APPENDIX D

VERIFICATION PROGRAM WITH SNOW -- INPUT AND OUTPUT SAMPLES

D.1 VERIFICATION PROGRAM WITH SNOW - INPUT SUMMARY

D.2 SAMPLE INPUT FOR VERIFICATION PROGRAM WITH SNOW

D.3 EXAMPLES OF OUTPUT FROM VERIFICATION PROGRAM WITH SNOW

D.1 VERIFICATION PROGRAM WITH SNOW - INPUT SUMMARY

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C          INPUT SUMMARY FOR VERIFICATION
*****************************************************************************
*CARD NO. FORMAT     CONTENTS
*****************************************************************************
C   1       20A4     BASIC RUN INFORMATION SUCH AS DATE,ETC.
*****************************************************************************
C   2       20A4     BASIN NAME
*****************************************************************************
C   3         I5     NO. OF MBP AREAS USED IN RUN (NGAGES)
C             I5     NO. OF PE STATIONS USED (NPEGS)
C             I5     NO. OF STREAM-FLOW-POINTS USED (NPTS)
C             I5     NO. OF UPSTREAM INFLOW POINTS NEEDED FROM OUTSIDE
C                        AREA BEING RUN (NPTSUP)
*****************************************************************************
C   4         I5     NO. OF MBP AREAS ON INPUT TAPE
C             I5     NO. OF PE STATIONS ON TAPE
C             I5     NO. OF MEAN DAILY FLOW-POINTS ON TAPE
C             I5     NO. OF POINTS WITH OBSERVED SIX-HOUR DISCHARGE
C                        THAT ARE ON TAPE
C             I5     NO. OF UPSTREAM INFLOWS FROM OUTSIDE RUN AREA
C                        ON TAPE
*****************************************************************************
C   5         I5     FIRST MONTH OF RUN
C             I5     FIRST YEAR OF RUN (LAST 2 DIGITS ONLY)
C             I5     LAST MONTH
C             I5     LAST YEAR
*****************************************************************************
C   6       16I5     IDENTIFIES THE MBP AREAS ON TAPE TO BE USED IN THE RUN.
C                        ALSO DEFINES THE PRECIP. AREA ORDER FOR THE RUN.
C                        1 TO (NGAGES) VALUES ARE NEEDED.
C                    E.G.    5 MBP AREAS ON TAPE,(NGAGES)=3, CARD 6=4,1,5
C                              THEN THE 4 TH GAGE ON TAPE WILL BE GAGE 1 FOR RUN.
C                                       1 ST GAGE ON TAPE WILL BE GAGE 2 FOR RUN.
C                                       5 TH GAGE ON TAPE WILL BE GAGE 3 FOR RUN.
*****************************************************************************
C   7       10A4     NAME OF PE STATION
C             I5     NEP
C             I5     NDUR
C     (REPEAT CARD 7 FOR EACH PE STATION(1 TO NPEGS))--ORDER OF READ DETERMINES
C                        PE STATION NUMBER FOR THE RUN)
*****************************************************************************
C   8       16I5     SAME AS CARD 6 ONLY FOR PE STATIONS.
*****************************************************************************
C   9       16I5     ASSOCIATES PE STATIONS TO MBP AREAS
C                        1 TO (NGAGES) VALUES ARE NEEDED
C                    E.G. (NGAGES)=3,(NPEGS)=2, CARD  9=2,1,2
C                              THEN THE 1ST PRECIP AREA WILL USE PE FROM NO.2
C                                                                 PE STATION
C                                   THE 2ND PRECIP AREA WILL USE PE FROM NO.1
```

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C                                                                PE STATION
C                                   THE 3RD PRECIP AREA WILL USE PE FROM NO.2
C                                                                PE STATION
*************************************************************************
C  10       16I5      SAME AS CARD 6 ONLY FOR MEAN DAILY FLOW STATIONS
C                          (VALUE =0 IF NO M.D.F. FOR A PARTICULAR FLOW-POINT)
*************************************************************************
C  11       16I5      SAME AS CARD 6 ONLY FOR SIX HOUR OBSERVED DISCHARGE
C                          (VALUE =0 IF NO DISCHARGE FOR A PARTICULAR FLOW-POINT)
*************************************************************************
C  11A      16I5      SAME AS CARD 6 ONLY FOR UPSTREAM INFLOW STATIONS
C                         FROM OUTSIDE CURRENT RUN AREA
C                          (ONLY NEEDED IF NO. OF UPSTREAM INFLOWS ON TAPE.GT.0)
*************************************************************************
C  12       16I5      TYPE OF ROUTING TO BE APPLIED TO REACH ABOVE FLOW-
C                          POINT (1 TO NPTS) EQUAL TO 1 FOR NOW
C                     1 IS FOR LAG AND K ROUTING INCLUDING VARIABLE
C                     SEE CHAPTER 6 OF HYDRO-14 FOR ADDING OTHER ROUTING
C                          PROCEDURES.
*************************************************************************
C  13       16I5      FLOW TO ROUTE DOWNSTREAM (1 TO NPTS)
C                     =1 ROUTE OBSERVED OR BEST ESTIMATE OF OBSERVED
C                     =0 ROUTE SIMULATED
*************************************************************************
C  14          I5     =1 STORE CHANNEL INFLOW ON TAPE    =0 NO
C              I5     =1 DO ROUTING ONLY USING CHANNEL INFLOWS PREVIOUSLY STORED
C                            ON TAPE   =0 NO
C              I5     =1 SAVE 6 HOUR FLOW AT EACH FLOW POINT ON TAPE FOR USE
C                          AS  UPSTREAM INFLOWS LATER    =0 NO
C              I5     =1 PLOT SIX HOUR FLOW FOR ALL PERIODS WHEN OBSERVED IS
C                            READ IN.       =0 NO
C              I5     =1 PLOT MEAN DAILY FLOWS BY WATER YEAR FOR FLOW-POINTS
C                          WHERE OBSERVED DATA IS READ IN AND PLOT IS WANTED.
C                          THIS IS A PRINTER PLOT.  =0 FOR CARD OUTPUT FOR
C                      CAL-COMP PLOT PROGRAM
C              I5     TAPE NO. OF CHANNEL INFLOW TAPE
C              I5     TAPE NO. OF PRECIPITATION TAPE
C              I5     TAPE NO. OF MEAN DAILY FLOW TAPE
C              I5     TAPE NO. OF SIX HOUR OBSERVED DISCHARGE TAPE
C              I5     TAPE NO. OF PE TAPE
C              I5     TAPE NO. OF SNOW DATA (TEMPERATURE-WATER EQUIVALENT)
C              I5     TAPE NO. FOR SAVING SIX HOUR FLOWS AS FUTURE
C                                     UPSTREAM INFLOWS
C              I5     TAPE NO. FOR UPSTREAM INFLOWS FROM OUTSIDE RUN AREA
C              I5     =0   NO  STATISTICAL SUMMARY
C                     =1   MULTIYEAR STATISTICAL SUMMARY PLUS PUNCH M.D.F. IN
C                                          STANDARD FORMAT
C                     =2   MULTIYEAR SUMMARY ONLY
C                     =3   YEARLY AND MULTIYEAR SUMMARY
C                     =4   YEARLY PLUS MULTIYEAR PLUS PUNCH M.D.F. CARDS
C              I5     =1 OUTPUT MONTHLY FLOW VOLUMES AND MOISTURE STORAGES, =0 NO
*************************************************************************
C  15          I5     =1 SNOW IS INCLUDED,  =0 NO SNOW
C              I5     =1 OUTPUT WATER YEAR MEAN DAILY FLOW SUMMARY TABLES,
```

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C                          =0 NO TABLE OUTPUT
C                I5    =1 OUTPUT DETAILED SOIL MOISTURE OUTPUT FOR SELECTED MONTHS,
C                          =0 NO DETAILED OUTPUT
*****************************************************************************
C  15A        16I5    MONTH AND YEAR (2 DIGITS) FOR WHICH DETAILED SOIL MOISTURE
C                          OUTPUT IS WANTED.  (UP TO 8 MONTHS CAN BE OBTAINED)
C                       (THIS CARD ONLY NEEDED IF DETAILED SOIL MOISTURE OUTPUT
C                          IS ASKED FOR)
*****************************************************************************
*****************************************************************************
C**NOTE**  REPEAT CARDS 16 THROUGH 19 FOR EACH MBP AREA (NGAGES)
C  16        5A4      NAME OF MBP AREA
C          4F5.2      SOIL-MOISTURE VOLUME PARAMETERS
C         ,F5.1,          MOD. STANFORD WATERSHED MODEL
C          F5.2,          ORDER OF PARAMETERS IS --
C         2F5.1,               K1,A,EPXM,UZSN,LZSN,CB,POWER,CC,K24L
C          F5.2         (PARAMETERS DEFINED IN SECTION 4.3 OF HYDRO-14
*****************************************************************************
C  17       20X,      EVAPOTRANSPIRATION PARAMETERS FOR SOIL MOISTURE
C          5F5.2          ORDER IS  K3,GAGEPE,EHIGH,ELOW,K24EL
*****************************************************************************
C  18       20X,      SOIL MOISTURE  TIMING PARAMETERS
C         2F5.2,          ORDER IS---
C          F5.4,           SRC1,LIRC6,LKK6,KV,KGS
C         2F5.2
*****************************************************************************
C  19       20X,      SOIL MOISTURE INITIAL CONDITIONS
C         7F5.1          ORDER IS---UZSI,LZSI,SGWI,GWSI,RESI,SRGXI,SCEPI
C                             UZS=UPPER ZONE STORAGE
C                             LZS=LOWER ZONE STORAGE
C                             SGW=GROUNDWATER STORAGE
C                             GWS=ANTECEDENT GW INFLOW INDEX
C                             RES=SURFACE DETENTION
C                             SRGX=INTERFLOW DETENTION
C                             SCEP=INTERCEPTION STORAGE
*****************************************************************************
*****************************************************************************
*****************************************************************************
**********NOTE***********  THE FOLLOWING 200 SERIES CARDS ARE ONLY NEEDED
***   IF SNOW IS INCLUDED.      DO NOT PUT IN OTHERWISE.    ******************
*****************************************************************************
C 201          I5      PUNCH 1 IN COLUMN 5
C              I5      =1 OUTPUT DAILY SNOW QUANTITIES SUCH AS WATER-EQUIVALENT,
C                          SNOWFALL,HEAT EXCHANGE,ETC.
C                      =0 NO DAILY SNOW OUTPUT
C              I5      =1  OUTPUT SNOWPACK OUTFLOW ON TO TAPE.
C                      =0  DO NOT OUTPUT ON TO TAPE
C              I5      TAPE NUMBER TO WHICH SNOWPACK OUTFLOW IS TO BE WRITTEN
*****************************************************************************
C 202          I5      NUMBER OF MAT AREAS USED IN THIS RUN (NTAG)
C              I5      NUMBER OF AREAS WITH OBSERVED WATER-EQUIVALENT  (NWEG)
*****************************************************************************
C 203          I5      NUMBER OF MAT AREAS ON INPUT TAPE
C              I5      NUMBER OF OBS. AREAL WATER-EQUIVALENTS ON INPUT TAPE
```

```
*************************************************************************
C 204      5A4      NAME OF MAT AREA
C         F10.0     MEAN ELEVATION OF MAT AREA IN FEET
C         4F5.1     AIR TEMPERATURE LAPSE RATES FOR MID-6AM,6AM-NOON,
C                        NOON-6PM,6PM-MID.   DEG. F/1000 FT. ELEV. CHANGE
C              NOTE..REPEAT THIS CARD FOR EACH MAT AREA. CARD ORDER
C                   DEFINES MAT ORDER NUMBER FOR THIS RUN.
*************************************************************************
C 205      16I5     IDENTIFIES THE MAT AREAS ON TAPE TO BE USED IN THIS RUN.
C                        1 TO (NTAG) VALUES ARE NEEDED.
C                   E.G. 5 MAT AREAS ON TAPE, NTAG=2 , CARD 205 = 4,2
C                        THEN THE 4 TH MAT RECORD ON TAPE IS THE TEMPERATURE
C                                 DATA FOR THE 1 ST MAT AREA.
C                              2 ND MAT RECORD ON TAPE IS THE TEMPERATURE
C                                 DATA FOR THE 2 ND MAT AREA.
*************************************************************************
C 206      16I5     ASSOCIATES MAT AREAS TO MBP AREAS
C                        1 TO (NGAGES) VALUES ARE NEEDED
C                   E.G. (NGAGES)=3, (NTAG)=2,  CARD 206=2,1,1
C                        THEN THE 1 ST PRECIP AREA WILL USE AIR TEMPERATURE
C                                      FROM MAT AREA NO.2
C                              2 ND PRECIP AREA WILL USE AIR TEMPERATURE
C                                      FROM MAT AREA NO.1
C                              3 RD PRECIP AREA WILL USE AIR TEMPERATURE
C                                      FROM MAT AREA NO.1
*************************************************************************
C NOTE..CARDS 207 THROUGH 209 ONLY NEEDED IF (NWEG.GT.0)
*************************************************************************
C 207       5A4      NAME OF OBSERVED WATER-EQUIVALENT MEASUREMENT AREA
C              NOTE..REPEAT THIS CARD FOR EACH OBS. WATER-EQUIVALENT AREA
C                   USED IN THIS RUN.  CARD ORDER DEFINES ORDER NO. FOR RUN.
*************************************************************************
C 208      16I5     SAME AS CARD 205 ONLY FOR OBS. WATER-EQUIVALENT AREAS.
*************************************************************************
C 209      16I5     SAME AS CARD 206 ONLY FOR OBS. WATER-EQUIVALENT AREAS.
*************************************************************************
*************************************************************************
C NOTE..REPEAT CARDS 210,211,212,213,214 FOR EACH MEAN BASIN PRECIPITATION AREA
C              USED IN THIS RUN (NGAGES)
*************************************************************************
C 210 20X,F10.0     MEAN AREA ELEVATION IN FEET
C          F5.2     PERCENT/100 OF AREA OVER WHICH EVAPOTRANSPIRATION CAN TAKE
C                        PLACE WHEN THERE IS COMPLETE AREAL SNOW COVER (EFC)
C          F5.2     MULTIPLYING FACTOR TO CORRECT FOR GAGE CATCH DEFICIENCY
C                        IN THE CASE OF SNOWFALL. (SCF)
C          F5.4     MAXIMUM NON-RAIN MELT FACTOR -- OCCURS ON JUNE 21. (MFMAX)
C          F5.4     MINIMUM NON-RAIN MELT FACTOR -- OCCURS ON DEC. 21. (MFMIN)
C          F5.4     MAXIMUM NEGATIVE MELT FACTOR -- (NMF)
C              NOTE..UNITS FOR MELT FACTORS ARE INCHES/DEG.F/SIX HOURS
C          F5.4     MEAN WIND FUNCTION VALUE DURING RAIN ON SNOW PERIODS
C                        UNITS ARE INCHES/INCH OF MERCURY  (UADJ)
C          F5.1     AREAL WATER-EQUIVALENT (INCHES) ABOVE WHICH THERE IS
C                        ALWAYS COMPLETE AREAL SNOW COVER.  (SI)
C          F5.2     DAILY MELT AT THE SNOW-SOIL INTERFACE IN INCHES. (DAYGM)
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*************************************************************************
C 211          INITIAL VALUES OF SOME SNOW COVER VARIABLES.
C      20X,F5.0      ANTECEDENT SNOW TEMP. INDEX  (DEG. F)  (ATI)
C          F5.2      FREE WATER IN SNOW IN EXCESS OF THAT HELD AGAINST GRAVITY
C                         DRAINAGE  (INCHES)
C          F5.2      POINT SB ON AREAL DEPLETION CURVE  (INCHES)
C          F5.2      PERCENT/100 AREAL SNOW COVER AT POINT SB.
C          F5.2      POINT SBWS ON AREAL DEPLETION CURVE (INCHES)
C     NOTE..SEE CHAP. 3  FOR FURTHER EXPLANATION OF THESE INITIAL VALUES.
*************************************************************************
C 212          INITIAL VALUES OF MAJOR SNOW COVER VARIABLES
C      20X,F5.2      INITIAL WATER-EQUIVALENT OF SOLID PORTION OF THE
C                         SNOWPACK.   (INCHES)
C          F5.2      INITIAL NEGATIVE HEAT STORAGE  (INCHES)
C          F5.2      INITIAL AMOUNT OF FREE WATER HELD AGAINST GRAVITY
C                         DRAINAGE (INCHES).  MAXIMUM EQUALS PERCENT LIQUID
C                         WATER HOLDING CAPACITY TIMES INITIAL WATER-EQUIVALENT.
*************************************************************************
*************************************************************************
C 213          ADDITIONAL SNOW PARAMETERS
C      20X,F5.0      MELT FACTOR BASE TEMPERATURE  (DEG. F) (MBASE)
C          F5.0      TEMPERATURE (DEG. F) TO DIVIDE RAIN FROM SNOW  (PXTEMP)
C                         IF AIR TEMPERATURE GREATER,THEN RAIN
C                         IF AIR TEMPERATURE LESS THAN OR EQUAL,THEN SNOW
C          F5.2      PERCENT/100 LIQUID WATER HOLDING CAPACITY  (PLWHC)
C                        MAXIMUM AMOUNT OF FREE WATER HELD AGAINST GRAVITY.
C          F5.2      ANTECEDENT SNOW TEMP. INDEX PARAMETER  (TIPM)
C                         (.GE.0.0 --.LE.1.0)
*************************************************************************
C 214 20X,9F5.2      AREAL SNOW COVER DEPLETION CURVE
C                        PERCENT/100 AREAL EXTENT OF SNOW COVER AT
C                        WATER EQUIVALENT/AI RATIOS OF  0.1,0.2,0.3,0.4,0.5,
C                             0.6,0.7,0.8,0.9  (SEE SECTION 3.3.3 FOR DEFINITION
C                             OF AI)     FOR RATIO=0.0  AREAL COVER=0.05
C                                            RATIO=1.0  AREAL COVER=1.00
*************************************************************************
*************************************************************************
*************************************************************************
C**NOTE**CARD 20A IS ONLY NEEDED WHEN THE NUMBER OF UPSTREAM INFLOWS
C          FROM OUTSIDE THE AREA BEING RUN IS.GT.0 (NPTSUP.GT.0)
C  20A       7A4      NAME OF UPSTREAM INFLOW POINT
C      2X,F10.0       AREA OF UPSTREAM INFLOW POINT  (TOTAL AREA ABOVE GAGE SQ.MI)
C        REPEAT CARD 20A FOR EACH UPSTREAM INFLOW POINT (1 TO NPTSUP))
C              ORDER OF CARDS DETERMINES FLOW-POINT NUMBER FOR RUN
C              FIRST UPSTREAM INFLOW POINT IS ASSIGNED FLOW-POINT NUMBER
C                   EQUAL TO (NPTS+1) ETC. F.G. IF NPTS=3 THEN THE FIRST
C                   UPSTREAM INFLOW POINT BECOMES FLOW-POINT 4 FOR
C                   THE RUN.
*************************************************************************
*************************************************************************
C**NOTE** REPEAT CARDS 20 THROUGH 23 (IF ALL NEEDED) FOR EACH FLOW-POINT
C          WITHIN RUN AREA (NPTS)
C        ORDER OF CARDS DETERMINES FLOW-POINT NUMBER FOR THE RUN.
C        NOTE...ALL FLOW-POINTS UPSTREAM FROM GAGE MUST HAVE A SMALLER RUN
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C              NUMBER THAN THE GIVEN GAGE--EXCEPT FOR UPSTREAM INFLOW-POINTS
C              FROM OUTSIDE THE AREA BEING RUN(SEE CARD 20A)
C  20        7A4      NAME OF FLOW-POINT
C       2X,F10.0      TOTAL AREA ABOVE FLOW-POINT IN SQUARE MILES
C         ,F5.2,      CONSTANT K ROUTING FACTOR IN HOURS   =0.0 IF VAR. K USED
C            I5       =1 USE VARIABLE K   =0 NO
C            I5       =1 USE VARIABLE LAG =0 NO
C            I5       ROUTING INTERVAL IN HOURS  (MUST=6 FOR NOW)
C            I5       NO. OF VALUES  IN TIME-DELAY HISTOGRAM FOR LOCAL AREA
C            I5       NO. OF UPSTREAM  INFLOW POINTS TO LOCAL AREA (NUPIN)
C                          THESE CAN BE UPSTREAM INFLOWS FROM OUTSIDE OR
C                          INSIDE THE RUN AREA
C            I5       NO.OF POINTS TO DEFINE VARIABLE K VS OUTFLOW CURVE
C            I5       NO. OF POINTS TO DEFINE VARIABLE LAG VS INFLOW CURVE
*************************************************************************
C  20B    8F10.0      VARIABLE K VS.OUTFLOW CURVE IF NEEDED    K IN HOURS
C                          MAXIMUM POINTS TO DEFINE CURVE IS 10 (THUS 3 CARDS)
C                          VALUES READ IN PAIRS  (FLOW,K)
C                               SO 4 PAIRS OF (FLOW,K) CAN GO ON A CARD
C                          K AT ZERO FLOW MUST BE FIRST POINT
C                          CALCULATIONS USING K ARE BASED ON A LINEAR
C                               INTERPOLATION BETWEEN POINTS
C                          K VALUE FOR HIGHEST DEFINED FLOW IS USED FOR
C                               ALL FLOWS ABOVE THAT DISCHARGE
*************************************************************************
C  20C    8F10.0      VARIABLE LAG VS. INFLOW CURVE IF NEEDED   LAG IN HOURS
C                          MAX.PTS=10, VALUES IN PAIRS(FLOW,LAG), 4 PAIRS PER CARD
C                          LAG AT ZERO FLOW MUST BE FIRST POINT
C                          CALCULATIONS USING VARIABLE LAG ARE BASE ON
C                               LAGGING THE VOLUME OF FLOW IN THE INTERVAL
C                               FLOW(N) TO FLOW(N+1) BY THE AVERAGE LAG FOR
C                               THAT INTERVAL (LAG(N)+LAG(N+1))*0.5
C                          LAG VALUE FOR HIGHEST DEFINED FLOW IS USED FOR
C                               ALL FLOW ABOVE THAT DISCHARGE
*************************************************************************
C  21     40X,I5      =1 IF M.D.F. PLOT WANTED FOR THE FLOW-POINT  =0 NO PLOT
C                          M.D. OBSERVED FLOW MUST BE READ IN TO GET PLOT
C          F10.0      MAXIMUM PLOT ORDINATE FOR M.D.F. PLOT
C          F10.0      BASE FOR FLOW INTERVAL CALCULATIONS IN STATISTICAL
C                          SUBROUTINE   (GUIDE--FLOW THAT IS EXCEEDED 25 PER
C                                                   CENT OF THE TIME)
C          1X,A9      USGS STATION IDENTICATION NUMBER  (NEEDED IF STD. FMT CARDS
C                                   ARE TO BE PUNCHED)
*************************************************************************
C  22       30X,      TIME DELAY HISTOGRAM (MAX.NO OF POINTS=30)
C         10F5.2           HISTOGRAM IS FOR LOCAL AREA   SUMMATION OF VALUES=1.0
*************************************************************************
C  23       30X,      MBP AREAS TO BE ASSIGNED TO EACH ELEMENT OF THE TIME-DELAY
C           10I5           HISTOGRAM ---  MBP AREAS DESIGNATED BY RUN NO. WHICH
C                          IS DETERMINED BY THE ORDER CARDS 16 TO 19 WERE READ.
*************************************************************************
C  20D      30X,      RUN NO. OF EACH UPSTREAM INFLOW POINT TO LOCAL AREA
C           5I5            NEEDED IF (NUPIN.GT.0)
*************************************************************************
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```
C  20E      30X,      CONSTANT LAG FOR EACH UPSTREAM INFLOW POINT
C          5F5.1          (LAG IN HOURS)    NEEDED IF (NUPIN.GT.0)
C                 **NOTE** TOTAL LAG CONSISTS OF CONSTANT PLUS VARIABLE COMPONENT
*****************************************************************************
*****************************************************************************
C  24        4I5      NUMBER OF RECORDS TO SKIP ON TAPES 1 TO 4 TO POSITION
C                          THE TAPE CORRECTLY FOR THE INITIAL MONTH
*****************************************************************************
*****************************************************************************
*****************************************************************************
C     THE FOLLOWING SNOW INPUT  CARD  TELLS THE PROGRAM FOR WHICH MONTHS VALID
C          AIR TEMPERATURE DATA ARE AVAILABLE AND THUS WHICH MONTHS SNOW
C          COMPUTATIONS ARE TO BE MADE.     =1 VALID DATA AVAILABLE
C                                           =0 AIR TEMPERATURE DATA IS MISSING
******NOTE********  CARD 241 ONLY NEEDED IF SNOW IS INCLUDED.  ****************
*****************************************************************************
C 241       12I5      VALID AIR TEMP. DATA INDICATOR-- MONTHS 1-12 (JAN-DEC)
C                          REPEAT CARD 241 FOR EACH WATER YEAR
*****************************************************************************
*****************************************************************************
*****************************************************************************
*****************************************************************************
C      DATA INPUT DESCRIPTION --------- SNOW NOT INCLUDED.
C
C          A.   BASIC DATA  CAN BE ON MORE THAN ONE TAPE  (IN ORDER BY MONTHS)
C                          IF ON ONE TAPE MUST BE IN FOLLOWING ORDER
C               1.   MBP AREAS  RECORD SIZE=124    SIX HOUR PCPN IN SEQUENTIAL
C                                                 ORDER FOR THE MONTH
C               2.   PE STATION RECORD SIZE=31     DAILY PE
C               3.   M.D.F STREAMGAGES  RECORD SIZE=31  DAILY FLOWS FROM
C                                                  USGS WATER SUPPLY PAPERS
C                          MISSING DATA IS READ IN AS NEGATIVE NUMBER
C                          ENTIRE MONTH MUST EITHER BE ALL VALID DATA OR
C                               ALL MISSING DATA.
C               4.   SIX HOUR DISCHARGES RECORD SIZE=124
C                          DISCHARGE AT 6 A.M.,NOON,6 P.M.,MID. FOR EACH DAY
C                               IN SEQ. ORDER FOR THE MONTH
C                          MISSING DATA IS READ IN AS NEGATIVE NUMBER
C
C          B.  OTHER DATA IS EITHER GENERATED BY THE PROGRAM IN A PREVIOUS
C               RUN OR IN THE CASE OF UPSTREAM INFLOWS, THESE CAN BE GENERATED
C               BY A PREVIOUS RUN OR THE TAPE COULD BE PREPARED.
C                    IF PREPARED IT IS THE SAME FORMAT AS SIX HOUR DISCHARGES
C                          EXCEPT NO MISSING DATA IS ALLOWED.
*****************************************************************************
*****************************************************************************
*****************************************************************************
C      DATA INPUT DESCRIPTION ------- SNOW INCLUDED.
C
C          BASIC DATA CAN BE ON MORE THAN ONE TAPE  (IN ORDER BY MONTHS)
C               IF ON ONE TAPE,MUST BE IN THE FOLLOWING ORDER
C
C          1. MBP AREA DATA -- RECORD SIZE 124
C          2. PE DATA -- RECORD SIZE 31
```

