Attachment E

COMPUTER PROGRAM DOCUMENTATION

Listings for the following FORTRAN and SAS programs are presented herein:

- DAYFLOW (FORTRAN)
- DFDAT84 (FORTRAN)
- XCHNLOP (FORTRAN)
- DFREVIZ (FORTRAN)
- DAYFLOW DATA SUMMARY REPORT - PART 1 (SAS)
- DAYFLOW DATA SUMMARY REPORT - PART 2 (SAS)

C—106248

C-106248

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      PROGRAM DAYFLOW
      DIMENSION QSJR(31),QCRM(31),QMOKE(31),QMISC(31),QSAC(31)
      DIMENSION QYOLO(31),QCCC(31),QTPP(31),QXGEO(31),QDPP(31)
      DIMENSION QEAST(31),QMID(31),QTOT(31),QCD(31),QRIO(31)
      DIMENSION QEXP(31),QOUT(31),QDIVER(31),NDAYS(31),QEFFECT(31)
      DIMENSION QDEPL(31),QPREC(31),QSFCD(31),QWEST(31),QEFFDIV(31)
      DIMENSION OPENF(31),OPENP(31),OPEN(31),PART(31),CLOSE(31)
C
C
C
C
C                    * * * * * * * * * * * * * * * * *
C                      * * *  PROGRAMMED  BY  * * *
C                        * * *  VIC  CHICO  * * *
C                    * * * * * * C . D . * * * * * * *
C
C LINE 75 AND HEADINGS WERE MODIFIED 12/17/84 FOR 83-84 WY ADDENDUM.
C
C          COLUMN   VARIABLE              DESCRIPTION
C             1       QSJR      SAN JOAQUIN RIVER NEAR VERNALIS FLOW
C             2       QCRM      COSUMNES RIVER AT MCCONNELL FLOW
C             3      QMOKE      MOKELUMNE RIVER AT WOODBRIDGE FLOW
C             4      QMISC      MISCELLANEOUS FLOWS WHICH INCLUDES CALAV
C                               RAS RIVER,BEAR CREEK,MARSH CREEK,MORRISO
C                               CREEK,DRY CREEK,STOCKTON DIVERTING CANAL
C                               AND FRENCH CAMP SLOUGH.
C             5      QEAST      SUM OF SAN JOAQUIN RIVER,COSUMNES RIVER,
C                               MOKELUMNE RIVER AND MISCELLANEOUS FLOWS.
C             6       QSAC      SACRAMENTO RIVER AT EYE STREET BRIDGE
C             7      QYOLO      YOLO BY PASS NEAR WOODLAND WHICH INCLUDE
C                               SACRAMENTO WEIR SPILL TO YOLO BY PASS AN
C                               SOUTH FORK PUTAH CREEK NEAR DAVIS.
C             8       QTOT      TOTAL INFLOW TO THE DELTA
C             9      QXGEO      FLOW AT DELTA CROSS CHANNEL AND GEORGIA-
C                               NA SLOUGH.
C            10       QMID      MIDDLE RIVER PUMPING
C            11       QCCC      CONTRA COSTA CANAL PUMPING
C            12       QTPP      USBR TRACY PUMPING PLANT
C            13       QDPP      SWP DELTA PUMPING PLANT. CLIFTON COURT
C                               FERRY MINUS BETHANY DIVERSION
C            14       QEXP      TOTAL EXPORTS.
C            15      QDEPL      GROSS CHANNEL DEPLETION
C            16      QPREC      PRECIPITATION TAKEN AT STOCKTON FIRE
C                               STATION NO. 4
C            17        QCD      NET CHANNEL DEPLETION
C            18      QSFCD      65 PERCENT OF NET CHANNEL DEPLETION
C            19     QDIVER      PERCENT DIVERTED WHICH IS EQUAL TO TOTAL
C                               EXPORTS PLUS NET CHANNEL DEPLETION DIVID
C                               BY TOTAL INFLOW.
C            20      QWEST      FLOWS AT SAN JOAQUIN RIVER FROM WESTERN
C                               DELTA
C            21      QOUT       TOTAL DELTA OUTFLOW AT CHIPPS ISLAND
C            22    QEFFDIV      EFFECTIVE PERCENT DIVERTED FOR STRIPED
C                               BASS SURVIVAL.
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```
      OPEN(60,FILE='DAYCHEK')
      OPEN(61,FILE='OUTPUT')
   50 READ(60,30) IYEAR,IMO,KDAYS
   30 FORMAT(10X,I4,A4,I4)
C     ALL FLOWS ARE READ IN CUBIC FEET PER SECOND (CFS)
      READ(60,10) (QSJR(I) ,I=1,KDAYS)
      READ(60,10) (QCRM(I) ,I=1,KDAYS)
      READ(60,10) (QMOKE(I),I=1,KDAYS)
      READ(60,10) (QMISC(I),I=1,KDAYS)
      READ(60,10) (QYOLO(I),I=1,KDAYS)
      READ(60,10) (QSAC(I) ,I=1,KDAYS)
      READ(60,10) (QMID(I) ,I=1,KDAYS)
      READ(60,10) (QCCC(I) ,I=1,KDAYS)
      READ(60,10) (QTPP(I) ,I=1,KDAYS)
      READ(60,10) (QDPP(I) ,I=1,KDAYS)
      READ(60,10) (QDEPL(I),I=1,KDAYS)
      READ(60,10) (QPREC(I),I=1,KDAYS)
      READ(60,11)(OPENF(I),OPENP(I),I=1,KDAYS)
   55 CONTINUE
   10 FORMAT(6X,11F6.0)
   11 FORMAT(6X,11(F3.0,F3.0)/(6X,11(F3.0,F3.0)))
      KOUNT=0
      TSJR=0
      TCRM=0
      TMOKE=0
      TMISC=0
      TEAST=0
      TSAC=0
      TYOLO=0
      TTOT=0
      TXGEO=0
      TMID=0
      TCCC=0
      TTPP=0
      TDPP=0
      TEXP=0
      TDEPL=0
      TPREC=0
      TCD=0
      TSFCD=0
      TWEST=0
      TOUT=0
      TEFFECT=0
      DO 20 I=1,KDAYS
      KOUNT = KOUNT + 1
      NDAYS(I) = KOUNT
      QEAST(I) = QSJR(I)+QCRM(I)+QMOKE(I)+QMISC(I)
      QTOT(I) = QSAC(I)+QYOLO(I)+QEAST(I)
C     DELTA CROSS CHANNEL AND GEORGINIANA FLOWS BASED ON THE LATEST CURV
C        OPENF = FULLY OPEN      OPENP = PARTIALLY OPEN
      OPEN(I) = OPENF(I)/100
      PART(I) = OPENP(I)/100
 4500 CONTINUE
C
```

