NOAA Eastern Region Computer Programs
and Problems NWS ERCP - No. 11

STABILITY AND OTHER PARAMETERS FROM THE FIRST TRANSMISSION RAOB DATA

Scientific Services Division
Eastern Region Headquarters
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U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration / National Weather Service

NOAA Technical Memorandum

er Service, Eastern Region Computer Programs and Problems

gion Computer Programs and Problems (ERCP)series is a sub-
tern Region Technical Memorandum series. It will serve as
r the transfer of information about fully documented AFOS
ograms. The format of ERCP - No. 1 will serve as the model
for future issuances in this series.

1 An AFOS version of the Flash Flood Checklist. Cynthia M. Scott, March 1981. (PB81 211252).

2 An AFOS Applications Program to Compute Three-Hourly Stream Stages. Alan P. Blackburn, September 1981. (PB82 156886).

3 PUPPY (AFOS Hydrologic Data Reporting Program). Daniel P. Provost, December 1981. (PB82 199720).

4 Special Search Computer Program. Alan P. Blackburn, April 1982. (PB83 175455).

5 Conversion of ALEMBIC$ Workbins. Alan P. Blackburn, October 1982. (PB83 138313).

6 Real-Time Quality Control of SAOs. John A. Billet, January 1983. (PB83 166082).

7 Automated Hourly Weather Collective from HRR Data Input. Lawrence Cedrone, January 1983. (PB83 167122).

8 Decoders for FRH, FTJ and FD Products. Cynthia M. Scott, February 1983. (PB83 176057).

9 Stability Analysis Program. Hugh M. Stone, March 1983. (PB83 197947).

10 Help for AFOS Message Comp. Alan P. Blackburn, May 1983.

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UNITED STATES
DEPARTMENT OF COMMERCE
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I. General Information

A. Summary

This software package consists of 2 main programs--UA and STAB. The programs decode mandatory level data, analyze it and store the final product into the AFOS database. The final product, in table form, contains several stability parameters, a first guess of precipitable water and tropopause height, an estimate of maximum temperature and several other parameters. The programs were written to aid the forecaster in rapid assessment of current raob data, especially in convective and flash flood situations.

B. Environment

All programs run on the Data General Eclipse minicomputer and are written in FORTRAN. The programs are executed mainly in the background partition of memory.

C. References

Air Weather Service Technical Report 2ØØ. Revised May 1972. Appendix F.

Hess, Seymour L., 1959. Introduction to Theoretical Meteorology. Holt, Rinehart and Winston, New York, 355pp.

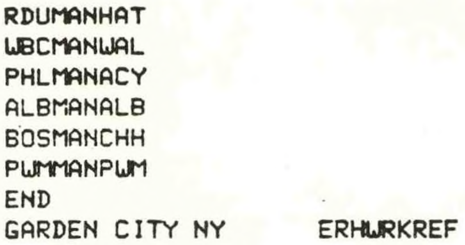
Sunkel, Warren E., 1981. "Topeka Library Routines Version 1.Ø3." July 1981.

Townsend, John F., and Russell J. Younkin, 1972. An Objective Method of Forecasting Summertime Thunderstorms. NOAA Technical Memorandum NWS ER-46. May 1972.

II. Application

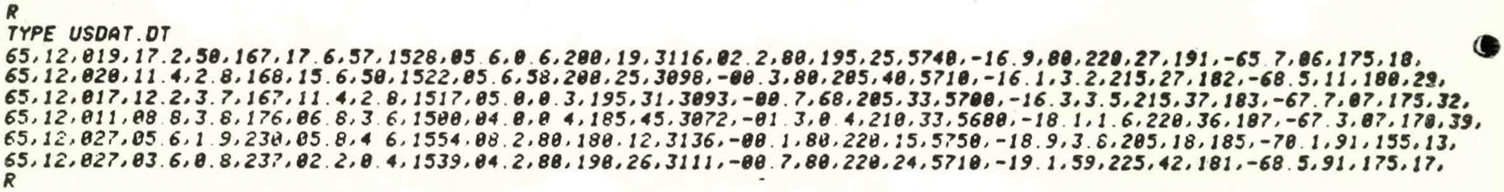
A. Complete Program Description

The software allows the forecaster rapid access to raob data that is time consuming when computed manually. UA is the first program executed. The program reads the data file USMAN (see Fig. 1) to obtain the AFOS keys to be decoded, decodes the raob data and writes the data to a file called USDAT.DT (see Fig. 2). UA uses the following subroutines:



```
RDUMANHAT
WBCMANWAL
PHLMANACY
ALBMANALB
BOSMANCHH
PWMMANPWM
END
GARDEN CITY NY       ERHWRKREF
```

Figure 1. Sample USMAN.



```
R
TYPE USDAT.DT
65,12,019,17.2,50,167,17.6,57,1528,05.6,0.6,200,19,3116,02.2,80,195,25,5740,-16.9,80,220,27,191,-65.7,06,175,18,
65,12,020,11.4,2.8,168,15.6,50,1522,05.6,58,200,25,3098,-00.3,80,205,40,5710,-16.1,3.2,215,27,182,-68.5,11,180,29,
65,12,017,12.2,3.7,167,11.4,2.8,1517,05.0,0.3,195,31,3093,-00.7,68,205,33,5700,-16.3,3.5,215,37,183,-67.7,07,175,32,
65,12,011,08.8,3.8,176,06.8,3.6,1500,04.0,0.4,185,45,3072,-01.3,0.4,210,33,5680,-18.1,1.6,220,36,187,-67.3,07,170,39,
65,12,027,05.6,1.9,230,05.8,4.6,1554.08.2,80,180.12,3136,-00.1,80,220,15,5750,-18.9,3.6,205,18,185,-70.1,91,155,13,
65,12,027,03.6,0.8,237,02.2,0.4,1539,04.2,80,190,26,3111,-00.7,80,220,24,5710,-19.1,59,225,42,181,-68.5,91,175,17,
R
```

Figure 2. Sample USDAT.DT.

OPENA, READA - These 2 subroutines open and read the desired AFOS key (Sunkel, 1981).

LIN - Drives the subroutines TD, WND, and PRES.

TD - Decodes the temperature and dew point depression.

PRES - Decodes the height field from the surface to 5ØØmb.

WND - Decodes the wind data.

LN35 - Decodes the tropopause, Showalter Index and the mean low level winds from the surface to 5ØØØ feet in meters per second (mps).

CHG - Performs a line search.

UA then swaps to STAB. This program decodes or computes the various stabilities, tropopause height, wind information, precipitable water, and projected maximum temperatures. STAB drives the following subroutines:

ZERO1 - Sets all arrays to 999.9 or 999.

JDT - Computes the Julian date.

STAB1 - Computes the K-Index, Total Totals and decodes the Showalter Index. The Total Totals (TT) is given by equation (1) and the K-Index (KI) is given by equation (2).

TT = 85Ø temp + 85Ø dew point - 2(5ØØ temp). (1)

KI = (85Ø temp - 5ØØ temp) + 85Ø dew point -
7ØØ depression. (2)

DELTA - Computes saturation vapor pressure using Tetens' formula.

WD - Decodes the steering winds (7ØØmb), mean low level winds (SFC-5,000 feet, mps) and computes the tropopause height via the subroutine TROP1.

TROP1 - Computes the tropopause height in feet using a thickness scheme based on equation (3) (Hess, 1959).

$$dZ = \frac{RT^*}{9.8} \, \mathrm{Ln}(p2/p1) \qquad (3)$$

T* is the average temperature in the layer between p1 and p2. R is the gas constant. Thickness values are computed for the SFC to 85Ømb, 85Ø to 7ØØmb, 7ØØmb to 5ØØmb and 5ØØmb to the tropopause. The final thickness value is too great, but the results give a good approximation to the actual value.

STAB2 - 1/ computes the Modified Younkin Index, a thunderstorm forecast index (Townsend and Younkin, 1972) and the associated thunderstorm probability, SWEAT Index (Air Weather Service Technical Report 2ØØ), and the projected afternoon maximum temperatures. The projected maximum temperatures are only computed on the 12Z run.

The Modified Younkin Index (MYI) is given by:

$$MYI = H5 - 5030 - 2.5(Tmax + 3TDmax) \qquad (4)$$

In the original equation, H5 was the 24-hour 1ØØØ-5ØØmb thickness valid at ØØØØZ, Tmax was the Klein Temperature Forecast and TDmax was the projected afternoon dew point. In this program, H5 is the current thickness, Tmax is the projected afternoon temperature, and TDmax is the current dew point. Due to the Tmax term, this index should only be used when computed off of the 12Z sounding.

The SWEAT Index (SI) is given by:

$$SI = 12D + 20(T-49) + 2F8 + F5 + 125(S + 0.2) \qquad (5)$$

D is the 85Ømb dew point in degrees Celsius (if negative, set the term equal to zero).

T is the Total Totals (see eqn. 1.). If it is less than 49, set the entire term equal to zero.

F8 is the speed of the 85Ømb wind in knots.

F5 is the speed of the 5ØØmb wind in knots.

S is the Sine (5ØØmb - 85Ømb wind direction).

The entire shear term, 125(S + Ø.2) is set to zero if any of the following conditions are not met:

1. 85Ømb wind direction in the range 13Ø through 25Ø degrees.

2. 5ØØmb wind direction in the range 21Ø through 31Ø degrees.

3. 5ØØmb wind direction minus the 85Ømb wind direction is positive.

