.0	26.0	32.0	36.0	37.0	38.0	43.0	45.0	48.0	53.0	60.0
	66.0	72.0	73.0	75.0	72.0	60.0	61.0	66.0	69.0	71.0	75.0	80.0	94.0	99.0	97.0	0.0				
17	0.0	0.0	3.0	5.0	3.0	4.0	16.0	20.0	22.0	25.0	27.0	33.0	36.0	38.0	43.0	46.0	46.0	47.0	54.0	60.0
	65.0	72.0	73.0	73.0	68.0	56.0	60.0	67.0	68.0	70.0	75.0	89.0	99.0	97.0	99.0	0.0				
18	0.0	2.0	4.0	5.0	2.0	2.0	16.0	19.0	23.0	25.0	30.0	35.0	37.0	45.0	47.0	46.0	46.0	51.0	56.0	61.0
	65.0	71.0	71.0	72.0	56.0	54.0	58.0	66.0	71.0	72.0	91.0	104.0	104.0	104.0	114.0	0.0				
19	0.0	2.0	4.0	5.0	2.0	10.0	16.0	19.0	22.0	25.0	31.0	36.0	37.0	45.0	48.0	49.0	51.0	55.0	57.0	62.0
	65.0	67.0	71.0	66.0	52.0	52.0	58.0	68.0	74.0	76.0	96.0	104.0	109.0	109.0	120.0	0.0				
20	0.0	9.0	5.0	5.0	2.0	10.0	12.0	18.0	23.0	26.0	34.0	38.0	39.0	45.0	50.0	52.0	51.0	55.0	58.0	62.0

	64.0	68.0	71.0	62.0	48.0	50.0	59.0	65.0	76.0	85.0	91.0	96.0	104.0	104.0	109.0	0.0				
21	0.0	49.0	54.0	32.0	2.0	5.0	12.0	19.0	25.0	27.0	33.0	38.0	45.0	52.0	52.0	54.0	56.0	57.0	60.0	62.0
	64.0	66.0	66.0	61.0	46.0	48.0	54.0	64.0	67.0	79.0	87.0	89.0	93.0	95.0	104.0	0.0				
22	0.0	49.0	39.0	27.0	5.0	6.0	12.0	17.0	20.0	30.0	33.0	37.0	41.0	50.0	52.0	54.0	51.0	57.0	61.0	63.0
	64.0	65.0	63.0	58.0	43.0	46.0	52.0	62.0	67.0	75.0	80.0	88.0	89.0	89.0	101.0	0.0				
23	0.0	49.0	44.0	12.0	6.0	9.0	12.0	17.0	19.0	27.0	32.0	37.0	43.0	46.0	51.0	54.0	54.0	57.0	59.0	61.0
	62.0	63.0	60.0	52.0	42.0	42.0	50.0	58.0	63.0	69.0	79.0	84.0	83.0	83.0	86.0	0.0				
24	0.0	54.0	69.0	19.0	7.0	9.0	12.0	15.0	18.0	24.0	29.0	34.0	36.0	42.0	51.0	53.0	52.0	53.0	55.0	55.0
	64.0	61.0	49.0	38.0	39.0	47.0	46.0	56.0	58.0	69.0	72.0	76.0	72.0	73.0	76.0	0.0				
25	0.0	69.0	64.0	24.0	3.0	7.0	9.0	12.0	15.0	20.0	23.0	34.0	32.0	42.0	51.0	51.0	53.0	52.0	53.0	56.0
	57.0	56.0	37.0	34.0	38.0	47.0	46.0	56.0	58.0	63.0	66.0	71.0	68.0	68.0	68.0	0.0				
26	0.0	79.0	49.0	24.0	0.0	3.0	7.0	8.0	13.0	16.0	22.0	30.0	30.0	40.0	45.0	52.0	52.0	49.0	49.0	53.0
	53.0	37.0	36.0	36.0	39.0	38.0	45.0	51.0	56.0	58.0	57.0	61.0	63.0	66.0	65.0	0.0				
27	0.0	0.0	29.0	14.0	0.0	3.0	4.0	4.0	9.0	13.0	16.0	24.0	29.0	33.0	43.0	44.0	50.0	47.0	45.0	44.0
	43.0	29.0	30.0	32.0	35.0	38.0	43.0	45.0	47.0	51.0	53.0	50.0	52.0	58.0	59.0	0.0				
28	0.0	0.0	0.0	0.0	0.0	1.0	1.0	3.0	7.0	11.0	16.0	22.0	27.0	32.0	39.0	39.0	43.0	39.0	42.0	39.0
	35.0	26.0	30.0	32.0	30.0	34.0	36.0	36.0	40.0	41.0	38.0	38.0	40.0	43.0	48.0	0.0				
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	6.0	11.0	21.0	25.0	32.0	36.0	34.0	30.0	25.0	32.0	35.0
	36.0	22.0	22.0	26.0	27.0	28.0	30.0	31.0	33.0	31.0	34.0	36.0	44.0	48.0	53.0	0.0				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0	33.0	32.0	27.0	19.0	19.0	34.0
	32.0	26.0	23.0	22.0	23.0	22.0	23.0	23.0	29.0	29.0	32.0	42.0	48.0	57.0	61.0	0.0				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	19.0	34.0
	39.0	34.0	32.0	21.0	29.0	37.0	35.0	24.0	26.0	28.0	33.0	44.0	59.0	67.0	70.0	0.0				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	21.0
	37.0	30.0	24.0	29.0	34.0	34.0	35.0	48.0	43.0	36.0	39.0	49.0	65.0	70.0	76.0	0.0				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0
	22.0	24.0	30.0	29.0	34.0	41.0	51.0	48.0	34.0	41.0	51.0	64.0	70.0	73.0	78.0	0.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

CONFINING BED THICKNESS = 1.000000

DISTANCE BEYOND BOUNDARY MATRIX

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				
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	9504.0000	12672.0000	14256.0000	16368.0000	17952.0000	19536.0000	21120.0000	22176.0000
	23232.0000	24288.0000	25344.0000	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000
	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	0.0				
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
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				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
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				
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
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				
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	0.0	0.0	0.0	0.0	0.0	0.0				
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
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				
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				
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
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				
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				
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

DISTANCE BEYOND BOUNDARY MATRIX

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				
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	7392.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	12672.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	10560.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10560.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10560.0000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7920.0000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5280.0000	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5280.0000	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
10	0.0	0.0	0.0	0.0	0.0	0.0	5280.0000	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
11	0.0	0.0	0.0	0.0	0.0	5280.0000	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
12	0.0	0.0	0.0	5280.0000	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	0.0	0.0	0.0	0.0	0.0	0.0				
13	0.0	0.0	5280.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
14	0.0	5280.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
15	0.0	5280.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
16	0.0	10560.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
17	0.0	22176.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
18	0.0	24288.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
19	0.0	26400.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
20	0.0	29568.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
21	0.0	32736.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
22	0.0	35904.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
23	0.0	36960.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
24	0.0	26400.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
25	0.0	26400.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

