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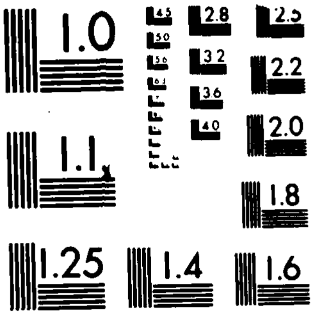

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

ESL-TR-83-63

A Real-Time Air Dispersion Modeling System

D.E. BLEEKER, G. GARRABRANT and G.G. WORLEY

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APRIL 1984

FINAL REPORT
JULY 1982 - DECEMBER 1983

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report documents a microcomputer-based system for the real-time computation of toxic corridors associated with chemical releases. The program assists the user with interactive input of critical meteorological parameters and accesses user-specified data bases of information regarding toxic chemical attributes. Graphic displays show the analyst the resulting toxic corridor superimposed upon site-specific base maps. The program is documented for the user through help files. An archive mode provides a chronological history of all events, including the time and date of each calculation. The program is modular in

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From other side

design, allowing for modifications and upgrades in the future.

PREFACE

This report was prepared by Sierra Geophysics, Inc., Redmond, Washington, under Contract F08635-82-C-0374, for the Air Force Engineering and Services Center, Environics Division (AFESC/RDV), Tyndall Air Force Base, Florida. Major Gary Worley was the AFESC Project Director; the Project Leader at Sierra Geophysics was Daniel Bleeker, assisted by Gary Garrabrant.

The primary objective of the work carried out on this project between July 1982 and December 1983 was to place on an Air Force microcomputer the procedures that were heretofore performed manually to predict the hazard corridor associated with a toxic propellant release. Computer hardware specifications were established which allow for expanded dispersion modeling techniques, and follow-on efforts are underway to upgrade the software contained in appendices to this report.

The use of certain computer equipment in this project does not constitute an endorsement of these products by the Air Force, and the views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representinq official policy, either expressed or implied, of the Air Force or the United States Government.

This report has been reviewed by the Public Affairs Office (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nationals.

This technical report has been reviewed and is approved for publication.

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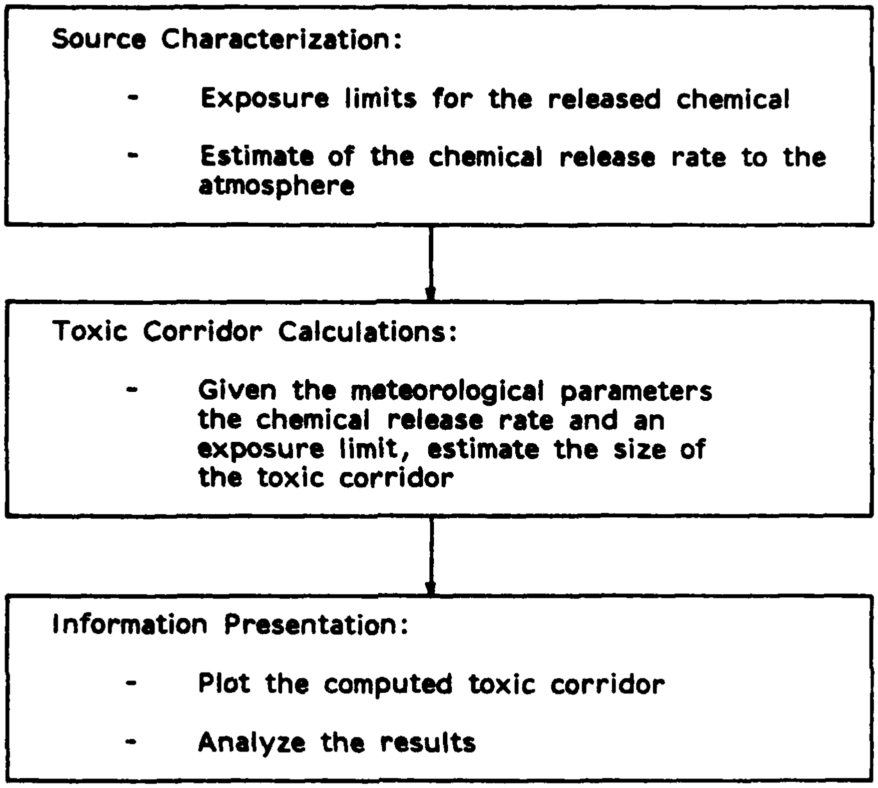
SECTION I

INTRODUCTION

When a toxic chemical is vented to the atmosphere, an estimate of the extent of the affected area, or "toxic corridor" must be made. The size of the toxic corridor depends upon the release rate of the toxic chemical, the concentration exposure limits for the chemical and the dispersive properties of the atmosphere at the time of release. Four methods of producing toxic corridor estimates, ranging from table look-up to programmable calculator techniques, have been described in previous work (Reference 1). This report describes a fifth approach: the use of a microcomputer system which encompasses crucial support functions, in addition to toxic corridor computations, and thereby expedites overall emergency response.

The primary goal of the computerized Real-Time Modeling System (RTMS) is to separate the tasks suitable for execution on a computer system from those which must be performed by an emergency response specialist. Figure 1 presents the basic tasks involved in toxic corridor calculations. The RTMS consolidates the data manipulation, toxic corridor computations, and plotting functions, allowing more time for subjective analysis of the results of the toxic corridor calculations.

The RTMS consolidates information pertinent to a toxic chemical release, as shown by Figure 2. Critical meteorological parameters and information about the toxic chemical are simultaneously displayed, aiding user analysis. The flexible nature of the RTMS allows inclusion of additional information in the graphic display to meet special requirements.



Source Characterization:

- Exposure limits for the released chemical
- Estimate of the chemical release rate to the atmosphere

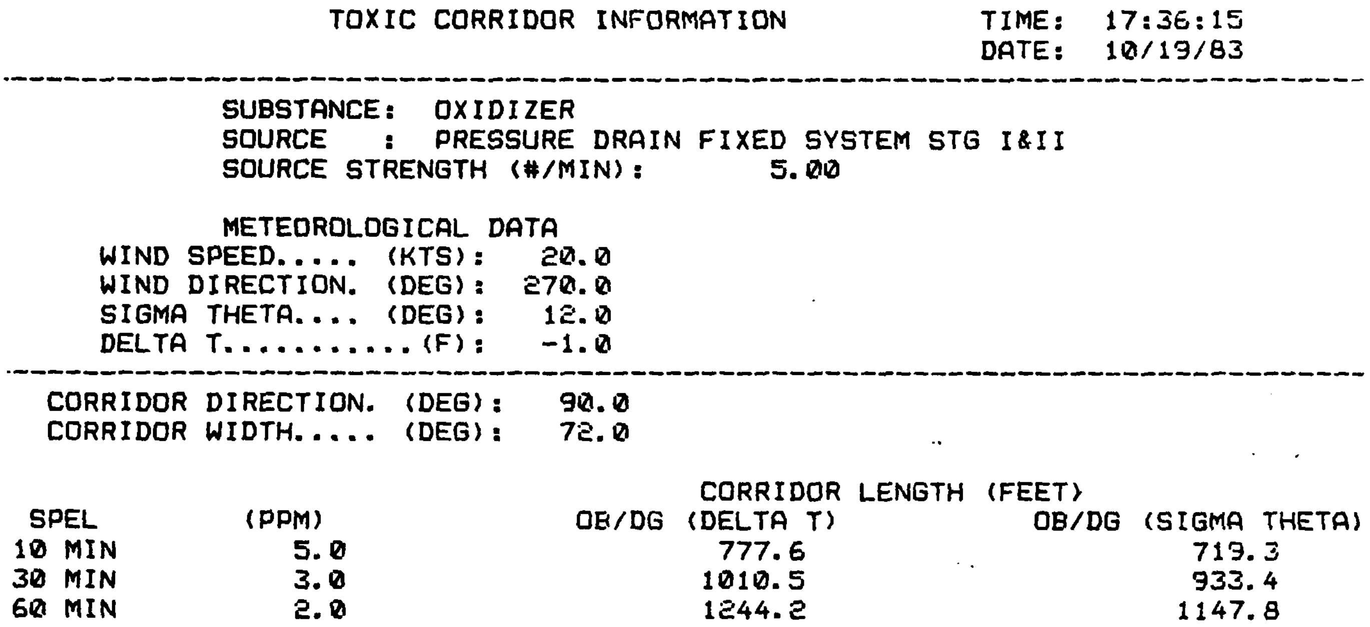
Toxic Corridor Calculations:

- Given the meteorological parameters the chemical release rate and an exposure limit, estimate the size of the toxic corridor

Information Presentation:

- Plot the computed toxic corridor
- Analyze the results

Figure 1. Toxic Corridor Development



```
                    TOXIC CORRIDOR INFORMATION          TIME:  17:36:15
                                                        DATE:  10/19/83
------------------------------------------------------------------------
              SUBSTANCE:  OXIDIZER
              SOURCE   :  PRESSURE DRAIN FIXED SYSTEM STG I&II
              SOURCE STRENGTH (#/MIN):        5.00

              METEOROLOGICAL DATA
        WIND SPEED..... (KTS):   20.0
        WIND DIRECTION. (DEG):  270.0
        SIGMA THETA.... (DEG):   12.0
        DELTA T...........(F):   -1.0
------------------------------------------------------------------------
    CORRIDOR DIRECTION. (DEG):   90.0
    CORRIDOR WIDTH..... (DEG):   72.0

                                         CORRIDOR LENGTH (FEET)
  SPEL         (PPM)               OB/DG (DELTA T)          OB/DG (SIGMA THETA)
 10 MIN          5.0                     777.6                       719.3
 30 MIN          3.0                    1010.5                       933.4
 60 MIN          2.0                    1244.2                      1147.8
```

Figure 2. Toxic Corridor Information Display

SECTION II

DESCRIPTION OF THE RTMS

The following sections describe the function of each major module of the RTMS. Figure 3 represents a block diagram showing the interrelationship of each module.

A. COMMAND AND CONTROL MODULE (CCM)

The CCM is the primary user interface with the RTMS. Each of the six functional areas shown in Figure 3 is accessed via a menu presented by the CCM.

B. EVENT ARCHIVE MODE

When the Event Archive Mode is selected, the results of all subsequent toxic corridor calculations are stored on the system in an archive file. The Event Archive mode provides a chronological history of all events, including the time and date of each calculation.

C. RECALL EVENT ARCHIVE

The Recall Event Archive utility provides the user with a list of stored event archive data. Users may select any of the stored event data for display and/or printing.

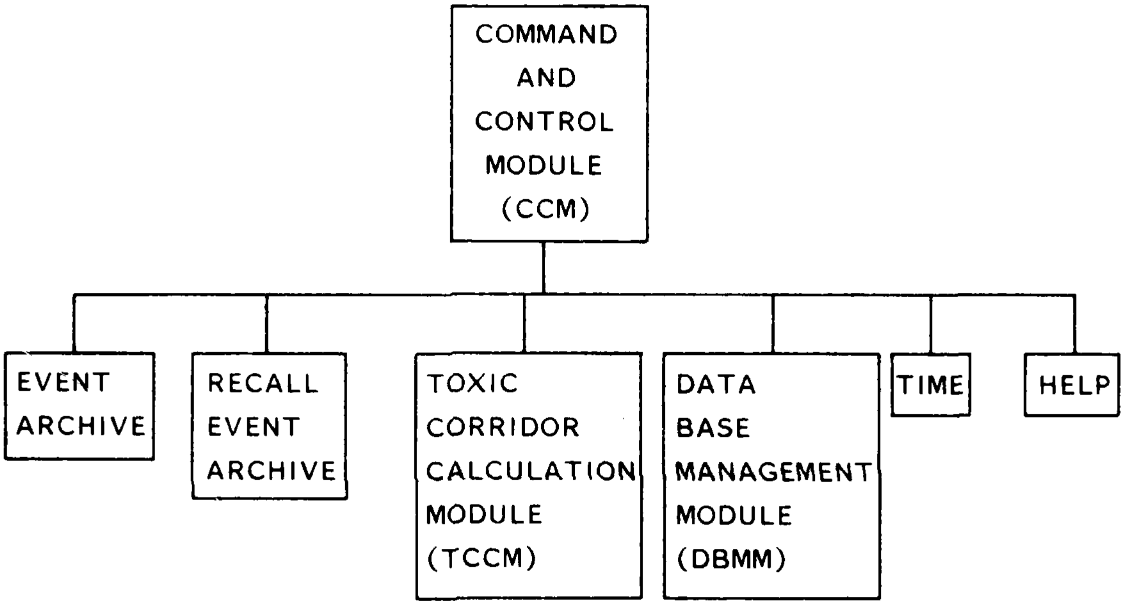

COMMAND AND CONTROL MODULE (CCM)
EVENT ARCHIVE
RECALL EVENT ARCHIVE
TOXIC CORRIDOR CALCULATION MODULE (TCCM)
DATA BASE MANAGEMENT MODULE (DBMM)
TIME
HELP

Figure 3. Functional Structure of the RTMS

D. TOXIC CORRIDOR CALCULATION MODULE (TCCM)

Toxic corridor lengths are calculated,based on the Ocean Breeze/ Dry Gulch equation (Reference 1):

$$X = P \left[3.28 \left(\frac{29.75}{GMW} \right)^{0.513} \left(\frac{Cp}{Q} \right)^{-0.513} \left(\Delta T + 10 \right)^{2.53} \right]$$

where X = downwind distance from the source in feet. As used here, this distance defines the toxic corridor length.

P = a probability factor based upon the probability that a specified concentration is not exceeded outside the corridor. Calculations in Kahler and others (Reference 1) assume a 90 percent probability with P equal to 1.63.

GMW = gram molecular weight of the toxic chemical.

Cp = peak concentration in parts per million by volume (PPM) along a plume centerline and at a height of approximately 5 feet above the ground at a given downwind travel distance, X, in feet. Toxic corridor lengths are calculated by using a specified exposure limit for Cp in the above equation.

Q = source strength in lb/min.

ΔT = the temperature in ^{o}F at 54 feet minus the temperature at 6 feet (NOTE: A negative ΔT means a decrease of temperature with height and a positive ΔT means an increase with height.)

Values for GMW, CP, and Q may be obtained from the RTMS data base or entered by the user. Three values are used for peak concentration, corresponding to the 10-, 30- and 60-minute exposures of a given toxic substance. A value for ΔT must be supplied by the user. Validity checks are performed on the data, then corridor lengths for appropriate concentration levels are calculated.

If the wind speed is greater than or equal to 3 knots, the corridor direction is determined from the wind direction entered by the user. The corridor width is set to 6 $\sigma\theta$ ($\sigma\theta$ is the standard deviation of the horizontal wind direction). The width is set to 360 degrees if the wind speed is less than 3 knots.

A simplified algorithm for computing source strengths due to toxic chemical spills (Reference 2) is available under the TCCM. If the spill option is selected, the user enters information concerning the size of the spill (square feet of area covered) and the temperature of the pool. A source strength is calculated and the TCCM computes corridor width and lengths. Figure 2 shows the typical output from the TCCM.

E. DATA BASE MANAGEMENT MODULE (DBMM)

Two distinct types of information are maintained by the DBMM: (1) Source-substance data and (2) Procedural information. Source-substance data include specific values for source and substance parameters necessary for toxic corridor calculations. A full description of the source-substance data base is available in Appendix A. The procedural data are of a documentary nature, providing the RTMS user access to background information while executing the RTMS. For example, the user may, while running the RTMS program, display detailed information concerning the Ocean Breeze/Dry Gulch equation.

The DBMM provides the user with the means of searching, modifying, adding to, and deleting from the source-substance and procedural data bases.

F. TIME

The "time" utility allows the user to display current time, as determined by the computer system which is host to the RTMS.

G. HELP

The entire RTMS program is self-documenting. The "help" utility presents the user with a description of each of the options presented in the selection menu.

SECTION III

IMPLEMENTATION OF THE RTMS

The RTMS, as described here, is implemented on a Cromemco 68000 computer system, operating under the CROMIX multiuser operating system. The basic components of the computer system are shown in Figure 4 and detailed specifications are listed in Table 1.

The RTMS is programmed entirely in FORTRAN 77 (as implemented under the CROMIX operating system). For details on the specifics of the FORTRAN 77, one should consult the Cromemco 68000 FORTRAN 77 manual. Complete program listings for the RTMS are available in Appendix B.

A. STRUCTURE OF THE RTMS PROGRAM

The RTMS is composed of two types of program modules: (1) high-level routines designed for performing the primary tasks of data base management, toxic corridor calculation, etc., and (2) low-level routines for menu display and command processing. The high-level routines are functionally grouped to perform the primary tasks described in Section II of this report. The low-level routines are used as required for display and command processing by any of the high-level routines.

The demarkation between high- and low-level routines greatly facilitates transporting the RTMS software between computer systems. The RTMS software may be fully implemented on a host computer system, given adequate random access memory and a FORTRAN 77 compiler, with relatively minor changes to the low-level routines.