4. 85Ømb and 5ØØmb wind speed is at least 15 knots.

1/ The routines for computing the maximum temperatures, precipitable water and Lifted Index were taken from a BASIC program developed by Alan Lee while at WSFO Columbia. The routines were translated to FORTRAN for use in the program.

PCPN - Computes the precipitable water (usually within 1Ø percent) and the Lifted Index.

WRT - A utility program that formats and stores the data into the AFOS database under the AFOS key used in USMAN. Figure 3 shows a 12Z product.

B. Machine Requirements

The total run-time (for both programs) is about 3Ø to 4Ø seconds. Disk storage requirements are listed below:

UA	23 blocks
STAB	47 blocks

The pair of programs runs in 15K.

C. Database

UA reads the file USMAN, accesses MAN products and creates the file USDAT.DT. STAB reads USDAT.DT and creates the files XXXDATAFL and XXXSTORED plus an output product specified in USMAN.

III. Procedures

A. Program Installation

The files UA.SV, STAB.SV and USMAN must be on or linked to DPØ. USMAN, which lists the particular MAN products to be decoded, can be created using a text editor or the ADM M:F/ command. The first six lines of USMAN are the products' AFOS keys; the last line allows 10 spaces for the office location followed by 9 spaces for the AFOS key of the output product (see Fig. 1). Six MAN products <u>must</u> be specified.

B. Initiation of Program

The program is started at an ADM by the command:

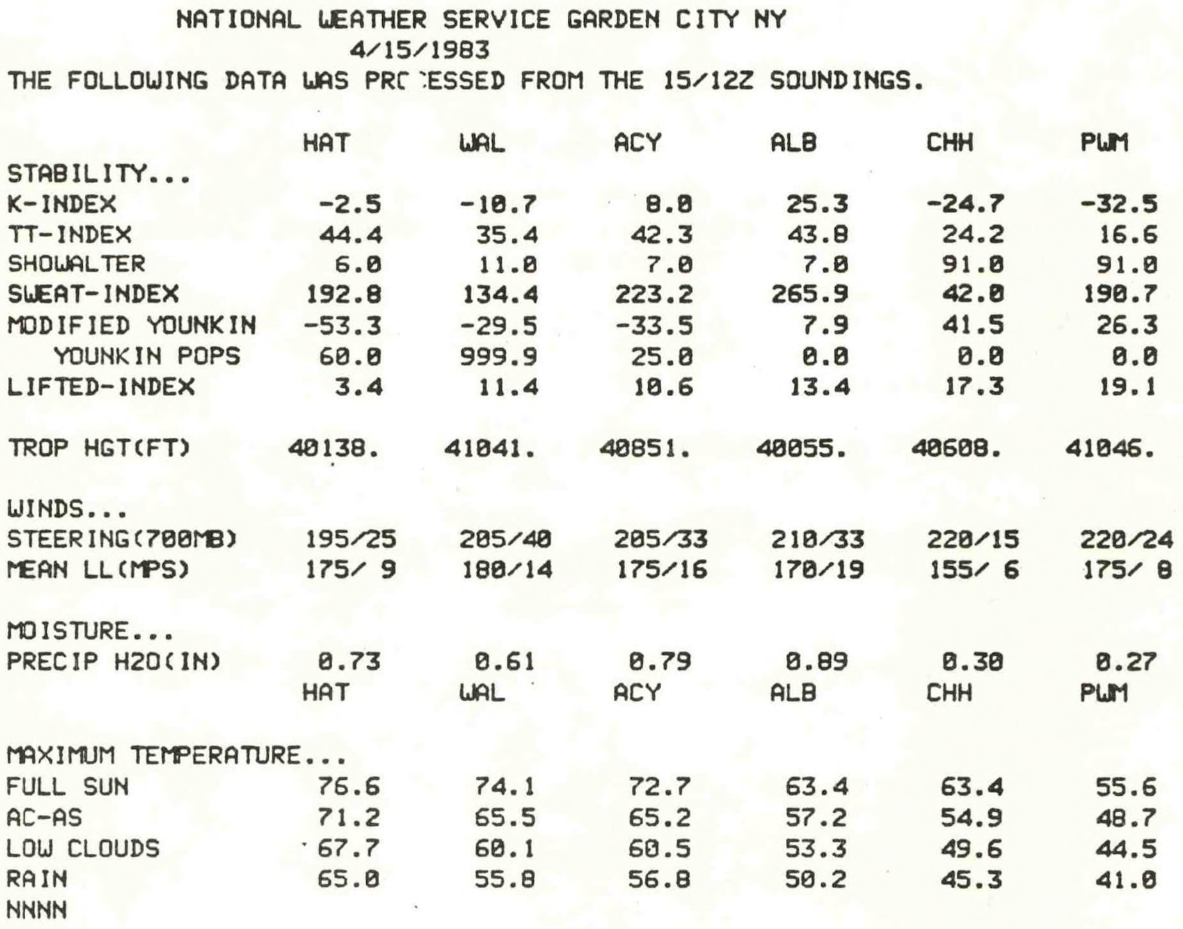
```
RUN:UA
```

An alert light will flash when STAB has stored the product into the AFOS database.

To process more than 6 soundings, create several files like USMAN, and name them USMAN1, USMAN2, etc.. A procedure or macro can then be made to rename the extra files USMAN and run UA until all the desired stations are processed.

C. Output

The final product (see Fig. 3) can be displayed on either an ADM or GDM. Processed keys are printed on the dasher. If an error is encountered in decoding, the message "DECODING ERROR - SUBROUTINE PRES" will be printed on the dasher. This results in the data being processed as missing and 999.9 or 999 will be printed as the value for most parameters.



```
           NATIONAL WEATHER SERVICE GARDEN CITY NY
                      4/15/1983
THE FOLLOWING DATA WAS PROCESSED FROM THE 15/12Z SOUNDINGS.

                   HAT       WAL       ACY       ALB       CHH       PWM
STABILITY...
K-INDEX              -2.5     -10.7       8.0      25.3     -24.7     -32.5
TT-INDEX             44.4      35.4      42.3      43.8      24.2      16.6
SHOWALTER             6.0      11.0       7.0       7.0      91.0      91.0
SWEAT-INDEX         192.8     134.4     223.2     265.9      42.0     190.7
MODIFIED YOUNKIN    -53.3     -29.5     -33.5       7.9      41.5      26.3
   YOUNKIN POPS      60.0     999.9      25.0       0.0       0.0       0.0
LIFTED-INDEX          3.4      11.4      10.6      13.4      17.3      19.1

TROP HGT(FT)       40138.    41041.    40851.    40055.    40608.    41046.

WINDS...
STEERING(700MB)     195/25    205/40    205/33    210/33    220/15    220/24
MEAN LL(MPS)        175/ 9    180/14    175/16    170/19    155/ 6    175/ 8

MOISTURE...
PRECIP H2O(IN)       0.73      0.61      0.79      0.89      0.30      0.27
                   HAT       WAL       ACY       ALB       CHH       PWM

MAXIMUM TEMPERATURE...
FULL SUN             76.6      74.1      72.7      63.4      63.4      55.6
AC-AS                71.2      65.5      65.2      57.2      54.9      48.7
LOW CLOUDS           67.7      60.1      60.5      53.3      49.6      44.5
RAIN                 65.0      55.8      56.8      50.2      45.3      41.0
NNNN
```

Figure 3. Sample output.

D. Cautions

The format of the raob data is critical and may result in the data being thrown out and not processed. If an error occurs, check the suspect key--simple editing may solve the problem. Old data or data without the current date/time group will be processed as missing. Output from STAB may not match the NMC plots of stability indices (PØ1-LI/KI) and precipitable water (PØ3) since NMC computations may include significant level data and the methods of computation themselves differ.