```
C          3. MAT AREA DATA -- RECORD SIZE 124
C               (NOTE..AIR TEMPERATURE CAN BE LOADED ON TO TAPE USING
C                O/H STANDARD FORMAT CARDS WITH PROGRAM NWSRFS2. (SEE NWSRFS
C                TECH. MEMO APPENDIX E ) NOTE THAT AIR TEMPERATURE MUST BE
C                PUNCHED WITH FIELD LENGTH .EQ.3 ON O/H STD. FMT. CARDS.
C          4. OBSERVED AREAL WATER EQUIVALENT -- RECORD SIZE 31
C               (NOTE..OBSERVED WATER EQUIVALENT DATA CAN BE LOADED ON TO TAPE
C              BY PROGRAM NWSRFS2, BY TREATING IT AS IF IT WAS MEAN DAILY FLOW.)
C          5. MEAN DAILY FLOW DATA -- RECORD SIZE 31
C          6. SIX HOUR DISCHARGE DATA -- RECORD SIZE 124
*************************************************************************
*************************************************************************
*************************************************************************
*************************************************************************
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D.2 SAMPLE INPUT FOR VERIFICATION PROGRAM WITH SNOW

```
NORTHERN NEW ENGLAND SNOW BASIN--TEMPERATURE INDEX MODEL--FINAL TRIAL,ERROR RUN
PASSUMPSIC RIVER AT PASSUMPSIC,VERMONT  --  TWO SUB-AREAS
    2    1    1    0
    3    1    1    0    0
   10   63    9   71
    2    3
NORTHERN NEW ENGLAND PE ESTIMATE          166   92
    1
    1    1
    1
    0
    1
    0
    0    0    0    0    1    0    1    1    0    1    1    0    0    3    1
    1    1    1
    4   70    5   70    4   71    5   71
PASSUMPSIC RIVER-L     1.0  .05  .20  .25  5.0  .30  3.0  .90  0.0        VOL PARM
PASSUMPSIC RIVER-L     .30  1.0  1.0  0.0  .25                            ET  PARM
PASSUMPSIC RIVER-L      .9  .10 .004  .55  .99                           TIME PARM
PASSUMPSIC RIVER-L     0.0  5.5  1.1  .12  0.0  0.0  .10                  INITIAL
PASSUMPSIC RIVER-H     1.0  .05  .20  .25  5.0  .30  3.0  .90  0.0        VOL PARM
PASSUMPSIC RIVER-H     .30  1.0  1.0  0.0  .25                            ET  PARM
PASSUMPSIC RIVER-H      .9  .10 .004  .55  .99                           TIME PARM
PASSUMPSIC RIVER-H     0.0  5.5  1.1  .12  0.0  0.0  .10                  INITIAL
    1    1    0    0
    2    0
    3    0
PASSUMPSIC R. MAT-L        1060. -1.5 -2.7 -3.9 -2.7
PASSUMPSIC R. MAT-H        1740. -1.5 -2.7 -3.9 -2.7
    2    3
    1    2
PASSUMPSIC RIVER-L         1060.  .50 1.17 .022 .005 .003 .054  4.5  .01
PASSUMPSIC RIVER-L     32.  0.0  0.0  0.0  0.0
PASSUMPSIC RIVER-L     0.0  0.0  0.0
PASSUMPSIC RIVER-L     32.  33.  .03   .5
AREAL DEPLETION LOW    .24  .39  .52  .64  .75  .82  .88  .92  .96
PASSUMPSIC RIVER-H         1740.  .90 1.13 .022 .005 .003 .054  6.0  .01
PASSUMPSIC RIVER-H     32.  0.0  0.0  0.0  0.0
PASSUMPSIC RIVER-H     0.0  0.0  0.0
PASSUMPSIC RIVER-H     32.  33.  .03   .5
AREAL DEPLETION HIGH   .24  .39  .52  .64  .75  .82  .88  .92  .96
PASSUMPSIC R. AT PASSUMPSIC          436.  9.0    0    0    6    3    0    0    0
PASSUMPSIC R. AT PASSUMPSIC                 1    10000.     1000.  01135500
TIME-DELAY,PASSUMPSIC              .10  .40  .50
GAGE-AREA ,PASSUMPSIC                1    1    2
    0    0    0    0                                                SKIP TAPE RECDS
    1    1    1    1    1    0    0    0    0    0    0    1        WATER YEAR  64
    1    1    1    1    1    0    0    0    0    1    1    1        WATER YEAR  65
    1    1    1    1    1    0    0    0    0    0    1    1        WATER YEAR  66
    1    1    1    1    1    0    0    0    0    0    1    1        WATER YEAR  67
    1    1    1    1    1    0    0    0    0    0    1    1        WATER YEAR  68
    1    1    1    1    1    0    0    0    0    0    1    1        WATER YEAR  69
    1    1    1    1    1    0    0    0    0    1    1    1        WATER YEAR  70
    1    1    1    1    1    0    0    0    0    0    1    1        WATER YEAR  71
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D.3 EXAMPLES OF OUTPUT FROM VERIFICATION PROGRAM WITH SNOW

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                    PASSUMPSIC RIVER AT PASSUMPSIC,VERMONT  --  TWO SUB-AREAS
NORTHERN NEW ENGLAND SNOW BASIN--TEMPERATURE INDEX MODEL--FINAL TRIAL,ERROR RUN
                                                BASIC RUN INFORMATION
RUN BEGINS OCT 1963     RUN ENDS SEPT 1971
NUMBER OF PRECIPITATION GAGES= 2     NUMBER OF FLOW-POINTS= 1     NUMBER OF POTENTIAL ET STATIONS= 1
        EVAPORATION PARAMETERS ARE    NORTHERN NEW ENGLAND PE ESTIMATE      NEP=166     NDUR= 92

                          SNOW IS INCLUDED
```

PASSUMPSIC RIVER AT PASSUMPSIC,VERMONT --- TWO SUB-AREAS

NORTHERN NEW ENGLAND SNOW BASIN--TEMPERATURE INDEX MODEL--FINAL TRIAL,ERROR RUN

SOIL MOISTURE VOLUME PARAMETERS

RG	PRECIP. GAGE NAME	K1	A	EPXM	UZSN	LZSN	CB	POWER	CC	K24L	K3	GAGEPE	EHIGH	ELOW	K24E
1	PASSUMPSIC RIVER-L	1.000	.050	.200	.250	5.000	.300	3.000	.900	0.000	.300	1.000	1.000	0.000	.25
2	PASSUMPSIC RIVER-H	1.000	.050	.200	.250	5.000	.300	3.000	.900	0.000	.300	1.000	1.000	0.000	.25

SOIL MOISTURE TIMING PARAMETERS

RG	SRC1	LIRC6	LKK6	KV	KGS
1	.900	.100	.0040	.550	.9900
2	.900	.100	.0040	.550	.9900

SOIL MOISTURE INITIAL VALUES

RG	UZS	LZS	SGW	GWS	RES	SRGX	SCEP
1	0.00	5.50	1.10	.12	0.00	0.00	.10
2	0.00	5.50	1.10	.12	0.00	0.00	.10

SNOW PARAMETERS--CASE=1

INPUT GAGES USED

RG	TA GAGE	WE GAGE
1	PASSUMPSIC R. MAT-L	
2	PASSUMPSIC R. MAT=H	

TA GAGE	ELEV.	PERIOD TA LAPSE RATES			
PASSUMPSIC R. MAT-L	1060.	-1.5	-2.7	-3.9	-2.7
PASSUMPSIC R. MAT-H	1740.	-1.5	-2.7	-3.9	-2.7

AREA SNOW PARAMETERS

RG	ELEV	EFC	SCF	MFMAX	MFMIN	NMF	UADJ	SI	DAYGM	MBASE	PXTEMP	PLWHC	TIPM
1	1060.	.50	1.17	.0220	.0050	.0030	.0540	4.50	.010	32.0	33.0	.030	.500
2	1740.	.90	1.13	.0220	.0050	.0030	.0540	6.00	.010	32.0	33.0	.030	.500

INTIAL SNOW VALUES

RG	WE	NEGHS	LIQW STORAGE	SB	SBAESC	SBWS	TINDEX
1	0.00	0.000	0.000	0.000	0.000	0.000	32.
2	0.00	0.000	0.000	0.000	0.000	0.000	32.

AREAL DEPLETION CURVE FOR AREA 1

WE/AI	0.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
AESC	.05	.24	.39	.52	.64	.75	.82	.88	.92	.96	1.00

AREAL DEPLETION CURVE FOR AREA 2

WE/AI	0.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
AESC	.05	.24	.39	.52	.64	.75	.82	.88	.92	.96	1.00

PASSUMPSIC RIVER AT PASSUMPSIC,VERMONT -- TWO SUB-AREAS

NORTHERN NEW ENGLAND SNOW BASIN--TEMPERATURE INDEX MODEL--FINAL TRIAL,ERROR RUN

FLOW-POINT PARAMETERS

FP	FLOW-POINT NAME	AREA	KS1	OBSER	COMPAR	CHECK	SIXIN	HISTOGRAMS			
1	PASSUMPSIC R. AT PASSUMPSIC	436.00	9.00	0	1	1	0	TIME-DELAY	.100	.400	.500
								GAGE AREA	1	1	2

SNOW SUMMARY FOR STATION 1 4470

DAY	SNOWFALL	RAIN	HEAT-EXO	COVER	PACK WE	LIQUID	NEG-HEAT	TOTAL WATER	OBS WATER EQUIV
1	0.000	0.000	.118	1.00	6.48	.194	.005	6.70	I
2	.427	.740	.080	1.00	6.83	.205	0.000	7.26	I
3	.244	0.000	-.004	1.00	7.05	.211	.014	7.26	I
4	0.000	0.000	.002	1.00	7.03	.210	.026	7.24	I
5	0.000	0.000	-.025	1.00	7.02	.210	.051	7.23	I
6	.001	0.000	.093	1.00	6.96	.207	.009	7.18	I
7	0.000	.021	.176	1.00	6.78	.203	.004	7.00	I
8	0.000	0.000	.580	1.00	6.19	.186	0.000	6.49	I
9	0.000	.020	.836	1.00	5.34	.160	0.000	5.61	I
10	0.000	.001	.194	1.00	5.13	.154	.007	5.31	I
11	0.000	0.000	-.004	1.00	5.12	.154	.011	5.28	I
12	0.000	.000	.255	1.00	4.87	.146	0.000	5.04	I
13	0.000	0.000	.335	1.00	4.52	.136	.005	4.67	I
14	0.000	0.000	.600	.96	3.91	.117	0.000	4.09	I
15	0.000	0.000	.488	.92	3.42	.102	0.000	3.55	I
16	0.000	0.000	.769	.85	2.64	.079	0.000	2.82	I
17	0.000	.234	.831	.68	1.80	.054	0.000	1.96	I
18	0.000	.028	.248	.58	1.54	.046	.000	1.59	I
19	0.000	0.000	.106	.55	1.42	.043	.006	1.46	I
20	.014	.195	.061	.54	1.37	.041	0.000	1.45	I
21	0.000	.207	.200	.49	1.16	.035	0.000	1.25	I
22	0.000	0.000	.260	.40	.89	.027	0.000	.91	I
23	.010	0.000	.198	.34	.69	.021	0.000	.71	I
24	0.000	1.178	.200	.26	.48	.014	0.000	.49	I
25	0.000	0.000	.170	.19	.30	.009	0.000	.31	I
26	0.000	.002	.186	.11	.10	.003	0.000	.11	I

SIX-HOUR SOIL MOISTURE OUTPUT FOR 4770 PASSUMPSIC RIVER-L ELKK6=LKK6*(1.0+KV*GWS) GWIN=INFLOW TO GROUNDWATER STORAGE

IDA	IP6	SCEP	UZS	LZS	SGW	RES	SRGX	ELKK6	INFIL	GWIN	IMPV-RO	SUR-RO	INTERFW	GW-FLOW	TOTAL-RO	PRECIP
1	1	.200	.537	7.776	1.474	0.0000	.0010	.0060	.0047	.0040	.0002	.0000	.0001	.0090	.0093	.005
1	2	.197	.537	7.776	1.468	0.0000	.0009	.0060	.0036	.0030	.0002	.0000	.0001	.0087	.0090	.004
1	3	.193	.536	7.778	1.468	0.0000	.0009	.0060	.0107	.0091	.0007	.0000	.0001	.0086	.0094	.013
1	4	.200	.538	7.788	1.512	0.0000	.0028	.0061	.0624	.0531	.0039	.0011	.0003	.0093	.0146	.078
2	1	.200	.538	7.790	1.515	0.0000	.0026	.0061	.0145	.0124	.0008	.0001	.0003	.0094	.0105	.016
2	2	.199	.538	7.791	1.511	0.0000	.0023	.0061	.0065	.0055	.0003	.0000	.0002	.0093	.0099	.007
2	3	.199	.548	7.814	1.623	0.0000	.0160	.0064	.1430	.1221	.0093	.0089	.0017	.0103	.0293	.186
2	4	.200	.588	7.852	1.796	0.0000	.0840	.0068	.2166	.1853	.0196	.0397	.0089	.0122	.0804	.393
3	1	.200	.596	7.876	1.914	0.0000	.0975	.0070	.1537	.1318	.0104	.0124	.0103	.0135	.0467	.209
3	2	.198	.596	7.879	1.916	0.0000	.0879	.0070	.0172	.0148	.0009	.0001	.0093	.0134	.0237	.019
3	3	.195	.594	7.880	1.909	0.0000	.0791	.0070	.0082	.0070	.0004	.0000	.0084	.0132	.0220	.008
3	4	.200	.594	7.880	1.897	0.0000	.0712	.0070	.0015	.0013	.0003	.0000	.0075	.0133	.0212	.006
4	1	.200	.594	7.881	1.887	0.0000	.0641	.0070	.0041	.0035	.0002	.0000	.0068	.0132	.0202	.004
4	2	.196	.594	7.881	1.876	0.0000	.0577	.0069	.0024	.0021	.0001	.0000	.0061	.0129	.0191	.003
4	3	.191	.591	7.881	1.866	0.0000	.0519	.0069	.0025	.0022	.0002	0.0000	.0055	.0125	.0182	.004
4	4	.200	.591	7.882	1.855	0.0000	.0467	.0069	.0020	.0017	.0006	.0000	.0049	.0129	.0184	.011
5	1	.200	.591	7.882	1.846	0.0000	.0421	.0069	.0049	.0043	.0003	.0000	.0044	.0128	.0175	.005
5	2	.196	.591	7.883	1.837	0.0000	.0379	.0068	.0037	.0032	.0002	.0000	.0040	.0125	.0167	.004
5	3	.191	.588	7.883	1.826	0.0000	.0341	.0068	.0024	.0021	.0001	0.0000	.0036	.0121	.0159	.003
5	4	.194	.588	7.883	1.814	0.0000	.0307	.0068	0.0000	0.0000	.0001	0.0000	.0032	.0124	.0158	.003
6	1	.196	.588	7.883	1.801	0.0000	.0276	.0068	0.0000	0.0000	.0001	0.0000	.0029	.0123	.0153	.003
6	2	.195	.588	7.883	1.789	0.0000	.0248	.0067	0.0000	0.0000	.0001	0.0000	.0026	.0119	.0147	.003
6	3	.192	.586	7.884	1.781	0.0000	.0224	.0067	.0040	.0035	.0003	.0000	.0024	.0116	.0143	.007
6	4	.200	.586	7.888	1.793	0.0000	.0206	.0067	.0290	.0249	.0020	.0003	.0022	.0122	.0166	.039
7	1	.200	.586	7.890	1.791	0.0000	.0186	.0067	.0108	.0093	.0006	.0000	.0020	.0121	.0147	.011
7	2	.196	.586	7.891	1.785	0.0000	.0168	.0067	.0077	.0066	.0004	.0000	.0018	.0119	.0141	.008
7	3	.193	.584	7.898	1.812	0.0000	.0163	.0068	.0456	.0392	.0026	.0007	.0017	.0120	.0169	.052
7	4	.200	.587	7.912	1.881	0.0000	.0214	.0069	.0958	.0825	.0061	.0033	.0023	.0131	.0253	.123
8	1	.200	.587	7.915	1.883	0.0000	.0194	.0069	.0176	.0152	.0009	.0001	.0020	.0132	.0163	.019
8	2	.196	.587	7.918	1.892	0.0000	.0178	.0070	.0251	.0217	.0014	.0002	.0019	.0131	.0165	.027
8	3	.192	.595	7.944	2.019	0.0000	.0431	.0072	.1646	.1421	.0116	.0151	.0045	.0143	.0455	.232
8	4	.200	.604	7.968	2.141	0.0000	.0656	.0075	.1595	.1379	.0116	.0149	.0069	.0162	.0496	.232
9	1	.200	.605	7.981	2.197	0.0000	.0645	.0076	.0846	.0733	.0050	.0030	.0068	.0169	.0318	.100
9	2	.194	.608	7.996	2.268	0.0000	.0668	.0078	.1026	.0889	.0063	.0048	.0071	.0175	.0357	.126
9	3	.187	.629	8.025	2.432	.0011	.1629	.0082	.2119	.1840	.0212	.0564	.0172	.0193	.1141	.425
9	4	.200	.635	8.050	2.554	0.0000	.1807	.0084	.1649	.1435	.0126	.0186	.0191	.0217	.0720	.251
10	1	.200	.636	8.061	2.599	0.0000	.1677	.0085	.0778	.0678	.0046	.0027	.0177	.0224	.0474	.092
10	2	.195	.636	8.063	2.594	0.0000	.1512	.0085	.0196	.0171	.0011	.0001	.0160	.0221	.0393	.021
10	3	.191	.633	8.073	2.635	0.0000	.1399	.0086	.0726	.0633	.0042	.0021	.0148	.0224	.0435	.084
10	4	.200	.634	8.085	2.684	0.0000	.1320	.0087	.0839	.0733	.0055	.0033	.0139	.0237	.0464	.109
11	1	.200	.634	8.087	2.673	0.0000	.1189	.0087	.0137	.0120	.0007	.0001	.0126	.0235	.0369	.015
11	2	.194	.634	8.088	2.655	0.0000	.1071	.0087	.0062	.0054	.0003	.0000	.0113	.0229	.0346	.007
11	3	.185	.630	8.088	2.635	0.0000	.0963	.0086	.0039	.0034	.0002	0.0000	.0102	.0223	.0327	.005
11	4	.188	.630	8.088	2.613	0.0000	.0867	.0086	0.0000	0.0000	.0001	0.0000	.0092	.0227	.0320	.003
12	1	.190	.630	8.088	2.593	0.0000	.0780	.0086	0.0000	0.0000	.0001	0.0000	.0082	.0224	.0307	.003
12	2	.194	.630	8.088	2.568	0.0000	.0702	.0085	0.0000	0.0000	.0005	0.0000	.0074	.0217	.0296	.010
12	3	.187	.627	8.099	2.617	0.0000	.0684	.0086	.0817	.0714	.0049	.0028	.0072	.0221	.0370	.099
12	4	.200	.629	8.112	2.675	0.0000	.0694	.0088	.0935	.0817	.0063	.0042	.0073	.0236	.0415	.127
13	1	.200	.629	8.114	2.667	0.0000	.0627	.0087	.0178	.0156	.0010	.0001	.0066	.0235	.0312	.019
13	2	.195	.629	8.117	2.664	0.0000	.0568	.0087	.0233	.0204	.0013	.0002	.0060	.0233	.0307	.025
13	3	.191	.629	8.136	2.757	0.0000	.0695	.0089	.1341	.1175	.0089	.0099	.0073	.0244	.0505	.178
13	4	.200	.631	8.151	2.828	0.0000	.0748	.0091	.1108	.0972	.0075	.0065	.0079	.0260	.0479	.150
14	1	.200	.631	8.153	2.811	0.0000	.0674	.0091	.0104	.0091	.0006	.0000	.0071	.0258	.0335	.011
14	2	.195	.631	8.158	2.819	0.0000	.0618	.0091	.0386	.0339	.0021	.0006	.0065	.0256	.0349	.043
14	3	.189	.640	8.186	2.960	0.0000	.1256	.0094	.1927	.1693	.0169	.0371	.0133	.0276	.0948	.338
14	4	.200	.643	8.205	3.048	0.0000	.1341	.0096	.1337	.1177	.0096	.0111	.0142	.0297	.0645	.192
15	1	.200	.643	8.210	3.054	0.0000	.1219	.0097	.0402	.0354	.0022	.0007	.0129	.0298	.0456	.045
15	2	.191	.644	8.215	3.062	0.0000	.1112	.0097	.0425	.0375	.0024	.0008	.0117	.0295	.0444	.048
15	3	.182	.646	8.240	3.185	0.0000	.1491	.0100	.1760	.1553	.0141	.0256	.0157	.0311	.0866	.281
15	4	.200	.648	8.254	3.249	0.0000	.1475	.0101	.1107	.0979	.0080	.0069	.0156	.0332	.0637	.159
16	1	.200	.648	8.257	3.239	0.0000	.1333	.0101	.0259	.0229	.0014	.0003	.0141	.0331	.0489	.028

