# MODEL MODIFICATIONS FOR SIMULATION OF FLOW THROUGH STRATIFIED ROCKS IN EASTERN OHIO

by John O. Helgesen, Steven P. Larson, and Allan C. Razem

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## CONVERSION FACTORS

For the convenience of those readers who prefer to use International System (SI) (metric) units rather than inch-pound units, the conversion factors for terms used in this report are listed below:

| To convert from | To | Multiply by |
|---|---|---|
| foot (ft) | meter (m) | 0.3048 |
| acre | hectare (ha) | 0.4047 |
| gallon per minute (gal/min) | liter per second (L/s) | 0.06309 |

# MODEL MODIFICATIONS FOR SIMULATION OF FLOW THROUGH STRATIFIED ROCKS IN EASTERN OHIO

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## ABSTRACT

A quasi three-dimensional ground-water flow model has been used as part of a study to determine impacts of coal-strip mining on local hydrologic systems. Modifications to the model were necessary to simulate local hydrologic conditions properly. Perched water tables required that the method of calculating the vertical flow rate be changed. A head-dependent spring discharge function and a head-dependent stream-aquifer interchange function were added to the program. Modifications were also made to allow recharge from precipitation to any layer. The modified program, data-deck instructions, and sample input and output are presented.

## INTRODUCTION

A study of the hydrology of small watersheds in the coal-mine region of Ohio has involved modification of the ground-water flow model described by Trescott (1975). This report documents changes to the model and may also be a useful reference for investigations of similar hydrologic settings.

The purpose of the overall study is to determine impacts of strip mining on local hydrologic systems. Premining hydrogeology of all study watersheds is similar (U.S. Bureau of Mines, 1978). One of the watersheds is described in this report to demonstrate the adaptation of the model to this study. Changes in the program were required to simulate the shallow ground-water systems properly. These systems are typically perched, may receive recharge directly from precipitation over all or part of their extent, and discharge part of their water locally to springs or streams. Results of simulations of premining flow have been described by Helgesen and Razem (1980).

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## DESCRIPTION OF GROUND-WATER SYSTEM

The study watershed has an area of 51 acres and is underlain by relatively flat lying interbedded shale, sandstone, coal, and clay of the Pennsylvanian System. The shallowest coal seam crops out within the watershed, and the next deeper coal seam crops out just below the watershed (fig. 1). Relatively impermeable clay beds (underclays) about 5 feet thick underlie the coal seams and form bases for two perched saturated zones. The saturated zones are herein referred to as aquifers, for convenience, even though they typically yield less than 1 gal/min to wells.

Ground water is stored and transmitted within intergranular pore spaces (primary) and fractures and bedding-plane openings (secondary). Recharge to the top aquifer is from percolation of precipitation within the watershed; discharge is downward as leakage through the underclay or laterally (fig. 2a) as springflow or seepage at the outcrop. Recharge to the next deeper or "middle" aquifer, is by leakage through the overlying clay and by percolation of precipitation and top-aquifer springflow where the clay is absent; discharge is downward as leakage through underclay or laterally (fig. 2b) as base flow to the stream. The top and middle aquifers have perched water tables and constitute local flow systems which are the primary concern in the study. The deep aquifer (fig. 1) is part of the regional flow system and is recharged and discharged outside the watershed except for leakage it receives from the middle aquifer.

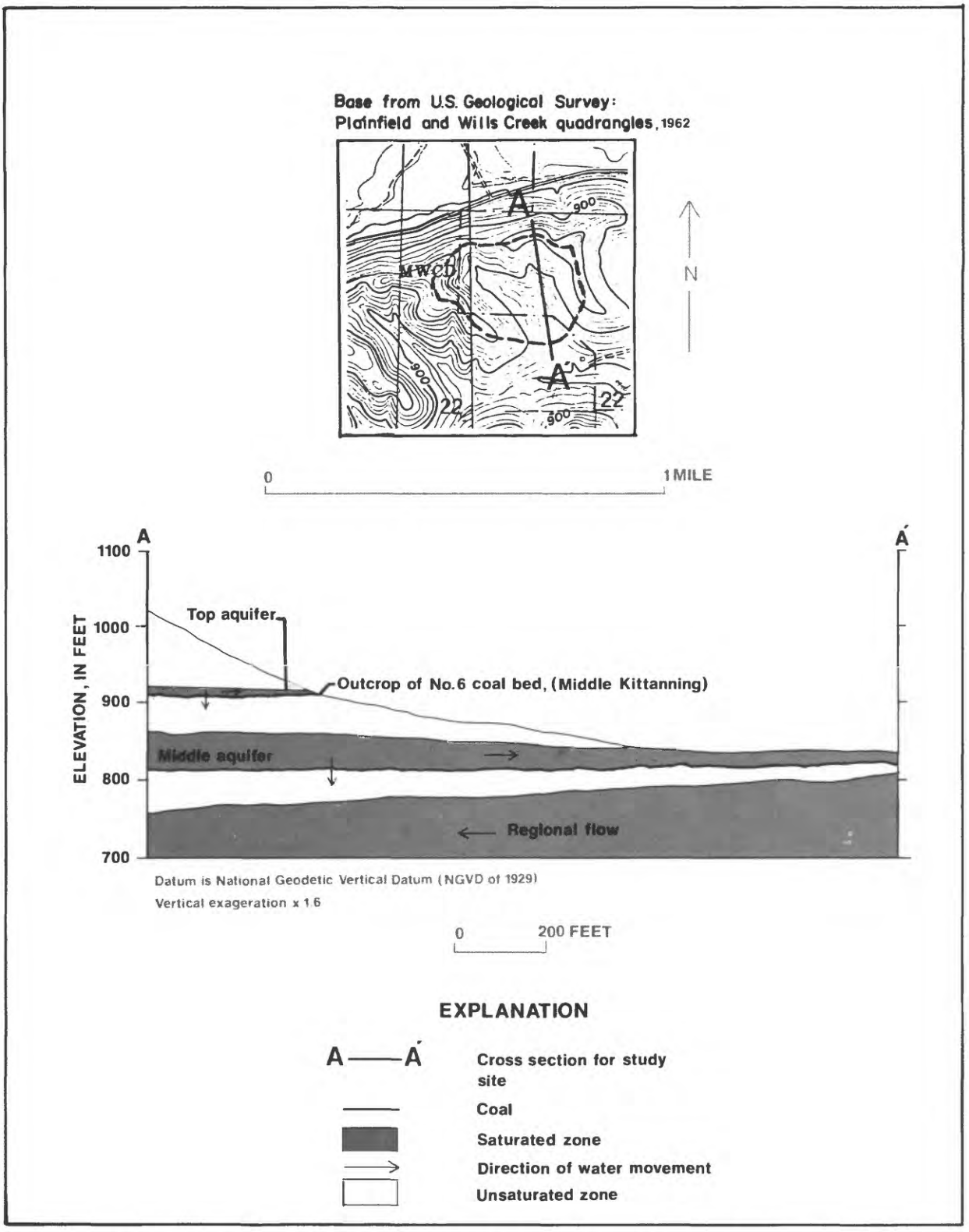



**Figure 1.--Hydrogeologic section of study watershed illustrating premining ground-water occurrence and flow.**

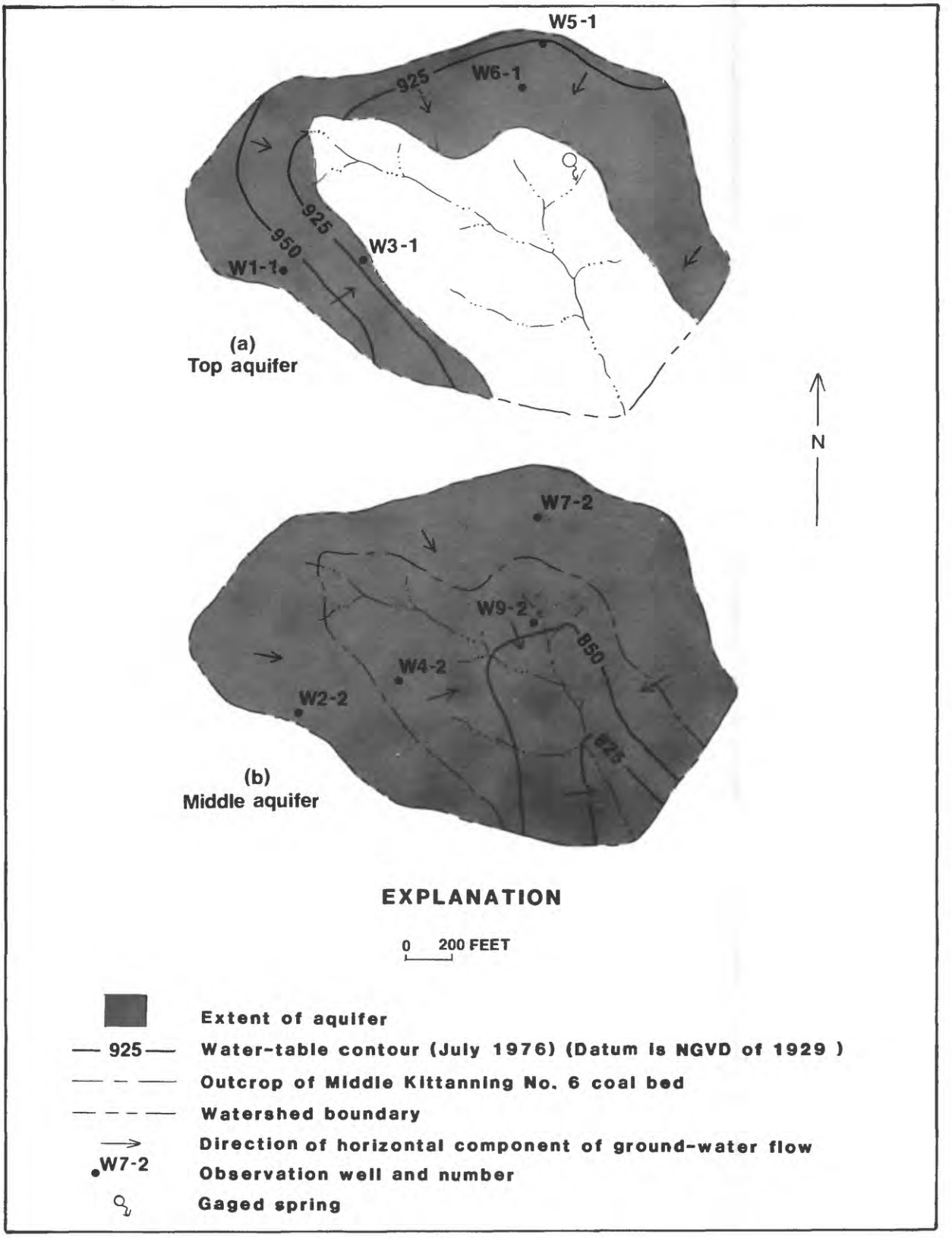



**Figure 2.--Potentiometric surfaces of top and middle aquifers in study watershed.**

## MODEL CONCEPTUALIZATION

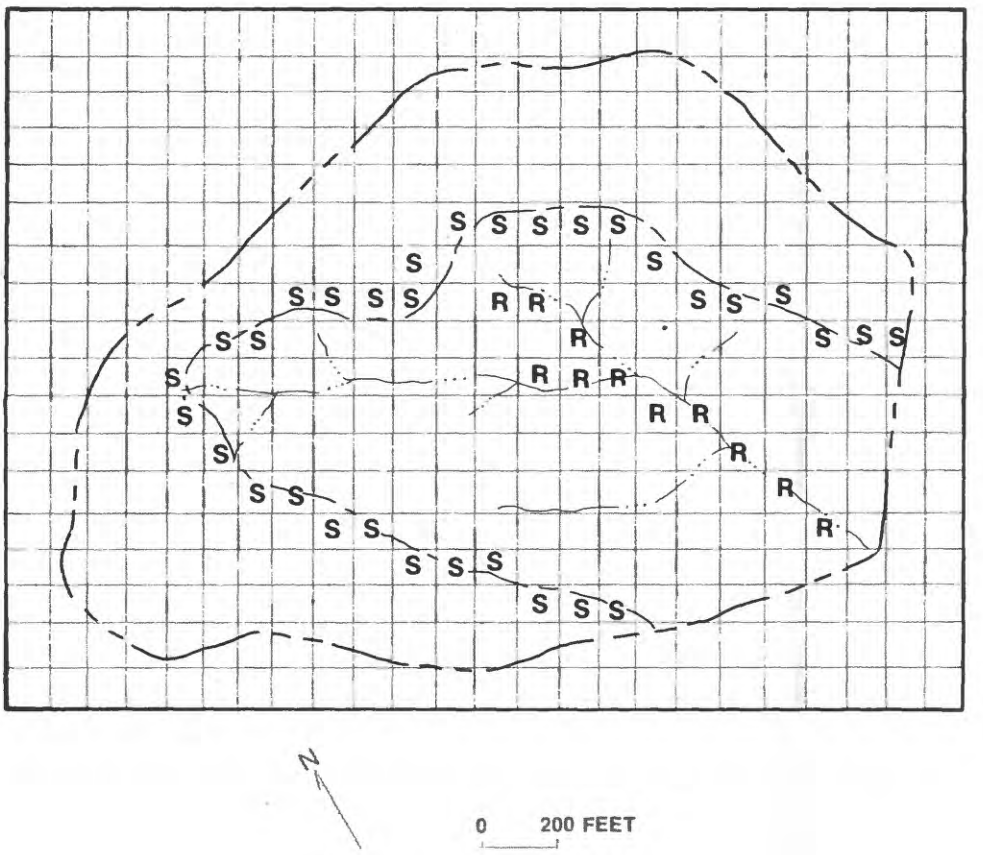
Ground-water flow in the watershed is conceptualized as quasi three-dimensional (horizontal within the aquifers and vertical through the underclays). The model of Trescott (1975) is applicable, with some modifications, for simulating this flow. Mathematical theory and details of the model are presented by Trescott (1975). Supplementary explanation and some corrections to the program are given by Trescott and Larson (1976).

The application of the model to the watershed is accomplished by an evenly spaced, 100-foot grid (fig. 3) that has 24 rows, 18 columns, and 3 layers. The watershed boundary is treated as no-flow because the ground-water divides in the top and middle aquifers coincide approximately with the surface drainage divide. The three model layers represent the top, middle, and deep aquifers. The top aquifer is represented by nodes between the watershed divide and the coal outcrop, whereas the middle and deep aquifers are represented by nodes across the entire watershed. Flow within the deep aquifer is not simulated, but the nodes of this layer are assigned constant-head values in order to simulate downward leakage from the middle aquifer.

The (vertical) flow through the underclay beds is calculated through assigned values of vertical hydraulic conductivity of the clay divided by thickness of the clay bed (Trescott, 1975, p. 28) and multiplying this quantity by the head gradient across the clay.

The top layer is modeled as unconfined; that is, transmissivity is computed by the program as aquifer hydraulilc conductivity times saturated thickness. Even though the middle layer is also unconfined, its transmissivity was not computed as part of the simulations because the saturated thickness was not expected to vary substantially.

Inherent in this model is also the assumption that leakage from the top aquifer enters the middle aquifer immediately. This assumption is not met in the real system because water must percolate through an unsaturated zone beneath the underclay. This condition is irrelevant in steady-state simulations, but is a potential source of error in transient simulations.




**EXPLANATION**

| | |
|---|---|
| —— – – —— | Outcrop of Middle Kittanning No.6 coal bed |
| —— – – – —— | Watershed boundary |
| ———— | Model boundary |
| S | Spring node (top layer) |
| R | Stream node (middle layer) |

**Figure 3.--Grid used for ground-water flow model of study watershed.**

## MODEL MODIFICATIONS

The logic of the modifications that were necessary to adapt the program to the study watershed is discussed below. The last four modifications discussed ("Other Modifications") do not affect program function but helped facilitate the analysis. Minor output format changes were also made but are not described here. The revised program listing and data-deck instructions, as well as an example simulation, are given in the appendix.

### Leakage Between Layers

In the original version of the program (Trescott, 1975), rate of vertical flow (leakage) between adjacent layers is calculated based on the head difference between those layers. The flow rate can be expressed as:

$$q_\ell = k_c/b\ (h_3 - h_2)$$

where

$q_\ell$ = nodal flow rate (leakage) betweeen aquifers (L/T)

$K_c/b$ = underclay leakance = vertical hydraulic conductivity of clay divided by thickness of clay bed ($T^{-1}$)

$h_3$ = head in top aquifer (L)

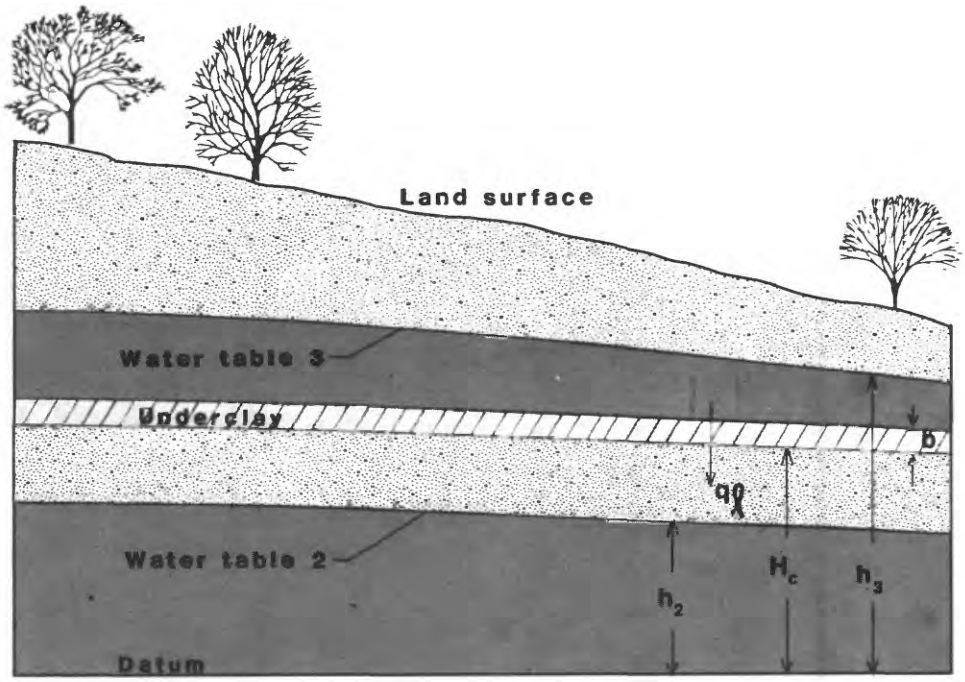
$h_2$ = head in middle aquifer (L)

This calculation is not appropriate for the study watershed because the top and middle aquifers are perched. In this case, the rate of vertical flow is calculated based on the difference between the altitude of the upper water table and the altitude of the bottom of the underclay (fig. 4), as follows:

$$q_\ell = K_c/b\ (h_3 - H_c)$$

where

$H_c$ = altitude of bottom of underclay (L)




**EXPLANATION**

b - Thickness of clay bed
$q_\ell$ - Flow rate between aquifers
$h_2$ - Head in middle aquifer
$h_3$ - Head in top aquifer
$H_c$ - Altitude of bottom of underclay

**Figure 4. --Schematic cross section illustrating leakage from top to middle aquifer.**

To simulate this, a correction is introduced in the program to cancel the part of the leakage caused by $H_C - h_2$. The BOTTOM array, which contains values for the bottom altitude of the top underclay, is required input, even if the top layer is modeled as confined. (In the original version of the model, the BOTTOM array is only used for simulating unconfined conditions in the uppermost layer.) However, if the head in the middle aquifer exceeds $H_C$, then $H_C$ is not a factor, and the calculation is based on the head difference between aquifers, as given in the original equation above.

Because the underclay is thin compared to the thickness of the overlying aquifer, the BOTTOM array is redefined from the original program and set equal to the altitude of the bottom of the underclay. This creates a small error during the calculation of transmissivity, but correctly determines the head difference during the leakage calculation. If, in a different application, confining-bed thickness is large compared with aquifer thickness, it may be necessary to further modify the program. This will allow both the bottom of the confining bed and bottom of the aquifer to be used in the calculations.

Because the middle aquifer is perched, nodes of the deep layer are assigned constant-head values equal to the altitude of the bottom of the overlying clay (underclay of middle aquifer). Leakage is thereby computed in the program based on the appropriate head difference--head in the middle aquifer minus altitude of the bottom of the underclay.

## Spring Discharge

A head-dependent function was introduced to simulate spring discharge at appropriate nodes in the top layer (fig. 3). Theoretical background is similar to that described by McDonald and Fleck (1978, p. 12) for drainage tiles. Springflow (fig. 5) can be expressed as:

$$q_{sp} = C_{sp}(H_{sp} - h) \quad h > H_{sp}$$

$$q_{sp} = 0 \quad h \leq H_{sp}$$

where

$q_{sp}$ = nodal spring discharge rate (L/T)

$C_{sp}$ = spring leakance coefficient ($T^{-1}$) = $(K_{sp}/b)(A_{sp}/A_n)$

$K_{sp}/b$ = spring leakance = hydraulic conductivity of soil material divided by thickness of soil material at spring ($T^{-1}$)

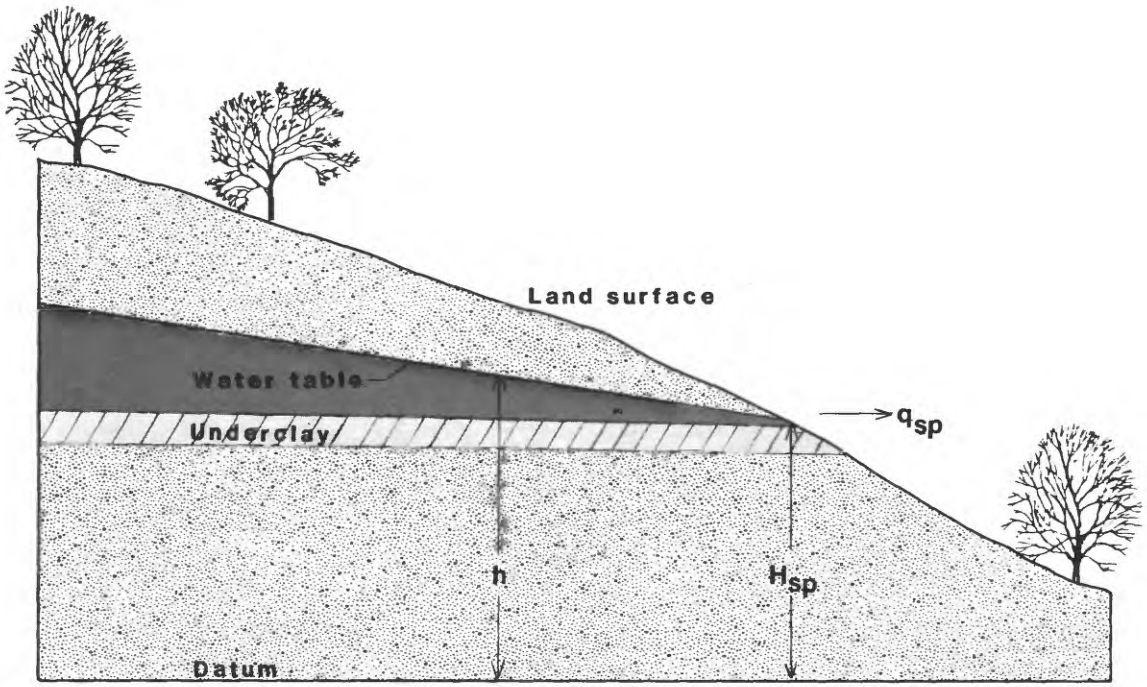
$A_{sp}$ = area of spring discharge within spring node ($L^2$)

$A_n$ = area of node ($L^2$)

$H_{sp}$ = discharge altitude of spring (L)

h = average head in aquifer within spring node (L)

Spring leakance coefficient, $C_{sp}$, is entered as a single value for each node although it is made up of lateral hydraulic conductivity of rock or soil material at the spring, thickness of soil material, and spring discharge area. The area-ratio term accounts for the fact that discharge occurs over only a fraction of the nodal area.




**EXPLANATION**

$q_{sp}$ - Spring discharge rate

h - Head in aquifer

$H_{sp}$ - Altitude of spring

**Figure 5. --Schematic cross section illustrating spring discharge.**

## Stream-Aquifer Interchange

A head-dependent function was introduced to permit simulation of discharge to, or recharge from, streams at appropriate nodes in the middle layer (fig. 3). Consideration of stream effects has been discussed by Prickett and Lonnquist (1977, p. 33) and McDonald and Fleck (1978, p. 14). A streambed layer separates the aquifer from the stream (fig. 6), and recharge or discharge depends on the relative head values of the aquifer and stream. If the water level in the aquifer drops below the streambed, leakage rate attains a constant maximum value. The recharge or discharge rate is given by:

$$q_{st} = C_{stb}\,(H_{st} - h) \qquad h > H_{stb}$$

$$q_{st} = C_{stb}\,(H_{st} - H_{stb}) \qquad h \leq H_{stb}$$

where

$q_{st}$ = nodal leakage rate to or from stream (L/T)

$C_{stb}$ = streambed leakance coefficient $(T^{-1})$ = $(K_{stb}/b)(A_{st}/A_n)$

$K_{stb}/b$ = streambed leakance = hydraulic conductivity of the streambed divided by thickness of streambed $(T^{-1})$

$A_{st}$ = area of stream within node $(L^2)$

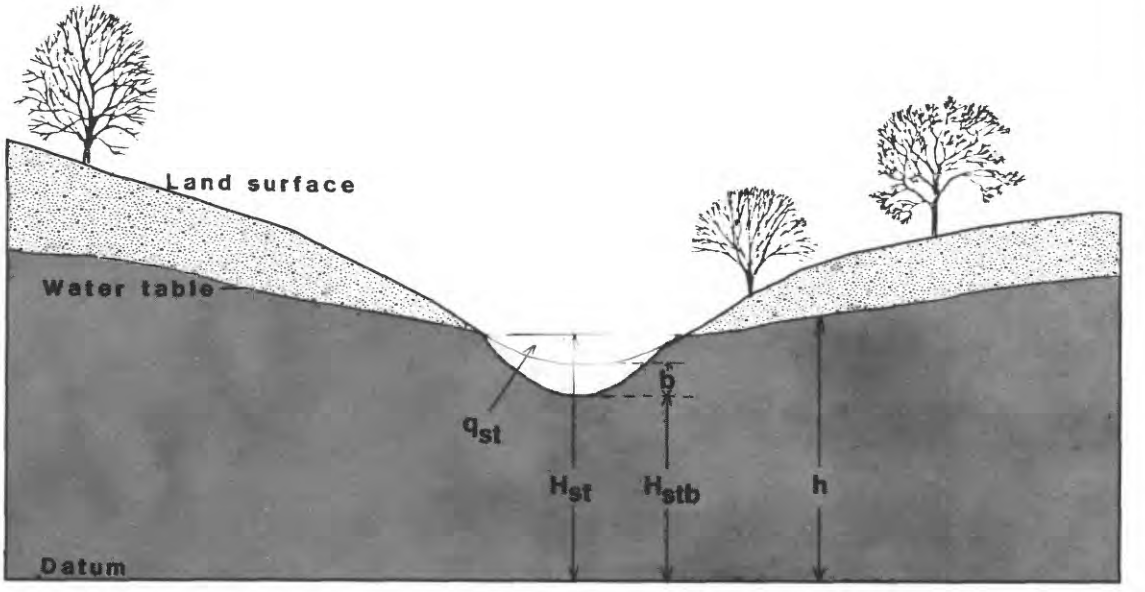
$A_n$ = area of node $(L^2)$

$H_{st}$ = altitude of stream surface (L)

$H_{stb}$ = altitude of bottom of streambed (L)

$h$ = average head in aquifer within stream node (L)

Streambed leakance coefficient is entered as a single value for each node, although it is made up of several parameters. The area-ratio term accounts for the fact that the stream covers only a fraction of the nodal area.




**EXPLANATION**

b - Thickness of streambed

$q_{st}$ - Leakage rate to or from stream

$H_{st}$ - Altitude of stream surface

$H_{stb}$ - Altitude of bottom of streambed

h - Head in aquifer

**Figure 6. --Schematic cross section illustrating discharge to stream.**

## Recharge From Precipitation to Any Layer

The original version of the program allows for recharge from precipitation to be applied only to the uppermost layer. Program changes have been made to permit recharge to any layer. This was necessary for the study watershed because the middle layer receives recharge from precipitation where it is not overlain by underclay. (See "Description of Ground-Water System".)

## Other Modifications

### Springflow recharge to middle layer

Some of the springflow discharge from the top aquifer infiltrates and recharges the middle aquifer. This recharge can be simulated by assigning relatively high underclay leakance values at appropriate spring nodes, and the code was changed to calculate these flow rates separately. This approach actually increases modeled leakage through the underclay over which the springflow is discharging, but the effect of increased recharge to the middle layer is established in approximately the correct place. As with the leakage process discussed previously, this recharge is a potential source of error in transient simulations.