E. Complete Program Source Listing

DP3:UA.FR   11/09/82 06:36

```
C DECODER FOR THE FIRST TRANSMISSION RAOB DATA.  SWAPS TO STAB.SV
C RLDR UA LIN LN35 TD PRES WND CHG TOP.LB FORT.LB
      DIMENSION KEY(6),IA(90),IB(90),IC(90),ID(90),LN(130)
      CALL OPEN (21,"USDAT.DT",2,IER)
      CALL OPEN (20,"USMAN",2,IER)
    4 LNNO = 1
      IG=1
      READ (20,100) (KEY(I),I=1,5)
  100 FORMAT (4A2,A1)
      IF(KEY(1).EQ."EN") GOTO 30
      DO 5 I=1,130
      LN(I)=" "
    5 CONTINUE
      CALL OPENA (KEY,IER)
      CALL READA (IA,IER)
      DO 10 I=1,2
      CALL READA (IA,IER)
      CALL LIN (IA,LN,LNNO,N,IG)
      IF(IG.EQ.0) GOTO 20
      LNNO=LNNO+1
   10 CONTINUE
      WRITE (10,115) (KEY(I),I=1,5)
  115 FORMAT (1X,4A2,A1)
      CALL READA (IA,IER)
      IF(IER.NE.1) GOTO 15
      CALL READA (IB,IER)
      IF(IER.NE.1) GOTO 15
      CALL READA (IC,IER)
      IF(IER.NE.1) GOTO 15
      CALL READA (ID,IER)
   15 CALL LN35 (IA,IB,IC,ID,LN,N)
   20 WRITE (21,110) (LN(I),I=1,130)
  110 FORMAT (1X,130A1)
      GOTO 4
   30 CALL CLOSE (20,IER)
      CALL CLOSE (21,IER)
      CALL SWAP ("STAB.SV",IER)
      STOP
      END
      SUBROUTINE LIN (IA,LN,LNNO,N,IG)
      DIMENSION IA(90),LN(130)
      GOTO (10,20), LNNO
C DRIVES SUBROUTINES TD .. WND .. PRES
 10   IF(IA(12).EQ."U ".AND.IA(13).EQ."S ") GOTO 11
      IP=18
      GOTO 12
 11   IP=22
 12   LN(1)=IA(IP)
      LN(2)=IA(IP+1)
      LN(3)=","
      LN(4)=IA(IP+2)
      LN(5)=IA(IP+3)
      LN(6)=","
      N=7
      IP=IP+12
      IT=IP+8
      DO 15 I=1,2
      CALL PRES (IP,IA,LN,N,IG)
      IF(IG.EQ.0) RETURN
      CALL TD (IT,IA,LN,N)
      IP=IP+18
      IT=IT+18
 15   CONTINUE
      RETURN
 20   IP=1
      IT=9
      IW=15
      DO 25 I=1,3
      CALL PRES (IP,IA,LN,N,IG)
      IF(IG.EQ.0) RETURN
      CALL TD (IT,IA,LN,N)
      CALL WND (IW,IA,LN,N)
      IP=IP+18
      IT=IT+18
      IW=IW+18
 25   CONTINUE
      RETURN
      END
      SUBROUTINE TD (IT,IA,LN,N)
C DECODES THE TEMPERATURE AND DEW POINT DEPRESSION
      DIMENSION IA(90),LN(130)
      IF(IA(IT).EQ."/ ") GOTO 20
      IF(IA(IT).EQ."0 ".OR.IA(IT).EQ."2 ") GOTO 10
      IF(IA(IT).EQ."4 ".OR.IA(IT).EQ."6 ") GOTO 10
      IF(IA(IT).EQ."8 ") GOTO 10
      LN(N)="-"
      N=N+1
  10  LN(N)=IA(IT-2)
      LN(N+1)=IA(IT-1)
      LN(N+2)="."
      LN(N+3)=IA(IT)
      LN(N+4)=","
      IF(IA(IT+1).EQ."/ ") GOTO 30
      IF(IA(IT+1).EQ."8 ".OR.IA(IT+1).EQ."7 ") GOTO 15
      IF(IA(IT+1).EQ."6 ".OR.IA(IT+1).EQ."5 ") GOTO 15
      LN(N+5)=IA(IT+1)
      LN(N+6)="."
      LN(N+7)=IA(IT+2)
      LN(N+8)=","
      N=N+9
      RETURN
  15  LN(N+5)=IA(IT+1)
      LN(N+6)=IA(IT+2)
      LN(N+7)=","
      N=N+8
      RETURN
  20  LN(N)="9"
      LN(N+1)="9"
      LN(N+2)="9"
      LN(N+3)=","
      LN(N+4)="9"
      LN(N+5)="9"
      LN(N+6)="9"
      LN(N+7)=","
      N=N+8
      RETURN
  30  LN(N)="9"
      LN(N+1)="9"
      LN(N+2)="9"
      LN(N+3)=","
      N=N+4
      RETURN
      END
      SUBROUTINE PRES (IP,IA,LN,N,IG)
C DECODES THE HEIGHT FIELD FROM THE FIRST TRANSMISSION RAOB DATA SFC THRU
C 500 MBS.
      DIMENSION IA(90),LN(130)
      IF(IA(IP+2).EQ."/ ") GOTO 10
      IF(IA(IP).EQ."9 ".OR.IA(IP).EQ."0 ") GOTO 20
      IF(IA(IP).EQ."8 ") GOTO 30
      IF(IA(IP).EQ."7 ") GOTO 40
      IF(IA(IP).EQ."5 ") GOTO 50
      WRITE (10,100)
 100  FORMAT (///," DECODING ERROR-SUBROUTINE PRES!",///)
      J=1
      DO 5 I=1,30
      LN(J)="9"
      LN(J+1)=","
      J=J+2
   5  CONTINUE
      IG=0
      RETURN
  10  LN(N)="9"
      LN(N+1)="9"
      LN(N+2)="9"
      LN(N+3)="9"
      LN(N+4)=","
      N=N+5
      RETURN
  20  LN(N)=IA(IP+2)
      LN(N+1)=IA(IP+3)
      LN(N+2)=IA(IP+4)
      LN(N+3)=","
      N=N+4
      RETURN
  30  IF(IA(IP+2).EQ."9 ".OR.IA(IP+2).EQ."8 ") GOTO 46
      LN(N)="1"
      N=N+1
      GOTO 46
  40  IF(IA(IP+2).EQ."0 ".OR.IA(IP+2).EQ."1 ") GOTO 45
      IF(IA(IP+2).EQ."2 ".OR.IA(IP+2).EQ."3 ") GOTO 45
      LN(N)="2"
      N=N+1
      GOTO 46
  45  LN(N)="3"
      N=N+1
  46  LN(N)=IA(IP+2)
      LN(N+1)=IA(IP+3)
      LN(N+2)=IA(IP+4)
      LN(N+3)=","
      N=N+4
      RETURN
  50  LN(N)=IA(IP+2)
      LN(N+1)=IA(IP+3)
      LN(N+2)=IA(IP+4)
      LN(N+3)="0"
      LN(N+4)=","
      N=N+5
      RETURN
      END
      SUBROUTINE WND (IW,IA,LN,N)
C DECODES THE WIND GROUPS FROM THE RAOB DATA
      DIMENSION IA(90),LN(130)
      IF(IA(IW).EQ."/ ") GOTO 40
      LN(N)=IA(IW-2)
      LN(N+1)=IA(IW-1)
      LN(N+2)=IA(IW)
      LN(N+3)=", "
      N=N+4
      IF(IA(IW).EQ."0 ".OR.IA(IW).EQ."5 ") GOTO 30
      IF(IA(IW).EQ."1 ".OR.IA(IW).EQ."6 ") GOTO 20
      LN(N)="2"
      N=N+1
      GOTO 30
 20   LN(N)="1"
      N=N+1
 30   LN(N)=IA(IW+1)
      LN(N+1)=IA(IW+2)
      LN(N+2)=","
      N=N+3
      RETURN
 40   LN(N)="9"
      LN(N+1)="9"
      LN(N+2)="9"
      LN(N+3)=","
      LN(N+4)="9"
      LN(N+5)="9"
      LN(N+6)="9"
      LN(N+7)=","
      N=N+8
      RETURN
      END
      SUBROUTINE LN35 (IA,IB,IC,ID,LN,N)
      DIMENSION IA(90),IB(90),IC(90),ID(90),LN(130)
C DECODES TROP DATA .. SHOWALTER .. AND MEAN LOW LVL WNDS.
      NCHG=1
  40  IP=1
C FINDING THE TROP HGT AND TEMP.
      DO 45 I=1,10
      IF(IA(IP).EQ."8 ".AND.IA(IP+1).EQ."8 ") GOTO 50
      IP=IP+6
      IF(NCHG.GT.3) GOTO 81
  45  CONTINUE
      CALL CHG (IA,IB,IC,ID,IP,NCHG)
      GOTO 40
  50  LN(N)=IA(IP+2)
      LN(N+1)=IA(IP+3)
      LN(N+2)=IA(IP+4)
      LN(N+3)=","
      N=N+4
      IF(IA(IP+2).EQ."9 ") GOTO 52
      IP=IP+6
      IF(IP.GE.60) CALL CHG (IA,IB,IC,ID,IP,NCHG)
      LN(N)="-"
      LN(N+1)=IA(IP)
      LN(N+2)=IA(IP+1)
      LN(N+3)="."
      LN(N+4)=IA(IP+2)
      LN(N+5)=","
      N=N+6
      GOTO 53
  52  LN(N)="9"
      LN(N+1)="9"
      LN(N+2)="9"
      LN(N+3)=","
      N=N+4
  53  IP=IP+6
  51  IF(IP.GE.60) CALL CHG (IA,IB,IC,ID,IP,NCHG)
C FINDING THE SHOWALTER INDEX
      DO 60 I=1,10
      IF(IA(IP).EQ."1 ".AND.IA(IP+1).EQ."0 ") GOTO 61
      GOTO 59
  61  IF(IA(IP+2).EQ."1 ".AND.IA(IP+3).EQ."6 ") GOTO 62
      GOTO 59
  62  IF(IA(IP+4).EQ."4 ") GOTO 65
  59  IP=IP+6
      IF(IP.GE.60) GOTO 51
  60  CONTINUE
  65  IP=IP+6
      IF(IP.GE.60) CALL CHG (IA,IB,IC,ID,IP,NCHG)
      LN(N)=IA(IP+3)
      LN(N+1)=IA(IP+4)
      LN(N+2)=","
      N=N+3
      IP=IP+6
C FINDING THE MEAN LOW LVL WINDS.
C
```

```
 69   IF(IP.GE.60) CALL CHG (IA,IB,IC,ID,IP,NCHG)
      DO 70 I=1,10
      IF(IA(IP).EQ."1 ".AND.IA(IP+1).EQ."0 ") GOTO 71
      GOTO 79
 71   IF(IA(IP+2).EQ."1 ".AND.IA(IP+3).EQ."9 ") GOTO 72
      GOTO 79
 72   IF(IA(IP+4).EQ."4 ") GOTO 75
 79   IP=IP+6
      IF(IP.GE.60) GOTO 69
 70   CONTINUE
 75   IP=IP+6
      IF(IP.GE.60) CALL CHG (IA,IB,IC,ID,IP,NCHG)
      IF(IA(IP).EQ."/ ") GOTO 82
      LN(N)=IA(IP)
      LN(N+1)=IA(IP+1)
      LN(N+2)=IA(IP+2)
      LN(N+3)=","
      LN(N+4)=IA(IP+3)
      LN(N+5)=IA(IP+4)
      LN(N+6)=","
      N=N+7
      RETURN
 81   DO 85 J=1,4
 82   LN(N)="9"
      LN(N+1)="9"
      LN(N+2)="9"
      LN(N+3)=","
      N=N+4
 85   CONTINUE
      LN(N)="9"
      LN(N+1)="9"
      LN(N+2)=","
      N=N+3
      RETURN
      END
```