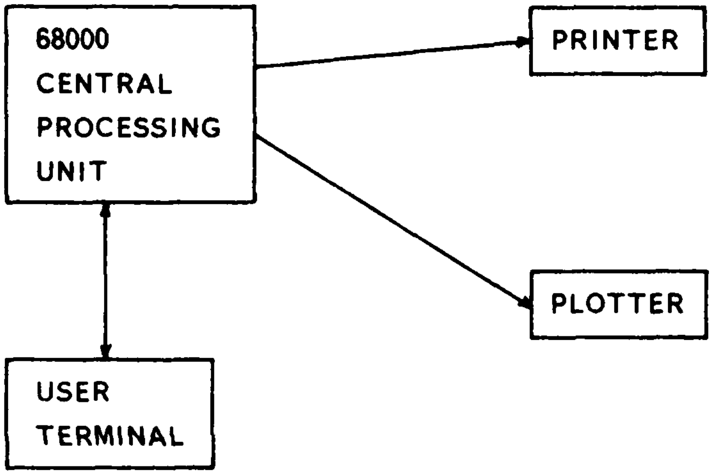


Figure 4. RTMS Computer System

TABLE 1

RTMS SYSTEM SPECIFICATIONS

1. Computer

- Cromemco 68000/Z80 Computer
- CROMIX Operating System
- 512 Kilobytes of Random Access Memory (RAM)
- 2 - 5.25-Inch Floppy Disk Drives
- 1 - 20-Million Byte Rigid Disk Drive
- FORTRAN 77 Software
- 3 - RS232 Serial I/O Ports
- 1 - Parallel Port (for the printer)

2. Printer

- 132-Column Dot Matrix Printer with a Parallel Interface

3. Plotter

- 8-Pen Plotter with a Serial Interface

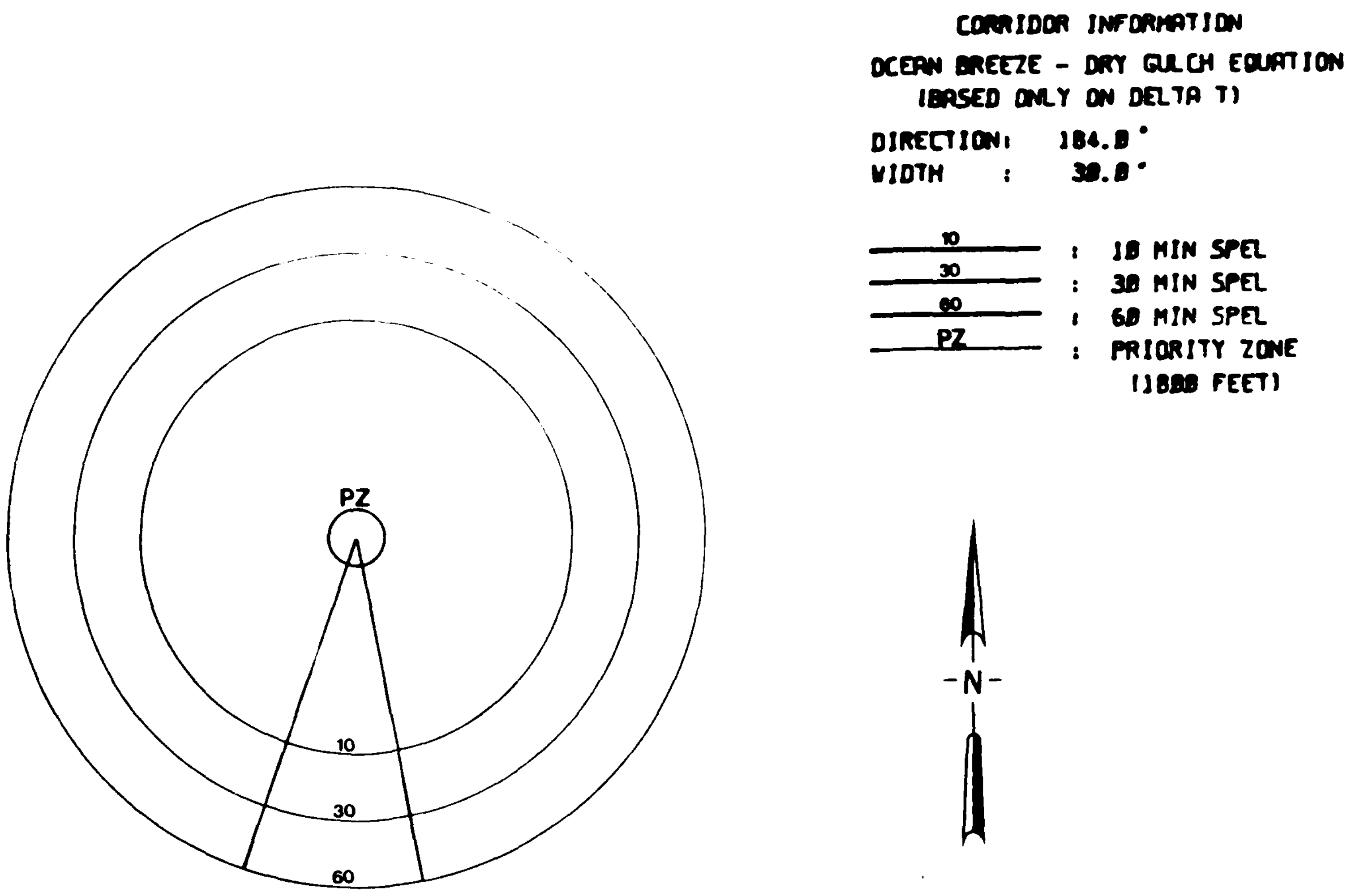
B. OPERATION OF THE RTMS

The RTMS program is self-documented, via "help" files. The "help" information is intended to aid the inexperienced person in effectively using the RTMS. Help is available to the user as a menu option and is therefore available during the operation of RTMS.

C. RTMS OUTPUT

Several types of output are available from the current version of RTMS. A tabular display (shown previously in Figure 2) contains a summary of the input data, output data and other pertinent information from the source-substance data base that was used in the calculation. This summary can be directed from the CRT to a printer, or it can be routed to a communications terminal.

A graphical display, as shown in Figure 5, is directed to the plotter. The hazard corridor can be plotted at a specified location on a digitized map from the data base, or the plot can serve as an overlay onto any base map of an appropriate scale.



CORRIDOR INFORMATION

OCEAN BREEZE - DRY GULCH EQUATION
(BASED ONLY ON DELTA T)

DIRECTION: 184.0°
WIDTH : 30.0°

10 : 10 MIN SPEL
30 : 30 MIN SPEL
60 : 60 MIN SPEL
PZ : PRIORITY ZONE
(1000 FEET)

Figure 5. Graphical Output Display (original in color).

SECTION IV

CONCLUSIONS

The RTMS fulfills its primary requirement of streamlining the toxic corridor calculations requirement by consolidating the data required to perform the corridor computations. Additional benefits derive from the archive mode of the RTMS, which provides automatic record keeping of all corridor determinations, and from the maintenance of source-substance and procedural data bases. The RTMS is fully menu-driven and provides on-line "help" information, facilitating system use by those unfamiliar with its operation.

A valuable enhancement to the existing RTMS will be the inclusion of interactive color graphics capabilities. The graphics capabilities will allow users to interact with the RTMS via displayed maps and pictorial representations of the data bases.

The RTMS, as developed, is oriented towards supporting TITAN II operations, but provides the framework for a much broader application. The data base capability is being extended to support a complete inventory of toxic substances for an arbitrary location, and the toxic corridor calculation module is being enhanced with a more advanced air dispersion model. Additional capabilities could be added, ultimately resulting in a fully integrated emergency response and toxic substance record-keeping system.

SECTION V

REFERENCES

1. Kahler, J..P., R.G. Curry, and R.A. Kandler, Calculating Toxic Corridors, Headquarters Air Weather Service (MAC), Scott AFB, IL, AWSTR-80-003, 1980.

2. Clewell, H.J., A Simple Formula for Estimating Source Strengths from Spills of Toxic Liquids, ESL TR 83-03, Engineering and Services Laboratory, Air Force Engineering and Services Center, Tyndall AFB, Florida, 1983.

3. Haugen, D.A., and J.H. Taylor (Editors), The Ocean Breeze and Dry Gulch Diffusion Programs - Volume II, AFCRL - 63 - 791 (2), December 1963.

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APPENDIX A

A. PROCEDURE DATA BASE

The procedure data base consists of an unformatted direct access file with a logical record length of 48 bytes. This file is called the procedure header file (PH file). The first record in this file contains a 4-byte integer which indicates how many records are in the file. The remainder of the records take the form shown in Figure A1.

The 40-character procedure name or description field is used as a key to identify each procedure. The actual name of the disk file in which the text for a procedure is contained is in the last eight characters of the record. These file names take the form PROCXXX where XXX ranges between 000 and 099.

The PROCXXX files are sequential formatted files whose logical record length is 80 bytes. These files contain the actual text about any procedure which is on file.

B. SUBSTANCE-SOURCE DATA BASE

The Substance-Source Data base is made up of four direct access unformatted files. The four file types are: Substance, Source, Pointer and Data. The relationship between the DBMM and the Substance-Source Data base is shown by Figure A2.

PROCEDURE FILE RECORD

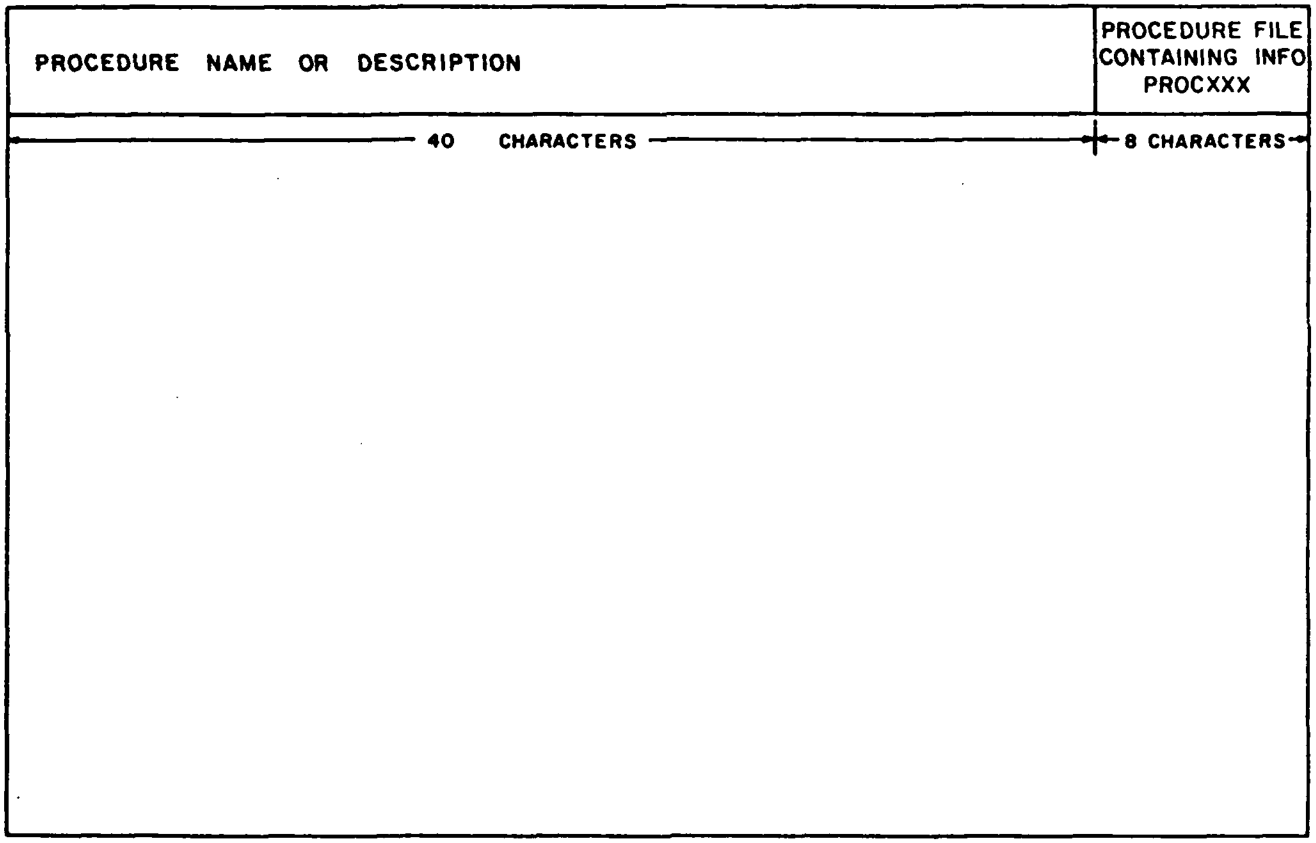
PROCEDURE NAME OR DESCRIPTION
PROCEDURE FILE CONTAINING INFO PROCXXX
40 CHARACTERS
8 CHARACTERS

Figure A1. Procedure Data Base File Structure.

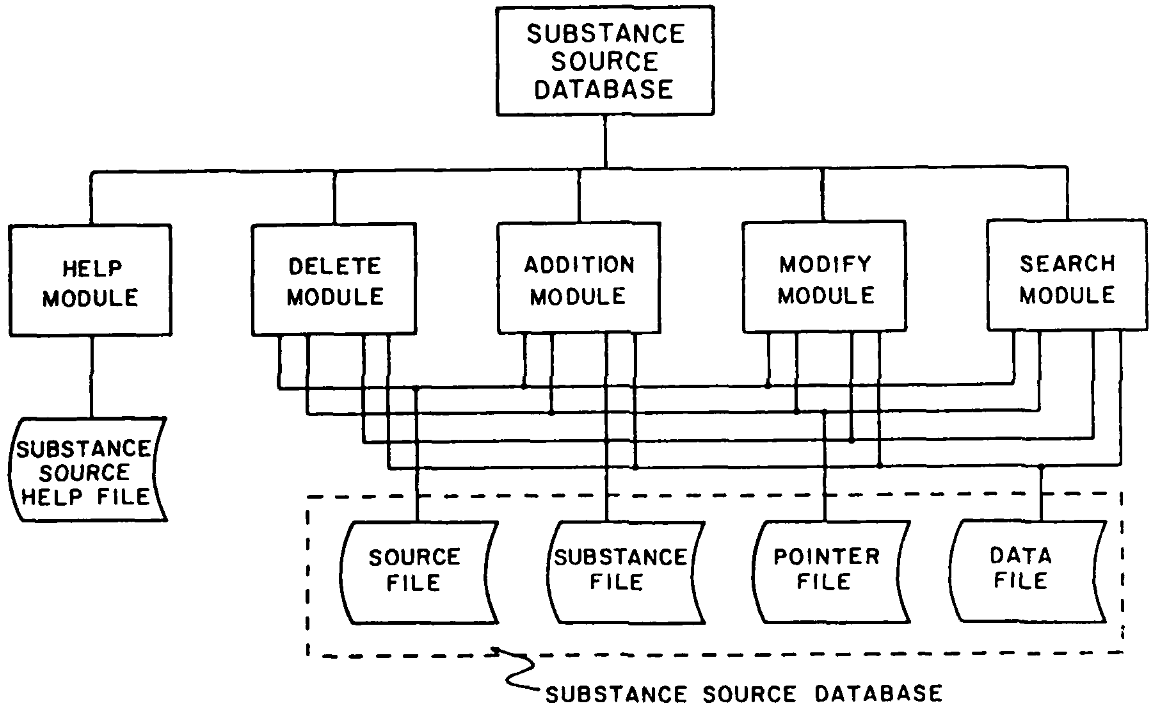

Figure A2. DBMM and the Substance-Source Data Base

The record length for the Source File is 40 bytes. The first record is a header record and contains a counter that indicates how many records are in the file. The counter is a 4-byte integer. The rest of the records take the form shown in Figure A3. The source name is stored in the file as indicated in Figure A3.

The Substance File has a logical record length of 120 bytes. The first 40 bytes are used to store the substance name. Since many of the quantities of interest are substance-related, they are stored in the substance record. The Substance File also has a header record which holds a 4-byte integer counter to indicate the number of records in the file, including the header record. The last 40 bytes of the record hold ten 4-byte real numbers. They are the gram molecular weight (GMW), the 10-, 30- and 60-minute public emergency limits, the Z factor and five extra locations for future expansion. All of these data are part of the substance records as shown in Figure A3. The middle 40 bytes contain ten 4-byte integers. The first 9 are pointers into the source file and the 10th pointer points into the substance file. Each substance record is allowed to point to 9 sources. The first 9 pointers are record numbers into the source file. These pointers indicate which sources the substance is linked to. Since a substance may be linked to more than nine sources, there may be more than one substance (of a particular kind) record in the substance file. The 10th pointer points to the next record in the substance file for the same substance (or the pointer has a zero value). This allows the substances to be forward-linked in the substance file.

The Pointer File is easy to explain, but a little harder to understand. The Pointer File record length is 40 bytes. It does not contain a header record. However, for uniformity with the other files the first record must be skipped. The rest of the records have the form shown on Figure A3. Each record consists of ten 4-byte integers. The last integer is extra, only the first 9 are used. The pointers point into the data file. The ith record and jth pointer in that record correspond to the ith substance and jth source pointer in the substance

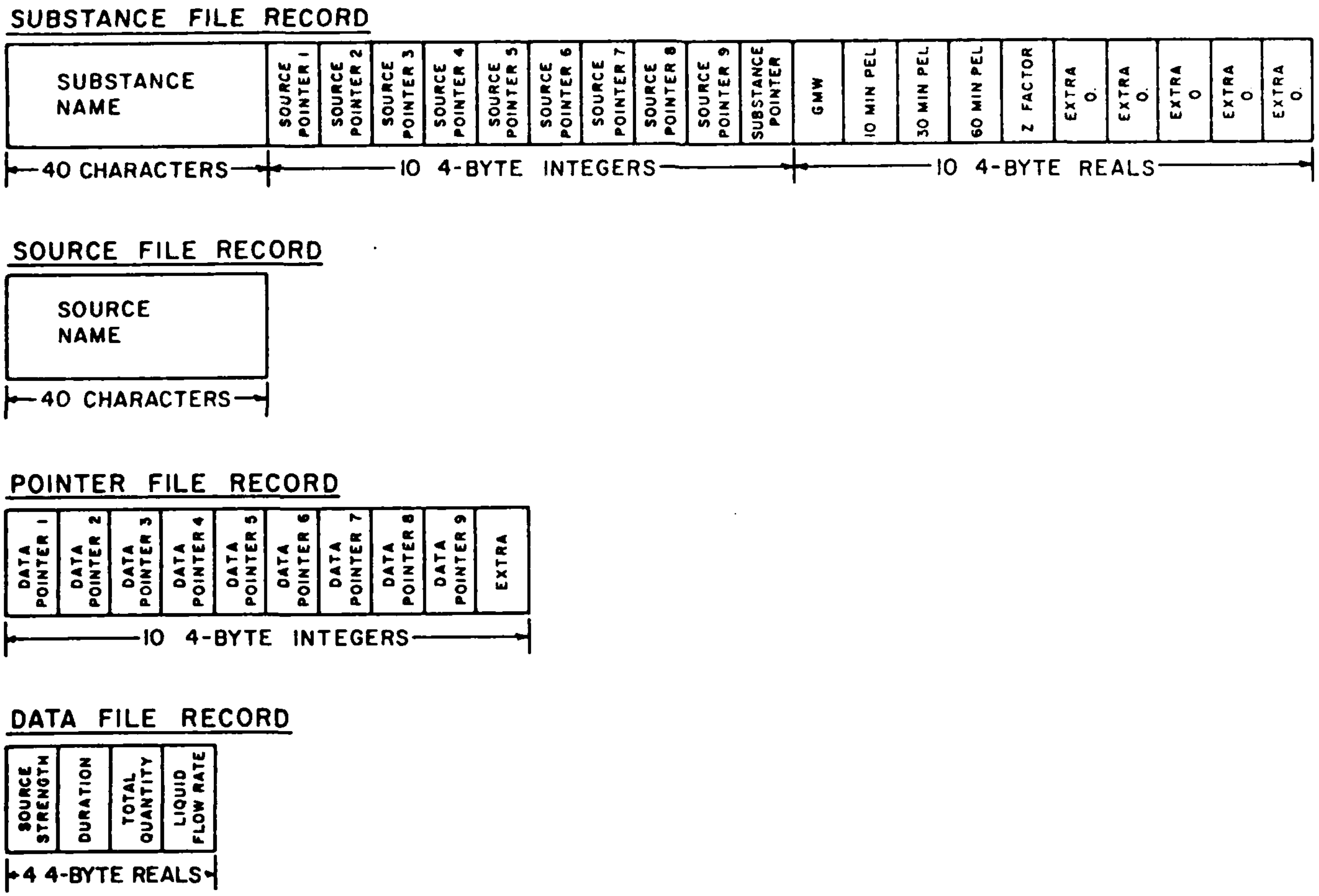

Figure A3. Substance-Source Data Base Structures.

record of interest. The pointer in the pointer record points to the record number in the data file that contains the source strength, duration, total quantity and liquid flow rate for a particular substance-source pair.