	0.0	0.0	0.0	0.0	0.0	0.0				
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
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				
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				
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
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				
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				
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

26	0.0	15840.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
27	0.0	0.0	10560.0000	10560.0000	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
28	0.0	0.0	0.0	0.0	8448.0000	9504.0000	11088.0000	14784.0000	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14256.0000	21120.0000
	26400.0000	21120.0000	15840.0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	15840.0000	15840.0000	21120.0000	26400.0000	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26400.0000	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26400.0000	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26400.0000
	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	26400.0000	25344.0000
	23760.0000	22176.0000	19536.0000	16896.0000	13728.0000	0.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

DISTANCE BEYOND BOUNDARY
MATRIX

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				
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	21120.0000	0.0				
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	21120.0000	0.0				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	21120.0000	0.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	21120.0000	0.0				
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	21120.0000	0.0				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	21120.0000	0.0				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	21120.0000	0.0				
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	21648.0000	0.0				
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	16896.0000	0.0				
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	12672.0000	0.0				
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	0.0	0.0	0.0	0.0	9504.0000	0.0				
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	6336.0000	0.0				
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	5808.0000	0.0				
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	5280.0000	0.0				
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	5280.0000	0.0				
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	5808.0000	0.0				
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	6336.0000	0.0				
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	6864.0000	0.0				
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	8448.0000	0.0				
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	9504.0000	0.0				
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	14784.0000	0.0				
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	21120.0000	0.0				
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	22176.0000	0.0				
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	26400.0000	0.0				

26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	31680.0000	0.0				
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	31680.0000	0.0				
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	26400.0000	0.0				
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	21120.0000	0.0				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	15840.0000	0.0				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	10560.0000	0.0				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	7392.0000	0.0				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	6864.0000	0.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

DELX = 5280.000

DELY = 5280.000

SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE

BETA= 1.00

10 ITERATION PARAMETERS: 0.0 0.8259623D+00 0.9697109D+00 0.9947286D+00 0.9990826D+00 0.0

0.8259623D+00 0.9697109D+00 0.9947286D+00 0.9990826D+00

********** TO FIT MAP WITHIN 12 INCHES, DINCH REVISED TO 2.666666 **********

PUMPING PERIOD NO. 1: 1.00 DAYS

NUMBER OF TIME STEPS= 1

DELT IN HOURS = 24.000

MULTIPLIER FOR DELT = 1.000

18 WELLS

I	J	PUMPING RATE	WELL RADIUS
7	27	-5.44	
7	28	-8.16	
8	25	-2.72	
8	26	-8.16	
8	27	-5.44	
8	28	-2.72	
9	25	-2.72	
9	26	-5.44	
10	26	-5.44	
27	26	-3.10	
27	27	-1.55	
28	26	-3.10	
28	27	-4.65	
28	28	-4.65	
29	26	-1.55	
29	27	-4.65	
29	28	-4.65	
29	28	-3.10	

TIME STEP NUMBER =	1

SIZE OF TIME STEP IN SECONDS=	86400.00
TOTAL SIMULATION TIME IN SECONDS=	86400.00
MINUTES=	1440.00
HOURS=	24.00
DAYS=	1.00
YEARS=	0.00
DURATION OF CURRENT PUMPING PERIOD IN DAYS=	1.00
YEARS=	0.00

CUMULATIVE MASS BALANCE:

	L**3
SOURCES:	
STORAGE =	0.0
RECHARGE =	0.0
CONSTANT FLUX =	0.0
CONSTANT HEAD =	0.0
HCF FLOW =	8377952.00
LEAKAGE =	46025968.0
TOTAL SOURCES =	54403920.0
DISCHARGES:	
EVAPOTRANSPIRATION =	0.0
CONSTANT HEAD =	0.0
HCF FLOW =	37909728.0
QUANTITY PUMPED =	6271762.00
LEAKAGE =	10220793.0
TOTAL DISCHARGE =	54402272.0
DISCHARGE-SOURCES =	-1648.00
PERCENT DIFFERENCE =	-0.00

RATES FOR THIS TIME STEP:

	L**3/T
STORAGE =	0.0
RECHARGE =	0.0
CONSTANT FLUX =	0.0
PUMPING =	-72.5898
EVAPOTRANSPIRATION =	0.0
CONSTANT HEAD:	
IN =	0.0
OUT =	0.0
LEAKAGE:	
FROM PREVIOUS PUMPING PERIOD =	355.0498
TOTAL =	414.4119
HCF FLOW =	-341.8030
SUM OF RATES =	0.0190

RATE OF VERTICAL LEAKAGE - DOWNWARD(+), UPWARD(-) - INCHES PER YEAR

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				
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	-4.88	-6.59	-8.52	-4.14	-5.94	8.23	7.67	12.96
	6.50	4.08	7.84	16.43	18.17	21.35	24.53	24.51	28.02	34.61
	5.65	6.15	9.60	11.05	10.17	0.0				
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	-9.59	-9.82	-11.11	9.89	9.33	10.18	9.39	5.30
	5.48	12.21	16.39	18.30	18.99	19.69	20.41	23.37	27.51	34.56
	5.93	5.77	9.35	11.59	15.43	0.0				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	-11.53	-3.27	-4.88	3.77	1.72	1.95	7.59	1.47	1.33
	3.50	7.76	14.76	15.52	16.52	17.38	18.25	21.50	24.64	29.17
	4.99	5.51	9.09	11.37	14.60	0.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	-10.99	-10.54	-12.12	-4.00	1.14	-2.79	-0.21	2.60	2.67	1.59
	2.05	11.74	12.17	13.17	14.36	15.50	16.63	18.76	23.20	23.70
	24.52	32.19	6.56	9.80	9.79	0.0				
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-9.54
	-9.52	-11.32	-3.25	-2.61	-0.40	3.07	1.37	2.45	3.70	3.24
	7.63	11.86	13.08	14.50	13.36	12.52	11.49	16.22	16.37	20.68
	20.06	19.59	3.85	8.78	10.56	0.0				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-9.54
	-5.69	1.91	0.39	0.01	-0.58	2.55	8.28	7.70	4.81	6.39
	8.24	10.62	30.00	27.07	40.85	41.68	18.25	24.88	21.57	18.83
	16.76	26.51	4.05	8.28	6.72	0.0				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-12.47	-14.39
	0.14	-1.42	0.78	0.20	0.74	1.07	2.63	2.95	3.33	5.03
	24.10	16.96	23.81	41.37	52.92	68.67	53.81	15.86	19.81	17.54
	16.46	38.39	7.26	8.70	5.85	0.0				
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-11.23	-12.47	7.47
	3.40	0.57	1.39	3.27	-0.29	2.45	2.51	3.81	3.59	16.83
	20.55	22.01	22.43	36.27	39.16	60.83	46.40	45.10	43.22	35.27
	10.47	40.60	46.23	5.91	6.22	0.0				
10	0.0	0.0	0.0	0.0	0.0	0.0	-10.05	-10.48	-4.46	4.55
	0.52	-1.01	-1.54	-2.38	2.94	6.79	5.45	2.65	4.71	19.02
	-5.08	24.13	22.04	38.52	40.00	45.49	35.74	32.45	29.16	34.53
	11.21	22.84	29.70	7.03	6.80	0.0				
11	0.0	0.0	0.0	0.0	0.0	-10.06	-9.42	-5.00	0.63	1.95
	0.51	-2.39	-0.37	-2.57	2.70	5.21	1.22	-0.39	1.52	1.80
	17.44	18.61	34.86	25.61	28.86	27.64	24.72	8.05	7.30	7.76
	8.01	33.78	5.98	5.90	5.81	0.0				
12	0.0	0.0	0.0	-2.61	-4.76	-3.51	-4.63	6.57	-7.10	-6.92
	-1.95	-3.67	-4.29	-2.58	-3.74	-1.15	-1.27	0.94	2.79	5.68
	4.48	32.53	26.20	25.33	32.60	10.86	6.46	5.89	8.85	7.73
	5.11	1.81	2.35	2.88	4.78	0.0				