DP3:CHG.FR   08/08/82 05:39

```
      SUBROUTINE CHG (IA,IB,IC,ID,IP,NCHG)
      DIMENSION IA(90),IB(90),IC(90),ID(90)
      IF(NCHG.EQ.1) GOTO 20
      IF(NCHG.EQ.2) GOTO 30
      DO 4 I=1,80
      IA(I)=ID(I)
  4   CONTINUE
      NCHG=4
      IP=1
      RETURN
 30   DO 5 I=1,80
      IA(I)=IC(I)
  5   CONTINUE
      NCHG=3
      IP=1
      RETURN
 20   DO 25 I=1,80
      IA(I)=IB(I)
 25   CONTINUE
      IP=1
      NCHG=2
      RETURN
      END
```

```
C                          STAB.FR
C COMPUTES STABILITY INDEXS, PRECIP WATER, TROP, AND OTHER PARAMETERS FROM
C THE FIRST RAOB TRANSMISSION.
C RLDR STAB ZERO1 STAB1 STAB2 PCPN DELTA WD TROPI JDT WRT BG.LB UTIL.LB FORT.LB
C AFOSE.LB
        INTEGER HEADER(5)
        REAL X(10),X2(10),X3(10),X4(10),YK(10),SW(10),PO(10),LI(10),YP(10),P(10)
        DIMENSION IDT(3),ITM(3),DAT(30),ZK(10),TT(10),SH(10),TROP(10),NA(10,4)
        DIMENSION ISW(10),ISS(10),MLW(10),LWS(10),IWSFO(11),IBUF(42),IFIL(6)
        COMMON/CDL/IFILE(6),INAME(6),HEADER
        DATA INAME/"DATASTORE",0/
        DATA IFILE/"XXXSTORED ",0/
        NO=6
        CALL ZERO1 (ZK,TT,SH,TROP,ISW,ISS,MLW,LWS,X,X2,X3,X4,YK,SW,PO,YP,LI,NO)
        CALL DATE (IDT,IER)
        CALL TIME (ITM,IER)
        IH=ITM(1)
        ID=IDT(2)
        IF(IH.GT.12) IH=12
        IF(IH.LT.12) IH=0
        CALL JDT (IDT,JD)
        CALL OPEN (20,"USDAT.DT",2,IER)
        CALL DFILW ("XXXDATAFL",IER)
        CALL CFILW ("XXXDATAFL",2,IER)
        CALL OPEN (22,"XXXDATAFL",2,IER)
        CALL OPEN (23,"USMAN",2,IER)
        READ (23,200) ((NA(I,J),J=1,2),I=1,NO)
 200    FORMAT (6X,A2,A1)
        READ (23,205) IWSFO(1)
        READ (23,210) (IWSFO(I),I=1,10),(IFIL(I),I=1,5)
 205    FORMAT (A2)
 210    FORMAT (10A2,4A2,A1)
C COMPUTING DATA
        DO 50 I=1,NO
        READ (20) IRD,IRH,(DAT(N),N=1,26)
        IRD=IRD-50
        IF(IRD.NE.ID) GOTO 50
        IF(IRH.NE.IH) GOTO 50
        CALL STAB1 (DAT,ZK,TT,SH,I)
        CALL WD (DAT,TROP,ISW,ISS,MLW,LWS,I)
        CALL STAB2 (DAT,X,X2,X3,X4,YK,SW,TT,YP,JD,I,IH)
        CALL PCPN (DAT,PO,X,LI,I)
 50     CONTINUE
C
        WRITE (22,100) (IFIL(I),I=1,5),(IWSFO(I),I=1,10),(IDT(I),I=1,3),ID,IH
        WRITE (22,101) ((NA(I,J),J=1,2),I=1,NO)
        WRITE (22,105) (ZK(I),I=1,NO)
        WRITE (22,110) (TT(I),I=1,NO)
        WRITE (22,115) (SH(I),I=1,NO)
        WRITE (22,120) (SW(I),I=1,NO)
        WRITE (22,125) (YK(I),I=1,NO)
        WRITE (22,126) (YP(I),I=1,NO)
        WRITE (22,130) (LI(I),I=1,NO)
        WRITE (22,150) (TROP(I),I=1,NO)
        WRITE (22.160) ((ISW(I),ISS(I)),I=1,NO)
```

```
      WRITE (22,165) ((MLW(I),LWS(I)),I=1,NO)
      WRITE (22,166) (PO(I),I=1,NO)
      IF(IH.LT.12) GOTO 60
      WRITE (22,101) ((NA(I,J),J=1,2),I=1,NO)
      WRITE (22,170) (X(I),I=1,NO)
      WRITE (22,175) (X2(I),I=1,NO)
      WRITE (22,180) (X3(I),I=1,NO)
      WRITE (22,185) (X4(I),I=1,NO)
  60  WRITE (22,199)
C
C FORMATS FOR WRITING DATA.
C
 100   FORMAT (1X,4A2,A1,/,12X,"NATIONAL WEATHER SERVICE ",10A2,/,
     *22X,I2,"/",I2,"/",I4,/," THE FOLLOWING DATA WAS PROCESSED FROM THE ",
     *I2,"/",I2,"Z SOUNDINGS.",/)
 101   FORMAT (20X,6(A2,A1,7X))
 105   FORMAT (" STABILITY...",/," K-INDEX",12X,F5.1,5(5X,F5.1))
 110   FORMAT (" TT-INDEX",11X,F5.1,5(5X,F5.1))
 115   FORMAT (" SHOWALTER",10X,F5.1,5(5X,F5.1))
 120   FORMAT (" SWEAT-INDEX",8X,F5.1,5(5X,F5.1))
 125   FORMAT (" MODIFIED YOUNKIN",3X,F5.1,5(5X,F5.1))
 126   FORMAT ("    YOUNKIN POPS ",3X,F5.1,5(5X,F5.1))
 130   FORMAT (" LIFTED-INDEX",7X,F5.1,5(5X,F5.1))
 150   FORMAT (/," TROP HGT(FT)",6X,F6.0,5(4X,F6.0))
 160   FORMAT (/," WINDS...",/," STEERING(700MB)",6(4X,I3,"/",I2))
 165   FORMAT (" MEAN LL(MPS)",7X,I3,"/",I2,5(4X,I3,"/",I2))
 166   FORMAT (/," MOISTURE...",/," PRECIP H2O(IN)",5X,F5.2,5(5X,F5.2))
 170   FORMAT (/," MAXIMUM TEMPERATURE...",/," FULL SUN",11X,F5.1,5(5X,F5.1))
 175   FORMAT (" AC-AS",14X,F5.1,5(5X,F5.1))
 180   FORMAT (" LOW CLOUDS",9X,F5.1,5(5X,F5.1))
 185   FORMAT (" RAIN",15X,F5.1.5(5X,F5.1))
 199   FORMAT (" NNNN")
       CALL CLOSE (20,IER)
       CALL CLOSE (22,IER)
       CALL CLOSE (23,IER)
       CALL URT
       STOP
       END
```

DP3:ZERO1.FR 11/08/82 06:37

```
      SUBROUTINE ZERO1 (ZK,TT,SH,TROP,ISW,ISS,MLW,LWS,X,X2,X3,X4,YK,SW,PO,YP,
     *LI,NO)
C SETS ALL ARRAYS TO MSG...
      DIMENSION ZK(10),TT(10),SH(10),TROP(10),ISW(10),ISS(10),X(10),X2(10)
      DIMENSION MLW(10),LWS(10),X3(10),X4(10),YK(10),SW(10),PO(10),YP(10)
      REAL LI(10)
      DO 10 I=1,NO
      ZK(I)=999.9
      TT(I)=999.9
      SH(I)=999.9
      LI(I)=999.9
      YP(I)=999.9
      TROP(I)=999.9
      X(I)=999.9
      X2(I)=999.9
      X3(I)=999.9
      X4(I)=999.9
      YK(I)=999.9
      SW(I)=999.9
      PO(I)=99.99
      ISW(I)=999
      ISS(I)=99
      MLW(I)=999
      LWS(I)=99
   10 CONTINUE
      RETURN
      END
```