The Data File logical record length is 16 bytes. As before, the data file contains a header record. The header record contains a 4-byte integer counter which indicates the number of records in the file. The data stored in each record are source strength, duration, total quantity and liquid flow rate for a particular substance-source. The word locations are shown in Figure A3.

APPENDIX B

PROGRAM LISTINGS

```
User - system    Date - 10/19/83    Time - 16:00:34    Filename - ccm.for

SYSTEM
10/19/83
16:00:34
CCM.FOR
```

```
$BIGCODE
      PROGRAM CCM

C*******************************************************************
C  THIS IS THE MAIN DRIVING PROGRAM FOR TOXIC CORRIDOR
C  CALCULATIONS.  THIS PROGRAM PRODUCES A MENU TO SELECT
C  WHICH OF THE MODULES, TCCM, DBCM, ... IS TO BE EXECUTED.
C  !!!  WARNING  !!! DO NOT USE UNIT 15 IN SYSPARM FILE, IT IS RESERVED
C                    FOR THE PRINTER
C
C         VARIABLES USED
C       ITR     -  INTERACTIVE TERMINAL READ UNIT
C       AUNIT   -  UNIT FOR ARCHIVE FILES
C       AUNIT1  -  UNIT FOR RECALLED ARCHIVE FILES
C       HFILE   -  SYSTEM HELP FILE NAME
C       HUNIT   -  UNIT FOR SYSTEM HELP FILE
C       SFILE1  -  SUBSTANCE FILE NAME      (SUBSTANCE-SOURCE DATA BASE)
C       SFILE2  -  SOURCE    "    "                          "
C       SFILE3  -  POINTER   "    "                          "
C       SFILE4  -  SOURCE DATA FILE NAME                     "
C       SUNIT1  -  UNIT FOR SFILE1
C       SUNIT2  -   "    "  SFILE2
C       SUNIT3  -   "    "  SFILE3
C       SUNIT4  -   "    "  SFILE4
C       SHFILE  -  SUBSTANCE-SOURCE HELP FILE NAME
C       PFILE1  -  PROCEDURE HEADER FILE NAME (PROCEDURE DATA BASE)
C       PUNIT1  -  UNIT FOR PFILE1
C       PHFILE  -  PROCEDURE HELP FILE NAME
C       SMFILE  -  MENU FILE NAME
C       SMUNIT  -  UNIT FOR SMFILE
C       BFILE   -  CROMIX DIRECTORY WHERE ARCHIVE FILES ARE STORED
C       BUNIT   -  UNIT FOR OPENING CROMIX FILE DIRECTORY LIST.  USED
C                  TO ESTABLISH A LIST OF AVAILABLE EVENT ARCHIVE FILES
C       MFILE   -  MAP DATA BASE HEADER FILE NAME
C       MUNIT   -  UNIT FOR MFILE
C*********************************************************************
C

      CHARACTER*40 BFILE
      CHARACTER*1  CMD(1)
      CHARACTER*15 STAMP
      CHARACTER*7  AFILE,CFILE,SFILE1,SFILE2,SFILE3,SFILE4,MFILE,
     *             HFILE,SHFILE,PFILE1,PHFILE,SMFILE

      INTEGER      ITR,AUNIT,AUNIT1,HUNIT,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *             CUNIT,PUNIT1,PUNIT2,SMUNIT,RC(2,3),BUNIT,MUNIT

      LOGICAL      AFLAG,MREAD

      COMMON/MENUS/MREAD

C     CHECK FOR THE SYSTEM FILE SYSPARM.  IF IT DOESN'T EXIST THEN
C     EXIT THE PROGRAM.
      INQUIRE (FILE='SYSPARM',EXIST=AFLAG)
      IF (.NOT. AFLAG) THEN
         CALL CLEAR(7,0)
         CALL MENUDR('SYSTEM FILE NOT FOUND',12,30,2,0,1,1)
         CALL MENUDR(' ',24,1,2,0,1,1)
         STOP
                       ENDIF
```

```
C           USER INPUT VALID, CALL ROUTINE TO DISPLAY THE FILE
            CALL PROREV(ITR,TEMP,AUNIT)

C           GO BACK AND DISPLAY THE MAIN MENU
            GOTO 100

                          ENDIF
C     INCREMENT THE COUNTER WHICH TELLS HOW MANY ARCHIVE FILES HAVE BEEN FOUND
      CNT=CNT+1
      GOTO 20

C     END OF FILE REACHED IN ARFILE
21    IF ((FLAG1).AND.(.NOT. FLAG2)) THEN
                                     CLOSE (BUNIT)
                                     GOTO 15
                                     ENDIF
      IF ((FLAG1).AND.(FLAG2))
     *   CALL MESS(17,RC(20,1),RC(20,2),RC(20,3),7)

C     THERE WERE NOT 19 FILES TO DISPLAY, ONLY CNT-1 TO DISPLAY
      CALL MENUWR(RC,20,2,CNT-1,OUT,0,2,ST)

C     INPUT THE USER OPTION
35    INP(1)=' '
      CALL MENURD(RC,20,1,1,INP,ITR)

C     USER SELECTED TO RETURN, SO CLOSE THE LISTING FILE
      IF (INP(1) .EQ. 'X  ') THEN
                             CLOSE (BUNIT)
                             RETURN
                             ENDIF

C     USER CHOOSE TO CONTINUE
      IF (INP(1) .EQ. 'C  ') THEN
         CLOSE (BUNIT)
         FLAG1=.TRUE.
         CALL MENUSV(SMFILE,115,RC,20,SMUNIT)
         GOTO 15
                             ENDIF

C     USER SELECTED A NUMBER, MAYBE.  CHECK TO SEE IF VALID INPUT AND TRY
C     TO OPEN THE ARCHIVE FILE
      READ(INP,'(BN,I3)',ERR=35) JJ

C     FORM THE ARCHIVE FILE NAME INCLUDING THE DIRECTORY PREFIX
      AFILE=EFILE(JJ)
      FNAME(1)(1:47)=BFILE
      FNAME(1)(41:47)=AFILE
      TEMP=FNAME(1)
      CALL PACK(TEMP,J)
      INQUIRE (FILE=TEMP,EXIST=FLAG3)
      IF (.NOT. FLAG3) GOTO 35

C     VALID USER INPUT, DISPLAY THE ARCHIVE FILE
      CALL PROREV(ITR,TEMP,AUNIT)
      CLOSE (BUNIT)

C     GO BACK AND DISPLAY THE MAIN MENU
      GOTO 100
      END
      SUBROUTINE PROREV(ITR,AFILE,AUNIT)
C****************************************************************************
C       PROREV DISPLAYS THE LIST OF AVAILABLE ARCHIVE FILES ON THE SCREEN
C       22 LINES AT A TIME
C
C       VARIABLES ITR,AFILE AND AUNIT ARE DESCRIBED IN SUBROUTINE REVENT
C
C       INTERNAL FLAGS:
C               FLAG1    -  TRUE :  THE SCREEN SHOULD BE CLEARED
C                           FALSE:  THE SCREEN SHOULD NOT BE CLEARED
C               FLAG2    -  TRUE :  END OF FILE REACHED
C                        -  FALSE:  NO END OF FILE REACHED
C****************************************************************************

      CHARACTER*80  DLINE
      CHARACTER*47  AFILE
      CHARACTER*1   INP(1),FMFEED

      INTEGER       AUNIT,RC(1,3)

      LOGICAL       FLAG1,FLAG2

      RC(1,1)=23
      RC(1,2)=34
      RC(1,3)=1

C     CLEAR THE SCREEN AND OPEN THE ARCHIVE FILE TO BE DISPLAYED
      CALL CLEAR(7,0)
      OPEN (AUNIT,FILE=AFILE,STATUS='OLD')

C     STRIP OFF THE HEADER:ARCHIVE FILE ARCHXX   HH:MM:SS   MM/DD/YY
      READ(AUNIT,'(A80)') DLINE

      FLAG2=.FALSE.
30    FLAG1=.TRUE.
      DO 10 I=1,22,1
         READ(AUNIT,'(A80)',END=14) DLINE
         IF (FLAG1) THEN
                   FLAG1=.FALSE.
                   CALL CLEAR(7,0)
                   ENDIF
         CALL MENUDR(DLINE,I,1,2,0,1,1)
10    CONTINUE
      GOTO 15
14    FLAG2=.TRUE.

C     IF END OF FILE REACHED DISPLAY MESSAGE TO THAT AFFECT
15    IF (FLAG2) CALL MENUDR('END OF FILE REACHED',23,62,7,0,1,1)
      CALL MENUDR('SELECT OPTION (X OR C OR P)  ==>',23,1,2,0,1,1)

C     INPUT THE USER SELECTED OPTION
20    INP(1)=' '
      CALL MENURD(RC,1,1,1,INP,ITR)

C     USER SELECTED THE RETURN OPTION, SO CLOSE FILE AND RETURN
      IF (INP(1) .EQ. 'X') THEN
                         CLOSE (AUNIT)
```

```
                           RETURN
                           ENDIF

C     USER SELECTED THE PRINT OPTION, SO PRINT THE FILE
      IF (INP(1) .EQ. 'P') THEN
                           CLOSE(AUNIT)
                           OPEN(AUNIT,FILE=AFILE,STATUS='OLD')

C                          SET THE PRINTER UP WITH FORM FEED
                           IFORM= 12
                           FMFEED= CHAR(IFORM)
                           OPEN(15,FILE='/DEV/PRT')

C                          STRIP OFF THE HEADER RECORD
                           READ(AUNIT,'(A80)',END=220) DLINE
200                     CONTINUE

C                          SEND FORM FEED
                           WRITE(15,'(A1)') FMFEED
                           DO 210 I=1,22
                              READ(AUNIT,'(A80)',END=220) DLINE
                              WRITE(15,'(A80)') DLINE
210                        CONTINUE

                        GO TO 200

C                          SEND FORM FEED TO CLEAR PAGE, CLOSE UNITS
220                        WRITE(15,'(A1)') FMFEED
                           CLOSE(AUNIT)
                           CLOSE(15)
                           RETURN
                           ENDIF

C     USER SELECTED TO CONTINUE VIEWING ARCHIVE FILE
      IF (INP(1) .EQ. 'C') THEN
                           IF (FLAG2) THEN
                              CLOSE (AUNIT)
                              OPEN (AUNIT,FILE=AFILE,STATUS='OLD')
                              READ(AUNIT,'(A80)') DLINE
                              FLAG2=.FALSE.
                                      ENDIF
                           GOTO 30
                           ENDIF
      GOTO 20
      END
      INTEGER FUNCTION BNDX(STR,N)

C******************************************************************************
C       THIS FUNCTION SCANS A CHARACTER STRING FROM POSITION N TO 1 AND RETURNS
C       THE FIRST NON-BLANK POSITION ENCOUNTERED, IF NO BLANKS ARE FOUND A 1 IS
C       RETURNED.
C       VARIABLES PASSED:
C
C       STR     -  CHARACTER STRING TO BE SEARCHED
C       N       -  POSITION OF THE STRING TO SEARCH BACKWARD FROM
C
C       VARIABLES RETURNED:
C
C       BNDX    -  FIRST NON-BLANK POSITION ENCOUNTERED IN THE BACKWARD SEARCH
C******************************************************************************
```

```
      RETURN
      END
      CHARACTER*7 FUNCTION EFILE(I)

C******************************************************************************
C      THIS FUNCTION FORMS THE FILE NAME ARCHX, WHERE X IS DETERMINED BY THE
C      VALUE OF I PASSED TO THE FUNCTION.
C      VARIABLES PASSED:
C
C      I  -  VALUE TO BE CONCATENATED ON ARCH
C
C      VARIABLES RETURNED:
C
C      EFILE  -  CHARACTER NAME ARCHX, X PASSED THROUGH THE WINDOW
C******************************************************************************

      CHARACTER*2  TEMP

      INTEGER      I

C     BUILD THE FILE NAME ARCHX, X=0,1,2,...,99
      EFILE(1:7)='ARCH   '
      WRITE(TEMP(1:2),'(I2)') I
      IF (TEMP(1:1) .EQ. ' ') THEN
                              EFILE(5:5)=TEMP(2:2)
                              ELSE
                              EFILE(5:6)=TEMP(1:2)
                              ENDIF

      RETURN
      END
      SUBROUTINE PACK(STR,J)

C******************************************************************************
C       THIS SUBROUTINE REMOVES THE BLANKS FROM WITHIN A CHARACTER STRING
C       AND PADS THE STRING WITH BLANKS
C
C       VARIABLES PASSED
C         STR   -  CHARACTER STRING TO BE PACKED
C
C       VARIABLES RETURNED
C         J     -  THE NUMBER OF NON-BLANK CHARACTERS IN THE RETURNED STRING
C******************************************************************************

      CHARACTER*(*)  STR

      INTEGER        I,J

      L=LEN(STR)
      J=0

C     REMOVE THE BLANKS FROM THE CHARACTER STRING
      DO 5 I=1,L,1
         IF (STR(I:I) .NE. ' ') THEN
                                J=J+1
                                STR(J:J)=STR(I:I)
                                ENDIF
5     CONTINUE

C     PAD THE REST OF THE STRING WITH BLANKS
```

```
      DO 10 I=J+1,L,1
         STR(I:I)=' '
10    CONTINUE

      RETURN
      END
      SUBROUTINE REVENT(ITR,AUNIT,SMUNIT,SMFILE,BUNIT,BFILE)

C***********************************************************************
C       REVENT RECALLS THE EVENT ARCHIVE FILES.  A LIST IS DISPLAYED ON THE
C       SCREEN ALLOWING THE USER TO SELECT THE DESIRED ARCHIVE FILE.  REVENT
C       ASSUMES THAT A DIRECTORY LISTING OF AVAILABLE ARCHIVE FILES HAS
C       BEEN CREATED BY THE HOST COMPUTER SYSTEM PRIOR TO RTMS EXECUTION.
C       THE DIRECTORY LISTING FILE MUST BE NAMED 'ARFILES' AND BE IN THE
C       DIRECTORY INDICATED BY ARGUMENT BFILE.
C
C       VARIABLES PASSED
C
C       ITR     -  INTERACTIVE TERMINAL READ UNIT
C       AUNIT   -  UNIT FOR RECALLED ARCHIVE FILE
C       SMFILE  -  MENU FILE NAME
C       SMUNIT  -  UNIT FOR SMFILE
C       BFILE   -  CROMIX DIRECTORY CONTAINING 'ARFILES'
C       BUNIT   -  UNIT FOR 'ARFILES'
C***********************************************************************

      CHARACTER*80  OUT(19),TLINE
      CHARACTER*47  FNAME(1),FNAME1(1),TEMP,TEMP1
      CHARACTER*40  BFILE
      CHARACTER*7   AFILE,EFILE,TFILE,SMFILE
      CHARACTER*3   INP(1)

      LOGICAL       FLAG1,FLAG2,FLAG3

      INTEGER       ITR,AUNIT,JJ,CNT,TUNIT,SMUNIT,RC(20,3),
     *              ST(3),BUNIT

      DATA ST/0,0,0/

C     FORM THE LISTING FILE NAME, PACK IT AND SEE IF IT EXISTS
      FNAME1(1)(1:47)=BFILE
      FNAME1(1)(41:47)='ARFILES'
      TEMP1=FNAME1(1)
      CALL PACK(TEMP1,J)
      INQUIRE (FILE=TEMP1,EXIST=FLAG1)
      IF (.NOT. FLAG1) RETURN

C     DISPLAY THE MAIN MENU
100   CALL MENUSV(SMFILE,115,RC,20,SMUNIT)

C     FLAG1 - INDICATES WHETHER THE SCREEN IS CLEAR
C     FLAG2 - INDICATES WHETHER ANY FILES EXIST
      FLAG1=.TRUE.
      FLAG2=.TRUE.

15    CNT=2
C     OPEN THE LISTING FILE
      OPEN (BUNIT,FILE=TEMP1,STATUS='OLD')

C     LOOK FOR ARCH FILES IN THE MASTER FILE
```

```
20    READ(BUNIT,'(A80)',END=21) TLINE
      IF (TLINE(18:21) .NE. 'arch') GOTO 20

C     FORM THE ARCHIVE FILE NAME INCLUDING THE DIRECTORY PREFIX
      AFILE=TLINE(18:23)
      FNAME(1)(1:47)=BFILE
      FNAME(1)(41:47)=AFILE
      TEMP=FNAME(1)
      CALL PACK(TEMP,J)
      FLAG2=.FALSE.
      FLAG1=.FALSE.

C     STORE OFF THE FILE NUMBER XX I.E. ARCHXX
      OUT(CNT)(1:80)=' '
      OUT(CNT)(1:3)=AFILE(5:6)

C     INPUT THE HEADER LINE OF THE ARCHIVE FILE
      OPEN (AUNIT,FILE=TEMP,STATUS='OLD')
      READ(AUNIT,'(A80)') TLINE
      CLOSE (AUNIT)

C     STORE OFF THE HEADER INFORMATION TO DISPLAY ALONG WITH THE FILE NO.
      OUT(CNT)(6:80)=TLINE

C     CAN ONLY SHOW 19 ARCHIVE FILE NAMES AT ONCE ON THE SCREEN