13	0.0	0.0	-2.12	-1.27	1.87	3.59	3.50	10.71	0.92	-0.24
	2.04	4.11	0.85	1.28	1.52	1.67	0.39	0.08	2.02	3.74
	2.73	24.03	29.48	22.10	10.53	12.70	5.84	5.16	2.74	0.26
	0.32	0.91	0.73	2.55	3.75	0.0				
14	0.0	-1.49	0.88	2.92	-3.09	-1.63	-4.52	-6.59	-8.86	-8.93
	-6.76	-3.49	-2.87	0.20	7.04	3.47	-1.52	-0.36	1.73	2.34
	2.96	14.74	28.45	21.91	7.09	6.96	6.64	3.06	0.15	0.59
	0.97	0.71	1.30	1.61	2.28	0.0				
15	0.0	-0.44	-2.32	-3.02	-2.66	-4.03	-7.27	-0.64	-0.72	1.57
	1.08	3.05	-0.13	-3.32	-5.31	-4.80	-3.15	-3.11	0.47	6.50
	6.21	8.92	18.20	27.73	5.71	3.90	-8.06	-3.19	-0.57	-0.34
	-0.30	0.59	1.54	1.40	1.73	0.0				
16	0.0	-2.29	-1.68	-3.77	-6.11	-9.03	-6.21	1.34	0.99	3.13
	1.28	4.52	5.25	2.17	-0.93	1.09	-0.89	-1.83	-0.54	3.21
	5.86	8.99	20.26	23.98	15.23	-24.20	-7.83	-3.90	-3.21	-0.44
	-0.32	-0.01	1.57	1.92	1.29	0.0				
17	0.0	-3.03	-1.19	-0.73	-5.74	-7.59	3.94	4.75	2.97	2.45
	0.51	3.74	3.16	1.33	3.50	3.16	-1.10	-4.32	-0.09	2.73
	4.40	26.69	23.17	22.02	9.54	-29.04	-17.92	-0.72	-3.37	-4.98
	-1.56	1.14	2.15	1.56	1.44	0.0				
18	0.0	-1.39	-0.80	-1.60	-7.90	-11.19	2.78	6.20	8.17	2.50
	7.69	4.58	2.69	8.58	6.90	1.57	-2.46	-0.24	1.76	3.73
	4.62	25.27	20.15	26.00	-23.61	-26.70	-18.12	-0.35	1.46	-1.94
	8.91	15.41	13.81	12.24	17.20	0.0				
19	0.0	-2.39	-1.75	-2.46	-8.71	-1.62	2.05	4.22	2.12	-0.38
	7.82	4.60	1.38	7.21	6.82	4.16	2.89	4.05	2.52	4.95
	5.12	13.76	25.66	12.78	-27.80	-25.68	-12.09	3.83	6.46	4.08
	12.62	15.92	17.67	16.19	21.89	0.0				
20	0.0	5.59	-1.56	-3.36	-9.36	-2.06	-3.37	-0.02	1.73	1.79
	16.99	6.39	3.11	6.30	8.52	7.20	2.17	3.55	3.60	5.05
	12.87	21.53	31.63	7.07	-33.11	-25.24	-0.75	1.96	10.92	8.87
	10.43	11.99	15.88	14.60	16.56	0.0				
21	0.0	5.72	6.20	3.13	-9.89	-8.69	-3.27	1.48	4.52	5.88
	13.52	6.35	10.67	15.06	10.80	9.54	8.53	6.16	6.37	15.94
	16.01	19.45	21.35	12.59	-31.63	-24.86	-4.57	3.43	2.17	12.71
	18.80	9.39	10.95	11.33	16.31	0.0				
22	0.0	5.58	4.11	2.40	-6.34	-7.35	-2.88	-0.44	-1.12	6.87
	5.67	5.93	6.20	13.11	11.38	10.13	2.70	6.92	8.51	23.23
	21.56	23.61	20.92	12.25	-33.56	-8.49	-4.19	4.13	5.83	11.63
	7.27	11.29	11.19	2.15	3.66	0.0				
23	0.0	5.48	4.70	3.70	-5.08	-3.10	-2.12	0.70	-0.99	4.58
	6.07	7.54	10.39	9.46	11.51	11.52	8.06	8.50	22.30	22.38
	22.94	9.85	8.38	1.19	-26.86	-10.42	-3.22	2.89	5.04	8.79
	9.36	11.60	2.09	2.05	2.48	0.0				
24	0.0	6.04	7.97	12.90	-3.28	-2.21	-0.81	-0.21	-0.28	2.94
	4.56	6.04	3.73	6.63	13.74	12.46	7.83	5.98	15.90	9.25
	14.30	12.02	-0.32	-11.78	-9.32	-0.27	-4.34	4.75	3.50	7.25
	1.57	1.90	1.27	1.35	1.75	0.0				
25	0.0	8.02	7.36	2.07	-7.20	-3.24	-2.77	-1.78	-1.56	0.62
	-0.25	9.05	1.57	9.64	16.76	12.94	12.41	8.29	19.89	24.63
	28.05	31.99	-9.97	-11.53	-5.93	4.43	0.51	9.80	8.86	1.26
	1.39	1.85	1.33	1.28	1.28	0.0				
26	0.0	9.40	5.50	2.24	-0.94	-0.65	-0.29	-4.13	-1.02	-1.22