### Water-budget determination for each layer

The original version of the program calculates a water budget for the entire model. Provisions were also made in this study to calculate separate water budgets for each layer. Knowledge of the recharge and discharge rates for each budget component in each layer enabled a more thorough evaluation of simulation results.

### Location of largest head changes

Additions were made in the program to identify and print out the row and column numbers of the node with the largest head change for each iteration. For some simulations, this information was useful in tracing the cause of nonconvergence to solution.

Flow to each constant head node

Modifications were made to the original program to identify and print out the row, column, and layer numbers of every constant-head node and the corresponding flow rate to or from that node. This was valuable in this study for detecting areal variations in leakage rate to the deep aquifer.

## SUMMARY

A study was undertaken to determine impacts of coal-strip mining on local hydrologic systems. As part of this study, a quasi three-dimensional ground-water flow model (Trescott, 1975) was modified and used to help define premining flow conditions.

Changes in the model were necessary to simulate hydrologic conditions in the watersheds properly. Perched water tables in the top and middle aquifers required that the rate of vertical flow between adjacent layers be calculated based on the difference between the altitude of the upper water table minus the altitude of the underclay. Spring discharge along the outcrop of the top underclay is simulated by incorporating a head-dependent function into the program. Interchange between a stream and the middle aquifer is simulated by introducing another head-dependent function. A change was made to allow recharge from precipitation to any layer because the middle aquifer is exposed over much of the watershed. Other changes, such as water-budget determination for each layer, were also useful during analysis.

Although the simulation methodology presented herein may be appropriate for other studies, the modified program is somewhat site specific and should be used judiciously. In particular, the program is keyed to the use of three model layers, with specific assumptions about each layer. Additional program changes would be required for systems with different hydrogeologic conditions. The changes have been tested and used in numerous simulations and have made the model a useful tool for evaluating the sudy watersheds.

## REFERENCES CITED


Helgesen, J. O., and Razem, A. C., 1980, Preliminary observation of surface-mine impacts on ground water in two small watersheds in eastern Ohio: Proceedings of the Symposium on Surface Mining Hydrology, Sedimentology, and Reclamation, University of Kentucky, Lexington, Kentucky, p. 351-360.

McDonald, M. G., and Fleck, W. B., 1978, Model analysis of impact on ground-water conditions of the Muskegon County wastewater disposal system, Michigan: U.S. Geological Survey Open-File Report 78-99, 63 p.

Prickett, T. A., and Lonnquist, C. G., 1971, Selected digital computer techniques for ground-water resource evaluation: Illinois State Water Survey Bulletin 55, 62 p.

Trescott, P. C., 1975, Documentation of finite-difference model for simulation of three-dimensional ground-water flow: U.S. Geological Survey Open-File Report 75-438, 32 p.

Trescott, P. C., and Larson, S. P., 1976, Supplement to Open-File Report 75-438, Documentation of finite-difference model for simulation of three-dimensional ground-water flow: U.S. Geological Survey Open-File Report 76-591, 21 p.

U.S. Bureau of Mines, 1978, Research on the hydrology and water quality of watersheds subjected to surface mining, phase I. Premining hydrologic and water-quality conditions: U.S. Bureau of Mines Open-File Report 88-80.