DP3:JDT.FR 08/08/82 04:39

```
      SUBROUTINE JDT (IDT,JD)
      DIMENSION IDT (3)
      JD=0
      ID=IDT(2)
      IM=IDT(1)
      IF(IM.EQ.1) JD=ID
      IF (IM.EQ.2) JD=31+ID
      IF(IM.EQ.3) JD=59+ID
      IF(IM.EQ.4) JD=90+ID
      IF(IM.EQ.5) JD=120+ID
      IF(IM.EQ.6) JD=151+ID
      IF(IM.EQ.7) JD=181+ID
      IF(IM.EQ.8) JD=212+ID
      IF(IM.EQ.9) JD=243+ID
      IF(IM.EQ.10) JD=273+ID
      IF(IM.EQ.11) JD=304+ID
      IF(IM.EQ.12) JD=334+ID
      RETURN
      END
```

DP3:STAB1.FR   12/31/82 17:12

```
      SUBROUTINE STAB1 (DAT,ZK,TT,SH,I)
C COMPUTES THE K-INDEX,TOTALS TOTAL,AND DECODES THE SHOWALTER
      DIMENSION DAT(30),ZK(10),TT(10),SH(10)
      T8=DAT(8)
      D8=DAT(9)
      D7=DAT(14)
      T5=DAT(18)
      IF(D8.EQ.50.) D8=5.0
      IF(D7.EQ.50.) D7=5.0
      IF(D8.GT.50.) D8=D8-50.
      IF(D7.GT.50.) D7=D7-50.
      DP8=T8-D8
C COMPUTE K-INDEX AND TOTALS TOTAL SHOWALTER...AND CHECK FOR MISSING DATA
      ZK(I)=(T8-T5)+(DP8)-(D7)
      TT(I)=(T8+DP8)-(2.*T5)
      IF(DAT(24).GE.50..AND.DAT(24).LT.70.) GOTO 3
      SH(I)=DAT(24)
      GOTO 4
    3 SH(I)=0.-(DAT(24)-50.)
    4 IF(T8.GT.500..OR.D8.GT.500.) GOTO 15
      IF(T5.GT.500.) GOTO 15
    5 IF(D7.GT.500.) GOTO 20
   10  IF(SH(I).EQ.999.) GOTO 30
       RETURN
   15  ZK(I)=999.9
       TT(I)=999.9
       GOTO 5
   20  ZK(I)=999.9
       GOTO 10
   30  SH(I)=999.9
       RETURN
       END
```

DP3:DELTA.FR   08/08/82 04:27

```
      SUBROUTINE DELTA (R)
C CALLED FROM SUBROUTINE PCPN.
      R=6.11*10**((7.5*R)/(239.7+R))
      RETURN
      END
```

DP3:WD.FR   08/08/82 04:28

```
      SUBROUTINE WD (DAT,TROP,ISW,ISS,MLW,LWS,I)
C DECODING TROP HGT-MBS TO FEET,STEERING WINDS 700MB AND MEAN LO LVL WNDS.
      DIMENSION DAT(30),TROP(10),ISW(10),ISS(10),MLW(10),LWS(10)
C TROP HGT FROM MBS USING THICKENSS.
      IF(DAT(22).GT.500.) GOTO 50
      CALL TROPI (DAT,ZT)
      TROP(I)=ZT
C STEERING WINDS (700 MB).
    5 IF(DAT(15).EQ.999.) GOTO 60
      ISW(I)=DAT(15)
      ISS(I)=DAT(16)
C MEAN LOW LEVEL WINDS (MPS).
   10 IF(DAT(24).EQ.999.) GOTO 70
      MLW(I)=DAT(25)
      LWS(I)=DAT(26)/2.0
      RETURN
   50 TROP(I)=99999.
      GOTO 5
   60 ISW(I)=999
      ISS(I)=99
      GOTO 10
    70 MLW(I)=999
       LWS(I)=99
       RETURN
       END
```