	1.96	7.43	2.60	10.79	12.86	18.33	15.43	9.16	20.13	30.64
	32.94	-17.27	-4.59	-3.18	0.99	-1.01	5.49	9.51	12.35	1.22
	0.80	1.09	1.21	1.50	1.29	0.0				
27	0.0	0.0	3.05	1.18	-0.69	-0.37	-0.38	-0.60	-2.61	-1.28
	-1.85	3.74	5.49	6.12	15.05	13.10	18.39	12.62	24.78	19.71
	19.54	-8.55	-5.52	-2.09	2.32	7.41	11.22	9.36	0.77	0.92
	0.89	1.78	1.95	7.95	8.55	0.0				
28	0.0	0.0	0.0	0.0	-0.38	-0.29	-0.38	-0.29	-1.16	0.42
	2.51	5.66	7.52	9.79	15.39	12.79	16.07	9.56	12.71	9.85
	5.77	-4.39	1.50	4.31	2.01	8.64	10.37	6.63	5.24	0.17
	-6.24	-28.57	-31.22	-9.26	-3.11	0.0				
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.73	-0.98
	0.82	9.56	10.04	15.28	17.82	13.43	6.96	-0.69	7.67	12.61
	14.23	-3.75	-3.75	1.16	1.97	2.88	4.08	1.65	-0.38	-7.33
	-24.65	-31.71	-14.34	-2.94	2.80	0.0				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	21.33	21.40	19.08	11.79	-0.56	-2.58	15.98
	12.77	4.53	0.49	-5.33	-4.46	-12.55	-15.09	-24.86	-13.79	-27.23
	-30.58	-3.28	-1.44	5.91	9.02	0.0				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.72	3.98	20.24
	25.33	17.77	14.36	-1.05	8.06	16.65	11.44	-19.06	-23.54	-30.14
	-9.97	-3.06	9.56	14.07	13.36	0.0				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.20	7.81
	26.44	15.70	6.72	12.20	17.13	14.89	13.16	26.15	15.11	-0.24
	-4.29	0.53	13.38	12.47	13.01	0.0				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.82
	10.37	11.18	18.03	15.92	20.86	27.83	37.80	28.71	5.02	6.08
	9.45	17.31	15.94	11.56	7.59	0.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0				

RATE OF HORIZONTAL FLOW INTO(+) AND OUT OF(-) SYSTEM THROUGH HCF NODES

ROW	COLUMN	RATE
2	13	-0.704E-07
2	14	-0.568E-07
2	15	-0.849E-07
2	16	-0.155E-06
2	17	-0.155E-06
2	18	-0.310E-06
2	19	-0.282E-06
2	20	-0.236E-06
2	21	-0.261E-06
2	22	-0.411E-06
2	23	-0.383E-06
2	24	-0.498E-06
2	25	-0.546E-06
2	26	-0.548E-06
2	27	-0.728E-06
2	28	-0.638E-06
2	29	-0.476E-06
2	30	-0.408E-06
2	31	-0.348E-06
2	32	-0.351E-06
2	33	-0.458E-06
2	34	-0.566E-06
2	35	0.599E-07
3	13	-0.701E-07
3	35	0.178E-06
4	12	-0.762E-07
4	35	0.116E-06
5	11	-0.731E-07
5	35	-0.258E-06
6	10	-0.617E-07
6	35	0.796E-08
7	10	-0.984E-07
7	35	0.321E-06
8	9	-0.973E-07
8	35	0.217E-06
9	8	-0.901E-07
9	35	0.173E-06
10	7	-0.882E-07
10	35	0.940E-07
11	6	-0.883E-07
11	35	-0.231E-08
12	4	-0.688E-07
12	35	-0.820E-08
13	3	-0.552E-07
13	35	-0.777E-08
14	2	-0.375E-07
14	35	0.118E-06
15	2	-0.453E-07
15	35	0.130E-06
16	2	-0.435E-07
16	35	0.136E-06
17	2	-0.448E-07
17	35	0.111E-06
18	2	-0.413E-07
18	35	0.561E-07
19	2	-0.439E-07
19	35	0.663E-07
20	2	-0.576E-07

20	35	0.642E-07
21	2	-0.552E-07
21	35	0.401E-07
22	2	-0.400E-07
22	35	0.979E-08
23	2	-0.385E-07
23	35	-0.606E-07
24	2	-0.104E-07
24	35	0.123E-07
25	2	-0.723E-08
25	35	-0.680E-08
26	2	-0.208E-07
26	35	0.251E-07
27	3	-0.281E-07
27	4	-0.887E-07
27	35	-0.222E-07
28	5	-0.774E-07
28	6	-0.825E-07
28	7	-0.102E-06
28	8	-0.139E-06
28	35	-0.120E-06
29	9	-0.135E-06
29	10	-0.162E-06
29	11	-0.103E-06
29	12	-0.147E-06
29	13	-0.123E-06
29	35	-0.121E-06
30	14	-0.217E-06
30	15	-0.217E-06
30	16	-0.225E-06
30	17	-0.248E-06
30	35	-0.654E-07
31	18	-0.284E-06
31	35	0.126E-06
32	19	-0.490E-06
32	35	0.276E-06
33	20	-0.328E-06
33	21	-0.268E-06
33	22	-0.199E-06
33	23	-0.238E-06
33	24	-0.331E-06
33	25	-0.327E-06
33	26	-0.363E-06
33	27	-0.363E-06
33	28	-0.159E-06
33	29	-0.228E-06
33	30	-0.706E-07
33	31	0.827E-07
33	32	0.817E-07
33	33	0.162E-06
33	34	0.764E-07
33	35	0.738E-06

MAXIMUM HEAD CHANGE FOR EACH ITERATION:

5.7222	1.6515	0.7476	0.3093	0.0581	0.0085

MAXIMUM CHANGE IN HEAD FOR THIS TIME STEP = 7.628

TIME STEP : 1

ITERATIONS: 5

PLOT OF DRAWDOWN

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	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	1	1	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	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
0	1	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	1	0
0	1	1	1	2	5	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	5	3	2	1	1	0
0	1	1	1	2	5	6	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	6	4	2	1	1	0
0	1	1	1	2	3	7	6	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	5	5	3	2	1	1	0
0	0	1	1	1	2	4	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0
0	0	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	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				