16	2	.192	.649	8.267	3.272	0.0000	.1252	.0102	.0746	.0660	.0044	.0027	.0132	.0333	.0536	.088
16	3	.183	.657	8.296	3.406	0.0000	.2087	.0105	.1926	.1766	.0192	.0497	.0220	.0352	.1261	.384
16	4	.200	.661	8.316	3.500	0.0000	.2203	.0107	.1491	.1322	.0117	.0167	.0233	.0380	.0897	.234
17	1	.200	.662	8.328	3.547	0.0000	.2085	.0109	.0968	.0860	.0060	.0052	.0220	.0389	.0722	.121
17	2	.186	.666	8.348	3.643	0.0000	.2245	.0111	.1533	.1363	.0114	.0189	.0237	.0402	.0942	.229
17	3	.172	.671	8.375	3.767	0.0000	.2978	.0114	.1880	.1674	.0190	.0487	.0314	.0419	.1410	.379
17	4	.200	.679	8.400	3.881	0.0000	.3510	.0117	.1788	.1595	.0183	.0420	.0370	.0458	.1431	.366
18	1	.200	.680	8.412	3.922	0.0000	.3272	.0118	.0985	.0879	.0062	.0057	.0345	.0467	.0932	.124
18	2	.195	.680	8.420	3.935	0.0000	.2992	.0118	.0679	.0607	.0043	.0024	.0316	.0469	.0849	.080
18	3	.190	.675	8.432	3.980	0.0000	.2808	.0120	.1041	.0931	.0065	.0058	.0296	.0476	.0894	.129
18	4	.200	.675	8.438	3.977	0.0000	.2552	.0120	.0504	.0450	.0034	.0012	.0269	.0482	.0798	.067
19	1	.200	.675	8.438	3.933	0.0000	.2296	.0119	.0037	.0033	.0002	.0000	.0242	.0474	.0718	.004
19	2	.187	.675	8.439	3.891	0.0000	.2067	.0118	.0048	.0043	.0003	.0000	.0218	.0460	.0681	.005
19	3	.174	.670	8.444	3.887	0.0000	.1877	.0118	.0477	.0427	.0030	.0009	.0198	.0452	.0689	.061
19	4	.200	.670	8.447	3.864	0.0000	.1696	.0118	.0258	.0231	.0027	.0003	.0179	.0462	.0672	.054
20	1	.200	.670	8.448	3.822	0.0000	.1526	.0118	.0040	.0036	.0002	.0000	.0161	.0455	.0618	.004
20	2	.196	.670	8.448	3.779	0.0000	.1374	.0117	.0024	.0022	.0001	.0000	.0145	.0445	.0591	.003
20	3	.193	.666	8.460	3.825	0.0000	.1347	.0118	.1017	.0911	.0063	.0055	.0142	.0452	.0713	.125
20	4	.200	.667	8.468	3.842	0.0000	.1266	.0119	.0710	.0637	.0046	.0026	.0134	.0462	.0667	.092
21	1	.200	.667	8.472	3.829	0.0000	.1151	.0119	.0366	.0328	.0020	.0006	.0122	.0460	.0608	.041
21	2	.197	.667	8.474	3.803	0.0000	.1040	.0118	.0216	.0193	.0012	.0002	.0110	.0454	.0577	.023
21	3	.195	.665	8.491	3.880	0.0000	.1208	.0120	.1386	.1244	.0096	.0135	.0128	.0469	.0827	.192
21	4	.200	.667	8.503	3.932	0.0000	.1248	.0122	.1110	.0997	.0075	.0080	.0132	.0484	.0771	.151
22	1	.200	.667	8.510	3.933	0.0000	.1154	.0122	.0550	.0495	.0032	.0015	.0122	.0485	.0654	.063
22	2	.194	.667	8.516	3.939	0.0000	.1077	.0122	.0611	.0549	.0036	.0019	.0114	.0485	.0653	.071
22	3	.188	.665	8.530	3.999	0.0000	.1167	.0124	.1233	.1109	.0083	.0097	.0123	.0495	.0798	.166
22	4	.200	.665	8.532	3.967	0.0000	.1053	.0123	.0188	.0169	.0016	.0002	.0111	.0496	.0625	.033
23	1	.200	.665	8.533	3.920	0.0000	.0948	.0123	.0024	.0022	.0001	.0000	.0100	.0487	.0588	.003
23	2	.193	.665	8.538	3.917	0.0000	.0879	.0123	.0509	.0458	.0029	.0013	.0093	.0483	.0618	.058
23	3	.185	.661	8.547	3.938	0.0000	.0851	.0123	.0778	.0700	.0048	.0029	.0090	.0484	.0651	.095
23	4	.200	.661	8.551	3.924	0.0000	.0780	.0123	.0382	.0344	.0029	.0007	.0082	.0490	.0609	.058
24	1	.200	.661	8.555	3.908	0.0000	.0715	.0123	.0368	.0332	.0021	.0006	.0076	.0488	.0591	.041
24	2	.197	.664	8.569	3.974	0.0000	.0902	.0125	.1292	.1164	.0091	.0126	.0095	.0502	.0814	.182
24	3	.193	.697	8.588	4.080	.0077	.3786	.0128	.1760	.1588	.0482	.3856	.0400	.0523	.5261	.965
24	4	.200	.699	8.604	4.151	0.0000	.3758	.0130	.1390	.1256	.0103	.0170	.0397	.0545	.1215	.206
25	1	.200	.699	8.606	4.114	0.0000	.3385	.0129	.0181	.0164	.0010	.0002	.0357	.0538	.0907	.020
25	2	.186	.699	8.612	4.112	0.0000	.3083	.0129	.0573	.0518	.0033	.0017	.0325	.0532	.0908	.067
25	3	.172	.693	8.618	4.117	0.0000	.2813	.0130	.0651	.0589	.0041	.0019	.0297	.0526	.0883	.082
25	4	.189	.693	8.618	4.064	0.0000	.2532	.0129	0.0000	0.0000	.0008	0.0000	.0267	.0530	.0806	.017
26	1	.191	.693	8.618	4.012	0.0000	.2279	.0128	0.0000	0.0000	.0001	0.0000	.0241	.0520	.0762	.003
26	2	.175	.693	8.624	4.008	0.0000	.2082	.0128	.0536	.0485	.0035	.0015	.0220	.0508	.0778	.070
26	3	.150	.687	8.631	4.020	0.0000	.1922	.0129	.0704	.0637	.0050	.0023	.0203	.0498	.0774	.101
26	4	.180	.687	8.631	3.968	0.0000	.1730	.0128	0.0000	0.0000	.0015	0.0000	.0183	.0514	.0711	.030
27	1	.188	.687	8.631	3.918	0.0000	.1557	.0127	0.0000	0.0000	.0004	0.0000	.0164	.0504	.0672	.009
27	2	.167	.687	8.635	3.899	0.0000	.1413	.0127	.0342	.0310	.0025	.0006	.0149	.0484	.0664	.050
27	3	.133	.682	8.636	3.866	0.0000	.1273	.0126	.0181	.0164	.0023	.0001	.0134	.0460	.0618	.047
27	4	.133	.682	8.636	3.818	0.0000	.1146	.0125	0.0000	0.0000	0.0000	0.0000	.0121	.0485	.0605	0.000
28	1	.133	.682	8.636	3.770	0.0000	.1031	.0124	0.0000	0.0000	0.0000	0.0000	.0109	.0475	.0584	0.000
28	2	.104	.682	8.636	3.723	0.0000	.0928	.0124	0.0000	0.0000	.0000	0.0000	.0098	.0451	.0549	.001
28	3	.042	.677	8.637	3.682	0.0000	.0835	.0123	.0050	.0045	0.0000	0.0000	.0088	.0427	.0515	0.000
28	4	.042	.677	8.637	3.637	0.0000	.0752	.0122	0.0000	0.0000	0.0000	0.0000	.0079	.0449	.0529	0.000
29	1	.042	.677	8.637	3.593	0.0000	.0677	.0121	0.0000	0.0000	0.0000	0.0000	.0071	.0441	.0512	0.000
29	2	.015	.677	8.637	3.550	0.0000	.0609	.0120	0.0000	0.0000	0.0000	0.0000	.0064	.0419	.0483	0.000
29	3	0.000	.633	8.637	3.510	0.0000	.0548	.0120	.0027	.0025	0.0000	0.0000	.0058	.0397	.0455	0.000
29	4	0.000	.633	8.637	3.468	0.0000	.0493	.0119	0.0000	0.0000	0.0000	0.0000	.0052	.0417	.0469	0.000
30	1	0.000	.633	8.637	3.427	0.0000	.0444	.0118	0.0000	0.0000	0.0000	0.0000	.0047	.0410	.0456	0.000
30	2	0.000	.592	8.637	3.387	0.0000	.0400	.0117	0.0000	0.0000	0.0000	0.0000	.0042	.0381	.0424	0.000
30	3	0.000	.508	8.637	3.348	0.0000	.0360	.0117	.0001	.0001	0.0000	0.0000	.0038	.0353	.0391	0.000
30	4	0.000	.508	8.637	3.309	0.0000	.0324	.0116	0.0000	0.0000	0.0000	0.0000	.0034	.0388	.0422	0.000

SNOW SUMMARY FOR STATION 2 4/70

DAY	SNOWFALL	RAIN	HEAT-EXQ	COVER	PACK WE	LIQUID	NEG-HEAT	TOTAL WATER	OBS WATER EQUIV
1	0.000	0.000	.065	1.00	9.93	.297	.007	10.23	I
2	.635	.197	.020	1.00	10.55	.316	0.000	11.03	I
3	.308	0.000	-.017	1.00	10.85	.316	.020	11.17	I
4	0.000	0.000	-.019	1.00	10.84	.316	.040	11.16	I
5	0.000	0.000	-.016	1.00	10.83	.316	.056	11.14	I
6	0.000	0.000	.048	1.00	10.82	.315	.008	11.13	I
7	.013	0.000	.101	1.00	10.72	.321	.008	11.07	I
8	0.000	0.000	.447	1.00	10.27	.308	0.000	10.71	I
9	0.000	.007	.684	1.00	9.58	.287	0.000	9.97	I
10	0.000	0.000	.023	1.00	9.53	.286	.015	9.83	I
11	0.000	0.000	-.008	1.00	9.52	.285	.023	9.81	I
12	0.000	0.000	.139	1.00	9.39	.282	.005	9.70	I
13	0.000	0.000	.213	1.00	9.16	.275	.010	9.47	I
14	0.000	0.000	.467	1.00	8.70	.261	0.000	9.01	I
15	0.000	0.000	.377	1.00	8.31	.249	0.000	8.59	I
16	0.000	0.000	.734	1.00	7.57	.227	0.000	7.97	I
17	0.000	.276	.915	1.00	6.64	.199	0.000	7.09	I
18	.038	0.000	.151	1.00	6.51	.195	.009	6.73	I
19	0.000	0.000	.068	1.00	6.42	.192	.015	6.63	I
20	.098	.171	.033	1.00	6.49	.192	.002	6.71	I
21	0.000	.202	.218	1.00	6.27	.188	0.000	6.58	I
22	0.000	0.000	.371	1.00	5.89	.177	0.000	6.11	I
23	.004	0.000	.331	.99	5.55	.167	0.000	5.83	I
24	0.000	1.466	.447	.95	5.09	.153	0.000	5.41	I
25	0.000	0.000	.450	.92	4.63	.139	0.000	4.81	I
26	0.000	0.000	.998	.85	3.63	.109	0.000	3.86	I
27	0.000	0.000	1.209	.69	2.41	.072	0.000	2.58	I
28	0.000	0.000	.893	.50	1.50	.045	0.000	1.62	I
29	0.000	0.000	.608	.34	.88	.027	0.000	.91	I
30	0.000	0.000	.454	.22	.42	.013	0.000	.43	I

SIX-HOUR SOIL MOISTURE OUTPUT FOR 4/70 PASSUMPSIC RIVER-H ELKK6=LKK6*(1.0+KV*GWS) GWIN=INFLOW TO GROUNDWATER STORAGE

IDA	IP6	SCEP	UZS	LZS	SGW	RES	SRGX	ELKK6	INFIL	GWIN	IMPV-RO	SUR-RO	INTERFW	GW-FLOW	TOTAL-RO	PRECIP
1	1	.192	.524	7.901	.940	0.0000	.0002	.0050	0.0000	0.0000	.0001	0.0000	.0000	.0047	.0049	.003
1	2	.189	.524	7.901	.935	0.0000	.0002	.0050	0.0000	0.0000	.0001	0.0000	.0000	.0044	.0045	.003
1	3	.181	.524	7.901	.931	0.0000	.0001	.0050	.0007	.0006	.0002	0.0000	.0000	.0040	.0043	.004
1	4	.192	.524	7.901	.926	0.0000	.0001	.0050	0.0000	0.0000	.0005	0.0000	.0000	.0046	.0051	.010
2	1	.197	.524	7.901	.922	0.0000	.0001	.0049	0.0000	0.0000	.0003	0.0000	.0000	.0046	.0048	.005
2	2	.199	.524	7.901	.917	0.0000	.0001	.0049	.0005	.0004	.0002	.0000	.0000	.0045	.0047	.004
2	3	.197	.523	7.901	.915	0.0000	0.0000	.0049	.0019	.0017	.0001	.0000	.0000	.0044	.0045	.003
2	4	.200	.523	7.904	.926	0.0000	.0002	.0050	.0189	.0163	.0011	.0001	.0000	.0046	.0059	.023
3	1	.200	.531	7.920	1.014	0.0000	.0069	.0052	.1076	.0927	.0066	.0038	.0007	.0052	.0164	.133
3	2	.196	.531	7.924	1.029	0.0000	.0065	.0052	.0242	.0209	.0013	.0002	.0007	.0052	.0073	.026
3	3	.192	.530	7.925	1.030	0.0000	.0059	.0052	.0068	.0059	.0005	.0000	.0006	.0050	.0061	.010
3	4	.197	.530	7.925	1.025	0.0000	.0053	.0052	0.0000	0.0000	.0003	0.0000	.0006	.0053	.0061	.005
4	1	.200	.530	7.925	1.020	0.0000	.0047	.0052	.0008	.0007	.0002	.0000	.0005	.0053	.0060	.004
4	2	.192	.530	7.925	1.017	0.0000	.0043	.0052	.0024	.0021	.0001	.0000	.0005	.0049	.0055	.003
4	3	.179	.529	7.925	1.012	0.0000	.0038	.0051	.0008	.0007	.0001	0.0000	.0004	.0044	.0050	.003
4	4	.181	.529	7.925	1.007	0.0000	.0035	.0051	0.0000	0.0000	.0001	0.0000	.0004	.0052	.0057	.003
5	1	.184	.529	7.925	1.002	0.0000	.0031	.0051	0.0000	0.0000	.0001	0.0000	.0003	.0052	.0056	.003
5	2	.180	.529	7.925	.997	0.0000	.0028	.0051	0.0000	0.0000	.0001	0.0000	.0003	.0048	.0052	.003
5	3	.168	.529	7.926	.992	0.0000	.0025	.0051	.0008	.0006	.0001	0.0000	.0003	.0044	.0048	.003
5	4	.171	.529	7.926	.987	0.0000	.0023	.0051	0.0000	0.0000	.0001	0.0000	.0002	.0051	.0054	.003
6	1	.173	.529	7.926	.982	0.0000	.0020	.0051	0.0000	0.0000	.0001	0.0000	.0002	.0050	.0054	.003
6	2	.169	.529	7.926	.977	0.0000	.0018	.0051	0.0000	0.0000	.0001	0.0000	.0002	.0046	.0050	.003
6	3	.158	.528	7.926	.973	0.0000	.0017	.0051	.0007	.0006	.0001	0.0000	.0002	.0042	.0045	.003
6	4	.160	.528	7.926	.968	0.0000	.0015	.0051	0.0000	0.0000	.0001	0.0000	.0002	.0049	.0052	.003
7	1	.163	.528	7.926	.963	0.0000	.0013	.0050	0.0000	0.0000	.0001	0.0000	.0001	.0049	.0051	.003
7	2	.159	.528	7.926	.958	0.0000	.0012	.0050	0.0000	0.0000	.0001	0.0000	.0001	.0045	.0048	.003
7	3	.156	.527	7.926	.954	0.0000	.0011	.0050	.0007	.0006	.0005	0.0000	.0001	.0042	.0048	.010
7	4	.200	.527	7.929	.967	0.0000	.0012	.0050	.0203	.0176	.0033	.0001	.0001	.0049	.0084	.066
8	1	.200	.527	7.931	.976	0.0000	.0012	.0051	.0167	.0144	.0009	.0001	.0001	.0050	.0061	.018
8	2	.193	.527	7.933	.983	0.0000	.0011	.0051	.0141	.0122	.0008	.0000	.0001	.0047	.0056	.015
8	3	.185	.531	7.947	1.056	0.0000	.0056	.0052	.0908	.0784	.0057	.0026	.0006	.0048	.0137	.115
8	4	.200	.546	7.968	1.176	0.0000	.0213	.0055	.1456	.1259	.0106	.0090	.0022	.0065	.0283	.211
9	1	.200	.549	7.980	1.240	0.0000	.0234	.0057	.0821	.0711	.0049	.0023	.0025	.0070	.0167	.097
9	2	.189	.551	7.989	1.286	0.0000	.0233	.0058	.0619	.0536	.0035	.0013	.0025	.0069	.0141	.071
9	3	.177	.573	8.017	1.438	0.0000	.0605	.0061	.1851	.1606	.0149	.0217	.0064	.0077	.0507	.298
9	4	.200	.588	8.043	1.576	0.0000	.0880	.0064	.1706	.1483	.0138	.0183	.0093	.0101	.0516	.276
10	1	.200	.590	8.053	1.625	0.0000	.0827	.0065	.0693	.0603	.0040	.0019	.0087	.0106	.0253	.080
10	2	.192	.590	8.055	1.632	0.0000	.0747	.0065	.0203	.0177	.0011	.0001	.0079	.0103	.0194	.022
10	3	.183	.587	8.056	1.627	0.0000	.0672	.0065	.0056	.0049	.0006	.0000	.0071	.0098	.0175	.012
10	4	.200	.587	8.058	1.627	0.0000	.0606	.0065	.0125	.0109	.0015	.0001	.0064	.0107	.0186	.030
11	1	.200	.588	8.059	1.625	0.0000	.0546	.0065	.0098	.0085	.0005	.0000	.0058	.0106	.0169	.010
11	2	.188	.588	8.060	1.619	0.0000	.0492	.0065	.0049	.0043	.0003	.0000	.0052	.0100	.0154	.005
11	3	.169	.585	8.060	1.610	0.0000	.0442	.0065	.0020	.0017	.0002	0.0000	.0047	.0093	.0141	.004
11	4	.171	.585	8.060	1.599	0.0000	.0398	.0064	0.0000	0.0000	.0001	0.0000	.0042	.0104	.0147	.003
12	1	.174	.585	8.060	1.589	0.0000	.0358	.0064	0.0000	0.0000	.0001	0.0000	.0038	.0103	.0142	.003
12	2	.167	.585	8.060	1.579	0.0000	.0323	.0064	0.0000	0.0000	.0002	0.0000	.0034	.0096	.0132	.005
12	3	.167	.583	8.060	1.571	0.0000	.0290	.0064	.0019	.0017	.0012	0.0000	.0031	.0089	.0131	.023
12	4	.200	.584	8.066	1.596	0.0000	.0273	.0064	.0414	.0361	.0039	.0006	.0029	.0103	.0178	.079
13	1	.200	.584	8.068	1.602	0.0000	.0247	.0064	.0179	.0156	.0010	.0001	.0026	.0104	.0141	.019
13	2	.192	.584	8.070	1.601	0.0000	.0223	.0064	.0115	.0101	.0006	.0000	.0024	.0099	.0130	.012
13	3	.183	.583	8.077	1.635	0.0000	.0217	.0065	.0503	.0439	.0031	.0009	.0023	.0098	.0161	.063
13	4	.200	.586	8.090	1.706	0.0000	.0268	.0067	.0949	.0829	.0066	.0039	.0028	.0114	.0248	.132
14	1	.200	.586	8.093	1.715	0.0000	.0245	.0067	.0229	.0200	.0012	.0002	.0026	.0115	.0155	.025
14	2	.191	.586	8.095	1.719	0.0000	.0222	.0067	.0185	.0162	.0010	.0001	.0023	.0111	.0146	.020
14	3	.181	.590	8.113	1.818	0.0000	.0350	.0069	.1279	.1118	.0087	.0081	.0037	.0117	.0321	.174
14	4	.200	.599	8.135	1.939	0.0000	.0591	.0072	.1543	.1352	.0120	.0148	.0062	.0140	.0470	.239
15	1	.200	.600	8.140	1.958	0.0000	.0541	.0072	.0372	.0326	.0021	.0005	.0057	.0142	.0225	.041
15	2	.186	.600	8.143	1.963	0.0000	.0491	.0072	.0224	.0197	.0012	.0002	.0052	.0136	.0202	.024
15	3	.171	.601	8.158	2.045	0.0000	.0551	.0074	.1109	.0973	.0075	.0058	.0058	.0138	.0330	.151
15	4	.200	.606	8.176	2.144	0.0000	.0677	.0076	.1309	.1150	.0102	.0096	.0071	.0165	.0434	.204
16	1	.200	.606	8.179	2.148	0.0000	.0614	.0076	.0236	.0208	.0013	.0002	.0065	.0165	.0245	.026

16	2	.187	.607	8.183	2.158	0.0000	.0559	.0077	.0304	.0267	.0017	.0004	.0059	.0160	.0239	.033
16	3	.173	.615	8.207	2.290	0.0000	.0914	.0079	.1710	.1506	.0136	.0217	.0096	.0170	.0619	.272
16	4	.200	.625	8.231	2.420	0.0000	.1271	.0082	.1702	.1501	.0147	.0235	.0134	.0201	.0718	.294
17	1	.200	.629	8.247	2.507	0.0000	.1309	.0084	.1218	.1076	.0080	.0086	.0138	.0213	.0517	.160
17	2	.181	.633	8.264	2.601	0.0000	.1390	.0087	.1327	.1173	.0090	.0110	.0147	.0218	.0565	.180
17	3	.162	.646	8.289	2.747	.0011	.2264	.0090	.1927	.1706	.0203	.0524	.0239	.0229	.1195	.405
17	4	.200	.659	8.317	2.885	0.0000	.2988	.0093	.1863	.1653	.0205	.0490	.0315	.0271	.1280	.410
18	1	.200	.663	8.337	2.993	0.0000	.3057	.0095	.1538	.1366	.0115	.0189	.0323	.0288	.0915	.229
18	2	.194	.663	8.340	2.981	0.0000	.2755	.0095	.0194	.0172	.0010	.0002	.0291	.0284	.0586	.021
18	3	.187	.659	8.346	2.997	0.0000	.2498	.0096	.0503	.0448	.0029	.0010	.0264	.0283	.0584	.058
18	4	.200	.659	8.354	3.028	0.0000	.2293	.0096	.0676	.0602	.0046	.0023	.0242	.0295	.0606	.092
19	1	.200	.659	8.356	3.013	0.0000	.2066	.0096	.0163	.0145	.0009	.0001	.0218	.0293	.0521	.018
19	2	.184	.659	8.357	2.991	0.0000	.1859	.0096	.0071	.0063	.0004	.0000	.0196	.0281	.0481	.008
19	3	.162	.654	8.357	2.966	0.0000	.1673	.0095	.0045	.0040	.0005	0.0000	.0177	.0269	.0451	.011
19	4	.200	.655	8.359	2.953	0.0000	.1509	.0095	.0175	.0156	.0028	.0001	.0159	.0284	.0472	.057
20	1	.200	.655	8.361	2.937	0.0000	.1359	.0095	.0126	.0113	.0007	.0001	.0143	.0281	.0432	.014
20	2	.196	.655	8.361	2.914	0.0000	.1223	.0094	.0059	.0052	.0003	.0000	.0129	.0275	.0408	.006
20	3	.191	.650	8.365	2.917	0.0000	.1109	.0094	.0340	.0303	.0019	.0004	.0117	.0273	.0413	.037
20	4	.200	.652	8.378	2.979	0.0000	.1115	.0096	.1020	.0908	.0069	.0060	.0118	.0289	.0535	.138
21	1	.200	.652	8.380	2.965	0.0000	.1006	.0096	.0167	.0149	.0009	.0001	.0106	.0286	.0403	.018
21	2	.197	.652	8.381	2.946	0.0000	.0906	.0095	.0110	.0098	.0006	.0000	.0096	.0282	.0384	.012
21	3	.194	.649	8.391	2.993	0.0000	.0884	.0096	.0851	.0759	.0050	.0034	.0093	.0288	.0466	.101
21	4	.200	.652	8.408	3.083	0.0000	.1049	.0099	.1347	.1202	.0097	.0128	.0111	.0307	.0643	.195
22	1	.200	.653	8.418	3.131	0.0000	.1032	.0100	.0896	.0800	.0055	.0044	.0109	.0315	.0524	.110
22	2	.193	.654	8.423	3.138	0.0000	.0946	.0100	.0433	.0387	.0024	.0009	.0100	.0314	.0446	.049
22	3	.186	.652	8.438	3.214	0.0000	.1031	.0102	.1221	.1092	.0082	.0090	.0109	.0323	.0603	.164
22	4	.200	.654	8.451	3.277	0.0000	.1071	.0103	.1082	.0969	.0077	.0072	.0113	.0342	.0604	.154
23	1	.200	.654	8.454	3.270	0.0000	.0972	.0103	.0306	.0275	.0017	.0004	.0103	.0341	.0465	.034
23	2	.192	.654	8.456	3.251	0.0000	.0877	.0103	.0161	.0145	.0009	.0001	.0093	.0334	.0437	.017
23	3	.184	.650	8.464	3.282	0.0000	.0838	.0104	.0728	.0653	.0045	.0024	.0089	.0335	.0493	.090
23	4	.200	.652	8.476	3.337	0.0000	.0878	.0105	.1014	.0909	.0073	.0061	.0093	.0355	.0581	.146
24	1	.200	.653	8.485	3.376	0.0000	.0867	.0106	.0833	.0748	.0051	.0038	.0091	.0362	.0543	.102
24	2	.197	.656	8.500	3.453	0.0000	.1016	.0108	.1280	.1149	.0089	.0117	.0107	.0375	.0688	.178
24	3	.193	.700	8.520	3.575	.0112	.3925	.0111	.1807	.1624	.0583	.5543	.0414	.0396	.6937	1.167
24	4	.200	.709	8.538	3.688	.0014	.5007	.0114	.1724	.1551	.0216	.0765	.0528	.0424	.1933	.432
25	1	.200	.710	8.551	3.750	0.0000	.4702	.0115	.1166	.1050	.0078	.0096	.0496	.0437	.1107	.155
25	2	.186	.710	8.556	3.745	0.0000	.4251	.0115	.0431	.0388	.0024	.0009	.0449	.0430	.0912	.049
25	3	.172	.704	8.574	3.837	0.0000	.4228	.0117	.1534	.1383	.0119	.0196	.0446	.0441	.1202	.237
25	4	.200	.705	8.586	3.886	0.0000	.3959	.0119	.1058	.0955	.0083	.0075	.0418	.0468	.1043	.166
26	1	.200	.705	8.588	3.862	0.0000	.3569	.0119	.0250	.0226	.0014	.0003	.0377	.0464	.0857	.027
26	2	.176	.706	8.599	3.906	0.0000	.3348	.0120	.1004	.0906	.0065	.0066	.0353	.0462	.0945	.129
26	3	.152	.708	8.617	4.014	.0019	.4778	.0122	.1751	.1582	.0255	.0975	.0504	.0472	.2206	.510
26	4	.200	.710	8.634	4.097	0.0000	.4752	.0125	.1481	.1341	.0140	.0218	.0502	.0517	.1376	.280
27	1	.200	.711	8.645	4.134	0.0000	.4413	.0126	.0992	.0898	.0064	.0065	.0466	.0526	.1121	.128
27	2	.169	.715	8.665	4.225	0.0000	.4699	.0128	.1612	.1461	.0147	.0348	.0436	.0533	.1524	.295
27	3	.138	.717	8.681	4.324	.0025	.6318	.0130	.1718	.1559	.0292	.1291	.0667	.0540	.2789	.584
27	4	.200	.719	8.697	4.391	0.0000	.6066	.0133	.1389	.1261	.0135	.0180	.0640	.0590	.1546	.271
28	1	.200	.719	8.707	4.416	0.0000	.5581	.0133	.0933	.0848	.0059	.0057	.0589	.0597	.1303	.119
28	2	.171	.721	8.723	4.489	0.0000	.5517	.0135	.1474	.1341	.0120	.0233	.0582	.0602	.1537	.239
28	3	.142	.718	8.739	4.578	.0012	.6209	.0138	.1684	.1533	.0203	.0597	.0655	.0609	.2065	.405
28	4	.200	.719	8.751	4.610	0.0000	.5766	.0139	.1069	.0974	.0100	.0083	.0609	.0650	.1442	.200
29	1	.200	.720	8.758	4.619	0.0000	.5277	.0140	.0811	.0739	.0050	.0041	.0557	.0654	.1303	.100
29	2	.174	.721	8.772	4.670	0.0000	.5069	.0141	.1295	.1181	.0095	.0149	.0535	.0656	.1436	.191
29	3	.146	.717	8.791	4.750	0.0000	.5354	.0143	.1637	.1494	.0163	.0369	.0565	.0663	.1760	.325
29	4	.200	.717	8.795	4.713	0.0000	.4831	.0143	.0336	.0307	.0046	.0006	.0510	.0685	.1246	.091
30	1	.200	.717	8.797	4.669	0.0000	.4356	.0143	.0266	.0243	.0015	.0004	.0460	.0676	.1154	.029
30	2	.160	.718	8.808	4.700	0.0000	.4116	.0144	.1092	.0998	.0074	.0091	.0434	.0666	.1265	.148
30	3	.118	.711	8.820	4.740	0.0000	.3922	.0145	.1198	.1095	.0098	.0101	.0414	.0656	.1269	.196
30	4	.200	.711	8.822	4.690	0.0000	.3534	.0145	.0204	.0187	.0052	.0002	.0373	.0688	.1115	.104