## Appendix 1

## PROGRAM LISTING

The following code listing is the program of Trescott (1975) and Trescott and Larson (1976) and incorporates the modifications presented in this report. Changes to the original code that are described in this report are marked by asterisks.

```
C     ------------------------------------------------------------------00000010
C     FINITE-DIFFERENCE MODEL FOR SIMULATION OF GROUND-WATER FLOW IN    00000020
C     THREE DIMENSIONS, SEPTEMBER, 1975 BY P.C. TRESCOTT, U. S. G. S.   00000030
C     WITH CONTRIBUTIONS TO MAIN, DATAI AND SOLVE BY S.P. LARSON        00000040
C      AND MODIFICATIONS BY LARSON, J.O. HELGESEN, AND A.C. RAZEM       00000045*
C     ------------------------------------------------------------------00000050
C       SMS - STRIP MINE PROJECT; STEADY-STATE(OR CONSTANT QRE) RUNS    00000060*
C     SPECIFICATIONS:                                                   00000070
      REAL *8YSTR                                                       00000080
C                                                                       00000090
      DIMENSION Y(40000), L(32), HEADNG(33), NAME(42), INFT(2,2), IOFT(900000100*
     1,4), DUM(3)                                                       00000110
C                                                                       00000120
      EQUIVALENCE (YSTR,Y(1))                                           00000130
C                                                                       00000140
      COMMON /INTEGR/ I0,J0,K0,I1,J1,K1,I,J,K,NPER,KTH,ITMAX,LENGTH,KP,N00000150
     1WEL,NUMT,IFINAL,IT,KT,IHEAD,IDRAW,IFLO,IERR,I2,J2,K2,IMAX,ITMX1,NC00000160
     2H,IDK1,IDK2,IWATER,IQRE,IP,JP,IQ,JQ,IK,JK,K5,IPU1,IPU2,ITK,INO,   00000170*
     3IEQN                                                              00000171
      COMMON /SPARAM/ TMAX,CDLT,DELT,ERR,TEST,SUM,SUMP,QR               00000180
      COMMON /SARRAY/ ICHK(13),LEVEL1(9),LEVEL2(9)                      00000190
C                                                                       00000200
      DATA NAME/2*4H    ,4H   S,4HTART,4HING ,4HHEAD,4H    ,4H STO,4HRAG00000210
     1E,4H COE,4HFFIC,4HIENT,2*4H    ,4H  TR,4HANSM,4HISSI,4HVITY,5*4H  00000220
     2  ,4H  TK,4H  HY,4HDRAU,4HLIC ,4HCOND,4HUCTI,4HVITY,2*4H    ,4HBOT00000230
     3T,4HOM E,4HLEVA,4HTION,2*4H    ,4H   R,4HECHA,4HRGE ,4HRATE/      00000240
      DATA INFT/4H(20F,4H4.0),4H(8F1,4H0.4)/                            00000250
      DATA IOFT/4H(1H0,4H,I2,,4H2X,2,4H0F6.,4H1/(5,4HX,20,4HF6.1,4H))  ,00000260
     14H    ,4H(1H0,4H,I5,,4H10E1,4H1.3/,4H(1H ,4H,5X,,4H10E1,4H1.3),4H)00000270
     2   ,4H  (1,4HH0,I,4H5,10,4HE11.,4H3/(1,4HH ,5,4HX,10,4HE11.,4H3)) 00000280
     3,4H  (1,4HH0,I,4H5,10,4HE11.,4H3/(1,4HH ,5,4HX,10,4HE11.,4H3))   /00000290
C                                                                       00000300
      DEFINE FILE 2(8,1520,U,KKK)                                       00000310
C     ..................................................................00000320
C                                                                       00000330
C     ---READ TITLE, PROGRAM SIZE AND OPTIONS---                        00000340
      READ (5,200) HEADNG                                               00000350
      WRITE (6,190) HEADNG                                              00000360
      READ (5,160) I0,J0,K0,ITMAX,NCH,ND,NRIV                           00000370*
      WRITE (6,180) I0,J0,K0,ITMAX,NCH,ND,NRIV                          00000380*
      READ (5,210) IDRAW,IHEAD,IFLO,IDK1,IDK2,IWATER,IQRE,IPU1,IPU2,ITK 00000390
     1,IEQN                                                             00000395
      WRITE (6,220) IDRAW,IHEAD,IFLO,IDK1,IDK2,IWATER,IQRE,IPU1,IPU2,ITK00000400
     1,IEQN                                                             00000405
      IERR=0                                                            00000410
      INO=ND                                                            00000420*
C                                                                       00000430
C     ---COMPUTE DIMENSIONS FOR ARRAYS---                               00000440
      J1=J0-1                                                           00000450
      I1=I0-1                                                           00000460
      K1=K0-1                                                           00000470
      I2=I0-2                                                           00000480
      J2=J0-2                                                           00000490
      K2=K0-2                                                           00000500
      IMAX=MAX0(I0,J0)                                                  00000510
      NCD=MAX0(1,NCH)                                                   00000520
      ITMX1=ITMAX+1                                                     00000530
      IS1Z=I0*J0*K0                                                     00000540
      IK1=I0*J0                                                         00000550
      IK2=MAX0(IK1*K1,1)                                                00000560
```

```
      ISUM=2*ISIZ+1                                                     00000570
      L(1)=1                                                            00000580
      DO 30 I=2,14                                                      00000590
      IF (I.NE.8) GO TO 20                                              00000600
      L(8)=ISUM                                                         00000610
      ISUM=ISUM+IK2                                                     00000620
      IF (IK2.EQ.1) GO TO 10                                            00000630
      IK=I0                                                             00000640
      JK=J0                                                             00000650
      K5=K1                                                             00000660
      GO TO 30                                                          00000670
   10 IK=1                                                              00000680
      JK=1                                                              00000690
      K5=1                                                              00000700
      GO TO 30                                                          00000710
   20 L(I)=ISUM                                                         00000720
      ISUM=ISUM+ISIZ                                                    00000730
   30 CONTINUE                                                          00000740
      L(15)=ISUM                                                        00000750
      ISUM=ISUM+J0                                                      00000760
      L(16)=ISUM                                                        00000770
      ISUM=ISUM+I0                                                      00000780
      L(17)=ISUM                                                        00000790
      ISUM=ISUM+K0                                                      00000800
      L(18)=ISUM                                                        00000810
      ISUM=ISUM+IMAX                                                    00000820
      L(19)=ISUM                                                        00000830
      ISUM=ISUM+K0*3                                                    00000840
      L(20)=ISUM                                                        00000850
      ISUM=ISUM+ITMX1                                                   00000860
      L(21)=ISUM                                                        00000870
      ISUM=ISUM+3*NCD                                                   00000880
      L(22)=ISUM                                                        00000890
      ISUM=ISUM+NCD                                                     00000900
      L(23)=ISUM                                                        00000910
      IF (IWATER.NE.ICHK(6)) GO TO 40                                   00000920
      ISUM=ISUM+IK1                                                     00000930
      L(24)=ISUM                                                        00000940
      ISUM=ISUM+IK1                                                     00000950
      IP=I0                                                             00000960
      JP=J0                                                             00000970
      GO TO 50                                                          00000980
   40 ISUM=ISUM+1                                                       00000990
      L(24)=ISUM                                                        00001000
      ISUM=ISUM+IK1                                                     00001010
      IP=1                                                              00001020
      JP=1                                                              00001030
   50 L(25)=ISUM                                                        00001040
      IF (IQRE.NE.ICHK(7)) GO TO 60                                     00001050
      ISUM=ISUM+ISIZ                                                    00001060*
      IQ=I0                                                             00001070
      JQ=J0                                                             00001080
      GO TO 70                                                          00001090
   60 ISUM=ISUM+1                                                       00001100
      IQ=1                                                              00001110
      JQ=1                                                              00001120
   70 IF(ND.EQ.0) GO TO 75                                              00001130*
      L(26)=ISUM                                                        00001140*
      ISUM=ISUM+ISIZ                                                    00001150*
      L(27)=ISUM                                                        00001160*
```

```
      ISUM=ISUM+ND                                                      00001170*
      L(28)=ISUM                                                        00001180*
      ISUM=ISUM+ND                                                      00001190*
      GO TO 76                                                          00001200*
   75 L(26)=ISUM                                                        00001210*
      ISUM=ISUM+1                                                       00001220*
      L(27)=ISUM                                                        00001230*
      ISUM=ISUM+1                                                       00001240*
      L(28)=ISUM                                                        00001250*
   76 IF(NRIV.EQ.0) GO TO 77                                            00001260*
      L(29)=ISUM                                                        00001270*
      ISUM=ISUM+ISIZ                                                    00001280*
      L(30)=ISUM                                                        00001290*
      ISUM=ISUM+NRIV                                                    00001300*
      L(31)=ISUM                                                        00001310*
      ISUM=ISUM+NRIV                                                    00001320*
      L(32)=ISUM                                                        00001330*
      ISUM=ISUM+NRIV                                                    00001340*
      GO TO 78                                                          00001350*
   77 L(29)=ISUM                                                        00001360*
      L(30)=ISUM+1                                                      00001370*
      L(31)=ISUM+2                                                      00001380*
      L(32)=ISUM+3                                                      00001390*
      ISUM=ISUM+4                                                       00001400*
   78 WRITE (6,170) ISUM                                                00001410*
C                                                                       00001420
C     ---PASS INITIAL ADDRESSES OF ARRAYS TO SUBROUTINES---             00001430
      CALL DATAI(Y(L(1)),Y(L(2)),Y(L(3)),Y(L(4)),Y(L(5)),Y(L(6)),Y(L(7))00001440
     1,Y(L(8)),Y(L(9)),Y(L(15)),Y(L(16)),Y(L(17)),Y(L(19)),Y(L(23)),Y(L(00001450
     2 24)),Y(L(25)),Y(L(26)),Y(L(27)),Y(L(28)),Y(L(29)),Y(L(30)),      00001460*
     3 Y(L(31)),Y(L(32)))                                               00001470*
      CALL STEP(Y(L(1)),Y(L(2)),Y(L(3)),Y(L(4)),Y(L(5)),Y(L(6)),Y(L(7)),00001480
     1Y(L(8)),Y(L(9)),Y(L(15)),Y(L(16)),Y(L(17)),Y(L(19)),Y(L(18)),Y(L(200001490
     20)))                                                              00001500
      CALL SOLVE(Y(L(1)),Y(L(2)),Y(L(3)),Y(L(4)),Y(L(5)),Y(L(6)),Y(L(7))00001510
     1,Y(L(8)),Y(L(9)),Y(L(15)),Y(L(16)),Y(L(17)),Y(L(19)),Y(L(10)),Y(L(00001520
     211)),Y(L(12)),Y(L(13)),Y(L(14)),Y(L(20)),Y(L(25)),Y(L(23)),       00001530*
     3 Y(L(26)),Y(L(27)),Y(L(28)),Y(L(29)),Y(L(30)),Y(L(31)),Y(L(32)),  00001540*
     4 ND,NRIV,Y(L(24)))                                                00001550*
      CALL COEF(Y(L(1)),Y(L(2)),Y(L(3)),Y(L(4)),Y(L(5)),Y(L(6)),Y(L(7)),00001560
     1Y(L(8)),Y(L(9)),Y(L(15)),Y(L(16)),Y(L(17)),Y(L(19)),Y(L(23)),Y(L(200001570
     24)),Y(L(25)))                                                     00001580
      CALL CHECKI(Y(L(1)),Y(L(2)),Y(L(3)),Y(L(4)),Y(L(5)),Y(L(6)),Y(L(7)00001590
     1),Y(L(8)),Y(L(9)),Y(L(15)),Y(L(16)),Y(L(17)),Y(L(19)),Y(L(21)),Y(L00001600
     2(22)),Y(L(25)),                                                   00001610
     3 Y(L(26)),Y(L(27)),Y(L(28)),Y(L(29)),Y(L(30)),Y(L(31)),Y(L(32)),  00001620*
     4 ND,NRIV,Y(L(24)))                                                00001630*
      CALL PRNTAI(Y(L(1)),Y(L(2)),Y(L(4)),Y(L(5)),Y(L(9)),Y(L(15)),Y(L(100001640
     16)))                                                              00001650
C                                                                       00001660
C     ---START COMPUTATIONS---                                          00001670
C     ************************                                          00001680
C     ---READ AND WRITE DATA FOR GROUPS II AND III---                   00001690
      CALL DATAIN                                                       00001700
      IRN=1                                                             00001710
      NIJ=I0*J0                                                         00001720
      DO 80 K=1,K0                                                      00001730
      LOC=L(2)+(K-1)*NIJ                                                00001740
   80 CALL ARRAY(Y(LOC),INFT(1,2),IOFT(1,1),NAME(1),IRN,DUM)            00001750
      DO 90 K=1,K0                                                      00001760
```

```
      LOC=L(5)+(K-1)*NIJ
   90 CALL ARRAY(Y(LOC),INFT(1,1),IOFT(1,2),NAME(7),IRN,DUM)
      DO 100 K=1,K0
      LOC=L(4)+(K-1)*NIJ
      L1=L(19)+K-1
      L2=L(19)+K0+K-1
      L3=L(19)+2*K0+K-1
      CALL ARRAY(Y(LOC),INFT(1,1),IOFT(1,2),NAME(13),IRN,DUM)
      Y(L1)=DUM(1)
      Y(L2)=DUM(2)
      Y(L3)=DUM(3)
  100 WRITE (6,230) K,Y(L1),Y(L2),Y(L3)
      IF (ITK.NE.ICHK(10)) GO TO 120
      DO 110 K=1,K1
      LOC=L(8)+(K-1)*NIJ
  110 CALL ARRAY(Y(LOC),INFT(1,1),IOFT(1,3),NAME(19),IRN,DUM)
  120 IF (IWATER.NE.ICHK(6)) GO TO 130
      K=K0
      CALL ARRAY(Y(L(23)),INFT(1,1),IOFT(1,4),NAME(25),IRN,DUM)
  130 CALL ARRAY(Y(L(24)),INFT(1,1),IOFT(1,1),NAME(31),IRN,DUM)
      IF(IQRE.NE.ICHK(7)) GO TO 135
      DO 131 K=1,K0
      LOC=L(25)+(K-1)*NIJ
  131 CALL ARRAY(Y(LOC),INFT(1,1),IOFT(1,4),NAME(37),IRN,DUM)
  135 CALL MDAT
       IF(ND.NE.0) CALL DDAT(ND)
      IF(NRIV.NE.0) CALL DDAT2(NRIV)
C
C     ---COMPUTE TRANSMISSIVITY FOR UNCONFINED LAYER---
      IF (IWATER.EQ.ICHK(6)) CALL TRANS(1)
C
C     ---COMPUTE T COEFFICIENTS---
      CALL TCOF
C
C     ---COMPUTE ITERATION PARAMETERS---
      CALL ITER
C
C     ---READ TIME PARAMETERS AND PUMPING DATA FOR A NEW PUMPING PERIOD-
  140 CALL NEWPER
C
      KT=0
      IFINAL=0
C
C     ---START NEW TIME STEP COMPUTATIONS---
  150 CALL NEWSTP
C
C     ---START NEW ITERATION IF MAXIMUM NO. ITERATIONS NOT EXCEEDED---
      CALL NEWITA
C
C     ---PRINT OUTPUT AT DESIGNATED TIME STEPS---
      CALL OUTPUT
C
C     ---LAST TIME STEP IN PUMPING PERIOD ?---
      IF (IFINAL.NE.1) GO TO 150
C
C     ---CHECK FOR NEW PUMPING PERIOD---
      IF (KP.LT.NPER) GO TO 140
C
      STOP
C
```

```
C     ---FORMATS---                                                     00002360
C                                                                       00002370
C                                                                       00002380
C                                                                       00002390
  160 FORMAT (8I10)                                                     00002400
  170 FORMAT ('0',54X,'WORDS OF VECTOR Y USED =',I7)                    00002410
  180 FORMAT ('0',62X,'NUMBER OF ROWS =',I5/60X,'NUMBER OF COLUMNS =',I500002420
     1/61X,'NUMBER OF LAYERS =',I5//39X,'MAXIMUM PERMITTED NUMBER OF ITE00002430
     2RATIONS =',I5//48X,'NUMBER OF CONSTANT HEAD NODES =',I5,          00002440*
     3 /56X,'NUMBER OF DRAIN NODES =',I5,                               00002450*
     4 /,56X,'NUMBER OF RIVER NODES =',I5)                              00002460*
  190 FORMAT ('1',33A4)                                                 00002470
  200 FORMAT (20A4)                                                     00002480
  210 FORMAT (16(A4,1X))                                                00002490
  220 FORMAT ('-SIMULATION OPTIONS:  ',11(A4,4X))                       00002500
  230 FORMAT (1H0,44X,'DIRECTIONAL TRANSMISSIVITY MULTIPLICATION FACTORS00002510
     1 FOR LAYER',I3,/,76X,'X =',G15.7/76X,'Y =',G15.7/76X,'Z =',G15.7) 00002520
      END                                                               00002530
      SUBROUTINE DATAI(PHI,STRT,OLD,T,S,TR,TC,TK,WELL,DELX,DELY,DELZ,FAC00002540
     1 T,PERM,BOTTOM,QRE,ID,LD,ELD,IDR,RH,RC,RB)                        00002550*
C     ------------------------------------------------------------------00002560
C     READ AND WRITE DATA                                               00002570
C     ------------------------------------------------------------------00002580
C                                                                       00002590
C     SPECIFICATIONS:                                                   00002600
      REAL *8PHI                                                        00002610
      REAL *8XLABEL,YLABEL,TITLE,XN1,MESUR                              00002620
      REAL*4 LD                                                         00002630*
C                                                                       00002640
      DIMENSION PHI(I0,J0,K0), STRT(I0,J0,K0), OLD(I0,J0,K0), T(I0,J0,K000002650
     1), S(I0,J0,K0), TR(I0,J0,K0), TC(I0,J0,K0), TK(IK,JK,K5), WELL(I0,00002660
     2J0,K0), DELX(J0), DELY(I0), DELZ(K0), FACT(K0,3), PERM(IP,JP), BOT00002670
     3TOM(IP,JP), QRE(IQ,JQ), TF(3), A(I0,J0), IN(6), IOFT(9), INFT(2)  00002680
     4 ,ID(I0,J0,K0),LD(1),ELD(1),IDR(I0,J0,K0),RH(1),RC(1),RB(1)       00002690*
C                                                                       00002700
      COMMON /INTEGR/ I0,J0,K0,I1,J1,K1,I,J,K,NPER,KTH,ITMAX,LENGTH,KP,N00002710
     1WEL,NUMT,IFINAL,IT,KT,IHEAD,IDRAW,IFLO,IERR,I2,J2,K2,IMAX,ITMX1,NC00002720
     2H,IDK1,IDK2,IWATER,IQRE,IP,JP,IQ,JQ,IK,JK,K5,IPU1,IPU2,ITK,INO,   00002730*
     3IEQN                                                              00002731*
      COMMON /SPARAM/ TMAX,CDLT,DELT,ERR,TEST,SUM,SUMP,QR               00002740
      COMMON /SARRAY/ ICHK(13),LEVEL1(9),LEVEL2(9)                      00002750
      COMMON /CK/ ETFLXT,STORT,QRET,CHST,CHDT,FLUXT,PUMPT,CFLUXT,FLXNT  00002760
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(6),XN1,MESUR,PRNT(122),BLANK00002770
     1(60),DIGIT(122),VF1(6),VF2(6),VF3(7),XSCALE,DINCH,SYM(17),XN(100),00002780
     2YN(13),NA(4),N1,N2,N3,YSCALE,FACT1,FACT2                          00002790
      RETURN                                                            00002800
C     ..................................................................00002810
C     ********************                                              00002820
      ENTRY DATAIN                                                      00002830
C     ********************                                              00002840
C                                                                       00002850
C     ---READ AND WRITE SCALAR PARAMETERS---                            00002860
      READ (5,330) NPER,KTH,ERR,LENGTH                                  00002870
      WRITE (6,340) NPER,KTH,ERR                                        00002880
      READ (5,460) XSCALE,YSCALE,DINCH,FACT1,(LEVEL1(I),I=1,9),FACT2,(LE00002890
     1VEL2(I),I=1,9),MESUR                                              00002900
      IF (XSCALE.NE.0.) WRITE (6,470) XSCALE,YSCALE,MESUR,MESUR,DINCH,FA00002910
     1CT1,LEVEL1,FACT2,LEVEL2                                           00002920
C                                                                       00002930
C     ---READ CUMULATIVE MASS BALANCE PARAMETERS---                     00002940
```

```
      READ (5,450) SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ETFL
     1XT,FLXNT
      IF (IDK1.EQ.ICHK(4)) GO TO 20
      IF (IPU1.NE.ICHK(8)) GO TO 50
C
C     ---READ INITIAL HEAD VALUES FROM CARDS---
      DO 10 K=1,K0
      DO 10 I=1,I0
   10 READ (5,360) (PHI(I,J,K),J=1,J0)
      GO TO 30
C
C     ---READ INITIAL HEAD AND MASS BALANCE PARAMETERS FROM DISK---
   20 READ (4) PHI,SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ETFL
     1XT,FLXNT
      REWIND 4
   30 WRITE (6,430) SUM
      DO 40 K=1,K0
      WRITE (6,440) K
      DO 40 I=1,I0
   40 WRITE (6,350) I,(PHI(I,J,K),J=1,J0)
C
   50 DO 60 K=1,K0
      DO 60 I=1,I0
      DO 60 J=1,J0
      WELL(I,J,K)=0.
      TR(I,J,K)=0.
      TC(I,J,K)=0.
      IF (K.NE.K0) TK(I,J,K)=0.
   60 CONTINUE
      RETURN
C     *********************
      ENTRY ARRAY(A,INFT,IOFT,IN,IRN,TF)
C     *********************
      READ (5,330) FAC,IVAR,IPRN,TF,IRECS,IRECD
      IC=4*IRECS+2*IVAR+IPRN+1
      GO TO (70,70,90,90,120,120), IC
   70 DO 80 I=1,I0
      DO 80 J=1,J0
   80 A(I,J)=FAC
      WRITE (6,280) IN,FAC,K
      GO TO 140
   90 IF (IC.EQ.3) WRITE (6,290) IN,K
      DO 110 I=1,I0
      READ (5,INFT) (A(I,J),J=1,J0)
      DO 100 J=1,J0
  100 A(I,J)=A(I,J)*FAC
  110 IF (IC.EQ.3) WRITE (6,IOFT) I,(A(I,J),J=1,J0)
      GO TO 140
  120 READ (2'IRN) A
      IF (IC.EQ.6) GO TO 140
      WRITE (6,290) IN,K
      DO 130 I=1,I0
  130 WRITE (6,IOFT) I,(A(I,J),J=1,J0)
  140 IF (IRECD.EQ.1) WRITE (2'IRN) A
      IRN=IRN+1
      RETURN
C     *********************
      ENTRY MDAT
C     *********************
      DO 150 K=1,K0
```

```
      DO 150 I=1,I0                                                     00003550
      DO 150 J=1,J0                                                     00003560
      IF (I.EQ.1.OR.I.EQ.I0.OR.J.EQ.1.OR.J.EQ.J0) T(I,J,K)=0.           00003570
      IF (IDK1.NE.ICHK(4).AND.IPU1.NE.ICHK(8)) PHI(I,J,K)=STRT(I,J,K)   00003580
      IF (K.NE.K0.OR.IWATER.NE.ICHK(6)) GO TO 150                       00003590
      IF (I.EQ.1.OR.I.EQ.I0.OR.J.EQ.1.OR.J.EQ.J0) PERM(I,J)=0.          00003600
  150 CONTINUE                                                          00003610
C     ............................ DELX ............................00003620
      READ (5,330) FAC,IVAR,IPRN                                        00003630
      IF (IVAR.EQ.1) READ (5,330) (DELX(J),J=1,J0)                      00003640
      DO 170 J=1,J0                                                     00003650
      IF (IVAR.NE.1) GO TO 160                                          00003660
      DELX(J)=DELX(J)*FAC                                               00003670
      GO TO 170                                                         00003680
  160 DELX(J)=FAC                                                       00003690
  170 CONTINUE                                                          00003700
      IF (IVAR.EQ.1.AND.IPRN.NE.1) WRITE (6,370) (DELX(J),J=1,J0)       00003710
      IF (IVAR.EQ.0) WRITE (6,300) FAC                                  00003720
C     ............................ DELY ............................00003730
      READ (5,330) FAC,IVAR,IPRN                                        00003740
      IF (IVAR.EQ.1) READ (5,330) (DELY(I),I=1,I0)                      00003750
      DO 190 I=1,I0                                                     00003760
      IF (IVAR.NE.1) GO TO 180                                          00003770
      DELY(I)=DELY(I)*FAC                                               00003780
      GO TO 190                                                         00003790
  180 DELY(I)=FAC                                                       00003800
  190 CONTINUE                                                          00003810
      IF (IVAR.EQ.1.AND.IPRN.NE.1) WRITE (6,380) (DELY(I),I=1,I0)       00003820
      IF (IVAR.EQ.0) WRITE (6,310) FAC                                  00003830
C     ............................ DELZ ............................00003840
      READ (5,330) FAC,IVAR,IPRN                                        00003850
      IF (IVAR.EQ.1) READ (5,330) (DELZ(K),K=1,K0)                      00003860
      DO 210 K=1,K0                                                     00003870
      IF (IVAR.NE.1) GO TO 200                                          00003880
      DELZ(K)=DELZ(K)*FAC                                               00003890
      GO TO 210                                                         00003900
  200 DELZ(K)=FAC                                                       00003910
  210 CONTINUE                                                          00003920
      IF (IVAR.EQ.1.AND.IPRN.NE.1) WRITE (6,390) (DELZ(K),K=1,K0)       00003930
      IF (IVAR.EQ.0) WRITE (6,320) FAC                                  00003940
C                                                                       00003950
C     ---INITIALIZE VARIABLES---                                        00003960
      B=0.                                                              00003970
      D=0.                                                              00003980
      F=0.                                                              00003990
      H=0.                                                              00004000
      SU=0.                                                             00004010
      Z=0.                                                              00004020
      IF (XSCALE.NE.0.) CALL MAP                                        00004030
      RETURN                                                            00004040
      ENTRY DDAT(ND)                                                    00004050*
      NK=1                                                              00004060*
      DO501 K=1,K0                                                      00004070*
      DO 500 I=1,I0                                                     00004080*
      READ 510, (ID(I,J,K),J=1,J0)                                      00004090*
  510 FORMAT (80I1)                                                     00004100*
      DO 500 J=1,J0                                                     00004110*
      IF(ID(I,J,K).EQ.0) GO TO 500                                      00004120*
      ID(I,J,K) = NK                                                    00004130*
      NK=NK+1                                                           00004140*
```

```
500 CONTINUE                                                            00004150*
501 CONTINUE                                                            00004160*
    NK = NK - 1                                                         00004170*
    IF (NK.EQ.ND) GO TO 520                                             00004180*
    PRINT 515,NK,ND                                                     00004190*
515 FORMAT ('  ERROR****NK.NE.ND     NK=',I5,5X,'ND=',I5)               00004200*
    STOP                                                                00004210*
520 READ 330, FAC                                                       00004220*
    PRINT 525,FAC                                                       00004221*
525 FORMAT ('1','SPRING COEFFICIENT FACTOR=',E20.7)                     00004222*
    READ 530, (LD(I),I=1,ND)                                            00004230*
530 FORMAT(40F2.0)                                                      00004240*
    PRINT 540,(LD(I),I=1,ND)                                            00004250*
540 FORMAT(/,2X,'SPRING COEFFICIENT VALUES',/,(20(1X,F5.0)))            00004260*
    DO 550 I=1,ND                                                       00004270*
    LD(I) = LD(I)*FAC                                                   00004280*
550 CONTINUE                                                            00004290*
    READ 330, FAC                                                       00004300*
    READ 560,(ELD(I),I=1,ND)                                            00004310*
    PRINT 555,(ELD(I),I=1,ND)                                           00004320*
555 FORMAT (/,1X,'SPRING ELEVATIONS',/,(20(1X,F5.0)))                   00004325*
560 FORMAT (20F4.0)                                                     00004330*
    DO 570 I=1,ND                                                       00004340*
570 ELD(I)=ELD(I)*FAC                                                   00004350*
    RETURN                                                              00004360*
    ENTRY DDAT2(NRIV)                                                   00004370*
    NK=1                                                                00004380*
    DO 581 K=1,K0                                                       00004390*
    DO 580 I=1,I0                                                       00004400*
    READ 510,(IDR(I,J,K),J=1,J0)                                        00004410*
    DO 580 J=1,J0                                                       00004420*
    IF(IDR(I,J,K).EQ.0) GO TO 580                                       00004430*
    IDR(I,J,K) = NK                                                     00004440*
    NK = NK + 1                                                         00004450*
580 CONTINUE                                                            00004460*
581 CONTINUE                                                            00004470*
    NK = NK - 1                                                         00004480*
    IF(NK.EQ.NRIV) GO TO 600                                            00004490*
    PRINT 585,NK,NRIV                                                   00004500*
585 FORMAT('   ERROR****NK.NE.NRIV     NK=',I5,5X,'NRIV=',I5)           00004510*
    STOP                                                                00004520*
600 READ 330,FAC                                                        00004530*
    READ 560,(RH(I),I=1,NRIV)                                           00004540*
    PRINT 605,(RH(I),I=1,NRIV)                                          00004550*
605 FORMAT (////////,1X'RIVER ELEVATIONS',/,(20(1X,F5.0)))              00004555*
    DO 610 I=1,NRIV                                                     00004560*
610 RH(I) = RH(I)*FAC                                                   00004570*
    READ 330,FAC                                                        00004580*
    READ 560,(RB(I),I=1,NRIV)                                           00004600*
    PRINT 611,(RB(I),I=1,NRIV)                                          00004610*
611 FORMAT (/,1X,'RIVER BED ELEVATIONS',/,(20(1X,F5.0)))                00004615*
    DO 620 I=1,NRIV                                                     00004620*
620 RB(I) = RB(I)*FAC                                                   00004630*
    READ 330,FAC                                                        00004640*
    PRINT 621,FAC                                                       00004650*
621 FORMAT (/,1X,'RIVER COEFFICIENT FACTOR=',E20.7)                     00004655*
    READ 625,(RC(I),I=1,NRIV)                                           00004660*
625 FORMAT(10F8.0)                                                      00004670*
    PRINT 635,(RC(I),I=1,NRIV)                                          00004680*
635 FORMAT(/,2X,'RIVER COEFFICIENT VALUES',/,(14(1X,F8.0)))             00004690*
```

```
      DO 630 I=1,NRIV                                                   00004700*
  630 RC(I)=RC(I)*FAC                                                   00004710*
      RETURN                                                            00004720*
C     ..................................................................00004730
C     ---READ TIME PARAMETERS AND PUMPING DATA FOR A NEW PUMPING PERIOD-00004740
C     ********************                                              00004750
      ENTRY NEWPER                                                      00004760
C     ********************                                              00004770
C                                                                       00004780
      READ (5,330) KP,KPM1,NWEL,TMAX,NUMT,CDLT,DELT                     00004790
C                                                                       00004800
C     ---COMPUTE ACTUAL DELT AND NUMT---                                00004810
      DT=DELT/24.                                                       00004820
      TM=0.0                                                            00004830
      DO 220 I=1,NUMT                                                   00004840
      DT=CDLT*DT                                                        00004850
      TM=TM+DT                                                          00004860
      IF (TM.GE.TMAX) GO TO 230                                         00004870
  220 CONTINUE                                                          00004880
      GO TO 240                                                         00004890
  230 DELT=TMAX/TM*DELT                                                 00004900
      NUMT=I                                                            00004910
  240 WRITE (6,400) KP,TMAX,NUMT,DELT,CDLT                              00004920
      DELT=DELT*3600.                                                   00004930
      TMAX=TMAX*86400.                                                  00004940
      SUMP=0.0                                                          00004950
C                                                                       00004960
C     ---READ AND WRITE WELL PUMPING RATES---                           00004970
      WRITE (6,410) NWEL                                                00004980
      IF (NWEL.EQ.0) GO TO 260                                          00004990
      DO 245 K=1,K0                                                     00004991
      DO 245 I=1,I0                                                     00004992
      DO 245 J=1,J0                                                     00004993
  245 WELL(I,J,K)=0.0                                                   00004994
      DO 250 II=1,NWEL                                                  00005000
      READ (5,330) K,I,J,WELL(I,J,K)                                    00005010
      WRITE (6,420) K,I,J,WELL(I,J,K)                                   00005020
  250 WELL(I,J,K)=WELL(I,J,K)/(DELX(J)*DELY(I))                         00005030
  260 RETURN                                                            00005040
C                                                                       00005050
C     ---FORMATS---                                                     00005060
C                                                                       00005070
C                                                                       00005080
C                                                                       00005090
  280 FORMAT (1H0,52X,6A4,' =',G15.7,' FOR LAYER',I3)                   00005100
  290 FORMAT (1H1,45X,6A4,' MATRIX, LAYER',I3/46X,41('-'))              00005110
  300 FORMAT ('0',72X,'DELX =',G15.7)                                   00005120
  310 FORMAT ('0',72X,'DELY =',G15.7)                                   00005130
  320 FORMAT ('0',72X,'DELZ =',G15.7)                                   00005140
  330 FORMAT (8G10.0)                                                   00005150
  340 FORMAT ('0',51X,'NUMBER OF PUMPING PERIODS =',I5/49X,'TIME STEPS B00005160
     1ETWEEN PRINTOUTS =',I5//51X,'ERROR CRITERIA FOR CLOSURE =',G15.7/)00005170
  350 FORMAT ('0',I2,2X,20F6.1/(5X,20F6.1))                             00005180
  360 FORMAT (8F10.4)                                                   00005190
  370 FORMAT (1H1,46X,40HGRID SPACING IN PROTOTYPE IN X DIRECTION/47X,400000005200
     1('-')//('0',12F10.0))                                             00005210
  380 FORMAT (1H-,46X,40HGRID SPACING IN PROTOTYPE IN Y DIRECTION/47X,400000005220
     1('-')//('0',12F10.0))                                             00005230
  390 FORMAT (1H-,46X,40HGRID SPACING IN PROTOTYPE IN Z DIRECTION/47X,400000005240
     1('-')//('0',12F10.0))                                             00005250
```

```
  400 FORMAT ('-',50X,'PUMPING PERIOD NO.',I4,':',F10.2,' DAYS'/51X,38('00005260
     1-')//53X,'NUMBER OF TIME STEPS=',I6//59X,'DELT IN HOURS =',F10.3//00005270
     253X,'MULTIPLIER FOR DELT =',F10.3)                                00005280
  410 FORMAT ('-',63X,I4,' WELLS'/65X,9('-')//50X,'K',9X,'I',9X,'J    PU00005290
     1MPING RATE'/)                                                     00005300
  420 FORMAT (41X,3I10,2F13.2)                                          00005310
  430 FORMAT ('-',40X,' CONTINUATION - HEAD AFTER ',G20.7,' SEC PUMPING 00005320
     1'/42X,58('-'))                                                    00005330
  440 FORMAT ('1',55X,'INITIAL  HEAD MATRIX, LAYER',I3/56X,30('-'))     00005340
  450 FORMAT (4G20.10)                                                  00005350
  460 FORMAT (3G10.0,2(G10.0,9I1,1X),A8)                                00005360
  470 FORMAT ('0',30X,'ON ALPHAMERIC MAP:'/40X,'MULTIPLICATION FACTOR F000005370
     1R X DIMENSION =',G15.7/40X,'MULTIPLICATION FACTOR FOR Y DIMENSION 00005380
     2=',G15.7/55X,'MAP SCALE IN UNITS OF  ',A11/50X,'NUMBER OF ',A8,' P00005390
     3ER INCH =',G15.7/43X,'MULTIPLICATION FACTOR FOR DRAWDOWN =',G15.7,00005400
     4' PRINTED FOR LAYERS',9I2/47X,'MULTIPLICATION FACTOR FOR HEAD =',G00005410
     515.7,' PRINTED FOR LAYERS',9I2)                                   00005420
      END                                                               00005430
      SUBROUTINE STEP(PHI,STRT,OLD,T,S,TR,TC,TK,WELL,DELX,DELY,DELZ,FACT00005440
     1,DDN,TEST3)                                                       00005450
C     ------------------------------------------------------------------00005460
C     INITIALIZE DATA FOR A NEW TIME STEP AND PRINT RESULTS             00005470
C     ------------------------------------------------------------------00005480
C                                                                       00005490
C     SPECIFICATIONS:                                                   00005500
      REAL *8PHI                                                        00005510
      REAL *8XLABEL,YLABEL,TITLE,XN1,MESUR                              00005520
C                                                                       00005530
      DIMENSION PHI(I0,J0,K0), STRT(I0,J0,K0), OLD(I0,J0,K0), T(I0,J0,K000005540
     1), S(I0,J0,K0), TR(I0,J0,K0), TC(I0,J0,K0), TK(IK,JK,K5), WELL(I0,00005550
     2J0,K0), DELX(J0), DELY(I0), DELZ(K0), FACT(K0,3), DDN(IMAX), TEST300005560
     3(ITMX1), ITTO(50)                                                 00005570
C                                                                       00005580
      COMMON /INTEGR/ I0,J0,K0,I1,J1,K1,I,J,K,NPER,KTH,ITMAX,LENGTH,KP,N00005590
     1WEL,NUMT,IFINAL,IT,KT,IHEAD,IDRAW,IFLO,IERR,I2,J2,K2,IMAX,ITMX1,NC00005600*
     2H,IDK1,IDK2,IWATER,IQRE,IP,JP,IQ,JQ,IK,JK,K5,IPU1,IPU2,ITK,INO    00005610*
     3,IEQN                                                             00005611
      COMMON /SPARAM/ TMAX,CDLT,DELT,ERR,TEST,SUM,SUMP,QR               00005620
      COMMON /SARRAY/ ICHK(13),LEVEL1(9),LEVEL2(9)                      00005630
      COMMON /CK/ ETFLXT,STORT,QRET,CHST,CHDT,FLUXT,PUMPT,CFLUXT,FLXNT  00005640
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(6),XN1,MESUR,PRNT(122),BLANK00005650
     1(60),DIGIT(122),VF1(6),VF2(6),VF3(7),XSCALE,DINCH,SYM(17),XN(100),00005660
     2YN(13),NA(4),N1,N2,N3,YSCALE,FACT1,FACT2                          00005670
      RETURN                                                            00005680
C     ..................................................................00005690
C     ********************                                              00005700
      ENTRY NEWSTP                                                      00005710
C     ********************                                              00005720
      KT=KT+1                                                           00005730
      IT=0                                                              00005740
      DO 10 K=1,K0                                                      00005750
      DO 10 I=1,I0                                                      00005760
      DO 10 J=1,J0                                                      00005770
   10 OLD(I,J,K)=PHI(I,J,K)                                             00005780
      DELT=CDLT*DELT                                                    00005790
      SUM=SUM+DELT                                                      00005800
      SUMP=SUMP+DELT                                                    00005810
      DAYSP=SUMP/86400.                                                 00005820
      YRSP=DAYSP/365.                                                   00005830
      HRS=SUM/3600.                                                     00005840
```

```
      SMIN=HRS*60.                                                      00005850
      DAYS=HRS/24.                                                      00005860
      YRS=DAYS/365.                                                     00005870
      PRINT 55                                                          00005875*
   55 FORMAT (//////2X,'NODE WITH MAXIMUM HEAD CHANGE FOR EACH ITERATION00005876*
     1',//,9X,'I',9X,'J',9X,'K',5X,'HEAD CHANGE')                       00005877*
      RETURN                                                            00005880
C                                                                       00005890
C     ---PRINT OUTPUT AT DESIGNATED TIME STEPS---                       00005900
C     ********************                                              00005910
      ENTRY OUTPUT                                                      00005920
C     ********************                                              00005930
      IF (KT.EQ.NUMT) IFINAL=1                                          00005940
      ITTO(KT)=IT                                                       00005950
      IF (IT.LE.ITMAX) GO TO 20                                         00005960
      IT=IT-1                                                           00005970
      ITTO(KT)=IT                                                       00005980
      IERR=2                                                            00005990
C                                                                       00006000
C     ---IF MAXIMUM ITERATIONS EXCEEDED,WRITE RESULTS ON DISK OR CARDS--00006010
      IF (IDK2.EQ.ICHK(5)) WRITE (4) PHI,SUM,SUMP,PUMPT,CFLUXT,QRET,CHST00006020
     1,CHDT,FLUXT,STORT,ETFLXT,FLXNT                                    00006030
      IF (IPU2.EQ.ICHK(9)) WRITE (7,230) SUM,SUMP,PUMPT,CFLUXT,QRET,CHST00006040
     1,CHDT,FLUXT,STORT,ETFLXT,FLXNT                                    00006050
C                                                                       00006060
   20 IF (IFLO.EQ.ICHK(3)) CALL CHECK                                   00006070
      IF (IERR.EQ.2) GO TO 30                                           00006080
      IF (MOD(KT,KTH).NE.0.AND.IFINAL.NE.1) RETURN                      00006090
   30 WRITE (6,210) KT,DELT,SUM,SMIN,HRS,DAYS,YRS,DAYSP,YRSP            00006100
      IF (IFLO.EQ.ICHK(3)) CALL CWRITE                                  00006110
      IT=IT+1                                                           00006120
      WRITE (6,180) (TEST3(J),J=1,IT)                                   00006130
      I3=1                                                              00006140
      I5=0                                                              00006150
  352 I5=I5+40                                                          00006160
      I4=MIN0(KT,I5)                                                    00006170
      WRITE (6,240) (I,I=I3,I4)                                         00006180
      WRITE (6,260)                                                     00006190
      WRITE (6,250) (ITTO(I),I=I3,I4)                                   00006200
      WRITE (6,260)                                                     00006210
      IF(KT.LE.I5) GO TO 353                                            00006220
      I3=I3+40                                                          00006230
      GO TO 352                                                         00006240
C                                                                       00006250
C     ---PRINT MAPS---                                                  00006260
  353 IF (XSCALE.EQ.0.) GO TO 70                                        00006270
      IF (FACT1.EQ.0.) GO TO 50                                         00006280