34.67
32.00
29.33
26.67
24.00
21.33
18.67
X DIS-
TANCE IN
MILES
16.00
13.33
10.67
8.00

```
I                      0   0   0   0  0   0   0   0  0   0   0   0  0   0   0   0  0   0   0 - 0- 0 - 0                 I
I                          0   0   0  0   0   0   0  0   0   0   0  0   0   0   0  0 - 0 - 0 - 0- 0                     I
I                                                                                                                         I
+                              0   0  0   0   0   0  0   0   0   0  0   0   0   0  0 - 0 - 0 - 0- 0                     +      5.33
I                                  0  0   0   0   0  0   0   0   0  0   0   0   0  0 - 0 - 0 - 0- 0                     I
I                                     0   0   0   0  0   0   0   0  0   0   0   0  0 - 0 - 0 - 0- 0                     I
+                                     0   0   0   0  0   0   0   0  0   0   0   0  0 - 0 - 0 - 0                         +      2.67
I                                                                                                                         I
I                                         0   0   0  0   0   0   0  0   0   0   0  0 - 0 - 0 - 0                         I
I                                             0   0  0   0   0   0  0   0   0   0- 0   0   0                             I
+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+      0.0

0.0      2.67      5.33      8.00     10.67     13.33     16.00     18.67     21.33     24.00     26.67     29.33     32.00

                                  DISTANCE FROM ORIGIN IN Y DIRECTION, IN    MILES
```

EXPLANATION

R = CONSTANT HEAD BOUNDARY
= VALUE EXCEEDED 3 FIGURES
MULTIPLICATION FACTOR =   1.000

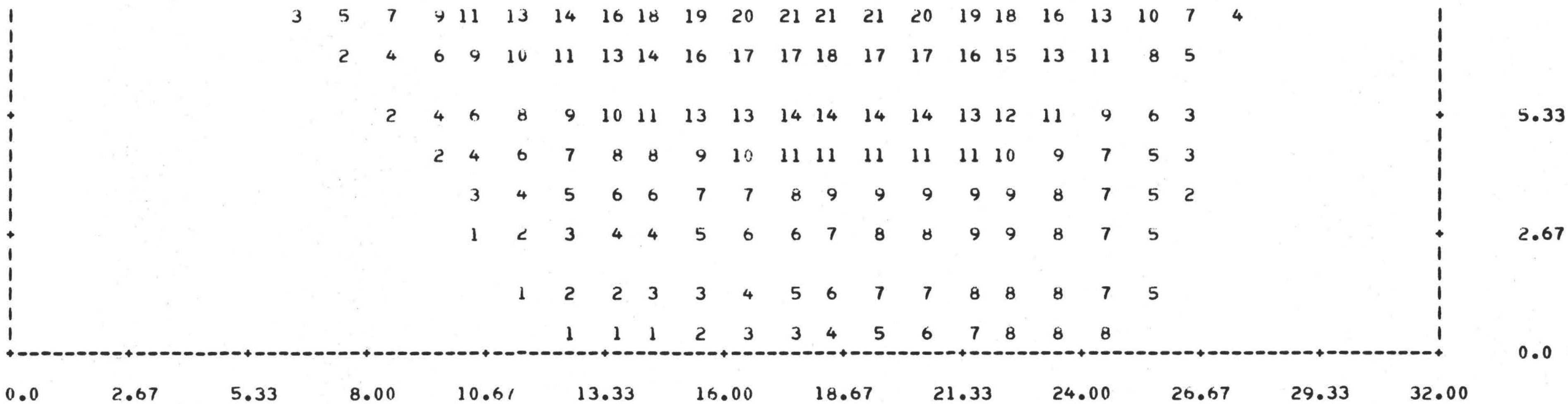
PLOT OF HYDRAULIC HEAD

34.67

42	43	44	46	49	54	60	68	72	75	77	80	83	85	87	88	88	86	83	79	73	67	62	58	55	52	50	50	54	59	66	72	
40	42	44	46	48	52	58	65	70	74	77	79	81	83	84	85	85	84	81	77	72	67	62	58	54	51	49	50	52	56	60	64	
39	41	43	45	47	51	57	65	70	73	76	78	80	81	82	82	83	82	80	76	72	67	62	57	53	50	47	47	49	51	54	57	32.00
38	40	42	44	47	50	57	64	69	73	75	77	78	79	80	80	80	79	77	74	70	66	61	57	52	48	45	43	44	46	48	50	
37	39	41	43	45	50	56	63	68	71	74	75	76	77	77	77	77	76	75	72	69	64	60	55	50	46	42	40	39	40	42	43	29.33
35	37	39	42	44	48	55	63	68	71	73	74	74	74	74	73	73	72	71	69	66	62	58	53	48	44	39	36	35	35	36	36	
33	36	38	40	42	46	54	62	67	70	72	72	72	72	71	70	69	69	67	65	62	59	55	51	46	41	36	33	32	31	31	30	
31	34	36	38	40	43	51	60	66	69	71	72	71	70	68	67	66	65	63	61	58	55	52	48	43	37	30	29	29	28	28	26	26.67
29	32	35	37	39	42	49	59	66	69	71	71	70	69	66	64	62	61	59	57	55	52	49	45	40	34	28	26	26	26	25	22	
27	31	33	36	38	43	48	56	63	69	70	71	70	69	66	63	60	58	56	54	52	49	47	43	38	32	27	25	25	24	22	19	
26	29	32	35	37	43	50	58	64	68	70	71	70	69	68	65	61	58	56	53	51	48	46	42	38	33	28	25	24	22	21	18	24.00
24	28	31	34	37	43	51	58	64	67	69	70	70	70	68	67	65	62	60	57	54	51	46	42	38	33	28	25	23	21	19	16	
23	26	29	32	36	42	50	56	61	65	67	68	68	68	67	67	65	64	63	60	57	53	49	44	39	34	28	24	22	21	18	16	21.33
20	24	28	31	35	40	47	53	57	61	63	64	65	65	65	65	64	63	62	61	59	55	51	47	41	35	29	24	22	20	18	15	
19	22	26	29	33	38	44	49	53	56	58	59	60	61	61	61	61	61	60	59	58	56	53	49	44	38	30	25	22	19	17	14	
16	19	23	27	31	36	41	45	49	51	53	55	56	57	57	57	58	58	58	57	57	55	52	49	45	39	31	25	21	18	15	12	18.67
13	16	20	24	29	33	37	41	44	46	48	50	51	52	53	54	54	55	55	55	54	53	50	47	43	38	32	26	20	15	11		
10	14	18	22	26	30	33	37	39	42	44	45	47	48	49	50	51	51	52	52	51	50	48	45	42	37	31	25	19	13			
8	11	15	19	22	26	30	33	35	38	39	41	43	44	45	46	47	48	49	49	48	47	46	43	40	36	30	24	18				16.00
6	9	12	16	19	23	26	29	31	34	35	37	39	40	42	43	44	45	46	46	46	45	43	41	38	34	29	23	17				
4	6	10	13	16	19	22	25	27	29	31	33	35	37	38	40	41	42	43	43	43	42	40	38	35	31	27	22	16				13.33
2	4	7	10	12	15	18	21	23	25	27	30	31	33	35	36	38	39	40	40	40	38	36	34	31	28	24	20	15				
1	2	4	7	9	12	15	17	20	22	24	26	28	30	32	33	34	35	36	36	36	35	33	30	28	24	21	17					
		2	4	6	9	12	14	16	18	20	22	24	26	28	30	31	32	33	33	32	31	29	27	24	21	17	13					10.67
			2	4	6	8	11	13	15	17	19	21	23	25	26	28	29	29	29	28	27	25	23	20	17	14	10					
				2	3	5	8	10	12	14	16	17	19	21	23	24	25	25	25	24	23	21	19	16	13	10	6					