MONTHLY SUMMARY FOR PASSUMPSIC RIVER AT PASSUMPSIC,VERMONT -- TWO SUB-AREAS

APR 1970

PRECIPITATION GAGE SUMMARY

SOIL MOISTURE ACCOUNTING VOLUMES

RG	PRECIP GAGE NAME	TOTAL RO	SURFACE RO	IMPV RO	INTERFLOW	GW-FLOW	RECHARGE	PRECIP	POTENTIAL-ET	ACTUAL-ET
1	PASSUMPSIC RIVER-L	6.745	.967	.506	1.454	3.818	0.000	10.12	1.200	.912
2	PASSUMPSIC RIVER-H	6.990	1.521	.662	1.945	2.863	0.000	13.24	1.200	1.105

SOIL MOISTURE VARIABLES AT END OF MONTH

PRECIP GAGE NAME	UZS	LZS	SGW	GWS	RES	SRGX	SCEP	BALANCE
PASSUMPSIC RIVER-L	.51	8.64	3.31	3.41	0.00	.03	0.00	-.000
PASSUMPSIC RIVER-H	.71	8.82	4.69	4.71	0.00	.35	.20	-.000

SNOW SUMMARY

RG NO.	SNOWFALL	RAIN	PACK RO	BALANCE
1	.695	2.626	10.118	-.000
2	1.097	2.320	13.238	-.000

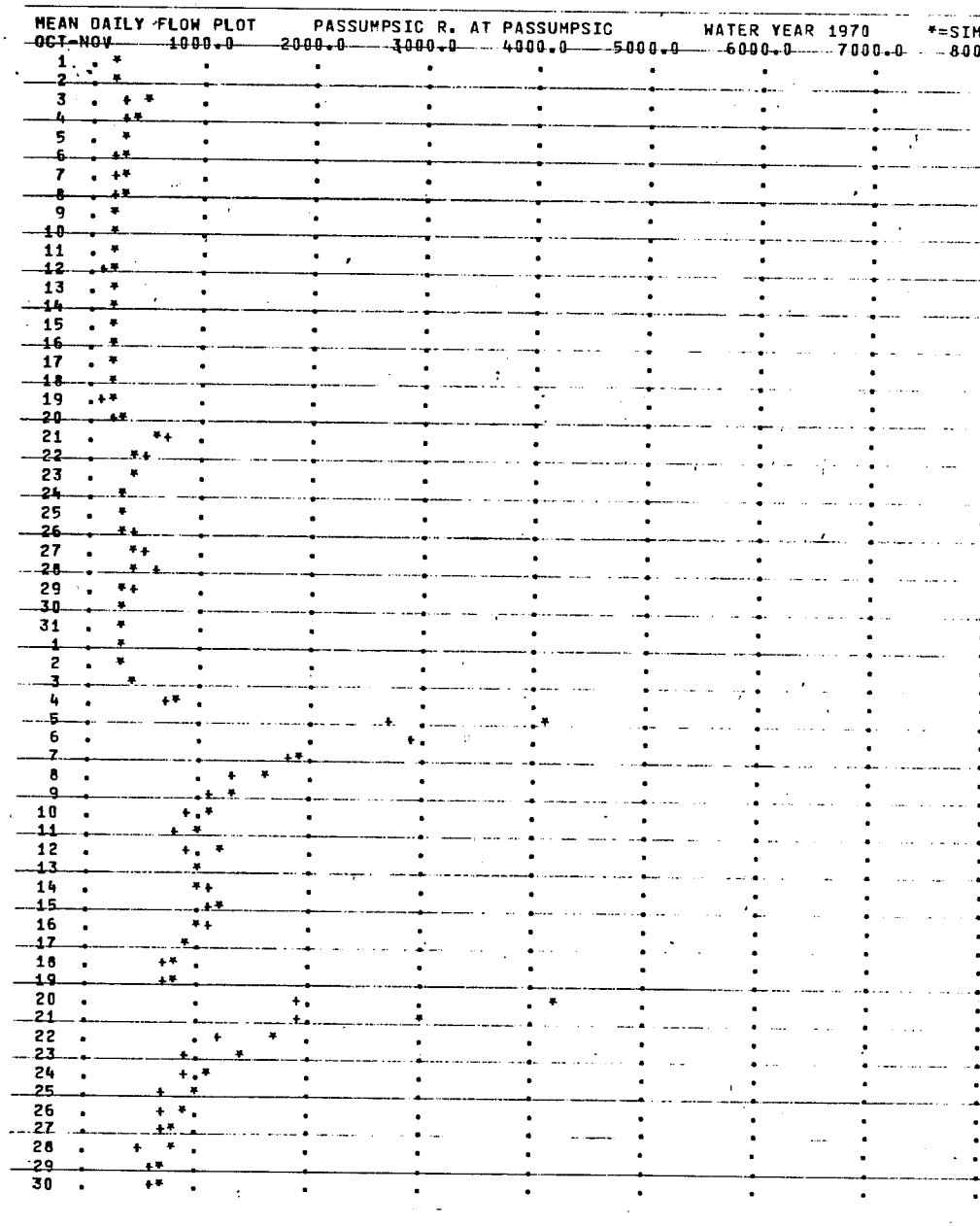
WATER YEAR SUMMARY FOR--PASSUMPSIC R. AT PASSUMPSIC

WATER YEAR 1970

MEAN DAILY DISCHARGE SUMMARY

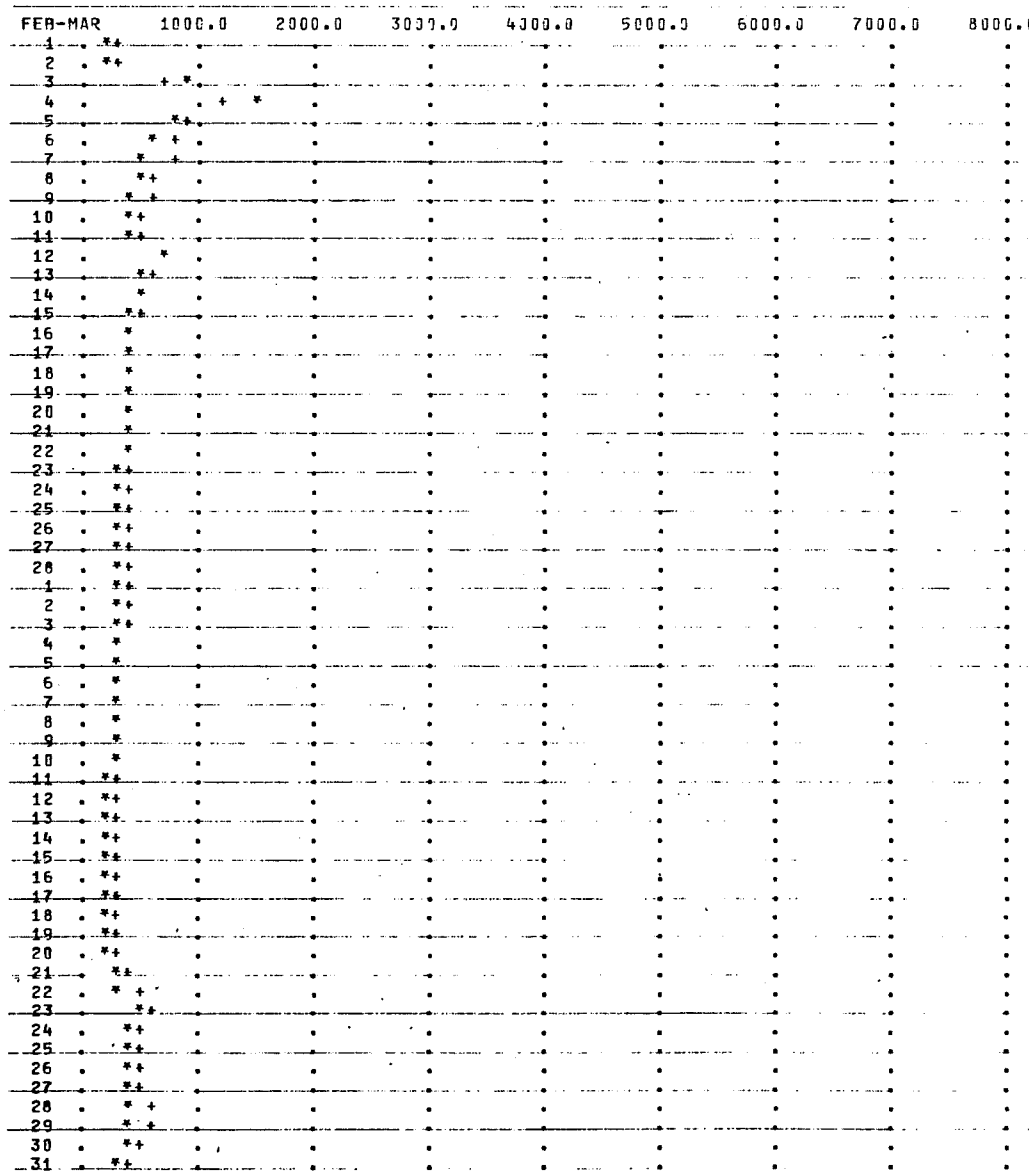
DAY	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	ANNUAL
1	244.4	299.9	634.8	378.4	213.1	300.8	332.5	3765.7	412.9	811.9	255.0	194.0	
2	236.3	299.2	606.1	368.6	226.8	294.9	422.1	3266.4	511.0	509.0	610.9	168.7	
3	490.1	426.1	581.6	359.7	901.4	289.2	1085.6	2908.3	515.6	515.5	283.0	158.7	
4	359.3	792.7	558.5	351.4	1519.3	283.4	701.9	2693.7	463.2	508.1	351.6	567.9	
5	286.4	4077.1	536.7	343.3	326.9	278.1	553.4	2334.6	402.8	839.1	213.5	440.4	
6	271.6	3373.8	517.6	335.3	635.5	273.1	490.0	2152.6	1333.1	538.9	190.3	311.7	
7	262.6	1913.2	520.3	327.6	546.8	268.2	477.2	1938.4	800.7	440.9	151.8	273.1	
8	270.4	1565.2	508.9	320.7	487.8	263.2	626.9	1721.6	557.3	382.7	129.3	257.1	
9	248.5	1271.2	538.4	313.9	446.3	257.5	1356.5	1563.6	467.3	336.1	124.2	246.4	
10	225.3	1067.7	498.6	307.1	417.1	252.6	2169.9	1537.9	415.2	291.5	119.3	247.9	
11	214.1	1001.2	1347.9	300.6	437.5	248.1	1453.0	1409.2	382.3	398.3	154.5	324.7	
12	207.4	1160.3	1793.1	294.7	726.3	243.4	1129.0	1371.5	375.1	380.6	150.7	199.6	
13	200.8	951.9	1075.6	289.1	545.8	238.6	1183.6	1210.6	282.9	374.3	102.3	178.2	
14	210.9	965.9	891.2	283.2	479.0	235.3	1445.9	1120.8	234.9	264.2	102.6	159.9	
15	215.2	1222.5	789.0	277.9	448.8	230.8	2033.4	1019.6	215.1	290.6	96.4	187.7	
16	188.3	947.7	715.3	272.8	426.6	226.7	2251.8	943.0	205.1	348.4	81.2	388.5	
17	185.8	872.7	660.5	268.0	409.0	222.3	3323.0	1785.7	208.1	354.3	75.8	249.2	
18	213.7	824.7	618.7	263.1	394.3	217.4	4676.4	3300.6	238.0	257.5	68.7	223.1	
19	184.9	840.9	585.7	258.7	381.7	213.4	3377.5	1599.4	239.3	338.9	62.7	221.8	
20	314.3	4180.4	557.2	254.5	370.6	224.2	2677.1	1240.9	190.9	214.8	75.3	166.9	
21	579.6	3008.1	533.2	250.4	360.6	322.6	2569.0	1047.6	170.0	173.2	338.1	146.5	
22	396.5	1715.8	512.9	246.3	351.5	306.6	2816.9	951.2	186.9	162.1	131.4	278.0	
23	367.6	1360.5	494.6	242.5	343.0	507.9	2778.3	942.6	165.4	134.0	332.4	228.8	
24	319.5	1147.9	478.3	238.8	335.1	435.5	3656.9	763.2	122.8	128.0	493.8	178.6	
25	310.3	999.3	463.4	235.2	327.6	447.3	9468.0	711.7	127.3	125.4	150.7	159.7	
26	305.7	893.5	449.4	231.7	320.2	412.4	4805.4	757.5	129.4	113.8	122.0	199.2	
27	356.0	813.7	435.7	228.3	313.4	400.9	4941.1	888.2	758.3	105.6	210.9	357.0	
28	369.4	753.6	422.2	225.1	307.0	384.7	5489.0	641.3	663.9	100.6	196.7	374.6	
29	333.0	707.2	410.2	221.9		379.1	4960.8	573.4	331.6	115.7	695.8	338.6	
30	310.2	668.1	399.0	218.8		354.7	4399.2	495.9	692.5	96.3	222.8	309.9	
31	308.8		388.7	215.8		338.6		434.8		88.6	259.5		
TOTAL	8987.	40162.	19503.	8723.	13499.	9352.	77651.	47091.	11799.	9739.	6553.	7736.	260797. CFSD
	.766	3.424	1.663	.744	1.151	.797	6.621	4.015	1.006	.830	.559	.660	22.24 INCHES
													517942. ACRE-FT
OBSV.	8836.	31282.	19957.	10670.	14540.	11840.	82180.	39040.	13179.	7982.	5570.	6175.	251251. CFSD
	.753	2.667	1.702	.910	1.240	1.010	7.007	3.329	1.124	.681	.475	.526	21.42 INCHES
													498984. ACRE-FT

MEAN DAILY FLOW PLOT PASSUMPSIC R. AT PASSUMPSIC WATER YEAR 1970 *=SIMULATED +=OBSERVED

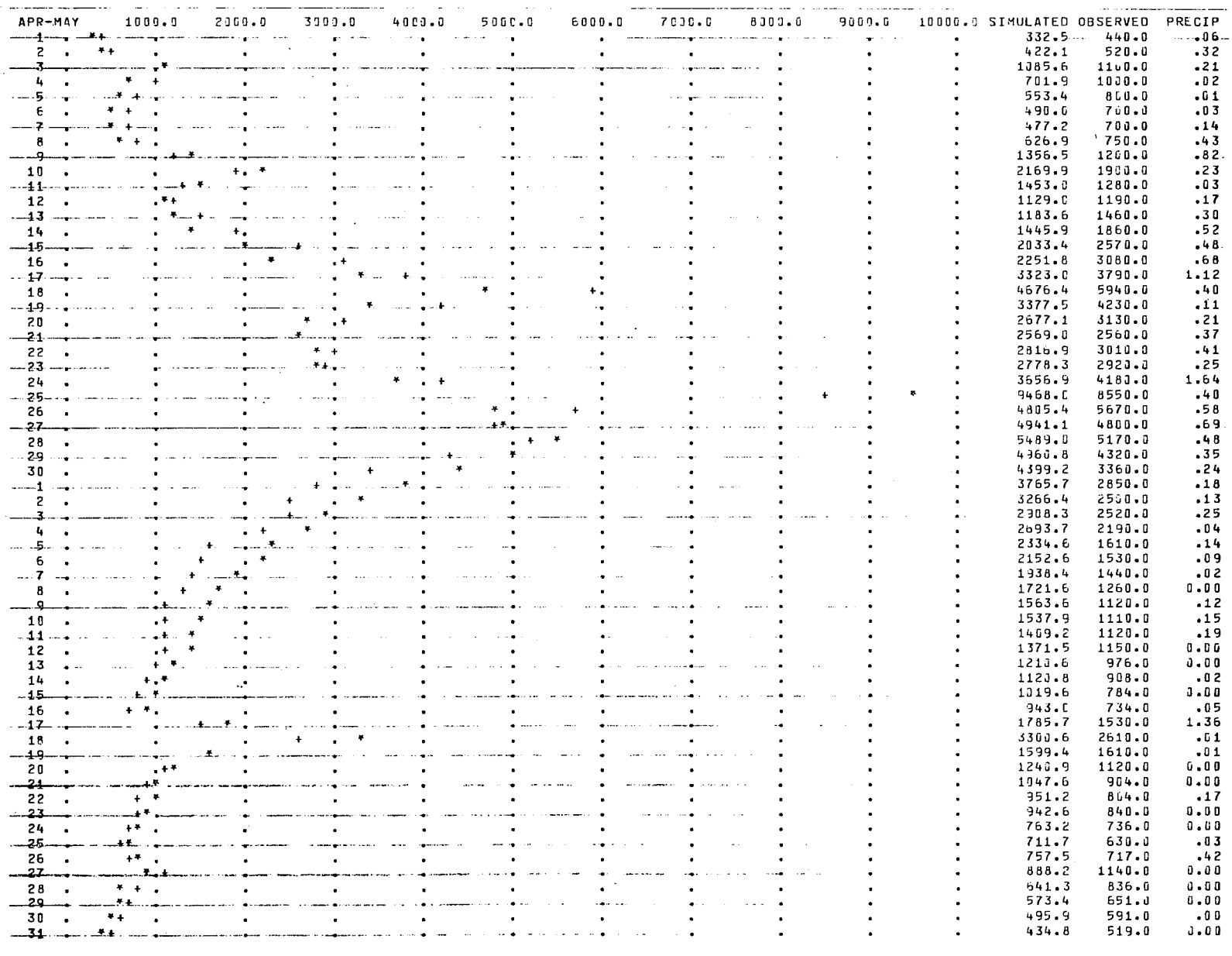


	SIMULATED	OBSERVED	PRECIP
OCT 1	244.4	192.0	0.00
2	236.3	169.0	.15
3	490.1	283.0	.41
4	359.3	342.0	.00
5	286.4	282.0	0.00
6	271.6	231.0	0.00
7	262.6	211.0	.00
8	270.4	189.0	.04
9	248.5	175.0	0.00
10	225.3	188.0	0.00
11	214.1	168.0	0.00
12	207.4	131.0	0.00
13	200.8	181.0	0.00
14	210.9	183.0	.05
15	215.2	176.0	0.00
16	188.3	168.0	.00
17	185.8	172.0	.04
18	213.7	168.0	.03
19	184.9	117.0	0.00
20	314.3	231.0	.77
21	579.6	700.0	.09
22	396.5	541.0	.19
23	367.6	426.0	.01
24	319.5	327.0	.02
25	310.3	311.0	.03
26	305.7	389.0	.07
27	356.0	513.0	.19
28	369.4	583.0	.05
29	333.0	440.0	.02
30	310.2	334.0	.03
31	308.8	315.0	.02
NOV 1	299.9	261.0	.02
2	299.2	276.0	.21
3	426.1	372.0	.07
4	792.7	683.0	1.76
5	4077.1	2660.0	.92
6	3373.8	2950.0	.23
7	1913.2	1760.0	.10
8	1565.2	1340.0	.15
9	1271.2	1150.0	.03
10	1067.7	905.0	.03
11	1001.2	827.0	.27
12	1160.3	920.0	.04
13	951.9	1040.0	.09
14	965.9	1100.0	.28
15	1222.5	1080.0	.08
16	987.7	1100.0	.01
17	872.7	869.0	.02
18	824.7	768.0	.10
19	840.9	701.0	.27
20	4180.4	1890.0	1.01
21	3008.1	1880.0	.01
22	1715.8	1180.0	.01
23	1360.5	921.0	.01
24	1147.9	851.0	.01
25	999.3	680.0	.01
26	893.5	740.0	.01
27	813.7	700.0	.01
28	753.6	500.0	.01
29	707.2	610.0	.01
30	668.1	628.0	.01

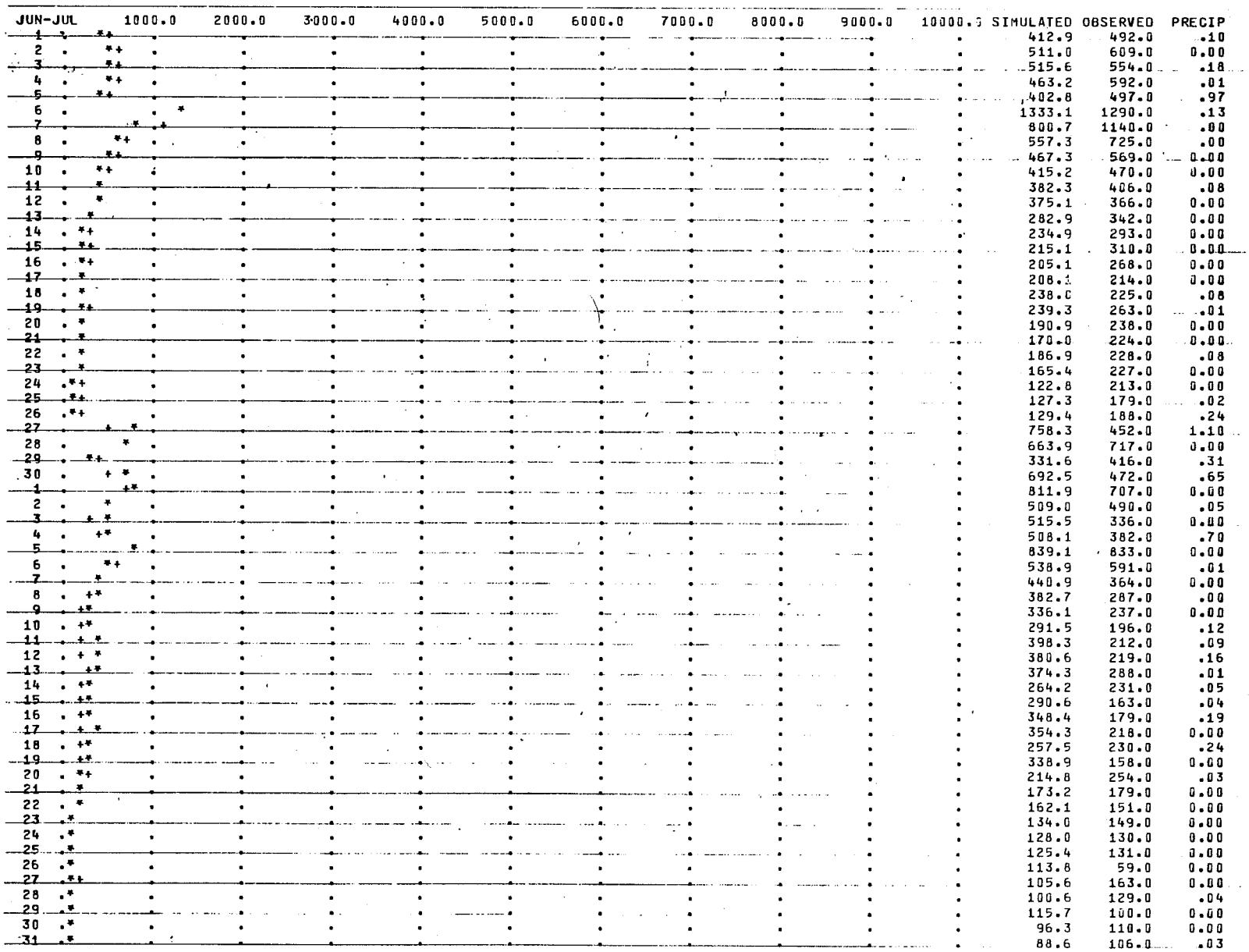
DEC-JAN	1000.0	2000.0	3000.0	4000.0	5000.0	6000.0	7000.0	8000.0	9000.0	10000.J	SIMULATED	OBSERVED	PRECIP
1											634.8	560.0	.01
2											606.1	480.0	.01
3											581.6	380.0	.01
4											558.5	410.0	.01
5											536.7	390.0	.01
6											517.6	390.0	.01
7											500.3	340.0	.01
8											508.9	434.0	.08
9											538.4	648.0	.02
10											498.6	781.0	.08
11											1347.9	1610.0	.92
12											1793.1	2480.0	.04
13											1075.6	1420.0	.01
14											891.2	901.0	.01
15											789.0	843.0	.01
16											715.3	670.0	.01
17											660.5	550.0	.01
18											618.7	500.0	.01
19											585.7	480.0	.01
20											557.2	450.0	.01
21											533.2	410.0	.01
22											512.9	440.0	.01
23											494.6	400.0	.01
24											478.3	370.0	.01
25											463.4	340.0	.01
26											449.4	370.0	.01
27											435.7	550.0	.01
28											422.2	650.0	.01
29											410.2	600.0	.01
30											399.0	570.0	.01
31											388.7	540.0	.01
1											378.4	500.0	.01
2											368.6	490.0	.01
3											359.7	470.0	.01
4											351.4	460.0	.01
5											343.3	450.0	.01
6											335.3	440.0	.01
7											327.6	430.0	.01
8											320.7	420.0	.01
9											313.9	410.0	.01
10											307.1	380.0	.01
11											300.6	370.0	.01
12											294.7	340.0	.01
13											289.1	330.0	.01
14											283.2	320.0	.01
15											277.9	310.0	.01
16											272.8	290.0	.01
17											268.0	280.0	.01
18											263.1	290.0	.01
19											258.7	290.0	.01
20											254.5	270.0	.01
21											250.4	260.0	.01
22											246.3	270.0	.01
23											242.5	300.0	.01
24											238.8	280.0	.01
25											235.2	280.0	.01
26											231.7	280.0	.01
27											228.3	270.0	.01
28											225.1	270.0	.01
29											221.9	280.0	.01
30											218.8	320.0	.01
31											215.8	320.0	.01