DP3:TROPI.FR   11/09/82 06:14

```
      SUBROUTINE TROPI (DAT,ZT)
      DIMENSION DAT(30)
C COMPUTES TROP HGT USING THICKNESS APPROXIMATIONS.
     LVL=1
     ZS=29.2898
     ZT=0.
   5 GOTO (10,20,30,40),LVL
  10 IF(DAT(1).LE.500.) P0=DAT(1)+1000.
     IF(DAT(1).GT.500.) P0=DAT(1)
     TS=273.+DAT(2)
     T8=273.+DAT(8)
     TA=(TS+T8)/2.
     TB=ABS(ALOG(850./P0))
     GOTO 50
  20 T7=273.+DAT(13)
     TA=(T7+T8)/2.
     TB=ABS(ALOG(700./850.))
     GOTO 50
   30 T5=273.+DAT(18)
      TA=(T5+T7)/2.
      TB=ABS(ALOG(500./700.))
      GOTO 50
   40 TT=273.+DAT(23)
      TA=(T5+TT)/2.
      TB=ABS(ALOG(DAT(22)/500.))
   50 ZT=ZT+(ZS*TA*TB)
      LVL=LVL+1
      IF(LVL.EQ.5) GOTO 60
      GOTO 5
 60   ZT=ZT/.3048
      RETURN
      END
      SUBROUTINE STAB2 (DAT,X,X2,X3,X4,YK,SW,TT,YP,JD,I,IH)
      DIMENSION DAT(30),X(10),X2(10),X3(10),X4(10),YK(10),SW(10),TT(10),YP(10)
      H0=DAT(4)
      SD=DAT(3)
      IF(SD.EQ.50.) SD=5.0
      IF(SD.GT.50.) SD=SD-50.
      ST=DAT(2)
      SDP=ST-SD
      D8=DAT(9)
      IF(D8.EQ.50.) D8=5.0
      IF(D8.GT.50.) D8=DAT(9)-50.
      H8=DAT(7)
      T8=DAT(8)
      DP8=T8-D8
      ZJD=JD
C COMPUTE MAXIMUM TEMPERATURES
      IF(DAT(2).GT.900..OR.H8.EQ.999.) GOTO 22
      X(I)=((H8-H0)-1194.)/2.8
      Y=ZJD/57.2958
      Y=COS(Y)
      IF(Y.LE.0) GOTO 20
      X(I)=X(I)-Y*5.+17.
      GOTO 21
 20   X(I)=X(I)+17.
 21   IF(IH.EQ.12) CX=1.8*DAT(2)+32.
      IF(IH.EQ.0)  CX=1.8*SDP+32.
      D=X(I)-CX
      X2(I)=X(I)-.4*D
      X3(I)=X(I)-.65*D
      X4(I)=X(I)-.85*D
      GOTO 25
 22   X(I)=999.9
      X2(I)=999.9
      X3(I)=999.9
      X4(I)=999.9
C COMPUTE YOUNKIN INDEX AND PROB.
C
 25   H5=DAT(17)
      SDP=1.8*SDP+32.
      IF(H5.EQ.999.) GOTO 30
      IF(SD.GT.500.) GOTO 30
      IF(ST.GT.500.) GOTO 30
      YK(I)=H5-H0-5030.-2.5*(X(I)+(3*SDP))
      IF(YK(I).GE.-19.4) YP(I)=0.0
      IF(YK(I).GE.-29.4.AND.YK(I).LE.-19.5) YP(I)=10.0
      IF(YK(I).GE.-39.4.AND.YK(I).LE.-29.5) YP(I)=25.0
       IF(YK(I).GE.-49.4.AND.YK(I).LE.-39.5) YP(I)=40.0
       IF(YK(I).GE.-59.4.AND.YK(I).LE.-49.5) YP(I)=60.0
       IF(YK(I).GE.-69.4.AND.YK(I).LE.-59.5) YP(I)=70.0
       IF(YK(I).GE.-79.4.AND.YK(I).LE.-69.5) YP(I)=85.0
       IF(YK(I).LT.-79.5) YP(I)=100.0
       GOTO 40
 30    YK(I)=999.9
       YP(I)=999.9
C COMPUTE SWEAT INDEX
```

```
C
  40    SQ=12.*DP8
        IF(SQ.LT.0.) SQ=0.
        IF(DP8.GT.900.) GOTO 90
        IF(TT(I).GT.900.) GOTO 90
        SR=20*(TT(I)-49.)
        IF(SR.LT.0.) SR=0.
        WS8=2*DAT(11)
        WS5=DAT(21)
        IF(WS8.GT.500..OR.WS5.GT.500.) GOTO 90
        IF(DAT(11).LT.15..OR.DAT(21).LT.15.) GOTO 5
        WD8=DAT(10)
        WD5=DAT(20)
        IF(WD8.GT.500..OR.WD5.GT.500.) GOTO 90
        IF(WD8.GE.130..AND.WD8.LE.250.) GOTO 10
   5    AZZ=0.
        GOTO 50
  10    IF(WD5.GE.210..AND.WD5.LE.310.) GOTO 49
        GOTO 5
  49    PH=WD5-WD8
        IF(PH.LT.0) GOTO 5
        XPH=3.14159265/180.
        PHO=PH*XPH
        AZZ=125.*(SIN(PHO)+0.2)
  50    SW(I)= SQ+SR+WS8+WS5+AZZ
        RETURN
  90    SW(I)=999.9
        RETURN
        END
```

```
      SUBROUTINE PCPN (DAT,PO,X,LI,I)
      REAL LI,M0,M1,M8,M7,M6,M5
      DIMENSION DAT(30),PO(10),X(10),LI(10),P(10)
C
C COMPUTING PRECIPITABLE WATER FROM FRIST TRANSMISSION
C
      P(1)=DAT(3)
      P(2)=DAT(6)
      P(3)=DAT(9)
      P(4)=DAT(14)
      P(5)=DAT(19)
      DO 10 N=1,5
      IF(P(N).GT.100.) GOTO 10
      IF(P(N).EQ.50.) P(N)=5.0
      IF(P(N).GT.50.) P(N)=P(N)-50.
 10   CONTINUE
      DPS=DAT(2)-P(1)
      DP1=DAT(5)-P(2)
      DP8=DAT(8)-P(3)
      DP7=DAT(13)-P(4)
      DP5=DAT(18)-P(5)
      DO 5 J=3,5
      IF(P(J).GT.100.) GOTO 45
  5   CONTINUE
      IF(DAT(1).GE.900.) P0=DAT(1)
      IF(DAT(1).LT.100.) P0=DAT(1)+1000.
      IF(DAT(6).GT.100.) GOTO 15
      R=DP1
      CALL DELTA (R)
      E1=R
 15   R=DPS
      CALL DELTA (R)
      E0=R
      R=DP8
      CALL DELTA (R)
      E8=R
      R=DP7
      R7=R
      CALL DELTA (R)
      E7=R
      R=DP5
      R5=R
      CALL DELTA (R)
      E5=R
      IF(DAT(6).GT.100.) GOTO 20
      M1=622.*E1/(1000.-E1)
 20   M0=622.*E0/(P0-E0)
      M8=622.*E8/(850.-E8)
      M7=622.*E7/(700.-E7)
      M5=622.*E5/(500.-E5)
      P9=0.
      IF(DAT(6).GT.100.) GOTO 30
      P9=((M0+M1)/2.*(P0-1000.))/980.
      P9=P9+((M1+M8)/2.*150.)/980.
 25   P9=P9+((M8+M7)/2.*150.)/980.
```

```
      R=(R7+R5)/2.
      CALL DELTA (R)
      E6=R
      M6=622.*E6/(600.-E6)
      P9=P9+(M6*200.)/980.
      P8=P9*.3937
      PO(I)=P8
      GOTO 50
 30   P9=((M0+M8)/2.*(P0-850.))/980.
      GOTO 25
 45   PO(I)=99.99
C
C COMPUTING THE LIFTED INDEX
C
 50   A5=DAT(2)
      IF(A5.GT.100.) GOTO 95
      D9=A5-DPS
      B5=DPS-(.212+(.00157*DPS)-(.000436*A5))*D9
      A6=A5+273.
      B6=B5+273.
      P5=(P0*(B6/A6)**3.5)
 80   R=B6-273.
      CALL DELTA (R)
      Q5=((333.-B6)*276.)/110.
      V5=Q5+2358.12
      G5=((.287*B6)/(1.003*P5))*(P5+((.622*V5*R)/(.287*B6)))/
     *(P5+((.622*V5**2*R)/(1.003*.461*B6**2)))
      P5=P5-5.
      B6=B6-5.*G5
      IF(P5.GT.500.) GOTO 80
      B6=B6-273.
      LI(I)=(DAT(18)-B6)
      RETURN
 95   LI(I)=999.9
      RETURN
      END
      SUBROUTINE WRT
C  THIS SUBROUTINE READS AN RDOS DATAFILE AND WRITES THE DATA TO THE AFOS
C  DATABASE. THE FILE XXXDATAFL IS READ.
C  DEC 19 1981
C
      DIMENSION IBUF(42)
      INTEGER HEADER(5)
      COMMON/CDL/IFILE(6),INAME(6),HEADER
      CALL OPEN (3,"XXXDATAFL",2,IER)
      READ (3,40) (HEADER(I),I=1,5)
  40  FORMAT (5A2)
      CALL DELETE (IFILE,IER)
      CALL CRAND (IFILE,IER)
      CALL PUNPACK (HEADER,9,IBUF)
      IBUF(10)=60K
      IBUF(11)=60K
      IBUF(12)=60K
      IBUF(13)=377K
      IBUF(14)=377K
      IBUF(15)=377K
      IBUF(16)=377K
      IBUF(17)=5
      IBUF(18)=0
      IBUF(19)=305K
      IBUF(20)=200K
      CALL PACK (IBUF,20,IBUF)
C
C  GET A FREE CHANNEL,OPEN FILE,AND WRITE THE COMMS HEADER.
C
      CALL GCHN (ICHN,IER)
      CALL OPENN (ICHN,IFILE,0,IER)
      CALL WRS (ICHN,IBUF,20,IER)
  50  IREAD=0
C
C  READ INPUT FILE FROM THE DISK.
C
      READ (3,100,END=175) (IBUF(I),I=1,39)
 100  FORMAT (40A2)
 175  IN1="NN"
      NCR=47015K
      IEND=0
      ISV=0
      DO 150 I=1,38
      IF(IBUF(I).NE.IN1) GOTO 150
      IF(IBUF(I+1).EQ.IN1) GOTO 145
      IF(IBUF(I+1).NE.NCR) GOTO 150
 145  IEND=I-1
      ISV=I
 150  CONTINUE
      IF(IEND.EQ.0) IREAD=1
      IF(ISV.EQ.1) IREAD=0
      IF(ISV.EQ.1) GOTO 155
      IF(IEND.EQ.0) IEND=39
      IBUF(IEND+1)=6412K
      ILEN=2*(IEND+1)
      CALL WRS (ICHN,IBUF,ILEN,IER)
C
C  WRITE THE END OF THE PRODUCT CHARACTER TO THE FILE.
C
 155  IF(IREAD.GT.0) GOTO 50
      IBUF(1)=IN1
      IBUF(2)=IN1
      IBUF(3)=101400K
      CALL WRS (ICHN,IBUF,6,IER)
      CALL KLOSE (ICHN,IER)
C
C  STORE THE PRODUCT INTO THE DATABASE AND NOTIFY THE FCSTR.
C
      CALL FSTORE (IFILE,0,IER)
      IF(IER.EQ.1) GOTO 200
      CALL SPCHR ("PROBLEM STORING PRODUCT",IER)
      CALL FORKO (INAME,IFILE,IER)
C
C  IF DATABASE STORAGE IS NOT SUCESSFUL NOTIFY FCSTR THAT FILE EXIST.
C
      CALL CLOSE (3,IER)
 200  CONTINUE
      CALL FORKP (INAME,HEADER,IER)
      CALL CLOSE (3,IER)
      STOP
      END
```

EASTERN REGION

CP BRIEF #11
OCTOBER 1985

RVF: PLOT A FORECASTED HYDROGRAPH AND E19 DATA

PART A: INFORMATION AND INSTALLATION

PROGRAM NAME: RVF.SV

AAL ID:
REVISION NO: 1.ØØ

PURPOSE: The program plots hydrograph and E19 data on a specified AFOS screen. Input is an AFOS product which contains the hydrograph of 10 six-hourly periods for up to 20 stations. An RDOS file can also be accessed for a number of useful parameters including the E19 data.

PROGRAM INFORMATION:

Development Programmer:
Frank J. Lucadamo
Location: NERFC Hartford CT
Phone: (FTS) 244-2178
Language: FORTRAN IV/REV 5.2Ø
Date: 7/16/85
Running Time: 10 seconds per station
Disk space:

Program	RVF.SV	72 blocks
Data	E19nnnxxx	dependent on number of stations selected

Maintenance Programmer:
Frank J. Lucadamo
Location: NERFC Hartford CT
Phone: (FTS) 244-2178
Type: Normal
Revision Date:

Program Requirements

Program Files:

Name	DP Location	R/W	Comments
RVF.SV	DPØ/ØF		

Data Files:

Name	DP Location	R/W	Comments
E19nnnxxx	DPØ/ØF	Read	contains critical stages and E19 staff summaries for up to 20 stations (optional).

AFOS Products:

ID	Action	R/W	Comments
cccnnnxxx	Input	Read	This contains the hydrograph forecasts (usually in stage) for up to 20 forecast stations. See attachment for proper format.

LOAD LINE

```
RLDR RVF FLHYDPLT FLE19DA FLHPLT FLHTXT FLE19PLT FLE19XT @LB@
@LB@ = FLNUMPAK FLNUM FLHYDRUN AFREAD.LB BG.LB UTIL.LB FORT.LB
SYS.LB EGR1.LB
```

PROGRAM INSTALLATION

1. Create E19nnnxxx using M:F/ or text editor. See attached sheet for format. Once created, only periodic updates of this file will be necessary. This file is optional.

2. Create AFOS product cccnnnxxx using the format attached. (At the River Forecast Center in Hartford we create this file on the S140 as our final forecast. It is then shipped to our HSA's via AFOS link.)

FORMAT FOR INPUT PRODUCT CONTAINING FORECAST HYDROGRAPHS

RVF can plot stages or flows. Flood stages (flows) in either input must be to the nearest foot/(nearest thousand cfs). The forecast stage, however, can be to the nearest tenth of a foot and flow to the nearest hundred cfs.

Forecasts are restricted to only 10 six hourly or 3 hourly forecast values. The line with the word "time" will contain the ten numerical periods for the series of stations and hydrographs which are to follow.

The program looks within the first 10 lines of the file for the letters " FCST"....in columns one to five.

Line #1....Columns 1 to 39
1-5 " FCST"
20-21 Day of creation (I2 Format)
24-27 Three letter month abbreviation
30-39 Time of creation ex. 10:14 EST (ASCII Format)

The program next looks at columns 1 to 5 for the letters " TIME". Ordinarily these letters will appear on the line following " FCST". However, when comments to our River District Offices are necessary...We place them in the lines between " FCST" and " TIME". The program allows for a possible separation of twenty lines.