8.00

X DISTANCE IN MILES



DISTANCE FROM ORIGIN IN Y DIRECTION, IN MILES

EXPLANATION

R = CONSTANT HEAD BOUNDARY
*** = VALUE EXCEEDED 3 FIGURES
MULTIPLICATION FACTOR = 1.000

HEAD MATRIX

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	1.3	2.1	2.3	4.8	7.4	10.2	13.8
	16.5	16.7	20.2	20.8	23.1	24.8	26.2	28.7	32.0	34.7	36.5	37.7	38.1	38.6	40.5	0.0				
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	1.2	2.7	4.1	6.0	8.5	10.8	13.2	16.2
	19.1	20.9	23.1	24.6	26.3	27.9	29.5	31.5	33.8	35.9	37.3	38.6	39.5	40.6	42.2	45.5				
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	4.5	6.8	9.5	12.0	14.3	16.9	20.0
	22.9	24.8	26.6	28.2	29.7	31.1	32.6	34.4	36.2	37.9	39.2	40.4	41.4	42.5	43.5	44.9				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.9	4.8	7.2	10.1	12.7	15.5	18.3	20.9	24.0
	26.4	28.1	29.9	31.3	32.5	33.9	35.2	36.8	38.4	40.0	41.3	42.4	43.4	44.2	44.8	46.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.8	4.7	7.1	10.0	13.1	16.1	19.2	22.0	25.0	27.8
	29.5	31.1	32.8	34.1	35.2	36.3	37.4	38.8	40.5	42.1	43.5	44.7	45.5	46.0	46.1	45.3				
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.4	4.4	6.8	9.8	13.0	16.3	19.7	23.0	26.2	29.2	31.6
	33.2	35.0	36.1	37.1	37.9	38.5	39.3	40.8	42.6	44.4	45.9	47.2	47.9	48.7	49.3	49.9				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	6.4	9.6	12.7	16.0	19.4	23.1	26.7	30.2	33.4	36.2
	38.8	41.0	42.5	43.2	43.7	43.5	42.2	43.2	46.7	48.8	50.3	51.0	51.4	52.5	54.3	58.4				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	3.1	5.6	8.9	12.1	15.4	18.8	22.4	26.2	30.0	33.8	37.5	41.2
	44.9	47.7	50.0	51.6	50.7	48.7	49.5	51.0	54.0	55.8	56.6	57.0	57.2	58.3	60.8	66.5				
9	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	2.8	5.1	8.4	11.4	14.6	17.9	21.5	25.2	29.2	33.1	37.1	41.3	45.8
	49.8	53.5	56.4	58.9	58.1	56.7	59.3	60.6	62.1	63.1	63.1	64.3	65.1	65.4	68.1	74.3				
10	0.0	0.0	0.0	0.0	0.0	-0.5	2.5	4.6	7.4	10.6	13.6	16.8	20.2	23.8	27.8	31.9	35.9	40.0	44.4	49.2
	53.3	57.9	61.5	64.3	64.9	63.6	66.0	66.8	67.7	68.3	68.5	69.8	70.6	70.9	72.7	76.1				
11	0.0	0.0	0.0	0.0	-0.5	2.5	4.4	6.8	9.5	12.5	15.6	18.8	22.3	25.9	30.0	34.1	38.1	42.3	46.9	51.6
	56.6	61.3	65.2	67.6	68.7	69.0	69.8	69.9	70.5	71.1	72.0	73.5	73.8	74.4	75.2	75.2				
12	0.0	0.0	-0.4	2.0	3.6	4.6	6.5	9.0	11.4	14.2	17.5	20.8	24.2	28.0	31.8	35.9	40.0	44.3	48.9	53.7
	58.6	63.8	67.4	69.6	70.8	70.8	71.1	71.6	72.3	73.2	74.1	75.4	76.3	77.3	77.9	77.7				
13	0.0	-0.3	1.6	3.0	4.6	6.3	8.4	10.9	13.3	16.2	19.5	22.9	26.4	30.0	33.9	37.7	41.7	45.9	50.5	55.2
	59.9	65.0	68.6	70.4	71.0	71.4	71.6	72.1	72.9	74.1	75.6	77.2	78.5	79.8	80.7	80.5				
14	-0.2	1.1	2.3	3.8	5.3	7.2	9.4	12.0	14.7	17.7	21.1	24.6	28.2	31.9	35.7	39.4	43.1	47.3	51.7	56.2
	60.8	65.3	68.8	70.5	70.6	70.7	71.0	71.7	72.9	74.6	76.7	78.6	80.2	81.8	83.8	86.7				
15	-0.2	1.3	2.8	4.3	6.0	8.0	10.5	13.5	16.5	19.8	23.2	26.7	30.1	33.5	37.0	40.6	44.4	48.3	52.6	57.1
	61.3	65.3	68.4	70.0	69.7	69.1	69.1	70.4	72.3	74.6	77.2	79.5	81.3	83.4	85.9	89.1				
16	0.2	1.7	3.3	4.8	6.6	8.8	11.7	15.0	18.3	21.6	25.0	28.6	32.0	35.4	38.7	42.2	45.7	49.4	53.4	57.6
	61.6	65.2	67.9	69.0	68.2	66.1	66.9	68.9	71.4	74.3	77.4	80.1	82.2	84.5	87.3	90.5				
17	0.7	2.3	3.9	5.6	7.3	9.7	13.0	16.4	19.8	23.2	26.6	30.2	33.6	37.0	40.4	43.6	46.8	50.3	54.1	57.9
	61.7	65.3	67.2	67.5	65.6	63.3	64.5	67.5	70.5	73.8	77.4	80.4	82.8	85.2	88.1	91.9				
18	1.6	3.0	4.6	6.2	8.0	10.5	13.9	17.4	20.9	24.4	28.1	31.5	35.0	38.5	41.8	44.8	47.9	51.2	54.7	58.2
	61.5	64.6	65.9	65.5	61.9	60.7	62.6	66.3	69.9	73.5	77.5	80.7	83.1	85.5	88.0	89.9				
19	2.3	3.8	5.3	6.9	8.6	11.2	14.4	17.9	21.5	25.1	29.0	32.5	36.0	39.6	42.8	45.9	48.8	51.9	55.1	58.3
	61.1	63.5	64.5	62.8	59.0	58.5	61.0	65.1	69.1	72.9	76.9	80.0	82.3	84.5	86.9	89.2				
20	2.8	4.8	6.2	7.5	9.1	11.6	14.5	18.0	21.7	25.5	29.7	33.2	36.6	40.2	43.6	46.6	49.4	52.3	55.3	58.2
	60.8	62.6	63.0	60.2	56.3	56.4	59.6	63.5	67.8	71.6	75.3	77.9	80.0	81.9	84.0	86.2				