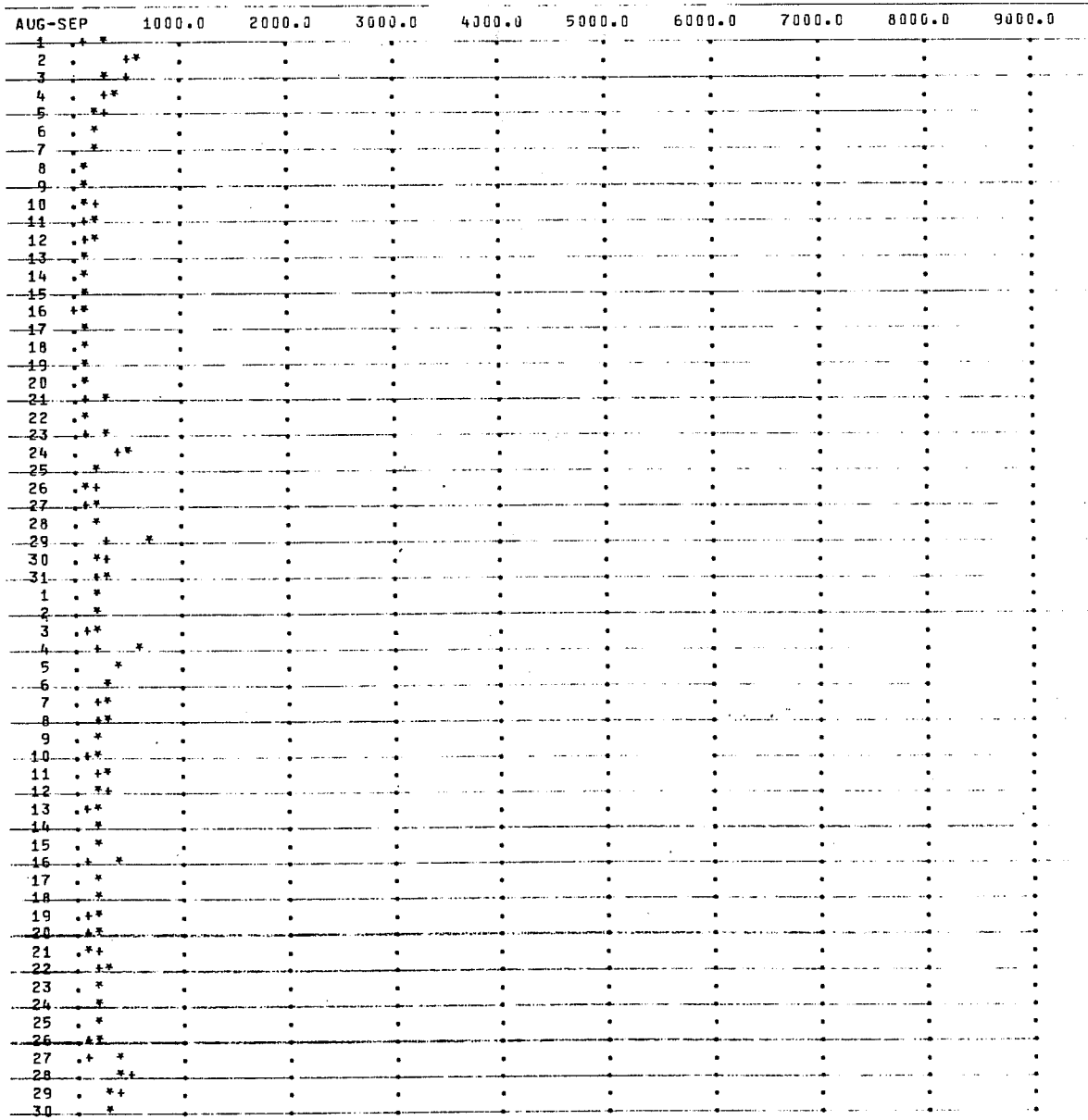
	SIMULATED	OBSERVED	PRECIP
1	213.1	300.0	.01
2	226.8	300.0	.22
3	901.4	700.0	.86
4	1519.3	1200.0	.03
5	826.9	900.0	.01
6	635.5	820.0	.01
7	546.8	750.0	.01
8	487.8	640.0	.01
9	446.3	570.0	.01
10	417.0	520.0	.03
11	437.5	550.0	.29
12	726.3	700.0	.03
13	545.8	560.0	.01
14	479.0	480.0	.01
15	448.8	450.0	.01
16	426.6	440.0	.01
17	409.0	430.0	.01
18	394.3	420.0	.01
19	381.7	420.0	.01
20	370.6	410.0	.01
21	360.6	400.0	.01
22	351.5	390.0	.01
23	343.0	380.0	.01
24	335.1	370.0	.01
25	327.6	370.0	.01
26	320.2	360.0	.01
27	313.4	360.0	.01
28	307.0	350.0	.01
1	300.8	350.0	.01
2	294.9	350.0	.01
3	289.2	350.0	.01
4	283.4	340.0	.01
5	278.1	340.0	.01
6	273.1	340.0	.01
7	268.2	330.0	.01
8	263.2	320.0	.01
9	257.5	320.0	.01
10	252.6	310.0	.01
11	248.1	310.0	.01
12	243.4	300.0	.01
13	238.6	300.0	.01
14	235.3	300.0	.01
15	230.8	290.0	.01
16	226.7	280.0	.01
17	222.3	270.0	.01
18	217.4	270.0	.01
19	213.4	270.0	.02
20	224.2	300.0	.13
21	322.6	400.0	.05
22	306.6	520.0	.23
23	507.9	600.0	.13
24	435.5	550.0	.12
25	447.3	500.0	.06
26	412.4	450.0	.05
27	400.9	520.0	.04
28	384.7	620.0	.04
29	379.1	560.0	.02
30	354.7	450.0	.01
31	338.6	430.0	.01



	SIMULATED	OBSERVED	PRECIP
1	332.5	440.0	.06
2	422.1	520.0	.32
3	1085.6	1100.0	.21
4	701.9	1000.0	.02
5	553.4	800.0	.01
6	490.0	700.0	.03
7	477.2	700.0	.14
8	626.9	750.0	.43
9	1356.5	1200.0	.82
10	2169.9	1900.0	.23
11	1453.0	1280.0	.03
12	1129.0	1190.0	.17
13	1183.6	1460.0	.30
14	1445.9	1860.0	.52
15	2033.4	2570.0	.48
16	2251.8	3080.0	.68
17	3323.0	3790.0	1.12
18	4676.4	5940.0	.40
19	3377.5	4230.0	.11
20	2677.1	3130.0	.21
21	2569.0	2560.0	.37
22	2816.9	3010.0	.41
23	2778.3	2920.0	.25
24	3656.9	4180.0	1.64
25	9468.0	8550.0	.40
26	4805.4	5670.0	.58
27	4941.1	4800.0	.69
28	5489.0	5170.0	.48
29	4960.8	4320.0	.35
30	4399.2	3360.0	.24
1	3765.7	2850.0	.18
2	3266.4	2500.0	.13
3	2308.3	2520.0	.25
4	2693.7	2190.0	.04
5	2334.6	1610.0	.14
6	2152.6	1530.0	.09
7	1938.4	1440.0	.02
8	1721.6	1260.0	0.00
9	1563.6	1120.0	.12
10	1537.9	1110.0	.15
11	1409.2	1120.0	.19
12	1371.5	1150.0	0.00
13	1210.6	976.0	0.00
14	1120.8	908.0	.02
15	1019.6	784.0	0.00
16	943.0	734.0	.05
17	1785.7	1530.0	1.36
18	3300.6	2610.0	.01
19	1599.4	1610.0	.01
20	1240.9	1120.0	0.00
21	1047.6	904.0	0.00
22	951.2	804.0	.17
23	942.6	840.0	0.00
24	763.2	736.0	0.00
25	711.7	630.0	.03
26	757.5	717.0	.42
27	888.2	1140.0	0.00
28	641.3	836.0	0.00
29	573.4	651.0	0.00
30	495.9	591.0	.00
31	434.8	519.0	0.00



JUN-JUL	SIMULATED	OBSERVED	PRECIP
1	412.9	492.0	.10
2	511.0	609.0	0.00
3	515.6	554.0	.18
4	463.2	592.0	.01
5	402.8	497.0	.97
6	1333.1	1290.0	.13
7	800.7	1140.0	.00
8	557.3	725.0	.00
9	467.3	569.0	0.00
10	415.2	470.0	0.00
11	382.3	406.0	.08
12	375.1	366.0	0.00
13	282.9	342.0	0.00
14	234.9	293.0	0.00
15	215.1	310.0	0.00
16	205.1	268.0	0.00
17	208.1	214.0	0.00
18	238.0	225.0	.08
19	239.3	263.0	.01
20	190.9	238.0	0.00
21	170.0	224.0	0.00
22	186.9	228.0	.08
23	165.4	227.0	0.00
24	122.8	213.0	0.00
25	127.3	179.0	.02
26	129.4	188.0	.24
27	758.3	452.0	1.10
28	663.9	717.0	0.00
29	331.6	416.0	.31
30	692.5	472.0	.65
1	811.9	707.0	0.00
2	509.0	490.0	.05
3	515.5	336.0	0.00
4	508.1	382.0	.70
5	839.1	833.0	0.00
6	538.9	591.0	.01
7	440.9	364.0	0.00
8	382.7	287.0	.00
9	336.1	237.0	0.00
10	291.5	196.0	.12
11	398.3	212.0	.09
12	380.6	219.0	.16
13	374.3	288.0	.01
14	264.2	231.0	.05
15	290.6	163.0	.04
16	348.4	179.0	.19
17	354.3	218.0	0.00
18	257.5	230.0	.24
19	338.9	158.0	0.00
20	214.8	254.0	.03
21	173.2	179.0	0.00
22	162.1	151.0	0.00
23	134.0	149.0	0.00
24	128.0	130.0	0.00
25	125.4	131.0	0.00
26	113.8	59.0	0.00
27	105.6	163.0	0.00
28	100.6	129.0	.04
29	115.7	100.0	0.00
30	96.3	110.0	0.00
31	88.6	106.0	.03



	SIMULATED	OBSERVED	PRECIP
1	255.0	83.0	.95
2	610.9	504.0	.19
3	283.0	461.0	.32
4	351.6	305.0	0.00
5	213.5	269.0	0.00
6	190.3	183.0	0.00
7	151.8	157.0	0.00
8	129.3	131.0	0.00
9	124.2	69.0	0.00
10	119.3	169.0	.05
11	154.5	146.0	.02
12	150.7	103.0	.01
13	102.3	109.0	0.00
14	102.6	111.0	.03
15	96.4	105.0	0.00
16	81.2	49.0	0.00
17	75.8	126.0	.00
18	68.7	84.0	0.00
19	62.7	97.0	0.00
20	75.3	74.0	.43
21	338.1	86.0	.17
22	131.4	130.0	.01
23	332.4	135.0	1.04
24	493.8	353.0	0.00
25	150.7	210.0	.02
26	122.0	160.0	.23
27	210.9	136.0	0.00
28	196.7	210.0	1.09
29	695.8	337.0	0.00
30	222.8	283.0	.10
31	259.5	195.0	.09
1	194.0	235.0	.08
2	168.7	176.0	0.00
3	158.7	126.0	.47
4	567.9	244.0	.51
5	440.4	369.0	.07
6	311.7	268.0	.07
7	273.1	243.0	.02
8	257.1	227.0	.01
9	246.4	181.0	.00
10	247.9	150.0	.20
11	324.7	187.0	0.00
12	199.6	254.0	0.00
13	178.2	144.0	0.00
14	159.9	162.0	.00
15	187.7	152.0	.20
16	388.5	140.0	.21
17	249.2	197.0	.00
18	223.1	201.0	.03
19	221.8	132.0	0.00
20	166.9	101.0	0.00
21	146.5	181.0	.06
22	278.0	151.0	.23
23	228.8	223.0	.07
24	178.6	182.0	.01
25	159.7	182.0	.13
26	199.2	129.0	.00
27	357.0	123.0	.61
28	374.6	477.0	.12
29	338.6	351.0	.15
30	309.9	287.0	.01

STATISTICAL SUMMARY

FLOW POINT = PASSUMPSIC R. AT PASSUMPSIC WATER YEAR = 1970

MONTH	SIMULATED MEAN	OBSERVED MEAN	BIAS (SIM MEAN -OBS MEAN)	PERCENT BIAS	1ST MOMENT (SIM)-1ST MOMENT(OBS)	MAXIMUM ERROR	STANDARD ERROR	PERCENT STANDARD ERROR	CORREL. COEFF	BEST FIT LINE OBS = A + B *SIM A	B
OCTOBER	289.894	285.032	4.862	1.706	-1.808	-213.644	77.716	27.266	.843	-111.944	1.369
NOVEMBER	1338.737	1042.733	296.004	28.387	.476	2290.377	244.258	23.425	.919	275.718	.573
DECEMBER	629.143	643.774	-14.631	-2.273	-.536	-686.921	151.935	23.601	.938	-246.254	1.415
JANUARY	281.402	344.194	-62.792	-18.243	.224	-121.643	27.735	8.058	.931	-72.184	1.480
FEBRUARY	482.103	519.286	-37.183	-7.160	-.226	319.342	74.383	14.324	.931	161.923	.741
MARCH	301.662	381.935	-80.273	-21.017	-.315	-235.291	42.627	11.161	.914	5.631	1.247
APRIL	2588.381	2739.333	-150.952	-5.511	.617	-1263.586	470.774	17.186	.970	328.618	.931
MAY	1519.078	1259.355	259.724	20.624	-.940	915.699	135.101	10.728	.977	180.321	.710
JUNE	393.293	439.300	-46.007	-10.473	.740	-339.266	104.032	23.681	.917	75.874	.924
JULY	314.160	257.484	56.676	22.012	-.196	186.324	68.122	26.457	.922	-6.955	.842
AUGUST	211.397	179.677	31.720	17.654	1.041	358.845	75.440	41.986	.736	65.805	.539
SEPTEMBER	257.882	205.833	52.049	25.287	-.434	323.910	70.072	34.043	.502	96.790	.423
WATER YEAR	714.511	688.359	26.152	3.799	-.516	2290.377	249.768	36.285	.964	37.101	.911

NOTE...SUM OF (SIM-OBS)2 = 25867059.....ROOT MEAN OF SUM OF (SIM-OBS)**2 = 266.212...**

FLOW INTERVAL	NUMBER OF CASES OBSERVED	OBSERVED MEAN	SIMULATED MEAN	BIAS	PERCENT BIAS	MAXIMUM ERROR	STANDARD ERROR	PERCENT STANDARD ERROR	CORREL. COEFF	BEST FIT LINE OBS = A + B *SIM A	B
0 - 8	NO OBSERVED FLOW IN THIS INTERVAL										
8 - 45	NO OBSERVED FLOW IN THIS INTERVAL										
45 - 162	42	120.762	169.164	48.402	40.080	252.135	26.571	22.003	.340	101.422	.114
162 - 440	166	293.880	296.779	2.899	.987	358.845	61,847	21.045	.631	150.542	.483
440 - 1000	98	637.194	623.430	-13.764	-2.160	439.463	87.840	13.786	.788	342.288	.473
1000 - 2000	35	1340.286	1540.792	200.506	14.960	2290.377	187.803	14.012	.721	876.531	.301
2000 - 3646	15	2759.333	2980.295	220.962	8.008	1417.118	282.761	10.247	.352	2309.194	.151
3646 - 6195	8	4762.500	4403.780	-358.720	-7.532	-1263.586	541.453	11.369	.659	2065.885	.612
6195 - 9952	1	8550.000	8467.952	-917.952	0.000	917.952	0.000	0.000	0.000	0.000	0.000
ABOVE 9952	NO OBSERVED FLOW IN THIS INTERVAL										
ABOVE 1000	59	2287.288	2429.328	142.039	6.210	2290.377	572.052	25.010	.923	116.167	.894

MULTIYEAR STATISTICAL SUMMARY

FLOWPOINT = PASSUMPSIC R. AT PASSUMPSIC WATER YEARS 1964 TO 1971

MONTH	SIMULATED MEAN	OBSERVED MEAN	BIAS (SIM MEAN -OBS MEAN)	PERCENT BIAS	1ST MOMENT (SIM)-1ST MOMENT(OBS)	MAXIMUM ERROR	STANDARD ERROR	PERCENT STANDARD ERROR	CORREL. COEFF	BEST FIT LINE OBS = A + B *SIM A	B
OCTOBER	340.098	364.367	-24.269	-6.661	-.438	-563.158	117.545	32.260	.910	19.611	1.014
NOVEMBER	543.079	581.904	-38.825	-6.672	-.277	2290.377	209.737	36.043	.877	221.353	.663
DECEMBER	466.547	483.944	-17.397	-3.595	-.067	-1051.814	168.644	34.848	.871	-48.805	1.142
JANUARY	284.033	311.512	-27.479	-8.821	.024	607.984	81.762	26.247	.861	80.958	.812
FEBRUARY	271.397	309.912	-38.515	-12.428	-.067	-413.449	95.342	30.764	.720	141.820	.619
MARCH	649.995	639.431	10.564	1.652	.164	1922.872	234.498	36.673	.955	70.505	.875
APRIL	2186.392	2177.787	8.604	.395	.551	-3333.505	689.597	31.665	.892	156.159	.925
MAY	1546.476	1488.125	58.351	3.921	-.963	2086.244	410.381	27.577	.917	363.680	.727
JUNE	515.655	562.037	-46.382	-8.253	.199	1622.286	179.848	31.999	.850	183.951	.733
JULY	346.764	326.363	20.402	6.251	-.221	-1356.042	170.683	52.298	.833	-70.835	1.145
AUGUST	378.385	322.722	55.664	17.248	.137	2070.596	147.637	45.748	.893	49.302	.723
SEPTEMBER	338.094	264.221	73.873	27.959	-.188	-628.973	131.240	49.671	.826	-56.066	.947
WATER YEAR	655.838	652.605	3.233	.495	16.473	-3333.505	293.517	44.976	.938	65.732	.895

NOTE...SUM OF (SIM-OBS)2 = 277012625.....ROOT MEAN OF SUM OF (SIM-OBS)**2 = 307.900...**

FLOW INTERVAL	NUMBER OF CASES OBSERVED	OBSERVED MEAN	SIMULATED MEAN	BIAS	PERCENT BIAS	MAXIMUM ERROR	STANDARD ERROR	PERCENT STANDARD ERROR	CORREL. COEFF	BEST FIT LINE OBS = A + B *SIM A	B
0 - 8	NO OBSERVED FLOW IN THIS INTERVAL										
8 - 45	NO OBSERVED FLOW IN THIS INTERVAL										
45 - 162	271	129.085	175.972	46.887	36.322	412.734	24.982	19.353	.173	118.501	.060
162 - 440	1484	275.548	289.036	13.488	4.895	417.964	63.390	23.005	.449	135.646	.276
440 - 1000	687	644.856	600.233	-44.623	-6.920	-918.403	120.738	18.723	.607	406.247	.398
1000 - 2000	303	1406.997	1411.349	4.352	.309	2290.377	235.234	16.719	.581	966.838	.312
2000 - 3646	126	2721.111	2850.275	129.164	4.747	2086.244	388.427	14.275	.523	2051.286	.235
3646 - 6195	43	4476.744	4377.947	-98.797	-2.207	-2252.143	592.932	13.245	.397	3562.564	.209
6195 - 9952	8	7290.000	6544.476	-745.524	-10.227	-3333.505	871.267	11.952	.552	5159.557	.326
ABOVE 9952	NO OBSERVED FLOW IN THIS INTERVAL										
ABOVE 1000	480	2125.000	2140.377	15.377	.724	-3333.505	625.633	29.442	.862	465.776	.775

APPENDIX E

OPTIMIZATION PROGRAM WITH SNOW -- INPUT AND OUTPUT SAMPLES

E.1 OPTIMIZATION PROGRAM WITH SNOW - INPUT SUMMARY

E.2 SAMPLE INPUT AND OUTPUT FOR OPTIMIZATION PROGRAM WITH SNOW - OPTIMIZATION MODE

E.3 SAMPLE INPUT AND OUTPUT FOR OPTIMIZATION PROGRAM WITH SNOW - SENSITIVITY MODE

E.1 OPTIMIZATION PROGRAM WITH SNOW - INPUT SUMMARY

```
*************************************************************************
*************************************************************************
C        NATIONAL WEATHER SERVICE RIVER FORECAST SYSTEM (OPTIMIZATION)
C                                                       (SENSITIVITY)
C                          INPUT SUMMARY
*************************************************************************
*CARD NO. FORMAT    CONTENTS
*************************************************************************
C   1          I5    TAPE NO. OF PRECIPITATION TAPE
C              I5    TAPE NO. OF PE TAPE
C              I5    TAPE NO. OF TEMPERATURE TAPE(SAME AS  PE  IF NO TEMP DATA)
C              I5    TAPE NO. OF MEAN DAILY FLOW TAPE
C              I5    TAPE NO. OF SIX HOUR FLOWS(SAME AS DAILY IF NO 6 FLOW DATA)
*************************************************************************
C   2          I5    NO. RECORD SKIPS FOR TAPE WHICH HAS PREC. DATA
C              I5    NO. RECORD SKIPS FOR TAPE WHICH HAS PE    DATA
C              I5    NO. RECORD SKIPS FOR TAPE WHICH HAS TEMP. DATA
C              I5    NO. RECORD SKIPS FOR TAPE WHICH HAS DAILY FLOW DATA
C              I5    NO. RECORD SKIPS FOR TAPE WHICH HAS SIXHR FLOW DATA
C     ****NOTE****      IF MORE THAN ONE TYPE OF DATA ARE ON A TAPE, ONLY
C                     INDICATE NUMBER OF RECORD SKIPS FOR THE FIRST TYPE OF
C                     DATA ON THAT TAPE
*************************************************************************
C   3          I5    NO. OF MBP AREAS ON INPUT TAPE
C              I5    NO. OF PE STATIONS ON TAPE
C              I5    PUNCH ZERO IN COLUMN 15
C              I5    NO. OF MEAN DAILY FLOW-POINTS ON TAPE
C              I5    NO. OF SIX HOUR FLOW-POINTS ON TAPE
*************************************************************************
C   4          I5    NO. OF MBP AREAS USED (NGAGES)
C              I5    NO. OF PE STATIONS USED (NPEGS)
C              I5    PUNCH ONE IN COLUMN 15
C              I5    NO. OF STREAM-FLOW POINTS USED (NPTS)   OR
C                    NO OF UPSTREAM INFLOW POINTS NEEDED (WHICHEVER IS GREATER)
*************************************************************************
C   5         5I5    IDENTIFIES THE MBP AREAS ON TAPE TO BE USED IN THE RUN
C                           ALSO DEFINES THE PRECIP. AREA ORDER FOR THE RUN
C                           1 TO NGAGES  VALUES ARE NEEDED
C                    E.G.       5 MBP AREAS ON TAPE,(NGAGES=2) CARD 5, 1,4
C                               THEN THE 1 ST GAGE ON TAPE WILL BE GAGE 1 FOR RUN
C                                        4 TH GAGE ON TAPE WILL BE GAGE 2 FOR RUN
*************************************************************************
C   6         5I5    SAME AS CARD 5 ONLY FOR PE STATIONS
*************************************************************************
C   7         2I5    IPEA(1)=1 , IPEA(2)=1  WHEN ONE PE STATION IS USED
C                    IPEA(1)=1 , IPEA(2)=2  WHEN TWO PE STATIONS ARE USED
*************************************************************************
C   8          I5    PUNCH ZERO IN COLUMN 5
*************************************************************************
C   9         2I5    SAME AS CARD 7 ONLY FOR TEMPERATURE STATIONS
```

```
C                    (INCLUDE ITAA(1)=1,ITAA(2)=1 EVEN IF NO STA)
*************************************************************************
C  10         5I5    SAME AS CARD 5 ONLY FOR DAILY Q
*************************************************************************
C  11         5I5    SAME AS CARD 5 ONLY FOR 6-HR Q
*************************************************************************
C  12          I5    NUMBER OF MONTHS FOR THE RUN (MAXIMUM OF 50)
C              I5    BEGINNING YEAR FOR THE RUN(4DIGITS) FIRST  DAY OF
C              I5    BEGINNING MONTH FOR THE RUN         BUFFER PERIOD
C              I5    CALANDER DAY NUMBER FOR THE RUN     DEFINES THE START
C                    (BASED ON A 365 DAY YEAR)           OF THE RUN
C              I5    =1  SNOW IS INCLUDED,  =0  NO SNOW
*************************************************************************
C  13      8F10.4    LAND PARAMETERS
C                    MOD. STANFORD WATERSHED MODEL
C                    A,EPXM,UZSN,LZSN,CB,POWER,CC
*************************************************************************
C  14      2F10.4    AREA OF AREA(1),  AREA OF AREA(2)
*************************************************************************
C  15      8F10.4    LAND PARAMETERS    K1 FOR EACH AREA()
*************************************************************************
C  16      2F10.4    LAND PARAMETERS
C                    K24L,K3
*************************************************************************
C  17        F5.3    UPPER LIMIT OF E CURVE (EHIGH)
C            F5.3    LOWER LIMIT OF E CURVE (ELOW)
C              I5    CALANDER DAY NUMBER WHEN E CURVE REACHES
C                       EHIGH  (IF JUNE 1  NEP=152) STHIGH
C              I5    NO DAYS E CURVE REMAINS AT EHIGH (MINUS ONE)
C                    (IF JUNE 1 TO JULY 31, NDUR=212-152=60 )NDUR
C            F5.3    LAND PARAMETER   K24EL
*************************************************************************
C  18      2F10.4    CONSTANT TIMES PE (PEADJ) FOR AREAS 1 AND 2
C                        NOTE..WHEN TWO AREAS ARE USED, PEADJ MUST BE THE
C                        SAME FOR BOTH AREAS AS THE PROGRAM IS CURRENTLY
C                        WRITTEN, UNLESS EACH AREA USES A SEPARATE PE STATION
*************************************************************************
C  19      5F10.4    TIMING  PARAMETERS
C                    SRC1, OVERLAND FLOW (ONE HR)
C                    LIRC6, INTERFLOW    (SIX HR)
C                    LKK6, GROUNDWATER   (SIX HR)
C                    KV
C                    KGS
*************************************************************************
C  20      8F10.4    SOIL MOISTURE INITIAL CONDITIONS
C                    UZSI,LZSI,SGWI,GWSI,RESI,SRGI,SCEPI
*************************************************************************
*************************************************************************
*************************************************************************
******NOTE*********  THE FOLLOWING 200 SERIES CARDS ARE NEEDED IF SNOW IS
C       INCLUDED.      DO NOT PUT IN OTHERWISE.    ***********************
*************************************************************************
*************************************************************************
C 201          I5    PUNCH 1 IN COLUMN 5
```