      IF (CNT .EQ. 19) THEN

C           OUTPUT THE 19 FILE NAMES
            CALL MENUWR(RC,20,2,19,OUT,0,2,ST)

C           INPUT THE USERS SELECTION
45          INP(1)=' '
            CALL MENURD(RC,20,1,1,INP,ITR)

C           USER SELECTED TO RETURN, SO CLOSE THE LISTING FILE
            IF (INP(1) .EQ. 'X  ') THEN
                                   CLOSE (BUNIT)
                                   RETURN
                                   ENDIF

C           USER SELECTED TO CONTINUE LOOKING AT THE LIST
            IF (INP(1) .EQ. 'C  ') THEN
               FLAG1=.TRUE.
               CALL MENUSV(SMFILE,115,RC,20,SMUNIT)
               CNT=2
               GOTO 20
                                   ENDIF

C           USER SELECTED A NUMBER MAYBE, CHECK TO BE SURE AND ALSO CHECK
C           THAT THE ARCHIVE FILE THE USER PICKED CAN BE OPENED
            READ(INP,'(BN,I3)',ERR=35) JJ

C           FORM THE FILE INCLUDING THE DIRECTORY
            AFILE=EFILE(JJ)
            FNAME(1)(1:47)=BFILE
            FNAME(1)(41:47)=AFILE
            TEMP=FNAME(1)
            CALL PACK(TEMP,J)
            INQUIRE (FILE=TEMP,EXIST=FLAG3)
            IF (.NOT. FLAG3) GOTO 45
      GOTO 1
      END
      SUBROUTINE EVENTA(AFLAG,AUNIT,AFILE,BFILE)
C****************************************************************************
C       THIS SUBROUTINE OPENS AN EVENT ARCHIVE FILE AND WRITES AN 80-BYTE
C       HEADER TO IDENTIFY THE FILE.
C
C       HEADER FORMAT:  ARCHIVE FILE: ARCHXX   HH:MM:SS   MM/DD/YY
C
C       VARIABLES PASSED
C
C       AUNIT   -  UNIT FOR OPEN ARCHIVE FILE
C       AFILE   -  ARCHIVE FILE NAME, E.G., ARCH0, ARCH1, ....ARCH99
C       BFILE   -  CROMIX DIRECTORY CONTAINING ARCHIVE FILES AND FILE LIST
C
C       VARAIBLES RETURNED
C
C       AFLAG   -  FALSE:  COULD NOT OPEN AFILE (99 FILES ARLREADY EXIST)
C                  TRUE :  FILE WAS OPEN SUCCESSFULLY
C***************************************************************************
C
      CHARACTER*80  ASTAMP(1)
      CHARACTER*40  BFILE
      CHARACTER*47  FNAME
      CHARACTER*15  STAMP
      CHARACTER*7   AFILE,EFILE

      LOGICAL       AFLAG,FLAG

      INTEGER       AUNIT

      ASTAMP(1)(1:13)= 'ARCHIVE FILE:'
      ASTAMP(1)(14:80)=' '

C     SEE IF AN ARCHIVE FILE CAN BE OPENED.  IF SO OPEN IT AS
C     ARCHX,  X=0,1,2,...,99
C     ADD A 54-CHARACTER HEADER IN THE FILE WHICH GIVES THE FILE NAME
C     AND TIME - DATE OF CREATION.
      DO 10 I=0,99,1
         AFILE=EFILE(I)
         FNAME(1:47)=BFILE
         FNAME(41:47)=AFILE
         CALL PACK(FNAME,J)
         INQUIRE (FILE=FNAME,EXIST=FLAG)
         IF (.NOT. FLAG) THEN
                         AFLAG=.TRUE.
                         OPEN (AUNIT,FILE=FNAME,STATUS='NEW')
                         ASTAMP(1)(14:20)=AFILE
                         CALL DATE(STAMP)
                         ASTAMP(1)(23:37)=STAMP
                         CALL TIME(STAMP)
                         ASTAMP(1)(40:54)=STAMP
                         WRITE(AUNIT,'(A80)') ASTAMP(1)
                         RETURN
                         ENDIF
10    CONTINUE

      AFLAG=.FALSE.
```

```
C     READ IN ALL THE SYSTEM PARAMETERS FROM SYSPARM THAT THE PROGRAM
C     WILL NEED TO EXECUTE.
      OPEN (60,FILE='SYSPARM',STATUS='OLD')
      READ(60,*) ITR,AUNIT,AUNIT1,HUNIT,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *           CUNIT,CFILE,SFILE1,SFILE2,SFILE3,SFILE4,HFILE,SHFILE,
     *           PUNIT1,PUNIT2,PFILE1,PHFILE,SMUNIT,SMFILE,BUNIT,BFILE,
     *           MUNIT,MFILE
      CLOSE (60)

C     SET UP DEFAULTS
      AFLAG=.FALSE.
      MREAD=.TRUE.

C     DISPLAY THE MAIN MENU
      CALL ONOFF(0)
1     CALL MENUSV(SMFILE,100,RC,2,SMUNIT)
2     CMD(1)=' '
      CALL MENURD(RC,2,1,1,CMD,ITR)

C     CHECK FOR A VALID INPUT
      IF (INDEX('123456X',CMD(1)) .EQ. 0) THEN
                                  CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),6)
                                  GOTO 2
                                             ENDIF
      IF (CMD(1) .EQ. '1') THEN
                         IF (AFLAG) THEN
                            CALL MESS(12,RC(2,1),RC(2,2),RC(2,3),6)
                                    ELSE
                            CALL EVENTA(AFLAG,AUNIT,AFILE,BFILE)
                            IF (AFLAG) THEN
                              CALL MESS(13,RC(2,1),RC(2,2),RC(2,3),6)
                                       ELSE
                              CALL MESS(14,RC(2,1),RC(2,2),RC(2,3),6)
                                       ENDIF
                                    ENDIF
                            GOTO 2
                            ENDIF
      IF (CMD(1) .EQ. '2') CALL REVENT(ITR,AUNIT1,SMUNIT,SMFILE,
     *                                  BUNIT,BFILE)
      IF (CMD(1) .EQ. '3') CALL TCCM(ITR,AUNIT,AFLAG,SUNIT1,SUNIT2,
     *                             SUNIT3,SUNIT4,CUNIT,CFILE,SFILE1,
     *                             SFILE2,SFILE3,SFILE4,SMUNIT,SMFILE,
     *                             MUNIT,MFILE)
      IF (CMD(1) .EQ. '4') CALL DBMM(ITR,CUNIT,SUNIT1,SUNIT2,SUNIT3,
     *                             SUNIT4,CFILE,SFILE1,SFILE2,SFILE3,
     *                             SFILE4,SHFILE,PUNIT1,PUNIT2,PFILE1,
     *                             PHFILE,SMUNIT,SMFILE)
      IF (CMD(1) .EQ. '5') THEN
                            CALL TIME(STAMP)
                            CALL MENUDR(STAMP,RC(2,1),RC(2,2),7,0,1,1)
                            GOTO 2
                            ENDIF
      IF (CMD(1) .EQ. '6') CALL HELP(ITR,HUNIT,HFILE,SMUNIT,SMFILE)
      IF (CMD(1) .EQ. 'X') THEN
                            IF (AFLAG) CLOSE (AUNIT)
                            CALL CLEAR(7,0)
                            CALL ONOFF(1)
                            STOP
                            ENDIF
      CHARACTER*(*)  STR

      INTEGER        N,I

C     SEARCH THE STRING BACKWARDS FOR A NON BLANK CHARACTER
      DO 5 I=N,2,-1
         IF (STR(I:I) .NE. ' ') GOTO 10
5     CONTINUE

C     RETURN THE NON BLANK POSITION
10    BNDX=I
      RETURN
      END
      SUBROUTINE HELP(ITR,HUNIT,HFILE,SMUNIT,SMFILE)

C*******************************************************************************
C       THIS SUBROUTINE DISPLAYS THE HELP FILE.  THE OPTION OF THE HELP FILE TO
C       BE DISPLAYED IS DETERMINED BY THE USER INPUT.  THE HELP FILES ARE SPLIT
C       UP BY SPECIAL DELIMITERS.  THEY ARE *##&&, WHERE # IDENTIFIES THE PART
C       OF THE FILE THE USER WANTS TO SEE AND && IS THE LENGTH OF THE TEXT THAT
C       PRETAINS TO THAT PORTION OF THE FILE.
C       VARIABLES PASSED:
C
C       ITR     -  INTERACTIVE TERMINAL READ UNIT
C       HUNIT   -  UNIT # TO OPEN THE HELP FILE (HFILE) ON
C       HFILE   -  SYSTEM LEVEL HELP FILE NAME
C       SMUNIT  -  UNIT # TO OPEN THE MENU FILE (SMFILE) ON
C       SMFILE  -  MENU FILE NAME
C*******************************************************************************

      CHARACTER*80  TLINE,LINE
      CHARACTER*7   HFILE,SMFILE
      CHARACTER*1   CMD(1)

      INTEGER       ITR,HUNIT,SMUNIT,RC(3,3)

      LOGICAL       FLAG

C     DISPLAY THE MAIN MENU, AND GET THE USER INPUT
1     CALL MENUSV(SMFILE,125,RC,3,SMUNIT)
2     CMD(1)=' '
      CALL MENURD(RC,3,1,1,CMD,ITR)

C     CHECK FOR A VALID INPUT
      IF (INDEX('12345X',CMD(1)) .EQ. 0) THEN
                         CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),6)
                         GOTO 2
                                        ENDIF
C     THE USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X') RETURN

C     CHECK TO SEE THAT THE HELP FILE PASSED EXITS, IF NOT DISPLAY AN ERROR
C     MESSAGE THAT HELP IS NOT AVAILABLE AND GO AND GET THE USERS INPUT
      INQUIRE (FILE=HFILE,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
                      CALL MESS(15,RC(2,1),RC(2,2),RC(2,3),6)
                      GOTO 2
                      ENDIF
```

```
User - system    Date - 10/19/83    Time - 16:01:02    Filename - map.for

SYSTEM
10/19/83
16:01:02
MAP.FOR
```

```
      PROGRAM MAPDIG

C  THIS PROGRAM ALLOWS THE USER TO EXTERNALLY DIGITIZE MAPS

      CHARACTER*1  CMD(1)
      CHARACTER*7  SMFILE,MHFILE,MFILE

      INTEGER      ITR,SMUNIT,RC(2,3),MUNIT,MUNIT1,MUNIT2,MUNIT3,
     *             ITD

C********************
      SMFILE='SYSMENU'
      MHFILE='MHELP  '
      MFILE='MAP.DB '
      MUNIT=43
      MUNIT1=40
      MUNIT2=41
      MUNIT3=42
      SMUNIT=44
      ITR=0
      ITD=0
      CALL ONOFF(0)
C********************

1     CALL MENUSV(SMFILE,130,RC,2,SMUNIT)
2     CMD(1)= ' '
      CALL MENURD(RC,2,1,1,CMD,ITR)

      IF (INDEX('13X',CMD(1)) .EQ. 0) THEN
                            CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),6)
                            GOTO 2
                                       ENDIF

      IF (CMD(1) .EQ. '1') CALL MHELP(ITR,MUNIT,MHFILE,SMUNIT,SMFILE)
      IF (CMD(1) .EQ. '3') CALL MADD(ITR,MUNIT1,MUNIT2,MUNIT3,MFILE,
     *                               SMUNIT,SMFILE,ITD)
      IF (CMD(1) .EQ. 'X') THEN
                           CALL CLEAR(7,0)
                           CALL ONOFF(1)
                           STOP
                           ENDIF

      GOTO 1
      END
      SUBROUTINE MHELP(ITR,MUNIT,MHFILE,SMUNIT,SMFILE)

      CHARACTER*80  TLINE,LINE
      CHARACTER*7   MHFILE,SMFILE
      CHARACTER*1   CMD(1)

      INTEGER       ITR,MUNIT,SMUNIT,RC(3,3)

      LOGICAL       FLAG

1     CALL MENUSV(SMFILE,135,RC,3,SMUNIT)
2     CMD(1)=' '
      CALL MENURD(RC,3,1,1,CMD,ITR)

C     CHECK FOR A VALID INPUT
      IF (INDEX('2X',CMD(1)) .EQ. 0) THEN
```

```
                          CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),7)
                          GOTO 2
                                      ENDIF

      IF (CMD(1) .EQ. 'X') RETURN
      INQUIRE (FILE=MHFILE,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
                       CALL MESS(15,RC(2,1),RC(2,2),RC(2,3),6)
                       GOTO 2
                       ENDIF

      CALL CLEAR(7,0)
      OPEN (MUNIT,FILE=MHFILE,STATUS='OLD')
      TLINE(1:80)='*X*'
      TLINE(2:2)=CMD(1)
5     READ(MUNIT,'(A80)') LINE
      IF (TLINE(1:3) .EQ. LINE(1:3)) THEN
                 READ(LINE(4:5),'(I2)') IG
                 J=0
                 DO 20 I=1,IG,1
                    READ(MUNIT,'(A80)') LINE
                    J=J+1
                    CALL MENUDR(LINE,J,1,2,0,1,1)
                    IF (MOD(I,22) .EQ. 0) THEN
                       IF (I .EQ. IG) THEN
                          CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),7)
                          READ(ITR,'(A1)') CMD(1)
                          CLOSE (MUNIT)
                          GOTO 1
                                      ELSE
                          CALL MESS(16,RC(3,1),RC(3,2),RC(3,3),7)
                          READ(ITR,'(A1)') CMD(1)
                          CALL CLEAR(7,0)
                          J=0
                                      ENDIF
                                          ENDIF
20                  CONTINUE
                    CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),7)
                    READ(ITR,'(A1)') CMD(1)
                    CLOSE (MUNIT)
                    GOTO 1
                               ENDIF

      GOTO 5
      END
      SUBROUTINE MADD(ITR,MUNIT1,MUNIT2,MUNIT3,MFILE,SMUNIT,SMFILE,ITD)

      CHARACTER*48  B48
      CHARACTER*40  FNAME(3),MNAME,MNAME1,MNAME2,MNAME3,MNAMEX,B40
      CHARACTER*7   SMFILE,MFILE
      CHARACTER*1   CMD(1),INP

      INTEGER       RC(5,3),SMUNIT,MUNIT1,MUNIT2,ITR,ST(3),HDR,MUNIT3,
     *              HDR1,HDR2,ITD

      LOGICAL       FLAG,FLAG1,FLAG2

      DATA ST/0,0,0/

      FNAME(1)(1:40)=' '
      FNAME(2)(1:40)=' '
      FNAME(3)(1:40)=' '
      INP=' '
      ITT=-1
5     CALL MENUSV(SMFILE,199,RC,5,SMUNIT)
      ST(3)=0
      CALL MENUWR(RC,5,1,3,FNAME,0,1,ST)

C     FLAG TO GO TO COMMAND LINE AFTER FIRST TIME
      IF (INP .EQ. '&') GOTO 10

      IST=1
15    CALL MENURD(RC,5,IST,3,FNAME,ITR)

10    CMD(1)=' '
      CALL MENURD(RC,5,4,4,CMD,ITT)
      IF (CMD(1) .EQ. ' ') THEN
                           ST(3)=1
                           CALL MENUWR(RC,5,4,4,CMD,0,1,ST)
                           CALL MESS(4,RC(5,1),RC(5,2),RC(5,3),1)
                           IST=1
                           GOTO 15
                           ENDIF
      IF (CMD(1) .EQ. 'X') RETURN
      IF (CMD(1) .NE. 'C') GOTO 10

C     CHECK THAT NONE OF THE FILE NAMES ARE BLANK
      DO 20 K=1,3,1
         IF (FNAME(K) .EQ. ' ') THEN
                                ST(3)=1
                                CMD(1)=' '
                                CALL MENUWR(RC,5,4,4,CMD,0,1,ST)
                                CALL MESS(1,RC(5,1),RC(5,2),RC(5,3),7)
                                IST=K
                                GOTO 15
                                ENDIF
20    CONTINUE

C     CHECK THAT THE SYMBOL FILE EXISTS
      MNAME3=FNAME(3)
      CALL PACK(MNAME3,J)
      INQUIRE (FILE=MNAME3,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
                      ST(3)=1
                      CMD(1)=' '
                      CALL MENUWR(RC,5,4,4,CMD,0,1,ST)
                      CALL MESS(18,RC(5,1),RC(5,2),RC(5,3),7)
                      IST=3