      DO 40 IA=1,9                                                      00006290
      II=LEVEL1(IA)                                                     00006300
      IF (II.EQ.0) GO TO 50                                             00006310
   40 CALL PRNTA(1,II)                                                  00006320
   50 IF (FACT2.EQ.0.) GO TO 70                                         00006330
      DO 60 IA=1,9                                                      00006340
      II=LEVEL2(IA)                                                     00006350
      IF (II.EQ.0) GO TO 70                                             00006360
   60 CALL PRNTA(2,II)                                                  00006370
   70 IF (IDRAW.NE.ICHK(1)) GO TO 100                                   00006380
C                                                                       00006390
C     ---PRINT DRAWDOWN---                                              00006400
      DO 90 K=1,KO                                                      00006410
```

```
      WRITE (6,200) K
      DO 90 I=1,I0
      DO 80 J=1,J0
   80 DDN(J)=STRT(I,J,K)-PHI(I,J,K)
   90 WRITE (6,170) I,(DDN(J),J=1,J0)
  100 IF (IHEAD.NE.ICHK(2)) GO TO 120
C
C     ---PRINT HEAD MATRIX---
      DO 110 K=1,K0
      WRITE (6,190) K
      DO 110 I=1,I0
  110 WRITE (6,170) I,(PHI(I,J,K),J=1,J0)
C
C     ---WRITE ON DISK---
  120 IF (IERR.EQ.2) GO TO 130
      IF (KP.LT.NPER.OR.IFINAL.NE.1) RETURN
      IF (IDK2.EQ.ICHK(5)) WRITE (4) PHI,SUM,SUMP,PUMPT,CFLUXT,QRET,CHST
     1,CHDT,FLUXT,STORT,ETFLXT,FLXNT
C
C     ---PUNCHED OUTPUT---
  130 IF (IPU2.NE.ICHK(9)) GO TO 160
      IF (IERR.EQ.2) GO TO 140
      WRITE (7,230) SUM,SUMP,PUMPT,CFLUXT,QRET,CHST,CHDT,FLUXT,STORT,ETF
     1LXT,FLXNT
  140 DO 150 K=1,K0
      DO 150 I=1,I0
  150 WRITE (7,220)  (PHI(I,J,K),J=1,J0)
  160 IF (IERR.EQ.2) STOP
      RETURN
C
C     ---FORMATS---
C
C
C
  170 FORMAT ('0',I4,18F7.2/(5X,18F7.2))
  180 FORMAT (////1X,'MAXIMUM HEAD CHANGE FOR EACH ITERATION:'/' ',39('-
     1')/('0',10F12.4))
  190 FORMAT ('1',55X,'HEAD MATRIX, LAYER',I3/56X,21('-'))
  200 FORMAT ('1',55X,'   DRAWDOWN, LAYER',I3/59X,18('-'))
  210 FORMAT (1H1,44X,57('-')/45X,'|',14X,'TIME STEP NUMBER =',I9,14X,'|
     1'/45X,57('-')//50X,29HSIZE OF TIME STEP IN SECONDS=,F14.2//55X,'T
     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//)
  220 FORMAT (8F10.4)
  230 FORMAT (4G20.10)
  240 FORMAT ('0TIME STEP :',40I3)
  250 FORMAT ('0ITERATIONS:',40I3)
  260 FORMAT (' ',10('-'))
      END
      SUBROUTINE SOLVE(PHI,STRT,OLD,T,S,TR,TC,TK,WELL,DELX,DELY,DELZ,FAC
     1T,EL,FL,GL,V,XI,TEST3,QRE,PERM,ID,FLD,ELD,IDR,RH,RC,RB,IDRAIN,
     2 IRIV,BOT)
C     ------------------------------------------------------------------
C     SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI,RHO,B,D,F,H,Z,SU,RHOP,W,WMIN,RHO1,RHO2,RHO3,XPART,YPART
      REAL*8 UX,UXR
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      ------

     1,ZPART,DMIN1,WMAX,XT,YT,ZT,DABS,DMAX1,DEN,TXM,TYM,TZM
      REAL *8E,AL,BL,CL,A,C,G,WU,TU,U,DL,RES,SUPH,GLXI,ZPHI
C
      DIMENSION PHI(1), STRT(1), OLD(1), T(1), S(1), TR(1), TC(1), TK(1)
     1, WELL(1), DELX(1), DELY(1), DELZ(1), FACT(K0,3), RHOP(20), TEST3(
     21),BOT(1), EL(1), FL(1), GL(1), V(1), XI(1), QRE(1)
     3,ID(1),FLD(1),ELD(1),PERM(1),IDR(1),RH(1),RC(1),RB(1)
C
      COMMON /INTEGR/ I0,J0,K0,I1,J1,K1,I,J,K,NPER,KTH,ITMAX,LENGTH,KP,N
     1WEL,NUMT,IFINAL,IT,KT,IHEAD,IDRAW,IFLO,IERR,I2,J2,K2,IMAX,ITMX1,NC
     2H,IDK1,IDK2,IWATER,IQRE,IP,JP,IQ,JQ,IK,JK,K5,IPU1,IPU2,ITK,INO
     3,IEQN
      COMMON /SPARAM/ TMAX,CDLT,DELT,ERR,TEST,SUM,SUMP,QR
      COMMON /SARRAY/ ICHK(13),LEVEL1(9),LEVEL2(9)
      RETURN
C     ..................................................................
C     *********************
      ENTRY ITER
C     *********************
C     ---COMPUTE AND PRINT ITERATION PARAMETERS---
      WRITE (6,240)
      WMIN=1.D0
      DELT=1.
      P2=LENGTH-1
      NT=I0*J0*K0
      NIJ=I0*J0
      XT=3.141593**2/(2.*J2*J2)
      YT=3.141593**2/(2.*I2*I2)
      ZT=3.141593**2/(2.*K0*K0)
      RHO1=0.D0
      RHO2=0.D0
      RHO3=0.D0
      DO 40 K=1,K0
      DO 40 I=2,I1
      DO 40 J=2,J1
      N=I+(J-1)*I0+(K-1)*NIJ
      IF (T(N).EQ.0.) GO TO 40
      D=TR(N-I0)/DELX(J)
      F=TR(N)/DELX(J)
      B=TC(N-1)/DELY(I)
      H=TC(N)/DELY(I)
      SU=0.D0
      Z=0.D0
      IF (K.NE.1) Z=TK(N-NIJ)/DELZ(K)
      IF (K.NE.K0) SU=TK(N)/DELZ(K)
   10 CONTINUE
      TXM=DMAX1(D,F)
      TYM=DMAX1(B,H)
      TZM=DMAX1(SU,Z)
      DEN=DMIN1(D,F)
      IF (DEN.EQ.0.D0) DEN=TXM
      IF (DEN.EQ.0.D0) GO TO 20
      RHO1=DMAX1(RHO1,TYM/DEN)
   20 DEN=DMIN1(B,H)
      IF (DEN.EQ.0.D0) DEN=TYM
      IF (DEN.EQ.0.D0) GO TO 30
      RHO2=DMAX1(RHO2,TXM/DEN)
   30 DEN=DMIN1(SU,Z)
      IF (DEN.EQ.0.D0) DEN=TZM
      IF (DEN.EQ.0.D0) GO TO 40
```

```
      RHO3=DMAX1(RHO3,TXM/DEN)
   40 CONTINUE
      XPART=XT/(1.D0+RHO1)
      YPART=YT/(1.D0+RHO2)
      ZPART=ZT/(1.D0+RHO3)
      WMIN=DMIN1(WMIN,XPART,YPART,ZPART)
      WMAX=1.D0-WMIN
      PJ=-1.
      DO 50 I=1,LENGTH
      PJ=PJ+1.
   50 RHOP(I)=1.D0-(1.D0-WMAX)**(PJ/P2)
      WRITE (6,230) LENGTH,(RHOP(J),J=1,LENGTH)
      RETURN
C     ..................................................................
C
C     INITIALIZE DATA FOR A NEW ITERATION
   60 IT=IT+1
      IF (IT.LE.ITMAX) GO TO 70
      WRITE (6,220)
      CALL OUTPUT
   70 IF (MOD(IT,LENGTH)) 80,80,90
C     ********************
      ENTRY NEWITA
C     ********************
   80 NTH=0
   90 NTH=NTH+1
      W=RHOP(NTH)
      TEST3(IT+1)=0.
      TEST=0.0
      BIG=0.
      DO 100 I=1,NT
      EL(I)=0.
      FL(I)=0.
      GL(I)=0.
      V(I)=0.
  100 XI(I)=0.
C
C     ---COMPUTE TRANSMISSIVITY AND T COEFFICIENTS FOR UPPER
C     HYDROLOGIC UNIT WHEN IT IS UNCONFINED---
      IF (IWATER.NE.ICHK(6)) GO TO 110
      CALL TRANS(0)
C
C     ---CHOOSE SIP NORMAL OR REVERSE ALGORITHM---
  110 IF (MOD(IT,2)) 120,120,170
  120 DO 150 K=1,K0
      DO 150 I=2,I1
      DO 150 J=2,J1
      N=I+(J-1)*I0+(K-1)*NIJ
      NIA=N+1
      NIB=N-1
      NJA=N+I0
      NJB=N-I0
      NKA=N+NIJ
      NKB=N-NIJ
      NKBB=N-2*NIJ
C
C     ---SKIP COMPUTATIONS IF NODE OUTSIDE MODEL---
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 150
C
C     ---COMPUTE COEFFICIENTS---
```

```
      D=TR(NJB)/DELX(J)                                                 00008250
      F=TR(N)/DELX(J)                                                   00008260
      B=TC(NIB)/DELY(I)                                                 00008270
      H=TC(N)/DELY(I)                                                   00008280
      SU=0.D0                                                           00008290
      Z=0.D0                                                            00008300
      IF(K.EQ.1) GO TO 124                                              00008311
      Z=TK(NKB)                                                         00008312
      IF(IEQN.EQ.ICHK(11)) Z=Z/DELZ(K)                                  00008313
  124 IF (K.EQ.K0) GO TO 125                                            00008321
      SU=TK(N)                                                          00008322
      IF(IEQN.EQ.ICHK(11))SU=SU/DELZ(K)                                 00008323
  125 RHO=S(N)/DELT                                                     00008330
      QR=0.                                                             00008340
      UXR = 0.                                                          00008350*
      UX = 0.                                                           00008360*
      IF(IQRE.EQ.ICHK(7)) QR=QRE(N)                                     00008370*
C                                                                       00008380
      IF(IRIV.LE.0) GO TO 126                                           00008390*
      ND=IDR(N)                                                         00008400*
      IF(ND.EQ.0) GO TO 126                                             00008410*
      IF(PHI(N).GT.RB(ND)) GO TO 123                                    00008420*
      QR = QR+ RC(ND)*(RH(ND) - RB(ND))                                 00008430*
      GO TO 126                                                         00008440*
  123 UXR = RC(ND)                                                      00008450*
      QR = QR + RC(ND)*RH(ND)                                           00008460*
  126 IF(IDRAIN.LE.0) GO TO 130                                         00008470*
      ND=ID(N)                                                          00008480*
      IF(ND.EQ.0) GO TO 130                                             00008490*
      IF(ELD(ND).GT.PHI(N)) GO TO 130                                   00008500*
      UX = FLD(ND)                                                      00008510*
      QR = QR + FLD(ND)*ELD(ND)                                         00008520*
C     ---SIP NORMAL ALGORITHM---                                        00008530
C     ---FORWARD SUBSTITUTE, COMPUTING INTERMEDIATE VECTOR V---         00008540
  130  E = -B -D -F -H -SU -Z -RHO -UX -UXR                             00008550*
      IF (K.NE.2) GO TO 131                                             00008560*
      IF (PHI(N).GE.BOT(NKB)) GO TO 131                                 00008561*
      IF(PHI(NKA).GE.BOT(NKB)) QR=QR-SU*BOT(NKB)+SU*PHI(N)              00008562*
      IF (PHI(NKA).GE.BOT(NKB)) GO TO 131                               00008563*
      E=E+SU                                                            00008570*
      SU=0                                                              00008580*
  131 IF (K.NE.3) GO TO 133                                             00008620*
      IF (PHI(NKB).GE.BOT(NKBB)) GO TO 133                              00008621*
      IF (PHI(N).GE.BOT(NKBB)) QR=QR+Z*BOT(NKBB)-Z*PHI(NKB)             00008622*
      IF (PHI(N).GE.BOT(NKBB)) GO TO 133                                00008623*
      E=E+Z                                                             00008650*
      Z=0                                                               00008670*
 133  CONTINUE                                                          00008680*
      BL=B/(1.+W*(EL(NIB)+GL(NIB)))                                     00008690
      CL=D/(1.+W*(FL(NJB)+GL(NJB)))                                     00008700
      C=BL*EL(NIB)                                                      00008710
      G=CL*FL(NJB)                                                      00008720
      WU=CL*GL(NJB)                                                     00008730
      U=BL*GL(NIB)                                                      00008740
      IF (K.EQ.1) GO TO 140                                             00008750
      AL=Z/(1.+W*(EL(NKB)+FL(NKB)))                                     00008760
      A=AL*EL(NKB)                                                      00008770
      TU=AL*FL(NKB)                                                     00008780
      DL=E+W*(A+C+G+WU+TU+U)-CL*EL(NJB)-BL*FL(NIB)-AL*GL(NKB)           00008790
      EL(N)=(F-W*(A+C))/DL                                              00008800
```

```
      FL(N)=(H-W*(G+TU))/DL
      GL(N)=(SU-W*(WU+U))/DL
      SUPH=0.D0
      IF (K.NE.K0) SUPH=SU*PHI(NKA)
      RES=-B*PHI(NIB)-D*PHI(NJB)-E*PHI(N)-F*PHI(NJA)-H*PHI(NIA)-SUPH-Z*P
     1HI(NKB)-WELL(N)-RHO*OLD(N)-QR
      V(N)=(RES-AL*V(NKB)-BL*V(NIB)-CL*V(NJB))/DL
      GO TO 150
  140 DL=E+W*(C+G+WU+U)-CL*EL(NJB)-BL*FL(NIB)
      EL(N)=(F-W*C)/DL
      FL(N)=(H-W*G)/DL
      GL(N)=(SU-W*(WU+U))/DL
      SUPH=0.D0
      IF (K.NE.K0) SUPH=SU*PHI(NKA)
      RES=-B*PHI(NIB)-D*PHI(NJB)-E*PHI(N)-F*PHI(NJA)-H*PHI(NIA)-SUPH-WEL
     1L(N)-RHO*OLD(N)-QR
      V(N)=(RES-BL*V(NIB)-CL*V(NJB))/DL
  150 CONTINUE
C
C     ---BACK SUBSTITUTE FOR VECTOR XI---
      DO 160 K=1,K0
      K3=K0-K+1
      DO 160 I=1,I2
      I3=I0-I
      DO 160 J=1,J2
      J3=J0-J
      N=I3+(J3-1)*I0+(K3-1)*NIJ+I-I
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 160
      GLXI=0.D0
      IF (K3.NE.K0) GLXI=GL(N)*XI(N+NIJ)
      XI(N)=V(N)-EL(N)*XI(N+I0)-FL(N)*XI(N+1)-GLXI
C
C     ---COMPARE MAGNITUDE OF CHANGE WITH CLOSURE CRITERIA---
      TCHK=ABS(XI(N))
      IF (TCHK.LT.BIG) GO TO 155
      BIG = TCHK
      IIN = I3
      JJN = J3
      KKN = K3
      BIGS = XI(N)
  155 PHI(N)=PHI(N)+XI(N)
  160 CONTINUE
      PRINT 251,IIN,JJN,KKN,BIGS
      IF (BIG.GT.ERR) TEST=1.
      TEST3(IT+1)=BIG
      IF (TEST.EQ.0.) RETURN
      GO TO 60
C     ..................................................................
  170 DO 200 KK=1,K0
      K=K0-KK+1
      DO 200 II=1,I2
      I=I0-II
      DO 200 J=2,J1
      N=I+(J-1)*I0+(K-1)*NIJ
      NIA=N+1
      NIB=N-1
      NJA=N+I0
      NJB=N-I0
      NKA=N+NIJ
      NKB=N-NIJ
```

```
      NKBB=N-2*NIJ                                                      00009370*
C                                                                       00009380
C     ---SKIP COMPUTATIONS IF NODE OUTSIDE AQUIFER---                   00009390
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 200                           00009400
C                                                                       00009410
C     ---COMPUTE COEFFICIENTS---                                        00009420
      D=TR(NJB)/DELX(J)                                                 00009430
      F=TR(N)/DELX(J)                                                   00009440
      B=TC(NIB)/DELY(I)                                                 00009450
      H=TC(N)/DELY(I)                                                   00009460
      SU=0.D0                                                           00009470
      Z=0.D0                                                            00009480
      IF(K.EQ.1) GO TO 174                                              00009491
      Z=TK(NKB)                                                         00009492
      IF(IEQN.EQ.ICHK(11)) Z=Z/DELZ(K)                                  00009493
  174 IF(K.EQ.K0) GO TO 175                                             00009501
      SU=TK(N)                                                          00009502
      IF(IEQN.EQ.ICHK(11))SU=SU/DELZ(K)                                 00009503
  175 RHO=S(N)/DELT                                                     00009510
      QR=0.                                                             00009520
      UXR = 0.                                                          00009530*
      UX  = 0.                                                          00009540*
      IF(IQRE.EQ.ICHK(7)) QR=QRE(N)                                     00009550*
      IF(IRIV.LE.0) GO TO 176                                           00009560*
      ND = IDR(N)                                                       00009570*
      IF(ND.EQ.0) GO TO 176                                             00009580*
      IF(PHI(N).GT.RB(ND)) GO TO 173                                    00009590*
      QR = QR + RC(ND)*(RH(ND)-RB(ND))                                  00009600*
      GO TO 176                                                         00009610*
  173 UXR = RC(ND)                                                      00009620*
      QR = QR + RC(ND)*RH(ND)                                           00009630*
  176 IF(IDRAIN.LE.0) GO TO 180                                         00009640*
      ND= ID(N)                                                         00009650*
      IF(ND.EQ.0) GO TO 180                                             00009660*
      IF(ELD(ND).GT.PHI(N)) GO TO 180                                   00009670*
      UX = FLD(ND)                                                      00009680*
      QR = QR + FLD(ND)*ELD(ND)                                         00009690*
C                                                                       00009700
C     ---SIP REVERSE ALGORITHM---                                       00009710
C     ---FORWARD SUBSTITUTE, COMPUTING INTERMEDIATE VECTOR V---         00009720
 180  E= -B -H -D -F -SU -Z -RHO -UX -UXR                               00009730*
      IF (K.NE.2) GO TO 181                                             00009740*
      IF (PHI(N).GE.BOT(NKB)) GO TO 181                                 00009741*
      IF (PHI(NKA).GE.BOT(NKB)) QR=QR-SU*BOT(NKB)+SU*PHI(N)             00009742*
      IF (PHI(NKA).GE.BOT(NKB))GO TO 181                                00009743*
      E=E+SU                                                            00009750*
      SU=0                                                              00009760*
 181  IF (K.NE.3) GO TO 183                                             00009800*
      IF (PHI(NKB).GE.BOT(NKBB)) GO TO 183                              00009801*
      IF (PHI(N).GE.BOT(NKBB)) QR=QR+Z*BOT(NKBB)-Z*PHI(NKB)             00009802*
      IF (PHI(N).GE.BOT(NKBB)) GO TO 183                                00009803*
      E=E+Z                                                             00009830*
      Z=0                                                               00009850*
 183  CONTINUE                                                          00009860*
      BL=H/(1.+W*(EL(NIA)+GL(NIA)))                                     00009870
      CL=D/(1.+W*(FL(NJB)+GL(NJB)))                                     00009880
      C=BL*EL(NIA)                                                      00009890
      G=CL*FL(NJB)                                                      00009900
      WU=CL*GL(NJB)                                                     00009910
      U=BL*GL(NIA)                                                      00009920
```

```
      IF (K.EQ.K0) GO TO 190                                            00009930
      AL=SU/(1.+W*(EL(NKA)+FL(NKA)))                                    00009940
      A=AL*EL(NKA)                                                      00009950
      TU=AL*FL(NKA)                                                     00009960
      DL=E+W*(C+G+A+WU+TU+U)-AL*GL(NKA)-BL*FL(NIA)-CL*EL(NJB)           00009970
      EL(N)=(F-W*(C+A))/DL                                              00009980
      FL(N)=(B-W*(G+TU))/DL                                             00009990
      GL(N)=(Z-W*(WU+U))/DL                                             00010000
      ZPHI=0.D0                                                         00010010
      IF (K.NE.1) ZPHI=Z*PHI(NKB)                                       00010020
      RES=-B*PHI(NIB)-D*PHI(NJB)-E*PHI(N)-F*PHI(NJA)-H*PHI(NIA)-SU*PHI(N00010030
     1KA)-ZPHI-WELL(N)-RHO*OLD(N)-QR                                    00010040
      V(N)=(RES-AL*V(NKA)-BL*V(NIA)-CL*V(NJB))/DL                       00010050
      GO TO 200                                                         00010070
  190 DL=E+W*(C+G+WU+U)-BL*FL(NIA)-CL*EL(NJB)                           00010080
      EL(N)=(F-W*C)/DL                                                  00010090
      FL(N)=(B-W*G)/DL                                                  00010100
      GL(N)=(Z-W*(WU+U))/DL                                             00010110
      ZPHI=0.D0                                                         00010120
      IF (K.NE.1) ZPHI=Z*PHI(NKB)                                       00010130
      RES=-B*PHI(NIB)-D*PHI(NJB)-E*PHI(N)-F*PHI(NJA)-H*PHI(NIA)-ZPHI-WEL00010140
     1L(N)-RHO*OLD(N)-QR                                                00010150
      V(N)=(RES-BL*V(NIA)-CL*V(NJB))/DL                                 00010170
  200 CONTINUE                                                          00010180
C                                                                       00010190
C     ---BACK SUBSTITUTE FOR VECTOR XI---                               00010200
      DO 210 K=1,K0                                                     00010210
      DO 210 I=2,I1                                                     00010220
      DO 210 J=1,J2                                                     00010230
      J3=J0-J                                                           00010240
      N=I+(J3-1)*I0+(K-1)*NIJ                                           00010250
      IF (T(N).EQ.0..OR.S(N).LT.0.) GO TO 210                           00010260
      GLXI=0.D0                                                         00010270
      IF (K.NE.1) GLXI=GL(N)*XI(N-NIJ)                                  00010280
      XI(N)=V(N)-EL(N)*XI(N+I0)-FL(N)*XI(N-1)-GLXI                      00010290
C                                                                       00010300
C     ---COMPARE MAGNITUDE OF CHANGE WITH CLOSURE CRITERIA---           00010310
      TCHK=ABS(XI(N))                                                   00010320
      IF (TCHK.LT.BIG) GO TO 205                                        00010330*
      BIG = TCHK                                                        00010331*
      IIN = I                                                           00010332*
      JJN = J3                                                          00010333*
      KKN = K                                                           00010334*
      BIGS = XI(N)                                                      00010335*
  205 PHI(N)=PHI(N)+XI(N)                                               00010340*
  210 CONTINUE                                                          00010350
      PRINT 251,IIN,JJN,KKN,BIGS                                        00010351*
  251 FORMAT (1X,3I10,G20.7)                                            00010352*
      IF (BIG.GT.ERR) TEST=1.                                           00010360
      TEST3(IT+1)=BIG                                                   00010370
      IF (TEST.EQ.0.) RETURN                                            00010380
      GO TO 60                                                          00010390
C     ..................................................................00010400
C                                                                       00010410
C     ---FORMATS---                                                     00010420
C                                                                       00010430
C                                                                       00010440
C                                                                       00010450
  220 FORMAT ('0EXCEEDED PERMITTED NUMBER OF ITERATIONS'/' ',39('*'))   00010460
  230 FORMAT (///1H0,I5,22H ITERATION PARAMETERS:,6E15.7/(/28X,6E15.7/))00010470
```

```
  240 FORMAT ('1',44X,'SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE'/45X,00010480
     143('-'))                                                          00010490
      END                                                               00010500
      SUBROUTINE COEF(PHI,STRT,OLD,T,S,TR,TC,TK,WELL,DELX,DELY,DELZ,FACT00010510
     1,PERM,BOTTOM,QRE)                                                 00010520
C     ------------------------------------------------------------------00010530
C     COMPUTE COEFFICIENTS                                              00010540
C     ------------------------------------------------------------------00010550
C                                                                       00010560
C     SPECIFICATIONS:                                                   00010570
      REAL *8PHI                                                        00010580
C                                                                       00010590
      DIMENSION PHI(I0,J0,K0), STRT(I0,J0,K0), OLD(I0,J0,K0), T(I0,J0,K000010600
     1), S(I0,J0,K0), TR(I0,J0,K0), TC(I0,J0,K0), TK(IK,JK,K5), WELL(I0,00010610
     2J0,K0), DELX(J0), DELY(I0), DELZ(K0), FACT(K0,3), PERM(IP,JP), BOT00010620
     3TOM(IP,JP), QRE(IQ,JQ)                                            00010630
C                                                                       00010640
      COMMON /INTEGR/ I0,J0,K0,I1,J1,K1,I,J,K,NPER,KTH,ITMAX,LENGTH,KP,N00010650
     1WEL,NUMT,IFINAL,IT,KT,IHEAD,IDRAW,IFLO,IERR,I2,J2,K2,IMAX,ITMX1,NC00010660
     2H,IDK1,IDK2,IWATER,IQRE,IP,JP,IQ,JQ,IK,JK,K5,IPU1,IPU2,ITK,INO    00010670*
     3,IEQN                                                             00010671
      COMMON /SPARAM/ TMAX,CDLT,DELT,ERR,TEST,SUM,SUMP,QR               00010680
      COMMON /SARRAY/ ICHK(13),LEVEL1(9),LEVEL2(9)                      00010690
      N3=1                                                              00010695
      RETURN                                                            00010700
C     ..................................................................00010710
C     ---COMPUTE TRANSMISSIVITY FOR UPPER HYDROLOGIC UNIT WHEN          00010720
C     IT IS UNCONFINED---                                               00010730
C     *********************                                             00010740
      ENTRY TRANS(N3)                                                   00010750
C     *********************                                             00010760
      DO 10 I=2,I1                                                      00010770
      DO 10 J=2,J1                                                      00010780
      IF (PERM(I,J).EQ.0.) GO TO 10                                     00010790
      T(I,J,K0)=PERM(I,J)*(PHI(I,J,K0)-BOTTOM(I,J))                     00010800
      IF (T(I,J,K0).GT.0.) GO TO 10                                     00010810
      IF (WELL(I,J,K0).LT.0.) WRITE (6,60) I,J,K0                       00010820
      IF (WELL(I,J,K0).GE.0.) WRITE (6,70) I,J,K0                       00010830
      PERM(I,J)=0.                                                      00010840
      T(I,J,K0)=0.                                                      00010850
      TR(I,J-1,K0)=0.                                                   00010860
      TR(I,J,K0)=0.                                                     00010870
      TC(I,J,K0)=0.                                                     00010880
      TC(I-1,J,K0)=0.                                                   00010890
      IF (K0.NE.1) TK(I,J,K1)=0.                                        00010900
      PHI(I,J,K0)=1.D30                                                 00010910
   10 CONTINUE                                                          00010920
      IF (N3.EQ.1) RETURN                                               00010930
      N1=K0                                                             00010940
      N2=K0                                                             00010950
      N4=K1                                                             00010960
      GO TO 20                                                          00010970
C     ---COMPUTE T COEFFICIENTS---                                      00010980
C     *********************                                             00010990
      ENTRY TCOF                                                        00011000
C     *********************                                             00011010
      N1=1                                                              00011020
      N2=K0                                                             00011030
      N4=1                                                              00011040
   20 DO 40 K=N1,N2                                                     00011050
```

```
      DO 40 I=1,I1
      DO 40 J=1,J1
      IF (T(I,J,K).EQ.0.) GO TO 40
      IF (T(I,J+1,K).EQ.0.) GO TO 30
      TR(I,J,K)=(2.*T(I,J+1,K)*T(I,J,K))/(T(I,J,K)*DELX(J+1)+T(I,J+1,K)*
     1DELX(J))*FACT(K,1)
   30 IF (T(I+1,J,K).EQ.0.) GO TO 40
      TC(I,J,K)=(2.*T(I+1,J,K)*T(I,J,K))/(T(I,J,K)*DELY(I+1)+T(I+1,J,K)*
     1DELY(I))*FACT(K,2)
   40 CONTINUE
      IF (K0.EQ.1.OR.ITK.EQ.ICHK(10).OR.N3.EQ.0) RETURN
      DO 50 K=N4,K1
      DO 50 I=2,I1
      DO 50 J=2,J1
      IF (T(I,J,K+1).EQ.0.) GO TO 50
      T1=T(I,J,K)*FACT(K,3)
      T2=T(I,J,K+1)*FACT(K+1,3)
      TK(I,J,K)=(2.*T2*T1)/(T1*DELZ(K+1)+T2*DELZ(K))
   50 CONTINUE
      RETURN
C
C
   60 FORMAT ('-',20('*'),'WELL',2I3,' IN LAYER',I3,' GOES DRY',20('*'))
   70 FORMAT ('-',20('*'),'NODE',2I3,' IN LAYER',I3,' GOES DRY',20('*'))
      END
      SUBROUTINE CHECKI(PHI,STRT,OLD,T,S,TR,TC,TK,WELL,DELX,DELY,DELZ,FA
     1CT,JFLO,FLOW,QRE,ID,FLD,ELD,IDR,RH,RC,RB,IDRAIN,IRIV,BOT)
C     ------------------------------------------------------------------
C     COMPUTE A VOLUMETRIC BALANCE
C     ------------------------------------------------------------------
C
C     SPECIFICATIONS:
      REAL *8PHI
C
      DIMENSION PHI(I0,J0,K0), STRT(I0,J0,K0), OLD(I0,J0,K0), T(I0,J0,K
     1), S(I0,J0,K0), TR(I0,J0,K0), TC(I0,J0,K0), TK(IK,JK,K5), WELL(I0,
     2J0,K0), DELX(J0), DELY(I0), DELZ(K0), FACT(K0,3), JFLO(NCH,3), FLO
     3W(NCH),QRE(I0,J0,K0),CHD1(8),CHD2(8),QREFLX(8),PUMP(8),
     4  ID(I0,J0,K0),FLD(1),ELD(1),IDR(I0,J0,K0),RH(1),RC(1),RB(1),
     4 CFLUX(8),STOR(8),FLUX(8),ETFLUX(8),FLXN(8),BOT(I0,J0)
     5,INDEX1(99),INDEX2(99),DFLUX(99)
      COMMON /INTEGR/ I0,J0,K0,I1,J1,K1,I,J,K,NPER,KTH,ITMAX,LENGTH,KP,N
     1WEL,NUMT,IFINAL,IT,KT,IHEAD,IDRAW,IFLO,IERR,I2,J2,K2,IMAX,ITMX1,NC
     2H,IDK1,IDK2,IWATER,IQRE,IP,JP,IQ,JQ,IK,JK,K5,IPU1,IPU2,ITK,INO
     3,IEQN
      COMMON /SPARAM/ TMAX,CDLT,DELT,ERR,TEST,SUM,SUMP,QR
      COMMON /SARRAY/ ICHK(13),LEVEL1(9),LEVEL2(9)
      COMMON /CK/ ETFLXT,STORT,QRET,CHST,CHDT,FLUXT,PUMPT,CFLUXT,FLXNT
      RETURN
C     ..................................................................
C     ********************
      ENTRY CHECK
C     ********************
C     ---INITIALIZE VARIABLES---
      DO 5 K=1,K0
      STOR(K)=0
      CFLUX(K)=0
      PUMP(K)=0
      QREFLX(K)=0
      CHD2(K)=0
```

```
      CHD1(K)=0
      FLUX(K) = 0
      ETFLUX(K) = 0
      FLXN(K) = 0
    5 CONTINUE
      KK=0
      PUMPTR=0
      STORTR=0
      FLUXS=0
      CHDTR=0
      CHSTR=0
      QRETR=0
      CFLXTR=0
      ETFTR = 0
      FLUXTR = 0
      II=0
C     ..............................................................
C
C     ---COMPUTE RATES,STORAGE AND PUMPAGE FOR THIS STEP---
      DO 220 K=1,K0
      DO 220 I=2,I1
      DO 220 J=2,J1
      IF (T(I,J,K).EQ.0.) GO TO 220
      AREA=DELX(J)*DELY(I)
      VOLUME=AREA*DELZ(K)
      IF(K.NE.3.OR.ID(I,J,3).EQ.0) GO TO 9
      DN=PHI(I,J,K-1)
      IF(PHI(I,J,2).LT.BOT(I,J)) DN=BOT(I,J)
      X=(PHI(I,J,K)-DN)*TK(I,J,K-1)*AREA
      KK=KK+1
      INDEX1(KK)=I
      INDEX2(KK)=J
      DFLUX(KK)=X
 9    CONTINUE
      IF (S(I,J,K).GE.0.) GO TO 180
C
C     ---COMPUTE FLOW RATES TO AND FROM CONSTANT HEAD BOUNDARIES---
      II=II+1
      FLOW(II)=0.
      JFLO(II,1)=K
      JFLO(II,2)=I
      JFLO(II,3)=J
      IF (S(I,J-1,K).LT.0..OR.T(I,J-1,K).EQ.0.) GO TO 30
      X=(PHI(I,J,K)-PHI(I,J-1,K))*TR(I,J-1,K)*DELY(I)
      IF(IEQN.EQ.ICHK(11)) X=X*DELZ(K)
      FLOW(II)=FLOW(II)+X
      IF (X) 10,30,20
   10 CHD1(K)=CHD1(K)+X
      GO TO 30
   20 CHD2(K)=CHD2(K)+X
   30 IF (S(I,J+1,K).LT.0..OR.T(I,J+1,K).EQ.0.) GO TO 60
      X=(PHI(I,J,K)-PHI(I,J+1,K))*DELY(I)*TR(I,J,K)
      IF (IEQN.EQ.ICHK(11)) X=X*DELZ(K)
      FLOW(II)=FLOW(II)+X
      IF (X) 40,60,50
   40 CHD1(K)=CHD1(K)+X
      GO TO 60
   50 CHD2(K)=CHD2(K)+X
   60 IF (K.EQ.1) GO TO 90
      IF (S(I,J,K-1).LT.0..OR.T(I,J,K-1).EQ.0.) GO TO 90
```

```
      DN=PHI(I,J,K-1)                                                   00012220*
      IF (K.EQ.3.AND.PHI(I,J,K-1).LE.BOT(I,J)) DN=BOT(I,J)              00012230*
      X=(PHI(I,J,K)-DN)*TK(I,J,K-1)*AREA                                00012240*
      FLOW(II)=FLOW(II)+X                                               00012260
      IF (X) 70,90,80                                                   00012270
   70 CHD1(K)=CHD1(K)+X                                                 00012280
      GO TO 90                                                          00012290
   80 CHD2(K)=CHD2(K)+X                                                 00012300
   90 IF (K.EQ.KO) GO TO 120                                            00012310
      IF (S(I,J,K+1).LT.0..OR.T(I,J,K+1).EQ.0.) GO TO 120               00012320
      UP=PHI(I,J,K)                                                     00012330*
      IF(K.EQ.2.AND.PHI(I,J,2).LT.BOT(I,J)) UP=BOT(I,J)                 00012340*
      IF (K.EQ.2.AND.PHI(I,J,2).LT.BOT(I,J).AND.PHI(I,J,3).LT.BOT(I,J)) 00012350*
     2GO TO 120                                                         00012360*
      X=(UP-PHI(I,J,K+1))*TK(I,J,K)*AREA                                00012370*
      FLOW(II)=FLOW(II)+X                                               00012380
      IF (X) 100,120,110                                                00012390
  100 CHD1(K)=CHD1(K)+X                                                 00012400
      GO TO 120                                                         00012410
  110 CHD2(K)=CHD2(K)+X                                                 00012420
  120 IF (S(I-1,J,K).LT.0..OR.T(I-1,J,K).EQ.0.) GO TO 150               00012430
      X=(PHI(I,J,K)-PHI(I-1,J,K))*TC(I-1,J,K)*DELX(J)                   00012440
      IF(IEQN.EQ.ICHK(11)) X=X*DELZ(K)                                  00012445
      FLOW(II)=FLOW(II)+X                                               00012450
      IF (X) 130,150,140                                                00012460
  130 CHD1(K)=CHD1(K)+X                                                 00012470
      GO TO 150                                                         00012480
  140 CHD2(K)=CHD2(K)+X                                                 00012490
  150 IF (S(I+1,J,K).LT.0..OR.T(I+1,J,K).EQ.0.) GO TO 220               00012500
      X=(PHI(I,J,K)-PHI(I+1,J,K))*TC(I,J,K)*DELX(J)                     00012510
      IF(IEQN.EQ.ICHK(11)) X=X*DELZ(K)                                  00012515
      FLOW(II)=FLOW(II)+X                                               00012520
      IF (X) 160,220,170                                                00012530
  160 CHD1(K)=CHD1(K)+X                                                 00012540
      GO TO 220                                                         00012550
  170 CHD2(K)=CHD2(K)+X                                                 00012560
      GO TO 220                                                         00012570
C                                                                       00012580
C     ---CHECK FOR EQUATION BEING SOLVED---                             00012581
  180 IF(IEQN.EQ.ICHK(11)) GO TO 211                                    00012582
C                                                                       00012583
C     ---EQUATION 4---                                                  00012584
C     ---RECHARGE AND WELLS---                                          00012590
      IF(IQRE.EQ.ICHK(7)) QREFLX(K)=QREFLX(K)+QRE(I,J,K)*AREA           00012600*
      IF (WELL(I,J,K)) 190,210,200                                      00012610
  190 PUMP(K)=PUMP(K)+WELL(I,J,K)*AREA                                  00012620
      GO TO 210                                                         00012630
  200 CFLUX(K)=CFLUX(K)+WELL(I,J,K)*AREA                                00012640
C                                                                       00012650
C     ---COMPUTE VOLUME FROM STORAGE---                                 00012660
  210 STOR(K)=STOR(K)+S(I,J,K)*(OLD(I,J,K)-PHI(I,J,K))*AREA             00012670
      GO TO 215                                                         00012671
C                                                                       00012672
C     ---EQUATION 3---                                                  00012673
C     ---RECHARGE AND WELLS--                                           00012674
  211 IF(IQRE.EQ.ICHK(7)) QREFLX(K)=QREFLX(K)+QRE(I,J,K)*VOLUME         00012675
      IF (WELL(I,J,K)) 212,214,213                                      00012676
  212 PUMP(K)=PUMP(K)+WELL(I,J,K)*VOLUME                                00012677
      GO TO 214                                                         00012678
  213 CFLUX(K)=DFLUX(K)+WELL(I,J,K)*VOLUME                              00012679
```

```
C
C     ---COMPUTE VOLUME FROM STORAGE-
  214 STOR(K)=STOR(K)+S(I,J,K)*(OLD(I,J,K)-PHI(I,J,K))*VOLUME
  215 CONTINUE
      IF(IRIV.LE.0) GO TO 217
C      --- COMPUTE LEAKAGE TO OR FROM STREAM ---
      ND = IDR(I,J,K)
      IF(ND.EQ.0) GO TO 217
      IF(PHI(I,J,K).GT.RB(ND)) GO TO 216
      ETFLUX(K) =RC(ND)*(RH(ND) - RB(ND))*AREA  + ETFLUX(K)
      GO TO 217
  216 ETFLUX(K) = (RH(ND) - PHI(I,J,K))*AREA*RC(ND) + ETFLUX(K)
  217 IF (IDRAIN.LE.0) GO TO 220
C       COMPUTE SPRINGFLOW
      ND = ID(I,J,K)
      IF(ND.EQ.0) GO TO 220
      IF(ELD(ND).GT.PHI(I,J,K)) GO TO 220
      FLUX(K)=FLUX(K)+FLD(ND)*AREA*(ELD(ND) - STRT(I,J,K))
      FLXN(K)=FLXN(K)+FLD(ND)*AREA*(ELD(ND) - PHI(I,J,K))
  220 CONTINUE
C     ..............................................................
C
C     ---COMPUTE CUMULATIVE VOLUMES, TOTALS, AND DIFFERENCES---
      FLXPT=0.0
      DO 221 K=1,K0
      ETFLXT = ETFLXT - ETFLUX(K)*DELT
      ETFTR = ETFTR + ETFLUX(K)
      FLUXS = FLXN(K) + FLUXS
      FLXNT = FLXNT - FLXN(K)*DELT
      FLUXTR = FLUX(K) + FLUXTR
      STORT = STORT + STOR(K)
      STOR(K) = STOR(K)/DELT
      STORTR = STORTR + STOR(K)
      QRET = QRET + QREFLX(K)*DELT
      QRETR = QRETR + QREFLX(K)
      CHDT = CHDT - CHD1(K)*DELT
      CHDTR = CHDTR + CHD1(K)
      CHST = CHST + CHD2(K)*DELT
      CHSTR = CHSTR + CHD2(K)
      PUMPT = PUMPT - PUMP(K)*DELT
      PUMPTR = PUMPTR + PUMP(K)
      CFLUXT = CFLUXT + CFLUX(K)*DELT
  221 CFLXTR=CFLXTR+CFLUX(K)
      TOTL1=STORT+QRET+CFLUXT+CHST+FLXPT
      TOTL2=CHDT+PUMPT+ETFLXT+FLXNT
      SUMR = QRETR + CFLXTR+CHSTR+CHDTR+PUMPTR+ETFTR + FLUXS  +
     1STORTR
      DIFF=TOTL2-TOTL1
      PERCNT=0.0
      IF (TOTL2.EQ.0.) GO TO 230
      PERCNT=DIFF/TOTL2*100.
  230 RETURN
C     ..............................................................
C
C     ---PRINT RESULTS---
C     ************************
      ENTRY CWRITE
C     ************************
C
      WRITE(6,260) STORTR, QRETR, STORT, CFLXTR , QRET, PUMPTR, CFLUXT,
```

```
     1ETFTR, CHST, FLXPT, CHSTR,TOTL1,CHDTR,FLUXTR,FLUXS,ETFLXT,
     2CHDT, SUMR, PUMPT, FLXNT, TOTL2, DIFF, PERCNT
      WRITE(6,300)
  300 FORMAT(//,45H RATES OF COMPONENTS FOR EACH LAYER IN L**3/T)
      DO 231 K=1,K0
      WRITE(6,310) K, CHD1(K), CHD2(K), QREFLX(K), PUMP(K),
     1 CFLUX(K), STOR(K), ETFLUX(K), FLXN(K)
  231 CONTINUE
  310 FORMAT(6H LAYER,I3,8H  CHOUT=,G11.5,7H  CHIN=,G11.5,6H  QRE=,G11.5
     1,6H  PMP=,G11.5,8H  CFLUX=,G11.5,7H  STOR=,G11.5,/,9X,8H  RIVER=,
     * G11.5,9H  SPRING=,G11.5)
      IF (NCH.EQ.0) GO TO 240
      WRITE (6,270)
      WRITE (6,280) ((JFLO(I,J),J=1,3),FLOW(I),I=1,NCH)
C
C     ---COMPUTE VERTICAL FLOW---
  240 X=0.
      Y=0.
      IF (K0.EQ.1) RETURN
      DO 250 I=2,I1
      DO 250 J=2,J1
      X=X+(PHI(I,J,1)-PHI(I,J,2))*TK(I,J,1)*DELX(J)*DELY(I)
      H2=PHI(I,J,2)
      IF(PHI(I,J,2).LT.BOT(I,J)) H2=BOT(I,J)
      IF (PHI(I,J,2).LT.BOT(I,J).AND.PHI(I,J,3).LT.BOT(I,J)) GO TO 250
      Y=Y+(H2-PHI(I,J,K0))*TK(I,J,K1)*DELX(J)*DELY(I)
 250  CONTINUE
      WRITE (6,290) Y,X
      PRINT 251
  251 FORMAT('1',2X,'SPRING FLOW RECHARGING SECOND LAYER',//,17X,'I',9X
     1,'J',6X,'RATE')
      DO 63 I=1,KK
63    WRITE(6,62)INDEX1(I),INDEX2(I),DFLUX(I)
  62  FORMAT ('0',8H SPRING ,2I10,E15.7)
      SPLK=0.0
      DO 64 I=1,INO
 64   SPLK=SPLK+DFLUX(I)
 65   WRITE(6,66)SPLK
 66   FORMAT('0',39H    TOTAL SPRING LKAGE RCHRG 2ND LAYER ,E15.7)
      RETURN
C
C     ---FORMATS---
C
C     ------------------------------------------------------------------
C
C
C
  260 FORMAT ('0',10X,'CUMULATIVE MASS BALANCE:',16X,'L**3',23X,'RATES F
     1OR THIS TIME STEP:',16X,'L**3/T'/11X,24('-'),43X,25('-')//20X,'SOU
     2RCES:',69X,'STORAGE =',F20.4/20X,8('-'),68X,'RECHARGE =',F20.4/27X
     3,'STORAGE =',F20.2,35X,'CONSTANT FLUX =',F20.4/26X,'RECHARGE =',F20
     4 0.2,41X,'PUMPING =',F20.4/21X,'CONSTANT FLUX =',F20.2,31X,'    RI
     5VER LEAKAGE =',F20.4/21X,'CONSTANT HEAD =',F20.2,34X,'CONSTANT HEA
     6D:'/27X,'LEAKAGE =',F20.2,46X,'IN =',F20.4/21X,'TOTAL SOURCES =',F
     720.2,45X,'OUT =',F20.4/96X,'LEAKAGE:'/20X,'DISCHARGES:',45X,'FROM
     8PREVIOUS PUMPING PERIOD =',F20.4/20X,11('-'),68X,'TOTAL =',F20.4/10
     98X,'   RIVER LEAKAGE =',F20.2/21X,'CONSTANT HEAD =',F20.2,34X,'  S
     $UM OF RATES =',F20.4/19X'QUANTITY PUMPED =',F20.2/27X,'LEAKAGE =',
     $F20.2/19X,'TOTAL DISCHARGE =',F20.2//17X,'DISCHARGE-SOURCES =',F20
     $.2/15X,'PER CENT DIFFERENCE =',F20.2//)
```

```
  270 FORMAT ('1','FLOW RATES TO CONSTANT HEAD NODES:'/' ',34('-')//' ',
     13(9X,'K',4X,'I',4X,'J',5X,'RATE (L**3/T)')/' ',3(9X,'-',4X,'-',4X,
     2'-',5X,13('-'))/)
  280 FORMAT (/(1X,3(I10,2I5,G18.7)))
  290 FORMAT (//////,2X,'FLOW TO TOP LAYER =',G15.7,'  FLOW TO BOTTOM LA
     1YER =',G15.7,'      POSITIVE UPWARD')
      END
      SUBROUTINE PRNTAI(PHI,STRT,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
C
      DIMENSION PHI(I0,J0,K0), STRT(I0,J0,K0), S(I0,J0,K0), WELL(I0,J0,K
     10), DELX(J0), DELY(I0), T(I0,J0,K0)
C
      COMMON /INTEGR/ I0,J0,K0,I1,J1,K1,I,J,K,NPER,KTH,ITMAX,LENGTH,KP,N
     1WEL,NUMT,IFINAL,IT,KT,IHEAD,IDRAW,IFLO,IERR,I2,J2,K2,IMAX,ITMX1,NC
     2H,IDK1,IDK2,IWATER,IQRE,IP,JP,IQ,JQ,IK,JK,K5,IPU1,IPU2,ITK,INO
     3,IEQN
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(6),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
      RETURN
C     ................................................................
C
C     ---INITIALIZE VARIABLES FOR PLOT---
C     ********************
      ENTRY MAP
C     ********************
      YDIM=0.
      WIDTH=0.
      DO 10 J=2,J1
   10 WIDTH=WIDTH+DELX(J)
      DO 20 I=2,I1
   20 YDIM=YDIM+DELY(I)
   30 XSF=DINCH*XSCALE
      YSF=DINCH*YSCALE
      NYD=YDIM/YSF
      IF (NYD*YSF.LE.YDIM-DELY(I1)/2.) NYD=NYD+1
      IF (NYD.LE.12) GO TO 40
      DINCH=YDIM/(12.*YSCALE)
      WRITE (6,330) DINCH
      IF (YSCALE.LT.1.0) WRITE (6,340)
      GO TO 30
   40 NXD=WIDTH/XSF
      IF (NXD*XSF.LE.WIDTH-DELX(J1)/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 60 I=1,NE
      NNX=N5-I
      NNY=I-1
      IF (NNY.GE.N6) GO TO 50
      YN(I)=YSF*NNY/YSCALE
   50 IF (NNX.LT.0) GO TO 60
      XN(I)=XSF*NNX/YSCALE
   60 CONTINUE
      RETURN
C     ..................................................................
C
C     ********************
      ENTRY PRNTA(NG,LA)
C     ********************
C     ---VARIABLES INITIALIZED EACH TIME A PLOT IS REQUESTED---
      DIST=WIDTH-DELX(J1)/2.
      JJ=J1
      LL=1
      Z=NXD*XSF
      IF (NG.EQ.1) WRITE (6,300) (TITLE(I),I=1,3),LA
      IF (NG.EQ.2) WRITE (6,300) (TITLE(I),I=4,6),LA
      DO 290 I=1,N4
C
C     ---LOCATE X AXES---
      IF (I.EQ.1.OR.I.EQ.N4) GO TO 70
      PRNT(1)=SYM(12)
      PRNT(N8)=SYM(12)
      IF ((I-1)/N1*N1.NE.I-1) GO TO 90
      PRNT(1)=SYM(14)
      PRNT(N8)=SYM(14)
      GO TO 90
C
C     ---LOCATE Y AXES---
   70 DO 80 J=1,N8
      IF ((J-1)/N2*N2.EQ.J-1) PRNT(J)=SYM(14)
   80 IF ((J-1)/N2*N2.NE.J-1) PRNT(J)=SYM(13)
C
C     ---COMPUTE LOCATION OF NODES AND DETERMINE APPROPRIATE SYMBOL---
   90 IF (DIST.LT.0..OR.DIST.LT.Z-XN1*XSF) GO TO 240
      YLEN=DELY(2)/2.
      DO 220 L=2,I1
      J=YLEN*N2/YSF+1.5
      IF (T(L,JJ,LA).EQ.0.) GO TO 160
      IF (S(L,JJ,LA).LT.0.) GO TO 210
      INDX3=0
      GO TO (100,110), NG
  100 K=(STRT(L,JJ,LA)-PHI(L,JJ,LA))*FACT1
C     -TO CYCLE SYMBOLS FOR DRAWDOWN, REMOVE C FROM COL. 1 OF NEXT CARD-
C     K=AMOD(K,10.)
      GO TO 120
  110 K=PHI(L,JJ,LA)*FACT2
  120 IF (K) 130,160,140
  130 IF (J-2.GT.0) PRNT(J-2)=SYM(13)
      N=-K+.5
      IF (N.LT.100) GO TO 150
```

```
      GO TO 190
  140 N=K+.5
      IF (N.LT.100) GO TO 150
      IF (N.GT.999) GO TO 190
      INDX3=N/100
      IF (J-2.GT.0) PRNT(J-2)=SYM(INDX3)
      N=N-INDX3*100
  150 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 170
      INDX2=N/10
      IF (INDX2.GT.0) GO TO 180
      INDX2=10
      IF (INDX3.EQ.0) INDX2=15
      GO TO 180
  160 INDX1=15
  170 INDX2=15
  180 IF (J-1.GT.0) PRNT(J-1)=SYM(INDX2)
      PRNT(J)=SYM(INDX1)
      GO TO 220
  190 DO 200 II=1,3
      JI=J-3+II
  200 IF (JI.GT.0) PRNT(JI)=SYM(11)
  210 IF (S(L,JJ,LA).LT.0.) PRNT(J)=SYM(16)
  220 YLEN=YLEN+(DELY(L)+DELY(L+1))/2.
  230 DIST=DIST-(DELX(JJ)+DELX(JJ-1))/2.
      JJ=JJ-1
      IF (JJ.EQ.0) GO TO 240
      IF (DIST.GT.Z-XN1*XSF) GO TO 230
  240 CONTINUE
C
C     ---PRINT AXES,LABELS, AND SYMBOLS---
      IF (I-NA(LL).EQ.0) GO TO 260
      IF ((I-1)/N1*N1-(I-1)) 270,250,270
  250 WRITE (6,VF1) (BLANK(J),J=1,NC),(PRNT(J),J=1,N8),XN(1+(I-1)/6)
      GO TO 280
  260 WRITE (6,VF2) (BLANK(J),J=1,NC),(PRNT(J),J=1,N8),XLABEL(LL)
      LL=LL+1
      GO TO 280
  270 WRITE (6,VF2) (BLANK(J),J=1,NC),(PRNT(J),J=1,N8)
C
C     ---COMPUTE NEW VALUE FOR Z AND INITIALIZE PRNT---
  280 Z=Z-2.*XN1*XSF
      DO 290 J=1,N8
  290 PRNT(J)=SYM(15)
C
C     ---NUMBER AND LABEL Y AXIS AND PRINT LEGEND---
      WRITE (6,VF3) (BLANK(J),J=1,NC),(YN(I),I=1,N6)
      WRITE (6,320) (YLABEL(I),I=1,6)
      IF (NG.EQ.1) WRITE (6,310) FACT1
      IF (NG.EQ.2) WRITE (6,310) FACT2
      RETURN
C
C     ---FORMATS---
C
C     ------------------------------------------------------------------
C
C
  300 FORMAT ('1',49X,3A8,'LAYER',I4//)
```

```
  310 FORMAT ('0EXPLANATION'/' ',11('-')//' R = CONSTANT HEAD BOUNDARY'/
     1' *** = VALUE EXCEEDED 3 FIGURES'/' MULTIPLICATION FACTOR =',F8.3)
  320 FORMAT ('0',39X,6A8)
  330 FORMAT ('0',25X,10('*'),' TO FIT MAP WITHIN 12 INCHES, DINCH REVIS
     1ED TO',G15.7,1X,10('*'))
  340 FORMAT ('0',45X,'NOTE: GENERALLY SCALE SHOULD BE > OR = 1.0')
      END
      BLOCK DATA
C     ----------
C
C     SPECIFICATIONS:
      REAL *8XLABEL,YLABEL,TITLE,XN1,MESUR
C
      COMMON /SARRAY/ ICHK(13),LEVEL1(9),LEVEL2(9)
      COMMON /PR/ XLABEL(3),YLABEL(6),TITLE(6),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     ****************************************************************
C
      DATA ICHK/'DRAW','HEAD','MASS','DK1','DK2','WATE','RECH','PUN1','P
     1UN2','ITKR','EQN3',2*0/
      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','50
     443','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)'/
C     ********************************************************
      END
```