```
C             GATES FULLY OPENED IN A DAY
C
      IF(OPEN(I).EQ.0.AND.PART(I).EQ.0) GO TO 21
      GO TO 22
   21 QXGEO(I)=(0.293*QSAC(I)+2090)
      GO TO 5
   22 IF(OPEN(I).NE.0.AND.PART(I).EQ.0) GO TO 23
      GO TO 25
C
C             GATES FULLY CLOSED IN A DAY
C
   23 CLOSE(I)=1-(OPEN(I))
      IF(CLOSE(I).EQ.0) GO TO 24
      GO TO 26
   24 QXGEO(I)=(0.133*QSAC(I)+829)
      GO TO 5
C
C             GATES OPENED AND CLOSED IN A DAY
C
   26 LOG1=OPEN(I)*(0.293*QSAC(I)+2090)
      LOG2=CLOSE(I)*(0.133*QSAC(I)+829)
      QXGEO(I)=LOG1+LOG2
      GO TO 5
C
C             GATES PARTIALLY OPENED AND CLOSED IN A DAY
C
   25 IF(OPEN(I).EQ.0.AND.PART(I).NE.0) GO TO 27
      GO TO 28
   27 CLOSE(I)= 1-PART(I)
      LOG1=PART(I)*(0.216*QSAC(I)+2660)
      LOG2=CLOSE(I)*(0.133*QSAC(I)+829)
      QXGEO(I)=LOG1+LOG2
      GO TO 5
C
C             GATES FULLY OPENED AND PARTIALLY OPENED AND/OR OPENED,
C             PARTIALLY OPENED AND CLOSED IN A DAY
C
   28 IF(OPEN(I).NE.0.AND.PART(I).NE.0) CLOSE(I)=1-(OPEN(I)+PART(I))
      LOG1=OPEN(I)*(0.293*QSAC(I)+2090)
      LOG2=PART(I)*(0.216*QSAC(I)+2660)
      LOG3=CLOSE(I)*(0.133*QSAC(I)+829)
      QXGEO(I)=LOG1+LOG2+LOG3
C
    5 QEXP(I) = QCCC(I)+QTPP(I)+QDPP(I)+QMID(I)
      QCD(I) = QDEPL(I)-QPREC(I)
      QSFCD(I) = 0.65 * QCD(I)
      IF(QCD(I).LE.0.AND.ABS(QCD(I)).GE.QEXP(I)) GO TO 15
      GO TO 16
   15 QDIVER(I) = 0.
      GO TO 17
   16 QDIVER(I) = ((QEXP(I) + QCD(I)) / QTOT(I)) * 100
   17 QWEST(I) = QEAST(I)+QXGEO(I)-QEXP(I)-QSFCD(I)
      QOUT(I) = QTOT(I)-QCD(I)-QEXP(I)
C             FOR DELTA STRIPED BASS STUDY
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C          QEFFECT        EFFECTIVE INFLOW WHICH IS COMPUTED BASED ON TWO
C                         CONDITIOS:
C
C                       1.IF EXPORTS PLUS 42\ OF CHANNEL DEPLETION IS GREA
C                         OR EQUAL TO SAN JOAQUIN RIVER FLOW THEN EFFECTIV
C                         INFLOW EQUALS TOTAL INFLOW MINUS SAN JOAQUIN RI-
C                         VER FLOW.
C
C                       2.IF EXPORTS PLUS 42\ OF  CHANNEL DEPLETION IS LES
C                         THAN SAN JOAQUIN RIVER FLOW THEN EFFECTIVE INFLO
C                         EQUALS TOTAL INFLOW MINUS THE LESSER OF 65\ OF
C                         SAN JOAQUIN RIVER FLOW PLUS 15\ OF CHANNEL DEPLE
C                         TION  OR  EXPORTS PLUS 42\ OF CHANNEL DEPLETION.
C
      CHECK1=(0.42*QCD(I)+QEXP(I))
      IF(CHECK1.GE.QSJR(I)) GO TO 70
      GO TO 80
   70 QEFFECT(I)=QTOT(I)-QSJR(I)
      GO TO 90
   80 CHECK2=(0.65*QSJR(I)+0.15*QCD(I))
      IF(CHECK2.LT.CHECK1) GO TO 110
      GO TO 120
  110 QEFFECT(I)=QTOT(I)-CHECK2
      GO TO 90
  120 QEFFECT(I)=QTOT(I)-CHECK1
   90 IF(QEFFECT(I).LE.QOUT(I)) GO TO 91
      GO TO 93
   91 QEFFDIV(I) = 0.
      GO TO 92
   93 QEFFDIV(I)=((QEFFECT(I)-QOUT(I))/QEFFECT(I))*100
   92 CONTINUE
C
      TSJR = TSJR + QSJR(I)
      TCRM = TCRM + QCRM(I)
      TMOKE = TMOKE + QMOKE(I)
      TMISC = TMISC + QMISC(I)
      TEAST = TEAST + QEAST(I)
      TSAC = TSAC + QSAC(I)
      TYOLO = TYOLO + QYOLO(I)
      TTOT = TTOT + QTOT(I)
      TXGEO = TXGEO + QXGEO(I)
      TMID = TMID + QMID(I)
      TCCC = TCCC + QCCC(I)
      TTPP = TTPP + QTPP(I)
      TDPP = TDPP + QDPP(I)
      TEXP = TEXP + QEXP(I)
      TDEPL = TDEPL + QDEPL(I)
      TPREC = TPREC + QPREC(I)
      TCD = TCD + QCD(I)
      TEFFECT=TEFFECT+QEFFECT(I)
      TSFCD = TSFCD + QSFCD(I)
      TWEST = TWEST + QWEST(I)
      TOUT = TOUT + QOUT(I)
      TDAYS = NDAYS(I)
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   20 CONTINUE
C
      ASJR = TSJR/TDAYS
      ACRM = TCRM/TDAYS
      AMOKE = TMOKE/TDAYS
      AMISC = TMISC/TDAYS
      AEAST = TEAST/TDAYS
      ASAC = TSAC/TDAYS
      AYOLO = TYOLO/TDAYS
      ATOT = TTOT/TDAYS
      AXGEO = TXGEO/TDAYS
      AMID = TMID/TDAYS
      ACCC = TCCC/TDAYS
      ATPP = TTPP/TDAYS
      ADPP = TDPP/TDAYS
      AEXP = TEXP/TDAYS
      ADEPL = TDEPL/TDAYS
      APREC = TPREC/TDAYS
      ACD = TCD/TDAYS
      AEFFECT=TEFFECT/TDAYS
      ASFCD = TSFCD/TDAYS
      IF(ACD.LE.0.AND.ABS(ACD).GE.AEXP) GO TO 41
      GO TO 42
   41 ADIVER = 0
      GO TO 43
   42 ADIVER = ((AEXP + ACD) / ATOT) * 100
   43 CONTINUE
      AWEST = TWEST/TDAYS
      AOUT = TOUT/TDAYS
      IF(AOUT.GE.AEFFECT) GO TO 31
      GO TO 32
   31 AEFFDIV=0
      GO TO 33
   32 AEFFDIV=((AEFFECT-AOUT)/AEFFECT)*100
   33 CONTINUE
      DO 9000 I=1,KDAYS
 9000 QRIO(I)=QSAC(I)+QYOLO(I)-QXGEO(I)-.28*QCD(I)
C
      WRITE(61,100)
      WRITE(61,800) IYEAR
      WRITE(61,900) IMO
      WRITE(61,200)
      WRITE(61,300)
      WRITE(61,400)
      WRITE(61,1000) (NDAYS(I),QSJR(I),QCRM(I),QMOKE(I),QMISC(I),QEAST(I
     $               ),QSAC(I),QYOLO(I),QTOT(I),QXGEO(I),QMID(I),QCCC(I)
     $               ,I=1,KDAYS)
      WRITE(61,2000)  TSJR,TCRM,TMOKE,TMISC,TEAST,TSAC,TYOLO,TTOT,TXGEO,
     $                TMID,TCCC
      WRITE(61,3000)  ASJR,ACRM,AMOKE,AMISC,AEAST,ASAC,AYOLO,ATOT,AXGEO,
     $                AMID,ACCC
      WRITE(61,100)
      WRITE(61,800) IYEAR
      WRITE(61,900) IMO
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      WRITE(61,500)
      WRITE(61,600)
      WRITE(61,700)
      WRITE(61,4000) (NDAYS(I),QTPP(I),QDPP(I),QEXP(I),QDEPL(I),QPREC(I)
     *               ,QCD(I),QEFFECT(I),QDIVER(I),QWEST(I),QOUT(I),
     $               QEFFDIV(I),I=1,KDAYS)
      WRITE(61,2500) TTPP,TDPP,TEXP,TDEPL,TPREC,TCD,TEFFECT,TWEST,TOUT
      WRITE(61,3500) ATPP,ADPP,AEXP,ADEPL,APREC,ACD,AEFFECT,ADIVER,
     *               AWEST,AOUT,AEFFDIV
C
      READ(60,40) KONTROL
      IF(KONTROL.EQ.1111) GO TO 50
      CONTINUE
      IF(KONTROL.EQ.9999) STOP 123
C
   40 FORMAT(10X,I4)
  100 FORMAT(1H1,///43X,46HHISTORIC VALUES IN CUBIC FEET PER SECOND (CFS
     $)///)
  800 FORMAT(56X,13HCALENDAR YEAR,2X,I4///)
  900 FORMAT(52X,23HFLOWS FOR THE MONTH OF ,A4)
  200 FORMAT(1H0/,15X,111H   SAN JOA-  COSUMNES MOKELUMNE     MISC.  SUB
     *TOTAL SACRAMEN-      YOLO     TOTAL  DEL-X-CH    MISC.     CONTRA)
  300 FORMAT(1H0,6X,4HDATE,5X,110H  QUIN RIV  RIVER AT  RIVER AT    STRE
     *AM  SJR+COS+  TO RIVER    BYPASS    INFLOW GEORGIANA DIVERSION
     $ COSTA)
  400 FORMAT(1H0,15X,110H  VERNALIS  MICH.BAR WOODBRIDGE     FLOWS MOKE+M
     *ISC  FREEPORT      FLOW     (CFS)      FLOW     (CFS)   PUMPING/)
  500 FORMAT(1H0/,15X,111H      TRACY   CLIFTON     TOTAL GROSS CHN    P
     *RECI-  NET CHN. EFFECTIVE   PERCENT  SJR FLOW   OUTFLOW EFFECTIVE)
  600 FORMAT(1H0,6X,4HDATE,5X,110H   PUMPING     COURT   EXPORTS DEPLETI
     *ON  PITATION DEPLETION    INFLOW  DIVERTED  FR. WES-    CHIPPS   P
     $ERCENT)
  700 FORMAT(1H0,15X,110H     PLANT    INFLOW     (CFS)     (CFS)     (C
     $FS)     (CFS)     (CFS)            TERN DELT    ISLAND  DIVERTED/)
 1000 FORMAT(1H ,6X,I4,5X,11F10.0)
 2000 FORMAT(1H0,5X,10HSUMMATION ,11F10.0)
 2500 FORMAT(1H0,5X,10HSUMMATION ,7F10.0,10X,2F10.0)
 3000 FORMAT(1H0,5X,10HAVERAGE   ,11F10.0)
 3500 FORMAT(1H0,5X,10HAVERAGE   ,7F10.0,7X,F3.0,2F10.0,7X,F3.0)
 4000 FORMAT(1H ,6X,I4,5X,7F10.0,7X,F3.0,2F10.0,7X,F3.0)
      END
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```
      PROGRAM DFDAT84
C
C           DAYFLOW DATA DECK CREATION
C           FOR WATER YEAR 8384
C
C                 INDIVIDUAL INPUT DATA FILES ARE READ IN,
C                 PREPARATORY CALCULATIONS ARE MADE, AND
C                 THE OUTPUT IS WRITTEN ON A FILE IN THE
C                 FORMAT REQUIRED TO RUN THE DAYFLOW PGM.
C
      CHARACTER*3 MONTH(11)
      INTEGER BRCR(336), CALR(336), QCCC(336), QDPP(336), FCSL(336)
      INTEGER OPENF(336), OPENP(336), QPREC(336), SDC(336)
      INTEGER SPCR(336), QTPP(336), QCRM(336), QMOKE(336), QSAC(336)
      INTEGER QSJR(336), YOLOW(336), QMISC(336), QYOLO(336)
      INTEGER QDEPL(336), DRCR(336), SWSYBP(336), QMID(336)
      INTEGER YEAR(11), MDAY(11), DATFLG(11), FDAY(11), LDAY(11)
      INTEGER TDAY, TMONTH, FDM, LDM
C
C           OPEN INPUT FILES
C
      OPEN (10,FILE='DFHEAD.DAT')
      OPEN (11,FILE='BRCR84E.DAT')
      OPEN (12,FILE='CALR84.DAT')
      OPEN (13,FILE='CCC84.DAT')
      OPEN (14,FILE='CLBBD84.DAT')
      OPEN (15,FILE='FCSL84.DAT')
      OPEN (16,FILE='GATE84.DAT')
      OPEN (17,FILE='DFGCDLY.DAT')
      OPEN (18,FILE='PREC84.DAT')
      OPEN (19,FILE='SDC84E.DAT')
      OPEN (20,FILE='SPCR84E.DAT')
      OPEN (21,FILE='SWS84.DAT')
      OPEN (22,FILE='TPP84.DAT')
      OPEN (23,FILE='MOKE84.DAT')
      OPEN (24,FILE='CSMR84.DAT')
      OPEN (25,FILE='YOLW84E.DAT')
      OPEN (26,FILE='SJR84.DAT')
      OPEN (27,FILE='SAC84.DAT')
      OPEN (28,FILE='DRCR84E.DAT')
C
C           OPEN OUTPUT FILE
C
      OPEN (100,FILE='DFWY84.DAT',STATUS='NEW')
C
C           READ IN HEADERS
C
      READ (10,101)  TDAY, TMONTH
      READ (10,102)  ( YEAR(M), MONTH(M), MDAY(M), DATFLG(M),
     1                M=1,TMONTH )
C
C           DETERMINATION OF I / O FLAGS
C
            FDAY(1) = 1
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```
            LDAY(1) = MDAY(1)
      DO 300 M=2,TMONTH
            FDAY(M) = LDAY(M - 1) + 1
            LDAY(M) = FDAY(M) + MDAY(M) - 1
  300 CONTINUE
C
C           READ INPUT DATA
C
      DO 400 M=1,TMONTH
            FDM = FDAY(M)
            LDM = LDAY(M)
            READ (11,111)  ( BRCR(I), I=FDM,LDM )
            READ (12,111)  ( CALR(I), I=FDM,LDM )
            READ (13,111)  ( QCCC(I), I=FDM,LDM )
            READ (14,111)  ( QDPP(I), I=FDM,LDM )
            READ (15,111)  ( FCSL(I), I=FDM,LDM )
            READ (16,161)  ( OPENF(I), OPENP(I), I=FDM,LDM)
            READ (17,111)  ( QDEPL(I), I=FDM,LDM )
            READ (18,111)  ( QPREC(I), I=FDM,LDM )
            READ (19,111)  ( SDC(I),  I=FDM,LDM )
            READ (20,111)  ( SPCR(I), I=FDM,LDM )
            READ (21,111)  ( SWSYBP(I), I=FDM,LDM )
            READ (22,111)  ( QTPP(I), I=FDM,LDM )
            READ (23,231)  ( QMOKE(I), I=FDM,LDM )
            READ (24,231)  ( QCRM(I), I=FDM,LDM )
            READ (25,231)  ( YOLOW(I), I=FDM,LDM )
            READ (26,231)  ( QSJR(I), I=FDM,LDM )
            READ (27,271)  ( QSAC(I), I=FDM,LDM )
            READ (28,231)  ( DRCR(I), I=FDM,LDM )
  400 CONTINUE
C
C          CALCULATION OF QMISC
C
      DO 500 I=1,TDAY
            QMISC(I) = BRCR(I) + CALR(I) + FCSL(I) + SDC(I) + DRCR(I)
  500 CONTINUE
C
C           CALCULATION OF QYOLO
C
      DO 600 I=1,TDAY
            QYOLO(I) = YOLOW(I) + SWSYBP(I) + SPCR(I)
  600 CONTINUE
C
C           INPUT QMID AS ZERO
C
      DO 700 I=1,TDAY
            QMID(I) = 0
  700 CONTINUE
C
C           WRITE DATA DECK FILE
C
      DO 800 M=1,TMONTH
            FDM = FDAY(M)
            LDM = LDAY(M)
```