I5 STLOW

I5 NEP

```
*************************************************************************
C 202         I5      NUMBER OF MAT AREAS USED IN THIS RUN (NTAG)
C             I5      NUMBER OF AREAS WITH OBSERVED WATER-EQUIVALENT  (NWEG)
*************************************************************************
C 203         I5      NUMBER OF MAT AREAS ON INPUT TAPE
C             I5      NUMBER OF OBS. AREAL WATER-EQUIVALENTS ON INPUT TAPE
*************************************************************************
C 204        5A4      NAME OF MAT AREA
C          F10.0      MEAN ELEVATION OF MAT AREA IN FEET
C          4F5.1      AIR TEMPERATURE LAPSE RATES FOR MID-6AM,6AM-NOON,
C                          NOON-6PM,6PM-MID.   DEG. F/1000 FT. ELEV. CHANGE
C                NOTE..REPEAT THIS CARD FOR EACH MAT AREA. CARD ORDER
C                      DEFINES MAT ORDER NUMBER FOR THIS RUN.
*************************************************************************
C 205       16I5      IDENTIFIES THE MAT AREAS ON TAPE TO BE USED IN THIS RUN.
C                          1 TO (NTAG) VALUES ARE NEEDED.
C                      E.G. 5 MBT AREAS ON TAPE, NTAG=2 , CARD 205 = 4,2
C                          THEN THE 4 TH MAT RECORD ON TAPE IS THE TEMPERATURE
C                                        DATA FOR THE 1 ST MAT AREA.
C                                  2 ND MAT RECORD ON TAPE IS THE TEMPERATURE
C                                        DATA FOR THE 2 ND MAT AREA.
*************************************************************************
C 206       16I5      ASSOCIATES MAT AREAS TO MBP AREAS
C                          1 TO (NGAGES) VALUES ARE NEEDED
C                      E.G. (NGAGES)=3, (NTAG)=2,  CARD 206=2,1,1
C                          THEN THE 1 ST PRECIP AREA WILL USE AIR TEMPERATURE
C                                            FROM MAT AREA NO.2
C                                  2 ND PRECIP AREA WILL USE AIR TEMPERATURE
C                                            FROM MAT AREA NO.1
C                                  3 RD PRECIP AREA WILL USE AIR TEMPERATURE
C                                            FROM MAT AREA NO.1
*************************************************************************
C NOTE..CARDS 207 THROUGH 209 ONLY NEEDED IF (NWEG.GT.0)
*************************************************************************
C 207        5A4      NAME OF OBSERVED WATER-EQUIVALENT MEASUREMENT AREA
C                NOTE..REPEAT THIS CARD FOR EACH OBS. WATER-EQUIVALENT AREA
C                       USED IN THIS RUN.  CARD ORDER DEFINES ORDER NO. FOR RUN.
*************************************************************************
C 208       16I5      SAME AS CARD 205 ONLY FOR OBS. WATER-EQUIVALENT AREAS.
*************************************************************************
C 209       16I5      SAME AS CARD 206 ONLY FOR OBS. WATER-EQUIVALENT AREAS.
*************************************************************************
*************************************************************************
C NOTE..REPEAT CARDS 210,211,212 FOR EACH MEAN BASIN PRECIPITATION AREA
C                USED IN THIS RUN (NGAGES)
*************************************************************************
C 210 20X,F10.0      MEAN AREA ELEVATION IN FEET
C           F5.2     PERCENT/100 OF AREA OVER WHICH EVAPOTRANSPIRATION CAN TAKE
C                          WHEN THERE IS COMPLETE AREAL SNOW COVER (EFC)
C           F5.2     MULTIPLYING FACTOR TO CORRECT FOR GAGE CATCH DEFICIENCY
C                          IN THE CASE OF SNOWFALL.  (SCF)
C           F5.4     MAXIMUM NON-RAIN MELT FACTOR -- OCCURS ON JUNE 21. (MFMAX(
C           F5.4     MINIMUM NON-RAIN MELT FACTOR -- OCCURS ON DEC. 21. (MFMIN)
C           F5.4     MAXIMUM NEGATIVE MELT FACTOR -- (NMF)
```

```
C                NOTE..UNITS FOR MELT FACTORS ARE INCHES/DEG.F/SIX HOURS
C          F5.4      MEAN WIND FUNCTION VALUE DURING RAIN ON SNOW PERIODS
C                         UNITS ARE INCHES/INCH OF MERCURY (UADJ)
C          F5.1      AREAL WATER-EQUIVALENT (INCHES) ABOVE WHICH THERE IS
C                         ALWAYS COMPLETE AREAL SNOW COVER.  (SI)
C          F5.2      DAILY MELT AT THE SNOW-SOIL INTERFACE IN INCHES. (DAYGM)
*************************************************************************
C 211            INITIAL VALUES OF SOME SNOW COVER VARIABLES.
C      20X,F5.0      ANTECEDENT SNOW TEMP. INDEX  (DEG. F)  (ATI)
C          F5.2      FREE WATER IN SNOW IN EXCESS OF THAT HELD AGAINST GRAVITY
C                         DRAINAGE  (INCHES)
C          F5.2      POINT SB ON AREAL DEPLETION CURVE  (INCHES)
C          F5.2      PERCENT/100 AREAL SNOW COVER AT POINT SB.
C          F5.2      POINT SBWS ON AREAL DEPLETION CURVE (INCHES)
C     NOTE..SEE CHAP. 3  FOR FURTHER EXPLANATION OF THESE INITIAL VALUES.
*************************************************************************
C 212            INITIAL VALUES OF MAJOR SNOW COVER VARIABLES
C      20X,F5.2      INITIAL WATER-EQUIVALENT OF SOLID PORTION OF THE
C                         SNOWPACK.   (INCHES)
C          F5.2      INITIAL NEGATIVE HEAT STORAGE  (INCHES)
C          F5.2      INITIAL AMOUNT OF FREE WATER HELD AGAINST GRAVITY
C                         DRAINAGE (INCHES).  MAXIMUM EQUALS PERCENT LIQUID
C                         WATER HOLDING CAPACITY TIMES INITIAL WATER-EQUIVALENT.
*************************************************************************
C NOTE..CARD 213 AND 214 PARAMETERS ARE THE SAME FOR ALL AREAS IN NWSRFS3
*************************************************************************
C 213  20X,F5.0      MELT FACTOR BASE TEMPERATURE  (DEG. F) (MBASE)
C          F5.0      TEMPERATURE (DEG. F) TO DIVIDE RAIN FROM SNOW (PXTEMP)
C                         IF AIR TEMPERATURE GREATER,THEN RAIN
C                         IF AIR TEMPERATURE LESS THAN OR EQUAL,THEN SNOW
C          F5.2      PERCENT/100 LIQUID WATER HOLDING CAPACITY (PLWHC)
C                         MAXIMUM AMOUNT OF FREE WATER HELD AGAINST GRAVITY.
C          F5.2      ANTECEDENT SNOW TEMP. INDEX PARAMETER (TIPM)
C                         (.GE.0.0 --.LE.1.0)
*************************************************************************
C 214 20X,9F5.2      AREAL SNOW COVER DEPLETION CURVE
C                         PERCENT/100 AREAL EXTENT OF SNOW COVER AT
C                         WATER EQUIVALENT/AI RATIOS OF  0.1,0.2,0.3,0.4,0.5,
C                              0.6,0.7,0.8,0.9  (SEE SECTION 3.3.3 FOR DEFINITION
C                              OF AI)     FOR RATIO=0.0  AREAL COVER=0.05
C                                            RATIO=1.0  AREAL COVER=1.00
*************************************************************************
*************************************************************************
*************************************************************************
C  21            PARAMETERS FOR OPTIMIZATION OR SENSITIVITY ROUTINE
C          I5    NDAY=NUMBER OF DAYS IN RUN (50 MONTHS IS MAXIMUM)
C          I5    IBUF=NUMBER OF DAYS IN BUFFER PERIOD (USUALLY TWO MONTHS)
C                                  (ADD OR DELETE BY WHOLE MONTHS)
C          I5    NUMA= NO OF PARAMETERS TO BE CONSIDERED
C          I5    NPER  IF=1 DDELTA(I) MUST BE IN PERCENT/100
C                       IF=0 DDELTA(I) MUST BE AN ABSOLUTE VALUE
C          I5    KC= MAXIMUM NUMBER OF RESOLUTIONS BEFORE OPTIMIZATION
C                       IS TERMINATED
C          I5    MAXN= MAXIMUM NUMBER OF  RUNS  BEFORE OPTIMIZATION IS
```

```
C                          ABORTED (MAXN OVER-RIDES KC)
C         I5     MAXIN=3
*****************************************************************************
C  22  16I5     PARAMETERS TO BE OPTIMIZED OR USED IN SENSITIVITY ANALYSIS SEE
C               PARM( ) ARRAY BELOW FOR PARAMETER NUMBERS (E.G. CB IS NO. 3)
C
C      PARM(1) =UZSN            PARM(16)=K3              PARM(31)=NMF(1)
C      PARM(2) =LZSN            PARM(17)=SRC1            PARM(32)=NMF(2)
C      PARM(3) =CB              PARM(18)=LIRC6           PARM(33)=UADJ(1)
C      PARM(4) =POWER           PARM(19)=LKK6            PARM(34)=UADJ(2)
C      PARM(5) =CC              PARM(20)=CSSR            PARM(35)=NOT USED
C      PARM(6) =KV              PARM(21)=HWARP           PARM(36)=NOT USED
C      PARM(7) =KGS             PARM(22)=VWARP           PARM(37)=SI(1)
C      PARM(8) =K24EL           PARM(23)=NOT USED        PARM(38)=SI(2)
C      PARM(9) =A               PARM(24)=NOT USED        PARM(39)=DAYGM(1)
C      PARM(10)=K24L            PARM(25)=SCF(1)          PARM(40)=DAYGM(2)
C      PARM(11)=EPXM            PARM(26)=SCF(2)          PARM(41)=PLWHC
C      PARM(12)=K1(1)           PARM(27)=MFMAX(1)        PARM(47)=EHIGH
C      PARM(13)=K1(2)           PARM(28)=MFMAX(2)        PARM(48)=ELOW
C      PARM(14)=PEADJ(1)        PARM(29)=MFMIN(1)        PARM(49)=NEP
C      PARM(15)=PEADJ(2)        PARM(30)=MFMIN(2)        PARM(50)=NDUR
C                          NOTE..SUBSCRIPTS AFTER SNOW PARAMETER NAMES INDICATED
C                          SUBAREA 1 AND 2.  SEE SECTION 4.4.1 OF WRITE-UP.
C
C               THE MAXIMUM NUMBER OF PARAMETERS THAT CAN BE OPTIMIZED IS 16
C               THE MAXIMUM NUMBER OF PARAMETERS THAT CAN BE CONSIDERED FOR
C               SENSITIVITY ANALYSIS IS 50
C               THE ORDER OF THE PARAMETER NUMBERS IS NOT FIXED
C                                  EXCEPT
C                                  ******
C               THE  E  CURVE PARAMETERS, IF CONSIDERED, MUST BE LAST AND
C               ORDERED FROM LOW PARAMETER NUMBER TO HIGH PARAMETER
C               NUMBER (47,48,49,50)
C               REPEAT THIS CARD IF NUMA GT 16
*****************************************************************************
C  23    2I5     NEPDEL IS THE FIXED SIZE DELTA FOR PARAMETER NEP (IN DAYS)
C               NDURDEL IS THE FIXED SIZE DELTA FOR PARAMETER NDUR (IN DAYS)
C                   (IF NEP AND NDUR ARE NOT TO BE OPTIMIZED
C                       STILL INCLUDE THIS CARD)
*****************************************************************************
C  24          I5     NUMBER OF PERIODS TO BE REMOVED FROM CALCULATING
C                     THE VALUE OF THE OPTIMIZATION CRITERION--EXCLUDING
C                     THE BUFFER PERIOD. FROM ZERO(0) TO A MAXIMUM OF
C                                            TEN(10) PERIODS
*****************************************************************************
C  25                 IF OUTPER=0  THIS CARD IS NOT NEEDED
C             3I5     MONTH-DAY-YEAR(FOUR DIGITS) STOP CAL. CRITERION
C             3I5     MONTH-DAY-YEAR              BEGIN CAL. CRITERION
C
C                     REPEAT THIS CARD FOR EACH PERIOD TO BE DROPPED
*****************************************************************************
C 25B          I5     ISENSE=0   NO SENSITIVITY ANALYSIS  WE THEREFORE ARE
C                                 IN THE OPTIMIZATION MODE (IF ISENSE=0 THE
C                                 MAX VALUE FOR NUMA IS 16)
```

```
C
C                          =1   SENSITIVITY  ANALYSIS (MAX VALUE FOR
C                                                     NUMA IS 50    )
C
*************************************************************************
C 25C                 IF ISENSE=0 THIS CARD IS NOT NEEDED
C           16I5      NUMBER OF + AND/OR - PERTUBATIONS FOR EACH PARAMETER
C                                                      (8 IS MAXIMUM)
C                     REPEAT THIS CARD IF NUMA GT 16
*************************************************************************
C 25D                 IF ISENSE=0 THIS CARD IS NOT NEEDED
C         8F10.4      PERTUBATION VALUES FOR EACH PARAMETER I
C
C                     REPEAT THIS CARD FOR EACH OF THE NUMA PARAMETERS.
*************************************************************************
C                     IF ISENSE=1 THIS CARD IS NOT NEEDED
C  26     8F10.4      DDELTA(I)  WHEN NPER=1  DELTA(I)=ABS(DDELTA(I)*PARAMETER(I))
C                                     NPER=1  DELTA(I)=DDELTA(I)
C                     (IF MORE THAN 8  PARAMETERS IN OPT REPEAT CARD)
*************************************************************************
C                     IF ISENSE=1 THIS CARD IS NOT NEEDED
C  27     8F10.4      CHECKL(I)= LOWER CONSTRAINT ON PARAMETER(I)
C                     (IF MORE THAN 8  PARAMETERS IN OPT REPEAT CARD)
*************************************************************************
C                     IF ISENSE=1 THIS CARD IS NOT NEEDED
C  28     8F10.4      CHECKH(I)= UPPER CONSTRAINT ON PARAMETER(I)
C                     (IF MORE THAN 8  PARAMETERS IN OPT REPEAT CARD)
*************************************************************************
C                     IF ISENSE=1 THIS CARD IS NOT NEEDED
C  28B     F10.5      PCENTOT=  PERCENT/100 CRITERION MUST AT LEAST CHANGE
C                       IN KSTOP TRIALS OR ANALYSIS IS STOPPED
C             I5      KSTOP  (SEE ABOVE)
*************************************************************************
C  29         2I5     NUMBER OF NON ZERO ORDINATES IN THE CHANNEL
C                       DELAY HISTOGRAM FOR EACH AREA. (SIX HOUR INTERVALS)
*************************************************************************
C   30        2I5     FIXED LAG (IN HOURS) FOR EACH AREA().SEE CARDS 29,32,
C                     32A.THE UPSTREAM AREA() FIXED LAG TRANSLATES ITS
C                     HISTOGRAM TO THE DOWNSTREAM FLOW POINT.  THE DOWNSTREAM
C                     AREA() HAS A FIXED LAG OF 0
*************************************************************************
C   31         I5     INWARP=0  THEN THE CHANNEL DELAY HISTOGRAM WILL NOT BE
C                     MODIFIED DURING THE OPTIMIZATION OR SENITIVITY ANALYSIS
C                           .GT. 0 THEN VERTICAL AND HORIZONTAL WARPING OF
C                                  THE HISTOGRAM WILL BE DONE DURING OPTIMIZATION
C                                  OR SENITIVITY
C
C              I5     NOWARP=  SEQUENCE NUMBER FOR HWARP PARAMETER.  IF
C                     HWARP PARAMETER NUMBER IS TH 5 TH NUMBER ON CARD 22
C                     THEN NOWARP=5.  (VWARP PARAMETER NUMBER MUST ALWAYS
C                     FOLLOW HWARP PARAMETER NUMBER ON CARD 22, IF VWARP IS USED.)
*************************************************************************
C   32                IF INWARP=0 THIS CARD IS NOT NEEDED
C         20F4.4      G(I)  TWO HOUR INSTANTANEOUS ORDINATES OF THE MODIFIED
C                           CHANNEL DELAY HISTOGRAM.  THESE ORDINATES COME
```

```
C   NOTE-- THE 2 HR        FROM A CONTINUOUS CURVE FITTED TO THE ORIGINAL
C     HISTOGRAM IS FOR     6 HOUR DELAY HISTOGRAM.  G(1) SHOULD EQUAL 0
C     THE TOTAL AREA. IF
C               TWO AREAS ARE ANALYZED
C               COMBINE THEIR HISTOGRAMS
C
C                            (READ IN (NELEM(1)+NELEM(2))*3+1 G(I) ORDINATES
C                             IF MORE THAN 20 REPEAT THIS CARD)
*************************************************************************
C  32A                 IF INWARP = 0 THIS CARD IS NEEDED
C        20F4.4        DIMENSIONALESS ORDINATES OF THE CHANNEL DELAY
C                      HISTOGRAM FOR AREA ONE -- SIX HOUR INTERVALS
C                       (REPEAT IF TWO AREAS.  BE SURE
C                        HIST(1,I)+HIST(2,I) ORDINATES EQUAL 1.0)
*************************************************************************
*************************************************************************
C  32B          I5     VARL= 0  IF VARIABLE LAG IS NOT REQUESTED
C                          = 1  IF VARIABLE LAG IS REQUESTED
C               I5     VARK= 0  IF VARIABLE   K IS NOT REQUESTED
C                          = 1  IF VARIABLE   K    IS REQUESTED
C               I5     LOCAL= 0 HEADWATER OPTIMIZATION
C                           = 1 OR 2 LOCAL AREA OPTIMIZATION (LAND PARM)
C                      LOCAL= 3 LOCAL AREA OPTIMIZATION OF JUST CHANNEL PARM
C                             (OPTION 3 IS NOT PROGRAMED AS YET)
C               I5     NHWA  IS THE NUMBER OF UPSTREAM INFLOWS WHEN RUNNING
C                            UNDER LOCAL= 1 OR 2
*************************************************************************
C  33          4I5     IF LOCAL= 0 THIS CARD IS NOT NEEDED
C                      FIXED LAG (IN HOURS) FOR EACH UPSTREAM INFLOW
C                      WHEN RUNNING UNDER LOCAL= 1 OR 2
*************************************************************************
C  34         F4.4     FUNCTION OF CONSTANT K ROUTING FACTOR
C                         CSSR= (K-3)/(K+3)
*************************************************************************
C  35          I5      IF VARL= 0 THIS CARD IS NOT NEEDED
C                      NUMBER OF LAG VS Q POINTS TO DEFINE CURVE (MAX=15)
*************************************************************************
C  36      8F10.4      IF VARL= 0 THIS CARD IS NOT NEEDED
C                      FLOW VALUES DEFINING THE ABSCISSA OF THE
C                      LAG VS Q CURVE (FROM LOW TO HIGH Q AND FQLAG(1)
C                      USUALLY EQUALS 0.0)
C                                  REPEAT CARD IF NVL GT 8
*************************************************************************
C  37      8F10.4      IF VARL= 0 THIS CARD IS NOT NEEDED
C                      LAG VALUES (IN HOURS) DEFINING THE ORDINATE OF
C                      THE LAG VS Q CURVE. THEY MUST CORRESPOND TO THE
C                      ABOVE FQLAG( ) VALUES
C                      CALCULATIONS USING VARIABLE LAG ARE BASED ON
C                           LAGGING THE VOLUME OF FLOW IN THE INTERVAL
C                           FQLAG(N) TO FQLAG(N+1) BY VL(N+1)
C                      (NOTE DIFFERENCE BETWEEN THIS AND NWSRFS4 ROUTINE)
C                      LAG VALUE FOR HIGHEST DEFINED FLOW IS USED FOR
C                           ALL FLOW ABOVE THAT DISCHARGE
C                                   REPEAT CARD IF NVL GT 8
```

```
*************************************************************************
C  38-40              IF VARK= 0 THESE CARDS ARE NOT NEEDED
C                     IF VARK= 1 SEE CARDS 35-37 FOR FORMAT DESCRIPTION
C
C                     CALCULATION USING K ARE BASED ON A LINEAR
C                          INTERPOLATION BETWEEN POINTS
C                     K VALUE FOR HIGHEST DEFINED FLOW IS USED FOR
C                          ALL FLOWS ABOVE THAT DISCHARGE
C                     (NOTE THIS ROUTINE IS THE SAME AS NWSRFS4 ROUTINE)
*************************************************************************
C  41       8A10      HEADER CARD  (USE COLS 2 THUR 80)
*************************************************************************
*************************************************************************
C    THE FOLLOWING SNOW INPUT CARD  TELLS  THE PROGRAM FOR WHICH MONTHS VALID
C         AIR TEMPERATURE DATA ARE AVAILABLE AND THUS WHICH MONTHS SNOW
C         COMPUTATIONS ARE TO BE MADE.     =1 VALID DATA AVAILABLE
C                                          =0 AIR TEMPERATURE DATA IS MISSING
********NOTE********   CARD 411 ONLY NEEDED IF SNOW IS INCLUDED
*************************************************************************
C 411       50I1      VALID AIR TEMP. INDICATOR FOR EACH MONTH INCLUD. BUFFER.
*************************************************************************
*************************************************************************
C     THE FOLLOWING SNOW INPUT CARD IS NEEDED FOR THE OPTIMIZATION PROGRAM
C             ONLY IF  (NGAGES.GT.1)
*************************************************************************
C 412        9I5      PARM( ) NUMBERS OF AREA TWO PARAMETERS THAT SHOULD BE
C                          THE SAME AS AREA ONE PARAMETERS -- CAN ONLY USE
C                          PARM( ) NUMBERS 26,28,30,32,34,38,40
*************************************************************************
*************************************************************************
```

E.2 SAMPLE INPUT AND OUTPUT FOR OPTIMIZATION PROGRAM WITH SNOW - OPTIMIZATION MODE

```
    1     1     1     1     1
  368     0     0     0     0
    3     1     0     1     0
    2     1     1     1
    2     3
    1
    1     1
    0
    1     2
    1
    0
   50 1967     8   213     1
      .05        .20        .25        5.0        .30        3.0        0.9
     218.       218.
      1.0        1.0
      0.0        .30
  1.0  0.0   166   92   .25
      1.0        1.0
       .9         .1       .004        .55        .99
      0.0        5.0        1.5        .95        0.0        0.0        0.0
    1
    2     0
    3     0
PASSUMPSIC R. MAT-L       1060. -1.5 -2.7 -3.9 -2.7
PASSUMPSIC R. MAT-H       1740. -1.5 -2.7 -3.9 -2.7
    2     3
    1     2
PASSUMPSIC RIVER-L        1060.  .50  1.3 .018 .007 .005 .036  3.0  .01
PASSUMPSIC RIVER-L     32.  0.0  0.0  0.0  0.0
PASSUMPSIC RIVER-L     0.0  0.0  0.0
PASSUMPSIC RIVER-H        1740.  .90  1.3 .018 .007 .005 .036  4.5  .01
PASSUMPSIC RIVER-H     32.  0.0  0.0  0.0  0.0
PASSUMPSIC RIVER-H     0.0  0.0  0.0
BASINWIDE PARAMETERS   32.  33.  .03  .50
AREAL DEPLETION        .24  .39  .52  .64  .75  .82  .88  .92  .96
 1522   61   11    1    3  125    3
    1    2    3   25   26   27   29   31   33   37   38
    1    1
    1
    3   25 1969    5   19 1969
    0
      .04        .01        .04        .02        .02        .02        .05        .05
      .03        .02        .02
      .20        3.0        .20        1.0        1.0       .015       .003       .002
      .02        2.0        3.0
      .40        7.0        .40        1.5        1.5       .025       .010       .008
      .15        6.0       10.0
      .10    3
    2    1
```

```
    0    12
    0
 .10  .40
 .50
    0     0     0     0
  .5
 PASSUMPSIC RIVER AT PASSUMPSIC.VT.--SAMPLE OUTPUT OPTIMIZATION PROGRAM-W/SNOW
0001111111000001111111000011111111000001111111 0000
   28    30    32    34    40
```

SNOW PARAMETERS--CASE=1

INPUT GAGES USED

RG	TA GAGE	WE GAGE
1	PASSUMPSIC R. MAT-L	
2	PASSUMPSIC R. MAT-H	

TA GAGE	ELEV.	PERIOD TA LAPSE RATES			
PASSUMPSIC R. MAT-L	1060.	-1.5	-2.7	-3.9	-2.7
PASSUMPSIC R. MAT-H	1740.	-1.5	-2.7	-3.9	-2.7

AREA SNOW PARAMETERS

RG	ELEV	EFC	SCF	MFMAX	MFMIN	NMF	UADJ	SI	DAYGM
1	1060.	.50	1.30	.0180	.0070	.0050	.0360	3.00	.010
2	1740.	.90	1.30	.0180	.0070	.0050	.0360	4.50	.010

INTIAL SNOW VALUES

RG	WE	NEGHS	LIQW STORAGE	SB	SBAESC	SBWS	TINDEX
1	0.00	0.000	0.000	0.000	0.000	0.000	32.
2	0.00	0.000	0.000	0.000	0.000	0.000	32.