Appendix 2

## DATA-DECK INSTRUCTIONS

These instructions are modified from Trescott (1975) and Trescott and Larson (1976).

### 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 4, punch the characters underlined in the definition. For an option not used, that section of the card 4 can be left blank.

Note: Default typing of variables applies for all data input.

| CARD | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 1 | 1-80 | 20A4 | HEADING | Any title the user wishes to print on one line at the start of output. |
| 2 | 1-52 | I3A4 | " | |
| 3 | 1-10 | I10 | I0 | Number of rows. |
| | 11-20 | I10 | J0 | Number of columns. |
| | 21-30 | I10 | K0 | Number of layers. |
| | 31-40 | I10 | ITMAX | Maximum number of iterations per time step. |
| | 41-50 | I10 | NCH | Number of constant head nodes. |
| | 51-60 | I10 | ND | Number of spring nodes. |
| | 61-70 | I10 | NRIV | Number of stream nodes. |
| 4 | 1-4 | A4 | IDRAW | DRAW to print drawdown. |
| | 6-9 | A4 | IHEAD | HEAD to print hydraulic head. |

Appendix 2.--Data-deck instructions--Continued

| CARD | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 4 | 11-14 | A4 | IFLOW | MASS to compute a mass balance. |
| | 16-18 | A3 | IDK1 | DK1 to read initial head, elapsed time, and mass balance parameters from unit 4 on disk. |
| | 21-23 | A3 | IDK2 | DK2 to write computed head, elapsed time, and mass balance parameters on unit 4 (disk). |
| | 26-29 | A4 | IWATER | WATE if the upper hydrologic unit is unconfined. |
| | 31-34 | A4 | IQRE | RECH for a constant recharge that may be a function of space. |
| | 36-39 | A4 | IPU1 | PUN1 to read initial head, elapsed time, and mass balance parameters from cards. |
| | 41-44 | A4 | IPU2 | PUN2 to punch computed head, elapsed time, and mass balance parameters on cards. |
| | 46-49 | A4 | ITK | ITKR to read the value of TK(I,J,K) for simulations in which confining layers are not represented by layers of nodes. TK(I,J,K) = $K_{zz}/b$. (See Supplement also.) |
| | 51-54 | A4 | IEQN | EQN3 if eq.3 is being solved; otherwise it is assumed that eq. 4 is being solved. Do not use eq. 3 with this modified version of the program. |

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 format 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.

| CARD | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 1 | 1-10 | G10.0 | NPER | Number of pumping periods for the 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, making 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 (L). |
| | Note: When the head change at all nodes on subsequent iterations is less than this value (for example, 0.01 foot), the program has converged to a solution for the time step. | | | |
| | 31-40 | G10.0 | LENGTH | Number of iteration parameters. |
| 2 | 1-10 | G10.0 | XSCALE | Factor to convert model length unit to unit used in X direction on maps (e.g. to convert from feet to miles, XSCALE = 5280). For no maps, card 2 is blank |
| | 11-20 | G10.0 | YSCALE | Factor to convert model length unit to unit used in Y direction on maps. |

Appendix 2.--Data-deck instructions--Continued

| CARD | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 2 | 21-30 | G10.0 | DINCH | Number of map units per inch. |
| | 31-40 | G10.0 | FACT1 | Factor to adjust value of drawdown printed*. |
| | 41-49 | 9I1 | LEVEL1(I) | Layers for which drawdown maps are to be printed. List the layers starting in column 41; the first zero entry terminates the printing of drawdown maps. |
| | 51-60 | G10.0 | FACT2 | Factor to adjust value of head printed*. |
| | 61-69 | 9I1 | LEVEL2(I) | Layers for which head maps are to be printed. List layers starting in column 61; the first zero entry terminates the printing of head maps. |
| | 71-78 | A8 | MESUR | Name of map length unit. |

| *Value of drawdown or head | FACT 1 or FACT 2 | Printed value |
|---|---|---|
| | 0.01 | 1 |
| | 0.1 | 5 |
| 52.57 | 1.0 | 53 |
| | 10.0 | 526 |
| | 100.0 | *** |

Appendix 2.--Data-deck instructions--Continued

| CARD | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 3 | 1-20 | G20.10 | SUM | Parameters in which elapsed time and cumulative volumes for mass balance are stored. For the start of a simulation insert three blank cards. For continuation of a previous run using cards as input, replace the three blank cards with the first three cards of punched output from the previous run Using data from disk for input, leave the three blank cards in the data deck. |
| | 21-40 | G20.10 | SUMP | |
| | 41-60 | G20.10 | PUMPT | |
| | 61-80 | G20.10 | CFLUXT | |
| 4 | 1-20 | G20.10 | QRET | |
| | 21-40 | G20.10 | CHST | |
| | 41-60 | G20.10 | CHDT | |
| | 61-80 | G20.10 | FLUXT | |
| 5 | 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 data set 1 and the spring and stream data) consists of a parameter card and, if the data set contains variable data, a set of data cards. If the data set requires data for each layer, a parameter card and data cards (for layers with variable data) are required for each layer. Each parameter card contains at least five variables:

| CARD | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| Every Parameter Card | 1-10 | G10.0 | FAC | If IVAR = 0, FAC is the value assigned to every element of the matrix for this layer.<br><br>If IVAR = 1, FAC is the multiplication factor for the following set of data cards for this layer. |
| | 11-20 | G10.0 | IVAR | = 0 if no data cards are to be read for this layer.<br><br>= 1 if data cards for this layer follow. |
| | 21-30 | G10.0 | IPRN | = 0 if input data for this layer are to be printed.<br><br>= 1 if input data for the layer are <u>not</u> to be printed. |

Appendix 2.--Data deck instructions--Continued

| CARD | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| Trans-missivity Parameter Cards also have these Variables | 31-40 | G10.0 | FACT(K,1) | Multiplication factor for transmissivity in x direction. |
| | 41-50 | G10.0 | FACT(K,2) | Multiplication factor for transmissivity in the y direction. |
| | 51-60 | G10.0 | FACT(K,3) | Multiplication factor for hydraulic conductivity in the z direction (Not used when confining bed nodes are eliminated and TK values are read). |
| Every Parameter Card | 61-70 | G10.0 | IRECS | = 0 if the matrix is being read from cards or if each element is being set equal to FAC.<br>= 1 if the matrix is to be read from disk (unit 2). |
| | 71-80 | G10.0 | IRECD | = 0 if the matrix is <u>not</u> to be stored on disk.<br>= 1 if the matrix being read from cards or set equal to FAC <u>is</u> to be stored on disk (unit 2) for later retrieval. |

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 DELX ranges from 1000 to 15000 feet, coded values should range from 1-15; the muliplication factor (FAC) would be 1000.

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

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

| | | | | |
|---|---|---|---|---|
| 2 | 1-80 | 8F10.4 | STRT(I,J,K) | Starting head matrix (L). |
| 3 | 1-80 | 20F4.0 | S (I,J,K) | Storage coefficient (dimensionless). |

Note: This matrix is also used to locate constant head boundaries by coding a negative number at constant head nodes. At these nodes T must be greater than zero.

| | | | | |
|---|---|---|---|---|
| 4 | 1-80 | 20F4.0 | T(I,J,K) | Transmissivity ($L^2/t$). |

Note 1) Zero values are required around the perimeter of the T matrix for each layer for reasons inherent in the computational scheme. This is done automatically by the program.

2) See the previous page for the additional requirements on the parameter cards for this data set.

3) If the upper active layer is unconfined and PERM is to be read for this layer, insert a parameter card for this layer with only the values for FACT on it.

Appendix 2.--Data-deck instructions--Continued

| DATA SET | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 5 | 1-80 | 20F4.0 | TK(I,J,K) | $K_{zz}/b$. |

Note: This data set is read only if specified in the options.

| | | | | |
|---|---|---|---|---|
| 6 | 1-80 | 20F4.0 | PERM(I,J) | Hydraulic conductivity (L/T). (See note 1 for data set 4.) |

Note: This data set is required only for simulating unconfined conditions in the uppermost hydrologic unit.

| | | | | |
|---|---|---|---|---|
| 7 | 1-80 | 20F4.0 | BOTTOM(I,J) | Altitude of bottom of clay separating upper layer from next lower layer(L). |

| | | | | |
|---|---|---|---|---|
| 8 | 1-80 | 20F4.0 | QRE(I,J,K) | Recharge rate (L/T). |

Note: Omit if not used.

| | | | | |
|---|---|---|---|---|
| 9 | 1-80 | 8G10.0 | DELX(J) | Grid spacing in x direction (L). |
| 10 | 1-80 | 8G10.0 | DELY(I) | Grid spacing in y direction (L). |
| 11 | 1-80 | 8G10.0 | DELZ(K) | Grid spacing in z direction (L). |

Spring data

| DATA SET | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 12 | 1-80 | 80I1 | ID(I0,J0,K0) | Indicator array for spring nodes; 1 for spring, zero for no spring. Start each row on a new card, layer by layer. |
| | 1-10 | G10.0 | FAC | Multiplier for subsequent spring leakance coefficient values. |
| | 1-80 | 40F2.0 | LD(ND) | Spring leakance coefficient for each spring node (ND values). Code continuously, 40 per card, row by row. |
| | 1-10 | G10.0 | FAC | Muliplier for subsequent spring altitude values. |
| | 1-80 | 20F4.0 | ELD(ND) | Spring altitude for each spring node (ND values). Code continuously 20 per card, row by row. |

Appendix 2.--Data-deck instructions--Continued

Stream data

| DATA SET | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 13 | 1-80 | 80I1 | IDR (I0,J0,K0) | Indicator array for stream nodes; 1 for stream, zero for no stream. Start each row on a new card, layer by layer. |
| | 1-10 | G10.0 | FAC | Multiplier for subsequent values of stream water-level altitude. |
| | 1-80 | 20F4.0 | RH(NRIV) | Stream water-level altitude for each stream node (NRIV values). Code continuously, 20 per card, row by row. |
| | 1-10 | G10.0 | FAC | Mutiplier for subsequent values of stream bottom altitude. |
| | 1-80 | 20F4.0 | RB(NRIV) | Stream bottom altitude for each stream node (NRIV values). Code continuously, 20 per card, row by row. |
| | 1-10 | G10.0 | FAC | Multiplier for subsequent values of streambed leakance coefficient. |
| | 1-80 | 10F8.0 | NC(NRIV) | Streambed leakance coefficient for each stream node (NRIV values). Code continuously, 10 per card, row by row. |

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 a value larger than the expected simulation period. The program will use NUMT, CDLT, and DELT as coded. If NUMT is greater than 50, change the dimension of ITTO in subroutine STEP to the appropriate size.

2. To simulate a given pumping period, set NUMT larger than the number required for the simulation period (for example, 50). The program will compute the exact DELT (which will be $\leq$ DELT coded) and NUMT to arrive exactly at TMAX on the last time step.

| 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. |
| | 21-30 | G10.0 | NWEL | Number of wells for this pumping period. |
| | 31-40 | G10.0 | MAX | 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. |
| | 61-70 | G10.0 | DELT | Initial time step in hours. |

If NWEL = 0 the following set of cards is omitted; otherwise DATA SET 1 consists of NWEL cards.