```
            WRITE(100,1010)  YEAR(M), MONTH(M), MDAY(M)
            WRITE(100,1020)  ( QSJR(I), I=FDM,LDM )
            WRITE(100,1020)  ( QCRM(I), I=FDM,LDM )
            WRITE(100,1020)  ( QMOKE(I), I=FDM,LDM )
            WRITE(100,1020)  ( QMISC(I), I=FDM,LDM )
            WRITE(100,1020)  ( QYOLO(I), I=FDM,LDM )
            WRITE(100,1020)  ( QSAC(I), I=FDM,LDM )
            WRITE(100,1020)  ( QMID(I), I=FDM,LDM )
            WRITE(100,1020)  ( QCCC(I), I=FDM,LDM )
            WRITE(100,1020)  ( QTPP(I), I=FDM,LDM )
            WRITE(100,1020)  ( QDPP(I), I=FDM,LDM )
            WRITE(100,1020)  ( QDEPL(I), I=FDM,LDM )
            WRITE(100,1020)  ( QPREC(I), I=FDM,LDM )
            WRITE(100,1030)  ( OPENF(I), OPENP(I), I=FDM,LDM )
            WRITE(100,1040)  DATFLG(M)
  800 CONTINUE
C
C           FORMAT STATEMENTS
C
  101 FORMAT(10X,I5,1X,I4)
  102 FORMAT(11X,I4,1X,A4,1X,I4,1X,I4)
  111 FORMAT(6X,11(I6,1X)/(6X,11(I6,1X)))
  161 FORMAT(6X,22(I3,1X)/(6X,22(I3,1X)))
  231 FORMAT(25X,8I7/25X,8I7)
  271 FORMAT(25X,8(I6,1X)/(25X,8(I6,1X)))
 1010 FORMAT(10X,I4,A4,I4)
 1020 FORMAT(6X,11I6/6X,11I6)
 1030 FORMAT(6X,22I3/6X,22I3)
 1040 FORMAT(10X,I4)
C
C           END OF PROGRAM
C
      STOP 123
      END
```