21	3.9	5.8	7.2	8.3	9.5	11.6	14.5	17.9	21.6	25.5	29.6	33.2	36.9	40.6	43.8	46.8	49.6	52.4	55.2	58.0
	60.0	61.1	60.6	57.8	54.0	54.3	57.5	61.4	65.4	69.4	72.8	74.8	76.5	77.9	79.4	80.8				
22	5.5	6.8	8.0	8.9	9.8	11.5	14.2	17.3	20.8	24.8	28.7	32.5	36.3	40.1	43.4	46.3	49.0	51.8	54.6	57.2
	58.6	59.1	57.7	54.9	51.4	52.4	55.2	58.9	62.6	66.2	69.0	70.9	72.1	72.8	73.4	73.8				
23	6.3	7.6	8.5	9.2	9.8	11.3	13.6	16.5	19.7	23.5	27.4	31.3	35.2	38.9	42.3	45.3	47.9	50.6	53.4	55.4
	56.2	55.6	53.7	51.1	48.8	49.9	52.4	55.8	59.2	62.4	64.9	66.5	67.2	67.6	67.3	65.3				
24	8.0	8.4	8.8	9.3	9.5	10.7	12.6	15.2	18.2	21.8	25.6	29.4	33.2	37.0	40.6	43.6	46.1	48.5	51.0	52.7
	53.2	51.9	49.2	46.9	46.0	47.2	49.3	52.4	55.4	58.1	60.1	61.6	62.4	62.8	62.8	63.3				
25	8.2	8.4	8.4	8.3	8.4	9.4	11.1	13.3	16.2	19.5	23.2	27.2	30.8	34.7	38.3	41.2	43.6	45.7	48.0	49.8
	49.9	47.9	44.5	42.7	42.5	43.7	45.6	48.6	51.3	53.5	55.5	57.1	58.0	58.3	58.4	58.4				
26	8.0	8.0	7.5	7.1	7.1	7.9	9.2	11.1	13.8	16.9	20.5	24.4	28.0	31.9	35.3	38.2	40.3	42.1	43.9	45.3
	44.7	41.3	39.5	38.4	38.3	38.8	40.9	43.8	46.7	48.8	50.9	52.7	53.9	54.7	55.3	56.0				
27	0.0	7.4	5.9	5.1	5.2	5.8	6.8	8.5	11.0	14.0	17.4	21.2	24.9	28.4	31.6	34.1	36.1	37.5	38.8	39.0
	38.1	35.5	34.2	33.6	33.3	32.4	34.5	37.9	41.2	44.0	46.3	48.7	50.5	52.0	52.5	52.3				
28	0.0	0.0	5.0	2.0	2.9	3.2	3.9	5.2	7.9	10.7	14.1	17.7	21.3	24.6	27.4	29.3	30.9	31.8	32.4	31.6
	30.6	29.3	28.9	28.7	28.5	27.5	28.2	31.0	36.0	39.7	42.7	45.2	47.9	50.0	50.3	48.3				
29	0.0	0.0	0.0	0.0	0.2	0.4	0.4	0.4	4.8	6.7	10.4	13.8	17.4	20.5	22.5	23.9	24.7	25.5	26.2	25.5
	25.3	24.8	24.8	25.1	25.5	25.8	26.9	29.8	33.3	36.5	40.2	44.0	47.6	50.2	50.9	48.8				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	6.8	8.7	13.2	15.9	16.8	17.6	18.1	19.4	20.9	21.9
	22.4	22.6	22.9	23.3	24.1	25.2	26.8	29.3	32.5	35.9	39.7	44.5	49.1	52.5	54.2	53.1				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	9.4	9.9	9.6	13.2	16.0	18.7
	19.9	20.6	21.2	21.8	22.9	24.4	26.4	28.8	31.9	35.6	40.5	46.3	51.8	56.4	59.9	62.4				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	11.6	15.1
	17.0	18.1	18.9	19.8	21.1	22.8	25.1	28.3	31.6	36.2	42.2	48.6	54.9	60.6	66.2	71.4				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	12.8
	14.2	15.6	16.4	17.0	18.2	20.0	22.5	26.3	30.2	36.4	43.9	50.9	58.0	64.3	72.3	80.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
	11.2	13.5	13.9	13.5	14.9	16.3	18.8	24.0	26.5	35.6	45.8	52.7	61.2	65.8	78.4	0.0				