BASINWIDE PARAMETERS

MELT-BASE	PX-TEMP	PLWHC	TI-PARM
32.0	33.0	.030	.500

AREAL DEPLETION CURVE

WE/AI	0.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
AESC	.05	.24	.39	.52	.64	.75	.82	.88	.92	.96	1.00

PASSUMPSIC RIVER AT PASSUMPSIC,VT.--SAMPLE OUTPUT OPTIMIZATION PROGRAM-W/SNOW

THE PERIOD OF RECORD BEING ANALYZED IS FROM 8 1967 THRU 9 1971 THE BUFFER PERIOD IS THE FIRST 61 DAYS

PARAMETER VALUES

1	2	3	0	0	0	0	0	0	0	0	0
UZSN	LZSN	CB	POWER	CC	KV	KGS	K24EL	A	K24L	EPXM	K1(1)
.2500	5.0000	.3000	3.0000	.9000	.5500	.9900	.2500	.0500	0.0000	.2000	1.0000

PARAMETER VALUES

0	0	0	0	0	0	0	0	0	0	0	0
K1(2)	PEADJ(1)	PEADJ(2)	K3	SRC1	LIRC6	LKK6	CSSR	HWARP	VWARP	FOREST(1)	FOREST(2)
1.0000	1.0000	0.0000	.3000	.9000	.1000	.0040	.5000	1.0000	1.0000	I	I

PARAMETER VALUES

4	5	6	0	7	0	8	0	9	0	0	0
SCF(1)	SCF(2)	MFMAX(1)	MFMAX(2)	MFMIN(1)	MFMIN(2)	NMF(1)	NMF(2)	UADJ(1)	UADJ(2)	FUCOEF(1)	FUCOEF(2)
1.3000	1.3000	.0180	.0180	.0070	.0070	.0050	.0050	.0360	.0360	I	I

PARAMETER VALUES

10	11	0	0	0	0	0	0	0	0	0	0
SI(1)	SI(2)	DAYGM(1)	DAYGM(2)	PLWHC	TOPM	AK	AN	RAIX	SAIX	EHIGH	ELOW
3.0000	4.5000	.0100	.0100	.0300	I	I	I	I	I	1.0000	0.0000

PARAMETER VALUES

0	0
NEP	NDUR
166.0000	92.0000

(NOTE ABOVE INUMBERS CORRESPOND TO A ( ) SUBSCRIPT NUMBERS)

THE FOLLOWING PERIODS WILL BE REMOVED FROM CALCULATING THE VALUE FOR THE OPTIMIZATION CRITERION AND (MEAN Q , R)

THE BUFFER PERIOD (THE FIRST 61 DAYS)	DATE	DAY NO.
	3 25 1969 TO 5 19 1969	603 TO 658

INITIAL STORAGE VALUES

UZSI	LZSI	SGWI	GWSI	RESI	SRGXI	SCEPI
0.0000	5.0000	1.5000	.9500	0.0000	0.0000	0.0000

FIXED LAG CHANNEL DELAY HISTOGRAM

GAGE	1	0	.1000	.4000
GAGE	2	12	.5000	

PASSUMPSIC RIVER AT PASSUMPSIC,VT.--SAMPLE OUTPUT OPTIMIZATION PROGRAM-W/SNOW

NOAY WATER BALANCE QUANTITIES (FOR RUN 1)

SURFACE RO	INTERFLOW	IMPERVIOUS RO	GROUNDWATER	INTERCEPTION	ACT. ET LOSS	PREC.	P.E.	AVAIL ET	BALANCE
6.104	10.294	8.688	63.795	39.493	84.810	173.761	104.176	84.822	-.000

MEAN DAILY FLOWS (FOR RUN 1 BUFFER PER NOT INC)

10.229	16.952	9.928	74.051	42.940	86.742	198.554	104.176	86.744	-.000

MEAN DAILY FLOWS (FOR RUN 1 BUFFER PER NOT INC)

208.86	308.49	215.70	198.96	284.95	364.26	232.00	204.20	217.98	410.63
1298.99	599.28	424.10	384.14	383.83	344.84	340.07	338.93	968.96	549.90
424.80	423.42	369.29	346.08	331.17	1245.12	941.25	578.05	495.94	447.69
412.87									
386.41	367.86	492.98	450.27	544.32	419.50	387.32	365.62	352.37	343.98
330.88	328.96	403.89	336.83	314.81	304.12	294.51	285.68	277.14	269.22
261.81	254.80	314.61	588.51	364.09	323.94	307.67	298.01	285.39	275.80
412.87									
267.48	259.68	252.58	245.92	239.55	233.73	228.24	222.99	217.95	213.20
208.87	764.95	2525.62	1114.77	784.42	651.03	567.44	509.13	468.38	458.70
441.63	416.93	423.06	395.35	379.21	367.39	356.78	347.04	338.02	329.48
321.28									
313.65	306.75	300.04	293.62	287.48	281.65	276.03	270.63	265.47	260.56
255.82	251.26	246.89	242.72	238.69	234.80	231.06	227.45	223.98	220.62
217.36	214.24	211.22	208.31	205.49	202.77	200.15	197.60	195.13	192.75
190.44									
188.21	186.04	279.39	326.99	253.52	236.59	230.02	224.85	220.48	216.63
213.12	209.85	206.79	203.78	200.95	198.32	195.80	193.35	190.97	188.67
186.42	184.24	182.12	180.05	178.02	176.04	174.10	172.19	170.32	192.75
190.44									
168.53	166.72	164.94	163.17	161.43	159.70	157.96	156.23	154.50	158.15
164.38	155.72	152.62	150.61	148.69	155.07	423.39	602.78	874.21	1359.69
1346.90	1907.69	2605.63	3959.53	2621.27	1993.90	1892.88	2133.16	2470.94	3126.47
2865.50									
3412.30	3123.00	2681.66	2852.65	3309.27	3081.49	2646.25	2616.15	2891.82	2913.47
2714.98	2652.69	3187.22	3850.29	3913.07	4644.49	3523.21	3030.16	2671.70	2380.42
2115.59	1901.19	1727.59	1705.95	5621.22	3850.32	2810.52	2556.34	2020.04	1728.40
2865.50									
1517.46	1351.79	1219.63	1187.05	1043.50	942.55	872.68	812.09	765.50	781.62
665.38	637.25	596.32	501.34	458.37	428.11	870.28	931.02	1271.40	1535.32
2199.65	1321.14	1085.22	907.98	797.50	715.53	648.46	595.90	550.57	591.92
728.35									
728.08	596.22	636.61	758.09	573.24	518.17	494.00	460.23	685.77	1144.93
837.00	744.73	700.39	731.52	659.59	1367.58	881.25	784.52	854.87	877.56
704.29	638.85	603.58	601.97	970.92	670.17	591.98	566.94	586.77	887.39
728.35									
774.11	607.09	516.55	467.21	412.94	565.95	522.09	414.90	364.14	941.63
803.28	576.25	515.51	448.03	451.23	400.05	399.88	869.20	534.07	588.30
438.31	374.05	341.39	286.56	283.85	249.42	249.73	403.82	556.30	356.07
275.49									
302.13	357.65	249.43	198.65	185.12	191.63	209.72	177.07	186.10	281.40
169.99	134.73	123.03	109.95	103.17	97.13	158.60	360.19	138.82	277.37
658.14	277.84	208.55	177.49	247.94	263.68	169.39	152.18	143.65	133.09
129.09									
125.15	112.86	137.44	116.45	98.56	139.20	298.08	141.59	113.75	92.72
406.73	821.16	354.69	255.41	238.17	221.59	204.72	171.92	160.48	154.78
149.15	144.03	139.18	134.79	198.06	218.31	169.65	163.68	151.63	121.38

129.09									
122.12	109.77	117.61	319.11	349.91	202.07	311.07	388.81	217.71	199.54
250.18	210.20	182.83	176.54	170.82	161.41	147.85	143.13	169.24	453.27
222.20	184.87	186.24	181.41	253.43	293.37	197.03	321.59	412.48	256.07
238.09									
228.20	250.52	258.40	224.31	209.68	203.33	208.50	277.33	236.95	219.55
205.08	199.55	194.65	190.18	185.96	181.86	177.75	202.16	685.86	384.93
296.76	283.13	285.55	273.29	296.76	270.67	259.25	268.82	1114.04	893.05
238.09									
579.58	510.52	485.23	469.72	569.57	545.07	476.74	453.88	436.60	421.74
408.89	396.44	384.04	393.38	597.71	462.44	423.58	406.61	392.30	380.29
369.16	358.34	348.50	339.41	330.01	321.80	314.42	307.17	300.19	292.88
286.40									
280.34	274.24	268.36	263.09	257.53	251.25	247.27	242.80	238.12	234.20
229.91	226.03	222.08	218.46	214.91	211.57	208.50	205.27	202.35	199.05
196.42	193.68	191.05	188.13	185.86	183.51	181.28	179.09	177.04	174.97
173.03									
171.05	169.23	167.44	165.68	163.93	162.28	160.67	159.11	157.60	156.12
154.67	153.28	151.92	150.60	149.31	148.05	146.82	145.62	144.43	143.26
142.10	140.98	139.89	138.82	137.81	136.74	135.56	134.45	177.04	174.97
173.03									
133.34	132.37	131.22	129.70	128.21	127.43	126.41	125.13	124.12	122.98
122.03	120.65	119.21	117.91	116.97	115.28	113.88	114.21	113.13	141.48
184.27	189.38	154.14	186.90	302.21	541.21	410.78	320.77	291.90	278.39
265.00									
254.79	244.71	238.23	227.20	377.50	645.44	470.05	471.73	444.16	782.27
1427.01	1027.57	901.00	1226.43	2149.69	3315.52	3476.18	4021.75	6451.95	5591.36
4016.57	3864.12	4474.39	4932.49	4180.32	4109.84	4467.42	6846.18	9907.12	7784.02
265.00									
6785.46	6093.85	6286.96	6294.52	5591.57	4839.84	4654.61	4485.21	6338.49	7391.18
5925.70	6078.29	5137.92	4833.16	4342.85	3979.33	3878.04	3619.93	3396.53	6386.85
6165.07	4009.73	3229.32	2704.94	2338.26	2148.52	1795.84	1626.68	1440.32	1290.18
1180.03									
1082.21	984.01	1009.07	1006.71	823.29	762.88	818.55	650.29	530.04	471.01
430.74	394.09	426.06	827.06	1204.65	2373.67	1238.09	881.88	724.61	764.98
635.70	518.46	488.10	628.41	483.97	392.76	337.92	440.80	324.01	251.98
1180.03									
248.28	216.69	200.42	255.66	188.86	209.00	160.53	129.69	119.03	117.96
276.41	1480.56	1101.26	622.78	463.88	392.33	348.16	289.10	231.89	195.78
184.11	614.32	421.18	301.28	257.76	385.99	522.02	462.73	1625.67	1584.64
1237.45									
887.10	843.09	852.54	663.89	1507.41	1314.84	936.15	798.92	793.96	700.45
754.10	592.80	543.32	507.95	478.01	439.28	676.93	604.86	687.33	599.61
511.62	466.63	414.18	462.85	464.94	492.86	391.92	348.43	315.78	297.81
281.40									
276.40	321.80	283.10	251.03	240.65	295.22	484.51	627.88	635.26	484.38
431.36	422.68	400.54	377.83	356.85	349.54	469.79	574.70	401.72	374.29
358.84	340.43	317.55	309.69	384.65	337.91	308.65	284.05	267.58	256.53
281.40									
241.49	233.62	487.46	356.85	283.95	269.18	260.19	268.06	246.24	224.14
212.14	205.39	198.83	208.97	213.17	186.38	183.94	211.69	182.99	312.54
578.62	396.38	367.68	320.75	311.03	306.20	359.48	370.58	337.26	313.33
313.84									
305.94	310.97	448.65	823.69	4250.56	3481.09	1973.75	1609.61	1305.76	1093.94
1022.60	1182.79	974.83	992.51	1224.51	1008.62	889.30	840.83	881.55	4317.95
3097.26	1755.43	1392.96	1178.99	1025.07	916.37	834.48	772.61	724.66	684.38
313.84									
649.95	620.23	594.87	570.93	548.41	528.61	510.61	508.37	519.47	499.31
1274.59	1727.77	1070.77	891.98	794.54	724.14	671.22	630.38	597.66	569.18
544.91	524.21	505.44	488.67	473.19	458.75	444.56	430.54	418.07	406.50
395.87									
385.14	374.99	365.85	357.23	348.81	340.57	332.58	325.44	318.44	311.46
304.77	298.70	292.94	286.87	281.37	276.20	271.27	266.22	261.71	257.38
253.17	248.97	245.04	241.26	237.57	234.04	230.52	227.22	223.94	220.78
217.79									
214.95	217.95	641.27	1279.19	716.11	556.08	489.62	439.21	405.28	380.86

383.83	596.74	466.36	417.33	395.24	378.79	365.35	353.96	344.02	335.13
327.03	319.54	312.54	305.83	299.38	293.31	287.74	282.28	223.94	220.78
217.79									
277.02	272.07	267.19	252.21	257.62	253.40	249.14	244.85	239.83	235.57
231.66	227.51	223.20	220.40	216.38	212.81	208.89	204.37	200.27	196.23
192.48	202.13	360.18	326.17	339.53	313.22	297.78	286.82	281.35	267.48
257.03									
249.50	303.91	890.62	548.88	426.94	378.25	349.57	436.24	965.24	1621.71
1092.81	841.28	872.78	1046.34	1462.16	1672.78	2643.99	4101.55	3033.41	2373.53
2294.92	2720.92	2799.22	3997.90	9763.23	5530.03	5796.11	6491.03	6572.98	6482.94
257.03									
6617.89	6670.25	5352.99	4536.67	3950.72	3383.85	2952.57	2549.68	2252.48	2124.05
1916.62	1818.63	1604.45	1470.09	1331.45	1234.47	2152.97	3747.30	1878.92	1473.96
1249.66	1128.80	1100.23	904.14	838.37	872.13	997.79	740.58	661.92	571.71
506.24									
468.17	572.93	573.53	515.89	450.58	1401.44	853.11	600.91	505.91	449.80
414.48	404.47	307.41	253.39	231.69	220.14	221.73	251.50	252.63	201.43
180.68	195.44	172.11	127.64	132.69	135.56	776.37	687.49	345.91	710.65
506.24									
840.43	527.22	529.37	519.52	860.06	553.80	453.84	395.89	347.33	297.16
402.66	384.76	377.57	266.68	292.64	350.23	355.63	258.62	339.85	215.30
173.94	162.34	134.09	128.50	125.57	113.79	105.56	100.51	115.53	96.07
88.38									
255.24	614.55	288.33	357.33	219.10	196.91	156.21	132.47	125.82	121.65
157.66	153.59	104.11	104.91	98.36	82.77	77.34	70.17	64.06	77.04
340.13	134.10	336.14	500.60	157.07	127.49	216.64	202.64	705.92	232.71
269.40									
202.41	175.60	166.44	578.37	452.57	323.84	284.71	268.13	256.87	257.97
334.03	208.27	189.11	167.58	194.99	396.65	257.66	231.26	229.47	173.83
152.17	284.12	235.40	185.37	166.24	205.23	362.82	382.16	345.48	317.91
269.40									
263.48	251.12	390.93	436.44	323.60	288.27	269.71	259.18	244.30	210.50
214.94	263.51	245.49	344.50	475.49	565.07	386.17	343.27	324.36	310.70
300.15	303.79	490.33	384.56	318.19	309.29	299.44	285.51	274.66	267.77
258.27									
247.98	241.18	231.00	223.83	223.61	222.92	209.64	192.75	183.81	188.12
310.71	237.73	189.76	192.11	314.38	407.56	272.46	256.02	266.14	350.46
510.49	424.60	385.87	384.34	353.19	341.64	331.55	377.30	573.33	425.64
258.27									
411.08	454.42	484.70	430.19	408.64	393.89	379.66	367.45	357.18	346.96
336.63	328.25	320.37	312.28	303.77	296.82	289.86	282.39	275.15	269.41
262.95	258.01	253.16	247.93	242.32	238.12	233.23	228.60	224.14	219.63
215.52									
211.96	208.64	205.08	201.02	198.37	194.79	191.29	188.80	186.59	184.16
181.55	179.08	176.71	174.72	172.44	170.16	168.23	166.45	164.57	162.78
160.90	159.26	157.45	155.74	154.10	152.56	151.23	149.82	148.49	147.12
145.76									
144.58	143.38	142.20	141.07	139.94	138.84	137.75	136.73	135.71	134.74
133.79	132.86	131.95	131.07	130.20	129.35	128.53	127.71	126.90	126.11
125.37	124.63	123.90	123.17	122.36	121.65	120.87	120.13	148.49	147.12
145.76									
118.94	118.06	117.47	117.03	116.26	115.06	114.29	114.02	112.64	111.78
110.62	110.23	108.62	107.53	106.14	111.20	160.74	123.92	116.42	115.84
119.80	114.11	110.50	108.72	105.64	103.74	102.44	100.05	105.92	141.41
140.53									
114.27	139.00	415.39	506.10	334.40	302.02	350.42	322.23	290.60	409.51
1110.88	1088.45	1424.17	1613.48	1274.41	1067.10	972.27	960.39	1353.59	2058.14
2497.45	2741.29	2361.94	2168.22	2728.08	2975.20	2930.59	3011.40	3809.40	4109.57
140.53									
4797.80	4945.43	6288.16	7593.91	7031.13	6831.93	6766.12	6395.63	6530.55	6504.96
6901.66	7320.68	6746.30	5683.27	4634.57	4011.23	3563.37	3137.36	2716.75	2367.63
2140.41	2294.87	2041.66	1773.34	1626.27	1848.01	1631.43	1605.03	1395.02	1223.33
1058.13									
926.44	768.78	844.56	875.45	691.68	565.51	571.64	1048.75	1132.08	846.03
714.28	609.02	482.55	453.89	492.74	410.88	372.22	328.79	297.73	263.61
394.56	763.26	445.94	385.76	432.36	870.69	491.62	403.91	330.23	282.55

1058.13									
479.77	1339.28	633.02	522.24	460.57	415.91	411.28	292.66	269.00	232.13
192.88	185.73	190.63	527.80	458.27	295.03	347.42	590.08	348.18	551.04
343.80	245.72	201.53	204.39	315.36	232.73	283.46	274.78	226.66	426.59
356.28									
505.92	501.66	1027.58	5004.41	1565.19	979.84	783.44	645.15	527.00	404.61
468.24	570.49	385.00	301.65	292.39	292.76	234.93	219.66	210.17	252.24
544.49	416.31	867.42	823.73	498.53	468.52	472.24	1845.52	2827.92	1290.52
1049.37									
872.82	777.08	710.27	657.05	615.36	602.36	551.84	453.82	385.62	375.67
398.91	554.95	665.05	636.33	677.09	538.37	516.18	620.01	509.19	486.20
579.91	497.20	439.75	438.36	386.04	330.81	311.97	332.52	349.95	320.24
1049.37									

TRIAL	RUN	CRITERION	MEAN Q	R	A(1)	A(2)	A(3)	A(4)	A(5)	A(6)	A(7)	A(8)
					A(9)	A(10)	A(11)	A(12)	A(13)	A(14)	A(15)	A(16)
					INITIAL VALUES OF THE PARAMETERS							
1	1	.3386E+09	689.5	.9016	.2500	5.0000	.3000	1.3000	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
TRIAL	RUN	CRITERION	MEAN Q	R	A(1)	A(2)	A(3)	A(4)	A(5)	A(6)	A(7)	A(8)
					A(9)	A(10)	A(11)	A(12)	A(13)	A(14)	A(15)	A(16)
1	2	.3388E+09	689.2	.9011	.2600	5.0000	.3000	1.3000	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	3	.3385E+09	689.7	.9020	.2400	5.0000	.3000	1.3000	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	4	.3383E+09	689.7	.9017	.2400	5.0500	.3000	1.3000	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	5	.3389E+09	689.9	.8997	.2400	5.0500	.3120	1.3000	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	6	.3380E+09	689.6	.9036	.2400	5.0500	.2880	1.3000	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	7	.3547E+09	693.2	.9022	.2400	5.0500	.2880	1.3260	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	8	.3246E+09	686.0	.9046	.2400	5.0500	.2880	1.2740	1.3000	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	9	.3514E+09	691.2	.8998	.2400	5.0500	.2880	1.2740	1.3260	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	10	.3008E+09	680.9	.9090	.2400	5.0500	.2880	1.2740	1.2740	.0180	.0070	.0050
					.0360	3.0000	4.5000					
1	11	.2872E+09	680.1	.9135	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0070	.0050
					.0360	3.0000	4.5000					
1	12	.2810E+09	679.9	.9155	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0050
					.0360	3.0000	4.5000					
1	13	.2874E+09	680.0	.9138	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0053
					.0360	3.0000	4.5000					
1	14	.2740E+09	679.8	.9173	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0048
					.0360	3.0000	4.5000					
1	15	.2728E+09	679.7	.9177	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0048
					.0371	3.0000	4.5000					
1	16	.2730E+09	679.7	.9175	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0048
					.0371	3.0600	4.5000					
1	17	.2727E+09	679.7	.9178	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0048
					.0371	2.9400	4.5000					
1	18	.2719E+09	679.8	.9180	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0048
					.0371	2.9400	4.5900					