```
      PROGRAM XCHNLOP
C
C DEVELOPED IN JAN.  1985 TO CREATE A DATA DECK FOR DELTA CROSS
C CHANNEL GATE OPERATIONS.  THE OUTPUT IS USED TO REVISE EXISTING
C ERRORS IN THE DWR DAYFLOW SUMMARY.  THE INPUT DATA IS THE USBR
C GATE OPERATION SCHEDULE.  THE OUTPUT DATA DECK CONSISTS OF DAILY
C RECORDS INDICATING THE FRACTION OF THE DAY WHEN NO, ONE, OR TWO
C GATES WERE/WAS OPEN.
C CONTACT:  KAMYAR GUIVETCHI, DEPT. OF WATER RESOURCES, SAC., CA.
C           (916) 445-5157.
C
C PARAMETER DEFINITIONS:
C
      INTEGER  GRECRD, JULIAN, TDAYS, JULDAYS
      INTEGER  GYR(200), GMO(200), GDAY(200), GHR(200), GMIN(200)
      INTEGER  GATES(200), GJUL(200), GTYMM(200), GCODE(200)
      REAL     TGATE0, TGATE1, TGATE2, FIRST, MID, LAST
C
C GRECRD  = NUMBER OF XCHNL GATE OPERATION RECORDS; ONE PER CHANGE.
C JULIAN  = JULIAN DAY REFERENCED TO JAN. 1, 1900.
C TDAYS   = TOTAL NUMBER OF DAYS FOR WHICH GATE OPER. ARE GENERATED.
C GYR     = YEAR WHEN GATE SETTING CHANGED, TWO DIGITS.
C GMO     = MONTH WHEN GATE SETTING CHANGED, TWO DIGITS.
C GDAY    = DAY WHEN GATE SETTING CHANGED, TWO DIGITS.
C GHR     = HOUR WHEN GATE SETTING CHANGED, TWO DIGITS, 24-HOUR CLK.
C GMIN    = MINUTES PAST HOUR WHEN GATE SETTING CHANGED, TWO DIGITS.
C GATES   = NUMBER OF GATES OPEN AFTER GATE SETTING CHANGE.
C GJUL    = JULIAN DAY EQIV. FOR DATE GATE SETTING CHANGED.
C GTYMM   = MINUTES ELAPSED IN DAY WHEN GATE SETTING CHANGED.
C GCODE   = GATES MINUS ONE, USED IN ARITHMETIC IF STATEMENTS.
C TGATE0  = FRACTION OF DAY WITH NO GATES OPEN.
C TGATE1  = FRACTION OF DAY WITH ONE GATE OPEN.
C TGATE2  = FRACTION OF DAY WITH TWO GATES OPEN.
C FIRST   = STATEMENT FUNCTION USED TO DETERMINE FRACTION OF DAY
C           FROM TIME ZERO TO FIRST GATE SETTING CHANGE IN SAME DAY.
C MID     = STATEMENT FUNCTION USED TO DETERMINE FRACTION OF DAY
C           BETWEEN TWO CONSECUTIVE GATE SETTINGS IN SAME DAY.
C LAST    = STATEMENT FUNCTION USED TO DETERMINE FRACTION OF DAY
C           BETWEEN LAST GATE SETTING CHANGE AND END OF SAME DAY.
C JULDAYS = SUBROUTINE FUNCTION GIVING ELAPSED DAYS FROM 1/1/1900.
C
C STATEMENT FUNCTION DEFINTIONS:
C
      FIRST(K) = FLOAT(K) / 1440.
      MID(K,L) = ( FLOAT(K) - FLOAT(L) ) / 1440.
      LAST(K)  = ( 1440. - FLOAT(K) ) / 1440.
C
C OPEN INPUT AND OUTPUT FILES, FILE NAMES READ IN AT EXECUTION.
C
      OPEN(5,FILE = ' ')
      OPEN(6,FILE = ' ', STATUS = 'NEW')
C
C READ INPUT DATA.
C
```