                      GOTO 15
                      ENDIF

C     SET UP THE MAP.DB DATA BASE IF NECESSARY
      INQUIRE (FILE=MFILE,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
         OPEN (MUNIT3,FILE=MFILE,STATUS='NEW',ACCESS='DIRECT',RECL=42,
     *         FORM='FORMATTED')
                      HDR=1
                      B40(1:40)=' '
                      WRITE(B40(1:4),'(I4)') HDR
                      WRITE(MUNIT3,'(A40)',REC=1) B40
                      WRITE(MUNIT3,'(A40)',REC=2) B40
                      CLOSE (MUNIT3)
                      ENDIF

C     SET UP THE BASE MAP DATA BASEIF NECESSARY
      FLAG1=.FALSE.
      MNAME1=FNAME(1)
      CALL PACK(MNAME1,J)
      INQUIRE (FILE=MNAME1,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
         OPEN (MUNIT1,FILE=MNAME1,STATUS='NEW',ACCESS='DIRECT',
     *         FORM='FORMATTED',RECL=50)
                      HDR=1
                      B48(1:48)=' '
                      WRITE(B48(1:4),'(I4)') HDR
                      WRITE(MUNIT1,'(A48)',REC=1) B48
                      WRITE(MUNIT1,'(A48)',REC=2) B48
                      CLOSE (MUNIT1)
                      FLAG1=.TRUE.
                      ENDIF

      MNAME2=MNAME1
      IF ((J+1) .GT. 38) THEN
                         MNAME2(38:40)='.MM'
                         ELSE
                         MNAME2(J+1:J+3)='.MM'
                         ENDIF
C     SET UP THE MAP DATA BASE  IF NECESSARY
      FLAG2=.FALSE.
      INQUIRE (FILE=MNAME2,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
         OPEN (MUNIT2,FILE=MNAME2,STATUS='NEW',ACCESS='DIRECT',RECL=42,
     *         FORM='FORMATTED')
                      HDR=1
                      B40(1:40)=' '
                      WRITE(B40(1:4),'(I4)') HDR
                      WRITE(MUNIT2,'(A40)',REC=1) B40
                      WRITE(MUNIT2,'(A40)',REC=2) B40
                      CLOSE (MUNIT2)
                      FLAG2=.TRUE.
                      ENDIF

C     ADD THE BASE MAP NAME TO MAP.DB
      OPEN (MUNIT3,FILE=MFILE,STATUS='OLD',ACCESS='DIRECT',
     *      FORM='FORMATTED',RECL=42)
      READ(MUNIT3,'(A40)',REC=1) B40
      READ(B40(1:4),'(I4)') HDR
      DO 25 K=2,HDR,1
         READ(MUNIT3,'(A40)',REC=K) MNAME
         CALL PACK(MNAME,J)
         IF (MNAME .EQ. MNAME1) GOTO 30
25    CONTINUE
      HDR=HDR+1
      WRITE(MUNIT3,'(A40)',REC=HDR) FNAME(1)
      III=HDR+1
      WRITE(MUNIT3,'(A40)',REC=III) FNAME(1)

C     OPEN THE BASE MAP DATA BASE  AND THE MAP DATA BASE
30       OPEN (MUNIT1,FILE=MNAME1,STATUS='OLD',ACCESS='DIRECT',
     *         FORM='FORMATTED',RECL=50)
```

```
         OPEN (MUNIT2,FILE=MNAME2,STATUS='OLD',ACCESS='DIRECT',
     *         FORM='FORMATTED',RECL=42)

      MNAMEX=FNAME(2)
      CALL PACK(MNAMEX,J)
C     CHECK THAT THE MAP FILE NOT ALREADY THERE
      READ(MUNIT1,'(A48)',REC=1) B48
      READ(B48(1:4),'(I4)') HDR1
      DO 35 K=2,HDR1,1
         READ(MUNIT1,'(A40)',REC=K) MNAME
         CALL PACK(MNAME,J)
         IF (MNAME .EQ. MNAMEX) THEN
            ST(3)=1
            CMD(1)=' '
            CALL MENUWR(RC,5,4,4,CMD,0,1,ST)
            CALL MESS(2,RC(5,1),RC(5,2),RC(5,3),7)
            IST=2
            GOTO 15
                                ENDIF
35    CONTINUE
      HDR1=HDR1+1
      READ(MUNIT2,'(A40)',REC=1) B40
      READ(B40(1:4),'(I4)') HDR2
      HDR2=HDR2+1
      IS=HDR2

      CALL MDIG(ITR,SMUNIT,SMFILE,MUNIT2,HDR2,IERR,ITD,FNAME(2),
     *          FNAME(3))
      IF (IERR .EQ. 0) THEN
                       IE=HDR2
                       B48(1:48)=' '
                       WRITE(B48(1:4),'(I4)') HDR1
                       WRITE(MUNIT1,'(A48)',REC=1) B48
                       B48(1:48)=' '
                       B48(1:40)=FNAME(2)
                       WRITE(B48(41:48),'(2I4)') IS,IE
                       WRITE(MUNIT1,'(A48)',REC=HDR1) B48
                       III=HDR1+1
                       WRITE(MUNIT1,'(A48)',REC=III) B48
                       B40(1:40)=' '
                       WRITE(B40(1:4),'(I4)') HDR2
                       WRITE(MUNIT2,'(A40)',REC=1) B40
                       WRITE(MUNIT2,'(A40)',REC=IE+1) B40
                       B40(1:40)=' '
                       WRITE(B40(1:4),'(I4)') HDR
                       WRITE(MUNIT3,'(A40)',REC=1) B40
                       ENDIF

      IF ((IERR .NE. 0).AND.(FLAG1)) THEN
                                     CLOSE (MUNIT1,STATUS='DELETE')
                                     ELSE
                                     CLOSE (MUNIT1)
                                     ENDIF
      IF ((IERR .NE. 0).AND.(FLAG2)) THEN
                                     CLOSE (MUNIT2,STATUS='DELETE')
                                     ELSE
                                     CLOSE (MUNIT2)
                                     ENDIF
      CLOSE (MUNIT3)
      INP='&'
      GOTO 5

      END
      SUBROUTINE PACK(STR,J)

      CHARACTER*(*)  STR

      INTEGER        I,J

      L=LEN(STR)
      J=0

      DO 5 I=1,L,1
         IF (STR(I:I) .NE. ' ') THEN
                                J=J+1
                                STR(J:J)=STR(I:I)
                                ENDIF
5     CONTINUE

      DO 10 I=J+1,L,1
         STR(I:I)=' '
10    CONTINUE

      RETURN
      END
      SUBROUTINE MDIG(ITR,SMUNIT,SMFILE,MUNIT2,HDR2,IERR,ITD,
     *                MFILE,SFILE)

      CHARACTER*40  TEXT(4),SFILE,MFILE,TSTAMP,TFILE
      CHARACTER*30  MES(1)
      CHARACTER*20  IOP,ANNO(1)
      CHARACTER*15  TEMP
      CHARACTER*10  DIG(2)
      CHARACTER*7   SMFILE
      CHARACTER*6   USRUNT(1)
      CHARACTER*2   INP(1)
      CHARACTER*1   CMD(1)

      INTEGER      ITR,SMUNIT,MUNIT2,HDR2,IERR,ITD,RC(10,3),ST(3),
     *             ANGLE(40),WCS(40,3),LINK(8)

      REAL         VLX,VLY,VUX,VUY,ULX,ULY,UUX,UUY,SCALE(40)

      DATA  ST/0,0,0/

      ITT=-1
      USRUNT(1)='FEET  '

C     INITALIZE THE MENU VARIABLES
100   TEXT(1)(1:40)=' '
      TEXT(2)(1:40)=  '
      TEXT(3)(1:40)=' '
      TEXT(4)(1:40)=' '

C     DISPLAY THE DIGITIZING MENU
      CALL MENUSV(SMFILE,200,RC,10,SMUNIT)

C     DISPLAY THE USER UNITS
      ST(3)=1
      CALL MENUWR(RC,10,3,3,USRUNT,0,1,ST)
```

```
C       READ IN THE TITLE
        CALL MENURD(RC,10,1,2,TEXT,ITR)

C       INPUT THE USER UNITS
        DIG(1)(1:10)=' '
        DIG(2)(1:10)=' '
        IST=4
301     CALL MENURD(RC,10,IST,5,DIG,ITT)
        READ(DIG(1)(1:10),'(F10.0)',ERR=302) ULX
        READ(DIG(2)(1:10),'(F10.0)',ERR=303) ULY
        GOTO 400
302     IST=4
        GOTO 301
303     IST=5
        GOTO 301

C       INPUT THE VIRTUAL UNITS FROM THE DIGITIZER
400     MES(1)='DIGITIZE LOWER LEFT POINT'
        CALL MENUWR(RC,10,8,8,MES,0,7,ST)
        READ(ITD,*) IBUT,VLX,VLY
        MES(1)(1:30)=' '
        CALL MENUWR(RC,10,8,8,MES,0,1,ST)

C       INPUT THE USER UNITS
        DIG(1)(1:10)=' '
        DIG(2)(1:10)=' '
        IST=6
310     CALL MENURD(RC,10,IST,7,DIG,ITT)
        READ(DIG(1)(1:10),'(F10.0)',ERR=311) UUX
        READ(DIG(2)(1:10),'(F10.0)',ERR=312) UUY
        GOTO 500
311     IST=6
        GOTO 310
312     IST=7
        GOTO 310

C       INPUT THE VIRTUAL UNITS FROM THE DIGITIZER
500     MES(1)='DIGITIZE UPPER RIGHT POINT'
        CALL MENUWR(RC,10,9,9,MES,0,7,ST)
        READ(ITD,*) IBUT,VUX,VUY
        MES(1)(1:30)=' '
        CALL MENUWR(RC,10,9,9,MES,0,1,ST)

C       SCAN THE COMMAND INPUT LINE
200     CMD(1)=' '
        CALL MENURD(RC,10,10,10,CMD,ITT)
        IF (CMD(1) .EQ. 'X') THEN
                                IERR=1
                                RETURN
                                ENDIF
        IF (CMD(1) .EQ. 'R') GOTO 100
        IF (CMD(1) .NE. 'C') GOTO 200

C       FILL IN THE HEADER INFORMATION OF THE FILE
        WRITE(MUNIT2,'(A40)',REC=HDR2) MFILE

C       WRITE THE MAP DESCRIPTION IN THE HEADER
        WRITE(MUNIT2,'(A40)',REC=HDR2+1) TEXT(1)
        WRITE(MUNIT2,'(A40)',REC=HDR2+2) TEXT(2)
```

```
      WRITE(MUNIT2,'(A40)',REC=HDR2+3) TEXT(3)
      WRITE(MUNIT2,'(A40)',REC=HDR2+4) TEXT(4)

C     WRITE THE SYMBOL FILE NAME IN THE HEADER
      WRITE(MUNIT2,'(A40)',REC=HDR2+5) SFILE

C     OBTAIN THE TIME STAMP FOR CREATION DATE
      TSTAMP(1:40)=' '
      CALL TIME(TEMP)
      TSTAMP(1:10)=TEMP(1:10)
      CALL DATE(TEMP)
      TSTAMP(11:20)=TEMP(1:10)
C     WRITE THE TIME AND DATE STAMP IN THE HEADER
      WRITE(MUNIT2,'(A40)',REC=HDR2+6) TSTAMP

C     STORE THE VIRTUAL AND USER UNITS IN THE HEADER
      WRITE(TEXT(4)(1:40),'(4F10.2)') VLX,VLY,ULX,ULY
      WRITE(MUNIT2,'(A40)',REC=HDR2+7) TEXT(4)

C     STORE THE VIRTUAL AND USER UNITS IN THE HEADER
      WRITE(TEXT(4)(1:40),'(4F10.2)') VUX,VUY,UUX,UUY
      WRITE(MUNIT2,'(A40)',REC=HDR2+8) TEXT(4)

C     OUTPUT THE USER UNITS, SUB UNITS ...
      TEXT(4)(1:40)=' '
      TEXT(4)(1:6)=USRUNT(1)
      TEXT(4)(7:12)='INCHES'
      TEXT(4)(13:16)='  12'
      TEXT(4)(17:20)='0000'
      WRITE(MUNIT2,'(A40)',REC=HDR2+9) TEXT(4)

C     BLANK OUT THE UNUSED HEADER RECORDS
      TEXT(4)(1:40)=' '
      WRITE(MUNIT2,'(A40)',REC=HDR2+10) TEXT(4)
      WRITE(MUNIT2,'(A40)',REC=HDR2+11) TEXT(4)
      WRITE(MUNIT2,'(A40)',REC=HDR2+12) TEXT(4)
      WRITE(MUNIT2,'(A40)',REC=HDR2+13) TEXT(4)
      WRITE(MUNIT2,'(A40)',REC=HDR2+14) TEXT(4)

C     POINT TO THE LAST RECORD
      HDR2=HDR2+14

C     SET UP THE DEFAULT WEIGHT, COLOR, STYLE, SCALE AND ANGLE
      DO 599 I=1,40,1
         WCS(I,1)=0
         WCS(I,2)=1
         WCS(I,3)=0
         SCALE(I)=1.
         ANGLE(I)=0
599   CONTINUE

      TFILE=SFILE
      CALL PACK(TFILE,J)
C     READ IN THE SYMBOL FILE AND SET THE WEIGHT, STYLE, ...
      OPEN (SMUNIT,FILE=TFILE,STATUS='OLD',ACCESS='DIRECT',RECL=20,
     *      FORM='FORMATTED')
      READ(SMUNIT,'(I2)',REC=1) IHD
      DO 598 I=1,IHD,1
         READ(SMUNIT,'(A20)',REC=I+1) IOP
         READ(IOP(1:2),'(I2)') II
         READ(IOP(3:16),'(3I2,F4.2,I4)') WCS(II,1),WCS(II,2),WCS(II,3),
     *                                   SCALE(II),ANGLE(II)
598   CONTINUE
      CLOSE (SMUNIT)

C     DISPLAY THE ENTRY MENU
600   LINK(1)=0
      LINK(2)=0
      LINK(3)=0
      LINK(4)=0
      LINK(5)=0
      LINK(6)=0
      LINK(7)=0
      LINK(8)=0
      CALL MENUSV(SMFILE,210,RC,10,SMUNIT)

C     INPUT THE ANNOTATION
      ANNO(1)(1:20)=' '
      CALL MENURD(RC,10,1,1,ANNO,ITR)
      AX=0.
      AY=0.
      IF (ANNO(1) .NE. ' ') THEN
      TEXT(1)='DIGITIZE ANNOTATION PLACEMENT'
      ST(3)=1
      CALL MENUWR(RC,10,2,2,TEXT,0,7,ST)
      READ(ITD,*) IBUT,AX,AY
                            ENDIF

C     SCAN THE COMMAND INPUT LINE
300   INP(1)='  '
      CALL MENURD(RC,10,3,3,INP,ITT)
      IF (INP(1) .EQ. 'X ') THEN
                            IERR=0
                            RETURN
                            ENDIF

C     CHECK FOR A VALID INPUT
      READ(INP(1)(1:2),'(I2)',ERR=300) II
      IF ((II .LE. 0).OR.(II .GE. 21)) GOTO 300

C     IF POINT FIND OUT IF POTENTIAL SOURCE
      IF ((II .EQ. 1).OR.(II .EQ. 2).OR.(II .EQ. 3).OR.(II .EQ. 8).OR.
     *    (II .EQ. 16).OR.(II .EQ. 17)) THEN
         CMD(1)=' '
         CALL MENURD(RC,10,4,4,CMD,ITT)
         LINK(1)=0
         IF (CMD(1) .EQ. 'Y') LINK(1)=1
                                        ENDIF
C     ENTER THE MAP DATA
      CALL MAPDAT(ITR,SMUNIT,SMFILE,MUNIT2,HDR2,ITD,II,WCS,SCALE,
     *            ANGLE,40,ANNO(1),AX,AY,LINK)

      GOTO 600
      END
      SUBROUTINE MAPDAT(ITR,SMUNIT,SMFILE,MUNIT,HDR,ITD,II,WCS,SCALE,
     *                  ANGLE,N,ANNO,AX,AY,LINK)

      CHARACTER*40  IO
      CHARACTER*20  ANNO
      CHARACTER*7   SMFILE
      INTEGER       ITR,SMUNIT,MUNIT,HDR,ITD,II,ANGLE(N),WCS(N,3),
     *              LINK(8)

      REAL          VX,VY,VX1,VY1,SCALE(N),VXMIN,VYMIN,VXMAX,VYMAX,
     *              AX,AY

      LOGICAL       FLAG

      FLAG=.TRUE.
C     ENTRY WILL BE A POINT
      IF ((II .EQ.  1).OR.(II .EQ.  2).OR.(II .EQ.  3).OR.(II .EQ.  8).OR.
     *    (II .EQ. 16).OR.(II .EQ. 17)) THEN
          IO(1:40)=' '
          IO(1:2)='10'
          WRITE(IO(3:4),'(I2)') II
          IO(5:6)=' 1'
          WRITE(IO(7:20),'(3I2,F4.2,I4)') WCS(II,1),WCS(II,2),WCS(II,3),
     *                                    SCALE(II),ANGLE(II)
          IO(21:24)='0000'
          WRITE(IO(25:40),'(8I2)') LINK
          WRITE(MUNIT,'(A40)',REC=HDR+1) IO
          WRITE(IO(1:20),'(2F10.2)') AX,AY
          IO(21:40)=ANNO
          WRITE(MUNIT,'(A40)',REC=HDR+2) IO
          READ(ITD,*) IBUT,VX,VY
          IO(1:40)=' '
          WRITE(IO(1:20),'(2F10.2)') VX,VY
          WRITE(MUNIT,'(A40)',REC=HDR+3) IO
          HDR=HDR+3
                                        ENDIF

C     ENTRY WILL BE A LINE
      IF ((II .EQ. 11).OR.(II .EQ. 12).OR.(II .EQ. 13).OR.
     *    (II .EQ. 14).OR.(II .EQ. 18).OR.(II .EQ. 19).OR.
     *    (II .EQ. 20)) THEN
          IO(1:40)=' '
          IO(1:2)='11'
          WRITE(IO(3:4),'(I2)') II
          WRITE(IO(7:20),'(3I2,F4.2,I4)') WCS(II,1),WCS(II,2),WCS(II,3),
     *                                    SCALE(II),ANGLE(II)
          IO(21:24)='0000'
          WRITE(IO(25:40),'(8I2)') LINK
          WRITE(MUNIT,'(A40)',REC=HDR+1) IO
          WRITE(IO(1:20),'(2F10.2)') AX,AY
          IO(21:40)=ANNO
          WRITE(MUNIT,'(A40)',REC=HDR+2) IO
          IO(1:40)=' '
          WRITE(MUNIT,'(A40)',REC=HDR+3) IO