DRAWDOWN

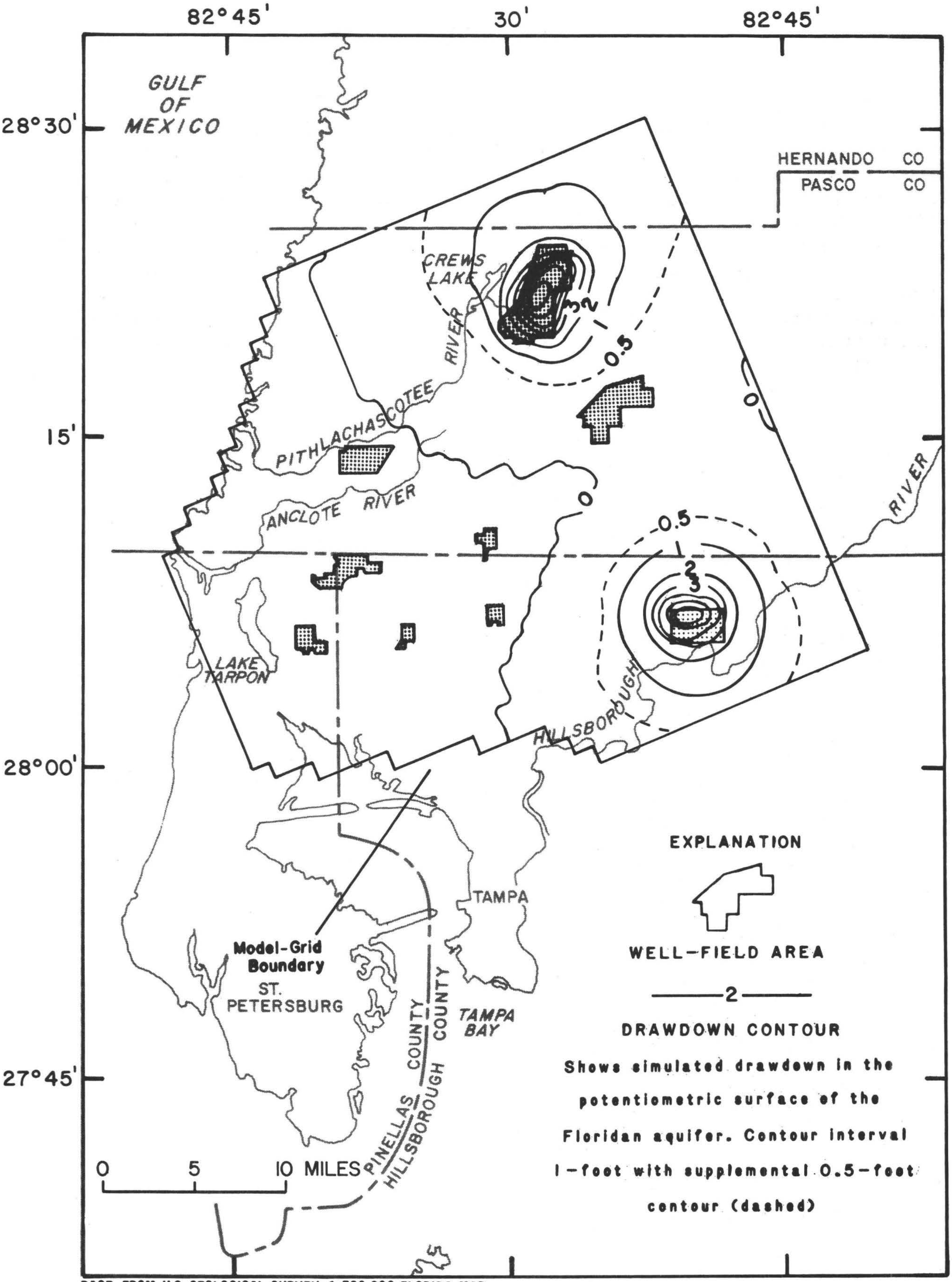
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3
	0.4	0.5	0.6	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.0				
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3
	0.4	0.6	0.7	0.8	1.0	1.1	1.1	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.0				
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4
	0.5	0.6	0.8	1.0	1.2	1.3	1.4	1.4	1.2	1.1	1.0	0.9	0.8	0.7	0.7	0.0				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4
	0.5	0.7	0.9	1.1	1.4	1.7	1.8	1.8	1.5	1.3	1.1	0.9	0.8	0.7	0.7	0.0				
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	0.1	0.1	0.2	0.3	0.4
	0.5	0.7	1.0	1.3	1.8	2.2	2.6	2.6	2.0	1.5	1.1	0.9	0.8	0.7	0.7	0.0				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3
	0.5	0.7	1.0	1.5	2.6	3.9	5.7	5.4	2.8	1.7	1.2	0.9	0.8	0.7	0.6	0.0				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3
	0.4	0.6	1.0	2.0	4.8	7.6	6.9	5.3	2.9	1.7	1.1	0.9	0.7	0.6	0.5	0.0				
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	0.1	0.1	0.1	0.2	0.2
	0.3	0.5	0.9	1.9	4.6	7.0	4.5	3.1	2.0	1.3	0.9	0.7	0.6	0.5	0.4	0.0				
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2
	0.3	0.4	0.8	1.5	2.8	5.2	2.9	2.0	1.3	0.9	0.7	0.6	0.5	0.4	0.3	0.0				
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	0.1	0.1	0.1	0.1
	0.2	0.3	0.6	0.9	1.5	2.1	1.6	1.3	1.0	0.7	0.6	0.5	0.4	0.3	0.2	0.0				
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
	0.2	0.2	0.4	0.6	0.9	1.1	1.0	0.9	0.7	0.6	0.4	0.4	0.3	0.2	0.1	0.0				
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
	0.1	0.2	0.2	0.4	0.5	0.7	0.6	0.6	0.5	0.4	0.4	0.3	0.2	0.2	0.1	0.0				
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.0				
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	0.1
	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0				
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	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0				
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0				
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0				
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0				
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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0				

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	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0				
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.0				
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.0				
24	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	0.1	0.2	0.4	0.5	0.7	0.9	0.9	0.9	0.8	0.7	0.5	0.4	0.3	0.3	0.2	0.0				
25	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
	0.2	0.3	0.5	0.8	1.2	1.5	1.6	1.4	1.2	0.9	0.7	0.5	0.4	0.3	0.2	0.0				
26	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
	0.2	0.4	0.7	1.2	1.8	2.7	2.8	2.3	1.7	1.3	0.9	0.6	0.4	0.3	0.3	0.0				
27	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2
	0.3	0.5	0.9	1.5	2.7	5.0	4.9	3.7	2.4	1.6	1.0	0.6	0.4	0.3	0.2	0.0				
28	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3
	0.4	0.6	0.9	1.6	2.7	5.3	6.5	5.6	2.8	1.6	1.0	0.6	0.4	0.3	0.2	0.0				
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3
	0.5	0.6	0.9	1.4	2.1	3.4	4.3	3.5	2.3	1.5	1.0	0.7	0.4	0.3	0.2	0.0				
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.4
	0.5	0.6	0.8	1.1	1.5	2.1	2.4	2.2	1.7	1.3	0.9	0.6	0.4	0.3	0.2	0.0				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4
	0.4	0.6	0.7	1.0	1.2	1.5	1.6	1.5	1.3	1.0	0.8	0.6	0.4	0.3	0.2	0.0				
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
	0.4	0.5	0.6	0.8	1.0	1.1	1.2	1.1	1.0	0.8	0.6	0.5	0.3	0.2	0.1	0.0				
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.9	0.8	0.6	0.5	0.4	0.3	0.2	0.1	0.0				
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

ATTACHMENT F: CALCOMP PLOT OF MODEL OUTPUT FOR WELL-FIELD PUMPAGE FIELD PROBLEM

A machine-drawn map of the computed potentiometric surface or drawdown can be readily made from the model-punched output. In the case presented here, program card number 10030 was used to have the model punch a deck of drawdowns in the format used by the CALCOMP (California Computer Products, 1971) contouring program. Output from the CALCOMP program is received on magnetic tape at the U.S. Geological Survey Florida District office in Tallahassee, where it is processed on a flat-bed plotter and then the finished map is mailed to the Tampa Subdistrict office. The plotter will draw maps on translucent paper to overlay base maps of any scale. The illustration in Attachment F is a tracing of a drawdown map produced by the CALCOMP contouring program.

ATTACHMENT F: CALCOMP PLOT OF MODEL OUTPUT FOR WELL-FIELD PUMPAGE FIELD PROBLEM



BASE FROM U.S. GEOLOGICAL SURVEY 1:500,000 FLORIDA MAP

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
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