```
      READ(5,400) GRECRD
      READ(5,410) (GMO(I), GDAY(I), GYR(I), GHR(I), GMIN(I),
     2             GATES(I), I = 2,GRECRD+1)
C
C
C DATA READ CHECK.
C
      WRITE(*,400) GRECRD
      WRITE(*,410) (GYR(I), GMO(I), GDAY(I), GHR(I), GMIN(I),
     2              GATES(I), I = 2,GRECRD+1)
C
C CREATE NEW PARAMETERS.
C
      DO 100 I = 2,GRECRD+1
            GYR(I) = GYR(I) + 1900
            GJUL(I) = JULDAYS( GYR(I),GMO(I),GDAY(I) )
            GTYMM(I) = 60 * GHR(I) + GMIN(I)
            GCODE(I) = GATES(I) - 1
  100 CONTINUE
C
C INITIALIZATIONS.
C
      GJUL(1) = GJUL(2) - 1
      GCODE(1) = GCODE(2)
      GJUL(GRECRD+2) = GJUL(GRECRD+1) + 1
      TDAYS = GJUL(GRECRD+1) - GJUL(2) + 1
      JULIAN = GJUL(2)
C
C DAY COUNTER LOOP RUNS WITH J SUBSCRIPT.
C
      DO 300 J = 1,TDAYS
C
            TGATE0 = 0
            TGATE1 = 0
            TGATE2 = 0
C
C GATE OPERATION TABLE LOOK-UP RUNS WITH M SUBSCRIPT.
C
      DO 200 M = 2,GRECRD+1
C
            IF (JULIAN .GT. GJUL(M)) GOTO 200
            IF (JULIAN .LT. GJUL(M)) GOTO 180
            IF (GJUL(M) .NE. GJUL(M-1)) GOTO 120
            IF (GJUL(M) .EQ. GJUL(M-1)) GOTO 140
C
C DETERMINATION OF DAILY GATE OPERATION.
C
  120 IF (GCODE(M-1)) 121,122,123
  121       TGATE0 = TGATE0 + FIRST(GTYMM(M))
            GOTO 125
  122       TGATE1 = TGATE1 + FIRST(GTYMM(M))
            GOTO 125
  123       TGATE2 = TGATE2 + FIRST(GTYMM(M))
C
```