1	18	.2719E+09	679.8	.9180	.2400	5.0500	.2880	1.2740	1.2740	.0184	.0073	.0048		
						.0371	2.9400	4.5900						
			PATTERN	MOVE										
2	19	.2153E+09	670.5	.9325	.2300	5.1000	.2760	1.2480	1.2480	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
TRIAL	RUN	CRITERION	MEAN Q	R	A(1)	A(2)	A(3)	A(4)	A(5)	A(6)	A(7)	A(8)		
					A(9)	A(10)	A(11)	A(12)	A(13)	A(14)	A(15)	A(16)		
2	20	.2157E+09	670.8	.9327	.2204	5.1000	.2760	1.2480	1.2480	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
2	21	.2151E+09	670.3	.9322	.2396	5.1000	.2760	1.2480	1.2480	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
2	22	.2150E+09	670.3	.9320	.2396	5.1505	.2760	1.2480	1.2480	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
2	23	.2163E+09	670.2	.9332	.2396	5.1505	.2645	1.2480	1.2480	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
2	24	.2144E+09	670.4	.9307	.2396	5.1505	.2875	1.2480	1.2480	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
2	25	.2037E+09	667.0	.9317	.2396	5.1505	.2875	1.2225	1.2480	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
2	26	.1862E+09	662.2	.9355	.2396	5.1505	.2875	1.2225	1.2225	.0187	.0077	.0045		
						.0382	2.8800	4.6800						
2	27	.1777E+09	661.7	.9385	.2396	5.1505	.2875	1.2225	1.2225	.0191	.0077	.0045		
						.0382	2.8800	4.6800						
2	28	.1737E+09	661.5	.9400	.2396	5.1505	.2875	1.2225	1.2225	.0191	.0081	.0045		
						.0382	2.8800	4.6800						
2	29	.1696E+09	661.5	.9411	.2396	5.1505	.2875	1.2225	1.2225	.0191	.0081	.0043		
						.0382	2.8800	4.6800						
2	30	.1689E+09	661.5	.9413	.2396	5.1505	.2875	1.2225	1.2225	.0191	.0081	.0043		
						.0393	2.8800	4.6800						
2	31	.1687E+09	661.5	.9414	.2396	5.1505	.2875	1.2225	1.2225	.0191	.0081	.0043		
						.0393	2.8212	4.6800						
2	32	.1683E+09	661.5	.9415	.2396	5.1505	.2875	1.2225	1.2225	.0191	.0081	.0043		
						.0393	2.8212	4.7718						
2	32	.1683E+09	661.5	.9415	.2396	5.1505	.2875	1.2225	1.2225	.0191	.0081	.0043		
						.0393	2.8212	4.7718						
			PATTERN	MOVE										
3	33	.1058E+09	644.1	.9562	.2392	5.2510	.2870	1.1710	1.1710	.0198	.0088	.0038		
						.0415	2.7024	4.9536						
TRIAL	RUN	CRITERION	MEAN Q	R	A(1)	A(2)	A(3)	A(4)	A(5)	A(6)	A(7)	A(8)		
					A(9)	A(10)	A(11)	A(12)	A(13)	A(14)	A(15)	A(16)		
3	34	.1056E+09	643.8	.9561	.2488	5.2510	.2870	1.1710	1.1710	.0198	.0088	.0038		
						.0415	2.7024	4.9536						
3	35	.1057E+09	643.9	.9559	.2488	5.3025	.2870	1.1710	1.1710	.0198	.0088	.0038		

```
                                                  .0415    2.7024    4.9536
   3  36   .1055E+09  643.8 .9563      .2488    5.1995     .2870    1.1710    1.1710     .0198     .0088     .0038
                                                  .0415    2.7024    4.9536
   3  37   .1049E+09  643.9 .9557      .2488    5.1995     .2985    1.1710    1.1710     .0198     .0088     .0038
                                                  .0415    2.7024    4.9536
   3  38   .1003E+09  640.5 .9561      .2488    5.1995     .2985    1.1466    1.1710     .0198     .0088     .0038
                                                  .0415    2.7024    4.9536
   3  39   .9339E+08  636.1 .9578      .2488    5.1995     .2985    1.1466    1.1466     .0198     .0088     .0038
                                                  .0415    2.7024    4.9536
   3  40   .9068E+08  635.8 .9590      .2488    5.1995     .2985    1.1466    1.1466     .0202     .0088     .0038
                                                  .0415    2.7024    4.9536
   3  41   .8895E+08  635.7 .9596      .2488    5.1995     .2985    1.1466    1.1466     .0202     .0092     .0038
                                                  .0415    2.7024    4.9536
   3  42   .8753E+08  635.7 .9601      .2488    5.1995     .2985    1.1466    1.1466     .0202     .0092     .0036
                                                  .0415    2.7024    4.9536
   3  43   .8725E+08  635.7 .9602      .2488    5.1995     .2985    1.1466    1.1466     .0202     .0092     .0036
                                                  .0426    2.7024    4.9536
   3  44   .8725E+08  635.7 .9602      .2488    5.1995     .2985    1.1466    1.1466     .0202     .0092     .0036
                                                  .0426    2.6460    4.9536
   3  45   .8705E+08  635.7 .9603      .2488    5.1995     .2985    1.1466    1.1466     .0202     .0092     .0036
                                                  .0426    2.6460    5.0490
   3  45   .8705E+08  635.7 .9603      .2488    5.1995     .2985    1.1466    1.1466     .0202     .0092     .0036
                                                  .0426    2.6460    5.0490
                          PATTERN  MOVE
   4  46   .7074E+08  611.4 .9630      .2488    5.2485     .2985    1.0707    1.0707     .0213     .0092     .0029
                                                  .0460    2.4708    5.3263
TRIAL RUN  CRITERION MEAN Q   R        A( 1)     A( 2)     A( 3)     A( 4)     A( 5)     A( 6)     A( 7)     A( 8)
                                                  A( 9)     A(10)     A(11)     A(12)     A(13)     A(14)     A(15)     A(16)

PARAMETER  A( 1) =      .249  REMOVED FROM OPTIMIZATION
   4  47   .7051E+08  611.4 .9631      .2488    5.1965     .2985    1.0707    1.0707     .0213     .0092     .0029
                                                  .0460    2.4708    5.3263
PARAMETER  A( 3) =      .299  REMOVED FROM OPTIMIZATION
   4  48   .7089E+08  608.3 .9628      .2488    5.1965     .2985    1.0477    1.0707     .0213     .0092     .0029
                                                  .0460    2.4708    5.3263
   4  49   .7083E+08  614.5 .9631      .2488    5.1965     .2985    1.0936    1.0707     .0213     .0092     .0029
                                                  .0460    2.4708    5.3263
   4  50   .7168E+08  607.5 .9625      .2488    5.1965     .2985    1.0707    1.0477     .0213     .0092     .0029
                                                  .0460    2.4708    5.3263
   4  51   .7012E+08  615.3 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0029
                                                  .0460    2.4708    5.3263
   4  52   .7059E+08  615.1 .9632      .2488    5.1965     .2985    1.0707    1.0936     .0217     .0092     .0029
                                                  .0460    2.4708    5.3263
   4  53   .7020E+08  615.5 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0209     .0092     .0029
                                                  .0460    2.4708    5.3263
```

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 4  54   .7025E+08  615.3 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0087     .0029
                                          .0460    2.4708    5.3263

 4  55   .7005E+08  615.3 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                          .0460    2.4708    5.3263

 4  56   .7004E+08  615.3 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                          .0473    2.4708    5.3263

 4  57   .7012E+08  615.3 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                          .0473    2.4178    5.3263

 4  58   .7001E+08  615.3 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                          .0473    2.5237    5.3263

 4  59   .7008E+08  615.3 .9634      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                          .0473    2.5237    5.4273

 4  60   .6995E+08  615.3 .9635      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                          .0473    2.5237    5.2253

 4  60   .6995E+08  615.3 .9635      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                          .0473    2.5237    5.2253

                     PATTERN  MOVE
 5  61   .7651E+08  605.9 .9599      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0027
                                          .0519    2.4014    5.4015

TRIAL RUN  CRITERION MEAN Q   R        A( 1)     A( 2)     A( 3)     A( 4)     A( 5)     A( 6)     A( 7)     A( 8)
                                          A( 9)     A(10)     A(11)     A(12)     A(13)     A(14)     A(15)     A(16)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

PARAMETER  A( 1) =     .249  REMOVED FROM OPTIMIZATION
PARAMETER  A( 2) =    5.196  REMOVED FROM OPTIMIZATION
PARAMETER  A( 3) =     .299  REMOVED FROM OPTIMIZATION
 5  62   .7640E+08  608.8 .9599      .2488    5.1965     .2985    1.0921    1.0406     .0224     .0092     .0027
                                          .0519    2.4014    5.4015

 5  63   .7392E+08  609.6 .9612      .2488    5.1965     .2985    1.0707    1.0625     .0224     .0092     .0027
                                          .0519    2.4014    5.4015

 5  64   .7949E+08  602.2 .9585      .2488    5.1965     .2985    1.0707    1.0187     .0224     .0092     .0027
                                          .0519    2.4014    5.4015

 5  65   .7850E+08  605.7 .9588      .2488    5.1965     .2985    1.0707    1.0406     .0228     .0092     .0027
                                          .0519    2.4014    5.4015

 5  66   .7495E+08  606.0 .9607      .2488    5.1965     .2985    1.0707    1.0406     .0220     .0092     .0027
                                          .0519    2.4014    5.4015

 5  67   .7746E+08  605.9 .9594      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0096     .0027
                                          .0519    2.4014    5.4015

 5  68   .7557E+08  605.9 .9604      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0087     .0027
                                          .0519    2.4014    5.4015

 5  69   .7608E+08  605.9 .9601      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0028
                                          .0519    2.4014    5.4015

 5  70   .7664E+08  605.9 .9598      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0027
                                          .0534    2.4014    5.4015

 5  71   .7642E+08  605.9 .9599      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0027
                                          .0505    2.4014    5.4015

 5  72   .7641E+08  605.9 .9599      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0027
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                                                .0519    2.4518    5.4015
  5  73   .7665E+08  605.9 .9598      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0027
                                                .0519    2.3509    5.4015

  5  74   .7640E+08  605.9 .9599      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0027
                                                .0519    2.4014    5.2970

  5  75   .7665E+08  605.9 .9598      .2488    5.1965     .2985    1.0707    1.0406     .0224     .0092     .0027
                                                .0519    2.4014    5.5061

                   PATTERN=   1   RESOLUTION=    0
  5  75   .6995E+08  605.9 .9598      .2488    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                                .0473    2.5237    5.2253

 TRIAL RUN  CRITERION MEAN Q   R        A( 1)     A( 2)     A( 3)     A( 4)     A( 5)     A( 6)     A( 7)     A( 8)
                                                A( 9)     A(10)     A(11)     A(12)     A(13)     A(14)     A(15)     A(16)

  5  76   .6974E+08  615.1 .9636      .2587    5.1965     .2985    1.0707    1.0936     .0213     .0092     .0027
                                                .0473    2.5237    5.2253

  5  77   .6954E+08  615.0 .9637      .2587    5.1445     .2985    1.0707    1.0936     .0213     .0092     .0027
                                                .0473    2.5237    5.2253

  5  78   .6865E+08  615.1 .9640      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0092     .0027
                                                .0473    2.5237    5.2253

  5  79   .6907E+08  618.0 .9640      .2587    5.1445     .3105    1.0921    1.0936     .0213     .0092     .0027
                                                .0473    2.5237    5.2253

  5  80   .6900E+08  618.9 .9641      .2587    5.1445     .3105    1.0707    1.1155     .0213     .0092     .0027
                                                .0473    2.5237    5.2253

  5  81   .6901E+08  611.4 .9638      .2587    5.1445     .3105    1.0707    1.0717     .0213     .0092     .0027
                                                .0473    2.5237    5.2253

  5  82   .6904E+08  614.9 .9638      .2587    5.1445     .3105    1.0707    1.0936     .0217     .0092     .0027
                                                .0473    2.5237    5.2253

  5  83   .6876E+08  615.4 .9640      .2587    5.1445     .3105    1.0707    1.0936     .0209     .0092     .0027
                                                .0473    2.5237    5.2253

  5  84   .6888E+08  615.1 .9639      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0096     .0027
                                                .0473    2.5237    5.2253

  5  85   .6886E+08  615.2 .9640      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0087     .0027
                                                .0473    2.5237    5.2253

  5  86   .6872E+08  615.1 .9640      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0092     .0028
                                                .0473    2.5237    5.2253

  5  87   .6863E+08  615.1 .9640      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0092     .0027
                                                .0487    2.5237    5.2253

  5  88   .6861E+08  615.1 .9640      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0092     .0027
                                                .0487    2.5741    5.2253

  5  89   .6853E+08  615.1 .9641      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0092     .0027
                                                .0487    2.5741    5.1208

  5  89   .6853E+08  615.1 .9641      .2587    5.1445     .3105    1.0707    1.0936     .0213     .0092     .0027
                                                .0487    2.5741    5.1208

                   PATTERN  MOVE
  6  90   .6778E+08  615.0 .9644      .2687    5.0926     .3224    1.0707    1.0936     .0213     .0092     .0027
```

TRIAL	RUN	CRITERION	MEAN Q	R	A(1)	A(2)	A(3)	A(4)	A(5)	A(6)	A(7)	A(8)
					A(9)	A(10)	A(11)	A(12)	A(13)	A(14)	A(15)	A(16)
					.0501	2.6246	5.0163					
6	91	.6783E+08	614.9	.9644	.2790	5.0926	.3224	1.0707	1.0936	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	92	.6776E+08	615.2	.9644	.2583	5.0926	.3224	1.0707	1.0936	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	93	.6757E+08	615.2	.9646	.2583	5.0411	.3224	1.0707	1.0936	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	94	.6751E+08	615.3	.9645	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	95	.6752E+08	612.4	.9645	.2583	5.0411	.3348	1.0492	1.0936	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	96	.6786E+08	618.2	.9645	.2583	5.0411	.3348	1.0921	1.0936	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	97	.6796E+08	619.0	.9644	.2583	5.0411	.3348	1.0707	1.1155	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	98	.6771E+08	611.6	.9644	.2583	5.0411	.3348	1.0707	1.0717	.0213	.0092	.0027
					.0501	2.6246	5.0163					
6	99	.6761E+08	615.1	.9645	.2583	5.0411	.3348	1.0707	1.0936	.0217	.0092	.0027
					.0501	2.6246	5.0163					
6	100	.6787E+08	615.5	.9643	.2583	5.0411	.3348	1.0707	1.0936	.0209	.0092	.0027
					.0501	2.6246	5.0163					
6	101	.6745E+08	615.3	.9645	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0027
					.0501	2.6246	5.0163					
6	102	.6748E+08	615.3	.9645	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0025
					.0501	2.6246	5.0163					
6	103	.6746E+08	615.3	.9645	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0028
					.0501	2.6246	5.0163					
6	104	.6751E+08	615.3	.9645	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0027
					.0516	2.6246	5.0163					
6	105	.6746E+08	615.3	.9645	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0027
					.0487	2.6246	5.0163					
6	106	.6737E+08	615.3	.9646	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0027
					.0501	2.6761	5.0163					
6	107	.6732E+08	615.3	.9646	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0027
					.0501	2.6761	4.9139					
6	107	.6732E+08	615.3	.9646	.2583	5.0411	.3348	1.0707	1.0936	.0213	.0096	.0027
					.0501	2.6761	4.9139					
			PATTERN	MOVE								
7	108	.6727E+08	615.4	.9646	.2579	4.9377	.3592	1.0707	1.0936	.0213	.0096	.0027
					.0515	2.7781	4.7069					
TRIAL	RUN	CRITERION	MEAN Q	R	A(1)	A(2)	A(3)	A(4)	A(5)	A(6)	A(7)	A(8)
					A(9)	A(10)	A(11)	A(12)	A(13)	A(14)	A(15)	A(16)

7 109	.6706E+08	615.5	.9647	.2476	4.9377	.3592	1.0707	1.0936	.0213	.0096	.0027	
				.0515	2.7781	4.7069						
7 110	.6687E+08	615.5	.9648	.2476	4.8873	.3592	1.0707	1.0936	.0213	.0096	.0027	
				.0515	2.7781	4.7069						
7 111	.6749E+08	615.6	.9644	.2476	4.8873	.3726	1.0707	1.0936	.0213	.0096	.0027	
				.0515	2.7781	4.7069						
7 112	.6648E+08	615.4	.9651	.2476	4.8873	.3458	1.0707	1.0936	.0213	.0096	.0027	
				.0515	2.7781	4.7069						
7 113	.6633E+08	612.5	.9651	.2476	4.8873	.3458	1.0492	1.0936	.0213	.0096	.0027	
				.0515	2.7781	4.7069						
7 114	.6658E+08	616.2	.9650	.2476	4.8873	.3458	1.0492	1.1155	.0213	.0096	.0027	
				.0515	2.7781	4.7069						
7 115	.6689E+08	608.8	.9650	.2476	4.8873	.3458	1.0492	1.0717	.0213	.0096	.0027	
				.0515	2.7781	4.7069						
7 116	.6625E+08	612.3	.9652	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0027	
				.0515	2.7781	4.7069						
7 117	.6641E+08	612.3	.9651	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0092	.0027	
				.0515	2.7781	4.7069						
7 118	.6626E+08	612.3	.9652	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0025	
				.0515	2.7781	4.7069						
7 119	.6638E+08	612.3	.9651	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0028	
				.0515	2.7781	4.7069						
7 120	.6624E+08	612.3	.9652	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0027	
				.0531	2.7781	4.7069						
7 121	.6638E+08	612.3	.9651	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0027	
				.0531	2.8316	4.7069						
7 122	.6628E+08	612.3	.9652	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0027	
				.0531	2.7245	4.7069						
7 123	.6619E+08	612.3	.9652	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0027	
				.0531	2.7781	4.6087						
7 123	.6619E+08	612.3	.9652	.2476	4.8873	.3458	1.0492	1.0936	.0217	.0096	.0027	
				.0531	2.7781	4.6087						

PATTERN MOVE

E.3 SAMPLE INPUT AND OUTPUT FOR OPTIMIZATION PROGRAM WITH SNOW - SENSITIVITY MODE

```
    1     1     1     1     1
   96     0     0     0     0
    3     1     0     1     0
    1     1     1     1
    1
    1
    1     1
    0
    1     1
    1
    0
   44  1964    10   274     1
       .05          .20        .25        5.0        .33        3.0        0.9
      436.
       1.0
       0.0          .30
  1.0  0.0   166    92   .25
       1.0
        .9           .1       .004        .55        .99
       0.0        4.41        .77        .30        0.0        0.0        .03
    1
    1     0
    3     0
PASSUMPSIC R. MAT          1400. -1.5 -2.7 -3.9 -2.7
    1
    1
PASSUMPSIC RIVER           1400.  .70  1.1 .023 .006 .003 .054  5.0  .01
PASSUMPSIC RIVER        32.  0.0  0.0  0.0  0.0
PASSUMPSIC RIVER        0.0  0.0  0.0
BASINWIDE PARAMETERS    32.  33.  .03  .50
AREAL DEPLETION         .24  .39  .52  .64  .75  .82  .88  .92  .96
 1339   61    6    1    3  125    3
   25   27   29   31   33   37
    1    1
    0
    1
    6    6    6    6    6    6
      -.20       -.10       -.05        .05        .10        .20
     -.013      -.008      -.003       .002       .007       .017
     -.005      -.003      -.001       .002       .004       .009
     -.002      -.001       .001       .002       .004       .007
     -.036      -.018       .018       .054       .090       .126
      -5.0       -3.0       -1.0        2.0        5.0       10.0
    3
    0
    0
 .10 .40 .50
    0    0    0    0
  .5
 PASSUMPSIC RIVER AT PASSUMPSIC,VT.--SAMPLE OUTPUT-SENSITIVITY WITH SNOW
111111110000011111110000011111110000011111111
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SNOW PARAMETERS--CASE=1

INPUT GAGES USED

RG	TA GAGE	WE GAGE
1	PASSUMPSIC R. MAT	

TA GAGE	ELEV.	PERIOD TA LAPSE RATES			
PASSUMPSIC R. MAT	1400.	-1.5	-2.7	-3.9	-2.7

AREA SNOW PARAMETERS

RG	ELEV	EFC	SCF	MFMAX	MFMIN	NMF	UADJ	SI	DAYGM
1	1400.	.70	1.10	.0230	.0060	.0030	.0540	5.00	.010

INTIAL SNOW VALUES

RG	WE	NEGHS	LIQW STORAGE	SB	SBAESC	SBWS	TINDEX
1	0.00	0.000	0.000	0.000	0.000	0.000	32.

BASINWIDE PARAMETERS

MELT-BASE	PX-TEMP	PLWHC	TI-PARM
32.0	33.0	.030	.500

AREAL DEPLETION CURVE

WE/AI	0.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
AESC	.05	.24	.39	.52	.64	.75	.82	.88	.92	.96	1.00

PASSUMPSIC RIVER AT PASSUMPSIC,VT.--SAMPLE OUTPUT-SENSITIVITY WITH SNOW

THE PERIOD OF RECORD BEING ANALYZED IS FROM 10 1964 THRU 5 1968 THE BUFFER PERIOD IS THE FIRST 61 DAYS

PARAMETER VALUES

0	0	0	0	0	0	0	0	0	0	0	0
UZSN	LZSN	CB	POWER	CC	KV	KGS	K24EL	A	K24L	EPXM	K1(1)
.2500	5.0000	.3300	3.0000	.9000	.5500	.9900	.2500	.0500	0.0000	.2000	1.0000

PARAMETER VALUES

0	0	0	0	0	0	0	0	0	0	0	0
K1(2)	PEADJ(1)	PEADJ(2)	K3	SRC1	LIRC6	LKK6	CSSR	HWARP	VWARP	FOREST(1)	FOREST(2)
0.0000	1.0000	0.0000	.3000	.9000	.1000	.0040	.5000	1.0000	1.0000	I	I

PARAMETER VALUES

1	0	2	0	3	0	4	0	5	0	0	0
SCF(1)	SCF(2)	MFMAX(1)	MFMAX(2)	MFMIN(1)	MFMIN(2)	NMF(1)	NMF(2)	UADJ(1)	UADJ(2)	FUCOEF(1)	FUCOEF(2)
1.1000	I	.0230	I	.0060	I	.0030	I	.0540	I	I	I

PARAMETER VALUES

6	0	0	0	0	0	0	0	0	0	0	0
SI(1)	SI(2)	DAYGM(1)	DAYGM(2)	PLWHC	TOPM	AK	AN	RAIX	SAIX	EHIGH	ELOW
5.0000	I	.0100	I	.0300	I	I	I	I	I	1.0000	0.0000

PARAMETER VALUES

0	0
NEP	NDUR
166.0000	92.0000

(NOTE ABOVE INUMBERS CORRESPOND TO A ( ) SUBSCRIPT NUMBERS)

THE FOLLOWING PERIODS WILL BE REMOVED FROM CALCULATING THE VALUE FOR THE OPTIMIZATION CRITERION AND (MEAN Q , R)

THE BUFFER PERIOD (THE FIRST 61 DAYS) DATE DAY NO.

INITIAL STORAGE VALUES

UZSI	LZSI	SGWI	GWSI	RESI	SRGXI	SCEPI
0.0000	4.4100	.7700	.3000	0.0000	0.0000	.0300

FIXED LAG CHANNEL DELAY HISTOGRAM

GAGE	1	0	.1000	.4000	.5000

SENSITIVITY ANALYSIS

INITIAL OPT	PRESENT OPT	PERCENT	R COEF	MEAN Q	NAME	VALUE	PERCENT
.9407097E+08	.9407097E+08	0.00000	.9184361	596.68			
.9407097E+08	.1540833E+09	-63.79468	.8899478	527.88	SCF(1)	.90000	-18.18182
.9407097E+08	.1166231E+09	-23.97350	.9079875	562.23	SCF(1)	1.00000	-9.09091
.9407097E+08	.1033799E+09	-9.89567	.9140281	579.45	SCF(1)	1.05000	-4.54545
.9407097E+08	.9019183E+08	4.12364	.9202995	613.93	SCF(1)	1.15000	4.54545
.9407097E+08	.9118286E+08	3.07015	.9207406	630.87	SCF(1)	1.20000	9.09091
.9407097E+08	.1089562E+09	-15.82339	.9180374	665.51	SCF(1)	1.30000	18.18182
.9407097E+08	.1424186E+09	-51.39488	.8722433	601.88	MFMAX(1)	.01000	-56.52174
.9407097E+08	.9014098E+08	4.17769	.9221760	598.54	MFMAX(1)	.01500	-34.78261
.9407097E+08	.8617022E+08	8.39871	.9262853	596.94	MFMAX(1)	.02000	-13.04348
.9407097E+08	.1028799E+09	-9.36411	.9098624	596.37	MFMAX(1)	.02500	8.69565
.9407097E+08	.1299061E+09	-38.09375	.8843284	595.74	MFMAX(1)	.03000	30.43478
.9407097E+08	.1896409E+09	-101.59343	.8305815	594.98	MFMAX(1)	.04000	73.91304
.9407097E+08	.8715788E+08	7.34881	.9243720	597.82	MFMIN(1)	.00100	-83.33333
.9407097E+08	.8678341E+08	7.74688	.9248389	597.14	MFMIN(1)	.00300	-50.00000
.9407097E+08	.9063237E+08	3.65533	.9215277	596.89	MFMIN(1)	.00500	-16.66667
.9407097E+08	.1039968E+09	-10.55144	.9091862	596.25	MFMIN(1)	.00800	33.33333
.9407097E+08	.1164448E+09	-23.78402	.8972953	595.86	MFMIN(1)	.01000	66.66667
.9407097E+08	.1528078E+09	-62.43885	.8614782	595.06	MFMIN(1)	.01500	150.00000
.9407097E+08	.1010165E+09	-7.38326	.9120101	596.43	NMF(1)	.00100	-66.66667
.9407097E+08	.9732250E+08	-3.45646	.9154502	596.56	NMF(1)	.00200	-33.33333
.9407097E+08	.9183865E+08	2.37302	.9204474	596.79	NMF(1)	.00400	33.33333
.9407097E+08	.8924661E+08	5.12843	.9228064	596.91	NMF(1)	.00500	66.66667
.9407097E+08	.8534034E+08	9.28090	.9263078	596.92	NMF(1)	.00700	133.33333
.9407097E+08	.8040616E+08	14.52607	.9306947	597.23	NMF(1)	.01000	233.33333
.9407097E+08	.9189803E+08	2.30990	.9203124	597.12	UADJ(1)	.01800	-66.66667
.9407097E+08	.9297424E+08	1.16586	.9193933	596.88	UADJ(1)	.03600	-33.33333
.9407097E+08	.9617877E+08	-2.24064	.9164917	596.49	UADJ(1)	.07200	33.33333
.9407097E+08	.1014476E+09	-7.84155	.9114747	596.16	UADJ(1)	.10800	100.00000
.9407097E+08	.1075711E+09	-14.35099	.9055099	596.08	UADJ(1)	.14400	166.66667
.9407097E+08	.1152826E+09	-22.54854	.8980334	595.97	UADJ(1)	.18000	233.33333
.9407097E+08	.1361017E+09	-44.67984	.8809736	597.31	SI(1)	0.00000	-100.00000
.9407097E+08	.1197065E+09	-27.25122	.8945981	597.03	SI(1)	2.00000	-60.00000
.9407097E+08	.1007946E+09	-7.14741	.9117155	596.78	SI(1)	4.00000	-20.00000
.9407097E+08	.9227908E+08	1.90483	.9209498	596.12	SI(1)	7.00000	40.00000
.9407097E+08	.9319258E+08	.93376	.9200994	596.10	SI(1)	10.00000	100.00000
.9407097E+08	.9319258E+08	.93376	.9200994	596.10	SI(1)	15.00000	200.00000