---

| DATA SET | COLUMNS | FORMAT | VARIABLE | DEFINITION |
|---|---|---|---|---|
| 1 (NWEL cards) | 1-10 | G10.0 | K | Layer in which well is located. |
| | 11-20 | G10.0 | I | Row location of well. |
| | 21-30 | G10.0 | J | Column location of well. |
| | 31-40 | G10.0 | WELL (I,J,K) | Pumping rate ($L^3/T$), negative for a pumping well. |

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

Appendix 3

## EXAMPLE INPUT

The following listing gives an example set of model input data as they were coded. The listing is given according to the instructions outlined in Appendix 2. The card numbers on the left side of each line are not part of the data, but are meant to be used for reference by the reader.

```
 CARD
NUMBER              GROUP I:TITLE, SIMULATION OPTIONS, AND PROBLEM DIMENSIONS

    1 |C06 WATERSHED - STRIP MINE PROJECT                        ***** C06SU *****          |
    2 |STEADY STATE; TOP LAYER UNCONFINED                                                   |
    3 |        26        20         3       100       268        32        14               |
    4 |     HEAD MASS            WATE RECH            ITKR                                  |


 CARD
NUMBER                              GROUP II:SCALAR PARAMETERS

    5 |         1         1      .001        10                                             |
    6 |                                                                                     |
    7 |                                                                                     |
    8 |                                                                                     |
    9 |                                                                                     |


 CARD                                GROUP III:ARRAY DATA
NUMBER                               STARTING HEAD MATRIX, LAYER 1

   10 |         1         1                                                                  |
   11 |    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  |
   13 |    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  |
   15 |    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                                             |
   17 |    0.0        0.0        0.0      802.0000   803.0000   803.0000     0.0        0.0  |
   18 |    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                                             |
   20 |    0.0        0.0        0.0      803.0000   804.0000   804.0000   804.0000   804.0000|
   21 |  804.0000   804.0000   804.0000     0.0        0.0        0.0        0.0        0.0  |
   22 |    0.0        0.0        0.0        0.0                                             |
   23 |    0.0        0.0      804.0000   805.0000   805.0000   805.0000   805.0000   805.0000|
   24 |  805.0000   805.0000   805.0000   805.0000     0.0        0.0        0.0        0.0  |
   25 |    0.0        0.0        0.0        0.0                                             |
   26 |    0.0        0.0      805.0000   805.0000   806.0000   807.0000   807.0000   807.0000|
   27 |  807.0000   807.0000   806.0000   806.0000     0.0        0.0        0.0        0.0  |
   28 |    0.0        0.0        0.0        0.0                                             |
   29 |    0.0        0.0      806.0000   806.0000   807.0000   809.0000   808.0000   808.0000|
   30 |  808.0000   809.0000   809.0000   808.0000   807.0000     0.0        0.0        0.0  |
   31 |    0.0        0.0        0.0        0.0                                             |
   32 |    0.0        0.0        0.0      808.0000   809.0000   810.0000   810.0000   810.0000|
   33 |  810.0000   810.0000   810.0000   809.0000   809.0000     0.0        0.0        0.0  |
   34 |    0.0        0.0        0.0        0.0                                             |
   35 |    0.0        0.0        0.0      810.0000   810.0000   811.0000   811.0000   811.0000|
   36 |  811.0000   811.0000   811.0000   810.0000   810.0000   810.0000     0.0        0.0  |
   37 |    0.0        0.0        0.0        0.0                                             |
   38 |    0.0        0.0      810.0000   810.0000   811.0000   812.0000   812.0000   812.0000|
   39 |  813.0000   813.0000   813.0000   812.0000   812.0000   811.0000   810.0000     0.0  |
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 40 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 41 | 0.0 | 0.0 | 811.0000 | 811.0000 | 812.0000 | 812.0000 | 813.0000 | 813.0000 |
| 42 | 814.0000 | 814.0000 | 814.0000 | 813.0000 | 813.0000 | 812.0000 | 812.0000 | 811.0000 |
| 43 | 810.0000 | 0.0 | 0.0 | 0.0 | | | | |
| 44 | 0.0 | 0.0 | 812.0000 | 813.0000 | 813.0000 | 814.0000 | 814.0000 | 815.0000 |
| 45 | 815.0000 | 815.0000 | 815.0000 | 815.0000 | 815.0000 | 814.0000 | 814.0000 | 812.0000 |
| 46 | 811.0000 | 0.0 | 0.0 | 0.0 | | | | |
| 47 | 0.0 | 0.0 | 813.0000 | 814.0000 | 814.0000 | 815.0000 | 815.0000 | 816.0000 |
| 48 | 816.0000 | 816.0000 | 816.0000 | 816.0000 | 816.0000 | 815.0000 | 815.0000 | 814.0000 |
| 49 | 813.0000 | 813.0000 | 0.0 | 0.0 | | | | |
| 50 | 0.0 | 0.0 | 814.0000 | 814.0000 | 815.0000 | 816.0000 | 816.0000 | 817.0000 |
| 51 | 817.0000 | 817.0000 | 817.0000 | 817.0000 | 817.0000 | 817.0000 | 816.0000 | 815.0000 |
| 52 | 815.0000 | 814.0000 | 0.0 | 0.0 | | | | |
| 53 | 0.0 | 0.0 | 814.0000 | 815.0000 | 816.0000 | 817.0000 | 817.0000 | 818.0000 |
| 54 | 818.0000 | 818.0000 | 818.0000 | 818.0000 | 818.0000 | 818.0000 | 818.0000 | 817.0000 |
| 55 | 815.0000 | 815.0000 | 0.0 | 0.0 | | | | |
| 56 | 0.0 | 0.0 | 815.0000 | 816.0000 | 817.0000 | 818.0000 | 818.0000 | 819.0000 |
| 57 | 820.0000 | 820.0000 | 820.0000 | 820.0000 | 820.0000 | 820.0000 | 819.0000 | 818.0000 |
| 58 | 818.0000 | 816.0000 | 0.0 | 0.0 | | | | |
| 59 | 0.0 | 0.0 | 815.0000 | 816.0000 | 818.0000 | 819.0000 | 819.0000 | 820.0000 |
| 60 | 821.0000 | 821.0000 | 821.0000 | 821.0000 | 821.0000 | 821.0000 | 820.0000 | 819.0000 |
| 61 | 819.0000 | 818.0000 | 0.0 | 0.0 | | | | |
| 62 | 0.0 | 0.0 | 0.0 | 816.0000 | 819.0000 | 819.0000 | 820.0000 | 821.0000 |
| 63 | 821.0000 | 821.0000 | 822.0000 | 822.0000 | 822.0000 | 821.0000 | 821.0000 | 820.0000 |
| 64 | 819.0000 | 819.0000 | 0.0 | 0.0 | | | | |
| 65 | 0.0 | 0.0 | 0.0 | 817.0000 | 819.0000 | 820.0000 | 821.0000 | 800.0000 |
| 66 | 822.0000 | 822.0000 | 822.0000 | 822.0000 | 822.0000 | 822.0000 | 821.0000 | 821.0000 |
| 67 | 820.0000 | 0.0 | 0.0 | 0.0 | | | | |
| 68 | 0.0 | 0.0 | 0.0 | 818.0000 | 820.0000 | 820.0000 | 800.0000 | 800.0000 |
| 69 | 823.0000 | 822.0000 | 823.0000 | 823.0000 | 823.0000 | 823.0000 | 822.0000 | 821.0000 |
| 70 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 71 | 0.0 | 0.0 | 0.0 | 819.0000 | 820.0000 | 800.0000 | 800.0000 | 822.0000 |
| 72 | 823.0000 | 823.0000 | 823.0000 | 824.0000 | 824.0000 | 824.0000 | 823.0000 | 0.0 |
| 73 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 74 | 0.0 | 0.0 | 0.0 | 820.0000 | 800.0000 | 800.0000 | 800.0000 | 823.0000 |
| 75 | 824.0000 | 824.0000 | 824.0000 | 824.0000 | 824.0000 | 824.0000 | 0.0 | 0.0 |
| 76 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 77 | 0.0 | 0.0 | 0.0 | 0.0 | 800.0000 | 800.0000 | 800.0000 | 824.0000 |
| 78 | 824.0000 | 825.0000 | 825.0000 | 825.0000 | 825.0000 | 0.0 | 0.0 | 0.0 |
| 79 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 80 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 800.0000 | 824.0000 | 825.0000 |
| 81 | 825.0000 | 826.0000 | 826.0000 | 826.0000 | 826.0000 | 0.0 | 0.0 | 0.0 |
| 82 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 83 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 84 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 86 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 88 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |

CARD NUMBER — GROUP III:ARRAY DATA
STARTING HEAD MATRIX, LAYER 2

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 89 | 1 | 1 | | | | | | |
| 90 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 91 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 92 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 93 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 94 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 95 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 96 | 0.0 | 0.0 | 0.0 | 838.9491 | 838.8871 | 838.7302 | 0.0 | 0.0 |
| 97 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 98 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 99 | 0.0 | 0.0 | 0.0 | 839.1436 | 838.9824 | 838.5780 | 837.7359 | 836.7772 |
| 100 | 835.9463 | 835.3161 | 835.1318 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 101 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 102 | 0.0 | 0.0 | 839.6420 | 839.4307 | 839.1121 | 838.5916 | 837.6903 | 836.6359 |
| 103 | 835.5990 | 834.9875 | 834.9045 | 834.7905 | 0.0 | 0.0 | 0.0 | 0.0 |
| 104 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 105 | 0.0 | 0.0 | 839.6641 | 839.4640 | 839.1204 | 838.5500 | 837.5558 | 836.2428 |
| 106 | 834.5651 | 833.9676 | 834.4435 | 834.6862 | 0.0 | 0.0 | 0.0 | 0.0 |
| 107 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 108 | 0.0 | 0.0 | 839.6735 | 839.4577 | 839.0901 | 838.4936 | 837.3208 | 836.0967 |
| 109 | 837.0582 | 836.5093 | 834.3864 | 835.1933 | 835.9640 | 0.0 | 0.0 | 0.0 |
| 110 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 111 | 0.0 | 0.0 | 0.0 | 839.4434 | 839.1057 | 838.3430 | 836.9319 | 838.7173 |
| 112 | 839.3933 | 838.6467 | 835.8901 | 836.0709 | 836.7606 | 0.0 | 0.0 | 0.0 |
| 113 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 114 | 0.0 | 0.0 | 0.0 | 839.6782 | 839.2607 | 838.5500 | 838.0786 | 840.7108 |
| 115 | 841.5498 | 841.0433 | 839.1915 | 836.6387 | 838.0216 | 839.4793 | 0.0 | 0.0 |
| 116 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 117 | 0.0 | 0.0 | 840.4925 | 840.0582 | 839.4623 | 838.5241 | 841.0666 | 842.9598 |
| 118 | 843.9480 | 843.5978 | 841.6221 | 837.9838 | 839.2841 | 840.6081 | 841.7236 | 0.0 |
| 119 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 120 | 0.0 | 0.0 | 840.6958 | 840.2989 | 839.7741 | 839.6814 | 843.0372 | 845.1824 |
| 121 | 846.4478 | 846.3609 | 844.1954 | 839.7280 | 840.4667 | 841.5528 | 842.8223 | 844.0552 |
| 122 | 844.5907 | 0.0 | 0.0 | 0.0 | | | | |
| 123 | 0.0 | 0.0 | 840.8160 | 840.4229 | 839.5031 | 842.4522 | 845.2277 | 847.4656 |
| 124 | 849.0618 | 849.9427 | 847.2693 | 842.5711 | 841.2129 | 842.1348 | 843.5375 | 844.6420 |
| 125 | 845.2859 | 0.0 | 0.0 | 0.0 | | | | |
| 126 | 0.0 | 0.0 | 840.9691 | 840.6865 | 840.0086 | 844.0982 | 846.9646 | 849.1570 |
| 127 | 851.5566 | 857.5515 | 851.0854 | 848.5146 | 845.4363 | 842.2876 | 844.3040 | 845.6995 |
| 128 | 846.7005 | 847.7624 | 0.0 | 0.0 | | | | |
| 129 | 0.0 | 0.0 | 840.9944 | 840.7287 | 841.0457 | 845.5292 | 848.0168 | 849.5804 |
| 130 | 850.7340 | 851.9799 | 851.3956 | 854.6158 | 847.7394 | 843.2801 | 845.3218 | 846.8695 |
| 131 | 847.9532 | 848.6133 | 0.0 | 0.0 | | | | |
| 132 | 0.0 | 0.0 | 840.8463 | 840.2569 | 844.0110 | 846.9883 | 848.6472 | 849.3391 |
| 133 | 848.6447 | 846.0975 | 846.9441 | 847.1355 | 846.9426 | 843.7390 | 846.3551 | 848.1539 |
| 134 | 849.2007 | 849.7216 | 0.0 | 0.0 | | | | |
| 135 | 0.0 | 0.0 | 841.1796 | 840.8723 | 845.4057 | 847.9131 | 848.9481 | 848.5281 |
| 136 | 846.1564 | 840.2185 | 840.3294 | 846.3558 | 847.0908 | 844.2869 | 847.6075 | 849.5393 |
| 137 | 850.6384 | 850.9682 | 0.0 | 0.0 | | | | |
| 138 | 0.0 | 0.0 | 841.7447 | 842.3031 | 846.7732 | 848.6988 | 848.7443 | 847.0448 |
| 139 | 842.8190 | 836.3673 | 844.0718 | 847.1863 | 847.3626 | 845.6087 | 849.1083 | 851.0686 |
| 140 | 851.9494 | 852.1294 | 0.0 | 0.0 | | | | |
| 141 | 0.0 | 0.0 | 0.0 | 847.1637 | 848.6434 | 848.9098 | 847.4808 | 842.9774 |
| 142 | 832.4044 | 841.7759 | 846.5910 | 847.2171 | 845.8854 | 848.3013 | 850.9699 | 852.4527 |
| 143 | 852.9254 | 852.8260 | 0.0 | 0.0 | | | | |
| 144 | 0.0 | 0.0 | 0.0 | 849.1601 | 849.1415 | 847.8144 | 843.7939 | 836.4547 |
| 145 | 829.5000 | 843.4289 | 847.2734 | 844.4700 | 847.6132 | 850.2807 | 852.4225 | 853.5535 |
| 146 | 853.7164 | 0.0 | 0.0 | 0.0 | | | | |
| 147 | 0.0 | 0.0 | 0.0 | 849.4957 | 848.0437 | 844.1349 | 836.1226 | 825.3851 |
| 148 | 840.7769 | 847.1807 | 848.5405 | 844.7091 | 848.9347 | 851.7317 | 853.4938 | 854.1970 |
| 149 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 150 | 0.0 | 0.0 | 0.0 | 848.3981 | 844.5051 | 834.8223 | 822.3767 | 840.7893 |
| 151 | 848.7611 | 851.2101 | 849.0689 | 845.7622 | 850.2442 | 852.8578 | 854.0788 | 0.0 |
| 152 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 153 | 0.0 | 0.0 | 0.0 | 846.5900 | 833.3692 | 819.3628 | 833.5236 | 848.0234 |
| 154 | 853.2907 | 852.6966 | 845.8112 | 848.4305 | 851.4813 | 853.3683 | 0.0 | 0.0 |
| 155 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 156 | 0.0 | 0.0 | 0.0 | 0.0 | 815.2760 | 830.2745 | 840.4549 | 852.1135 |
| 157 | 855.5724 | 854.0661 | 844.7853 | 849.7581 | 852.0140 | 0.0 | 0.0 | 0.0 |
| 158 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 159 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 838.8791 | 848.9627 | 853.1169 |
| 160 | 856.9914 | 854.8765 | 845.0484 | 850.4567 | 852.5883 | 0.0 | 0.0 | 0.0 |
| 161 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 162 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 163 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 164 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 165 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 166 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 167 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |

CARD NUMBER

GROUP III:ARRAY DATA
STARTING HEAD MATRIX, LAYER 3

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 168 | 1 | 1 | | | | | | |
| 169 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 170 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 171 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 172 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 173 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 174 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 175 | 0.0 | 0.0 | 0.0 | 955.0207 | 954.5831 | 954.6959 | 0.0 | 0.0 |
| 176 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 177 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 178 | 0.0 | 0.0 | 0.0 | 954.7777 | 954.5127 | 954.0338 | 953.3200 | 952.8577 |
| 179 | 952.8252 | 953.6100 | 954.3887 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 180 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 181 | 0.0 | 0.0 | 954.8637 | 954.6319 | 954.1099 | 953.2124 | 952.1405 | 951.0407 |
| 182 | 950.5995 | 951.4085 | 953.2400 | 954.7307 | 0.0 | 0.0 | 0.0 | 0.0 |
| 183 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 184 | 0.0 | 0.0 | 954.9506 | 954.5608 | 953.7131 | 952.1792 | 949.9430 | 946.9536 |
| 185 | 922.2968 | 923.3275 | 950.2683 | 953.6176 | 0.0 | 0.0 | 0.0 | 0.0 |
| 186 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 187 | 0.0 | 0.0 | 955.0241 | 954.4150 | 953.1866 | 950.7948 | 946.7053 | 920.2686 |
| 188 | 0.0 | 0.0 | 927.9326 | 951.7514 | 952.6337 | 0.0 | 0.0 | 0.0 |
| 189 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 190 | 0.0 | 0.0 | 0.0 | 953.9748 | 952.4876 | 949.3813 | 921.2703 | 0.0 |
| 191 | 0.0 | 0.0 | 927.2143 | 949.0750 | 950.8860 | 0.0 | 0.0 | 0.0 |
| 192 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 193 | 0.0 | 0.0 | 0.0 | 953.2904 | 951.3729 | 947.5178 | 920.3536 | 0.0 |
| 194 | 0.0 | 0.0 | 0.0 | 923.0741 | 947.6398 | 948.1230 | 0.0 | 0.0 |
| 195 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 196 | 0.0 | 0.0 | 953.7524 | 952.5383 | 949.6217 | 922.2037 | 0.0 | 0.0 |
| 197 | 0.0 | 0.0 | 0.0 | 920.2850 | 945.2217 | 946.5720 | 946.8080 | 0.0 |
| 198 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 199 | 0.0 | 0.0 | 953.1878 | 951.5208 | 947.5277 | 920.3706 | 0.0 | 0.0 |
| 200 | 0.0 | 0.0 | 0.0 | 917.2838 | 941.8650 | 944.1697 | 945.3197 | 945.6082 |
| 201 | 945.7922 | 0.0 | 0.0 | 0.0 | | | | |
| 202 | 0.0 | 0.0 | 952.6163 | 950.3574 | 922.2771 | 0.0 | 0.0 | 0.0 |
| 203 | 0.0 | 0.0 | 0.0 | 914.8086 | 915.1839 | 940.1873 | 943.3528 | 944.5664 |
| 204 | 944.9096 | 0.0 | 0.0 | 0.0 | | | | |
| 205 | 0.0 | 0.0 | 952.0204 | 949.7697 | 922.3606 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 206 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 913.2680 | 940.7826 | 942.8523 |
| 207 | 943.3452 | 942.8187 | 0.0 | 0.0 | | | | |
| 208 | 0.0 | 0.0 | 951.1901 | 948.2994 | 923.2686 | 0.0 | 0.0 | 0.0 |
| 209 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 910.4099 | 939.2364 | 941.2699 |
| 210 | 941.9330 | 941.8753 | 0.0 | 0.0 | | | | |
| 211 | 0.0 | 0.0 | 950.2432 | 925.0628 | 0.0 | 0.0 | 0.0 | 0.0 |
| 212 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 908.4183 | 937.7482 | 939.7572 |
| 213 | 940.5447 | 940.7450 | 0.0 | 0.0 | | | | |
| 214 | 0.0 | 0.0 | 950.6298 | 926.2477 | 0.0 | 0.0 | 0.0 | 0.0 |
| 215 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 907.4040 | 936.2717 | 938.2955 |
| 216 | 939.2223 | 939.6298 | 0.0 | 0.0 | | | | |
| 217 | 0.0 | 0.0 | 950.7717 | 926.2687 | 0.0 | 0.0 | 0.0 | 0.0 |
| 218 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 907.2359 | 934.8874 | 936.9680 |
| 219 | 938.0924 | 938.7085 | 0.0 | 0.0 | | | | |
| 220 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 221 | 0.0 | 0.0 | 0.0 | 0.0 | 908.0275 | 931.6840 | 934.9167 | 936.4093 |
| 222 | 937.4055 | 938.2157 | 0.0 | 0.0 | | | | |
| 223 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 224 | 0.0 | 0.0 | 0.0 | 909.2482 | 932.3740 | 934.4429 | 935.5989 | 936.3013 |
| 225 | 936.9187 | 0.0 | 0.0 | 0.0 | | | | |
| 226 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 227 | 0.0 | 0.0 | 0.0 | 910.2768 | 934.5070 | 935.8113 | 936.1301 | 936.2383 |
| 228 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 229 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 230 | 0.0 | 0.0 | 0.0 | 911.9545 | 935.6048 | 936.6209 | 936.4976 | 0.0 |
| 231 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 232 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 233 | 0.0 | 0.0 | 912.2445 | 935.2492 | 937.2175 | 937.3681 | 0.0 | 0.0 |
| 234 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 235 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 236 | 0.0 | 0.0 | 913.2431 | 937.1348 | 938.4430 | 0.0 | 0.0 | 0.0 |
| 237 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 238 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 239 | 0.0 | 0.0 | 913.2725 | 937.8017 | 939.0001 | 0.0 | 0.0 | 0.0 |
| 240 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 241 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 242 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 243 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 244 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 245 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 246 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |

CARD NUMBER

GROUP III:ARRAY DATA
STORAGE COEFFICIENT, LAYER 1

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 247 | -1 | | | 1 | | | | | | | | | | | | |
| 248 | | | | | | | | | | | | | | | | |
| 249 | | | | | | | | | | | | | | | | |
| 250 | | | 1 | 1 | 1 | | | | | | | | | | | |
| 251 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| 252 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | |
| 253 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | |
| 254 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| 255 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| 256 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| 257 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| 258 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

```
 259 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1                |
 260 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1            |
 261 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1            |
 262 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1            |
 263 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1            |
 264 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1            |
 265 |              1   1   1   1   1   1   1   1   1   1   1   1   1   1   1            |
 266 |              1   1   1   1   1   1   1   1   1   1   1   1   1   1                |
 267 |              1   1   1   1   1   1   1   1   1   1   1   1   1                    |
 268 |              1   1   1   1   1   1   1   1   1   1   1   1                        |
 269 |              1   1   1   1   1   1   1   1   1   1   1                            |
 270 |                  1   1   1   1   1   1   1   1   1                                |
 271 |                      1   1   1   1   1   1   1   1                                |
 272 |                                                                                  |
 273 |                                                                                  |
```

CARD NUMBER — GROUP III:ARRAY DATA
STORAGE COEFFICIENT, LAYER 2

```
 274 |        0                                                                         |
```

CARD NUMBER — GROUP III:ARRAY DATA
STORAGE COEFFICIENT, LAYER 3

```
 275 |        0                                                                         |
```

CARD NUMBER — GROUP III:ARRAY DATA
TRANSMISSIVITY, LAYER 1

```
 276 |    .0003         1                   1         1                                |
 277 |                                                                                  |
 278 |                                                                                  |
 279 |              1   1   1                                                           |
 280 |              1   1   1   1   1   1   1   1                                       |
 281 |          1   1   1   1   1   1   1   1   1   1                                   |
 282 |          1   1   1   1   1   1   1   1   1   1                                   |
 283 |          1   1   1   1   1   1   1   1   1   1   1                               |
 284 |              1   1   1   1   1   1   1   1   1   1                               |
 285 |              1   1   1   1   1   1   1   1   1   1   1                           |
 286 |          1   1   1   1   1   1   1   1   1   1   1   1   1                       |
 287 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1               |
 288 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1               |
 289 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1           |
 290 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1           |
 291 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1           |
 292 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1           |
 293 |          1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1           |
 294 |              1   1   1   1   1   1   1   1   1   1   1   1   1   1   1           |
 295 |              1   1   1   1   1   1   1   1   1   1   1   1   1   1               |
 296 |              1   1   1   1   1   1   1   1   1   1   1   1   1                   |
 297 |              1   1   1   1   1   1   1   1   1   1   1   1                       |
```

```
298 |                 1   1   1   1   1   1   1   1   1   1   1                   |
299 |                     1   1   1   1   1   1   1   1   1                       |
300 |                         1   1   1   1   1   1   1   1                       |
301 |                                                                             |
302 |                                                                             |
```

CARD NUMBER — GROUP III:ARRAY DATA
TRANSMISSIVITY, LAYER 2

```
303 |     2.E-6           1                       1           1                   |
304 |                                                                             |
305 |                                                                             |
306 |                 7   7   7                                                   |
307 |                 7   7   7   6   6   6   6   6                               |
308 |             7   6   6   6   6   6   6   6   6   6                           |
309 |             6   6   6   6   6   6   5   5   5   6                           |
310 |             6   6   6   6   5   5   5   5   5   5   5                       |
311 |                 6   6   5   5   5   5   5   5   5   5                       |
312 |                 6   5   5   5   5   5   5   5   5   5   5                   |
313 |             6   5   5   5   5   5   4   4   4   5   5   5   5               |
314 |             5   5   5   5   5   4   4   4   4   4   4   5   5   5   5       |
315 |             5   5   5   5   4   4   4   4   4   4   4   4   4   5   5       |
316 |             5   5   5   4   4   4   4   3   4   4   4   4   4   4   5   5   |
317 |             5   5   4   4   4   4   3   3   3   3   4   4   4   4   4   5   |
318 |             5   4   4   4   4   3   3   3   3   3   4   4   4   4   4   4   |
319 |             4   4   4   4   3   3   3   3   3   3   3   3   4   4   4   4   |
320 |             4   4   3   3   3   3   2   2   3   3   3   3   4   4   4   4   |
321 |                 3   3   3   2   2   2   2   2   3   3   3   3   4   4   4   |
322 |                 3   3   2   2   2   2   2   2   2   3   3   3   3   3       |
323 |                 2   2   2   2   1   2   2   2   2   3   3   3   3           |
324 |                 2   2   1   1   1   1   1   2   2   2   3   3               |
325 |                 1   1   1   1   1   1   1   2   2   2   2                   |
326 |                     1   1   1   1   1   1   1   2   2                       |
327 |                         1   1   1   1   1   1   2   2                       |
328 |                                                                             |
329 |                                                                             |
```

CARD NUMBER — GROUP III:ARRAY DATA
TRANSMISSIVITY, LAYER 3

```
330 |                                     1           1                           |
```

CARD NUMBER — GROUP III:ARRAY DATA
TK(1)

```
331 |   5.5E-10           1                                                       |
332 |                                                                             |
333 |                                                                             |
334 |                 1   1   1                                                   |
335 |                 1   1   1   1   1   1   1   1                               |
336 |             1   1   1   1   1   1   1   1   1   1                           |
```

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 337 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | |
| 338 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| 339 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| 340 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| 341 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| 342 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 343 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 344 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 345 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 346 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 347 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 348 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 349 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 350 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 351 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| 352 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| 353 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| 354 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| 355 | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| 356 | | | | | | | | | | | | | | | | |
| 357 | | | | | | | | | | | | | | | | |

CARD NUMBER — GROUP III:ARRAY DATA
TK(2)

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 358 | 5.5E-10 | | 1 | | | | | | | | | | | | | |
| 359 | | | | | | | | | | | | | | | | |
| 360 | | | | | | | | | | | | | | | | |
| 361 | | | 1 | 1 | 1 | | | | | | | | | | | |
| 362 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| 363 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | |
| 364 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | |
| 365 | | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | | | |
| 366 | | | 1 | 1 | 1 | 1 | | | | 1 | 1 | 1 | | | | |
| 367 | | | 1 | 1 | 1 | 1 | | | | | 1 | 1 | 1 | | | |
| 368 | | 1 | 1 | 1 | 1 | | | | | | 1 | 1 | 1 | 1 | | |
| 369 | | 1 | 1 | 1 | 1 | | | | | | 1 | 1 | 1 | 1 | 1 | 1 |
| 370 | | 1 | 1 | 1 | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 |
| 371 | | 1 | 1 | 1 | | | | | | | | | 1 | 1 | 1 | 1 | 1 |
| 372 | | 1 | 1 | 1 | | | | | | | | | 1 | 1 | 1 | 1 | 1 |
| 373 | | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | 1 | 1 |
| 374 | | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | 1 | 1 |
| 375 | | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | 1 | 1 |
| 376 | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 |
| 377 | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | |
| 378 | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | |
| 379 | | | | | | | | | | | 1 | 1 | 1 | 1 | | | |
| 380 | | | | | | | | | | 1 | 1 | 1 | 1 | | | | |
| 381 | | | | | | | | | | 1 | 1 | 1 | | | | | |
| 382 | | | | | | | | | | 1 | 1 | 1 | | | | | |
| 383 | | | | | | | | | | | | | | | | | |
| 384 | | | | | | | | | | | | | | | | | |

CARD — GROUP III:ARRAY DATA

NUMBER HYDRAULIC CONDUCTIVITY, LAYER 3

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 385 | 2.E-7 | | | 1 | | | | | | | | | | | | | | | |
| 386 | | | | | | | | | | | | | | | | | | | |
| 387 | | | | | | | | | | | | | | | | | | | |
| 388 | | | 1 | 1 | 1 | | | | | | | | | | | | | | |
| 389 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | |
| 390 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | |
| 391 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | |
| 392 | | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | | | | | | |
| 393 | | | 1 | 1 | 1 | 1 | | | | 1 | 1 | 1 | | | | | | | |
| 394 | | | 1 | 1 | 1 | 1 | | | | | 1 | 1 | 1 | | | | | | |
| 395 | | 1 | 1 | 1 | 1 | | | | | | 1 | 1 | 1 | 1 | | | | | |
| 396 | | 1 | 1 | 1 | 1 | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| 397 | | 1 | 1 | 1 | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| 398 | | 1 | 1 | 1 | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | |
| 399 | | 1 | 1 | 1 | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | |
| 400 | | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | |
| 401 | | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | |
| 402 | | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | |
| 403 | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| 404 | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| 405 | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | | | |
| 406 | | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | |
| 407 | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | | |
| 408 | | | | | | | | | | 1 | 1 | 1 | | | | | | | |
| 409 | | | | | | | | | | 1 | 1 | 1 | | | | | | | |
| 410 | | | | | | | | | | | | | | | | | | | |
| 411 | | | | | | | | | | | | | | | | | | | |

CARD NUMBER GROUP III:ARRAY DATA
ELEVATION OF BOTTOM OF WATER-TABLE UNIT 3

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 412 | 1 | | | 1 | | | | | | | | | | | | | | | |
| 413 | | | | | | | | | | | | | | | | | | | |
| 414 | | | | | | | | | | | | | | | | | | | |
| 415 | | | 919 | 919 | 919 | | | | | | | | | | | | | | |
| 416 | | | 918 | 918 | 918 | 919 | 920 | 920 | 923 | 923 | | | | | | | | | |
| 417 | 918 | 918 | 918 | 917 | 918 | 918 | 919 | 921 | 922 | 925 | | | | | | | | | |
| 418 | 919 | 919 | 919 | 918 | 917 | 918 | 919 | 920 | 923 | 927 | | | | | | | | | |
| 419 | 920 | 920 | 920 | 918 | 917 | 917 | | | 925 | 926 | 924 | | | | | | | | |
| 420 | | | 922 | 921 | 920 | 918 | | | 925 | 923 | 922 | | | | | | | | |
| 421 | | | 922 | 921 | 920 | 918 | | | | 920 | 920 | 917 | | | | | | | |
| 422 | 922 | 921 | 920 | 919 | | | | | | 918 | 917 | 915 | 915 | | | | | | |
| 423 | 921 | 921 | 919 | 918 | | | | | | 915 | 914 | 914 | 912 | 912 | 912 | | | | |
| 424 | 922 | 921 | 919 | | | | | | | 913 | 912 | 912 | 913 | 912 | 911 | | | | |
| 425 | 922 | 920 | 920 | | | | | | | | | 910 | 910 | 910 | 909 | 907 | | | |
| 426 | 922 | 922 | 921 | | | | | | | | | 908 | 908 | 908 | 907 | 905 | | | |
| 427 | 923 | 922 | | | | | | | | | | 906 | 907 | 906 | 905 | 904 | | | |
| 428 | 924 | 924 | | | | | | | | | | 905 | 905 | 904 | 903 | 903 | | | |
| 429 | 924 | 924 | | | | | | | | | | 904 | 902 | 900 | 901 | 902 | | | |
| 430 | | | | | | | | | | | 905 | 903 | 900 | 899 | 900 | 902 | | | |
| 431 | | | | | | | | | | 907 | 906 | 903 | 900 | 899 | 900 | | | | |
| 432 | | | | | | | | | | 908 | 906 | 903 | 900 | 899 | | | | | |
| 433 | | | | | | | | | | 909 | 906 | 903 | 900 | | | | | | |
| 434 | | | | | | | | | 910 | 909 | 906 | 903 | | | | | | | |
| 435 | | | | | | | | | 911 | 909 | 907 | | | | | | | | |

```
 436 |                                        911 909 907                                  |
 437 |                                                                                     |
 438 |                                                                                     |


 CARD                                  GROUP III:ARRAY DATA
NUMBER                          RECHARGE RATE, LAYER 1

 439 |          4                                                                          |


 CARD                                  GROUP III:ARRAY DATA
NUMBER                          RECHARGE RATE, LAYER 2

 440 |   1.87E-8          1                                                                |
 441 |                                                                                     |
 442 |                                                                                     |
 443 |                                                                                     |
 444 |                                                                                     |
 445 |                                                                                     |
 446 |                                                                                     |
 447 |                                          1    1                                     |
 448 |                                     1    1    1                                     |
 449 |                                     1    1    1    1                                |
 450 |                               1     1    1    1    1                                |
 451 |                               1     1    1    1    1                                |
 452 |                          1    1     1    1    1    1                                |
 453 |                          1    1     1    1    1    1    1    1                       |
 454 |                          1    1     1    1    1    1    1    1                       |
 455 |                     1    1    1     1    1    1    1    1    1                       |
 456 |                     1    1    1     1    1    1    1    1    1                       |
 457 |                     1    1    1     1    1    1    1    1    1                       |
 458 |                1    1    1    1     1    1    1    1    1                            |
 459 |                1    1    1    1     1    1    1    1                                 |
 460 |                1    1    1    1     1    1    1    1                                 |
 461 |                1    1    1    1     1    1    1    1                                 |
 462 |                1    1    1    1     1    1    1                                      |
 463 |                     1    1    1     1    1    1                                      |
 464 |                          1    1     1    1    1                                      |
 465 |                                                                                     |
 466 |                                                                                     |


 CARD                                  GROUP III:ARRAY DATA
NUMBER                          RECHARGE RATE, LAYER 3

 467 |   1.87E-8                                                                           |


 CARD                                  GROUP III:ARRAY DATA
NUMBER                        GRID SPACING IN X DIRECTION
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```
   468 |        100                                                                  |


 CARD                                   GROUP III:ARRAY DATA
NUMBER                                GRID SPACING IN Y DIRECTION

   469 |        100                                                                  |


 CARD                                   GROUP III:ARRAY DATA
NUMBER                                GRID SPACING IN Z DIRECTION

   470 |          1                                                                  |


 CARD                                   GROUP III:ARRAY DATA
NUMBER                            SPRING DATA

   471 |                                                                             |
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592 |            1                                                                   |
593 |            1  1                                                                |
594 |            1  1                                                                |
595 |            11                                                                  |
596 |            1                                                                   |
597 |          1                                                                     |
598 |          1                                                                     |
599 |         1                                                                      |
600 |        1                                                                       |
601 |       1                                                                        |
602 |      1                                                                         |
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630 |                                                                                |
631 |                                                                                |
632 |        1.0                                                                     |
633 | 858 852 855 846 847 840 840 836 832 829 825 822 819 815                         |
634 |        1.0                                                                     |
635 | 857 851 854 845 846 839 839 835 831 828 824 821 818 814                         |
636 |    1.E-07                                                                      |
637 |        1        1        1        1        1        1        1        1        1        1|
638 |        1        1        1        1                                            |
```

```
 CARD
NUMBER              GROUP IV:PARAMETERS THAT CHANGE WITH THE PUMPING PERIOD

639 |          1          0          0          1          1          1         24          |
```

Appendix 4

## EXAMPLE OUTPUT

The following is the output resulting from a simulation using the input listed in Appendix 3.