```
  125 IF (GJUL(M) .NE. GJUL(M+1)) GOTO 160
      GOTO 200
C
  140 IF (GCODE(M-1)) 141,142,143
  141       TGATE0 = TGATE0 + MID(GTYMM(M),GTYMM(M-1))
            GOTO 145
  142       TGATE1 = TGATE1 + MID(GTYMM(M),GTYMM(M-1))
            GOTO 145
  143       TGATE2 = TGATE2 + MID(GTYMM(M),GTYMM(M-1))
C
  145 IF (GJUL(M) .NE. GJUL(M+1)) GOTO 160
      GOTO 200
C
  160 IF (GCODE(M)) 161,162,163
  161       TGATE0 = TGATE0 + LAST(GTYMM(M))
            GOTO 250
  162       TGATE1 = TGATE1 + LAST(GTYMM(M))
            GOTO 250
  163       TGATE2 = TGATE2 + LAST(GTYMM(M))
      GOTO 250
C
  180 IF (GCODE(M-1)) 181,182,183
  181       TGATE0 = 1.000
            GOTO 250
  182       TGATE1 = 1.000
            GOTO 250
  183       TGATE2 = 1.000
      GOTO 250
C
C END OF TABLE LOOK-UP LOOP.
  200 CONTINUE
C
C WRITE GATE OPERATION MODE FOR JULIAN DAY TO OUTPUT FILE.
  250 WRITE(6,420) JULIAN, TGATE0, TGATE1, TGATE2
C
      JULIAN = JULIAN + 1
C
C END OF DAY COUNTER LOOP.
  300 CONTINUE
C
C FORMAT STATEMENTS
C
  400 FORMAT(I10)
  410 FORMAT(3(I10),I8,I2,I10)
  420 FORMAT(I6,3(F6.3))
C
      STOP 'WE HAVE IGNITION !'
      END
C
C SUBROUTINE FUNCTION DEFINITION:
C
      INTEGER FUNCTION JULDAYS(IYR,MON,IDAY)
      J1 = 365 * (IYR - 1900) + (IYR - 1900) / 4
      C = 30.6 * FLOAT(MON) - 32.3
```

```
      IF (MON .GE. 3) GOTO 5
      IF ((MOD(IYR,4) .EQ. 0) .AND. (IYR .NE. 1900)) J1 = J1 - 1
      C = C + 2.3
    5 JULDAYS = J1 + INT(C) + IDAY
      RETURN
      END
```


C—106261

C-106261

```
      PROGRAM DFREVIZ
C
C THIS PROGRAM WAS DEVELOPED TO (1) READ THE EXISTING DAYFLOW SUMMARY
C TAPE (JAN. 1985), (2) READ THE DELTA CROSS CHANNEL GATE OPERATIONS
C GENERATED BY PROGRAM XCHNLOP, (3) RECALCULATE THE DAILY, MONTHLY
C TOTAL AND MONTHLY AVERAGE FLOWS FOR THE GEORGIANA SLOUGH AND DELTA
C CROSS CHANNEL (QXGEO, TXGEO AND AXGEO FROM DAYFLOW), AND THE
C SAN JOAQUIN RIVER FLOW TO THE WESTERN DELTA (CHIPPS ISLAND; QWEST,
C TWEST AND AWEST FROM DAYFLOW), AND (4) WRITE THE REVISED DAYFLOW
C SUMMARY DATA TO TAPE.
C CONTACT: K. GUIVETCHI, DEPT. OF WATER RESOURCES, SACRAMENTO, CA.
C          (916) 445-5157.
C
C PARAMETER DEFINITIONS:
C
      INTEGER  MONTHS, IYEAR, IMO, KDAYS, NDAYS(40)
      REAL     QSJR(40), QCRM(40), QMOKE(40), QMISC(40), QEAST(40),
     2         QSAC(40), QYOLO(40), QTOT(40), BQXGEO(40), QMID(40),
     3         QCCC(40), QTPP(40), QDPP(40), QEXP(40), QDEPL(40),
     4         QPREC(40), QCD(40), QEFFECT(40),QDIVER(40),BQWEST(40),
     5         QOUT(40), QEFFDIV(40), QXGEO(40), QWEST(40), QGEO(40),
     6         QXCHG1(40), QXCHG2(40)
      REAL     TSJR, TCRM, TMOKE, TMISC, TEAST, TSAC, TYOLO, TTOT,
     2         BTXGEO, TMID, TCCC, TTPP, TDPP, TEXP, TDEPL, TPREC,
     3         TCD, TEFFECT, BTWEST, TOUT, TDAYS, TXGEO, TWEST,
     4         ASJR, ACRM, AMOKE, AMISC, AEAST, ASAC, AYOLO, ATOT,
     5         BAXGEO, AMID, ACCC, ATPP, ADPP, AEXP, ADEPL, APREC,
     6         ACD, AEFFECT, BAWEST, AOUT, AXGEO, AWEST
      REAL     TGATE0(40), TGATE1(40), TGATE2(40)
      CHARACTER*2 ADIVER, AEFFDIV
C
C OPEN INPUT AND OUTPUT FILES.
C
      OPEN(4,FILE='DFREVMO')
      OPEN(5,FILE='DFT5684')
      OPEN(6,FILE='DFXCHNL')
      OPEN(7,FILE='DFR5684')
C
C READ NUMBER OF MONTHS TO PROCESS.
C
      READ(4,10) MONTHS
C
C MONTH COUNTER LOOP USES SUBSCRIPT M.
C
      DO 200 M=1,MONTHS
            TXGEO = 0
            TWEST = 0
            AXGEO = 0
            AWEST = 0
C
```