Line #2....Columns 1 to 65
1-5 " TIME"
10-11 16-17 22-23 28-29 34-35 Two to ten time increments.
40-41 46-47 52-53 58-59 64-65 EX: 07 13 19 01 etc...

Line #3....Columns 1 to 80
1 to 80 A blank line.

Line #4....Columns 1 to 71
1-36 River Name
54-57 Flood Stage...integer right justified (whole feet).
69-71 Flood Flow....integer right justified (1000's of cfs).

Line #5....Columns 1 to 66
1-6 " STAGE" or " FLOW"
7-12 13-18 19-24 25-30 31-36 Stage (Flow) to the nearest tenth in
37-42 43-48 49-54 55-60 61-66 F6.1 Format.

Line #6....Columns 1 to 66
1 to 80 A blank line.

Line #7 Same as line 4
Line #8 Same as line 5
Line #9 Same as line 6

Repeated for up to 20 stations.

Another group of forecasts containing " FCST" and " TIME" can appear in the AFOS product. Every third record, the program searches for " FCST". This starts at record 7,10,13...etc. If found the time line is decoded as in record 2.

See sample input product (BOSRVFVT1) on reverse.

```
BOSRVFVT1 -
TTAA00 KHFD 291527
 NATIONAL WEATHER SERVICE NORTHEAST RIVER FORECAST CENTER
 FCST COMPLETED AT 29-OCT-85 10:12  EST
 TIME     7     13     19      1      7     13     19      1      7     13

 CONN RIVER AT N STRATFORD                    FLOOD STAGE  13    FLOOD Q 231
 STAGE   3.7    3.7    3.7    3.7    3.7    3.6    3.6    3.6    3.6    3.6

 CONN RIVER NR DALTON                         FLOOD STAGE   0    FLOOD Q   0
 STAGE   7.9    7.9    7.8    7.7    7.5    7.5    7.5    7.4    7.3    7.3

 PASSUMPSIC RIVER AT PASSUMPSIC               FLOOD STAGE  14    FLOOD Q  93
 STAGE   2.1    2.1    2.1    2.0    2.0    2.0    2.0    1.9    1.9    1.9

 CONN RIVER AT WELLS RIVER                    FLOOD STAGE  22    FLOOD Q 842
 STAGE   2.1    2.1    2.1    2.0    2.0    1.9    1.9    1.8    1.8    1.8

 WHITE RIVER AT W HARTFORD                    FLOOD STAGE  18    FLOOD Q 380
 STAGE   4.2    4.2    4.2    4.2    4.2    4.2    4.2    4.2    4.2    4.2

 CONN RIVER AT WEST LEBANON                   FLOOD STAGE  18    FLOOD Q 460
 STAGE   4.9    4.7    4.6    4.5    4.5    4.4    4.3    4.2    4.1    4.0

 CONN RIVER AT N WALPOLE                      FLOOD STAGE  28    FLOOD Q 852
 STAGE   6.5    6.4    6.2    6.1    6.0    6.0    5.9    5.8    5.7    5.6

 CONN RIVER AT MONTAGUE CITY                  FLOOD STAGE  28    FLOOD Q 790
 STAGE   8.3    7.7    7.4    7.1    6.9    6.7    6.5    6.3    6.2    6.1

 CHICOPEE RIVER AT INDIAN ORCHRD              FLOOD STAGE  12    FLOOD Q  92
 STAGE   5.0    5.0    5.0    5.0    5.0    5.0    4.9    4.9    4.9    4.9

 CONN RIVER AT THOMPSONVILLE                  FLOOD STAGE   0    FLOOD Q   0
 STAGE    .3     .1    -.1    -.2    -.3    -.4    -.5    -.5    -.6    -.6

 FARMINGTON RIVER AT TARIFFVILLE              FLOOD STAGE   9    FLOOD Q 121
 STAGE   1.2    1.2    1.2    1.2    1.2    1.2    1.2    1.1    1.1    1.1

 CONN RIVER AT HARTFORD                       FLOOD STAGE  16    FLOOD Q 661
 STAGE   3.0    2.7    2.4    2.0    1.6    1.3    1.0    1.0    1.0    1.0

 CONN RIVER AT BODKIN ROCK                    FLOOD STAGE   8    FLOOD Q 670
 STAGE   4.0    4.0    4.0    4.0    4.0    4.0    4.0    4.0    4.0    4.0
```

CREATING THE DATA FILE "E19RVFNNN"

The order of the stations in this file must be the same as that found in the input product containing the forecasts.

Lines 1 to 5 will be skipped by the program...Place what you wish in these lines.

Line #6....Columns 1 to 79

1-19: Program skips these...place abbreviated station name.

20-23: Place the flood stage starting in column 20...the program reads this as an ASCII variable...no decimal points please. Ex: " 12" for 12 ft.

24: A space

25-28: The flood stage...Integer right justified (I4). Place zeros or blanks to the left as filler...ex 0012 for 12 ft....NOTE: no decimal point permitted.

29: A space

30-33: Minimum stage possible for this location...An integer (I4) right justified.

34: A space

35-38: Maximum stage possible for this location...An integer (I4) right justified.

39-40: Two spaces

41-46 Critical E19 stage to the nearest tenth of a foot.

NOTE: You must have decimal point followed by one digit. Ex. 12 ft. would be "0012.0" or "12.0"

NOTE: If there is no E19 information for this station you must place 9999.9 in this location unless it (9999.9) was placed in the previous record.

47: A space (* implies comments will follow)

48-79: Description of critical E19 stage. This can be left blank if the critical stage is 9999.9.

Line#7....Columns will contain E19 critical and description only.

1-6: Critical E19 stage to the nearest tenth of a foot.

NOTE: You must have decimal point followed by one digit Ex. 12.1 ft. would be "0012.1" or " 12.1"

NOTE: If there is no E19 information for this station you must place 9999.9 in this location unless it (9999.9) was placed in the previous record.

7: A space (* implies comments will follow)

8-39: Description or critical E19 stage. This can be left blank if the critical stage is 9999.9

40: A space

41-46: The critical E19 stage to the nearest tenth of a foot. Again make sure to include the decimal as described earlier. 9999.9 if there are no additional critical stages.

47: A space (* implies comments will follow)

48-79: Description of critical E19 stage. This can be left blank if critical E19 stage is 9999.9

Line #8
The same format as Line #7.

Line #9
The same format as Line #7 and #8.

Line #10
1-4: The computer looks for "NNNN"
If found the computer will assume the last station in the E19 file has been read.

If NNNN is not found the program will continue and read data for the next station(s):

Line #11,16,21,26,31........The same as line number 6.

Line #12,17,22,27............The same as line number 7.

Line #13,18,23,28............Will be read as line number 8.

Line #14,19,24,29............Will be read as line number 9.

Line #15,20,25,30............Will be read as line number 10.

See sample E19 for BOSRVFVT1 (next page).

```
****************************************************************
....................THIS FILE CONTAINS E19 DATA FOR BOSRVFVT1.............

123456789012345678901234567890123456789012345678901234567890123456789012345678
1************************************************************************5****
CONN AT N STRAT       13 0013 0000 0026   16.7 MARCH 13.1936 ..ICEJAM..
  16.1 APRIL 3.1959 ..ICE JAM..           14.7 JUNE 16,1943
  13.0*RB AND DWN STRM PTS FLDG AT HI     12.3*STAGES. LB NEVER OVRFLWS BY GAG.
9999.9 12345678901234567890123456789012 9999.9 12345678901234567890123456789012
2*****************************************************************************
CONN AT DALTON         0 0000 0000 0027   25.6 MARCH 20.1936
  22.4 MARCH 29.1953...4/24/54 22.25      21.3 MAY 6, 1972
  15.0*BANKS ARE NEVER OVERFLOWED INVOF   14.0*OF GAGE. FLOODG CAN ONLY OCCUR
  13.0*IN NATURL LOWLND AREA FAR UPSTRM 9999.9 12345678901234567890123456789012
3*****************************************************************************
PASSUMTTIC RIVER      14 0014 0000 0035   31.5 NOV 1927 MAX STAGE SINCE 1780.
  23.5 JULY 1,1973                        21.2 MAR 18,1936
  17.7 JAN 1 1935                         16.9 MAY 5 1972
  19.8*HIGH BANKS NOT SUBJECT TO OVRFLW   18.8*EXCEPT AT EXTREMELY HIGH STAGES
4*****************************************************************************
CONN AT WELLS R       22 0022 0002 0035   17.4 JULY 1 1973
  16.0 MARCH 27 1953                      26.0*RIGHT BANK IS STEEP. THE LEFT
  25.0*IS SUBJCT TO FLDING AT HI STAGES 9999.9
9999.9 12345678901234567890123456789012 9999.9 12345678901234567890123456789012
******************************************************************************
WHITE R AT W HFD      18 0018 0002 0035   29.3 NOV 4,1927
  19.9 APR 12,1934                        19.1 JUNE 30,1973..19.3 SEP 12,1938
  16.3 ROUTE 4 WEST OF TOWN               18.0*DAMAGE IN W HFD AT GT 19.0 FT
9999.9                                  9999.9
6*****************************************************************************
CONN AT W LEBANON     18 0018 0002 0040   35.0 NOV 4,1927
  32.6 MAR 19,1936../30 FT MAR 27,1913    25.3 JUNE 30,1973
  29.5 WINDSOR-BR STR/28.5 LEB STT HIWY   26.0 WINDSOR/ 25.5 HARTLAND
  24.5 CORNISH,HARTFORD,WILDER HYD PLNT   21.5 LEBANON PLAINFIELD
7*****************************************************************************
CONN AT N WALPOLE     28 0028 0000 0045   43.8 MAR 19,1936..GREATEST SINCE 1750
  30.4 MAR 27,1953... (29.85 4/5/60)      29.6 MAR 24,1968...ALSO 3/22/48
  28.7 JULY 1 1973                      9999.9
9999.9                                  9999.9
8*****************************************************************************
CONN AT MONTGUE C     28 0028 0000 0045   38.1 MAY 31 1984
9999.9                                  9999.9
9999.9                                  9999.9
9999.9                                  9999.9
9*****************************************************************************
CHICOPEE AT I O       12 0012 0000 0025   23.3 SEPT 21,1938
  22.1 AUGUST 19,1955                     21.0 WEST ST BRIDGE,INDIAN ORCHD
  20.0 INDIAN ORCHARD COMPANY             16.0 INDUSTRIES IN CHICOPEE FALLS
  15.0*HIGHWAY 141                      9999.9
******************************************************************************
CONN R AT THOMPSVL     0 0000 0000 0017   10.8 MAY 31,1984...10.9 AUG 19,1955
  14.4 SEPT 22,1936                       16.6 MARCH 20 1936
9999.9                                  9999.9
9999.9                                  9999.9
11****************************************************************************
FARMINGTON R AT TAR    9 0009 0001 0025 9999.9
9999.9                                  9999.9
9999.9                                  9999.9
9999.9                                  9999.9
12****************************************************************************
CONN R AT HFD         16 0016 0000 0045   42.5 LEVEE PROTECTION AT HARTFORD
  36.0 LEVEE PROTECTION AT EAST HARTFRD   29.0 SEVERE FLOODING
  23.0 MODERATE FLOODING(DEPNDS TIME YR)  17.0 TO 23 FT.FLDG SIDE STR/CNTRY RDS
  37.6 MAR 21,1936...35.4 SEP 23,1938     31.0 JUNE 1 1984...30.6 AUG 20,1955
13****************************************************************************
CONN R AT BODKIN R     8 0008 0000 0033   28.2 MARCH 21,1936
  25.8 SEPT 23-24,1938                    21.3 JUN 2 1984
  20.4 AUG 20,1955                      9999.9
9999.9                                  9999.9
NNNN**************************************************************************
```