          III=HDR+3
          NPTS=0
100       READ(ITD,*) IBUT,VX,VY
          IF (IBUT .EQ. 9) THEN
             READ(MUNIT,'(A40)',REC=HDR+1) IO
             WRITE(IO(5:6),'(I2)') NPTS
             WRITE(MUNIT,'(A40)',REC=HDR+1) IO
             WRITE(IO(1:40),'(4F10.2)') VXMIN,VXMAX,VYMIN,VYMAX
             WRITE(MUNIT,'(A40)',REC=HDR+3) IO
             HDR=HDR+3+(NPTS/2)
             RETURN
```

```
                             ENDIF
          IF (FLAG) THEN
                    FLAG=.FALSE.
                    VXMIN=VX
                    VXMAX=VX
                    VYMIN=VY
                    VYMAX=VY
                    ENDIF
          IF (VX .GT. VXMAX) VXMAX=VX
          IF (VX .LT. VXMIN) VXMIN=VX
          IF (VY .GT. VYMAX) VYMAX=VY
          IF (VY .LT. VYMIN) VYMIN=VY
          READ(ITD,*) IBUT,VX1,VY1
          IF (IBUT .EQ. 9) THEN
             IO(1:40)=' '
             WRITE(IO(1:20),'(2F10.2)') VX,VY
             JJJ=III+(NPTS/2)+1
             WRITE(MUNIT,'(A40)',REC=JJJ) IO
             READ(MUNIT,'(A40)',REC=HDR+1) IO
             NPTS=NPTS+1
             WRITE(IO(5:6),'(I2)') NPTS
             WRITE(MUNIT,'(A40)',REC=HDR+1) IO
             WRITE(IO(1:40),'(4F10.2)') VXMIN,VXMAX,VYMIN,VYMAX
             WRITE(MUNIT,'(A40)',REC=HDR+3) IO
             HDR=HDR+3+(NPTS/2)+1
             RETURN
                             ENDIF
          IF (VX1 .GT. VXMAX) VXMAX=VX1
          IF (VX1 .LT. VXMIN) VXMIN=VX1
          IF (VY1 .GT. VYMAX) VYMAX=VY1
          IF (VY1 .LT. VYMIN) VYMIN=VY1
          WRITE(IO(1:40),'(4F10.2)') VX,VY,VX1,VY1
          NPTS=NPTS+2
          JJJ=III+(NPTS/2)
          WRITE(MUNIT,'(A40)',REC=JJJ) IO
          GOTO 100
                        ENDIF

C     ENTRY WILL BE A POLYGON
      IF ((II .EQ. 4).OR.(II .EQ. 5).OR.(II .EQ. 6).OR.(II .EQ. 7).OR.
     *    (II .EQ. 9).OR.(II .EQ. 10).OR.(II .EQ. 15)) THEN
          IO(1:40)=' '
          IO(1:2)='12'
          WRITE(IO(3:4),'(I2)') II
          WRITE(IO(7:20),'(3I2,F4.2,I4)') WCS(II,1),WCS(II,2),WCS(II,3),
     *                                    SCALE(II),ANGLE(II)
          IO(21:24)='0000'
          WRITE(IO(25:40),'(8I2)') LINK
          WRITE(MUNIT,'(A40)',REC=HDR+1) IO
          WRITE(IO(1:20),'(2F10.2)') AX,AY
          IO(21:40)=ANNO
          WRITE(MUNIT,'(A40)',REC=HDR+2) IO
          IO(1:40)=' '
          WRITE(MUNIT,'(A40)',REC=HDR+3) IO
          III=HDR+3
          NPTS=0
200       READ(ITD,*) IBUT,VX,VY
          IF (IBUT .EQ. 9) THEN
             READ(MUNIT,'(A40)',REC=HDR+1) IO
             WRITE(IO(5:6),'(I2)') NPTS
             WRITE(MUNIT,'(A40)',REC=HDR+1) IO
             WRITE(IO(1:40),'(4F10.2)') VXMIN,VXMAX,VYMIN,VYMAX
             WRITE(MUNIT,'(A40)',REC=HDR+3) IO
             HDR=HDR+3+(NPTS/2)
             RETURN
                              ENDIF
          IF (FLAG) THEN
                    FLAG=.FALSE.
                    VXMIN=VX
                    VXMAX=VX
                    VYMIN=VY
                    VYMAX=VY
                    ENDIF
          IF (VX .GT. VXMAX) VXMAX=VX
          IF (VX .LT. VXMIN) VXMIN=VX
          IF (VY .GT. VYMAX) VYMAX=VY
          IF (VY .LT. VYMIN) VYMIN=VY
          READ(ITD,*) IBUT,VX1,VY1
          IF (IBUT .EQ. 9) THEN
             IO(1:40)=' '
             WRITE(IO(1:20),'(2F10.2)') VX,VY
             JJJ=III+(NPTS/2)+1
             WRITE(MUNIT,'(A40)',REC=JJJ) IO
             READ(MUNIT,'(A40)',REC=HDR+1) IO
             NPTS=NPTS+1
             WRITE(IO(5:6),'(I2)') NPTS
             WRITE(MUNIT,'(A40)',REC=HDR+1) IO
             WRITE(IO(1:40),'(4F10.2)') VXMIN,VXMAX,VYMIN,VYMAX
             WRITE(MUNIT,'(A40)',REC=HDR+3) IO
             HDR=HDR+3+(NPTS/2)+1
             RETURN
                              ENDIF
          IF (VX1 .GT. VXMAX) VXMAX=VX1
          IF (VX1 .LT. VXMIN) VXMIN=VX1
          IF (VY1 .GT. VYMAX) VYMAX=VY1
          IF (VY1 .LT. VYMIN) VYMIN=VY1
          WRITE(IO(1:40),'(4F10.2)') VX,VY,VX1,VY1
          NPTS=NPTS+2
          JJJ=III+(NPTS/2)
          WRITE(MUNIT,'(A40)',REC=JJJ) IO
          GOTO 200
                                                         ENDIF

      RETURN
      END
      SUBROUTINE TIME(STAMP)
C  THIS SUBROUTINE DISPLAYS THE TIME ON THE SCREEN WITH
C  THE COMMAND MENU PRESENT

      CHARACTER*15 STAMP
      INTEGER      HOUR,MINUTE,SECOND
      COMMON/TIM1/HOUR,MINUTE,SECOND

C     GET THE TIME FROM THE SYSTEM
      CALL RTIME

      STAMP(1:15)=' '
C     GENERATE THE TIME STAMP
      STAMP(3:3) = ':'
      STAMP(6:6) = ':'
      WRITE(STAMP(1:2),1) HOUR
      WRITE(STAMP(4:5),1) MINUTE
      WRITE(STAMP(7:8),1) SECOND
1     FORMAT(I2)

C     FILL IN ANY BLANKS WITH A 0
      IF (STAMP(1:1) .EQ. ' ') STAMP(1:1) = '0'
      IF (STAMP(2:2) .EQ. ' ') STAMP(2:2) = '0'
      IF (STAMP(4:4) .EQ. ' ') STAMP(4:4) = '0'
      IF (STAMP(5:5) .EQ. ' ') STAMP(5:5) = '0'
      IF (STAMP(7:7) .EQ. ' ') STAMP(7:7) = '0'
      IF (STAMP(8:8) .EQ. ' ') STAMP(8:8) = '0'

      RETURN
      END
      SUBROUTINE DATE(STAMP)

      CHARACTER*15  STAMP
      INTEGER       MONTH, DAY, YEAR, DOW
      COMMON /DAT1/DOW, YEAR, MONTH, DAY

      CALL RDATE

      STAMP(1:15)=' '
      STAMP(3:3)='/'
      STAMP(6:6)='/'
      WRITE(STAMP(1:2),5) MONTH
      WRITE(STAMP(4:5),5) DAY
      WRITE(STAMP(7:8),5) YEAR
5     FORMAT(A2)

      RETURN
      END
```

```
C     CLEAR THE SCREEN AFTER OBTAINING THE USERS INPUT AND OPEN THE HELP FILE
      CALL CLEAR(7,Ø)
      OPEN (HUNIT,FILE=HFILE,STATUS='OLD')

C     SET UP THE SEARCH KEY *#* TO FIND THE REQUIRED PART OF THE FILE
      TLINE(1:8Ø)='*X*'
      TLINE(2:2)=CMD(1)

5     READ(HUNIT,'(A8Ø)') LINE

C     A MATCH WAS FOUND TO *#*
      IF (TLINE(1:3) .EQ. LINE(1:3)) THEN

C               FIND THE NUMBER OF LINE OF TEXT THAT NEEDS TO BE DISPLAYED
                READ(LINE(4:5),'(I2)') IG

                J=Ø
                DO 2Ø I=1,IG,1
                   READ(HUNIT,'(A8Ø)') LINE
                   J=J+1
C                  DISPLAY THE LINE OF TEXT ON THE SCREEN
                   CALL MENUDR(LINE,J,1,2,Ø,1,1)

C                  CAN ONLY DISPLAY 22 LINES ON THE SCREEN AT A TIME
                   IF (J .EQ. 22) THEN

C                     DETERMINE IF THERE IS MORE TEXT TO BE PRINTED
                      IF (I .EQ. IG) THEN

C                        DISPLAY THE END OF FILE MESSAGE TO INDICATE THAT
C                        THIS IS THE END OF THE HELP FILE
                         CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),6)
                         READ(ITR,'(A1)') CMD(1)
                         CLOSE (HUNIT)
                         GOTO 1
                                     ELSE

C                        DISPLAY MESSAGE PRESS RETRUN TO CONTINUE
                         CALL MESS(16,RC(3,1),RC(3,2),RC(3,3),6)
                         READ(ITR,'(A1)') CMD(1)
                         CALL CLEAR(7,Ø)
                         J=Ø
                                     ENDIF
                                  ENDIF
2Ø                 CONTINUE

C                  DISPLAY END OF FILE MESSAGE TO INDICATE NO MORE HELP TEXT
C                  AVAILABLE.
                   CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),6)
                   READ(ITR,'(A1)') CMD(1)
                   CLOSE (HUNIT)
                   GOTO 1
                                   ENDIF

C     KEY DID NOT MATCH, GO AND TRY ANOTHER LINE
      GOTO 5
      END
      SUBROUTINE TIME(STAMP)

C***********************************************************************
```

```
C  THIS SUBROUTINE GETS THE TIME FROM THE SYSTEM AND PASSES IT BACK IN STAMP
C  THE TIME IS PASSED BACK IN THE FORM HH:MM:SS
C*****************************************************************************

      CHARACTER*15 STAMP
      INTEGER      HOUR,MINUTE,SECOND,DOW,YEAR,MON,DAY
      COMMON/TIM1/HOUR,MINUTE,SECOND

C     GET THE TIME FROM THE SYSTEM, RTIME IS A 68000 ASSEMBLER PROGRAM
C     DATA IS PASSED IN THE COMMON BLOCK TIM1
      CALL RTIME

C     GENERATE THE TIME STAMP
      STAMP(1:15)=' '
      STAMP(3:3) = ':'
      STAMP(6:6) = ':'
      WRITE(STAMP(1:2),1) HOUR
      WRITE(STAMP(4:5),1) MINUTE
      WRITE(STAMP(7:8),1) SECOND
1     FORMAT(I2)

C     FILL IN ANY BLANKS WITH A 0
      IF (STAMP(1:1) .EQ. ' ') STAMP(1:1) = '0'
      IF (STAMP(2:2) .EQ. ' ') STAMP(2:2) = '0'
      IF (STAMP(4:4) .EQ. ' ') STAMP(4:4) = '0'
      IF (STAMP(5:5) .EQ. ' ') STAMP(5:5) = '0'
      IF (STAMP(7:7) .EQ. ' ') STAMP(7:7) = '0'
      IF (STAMP(8:8) .EQ. ' ') STAMP(8:8) = '0'

      RETURN
      END
      SUBROUTINE DATE(STAMP)

C*****************************************************************************
C     THIS ROUTINE OBTAINS THE DATE FROM THE SYSTEM AND RETURNS IT IN STAMP
C     THE DATE IS RETURNED IN THE FORM MM/DD/YY
C*****************************************************************************

      CHARACTER*15  STAMP
      INTEGER       HOUR,MINUTE,SEC,DOW,YEAR,MON,DAY
      COMMON/DAT1/DOW,YEAR,MON,DAY

C     GET THE DATE FROM THE SYSTEM, RDATE IS A 68000 ASSEMBLER PROGRAM
C     THE DATA IS PASSED THROUGH THE COMMON BLOCK DAT1
      CALL RDATE

C     FORM THE DATE
      STAMP(1:15)=' '
      STAMP(3:3)='/'
      STAMP(6:6)='/'
      WRITE(STAMP(1:2),5) MON
      WRITE(STAMP(4:5),5) DAY
      WRITE(STAMP(7:8),5) YEAR
5     FORMAT(I2)

      RETURN
      END
      SUBROUTINE DBMM(ITR,CUNIT,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                CFILE,SFILE1,SFILE2,SFILE3,SFILE4,
     *                SHFILE,PUNIT1,PUNIT2,PFILE1,PHFILE,
     *                SMUNIT,SMFILE)

C******************************************************************************
C       THIS SUBROUTINE MANAGES THE SUBSTANCE-SOURCE AND PROCEDURE DATA BASES
C       VARIABLES PASSED:
C
C          ITR       -  INTERACTIVE TERMINAL READ UNIT
C          SMUNIT    -  UNIT TO OPEN THE MENU FILE (SMFILE) ON
C          SMFILE    -  MENU FILE NAME
C          SHFILE    -  SUBSTANCE-SOURCE HELP FILE NAME
C          SUNIT1    -  UNIT # TO OPEN SFILE1 ON
C          SUNIT2    -  UNIT # TO OPEN SFILE2 ON
C          SUNIT3    -  UNIT # TO OPEN SFILE3 ON
C          SUNIT4    -  UNIT # TO OPEN SFILE4 ON
C          PHFILE    -  PROCEDURE HELP FILE NAME
C          PUNIT1    -  UNIT # TO OPEN PFILE1
C          PUNIT2    -  UNIT # TO OPEN PROCEDURE FILE OF INTEREST ON
C          PFILE1    -  FILE NAME CONTAINING LIST OF PROCEDURE CURRENT PROCEDURE
C                       FILES
C******************************************************************************

      INTEGER      ITR,CUNIT,SUNIT1,SUNIT2,SUNIT3,SUNIT4,PUNIT1,PUNIT2,
     *             SMUNIT,RC(2,3)

      CHARACTER*1  CMD(1)
      CHARACTER*7  CFILE,SFILE1,SFILE2,SFILE3,SFILE4,SHFILE,PFILE1,
     *             PHFILE,SMFILE

C     DISPLAY THE MAIN MENU AND INPUT USER SELECTION
5     CALL MENUSV(SMFILE,120,RC,2,SMUNIT)

10    CMD(1)=' '
      CALL MENURD(RC,2,1,1,CMD,ITR)

C     CHECK FOR VALID INPUT
      IF (INDEX('12X',CMD(1)) .EQ. 0) THEN
                       CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),6)
                       GOTO 10
                                    ENDIF

C     THE USER SELECTED THE SUBSTANCE-SOURCE DATA BASE
      IF (CMD(1) .EQ. '1') CALL SSSIP(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                              SFILE1,SFILE2,SFILE3,SFILE4,
     *                              SHFILE,SMUNIT,SMFILE)

C     THE USER SELECTED THE PROCEDURE DATA BASE
      IF (CMD(1) .EQ. '2') CALL PROCD(ITR,PUNIT1,PUNIT2,PFILE1,PHFILE,
     *                              SMUNIT,SMFILE)

C     THE USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X') RETURN

      GOTO 5
      END
```

```
User - system    Date - 10/19/83    Time - 16:03:00    Filename - symbol.for

SYSTEM
10/19/83
16:03:00
SYMBOL.F
```

```
      PROGRAM SYMBOL

      CHARACTER*40  FNAME
      CHARACTER*20  IO

      INTEGER       ITW,ITR,SUNIT,SN,WT,COLOR,STYLE,ANGLE

      REAL          SCALE

      ITW=1
      ITR=1
      SUNIT=14
C     INPUT THE SYMBOL FILE NAME
      WRITE(ITW,'(/,''ENTER THE SYMBOL FILE NAME'')')
      READ(ITR,'(A40)') FNAME

      OPEN (SUNIT,FILE=FNAME,STATUS='NEW',ACCESS='DIRECT',RECL=20,
     *      FORM='FORMATTED')

      IO(1:20)=' '
      WRITE(SUNIT,'(A20)',REC=1) IO
      ICNT=0
100   WRITE(ITW,'(''ENTER SYMBOL NUMBER , -999 TO QUIT'')')
      READ(ITR,*) SN
      IF (SN .EQ. -999) THEN
                        IO(1:20)=' '
                        WRITE(IO(1:2),'(I2)') ICNT
                        WRITE(SUNIT,'(A20)',REC=1) IO
                        CLOSE (SUNIT)
                        STOP
                        ENDIF
      WRITE(ITW,'(''ENTER WEIGHT'')')
      READ(ITR,*) WT
      WRITE(ITW,'(''ENTER COLOR'')')
      READ(ITR,*) COLOR
      WRITE(ITW,'(''ENTER STYLE'')')
      READ(ITR,*) STYLE
      WRITE(ITW,'(''ENTER SCALE'')')
      READ(ITR,'(F10.0)') SCALE
      WRITE(ITW,'(''ENTER ANGLE'')')
      READ(ITR,*) ANGLE

      ICNT=ICNT+1
      IO(1:20)=' '
      WRITE(IO(1:16),'(4I2,F4.2,I4)') SN,WT,COLOR,STYLE,SCALE,ANGLE
      WRITE(SUNIT,'(A20)',REC=ICNT+1) IO
      GOTO 100

      END
```

```
User - system    Date - 10/19/83    Time - 16:00:57    Filename - convert.for

SYSTEM
1Ø/19/83
16:ØØ:57
CONVERT.
```

```
      PROGRAM CNVRT

      CHARACTER*80  LINE