```
C READ DAILY INPUT DATA FOR A MONTH.
C
      READ(5,20) IYEAR, IMO, KDAYS
      READ(5,30) (NDAYS(I), QSJR(I), QCRM(I), QMOKE(I), QMISC(I),
     2            QEAST(I), QSAC(I), QYOLO(I), QTOT(I), BQXGEO(I),
     3            QMID(I), QCCC(I), QTPP(I), QDPP(I), QEXP(I),
     4            QDEPL(I), QPREC(I), QCD(I), QEFFECT(I), QDIVER(I),
     5            BQXGEO(I), QOUT(I), QEFFDIV(I), I=1,KDAYS)
      READ(5,40) TSJR, TCRM, TMOKE, TMISC, TEAST, TSAC, TYOLO, TTOT,
     2           BTXGEO, TMID, TCCC, TTPP, TDPP, TEXP, TDEPL, TPREC,
     3           TCD, TEFFECT, BTWEST, TOUT
      READ(5,50) ASJR, ACRM, AMOKE, AMISC, AEAST, ASAC, AYOLO, ATOT,
     2           BAXGEO, AMID, ACCC, ATPP, ADPP, AEXP, ADEPL, APREC,
     3           ACD, AEFFECT, ADIVER, BAWEST, AOUT, AEFFDIV
      READ(6,60) (TGATE0(I), TGATE1(I), TGATE2(I), I=1,KDAYS)
C
C FLOW DETERMINATION THROUGH DELTA CROSS CHANNEL AND GEORGIANA SLOUGH
C USING EMPIRICAL FORMULAS BASED ON NUMBER OF GATES OPEN DURING A DAY
C AND SACRAMENTO RIVER FLOW AT I STREET BRIDGE, SACRACMENTO (FLOWS
C SINCE OCT. 1979 MEASURED AT FREEPORT, CA.: VALUE STILL USED IN
C EMPIRICAL FORMULAS - APPROXIMATE).
C
C DAY OF MONTH COUNTER LOOP USES SUBSCRIPT I.
C
      DO 100 I = 1,KDAYS
            QGEO(I) = TGATE0(I) * (0.133 * QSAC(I) + 829)
            QXCHG1(I) = TGATE1(I) * (0.216 * QSAC(I) + 2660)
            QXCHG2(I) = TGATE2(I) * (0.293 * QSAC(I) + 2090)
            QXGEO(I) = QGEO(I) + QXCHG1(I) + QXCHG2(I)
            QWEST(I) = BQWEST(I) - BQXGEO(I) + QXGEO(I)
C
            TXGEO = TXGEO + QXGEO(I)
            TWEST = TWEST + QWEST(I)
            TDAYS = KDAYS
C
C END OF DAY COUNTER LOOP.
  100 CONTINUE
C
      AXGEO = TXGEO / TDAYS
      AWEST = TWEST / TDAYS
C
C WRITE VALUES FOR MONTH TO REVISED TAPE.
C
      WRITE(7,20) IYEAR, IMO, KDAYS
      WRITE(7,30) (NDAYS(I), QSJR(I), QCRM(I), QMOKE(I), QMISC(I),
     2            QEAST(I), QSAC(I), QYOLO(I), QTOT(I), QXGEO(I),
     3            QMID(I), QCCC(I), QTPP(I), QDPP(I), QEXP(I),
     4            QDEPL(I), QPREC(I), QCD(I), QEFFECT(I), QDIVER(I),
     5            QWEST(I), QOUT(I), QEFFDIV(I), I=1,KDAYS)
      WRITE(7,40) TSJR, TCRM, TMOKE, TMISC, TEAST, TSAC, TYOLO, TTOT,
```

```
     2            TXGEO, TMID, TCCC, TTPP, TDPP, TEXP, TDEPL, TPREC,
     3            TCD, TEFFECT, TWEST, TOUT
      WRITE(7,50) ASJR, ACRM, AMOKE, AMISC, AEAST, ASAC, AYOLO, ATOT,
     2            AXGEO, AMID, ACCC, ATPP, ADPP, AEXP, ADEPL, APREC,
     3            ACD, AEFFECT, ADIVER, AWEST, AOUT, AEFFDIV
C
C END OF MONTH COUNTER LOOP.
  200 CONTINUE
      REWIND 5
      REWIND 6
      STOP 'AT LAST !'
C
C FORMAT STATEMENTS.
C
   10 FORMAT(10X,I4)
   20 FORMAT(10X,I10,20X,A4,10X,I10)
   30 FORMAT(6X,I4,5X,11F10.0/15X,11F10.0)
   40 FORMAT(5X,10F10.0/5X,10F10.0)
   50 FORMAT(5X,11F10.0/5X,7F10.0,8X,A2,2F10.0,8X,A2)
   60 FORMAT(6X,3F6.3)
      END
```


C—106264

C-106264