```
C06 WATERSHED - STRIP MINE PROJECT                    ***** C06SU *****        STEADY STATE; TOP LAYER UNCONFINED

                                                          NUMBER OF ROWS =   26
                                                       NUMBER OF COLUMNS =   20
                                                        NUMBER OF LAYERS =    3

                                   MAXIMUM PERMITTED NUMBER OF ITERATIONS =  100

                                            NUMBER OF CONSTANT HEAD NODES =  268
                                                    NUMBER OF DRAIN NODES =   32
                                                    NUMBER OF RIVER NODES =   14

SIMULATION OPTIONS:          HEAD    MASS                    WATE    RECH                    ITKR

                                                     WORDS OF VECTOR Y USED =  29964

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

                                              ERROR CRITERIA FOR CLOSURE =   .9999999E-03
```

STARTING HEAD MATRIX, LAYER 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 802.0 | 803.0 | 803.0 | 0.0 | 0.0 | 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 | 803.0 | 804.0 | 804.0 | 804.0 | 804.0 | 804.0 | 804.0 | 804.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 804.0 | 805.0 | 805.0 | 805.0 | 805.0 | 805.0 | 805.0 | 805.0 | 805.0 | 805.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 805.0 | 805.0 | 806.0 | 807.0 | 807.0 | 807.0 | 807.0 | 807.0 | 806.0 | 806.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 806.0 | 806.0 | 807.0 | 809.0 | 808.0 | 808.0 | 808.0 | 809.0 | 809.0 | 808.0 | 807.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 808.0 | 809.0 | 810.0 | 810.0 | 810.0 | 810.0 | 810.0 | 810.0 | 809.0 | 809.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 810.0 | 810.0 | 811.0 | 811.0 | 811.0 | 811.0 | 811.0 | 811.0 | 810.0 | 810.0 | 810.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 810.0 | 810.0 | 811.0 | 812.0 | 812.0 | 812.0 | 813.0 | 813.0 | 813.0 | 812.0 | 812.0 | 811.0 | 810.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 811.0 | 811.0 | 812.0 | 812.0 | 813.0 | 813.0 | 814.0 | 814.0 | 814.0 | 813.0 | 813.0 | 812.0 | 812.0 | 811.0 | 810.0 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 812.0 | 813.0 | 813.0 | 814.0 | 814.0 | 815.0 | 815.0 | 815.0 | 815.0 | 815.0 | 815.0 | 814.0 | 814.0 | 812.0 | 811.0 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 813.0 | 814.0 | 814.0 | 815.0 | 815.0 | 816.0 | 816.0 | 816.0 | 816.0 | 816.0 | 816.0 | 815.0 | 815.0 | 814.0 | 813.0 | 813.0 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 814.0 | 814.0 | 815.0 | 816.0 | 816.0 | 817.0 | 817.0 | 817.0 | 817.0 | 817.0 | 817.0 | 817.0 | 816.0 | 815.0 | 815.0 | 814.0 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 814.0 | 815.0 | 816.0 | 817.0 | 817.0 | 818.0 | 818.0 | 818.0 | 818.0 | 818.0 | 818.0 | 818.0 | 818.0 | 817.0 | 815.0 | 815.0 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 815.0 | 816.0 | 817.0 | 818.0 | 818.0 | 819.0 | 820.0 | 820.0 | 820.0 | 820.0 | 820.0 | 820.0 | 819.0 | 818.0 | 818.0 | 816.0 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 815.0 | 816.0 | 818.0 | 819.0 | 819.0 | 820.0 | 821.0 | 821.0 | 821.0 | 821.0 | 821.0 | 821.0 | 820.0 | 819.0 | 819.0 | 818.0 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 | 0.0 | 816.0 | 819.0 | 819.0 | 820.0 | 821.0 | 821.0 | 821.0 | 822.0 | 822.0 | 822.0 | 821.0 | 821.0 | 820.0 | 819.0 | 819.0 | 0.0 | 0.0 |
| 19 | 0.0 | 0.0 | 0.0 | 817.0 | 819.0 | 820.0 | 821.0 | 800.0 | 822.0 | 822.0 | 822.0 | 822.0 | 822.0 | 822.0 | 821.0 | 821.0 | 820.0 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | 818.0 | 820.0 | 820.0 | 800.0 | 800.0 | 823.0 | 822.0 | 823.0 | 823.0 | 823.0 | 823.0 | 822.0 | 821.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 0.0 | 0.0 | 0.0 | 819.0 | 820.0 | 800.0 | 800.0 | 822.0 | 823.0 | 823.0 | 823.0 | 824.0 | 824.0 | 824.0 | 823.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 0.0 | 0.0 | 0.0 | 820.0 | 800.0 | 800.0 | 800.0 | 823.0 | 824.0 | 824.0 | 824.0 | 824.0 | 824.0 | 824.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 800.0 | 800.0 | 800.0 | 824.0 | 824.0 | 825.0 | 825.0 | 825.0 | 825.0 | 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 | 800.0 | 824.0 | 825.0 | 825.0 | 826.0 | 826.0 | 826.0 | 826.0 | 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 |
| 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 |

STARTING HEAD MATRIX, LAYER 2

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 838.9 | 838.9 | 838.7 | 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 |
| 4 | 0.0 | 0.0 | 0.0 | 839.1 | 839.0 | 838.6 | 837.7 | 836.8 | 835.9 | 835.3 | 835.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 839.6 | 839.4 | 839.1 | 838.6 | 837.7 | 836.6 | 835.6 | 835.0 | 834.9 | 834.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 839.7 | 839.5 | 839.1 | 838.6 | 837.6 | 836.2 | 834.6 | 834.0 | 834.4 | 834.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 839.7 | 839.5 | 839.1 | 838.5 | 837.3 | 836.1 | 837.1 | 836.5 | 834.4 | 835.2 | 836.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 839.4 | 839.1 | 838.3 | 836.9 | 838.7 | 839.4 | 838.6 | 835.9 | 836.1 | 836.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 839.7 | 839.3 | 838.6 | 838.1 | 840.7 | 841.5 | 841.0 | 839.2 | 836.6 | 838.0 | 839.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 840.5 | 840.1 | 839.5 | 838.5 | 841.1 | 843.0 | 843.9 | 843.6 | 841.6 | 838.0 | 839.3 | 840.6 | 841.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 840.7 | 840.3 | 839.8 | 839.7 | 843.0 | 845.2 | 846.4 | 846.4 | 844.2 | 839.7 | 840.5 | 841.6 | 842.8 | 844.1 | 844.6 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 840.8 | 840.4 | 839.5 | 842.5 | 845.2 | 847.5 | 849.1 | 849.9 | 847.3 | 842.6 | 841.2 | 842.1 | 843.5 | 844.6 | 845.3 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 841.0 | 840.7 | 840.0 | 844.1 | 847.0 | 849.2 | 851.6 | 857.6 | 851.1 | 848.5 | 845.4 | 842.3 | 844.3 | 845.7 | 846.7 | 847.8 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 841.0 | 840.7 | 841.0 | 845.5 | 848.0 | 849.6 | 850.7 | 852.0 | 851.4 | 854.6 | 847.7 | 843.3 | 845.3 | 846.9 | 848.0 | 848.6 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 840.8 | 840.3 | 844.0 | 847.0 | 848.6 | 849.3 | 848.6 | 846.1 | 846.9 | 847.1 | 846.9 | 843.7 | 846.4 | 848.2 | 849.2 | 849.7 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 841.2 | 840.9 | 845.4 | 847.9 | 848.9 | 848.5 | 846.2 | 840.2 | 840.3 | 846.4 | 847.1 | 844.3 | 847.6 | 849.5 | 850.6 | 851.0 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 841.7 | 842.3 | 846.8 | 848.7 | 848.7 | 847.0 | 842.8 | 836.4 | 844.1 | 847.2 | 847.4 | 845.6 | 849.1 | 851.1 | 851.9 | 852.1 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 | 0.0 | 847.2 | 848.6 | 848.9 | 847.5 | 843.0 | 832.4 | 841.8 | 846.6 | 847.2 | 845.9 | 848.3 | 851.0 | 852.5 | 852.9 | 852.8 | 0.0 | 0.0 |
| 19 | 0.0 | 0.0 | 0.0 | 849.2 | 849.1 | 847.8 | 843.8 | 836.5 | 829.5 | 843.4 | 847.3 | 844.5 | 847.6 | 850.3 | 852.4 | 853.6 | 853.7 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | 849.5 | 848.0 | 844.1 | 836.1 | 825.4 | 840.8 | 847.2 | 848.5 | 844.7 | 848.9 | 851.7 | 853.5 | 854.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 0.0 | 0.0 | 0.0 | 848.4 | 844.5 | 834.8 | 822.4 | 840.8 | 848.8 | 851.2 | 849.1 | 845.8 | 850.2 | 852.9 | 854.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 0.0 | 0.0 | 0.0 | 846.6 | 833.4 | 819.4 | 833.5 | 848.0 | 853.3 | 852.7 | 845.8 | 848.4 | 851.5 | 853.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 815.3 | 830.3 | 840.5 | 852.1 | 855.6 | 854.1 | 844.8 | 849.8 | 852.0 | 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 | 838.9 | 849.0 | 855.1 | 857.0 | 854.9 | 845.0 | 850.5 | 852.6 | 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 |
| 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 |

STARTING HEAD MATRIX, LAYER 3

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 955.0 | 954.9 | 954.7 | 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 |
| 4 | 0.0 | 0.0 | 0.0 | 954.8 | 954.5 | 954.0 | 953.3 | 952.9 | 952.8 | 953.6 | 954.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 954.9 | 954.6 | 954.1 | 953.2 | 952.1 | 951.0 | 950.6 | 951.4 | 953.2 | 954.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 955.0 | 954.6 | 953.7 | 952.2 | 949.9 | 947.0 | 922.3 | 923.3 | 950.3 | 953.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 955.0 | 954.4 | 953.2 | 950.8 | 946.7 | 920.3 | 0.0 | 0.0 | 927.9 | 951.8 | 952.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 954.0 | 952.5 | 949.4 | 921.3 | 0.0 | 0.0 | 0.0 | 927.2 | 949.1 | 950.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 953.3 | 951.4 | 947.5 | 920.4 | 0.0 | 0.0 | 0.0 | 0.0 | 923.1 | 947.6 | 948.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 953.8 | 952.5 | 949.6 | 922.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 920.3 | 945.2 | 946.6 | 946.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 953.2 | 951.5 | 947.5 | 920.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 917.3 | 941.9 | 944.2 | 945.3 | 945.6 | 945.8 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 952.6 | 950.4 | 922.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 914.8 | 915.2 | 940.2 | 943.4 | 944.6 | 944.9 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 952.0 | 949.8 | 922.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 913.3 | 940.8 | 942.9 | 943.3 | 942.8 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 951.2 | 948.3 | 923.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 910.4 | 939.2 | 941.3 | 941.9 | 941.9 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 950.2 | 925.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 908.4 | 937.7 | 939.8 | 940.5 | 940.7 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 950.6 | 926.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 907.4 | 936.3 | 938.3 | 939.2 | 939.6 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 950.8 | 926.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 907.2 | 934.9 | 937.0 | 938.1 | 938.7 | 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 | 908.0 | 931.7 | 934.9 | 936.4 | 937.4 | 938.2 | 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 | 909.2 | 932.4 | 934.4 | 935.6 | 936.3 | 936.9 | 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 | 910.3 | 934.5 | 935.8 | 936.1 | 936.2 | 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 | 912.0 | 935.6 | 936.6 | 936.5 | 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 | 912.2 | 935.2 | 937.2 | 937.4 | 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 | 913.2 | 937.1 | 938.4 | 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 | 913.3 | 937.8 | 939.0 | 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 |
| 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 |

STORAGE COEFFICIENT MATRIX, LAYER 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 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 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 |
| 19 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | 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 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 | -0.100E+01 |
| | -0.100E+01 | -0.100E+01 | -0.100E+01 | 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 |
| 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 |

STORAGE COEFFICIENT = .0 FOR LAYER 2

STORAGE COEFFICIENT = .0 FOR LAYER 3

TRANSMISSIVITY MATRIX, LAYER 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 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 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 |
| 19 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 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 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 | 0.300E-03 |
| | 0.300E-03 | 0.300E-03 | 0.300E-03 | 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 |
| 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 |

DIRECTIONAL TRANSMISSIVITY MULTIPLICATION FACTORS FOR LAYER 1

X = 1.000000
Y = 1.000000
Z = .0

TRANSMISSIVITY MATRIX, LAYER 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 0.140E-04 | 0.140E-04 | 0.140E-04 | 0.0 | 0.0 | 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 | 0.140E-04 | 0.140E-04 | 0.140E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 |
| | 0.120E-04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 0.140E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 |
| | 0.120E-04 | 0.120E-04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.100E-04 | 0.100E-04 |
| | 0.100E-04 | 0.120E-04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.120E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 |
| | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 0.120E-04 | 0.120E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 |
| | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 0.120E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 |
| | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 0.120E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.800E-05 | 0.800E-05 |
| | 0.800E-05 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.800E-05 | 0.800E-05 | 0.800E-05 |
| | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 |
| | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.100E-04 | 0.100E-04 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 0.100E-04 | 0.100E-04 | 0.100E-04 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.600E-05 |
| | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.100E-04 | 0.100E-04 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 0.100E-04 | 0.100E-04 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.600E-05 | 0.600E-05 |
| | 0.600E-05 | 0.600E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.100E-04 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 0.100E-04 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 |
| | 0.600E-05 | 0.600E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 |
| | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 0.800E-05 | 0.800E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.400E-05 | 0.400E-05 |
| | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 | 0.0 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.400E-05 |
| | 0.400E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.800E-05 | 0.800E-05 | 0.800E-05 | 0.0 | 0.0 |
| 19 | 0.0 | 0.0 | 0.0 | 0.600E-05 | 0.600E-05 | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.400E-05 |
| | 0.400E-05 | 0.400E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.200E-05 | 0.400E-05 | 0.400E-05 |
| | 0.400E-05 | 0.400E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.600E-05 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 0.0 | 0.0 | 0.0 | 0.400E-05 | 0.400E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 |
| | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.600E-05 | 0.600E-05 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 0.0 | 0.0 | 0.0 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 |
| | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.400E-05 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 |
| | 0.200E-05 | 0.400E-05 | 0.400E-05 | 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 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 | 0.200E-05 |
| | 0.200E-05 | 0.400E-05 | 0.400E-05 | 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 |
| 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 |

DIRECTIONAL TRANSMISSIVITY MULTIPLICATION FACTORS FOR LAYER 2
X = 1.000000
Y = 1.000000
Z = .0

TRANSMISSIVITY = .0 FOR LAYER 3

DIRECTIONAL TRANSMISSIVITY MULTIPLICATION FACTORS FOR LAYER 3
X = 1.000000
Y = 1.000000
Z = .0

TK MATRIX, LAYER 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 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 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 19 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 |
| 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 |

TK MATRIX, LAYER 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 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 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 |
| | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 |
| | 0.550E-09 | 0.550E-09 | 0.550E-09 | 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 |
| 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 |

HYDRAULIC CONDUCTIVITY MATRIX, LAYER 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 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 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 |
| | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 |
| | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 |
| | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 |
| | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 |
| | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 |
| | 0.200E-06 | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 |
| | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 |
| | 0.200E-06 | 0.200E-06 | 0.200E-06 | 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 |
| 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 |

BOTTOM ELEVATION MATRIX, LAYER 3

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 3 | 0.0 | 0.0 | 0.0 | 919.0 | 919.0 | 919.0 | 0.0 | 0.0 | 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 | 918.0 | 918.0 | 918.0 | 919.0 | 920.0 | 920.0 | 923.0 | 923.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 918.0 | 918.0 | 918.0 | 917.0 | 918.0 | 918.0 | 919.0 | 921.0 | 922.0 | 925.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 | 919.0 | 919.0 | 919.0 | 918.0 | 917.0 | 918.0 | 919.0 | 920.0 | 923.0 | 927.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.0 | 0.0 | 920.0 | 920.0 | 920.0 | 918.0 | 917.0 | 917.0 | 0.0 | 0.0 | 925.0 | 926.0 | 924.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 0.0 | 0.0 | 0.0 | 922.0 | 921.0 | 920.0 | 918.0 | 0.0 | 0.0 | 0.0 | 925.0 | 923.0 | 922.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | 0.0 | 0.0 | 0.0 | 922.0 | 921.0 | 920.0 | 918.0 | 0.0 | 0.0 | 0.0 | 0.0 | 920.0 | 920.0 | 917.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | 0.0 | 0.0 | 922.0 | 921.0 | 920.0 | 919.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 918.0 | 917.0 | 915.0 | 915.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 | 921.0 | 921.0 | 919.0 | 918.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 915.0 | 914.0 | 914.0 | 912.0 | 912.0 | 912.0 | 0.0 | 0.0 | 0.0 |
| 12 | 0.0 | 0.0 | 922.0 | 921.0 | 919.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 913.0 | 912.0 | 912.0 | 913.0 | 912.0 | 911.0 | 0.0 | 0.0 | 0.0 |
| 13 | 0.0 | 0.0 | 922.0 | 920.0 | 920.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 910.0 | 910.0 | 910.0 | 909.0 | 907.0 | 0.0 | 0.0 |
| 14 | 0.0 | 0.0 | 922.0 | 922.0 | 921.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 908.0 | 908.0 | 908.0 | 907.0 | 905.0 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 923.0 | 922.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 906.0 | 907.0 | 906.0 | 905.0 | 904.0 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 924.0 | 924.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 905.0 | 905.0 | 904.0 | 903.0 | 903.0 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 924.0 | 924.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 904.0 | 902.0 | 900.0 | 901.0 | 902.0 | 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 | 905.0 | 903.0 | 900.0 | 899.0 | 900.0 | 902.0 | 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 | 907.0 | 906.0 | 903.0 | 900.0 | 899.0 | 900.0 | 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 | 908.0 | 906.0 | 903.0 | 900.0 | 899.0 | 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 | 909.0 | 906.0 | 903.0 | 900.0 | 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 | 910.0 | 909.0 | 906.0 | 903.0 | 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 | 911.0 | 909.0 | 907.0 | 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 | 911.0 | 909.0 | 907.0 | 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 |
| 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 |

RECHARGE RATE = .0 FOR LAYER 1

RECHARGE RATE MATRIX, LAYER 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.187E-07 | 0.187E-07 |
| | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 0.187E-07 | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 15 | 0.0 | 0.0 | 0.0 | 0.0 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 16 | 0.0 | 0.0 | 0.0 | 0.0 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17 | 0.0 | 0.0 | 0.0 | 0.0 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 | 0.0 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 0.187E-07 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19 | 0.0 | 0.0 | 0.0 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 0.187E-07 | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 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 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 | 0.187E-07 |
| | 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 |
| 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 |

RECHARGE RATE = .1870000E-07 FOR LAYER 3

DELX = 100.0000

DELY = 100.0000

DELZ = 1.000000

SPRING COEFFICIENT FACTOR= 0.1000000E-07

SPRING COEFFICIENT VALUES

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | | | | | | | | |

SPRING ELEVATIONS

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 919. | 920. | 917. | 925. | 918. | 925. | 918. | 920. | 919. | 918. | 918. | 915. | 919. | 913. | 912. | 920. | 910. | 921. | 908. | 922. |
| 906. | 924. | 905. | 924. | 904. | 905. | 907. | 908. | 909. | 910. | 911. | 911. | | | | | | | | |

RIVER ELEVATIONS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 858. | 852. | 855. | 846. | 847. | 840. | 840. | 836. | 832. | 829. | 825. | 822. | 819. | 815. |

RIVER BED ELEVATIONS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 857. | 851. | 854. | 845. | 846. | 839. | 839. | 835. | 831. | 828. | 824. | 821. | 818. | 814. |

RIVER COEFFICIENT FACTOR= 0.1000000E-06

RIVER COEFFICIENT VALUES

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |

SOLUTION BY THE STRONGLY IMPLICIT PROCEDURE

10 ITERATION PARAMETERS: 0.0 0.5206823D+00 0.7702546D+00 0.8898789D+00 0.9472170D+00 0.9747002D+00
0.9878734D+00 0.9941875D+00 0.9972140D+00 0.9986646D+00

PUMPING PERIOD NO. 1: 1.00 DAYS

NUMBER OF TIME STEPS= 1

DELT IN HOURS = 24.000

MULTIPLIER FOR DELT = 1.000

0 WELLS

| K | I | J | PUMPING RATE |
|---|---|---|---|

NODE WITH MAXIMUM HEAD CHANGE FOR EACH ITERATION

| I | J | K | HEAD CHANGE |
|---|---|---|---|
| 21 | 8 | 2 | 4.280716 |
| 6 | 11 | 3 | 1.462394 |
| 24 | 12 | 3 | -.5083362 |
| 22 | 14 | 3 | -.2032576 |
| 17 | 17 | 3 | .1527373 |
| 19 | 17 | 3 | .7590914E-01 |
| 3 | 6 | 3 | .3194113E-01 |
| 22 | 12 | 3 | .9521123E-02 |
| 15 | 18 | 3 | .9941049E-02 |
| 4 | 9 | 3 | -.2845562E-02 |
| 4 | 11 | 3 | .3730713E-02 |
| 16 | 17 | 3 | -.1351943E-02 |
| 15 | 18 | 2 | -.6476056E-03 |

```
-----------------------------------------------------------
|              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                    RATES FOR THIS TIME STEP:                L**3/T
------------------------                                        -------------------------

        SOURCES:                                                                STORAGE =               0.0
        --------                                                               RECHARGE =               0.0501
               STORAGE =                0.0                                  CONSTANT FLUX =               0.0
              RECHARGE =             4329.99                                      PUMPING =               0.0
          CONSTANT FLUX =                0.0                                 RIVER LEAKAGE =              -0.0016
          CONSTANT HEAD =                0.0                                CONSTANT HEAD:
                 LEAKAGE =               0.0                                           IN =               0.0
          TOTAL SOURCES =             4329.99                                          OUT =              -0.0419
                                                                                   LEAKAGE:
        DISCHARGES:                                                   FROM PREVIOUS PUMPING PERIOD =      -0.0085
        -----------                                                                   TOTAL =              -0.0066
          RIVER LEAKAGE =              134.40
          CONSTANT HEAD =             3622.53                                   SUM OF RATES =               0.0000
       QUANTITY PUMPED =                 0.0
               LEAKAGE =              572.91
       TOTAL DISCHARGE =             4329.84