      CHARACTER*40  FIN,FOUT
      CHARACTER*20  FTYPE
      CHARACTER*5   FMT
      CHARACTER*1   TYPE

      WRITE(0,'(//,''ENTER FILE TO BE CONVERTED TO DIRECT'')')
      READ(0,'(A40)') FIN

      WRITE(0,'(//,''ENTER NEW FILE NAME OF DIRECT FILE'')')
      READ(0,'(A40)') FOUT

      WRITE(0,'(//,''ENTER DESIRED OUTPUT RECL LENGTH'')')
      READ(0,*) IRECL

      WRITE(0,'(//,''OUTPUT FILE FORMATTED OR UNFORMATTED (F OR U)'')')
      READ(0,'(A1)') TYPE

      FTYPE='UNFORMATTED'
      IF (TYPE .EQ. 'F') FTYPE='FORMATTED'
      IREC1=IRECL
      IF (TYPE .EQ. 'F') IREC1=IRECL+2
      OPEN (12,FILE=FIN,STATUS='OLD')
      OPEN (13,FILE=FOUT,STATUS='NEW',ACCESS='DIRECT',RECL=IREC1,
     *      FORM=FTYPE)

      FMT='(AXX)'
      WRITE(FMT(3:4),'(I2)') IRECL

      I=1
50    READ(12,'(A80)',END=100) LINE
      IF (TYPE .EQ. 'F') THEN
                         WRITE(13,FMT,REC=I) LINE(1:IRECL)
                         ELSE
                         WRITE(13,REC=I) LINE(1:IRECL)
                         ENDIF
      I=I+1
      GOTO 50

100   WRITE(0,'(//,I3,'' RECORDS WERE PROCESSED'')') I-1
      CLOSE (12)
      CLOSE (13)
      STOP
      END
```

```
User - system    Date - 10/19/83    Time - 16:00:31    Filename - bndx.for

SYSTEM
10/19/83
16:00:31
BNDX.FOR
```

```
      INTEGER FUNCTION BNDX(STR,N)

      CHARACTER*(*)   STR
      INTEGER         N,I

      DO 5 I=N,2,-1
         IF (STR(I:I) .NE. ' ') GOTO 10
5     CONTINUE

10    BNDX=I
      RETURN
      END
```

```
User - system    Date - 10/19/83    Time - 16:01:24    Filename - menudr.for

SYSTEM
10/19/83
16:01:24
MENUDR.F
```

```
$segment %menuseg
      SUBROUTINE MENUSV(FNAME,MN,RC,N,INU)

C*************************************************************************
C  THIS SUBROUTINE DISPLAY THE MENUS ON THE SCREEN AND LOADS AN ARRAY WITH THE
C  INPUT FIELD DATA.  IT ALSO INITIALLY CONVERTS THE FILE TO DIRECT ACCESS THE
C  FIRST TIME IT IS CALLED.
C      VARIABLES PASSED:
C
C      FNAME   -  MENU FILE NAME
C      MN      -  MENU NUMBER TO BE DISPLAYED
C      RC      -  ARRAY TO LOAD WITH THE INPUT FIELD DATA
C                 RC(N,1) - ROW POSITION OF THE INPUT FIELD
C                 RC(N,2) - COLUMN POSITION OF THE INPUT FIELD
C                 RC(N,3) - LENGTH OF THE INPUT FIELD
C      INU     -  UNIT # TO OPEN THE MENU FILE ON
C************************************************************************ *

      CHARACTER*(*)   FNAME
      CHARACTER*80    LINE(1),SCREEN(24),LINE1
      CHARACTER*3     ID

      INTEGER         MN,INU,ROW,COL,RC(N,3),STATE,IS,INX,L,MIND(50)

      LOGICAL         MREAD

      COMMON/MENUS/   MREAD


C     OPEN THE MENU FILE DIRECT ACCESS (INITIALLY SEQUENTIAL)
      OPEN (INU,FILE=FNAME,ERR=100,ACCESS='DIRECT',RECL=80)

C     FORM A DIRECT ACCESS ARRAY ON THE FIRST TIME THIS ROUTINE IS CALLED.
      IF (MREAD) THEN

C                 SET THE INDICATOR SO NO MORE CONVERSIONS TAKE PLACE
                  MREAD=.FALSE.

C                 SET THE INDEX AND RECORD TO 1
                  ICNT=1
                  IREC=1

C                 READ IN THE MENU HEADERS (*******)
5                 READ(INU,REC=IREC,ERR=200) LINE(1)

C                 CONVERT ### TO AN INTEGER VALUE
                  READ(LINE(1)(3:5),'(I3)') MIND(ICNT)

C                 INCREMENT THE ARRAY INDEX AND THE RECORD COUNTER, THE NEXT
C                 HEADER RECORD IS 24 AWAY
                  ICNT= ICNT+1
                  IREC= IREC+24
                  GO TO 5
                  ENDIF

C     DETERMINE WHICH MENU HAS BEEN SELECTED AND DETERMINE RECORD NUMBER
200   DO 10 I=1,50,1
         IF(MIND(I) .EQ. MN) GOTO 12
10    CONTINUE
```

```
C     FORM THE RECORD NUMBER AND CLOSE THE MENU FILE
12    IREC= (I-1)*24 +1
      CLOSE(INU)

C     OPEN THE MENU FILE AND CLEAR THE SCREEN
      OPEN (INU,FILE=FNAME,ERR=100,ACCESS='DIRECT',RECL=80)
      CALL CLEAR(7,0)

C     PROCESS THE MENU, DISPLAY TEXT ON THE SCREEN AND FORM THE INPUT FIELDS
      DO 15 ROW=1,23,1
         IREC= IREC+1
         STATE=1
         READ(INU,REC=IREC,ERR=100) LINE(1)

C        SET THE COLUMN COUNTER TO THE FIRST COLUMN
         COL=1
20       JJ= COL+1

C            STATE 1 IS THE INITIAL STATE IS IS REMAINED IN UNTIL A NON BLANK
C            CHARACTER IS ENCOUNTERED
             IF ( STATE.EQ.1 ) THEN
                IF (LINE(1)(COL:COL) .NE. ' ') THEN
                   IF (LINE(1)(COL:JJ) .EQ. '%%') THEN
                                                   STATE=2
                                                   ELSE
                                                   STATE=3
                                                   IS=COL
                                                   ENDIF
                                                ENDIF
                               ENDIF

            IF (STATE.EQ.3 ) THEN
               IF (LINE(1)(COL:COL) .EQ. '%') THEN
                  IF (LINE(1)(JJ:JJ) .EQ. '%') THEN
                     SCREEN(ROW)(IS:COL-1)=LINE(1)(IS:COL-1)
                     J1=COL-1
                     LINE1=LINE(1)
                     CALL MENUDR(LINE1(IS:J1),ROW,IS,1,0,1,1)
                     STATE=2
                                                ENDIF
                                               ENDIF
                             ENDIF

            IF (STATE .EQ. 2) THEN
               IF (LINE(1)(COL+4:COL+4) .NE. '%') GOTO 100
               IF (LINE(1)(COL+7:COL+8) .NE. '%%') GOTO 100
               READ(LINE(1)(COL+2:COL+3),'(I2)',ERR=100) INX
               READ(LINE(1)(COL+5:COL+6),,'(I2)',ERR=100) L
               RC(INX,1)=ROW
               RC(INX,2)=COL
               RC(INX,3)=L
               STATE=1
               COL=COL+8
                              ENDIF
C        INCREMENT THE COLUMN COUNTER AND TEST IF THIS IS THE LAST COLUMN
         COL=COL+1
         IF (COL .LE. 80) GOTO 20

C        NO MORE DATA LEFT IN THE RECORD, BUT THERE MAY BE DATA IN LINE(1)
C        THAT NEEDS TO BE OUTPUT
```

```
         IF (STATE .EQ. 3) THEN
                           SCREEN(ROW)(IS:80)=LINE(1)(IS:80)
                           LINE1=LINE(1)
                           CALL MENUDR(LINE1(IS:80),ROW,IS,1,0,1,1)
                           ENDIF
15    CONTINUE

C     CLOSE THE FILE FROM EITHER NORMAL OR ABNORMAL TERMINATION
100   CLOSE (INU)
      RETURN
      END
      SUBROUTINE MENUWR(RC,N,IS,IE,TEXT,ICLR,ICOLOR,S)

C*******************************************************************************
C  THIS SUBROUTINE DISPLAYS AN ARRAY OF TEXT ON THE SCREEN AT THE ROW AND
C  COLUMN POSITONS AND LENGTHS AS GIVEN IN THE RC ARRAY.  THE ADDRESSING INTO
C  THE TEXT ARRAY IS EITHER RELATIVE OR ABSOLUTE
C      VARIABLES PASSED:
C
C      RC     -  ARRAY TO HOLD THE INPUT FIELD DATA
C                RC(N,1) - ROW POSITION OF INPUT FIELD
C                RC(N,2) - COLUMN POSITION OF INPUT FIELD
C                RC(N,3) - LENGTH OF INPUT FIELD
C      N      -  SIZE OF THE RC ARRAY IN THE FIRST INDEX
C      IS     -  STARTING INDEX (RELATIVE) INTO THE TEXT ARRAY
C      IE     -  ENDING   INDEX (RELATIVE) INTO THE TEXT ARRAY
C      TEXT   -  ARRAY OF THE CHARACTER DATA TO BE DISPLAYED ON THE SCREN
C      ICLR   -  FLAG TO INDICATE WHETHER THE SCREEN IS CLEARED
C                1  ==)  CLEAR THE SCREEN
C                   ==)  NOT TO CLEAR THE SCREEN
C      ICOLOR -  COLOR OF THE DISPLAYED TEXT
C      S      -  STATUS ARRAY USED TO PASS PARAMTERS TO MENUDR
C                S(1)  -  USED TO INITIALZE PAGE ARRAY AND WRITE PAGE ARRAY
C                S(2)  -  USED TO PASS UNIT # OF ARCHIVE FILE
C                S(3)  -  INDICATE RELATIVE OR ABSOLUTE ADDRESSING IN TEXT ARRAY
C                         0 ==) ABSOLUTE ADDRESSING
C                           ==) RELATIVE ADDRESSING
C*******************************************************************************

      CHARACTER*(*)  TEXT(1)

      INTEGER        IS,IE,ICLR,ICOLOR,RC(N,3),K,N,S(1)

C     IF ICLR = 1 THEN CLEAR THE SCREEN
      IF (ICLR .EQ. 1) CALL CLEAR(7,0)

C     OUTPUT THE LINES OF TEXT
      IF (S(3) .EQ. 0) THEN

C        RELATIVE ADDRESSING MODE TO BE USED
         DO 5 K=IS,IE,1
            CALL MENUDR(TEXT(K)(1:RC(K,3)),RC(K,1),RC(K,2),ICOLOR,S(1),
     *                  S(2),1)
5        CONTINUE
                       ELSE

C        RELATIVE ADDRESSING MODE IS TO BE USED
         L=IE-IS+1
         DO 10 K=1,L,1
            J=IS+(K-1)
            CALL MENUDR(TEXT(K)(1:RC(J,3)),RC(J,1),RC(J,2),ICOLOR,S(1),
     *                  S(2),1)
10         CONTINUE
                       ENDIF

      RETURN
      END
      SUBROUTINE MENURD(RC,N,IS,IE,TEXT,ITT)

C*******************************************************************************
C  THIS SUBROUTINE DISPLAYS DATA IN THE INPUT FIELDS AND INPUTS DATA FROM THE
C  INPUT FIELDS
C     VARIABLES PASSED:
C
C     RC    -  ARRAY THAT HOLDS THE INPUT FIELD DATA
C              RC(N,1) - ROW POSITION OF THE INPUT FIELD
C              RC(N,2) - COLUMN POSITION OF THE INPUT FIELD
C              RC(N,3) - LENGTH OF THE INPUT FIELD
C     N     -  SIZE OF FIRST POSITION OF THE RC ARRAY
C     IS    -  STARTING INDEX (RELATIVE) INTO THE TEXT ARRAY
C     IE    -  ENDING   INDEX (RELATIVE) INTO THE TEXT ARRAY
C     TEXT  -  ARRAY TO HOLD THE INPUTTED DATA
C     ITT   -  FLAG TO INDICATE RELATIVE OR ABSOLUTE ADDRESSING
C              >= 0  ==> ABSOLUTE ADDRESSING
C                    ==> RELATIVE ADDRESSING
C*******************************************************************************

      CHARACTER*(*)   TEXT(1)
      CHARACTER*80    BK,UN,INPUT
      CHARACTER*5     FMT

      INTEGER         IS,IE,L,K,ITR,J,BNDX,ID,N,M,RC(N,3),ITT


C     INITIALIZE THE VARIABLES BK TO BLANKS AND UN TO UNDERSCORES
      IUN= 95
      DO 3 I=1,80,1
         BK(I:I)= ' '
         UN(I:I)= CHAR(IUN)
3     CONTINUE

C     SET THE INTERACTIVE TERMINAL READ UNIT TO 0 SINCE 0 AND -0 ARE THE SAME
      ITR=0

C     CHECK FOR THE TYPE OF ADDRESSING, RELATIVE OR ABSOLUTE
      IF (ITT .GE. 0) THEN

C     ABSOLUTE ADDRESSING SELECTED IN THE TEXT ARRAY
      DO 5 K=IS,IE,1

C        BUILD THE FORMAT STATEMENT
         FMT='(AXX)'
         L=RC(K,3)
         WRITE(FMT(3:4),'(I2)') L

C        SET UP THE LINE FOR INPUT, INTITIALLY DISPLAY UNDERSCORES
         CALL MENUDR(UN(1:L),RC(K,1),RC(K,2),1,0,1,1)

C        SEE IF THERE IS ALREADY DATA STORED FOR THIS INPUT FIELD
         IF (TEXT(K)(1:L) .EQ. BK(1:L)) THEN
```

```
C           SINCE NO DATA ALREADY STORED, HIGHLIGHT THE FIRST UNDERSCORE
            CALL MENUDR(UN(1:1),RC(K,1),RC(K,2),7,Ø,1,1)
            ID=1
                                        ELSE
C           DATA ALREADY STORED, WRITE IT OUT INTO THE UNDERSCORES FOR AS
C           MANY NON BLANKS IT CONTAINS
            J=BNDX(TEXT(K),L)
            CALL MENUDR(TEXT(K)(1:J),RC(K,1),RC(K,2),1,Ø,1,1)
            CALL MENUDR(TEXT(K)(1:1),RC(K,1),RC(K,2),7,Ø,1,1)
            ID=Ø
                                        ENDIF

C         MOVE THE CURSOR TO THE FIRST POSITION OF THE INPUT FIELD IN REVERSE
C         VIDEO
          CALL MENUDR('~',RC(K,1),RC(K,2),7,Ø,1,1)

C         READ IN THE RESPONSE
          READ(ITR,'(A8Ø)') INPUT

C         CHECK TO SEE IF THE NEW INPUT DATA IS BLANK OR NOT
          IF (INPUT(1:L) .NE. BK(1:L)) THEN

C           INPUT WAS NOT BLANK, SO DISPLAY IT AND MOVE ON TO THE NEXT INPUT
C           FIELD
            TEXT(K)(1:L)=INPUT(1:L)
            CALL MENUDR(TEXT(K)(1:L),RC(K,1),RC(K,2),1,Ø,1,1)
                                      ELSE

C        INPUT WAS BLANK, DETERMINE IF THE ORIGINAL DATA WAS BLANK OR NOT
C        IF BLANK, THEN BLANK THE INPUT FIELD,  OTHERWISE DISPLAY THE OLD
C        DATA
         IF (ID .EQ. 1) CALL MENUDR(BK(1:L),RC(K,1),RC(K,2),1,Ø,1,1)
         IF (ID .EQ. Ø) CALL MENUDR(TEXT(K)(1:L),RC(K,1),RC(K,2),1,Ø,1,1)
                                      ENDIF

5      CONTINUE

                      ELSE
C      RELATIVE ADDRESSING WAS SELECTED, OTHERWISE SAME AS ABOVE
       LL=IE-IS+1
       DO 1Ø J=1,LL,1
          K=IS+(J-1)
C         BUILD THE FORMAT STATEMENT
          FMT='(AXX)'
          L=RC(K,3)
          WRITE(FMT(3:4),'(I2)') L

C         SET UP THE LINE FOR INPUT
          CALL MENUDR(UN(1:L),RC(K,1),RC(K,2),1,Ø,1,1)
          IF (TEXT(J)(1:L) .EQ. BK(1:L)) THEN
             CALL MENUDR(UN(1:1),RC(K,1),RC(K,2),7,Ø,1,1)
             ID=1
                                        ELSE
             JJ=BNDX(TEXT(J),L)
             CALL MENUDR(TEXT(J)(1:JJ),RC(K,1),RC(K,2),1,Ø,1,1)
             CALL MENUDR(TEXT(J)(1:1),RC(K,1),RC(K,2),7,Ø,1,1)
             ID=Ø
                                        ENDIF
          CALL MENUDR('~',RC(K,1),RC(K,2),7,Ø,1,1)
```

```
C        READ IN THE RESPONSE
         READ(ITR,'(A80)') INPUT
         IF (INPUT(1:L) .NE. BK(1:L)) THEN
           TEXT(J)(1:L)=INPUT(1:L)
           CALL MENUDR(TEXT(J)(1:L),RC(K,1),RC(K,2),1,0,1,1)
                                        ELSE
        IF (ID .EQ. 1) CALL MENUDR(BK(1:L),RC(K,1),RC(K,2),1,0,1,1)
        IF (ID .EQ. 0) CALL MENUDR(TEXT(J)(1:L),RC(K,1),RC(K,2),1,0,1,1)
                                        ENDIF

10    CONTINUE

                     ENDIF

      RETURN
      END
      SUBROUTINE MENUCK(IN,OUT,N,FMT,EFLAG)

C*******************************************************************************