```
 1.     *   SAS PROGRAM TO GENERATE;
 2.     *   DAYFLOW DATA SUMMARY REPORT - PART 1;
 3.     *   USING SAS DAYFLOW DATA SET;
 4.
 5.     DATA ONE;SET WATER.DAYFLOW;
 6.     PROC SORT;BY YEAR MONTH DAY;
 7.
 8.     DATA TWO;SET WATER.SUMFLOW;
 9.     PROC SORT;BY YEAR MONTH;
10.
11.     DATA MERJ;MERGE TWO ONE;
12.     BY YEAR MONTH;
13.     IF WYEAR>8182;
14.     YEAR = YEAR + 1900;
15.     PROC SORT;BY YEAR MONTH DAY;
16.
17.     DATA _NULL_;SET MERJ;
18.     BY YEAR MONTH;
19.     FILE PRINT HEADER=H NOTITLES N=PS;
20.     PUT @9 DAY 2. @15 QSJR 10. @25 QCRM 10. @35 QMOKE 10.
21.         @45 QMISC 10. @55 QEAST 10. @65 QSAC 10. @75 QYOLO 10.
22.         @85 QTOT 10. @95 QDEPL 10. @105 QPREC 10. @115 QCD 10.;
23.     IF LAST.MONTH THEN DO;
24.     PUT / @5 'TOTAL CFS' @15 TSJR 10. @25 TCRM 10. @35 TMOKE 10.
25.           @45 TMISC 10. @55 TEAST 10. @65 TSAC 10. @75 TYOLO 10.
26.           @85 TTOT 10. @95 TDEPL 10. @105 TPREC 10. @115 TCD 10.;
27.     PUT / @5 'MONTHLY MEAN' @17 ASJR 8. @25 ACRM 10. @35 AMOKE 10.
28.           @45 AMISC 10. @55 AEAST 10. @65 ASAC 10. @75 AYOLO 10.
29.           @85 ATOT 10. @95 ADEPL 10. @105 APREC 10. @115 ACD 10.;
30.     PUT #13 @62 AMONTH $3. @68 YEAR 4. _PAGE_;
31.     END;
32.     RETURN;
33.
34.     H: PUT #4 @37 'HYDROLOGIC DATA FOR THE SACRAMENTO-SAN JOAQUIN ESTUARY (CFS)'/
35.            @55 'DAYFLOW PROGRAM SUMMARY'//
36.            @39 'PROGRAM VERSION : JAN. 1985          RUN DATE : FEB. 1985'/
37.            @36 '* SEE DOCUMENTATION FOR PARAMETER DESCRIPTIONS AND REVISIONS *'//
38.            @47 'CALIFORNIA DEPARTMENT OF WATER RESOURCES'/
39.            @59 'CENTRAL DISTRICT'////
40.            @20 '(1)' @30 '(2)' @40 '(3)' @50 '(4)' @60 '(5)' @70 '(6)'
41.            @80 '(7)' @90 '(8)' @100 '(9)' @110 '(10)' @120 '(11)'//
42.            @18 'SAN JOAQ' @28 'COSUMNES' @37 'MOKELUMNE' @50 'MISC'
43.            @58 'E. DELTA' @70 'SAC' @80 'YOLO' @88 'TOT DELT'
44.            @99 'DELTA' @109 'PRECIP' @118 'CHANNEL'/
45.            @8 'DAY' @19 'RIVER' @29 'RIVER' @39 'RIVER' @49 'FLOWS'
46.            @59 'INFLOW' @69 'RIVER' @79 'BYPASS' @89 'INFLOW'
47.            @97 'CONSUMP''N' @109 'RUNOFF' @118 'DEPLE''N'/
48.            @21 11*'—          '/
49.            @19 'MEASRD' @29 'MEASRD' @39 'MEASRD' @48 'MEAS SUM'
50.            @60 'CALC' @69 'MEASRD' @78 'MEAS SUM' @90 'CALC'
51.            @99 'ESTMTD' @108 'MEAS EST' @120 'CALC'/
52.            @7 120*'-'/;
53.     RETURN;
COMMAND?
```

```
 1.     *   SAS PROGRAM TO GENERATE;
 2.     *   DAYFLOW DATA SUMMARY REPORT - PART 2;
 3.     *   USING SAS DAYFLOW DATA SET;
 4.
 5.     DATA ONE;SET WATER.DAYFLOW;
 6.     PROC SORT;BY YEAR MONTH DAY;
 7.
 8.     DATA TWO;SET WATER.SUMFLOW;
 9.     PROC SORT;BY YEAR MONTH;
10.
11.     DATA MERJ;MERGE TWO ONE;
12.     BY YEAR MONTH;
13.     IF WYEAR>8182;
14.     YEAR = YEAR + 1900;
15.     PROC SORT;BY YEAR MONTH DAY;
16.
17.     DATA _NULL_;SET MERJ;
18.     BY YEAR MONTH;
19.     FILE PRINT HEADER=H NOTITLES N=PS;
20.     PUT @9 DAY 2. @15 QTPP 10. @25 QDPP 10. @35 QCCC 10.
21.         @45 QMID 10. @55 QEXP 10. @65 QXGEO 10. @75 QWEST 10.
22.         @85 QOUT 10. @95 QDIVER 10. @105 QEFFECT 10. @115 QEFFDIV 10.;
23.     IF LAST.MONTH THEN DO;
24.     PUT / @5 'TOTAL CFS' @15 TTPP 10. @25 TDPP 10. @35 TCCC 10.
25.           @45 TMID 10. @55 TEXP 10. @65 TXGEO 10. @75 TWEST 10.
26.           @85 TOUT 10. @105 TEFFECT 10.;
27.     PUT / @5 'MONTHLY MEAN' @17 ATPP 8. @25 ADPP 10. @35 ACCC 10.
28.           @45 AMID 10. @55 AEXP 10. @65 AXGEO 10. @75 AWEST 10.
29.           @85 AOUT 10. @95 ADIVER 10. @105 AEFFECT 10. @115 AEFFDIV 10.;
30.     PUT #13 @62 AMONTH $3. @68 YEAR 4. _PAGE_;
31.     END;
32.     RETURN;
33.
34.     H: PUT #4 @37 'HYDROLOGIC DATA FOR THE SACRAMENTO-SAN JOAQUIN ESTUARY (CFS)'/
35.            @55 'DAYFLOW PROGRAM SUMMARY'//
36.            @39 'PROGRAM VERSION : JAN. 1985          RUN DATE : FEB. 1985'/
37.            @36 '* SEE DOCUMENTATION FOR PARAMETER DESCRIPTIONS AND REVISIONS *'//
38.            @47 'CALIFORNIA DEPARTMENT OF WATER RESOURCES'/
39.            @59 'CENTRAL DISTRICT'////
40.            @20 '(12)' @30 '(13)' @40 '(14)' @50 '(15)' @60 '(16)'
41.            @70 '(17)' @80 '(18)' @90 '(19)' @100 '(20)' @110 '(21)'
42.            @120 '(22)'//
43.            @20 'CVP' @30 'SWP' @40 'CCC' @50 'MISC' @58 'TOT DELT'
44.            @69 'X-CHNL' @79 'JERSEY' @89 'DELTA' @98 'PERCENT'
45.            @108 'EFFECTIV' @118 'EFFECTIV'/
46.            @8 'DAY' @19 'EXPORT' @29 'EXPORT' @39 'EXPORT' @48 'DIVER''N'
47.            @58 'EXPORTS' @68 'GEORG SL' @78 'PT FLOW' @88 'OUTFLOW'
48.            @98 'DIVERTED' @109 'INFLOW' @118 '% DIVRTD'/
49.            @21 11*'--          '/
50.            @19 'MEASRD' @29 'MEASRD' @39 'MEASRD' @49 'ESTMTD'
51.            @60 'CALC' @69 'ESTMTD' @80 'CALC' @90 'CALC'
52.            @100 'CALC' @110 'CALC' @120 'CALC'/
53.            @7 120*'-'/;
54.     RETURN;
COMMAND?
```