     DISCHARGE-SOURCES =               -0.15
   PER CENT DIFFERENCE =               -0.00


RATES OF COMPONENTS FOR EACH LAYER IN L**3/T
LAYER  1  CHOUT=-.41927E-01  CHIN= .0          QRE= .0          PMP= .0          CFLUX= .0          STOR= .0
          RIVER= .0          SPRING= .0
LAYER  2  CHOUT= .0          CHIN= .0          QRE= .22253E-01  PMP= .0          CFLUX= .0          STOR= .0
          RIVER=-.15556E-02  SPRING= .0
LAYER  3  CHOUT= .0          CHIN= .0          QRE= .27863E-01  PMP= .0          CFLUX= .0          STOR= .0
          RIVER= .0          SPRING=-.66309E-02
```

FLOW RATES TO CONSTANT HEAD NODES:

| K | I | J | RATE (L**3/T) | K | I | J | RATE (L**3/T) | K | I | J | RATE (L**3/T) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 4 | -.1934449E-03 | 1 | 3 | 5 | -.1885492E-03 | 1 | 3 | 6 | -.1883624E-03 |
| 1 | 4 | 4 | -.1907275E-03 | 1 | 4 | 5 | -.1853644E-03 | 1 | 4 | 6 | -.1841997E-03 |
| 1 | 4 | 7 | -.1809365E-03 | 1 | 4 | 8 | -.1763617E-03 | 1 | 4 | 9 | -.1725069E-03 |
| 1 | 4 | 10 | -.1698059E-03 | 1 | 4 | 11 | -.1707240E-03 | 1 | 5 | 3 | -.1898340E-03 |
| 1 | 5 | 4 | -.1834504E-03 | 1 | 5 | 5 | -.1825281E-03 | 1 | 5 | 6 | -.1806379E-03 |
| 1 | 5 | 7 | -.1756208E-03 | 1 | 5 | 8 | -.1688607E-03 | 1 | 5 | 9 | -.1614738E-03 |
| 1 | 5 | 10 | -.1591222E-03 | 1 | 5 | 11 | -.1628227E-03 | 1 | 5 | 12 | -.1641227E-03 |
| 1 | 6 | 3 | -.1853917E-03 | 1 | 6 | 4 | -.1849338E-03 | 1 | 6 | 5 | -.1785034E-03 |
| 1 | 6 | 6 | -.1703244E-03 | 1 | 6 | 7 | -.1628250E-03 | 1 | 6 | 8 | -.1502339E-03 |
| 1 | 6 | 9 | -.1301160E-03 | 1 | 6 | 10 | -.1276160E-03 | 1 | 6 | 11 | -.1484143E-03 |
| 1 | 6 | 12 | -.1553897E-03 | 1 | 7 | 3 | -.1810223E-03 | 1 | 7 | 4 | -.1809908E-03 |
| 1 | 7 | 5 | -.1739053E-03 | 1 | 7 | 6 | -.1587116E-03 | 1 | 7 | 7 | -.1513482E-03 |
| 1 | 7 | 8 | -.1338889E-03 | 1 | 7 | 9 | -.1477761E-03 | 1 | 7 | 10 | -.1397966E-03 |
| 1 | 7 | 11 | -.1196686E-03 | 1 | 7 | 12 | -.1445326E-03 | 1 | 7 | 13 | -.1599427E-03 |
| 1 | 8 | 4 | -.1720018E-03 | 1 | 8 | 5 | -.1637058E-03 | 1 | 8 | 6 | -.1493306E-03 |
| 1 | 8 | 7 | -.1264487E-03 | 1 | 8 | 8 | -.1466035E-03 | 1 | 8 | 9 | -.1547296E-03 |
| 1 | 8 | 10 | -.1491638E-03 | 1 | 8 | 11 | -.1216261E-03 | 1 | 8 | 12 | -.1402037E-03 |
| 1 | 8 | 13 | -.1518148E-03 | 1 | 9 | 4 | -.1639911E-03 | 1 | 9 | 5 | -.1587541E-03 |
| 1 | 9 | 6 | -.1416187E-03 | 1 | 9 | 7 | -.1268044E-03 | 1 | 9 | 8 | -.1546287E-03 |
| 1 | 9 | 9 | -.1631262E-03 | 1 | 9 | 10 | -.1596932E-03 | 1 | 9 | 11 | -.1439594E-03 |
| 1 | 9 | 12 | -.1249008E-03 | 1 | 9 | 13 | -.1491171E-03 | 1 | 9 | 14 | -.1628145E-03 |
| 1 | 10 | 3 | -.1715398E-03 | 1 | 10 | 4 | -.1665958E-03 | 1 | 10 | 5 | -.1515234E-03 |
| 1 | 10 | 6 | -.1247245E-03 | 1 | 10 | 7 | -.1482629E-03 | 1 | 10 | 8 | -.1641765E-03 |
| 1 | 10 | 9 | -.1664096E-03 | 1 | 10 | 10 | -.1636687E-03 | 1 | 10 | 11 | -.1475685E-03 |
| 1 | 10 | 12 | -.1173043E-03 | 1 | 10 | 13 | -.1425128E-03 | 1 | 10 | 14 | -.1621855E-03 |
| 1 | 10 | 15 | -.1746987E-03 | 1 | 11 | 3 | -.1675336E-03 | 1 | 11 | 4 | -.1614257E-03 |
| 1 | 11 | 5 | -.1443204E-03 | 1 | 11 | 6 | -.1303431E-03 | 1 | 11 | 7 | -.1560407E-03 |
| 1 | 11 | 8 | -.1716529E-03 | 1 | 11 | 9 | -.1739572E-03 | 1 | 11 | 10 | -.1721273E-03 |
| 1 | 11 | 11 | -.1548292E-03 | 1 | 11 | 12 | -.1174154E-03 | 1 | 11 | 13 | -.1391354E-03 |
| 1 | 11 | 14 | -.1588353E-03 | 1 | 11 | 15 | -.1688305E-03 | 1 | 11 | 16 | -.1796008E-03 |
| 1 | 11 | 17 | -.1863312E-03 | 1 | 12 | 3 | -.1619653E-03 | 1 | 12 | 4 | -.1485342E-03 |
| 1 | 12 | 5 | -.1255568E-03 | 1 | 12 | 6 | -.1454593E-03 | 1 | 12 | 7 | -.1658073E-03 |
| 1 | 12 | 8 | -.1740625E-03 | 1 | 12 | 9 | -.1821719E-03 | 1 | 12 | 10 | -.1858290E-03 |
| 1 | 12 | 11 | -.1655883E-03 | 1 | 12 | 12 | -.1212973E-03 | 1 | 12 | 13 | -.1171030E-03 |
| 1 | 12 | 14 | -.1438426E-03 | 1 | 12 | 15 | -.1587781E-03 | 1 | 12 | 16 | -.1763623E-03 |
| 1 | 12 | 17 | -.1845307E-03 | 1 | 13 | 3 | -.1566931E-03 | 1 | 13 | 4 | -.1431161E-03 |
| 1 | 13 | 5 | -.1206632E-03 | 1 | 13 | 6 | -.1518662E-03 | 1 | 13 | 7 | -.1715540E-03 |
| 1 | 13 | 8 | -.1787235E-03 | 1 | 13 | 9 | -.1915195E-03 | 1 | 13 | 10 | -.2296725E-03 |
| 1 | 13 | 11 | -.1856772E-03 | 1 | 13 | 12 | -.1672513E-03 | 1 | 13 | 13 | -.1471898E-03 |
| 1 | 13 | 14 | -.1237481E-03 | 1 | 13 | 15 | -.1533187E-03 | 1 | 13 | 16 | -.1705333E-03 |
| 1 | 13 | 17 | -.1812566E-03 | 1 | 13 | 18 | -.1865277E-03 | 1 | 14 | 3 | -.1495281E-03 |
| 1 | 14 | 4 | -.1397588E-03 | 1 | 14 | 5 | -.1217874E-03 | 1 | 14 | 6 | -.1565352E-03 |
| 1 | 14 | 7 | -.1736997E-03 | 1 | 14 | 8 | -.1775677E-03 | 1 | 14 | 9 | -.1837425E-03 |
| 1 | 14 | 10 | -.1923779E-03 | 1 | 14 | 11 | -.1864714E-03 | 1 | 14 | 12 | -.2078491E-03 |
| 1 | 14 | 13 | -.1587871E-03 | 1 | 14 | 14 | -.1162712E-03 | 1 | 14 | 15 | -.1520283E-03 |
| 1 | 14 | 16 | -.1711336E-03 | 1 | 14 | 17 | -.1775605E-03 | 1 | 14 | 18 | -.1861874E-03 |
| 1 | 15 | 3 | -.1444036E-03 | 1 | 15 | 4 | -.1187137E-03 | 1 | 15 | 5 | -.1458348E-03 |
| 1 | 15 | 6 | -.1633430E-03 | 1 | 15 | 7 | -.1744980E-03 | 1 | 15 | 8 | -.1743251E-03 |
| 1 | 15 | 9 | -.1710755E-03 | 1 | 15 | 10 | -.1543167E-03 | 1 | 15 | 11 | -.1603958E-03 |
| 1 | 15 | 12 | -.1598494E-03 | 1 | 15 | 13 | -.1514507E-03 | 1 | 15 | 14 | -.1139589E-03 |
| 1 | 15 | 15 | -.1471060E-03 | 1 | 15 | 16 | -.1677689E-03 | 1 | 15 | 17 | -.1843293E-03 |
| 1 | 15 | 18 | -.1866169E-03 | 1 | 16 | 3 | -.1393026E-03 | 1 | 16 | 4 | -.1141087E-03 |
| 1 | 16 | 5 | -.1511939E-03 | 1 | 16 | 6 | -.1657397E-03 | 1 | 16 | 7 | -.1740055E-03 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 8 | -.1691238E-03 | 1 | 16 | 9 | -.1518204E-03 | 1 | 16 | 10 | -.1107595E-03 |
| 1 | 16 | 11 | -.1110585E-03 | 1 | 16 | 12 | -.1488841E-03 | 1 | 16 | 13 | -.1451365E-03 |
| 1 | 16 | 14 | -.1069004E-03 | 1 | 16 | 15 | -.1500430E-03 | 1 | 16 | 16 | -.1708115E-03 |
| 1 | 16 | 17 | -.1770261E-03 | 1 | 16 | 18 | -.1880884E-03 | 1 | 17 | 3 | -.1422081E-03 |
| 1 | 17 | 4 | -.1237617E-03 | 1 | 17 | 5 | -.1559395E-03 | 1 | 17 | 6 | -.1675208E-03 |
| 1 | 17 | 7 | -.1711449E-03 | 1 | 17 | 8 | -.1599579E-03 | 1 | 17 | 9 | -.1322634E-03 |
| 1 | 17 | 10 | -.8380039E-04 | 1 | 17 | 11 | -.1365595E-03 | 1 | 17 | 12 | -.1500525E-03 |
| 1 | 17 | 13 | -.1411049E-03 | 1 | 17 | 14 | -.1126657E-03 | 1 | 17 | 15 | -.1556179E-03 |
| 1 | 17 | 16 | -.1756872E-03 | 1 | 17 | 17 | -.1796388E-03 | 1 | 17 | 18 | -.1842314E-03 |
| 1 | 18 | 4 | -.1673222E-03 | 1 | 18 | 5 | -.1659414E-03 | 1 | 18 | 6 | -.1714433E-03 |
| 1 | 18 | 7 | -.1624156E-03 | 1 | 18 | 8 | -.1339755E-03 | 1 | 18 | 9 | -.6196198E-04 |
| 1 | 18 | 10 | -.1295957E-03 | 1 | 18 | 11 | -.1479070E-03 | 1 | 18 | 12 | -.1397930E-03 |
| 1 | 18 | 13 | -.1144944E-03 | 1 | 18 | 14 | -.1448661E-03 | 1 | 18 | 15 | -.1658214E-03 |
| 1 | 18 | 16 | -.1794103E-03 | 1 | 18 | 17 | -.1851814E-03 | 1 | 18 | 18 | -.1826755E-03 |
| 1 | 19 | 4 | -.1784484E-03 | 1 | 19 | 5 | -.1717567E-03 | 1 | 19 | 6 | -.1634265E-03 |
| 1 | 19 | 7 | -.1379437E-03 | 1 | 19 | 8 | -.2010614E-03 | 1 | 19 | 9 | -.4024246E-04 |
| 1 | 19 | 10 | -.1347827E-03 | 1 | 19 | 11 | -.1479191E-03 | 1 | 19 | 12 | -.1032614E-03 |
| 1 | 19 | 13 | -.1371832E-03 | 1 | 19 | 14 | -.1581054E-03 | 1 | 19 | 15 | -.1764817E-03 |
| 1 | 19 | 16 | -.1810959E-03 | 1 | 19 | 17 | -.1845620E-03 | 1 | 20 | 4 | -.1785470E-03 |
| 1 | 20 | 5 | -.1642751E-03 | 1 | 20 | 6 | -.1445791E-03 | 1 | 20 | 7 | -.1994188E-03 |
| 1 | 20 | 8 | -.1385968E-03 | 1 | 20 | 9 | -.1181788E-03 | 1 | 20 | 10 | -.1550748E-03 |
| 1 | 20 | 11 | -.1464892E-03 | 1 | 20 | 12 | -.9577749E-04 | 1 | 20 | 13 | -.1429901E-03 |
| 1 | 20 | 14 | -.1641137E-03 | 1 | 20 | 15 | -.1789856E-03 | 1 | 20 | 16 | -.1856878E-03 |
| 1 | 21 | 4 | -.1714144E-03 | 1 | 21 | 5 | -.1470745E-03 | 1 | 21 | 6 | -.1920118E-03 |
| 1 | 21 | 7 | -.1220767E-03 | 1 | 21 | 8 | -.1271053E-03 | 1 | 21 | 9 | -.1603779E-03 |
| 1 | 21 | 10 | -.1658898E-03 | 1 | 21 | 11 | -.1424831E-03 | 1 | 21 | 12 | -.9785038E-04 |
| 1 | 21 | 13 | -.1484292E-03 | 1 | 21 | 14 | -.1677787E-03 | 1 | 21 | 15 | -.1793973E-03 |
| 1 | 22 | 4 | -.1595802E-03 | 1 | 22 | 5 | -.1857303E-03 | 1 | 22 | 6 | -.1055557E-03 |
| 1 | 22 | 7 | -.1829311E-03 | 1 | 22 | 8 | -.1536592E-03 | 1 | 22 | 9 | -.1711930E-03 |
| 1 | 22 | 10 | -.1608109E-03 | 1 | 22 | 11 | -.9529428E-04 | 1 | 22 | 12 | -.1338812E-03 |
| 1 | 22 | 13 | -.1613770E-03 | 1 | 22 | 14 | -.1736554E-03 | 1 | 23 | 5 | -.8343795E-04 |
| 1 | 23 | 6 | -.1655923E-03 | 1 | 23 | 7 | -.2127433E-03 | 1 | 23 | 8 | -.1627203E-03 |
| 1 | 23 | 9 | -.1774548E-03 | 1 | 23 | 10 | -.1606856E-03 | 1 | 23 | 11 | -.7823674E-04 |
| 1 | 23 | 12 | -.1427634E-03 | 1 | 23 | 13 | -.1629119E-03 | 1 | 24 | 6 | -.2017612E-03 |
| 1 | 24 | 7 | -.1465233E-03 | 1 | 24 | 8 | -.1722548E-03 | 1 | 24 | 9 | -.1779713E-03 |
| 1 | 24 | 10 | -.1593752E-03 | 1 | 24 | 11 | -.7450042E-04 | 1 | 24 | 12 | -.1436197E-03 |
| 1 | 24 | 13 | -.1629941E-03 | | | | | | | | |

FLOW TO TOP LAYER = -.2123117E-01 FLOW TO BOTTOM LAYER = -.4192745E-01 POSITIVE UPWARD

SPRING FLOW RECHARGING SECOND LAYER

| | I | J | RATE |
|---|---|---|---|
| SPRING | 6 | 9 | 0.1227043E-04 |
| SPRING | 6 | 10 | 0.1243621E-04 |
| SPRING | 7 | 8 | 0.1226714E-04 |
| SPRING | 7 | 11 | 0.1204115E-04 |
| SPRING | 8 | 7 | 0.1228184E-04 |
| SPRING | 8 | 11 | 0.1073256E-04 |
| SPRING | 9 | 7 | 0.1091105E-04 |
| SPRING | 9 | 12 | 0.1220704E-04 |
| SPRING | 10 | 6 | 0.1226981E-04 |
| SPRING | 10 | 12 | 0.1078941E-04 |
| SPRING | 11 | 6 | 0.1093855E-04 |
| SPRING | 11 | 12 | 0.1082445E-04 |
| SPRING | 12 | 5 | 0.1237496E-04 |
| SPRING | 12 | 12 | 0.9778977E-05 |
| SPRING | 12 | 13 | 0.1229773E-04 |
| SPRING | 13 | 5 | 0.1091807E-04 |
| SPRING | 13 | 14 | 0.1228532E-04 |
| SPRING | 14 | 5 | 0.1081635E-04 |
| SPRING | 14 | 14 | 0.1090640E-04 |
| SPRING | 15 | 4 | 0.1220912E-04 |
| SPRING | 15 | 14 | 0.1093260E-04 |
| SPRING | 16 | 4 | 0.1078162E-04 |
| SPRING | 16 | 14 | 0.1088084E-04 |
| SPRING | 17 | 4 | 0.1083003E-04 |
| SPRING | 17 | 14 | 0.1210849E-04 |
| SPRING | 18 | 13 | 0.1198201E-04 |
| SPRING | 19 | 12 | 0.1073923E-04 |
| SPRING | 20 | 12 | 0.1074184E-04 |

```
 SPRING          21          12  0.1190853E-04

 SPRING          22          11  0.1074951E-04

 SPRING          23          11  0.1072385E-04

 SPRING          24          11  0.1076490E-04

    TOTAL SPRING LKAGE RCHRG 2ND LAYER   0.3646982E-03


MAXIMUM HEAD CHANGE FOR EACH ITERATION:
---------------------------------------

      4.2807      1.4624      0.5083      0.2033      0.1527      0.0759      0.0319      0.0095      0.0099      0.0028

      0.0037      0.0014      0.0006

TIME STEP :  1
----------

ITERATIONS: 12
----------
```

HEAD MATRIX, LAYER 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 | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | |
| 3 | 0.0 | 0.0 | 0.0 | 802.00 | 803.00 | 803.00 | 0.0 | 0.0 | 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 | 803.00 | 804.00 | 804.00 | 804.00 | 804.00 | 804.00 | 804.00 | 804.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 5 | 0.0 | 0.0 | 804.00 | 805.00 | 805.00 | 805.00 | 805.00 | 805.00 | 805.00 | 805.00 | 805.00 | 805.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 6 | 0.0 | 0.0 | 805.00 | 805.00 | 806.00 | 807.00 | 807.00 | 807.00 | 807.00 | 807.00 | 806.00 | 806.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 7 | 0.0 | 0.0 | 806.00 | 806.00 | 807.00 | 809.00 | 808.00 | 808.00 | 808.00 | 809.00 | 809.00 | 808.00 | 807.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 8 | 0.0 | 0.0 | 0.0 | 808.00 | 809.00 | 810.00 | 810.00 | 810.00 | 810.00 | 810.00 | 810.00 | 809.00 | 809.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 9 | 0.0 | 0.0 | 0.0 | 810.00 | 810.00 | 811.00 | 811.00 | 811.00 | 811.00 | 811.00 | 811.00 | 810.00 | 810.00 | 810.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 10 | 0.0 | 0.0 | 810.00 | 810.00 | 811.00 | 812.00 | 812.00 | 812.00 | 813.00 | 813.00 | 813.00 | 812.00 | 812.00 | 811.00 | 810.00 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 11 | 0.0 | 0.0 | 811.00 | 811.00 | 812.00 | 812.00 | 813.00 | 813.00 | 814.00 | 814.00 | 814.00 | 813.00 | 813.00 | 812.00 | 812.00 | 811.00 | 810.00 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 12 | 0.0 | 0.0 | 812.00 | 813.00 | 813.00 | 814.00 | 814.00 | 815.00 | 815.00 | 815.00 | 815.00 | 815.00 | 815.00 | 814.00 | 814.00 | 812.00 | 811.00 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 13 | 0.0 | 0.0 | 813.00 | 814.00 | 814.00 | 815.00 | 815.00 | 816.00 | 816.00 | 816.00 | 816.00 | 816.00 | 816.00 | 815.00 | 815.00 | 814.00 | 813.00 | 813.00 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 14 | 0.0 | 0.0 | 814.00 | 814.00 | 815.00 | 816.00 | 816.00 | 817.00 | 817.00 | 817.00 | 817.00 | 817.00 | 817.00 | 817.00 | 816.00 | 815.00 | 815.00 | 814.00 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 15 | 0.0 | 0.0 | 814.00 | 815.00 | 816.00 | 817.00 | 817.00 | 818.00 | 818.00 | 818.00 | 818.00 | 818.00 | 818.00 | 818.00 | 818.00 | 817.00 | 815.00 | 815.00 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 16 | 0.0 | 0.0 | 815.00 | 816.00 | 817.00 | 818.00 | 818.00 | 819.00 | 820.00 | 820.00 | 820.00 | 820.00 | 820.00 | 820.00 | 819.00 | 818.00 | 818.00 | 816.00 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 17 | 0.0 | 0.0 | 815.00 | 816.00 | 818.00 | 819.00 | 819.00 | 820.00 | 821.00 | 821.00 | 821.00 | 821.00 | 821.00 | 821.00 | 820.00 | 819.00 | 819.00 | 818.00 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 18 | 0.0 | 0.0 | 0.0 | 816.00 | 819.00 | 819.00 | 820.00 | 821.00 | 821.00 | 821.00 | 822.00 | 822.00 | 822.00 | 821.00 | 821.00 | 820.00 | 819.00 | 819.00 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 19 | 0.0 | 0.0 | 0.0 | 817.00 | 819.00 | 820.00 | 821.00 | 800.00 | 822.00 | 822.00 | 822.00 | 822.00 | 822.00 | 822.00 | 821.00 | 821.00 | 820.00 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |

HEAD MATRIX, LAYER 2

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | |
| 3 | 0.0 | 0.0 | 0.0 | 837.17 | 837.28 | 837.25 | 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 | | | | | | | | | | | | | | | | |
| 4 | 0.0 | 0.0 | 0.0 | 837.68 | 837.70 | 837.49 | 836.90 | 836.07 | 835.36 | 834.87 | 835.04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 5 | 0.0 | 0.0 | 838.52 | 838.35 | 838.19 | 837.84 | 836.93 | 835.70 | 834.36 | 833.93 | 834.60 | 834.84 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 6 | 0.0 | 0.0 | 838.71 | 838.62 | 838.46 | 837.97 | 836.60 | 834.32 | 830.66 | 830.20 | 832.98 | 834.25 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 7 | 0.0 | 0.0 | 838.91 | 838.91 | 838.62 | 837.86 | 835.52 | 832.34 | 834.87 | 834.42 | 830.76 | 834.28 | 836.08 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 8 | 0.0 | 0.0 | 0.0 | 839.27 | 838.76 | 837.15 | 832.99 | 836.66 | 838.13 | 837.12 | 832.11 | 834.49 | 836.60 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 9 | 0.0 | 0.0 | 0.0 | 839.82 | 838.86 | 836.75 | 834.06 | 839.11 | 840.66 | 840.04 | 837.17 | 832.71 | 837.11 | 839.60 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 10 | 0.0 | 0.0 | 841.19 | 840.29 | 838.55 | 834.68 | 838.96 | 841.85 | 843.26 | 842.76 | 839.83 | 833.33 | 837.91 | 840.49 | 841.76 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 11 | 0.0 | 0.0 | 841.46 | 840.35 | 838.24 | 835.70 | 841.37 | 844.21 | 845.63 | 845.30 | 842.15 | 834.35 | 838.30 | 840.88 | 842.70 | 843.55 | 843.88 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 12 | 0.0 | 0.0 | 841.45 | 840.01 | 835.83 | 840.45 | 844.15 | 846.65 | 848.12 | 848.79 | 845.11 | 837.05 | 836.29 | 840.15 | 842.87 | 844.07 | 844.55 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 13 | 0.0 | 0.0 | 841.49 | 840.02 | 835.94 | 842.61 | 846.19 | 848.50 | 850.82 | 857.76 | 849.76 | 846.41 | 842.76 | 837.50 | 842.88 | 845.01 | 845.96 | 846.91 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 14 | 0.0 | 0.0 | 841.19 | 839.41 | 837.14 | 844.46 | 847.58 | 849.29 | 850.41 | 851.98 | 850.90 | 854.79 | 845.87 | 838.14 | 843.64 | 846.12 | 847.28 | 847.85 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 15 | 0.0 | 0.0 | 840.26 | 836.58 | 842.52 | 846.70 | 848.73 | 849.70 | 849.10 | 846.06 | 847.16 | 847.06 | 845.54 | 838.72 | 844.75 | 847.50 | 848.51 | 848.93 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 16 | 0.0 | 0.0 | 840.33 | 836.75 | 844.49 | 848.13 | 849.64 | 849.75 | 847.60 | 840.14 | 840.19 | 847.07 | 846.39 | 839.44 | 846.28 | 849.06 | 850.19 | 850.20 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 17 | 0.0 | 0.0 | 840.86 | 838.50 | 846.35 | 849.46 | 850.12 | 849.08 | 845.05 | 836.24 | 845.83 | 848.28 | 846.66 | 841.48 | 848.29 | 850.94 | 851.66 | 851.50 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 18 | 0.0 | 0.0 | 0.0 | 846.42 | 849.17 | 850.17 | 849.53 | 845.36 | 832.27 | 844.56 | 848.89 | 847.42 | 842.82 | 847.34 | 851.15 | 852.62 | 852.67 | 852.21 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 19 | 0.0 | 0.0 | 0.0 | 849.45 | 850.23 | 849.71 | 846.08 | 836.56 | 829.32 | 846.51 | 848.89 | 840.77 | 846.94 | 850.75 | 853.09 | 853.93 | 853.56 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | 818.00 | 820.00 | 820.00 | 800.00 | 800.00 | 823.00 | 822.00 | 823.00 | 823.00 | 823.00 | 823.00 | 822.00 | 821.00 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 21 | 0.0 | 0.0 | 0.0 | 819.00 | 820.00 | 800.00 | 800.00 | 822.00 | 823.00 | 823.00 | 823.00 | 824.00 | 824.00 | 824.00 | 823.00 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 22 | 0.0 | 0.0 | 0.0 | 820.00 | 800.00 | 800.00 | 800.00 | 823.00 | 824.00 | 824.00 | 824.00 | 824.00 | 824.00 | 824.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 800.00 | 800.00 | 800.00 | 824.00 | 824.00 | 825.00 | 825.00 | 825.00 | 825.00 | 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 | 800.00 | 824.00 | 825.00 | 825.00 | 826.00 | 826.00 | 826.00 | 826.00 | 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 | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.0 | 0.0 | 0.0 | 850.46 | 849.87 | 846.29 | 836.26 | 825.20 | 844.49 | 850.20 | 849.63 | 840.41 | 849.00 | 852.84 | 854.54 | 854.76 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 21 | 0.0 | 0.0 | 0.0 | 850.17 | 846.74 | 834.91 | 822.20 | 845.11 | 852.16 | 853.16 | 848.91 | 841.79 | 850.99 | 854.51 | 855.62 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 22 | 0.0 | 0.0 | 0.0 | 849.01 | 833.77 | 819.19 | 833.26 | 850.94 | 855.13 | 853.24 | 841.33 | 848.34 | 853.34 | 855.57 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 815.17 | 830.11 | 838.68 | 853.59 | 856.26 | 854.22 | 839.22 | 850.96 | 854.62 | 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 | 836.68 | 850.64 | 856.32 | 857.36 | 854.98 | 839.55 | 852.11 | 855.64 | 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 | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | |

HEAD MATRIX, LAYER 3

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | |
| 3 | 0.0 | 0.0 | 0.0 | 952.60 | 952.58 | 952.54 | 0.0 | 0.0 | 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 | 952.31 | 952.24 | 952.14 | 952.25 | 952.57 | 953.10 | 954.49 | 955.36 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 5 | 0.0 | 0.0 | 952.44 | 952.34 | 952.12 | 951.64 | 951.41 | 951.18 | 951.51 | 952.87 | 954.82 | 956.64 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 6 | 0.0 | 0.0 | 952.89 | 952.78 | 952.38 | 951.40 | 950.07 | 948.46 | 921.23 | 922.26 | 953.36 | 956.43 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 7 | 0.0 | 0.0 | 953.37 | 953.34 | 952.69 | 950.99 | 948.09 | 919.23 | 0.0 | 0.0 | 927.19 | 955.07 | 955.41 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 8 | 0.0 | 0.0 | 0.0 | 953.99 | 952.98 | 950.85 | 920.23 | 0.0 | 0.0 | 0.0 | 926.95 | 952.60 | 953.46 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 9 | 0.0 | 0.0 | 0.0 | 953.95 | 952.59 | 949.84 | 919.98 | 0.0 | 0.0 | 0.0 | 0.0 | 922.22 | 950.06 | 949.52 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 10 | 0.0 | 0.0 | 954.43 | 953.50 | 951.42 | 921.23 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 919.96 | 947.39 | 947.75 | 947.39 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 11 | 0.0 | 0.0 | 954.04 | 952.90 | 949.85 | 919.99 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 916.97 | 944.41 | 945.63 | 945.68 | 945.24 | 945.06 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 12 | 0.0 | 0.0 | 953.97 | 952.33 | 921.25 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 914.78 | 914.24 | 942.51 | 944.15 | 944.35 | 944.10 | 0.0 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 13 | 0.0 | 0.0 | 953.79 | 951.91 | 921.99 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 912.23 | 941.50 | 942.47 | 942.16 | 940.95 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 14 | 0.0 | 0.0 | 953.56 | 951.30 | 922.97 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 909.98 | 939.55 | 940.61 | 940.42 | 939.73 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 15 | 0.0 | 0.0 | 953.38 | 924.22 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 907.99 | 937.88 | 938.80 | 938.74 | 938.43 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 16 | 0.0 | 0.0 | 953.88 | 925.96 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 906.98 | 936.08 | 936.97 | 937.10 | 937.17 |
| | 0.0 | 0.0 | | | | | | | | | | | | | | | | |
| 17 | 0.0 | 0.0 | 954.05 | 925.97 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 906.20 | 934.30 | 935.06 | 935.63 | 936.10 |
| | 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 | 907.18 | 932.79 | 933.92 | 934.19 | 934.76 | 935.59 |
| | 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 | 908.95 | 934.43 | 934.78 | 934.25 | 933.96 | 934.26 | 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 | 909.95 | 935.81 | 935.63 | 934.58 | 933.91 | 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 | 911.17 | 936.63 | 936.25 | 935.00 | 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 | 911.95 | 937.67 | 938.14 | 937.13 | 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 | 912.95 | 939.04 | 939.48 | 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 | 912.96 | 939.48 | 939.94 | 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 | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | |

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