CP BRIEF #11
OCTOBER 1985

PLOT A FORECASTED HYDROGRAPH AND E19 DATA

PART B: EXECUTION AND ERROR CONDITIONS

PROGRAM NAME: RVF

AAL ID:
REVISION NO.: 1.ØØ

PROGRAM EXECUTION:

From an AFOS ADM type:

```
RUN:RVF cccnnnxxx #1/C #2/S #3 #4
```

where cccnnnxxx is the input product and the local switches and arguments are defined as follows:

#1/C : AFOS console information: #1 is the console id number (GCID) minus 1.

#2/S : AFOS screen information: #2 is the number of the screen.

The parameters #1/C and #2/S are linked together. They both must be present or missing. If #1/C and #2/S are both omitted the program will plot the hydrographs on console 1 and screen number 1...(Or master console screen number 1). If one is missing the program will terminate with an error message.

#3 : The input product may contain up to 20 forecasts. #3 is the number within the file corresponding to the first station name and hydrograph that you wish to plot.

#4 : This corresponds to the order number of the last station name and hydrograph to be plotted.

All forecasts starting with position #3 and ending in the position #4 in the input product will be plotted on the console and screen specified. If both parameters are missing, all hydrographs in the file will be plotted in succession. If either one is missing then the program will terminate with an error message.

The program will strip off the CCC of the input product, replace it with E19 and look on DPØ for a file E19xxxnnn. If not found the program will read the AFOS input product and plot the hydrograph using zero as the lowest flow and two times the flood stage (flow) as the maximum value. In cases where forecasted stage is greater than twice the flood stage the length of the stage or y axis will become that of the maximum value forecasted.

If the file E19xxxnnn is found, information such as the lowest possible stage (flow) the highest possible stage, the flood stage, and the E19 summary with critical stage are all read for each station. At present, 7 critical stages and E19 summaries (up to 32 characters/summary) can be read and plotted. The program will stop plotting E19 summaries for a particular station when the first critical stage of 9999.9 is found.

Ex. Run:RVF BOSRVFSNE

On the master console on screen number 1 the first hydrograph from the AFOS file will be plotted.

After the first hydrograph is plotted, you may print the data at the PPM or go to the next hydrograph. To go to the next plot make sure the "cursor on" button is in the "on" position. Press the "Enter Cursor" button.

Press the "Enter Cursor" button each time you wish to examine the next hydrograph until the last forecast has been plotted.
The program will terminate with

```
          "Hydrology Program"
             "Completed"
```

on your screen.

****

Some Tips on Running the "RVF" program

1. Reset the GDM for the screen that will accept the hydrograph plots before running RVF. If you get an "unknown error number" while running the program this could mean the GDM must be reset before continuing.

2. Make sure the zoom for the screen is on 1:1. Since the program types the data directly on the screen without storing it in the CLS you will lose the contents of the screen if you attempt to zoom.

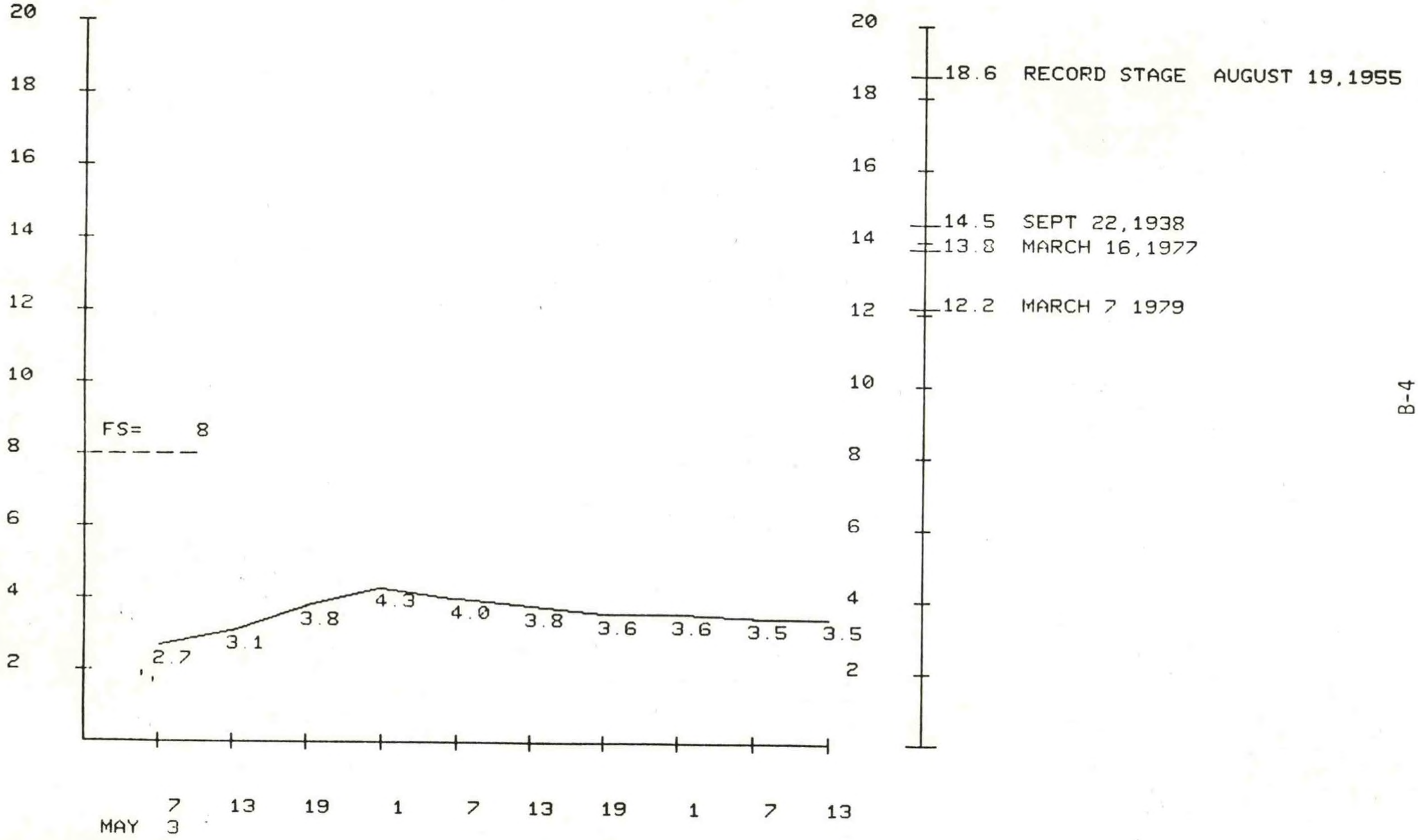
Error Conditions

Messages from ADM	Meaning
1. None	

Dasher Messages	Meaning
1. Messages pertaining to Run Line Error.	If the RUN line contains an error, program terminates.
2. A message pertaining to E19xxxnnn file on DPØ.	Program will continue running using default parameters.

A hydrograph plotted by RVF appears on the reverse.

HOUSATONIC RVR AT GAYLORDSVILLE
MAY 3 10:52 EDT



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