C  THIS SUBROUTINE CONVERTS THE CHARACTER DATA IN THE ARRAY IN TO REAL DATA
C  DATA IN THE OUT ARRAY
C     VARIABLES PASSED:
C
C     IN   -  ARRAY OF TEXT TO BE CONVERTED TO REAL DATA
C     N    -  SIZE OF THE TEXT ARRAY, AND THE NUMBER OF ELEMENTS TO CONVERT
C     FMT  -  NOT USED
C
C     VARIABLES RETURNED:
C
C     OUT    -  ARRAY OF CONVERTED CHARACTER DATA (REAL)
C     EFLAG  -  FLAG TO INDICATE WHETHER ANY ERRORS OCCURED IN CONVERSION
C               0  ==>  NO CONVERSION ERRORS
C               I  ==>  INDEX OF THE DATA ITEM A CONVERSION ERROR OCCURRED
C*******************************************************************************

      CHARACTER*(*)  IN(N),FMT
      CHARACTER*80   TEMP

      INTEGER        N,EFLAG,I,L

      REAL           OUT(N)

C     INITIALIZE THE ERROR FLAG TO NO ERRORS
      EFLAG=0

C     DETERMINE THE LENGTH OF THE CHARACTER DATA
      L=LEN(IN(1))

C     CONVERT THE CHARACTER DATA TO REAL DATA
      DO 5 I=1,N,1
         TEMP(1:80)=' '

C        IF NO DECIMAL POINT PRESENT THEN PUT ONE IN
         IF (INDEX(IN(I),'.') .EQ. 0) THEN
            TEMP(L+1:L+1)='.'
            TEMP(1:L)=IN(I)
                                        ELSE
            TEMP(1:L)=IN(I)
                                        ENDIF
```

```
C          CONVERT THE CHARACTER DATA TO REAL
           READ(TEMP(1:80),'(F80.1)',ERR=10) OUT(I)
5       CONTINUE
        RETURN

C       SET THE ERROR FLAG TO THE INDEX WITH THE CONVERSION ERROR
10      EFLAG=I
        RETURN
        END
        SUBROUTINE MENUDR(STRING,ROW,COLUMN,FG,BG,H,W)

C***********************************************************************
C   THIS SUBROUTINE MOVES THE CURSOR TO THE ROW AND COLUMN POSITON OF THE SCREEN
C   AS DESCRIBED BY ROW AND COLUMN.  ROW=1,2,3,...,24 AND COLUMN=1,2,3,...,80
C       VARIABLES PASSED:
C
C       STRING    -  TEXT STRING TO BE DISPLAYED ON THE SCREEN
C                    ~  ==>  JUST MOVE TO POSITION DO NOT DISPLAY
C       ROW       -  ROW TO MOVE TO ON THE SCREEN
C       COLUMN    -  COLUMN TO MOVE TO ON THE SCREEN
C       FG        -  COLOR TO DISPLAY THE TEXT IN ON THE SCREEN
C                    6 OR 7  ==>  REVERSE VIDEO
C                    OTHER   ==>  NO REVERSE VIDEO
C       BG        -  FLAG TO TELL MENUDR TO STORE OR OUTPUT DATA
C                    -1  ==>  INITIALIZE PAGE ARRAY AND STORE TEXT IN IT
C                    -2  ==>  OUTPUT THE PAGE ARRAY TO UNIT H
C       H         -  UNIT # THAT ARCHIVE FILE IS OPEN UNDER
C       W         -  NOT USED
C***********************************************************************

        CHARACTER*(*)   STRING
        CHARACTER*80    PAGE(22)
        CHARACTER*4     CURSOR
        INTEGER         L,FG,BG,H,W,ROW,COLUMN

C       INITALIZE THE PAGE ARRAY AND START STORING TEXT
        IF (BG .EQ. -1) THEN
                        DO 10 J=1,22,1
                           PAGE(J)(1:80)=' '
10                      CONTINUE
                        ENDIF

C       DETERMINE THE STRING LENGTH
        L=LEN(STRING)

C       STORE THE TEXT IN PAGE IF THERE IS TEXT TO STORE
        IF ((L .NE. 0).AND.(ROW .LT. 23))
     *              PAGE(ROW)(COLUMN:COLUMN+L-1)=STRING(1:L)

C       WRITE THE PAGE FILE TO THE ARCHIVE FILE ON UNIT H
        IF (BG .EQ. -2) THEN
                        DO 15 J=1,22,1
                           WRITE(H,'(A80)') PAGE(J)
15                      CONTINUE
                        ENDIF

C       SET THE CURSOR TO THE DESIRED POSITION BY SENDING ESC Y
        IESC=27
        CURSOR(1:1)=CHAR(IESC)
```

```
      CURSOR(2:2)='Y'
      CURSOR(3:3)=CHAR(ROW+31)
      CURSOR(4:4)=CHAR(COLUMN+31)

C     MOVE THE CURSOR TO THE DESIRED POSITION
      CALL TNOUA(CURSOR,4)

C     OUTPUT THE STRING IF IT IS NOT ~
      IF (L .EQ. 1) THEN
                     IF (STRING .EQ. '~') RETURN
                     ENDIF

C     SET THE TERMINAL INTENSITY IN ZENITH MODE
C      ESC q ==> REVERSE VIDEO
C      ESC p ==> NO REVERSE VIDEO
      CURSOR(2:2)='q'
      IF ((FG .EQ. 7).OR.(FG .EQ. 6)) CURSOR(2:2)='p'
      CALL TNOUA(CURSOR,2)

C     OUTPUT THE TEXT STRING THROUGH THE 68000 ASSEMBLER ROUTINE TNOUA
      CALL TNOUA(STRING,L)

      RETURN
      END
      SUBROUTINE CLEAR(FG,BG)

C*************************************************************************************
C  THIS SUBROUTINE CLEARS THE SCREEN BY TRANSMITTING AN ESC E IN ZENITH MODE
C     VARIABLES PASSED:
C
C     FG,BG  -  IGNORED IN THIS VERSION
C*************************************************************************************

      CHARACTER*2    TEMP
      INTEGER        FG,BG

      IESC=27
      TEMP(1:1)=CHAR(IESC)
      TEMP(2:2)='E'

      CALL TNOUA(TEMP,2)

      RETURN
      END
      SUBROUTINE ONOFF(I)

C*************************************************************************************
C  THIS SUBROUTINE TURNS THE CURSOR EITHER ON OR OFF.  ESC x5 TURNS THE CURSOR
C  OFF, WHILE ESC y5 TURNS THE CURSOR ON.  WHEN TURNING THE CURSOR ON, BE SURE
C  TO EXIT REVERSE VIDEO MODE.
C     VARIABLES PASSED:
C
C     I  -  FLAG TO TURN THE CURSOR ON OR OFF
C           0  ==>  CURSOR OFF
C           1  ==>  CURSOR ON
C*************************************************************************************

      CHARACTER*3    TEMP
      INTEGER        I
```

```
C     TURN THE CURSOR ON OR OFF
      IESC=27
      TEMP(1:1)=CHAR(IESC)
      TEMP(2:3)='x5'
      IF (I .EQ. 1) TEMP(2:2)='y'
      CALL TNOUA(TEMP,3)

C     BE SURE TO EXIT REVERSE VIDEO MODE, SEND AN ESC q
      IF (I .EQ. 1) THEN
                    TEMP(2:2)='q'
                    CALL TNOUA(TEMP,2)
                    ENDIF

      RETURN
      END
      SUBROUTINE MESS(I,R,C,L,CL)

C*******************************************************************************
C  THIS SUBROUTINE DISPLAY MESSAGE ON THE TERMINAL
C     VARIABLES PASSED:
C
C     I   -  MESSAGE INDEX
C     R   -  ROW ON THE SCREEN TO DISPLAY THE MESSAGE
C     C   -  COLUMN ON THE SCREEN TO DISPLAY THE MESSAGE
C     L   -  LENGTH OF THE MESSAGE TO BE DISPLAYED
C     CL  -  COLOR TO DISPLAY THE MESSAGE
C            6 OR 7  ==>  REVERSE VIDEO
C            OTHER   ==>  NO REVERSE VIDEO
C*******************************************************************************

      CHARACTER*30  MES(25)

      INTEGER       I,R,C,L,CL

      MES(1)(1:30)='INVALID DATA'
      MES(2)(1:30)='ENTRY EXISTS'
      MES(3)(1:30)='ADDITION MADE'
      MES(4)(1:30)=' '
      MES(5)(1:30)='NOT FOUND'
      MES(11)(1:30)='INVALID COMMAND'
      MES(12)(1:30)='IN ARCHIVE MODE'
      MES(13)(1:30)='ARCHIVE MODE'
      MES(14)(1:30)='TOO MANY FILES'
      MES(15)(1:30)='HELP NOT AVAILABLE'
      MES(16)(1:30)='PRESS RETURN TO CONTINUE'
      MES(17)(1:30)='NO ARCHIVE FILES FOUND'
      MES(18)(1:30)='DATABASE GONE'
      MES(19)(1:30)='PRESS RETURN TO EXIT'
      MES(20)(1:30)='NO FILENAME'
      MES(21)(1:30)='99 FILES EXIST'
      MES(22)(1:30)='NO PROCEDURE FILES'

C     DISPLAY THE DESIRED MESSAGE
      CALL MENUDR(MES(I)(1:L),R,C,CL,0,1,1)

      RETURN
      END
```

```
User - system    Date - 10/19/83    Time - 16:07:49    Filename - tccm.for

SYSTEM
10/19/83
16:07:49
TCCM.FOR
```

```
$bigcode
$segment %tccmseg
      SUBROUTINE TCCM(ITR,AUNIT,AFLAG,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                CUNIT,CFILE,SFILE1,SFILE2,SFILE3,SFILE4,
     *                SMUNIT,SMFILE,MUNIT,MFILE)

C******************************************************************************
C  THIS SUBROUTINE MANAGES THE DATA FOR THE TOXIC CORRIDOR CALCULATIONS.
C     VARIABLES PASSED:
C
C     ITR     -  INTERACTIVE TERMINAL READ UNIT
C     AUNIT   -  UNIT # ARCHIVE FILE IS OPEN ON
C     AFLAG   -  FLAG TO INDICATE WHETHER IN ARCHIVE MODE
C                TRUE  ==>  IN ARCHIVE MODE
C                FALSE ==>  NOT IN ARCHIVE MODE
C     SUNIT1 -   UNIT # TO OPEN SFILE1 ON
C     SUNIT2 -   UNIT # TO OPEN SFILE2 ON
C     SUNIT3 -   UNIT # TO OPEN SFILE3 ON
C     SUNIT4 -   UNIT # TO OPEN SFILE4 ON
C     CUNIT   -  UNIT # TO OPEN CFILE ON (NOT USED)
C     CFILE   -  CLIMATOLOGICAL DATABSE FILE NAME (NOT USED)
C     SFILE1 -   SUBSTANCE FILE NAME
C     SFILE2 -   SOURCE FILE NAME
C     SFILE3 -   POINTER FILE NAME
C     SFILE4 -   DATA FILE NAME
C     SMUNIT -   UNIT # TO OPEN MENU FILE (SMFILE) ON
C     SMFILE -   MENU FILE NAME
C     MUNIT   -  UNIT # TO OPEN MAP FILES ON
C     MFILE   -  SUPER DIRECTORY FILE FOR MAPS
C******************************************************************************

      CHARACTER*1    INP,CMD(1)
      CHARACTER*3    TT
      CHARACTER*8    DATE8,TEMPØ,CC(1Ø)
      CHARACTER*7    CFILE,SFILE1,SFILE2,SFILE3,SFILE4,SMFILE,MFILE
      CHARACTER*4Ø   SKEY(2)
      CHARACTER*8Ø   BK8Ø(1)

      INTEGER        ITR,I,SUNIT1,SUNIT2,SUNIT3,SUNIT4,AUNIT,
     *               CUNIT,RC(12,3),SMUNIT,ST(3),ITT,EFLAG,MUNIT

      REAL           SDATA(14),TDATA(2),CDATA(4)

      LOGICAL        FLAG1,FLAG2,FLAG3,FLAG4,AFLAG

      DATA ST /Ø,Ø,Ø/
      DATA TDATA/-1,-1/

      BK8Ø(1)(1:8Ø)=' '
      INP=' '
      ITT=-1
      SKEY(1)(1:4Ø)=' '
      SKEY(2)(1:4Ø)=' '

1ØØ   DO 1 I=1,11,1
         CC(I)(1:8)=' '
1     CONTINUE

C     DISPLAY THE TCCM MENU
      CALL MENUSV(SMFILE,3ØØ,RC,12,SMUNIT)
```

```
C     DISPLAY THE SOURCE OR BLANK
      ST(3)=0
      CALL MENUWR(RC,12,2,2,SKEY,0,1,ST)

C     IF THE SOURCE WAS GIVEN AS A ? THEN THE USER WAS ALLOWED TO
C     CHOOSE FROM A DISPLAYED LIST.  WHEN HE HAS MADE HIS CHOICE, THE
C     MAIN MENU IS DISPLAY ALONG WITH BOTH CHOICES AND THE USER IS
C     THEN PLACED AT THE SELECT OPTION LINE.
      IF (INP .EQ. '&') THEN
           CALL MENUWR(RC,12,1,1,SKEY,0,1,ST)
           GOTO 105
                        ENDIF

C     INPUT THE SUBSTANCE AND THE SOURCE
      IST=1
5     CALL MENURD(RC,12,IST,2,SKEY,ITR)

C     CHECK TO SEE IF THE SUBSTANCE AND/OR THE SOURCE ARE BLANK OR *.
C     IF EITHER IS THEN GO BACK AND GET A NON-BLANK CHARACTER STRING
      IF ((SKEY(1) .EQ. ' ').OR.(SKEY(2) .EQ. ' ')) THEN
         IF (SKEY(2) .EQ. ' ') IST=2
         IF (SKEY(1) .EQ. ' ') IST=1
         GOTO 5
                                                    ENDIF
      IF ((SKEY(1) .EQ. '*').OR.(SKEY(2) .EQ. '*')) THEN
         IF (SKEY(2) .EQ. '*') IST=2
         IF (SKEY(1) .EQ. '*') IST=1
         GOTO 5
                                                    ENDIF

C     DETERMINE WHICH COMMAND THE USER HAS SELECTED AND EXECUTE THAT
C     OPTION PROVIDED THAT IT IS A VALID SELECTION.
105   CMD(1)=' '
      CALL MENURD(RC,12,11,11,CMD,ITT)

C     USER WISHES TO GO BACK TO THE SUBSTANCE
      IF (CMD(1) .EQ. ' ') THEN
                           IST=1
                           ST(3)=1
                           CALL MENUWR(RC,12,11,11,CMD,0,1,ST)
                           CALL MESS(4,RC(12,1),RC(12,2),RC(12,3),1)
                           GOTO 5
                           ENDIF

C     USER WISHES TO USE THE MANUAL MODE OF THE TCCM
      IF (CMD(1) .EQ. 'M') THEN
                           INQUIRE (FILE=SFILE1,EXIST=FLAG1)
                           INQUIRE (FILE=SFILE2,EXIST=FLAG2)
                           INQUIRE (FILE=SFILE3,EXIST=FLAG3)
                           INQUIRE (FILE=SFILE4,EXIST=FLAG4)
                           IF ((.NOT. FLAG1).OR.(.NOT. FLAG2).OR.
     *                         (.NOT. FLAG3).OR.(.NOT. FLAG4)) THEN
                             CALL MESS(18,RC(12,1),RC(12,2),RC(12,3),6)
                             GOTO 105
                                                               ENDIF
                        CALL TCCM1(ITR,AUNIT,AFLAG,SUNIT1,SUNIT2,SUNIT3,
     *                             SUNIT4,CUNIT,CFILE,SFILE1,SFILE2,
     *                             SFILE3,SFILE4,SKEY,SMUNIT,SMFILE,
     *                             MUNIT,MFILE)
```

```
                    GOTO 100
                    ENDIF
C     USER WISHES TO RETURN
      IF (CMD(1) .EQ. 'X') RETURN

C     INVALID COMMAND
      IF (CMD(1) .NE. 'C') GOTO 105

C     PROCESS THE TCCM DATA.  THIS IS THE SECTION OF THE CODE THAT
C     SEARCHES THE DATA BASE FOR THE DATA THAT IS STORED WITH THE
C     GIVEN SUBSTANCE AND SOURCE.  WHEN THE SUBSTANCE AND THE SOURCE
C     ARE SPECIFIED, NO MATTER HOW THAT MAY BE, IT WILL EVENTUALLY BE
C     PROCESSED THROUGH THIS SECTION OF CODE.
      IF ((SKEY(1) .NE. '?').AND.(SKEY(2) .NE. '?')) THEN
        EFLAG=0
        INP='&'

C       SEARCH THE SUBSTANCE-SOURCE DATABASE FOR THE DESIRED ENTRY
        CALL SSEAR(EFLAG,ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,INP,SKEY,
     *               SDATA,SFILE1,SFILE2,SFILE3,SFILE4,SMUNIT,SMFILE)

C       EFLAG = 0 INNDICATES THAT THE VALUES WERE FOUND IN THE DATA BASE
        IF (EFLAG .EQ. 0) THEN

C       CONVERT THE REAL DATA TO ALPHA DATA
        CALL MESS(4,RC(12,1),RC(12,2),RC(12,3),1)
        WRITE(CC(3)(1:8),25) SDATA(2)
        WRITE(CC(4)(1:8),25) SDATA(3)
        WRITE(CC(5)(1:8),25) SDATA(4)
        WRITE(CC(6)(1:8),25) SDATA(11)
25      FORMAT(F8.3)

C       DISPLAY THE SUBSTANCE-SOURCE DATA
        ST(3)=0
        CALL MENUWR(RC,12,1,2,SKEY,0,7,ST)
        CALL MENUWR(RC,12,3,6,CC,0,7,ST)
        CALL MENUDR(BK80,23,1,1,0,1,1)
        RC(11,2)=30
        CALL MENUDR('C(ONTINUE) OR X(RETURN)  ==>',23,1,1,0,1,1)

C       THIS IS WHERE THE I/O DIRVERS WILL INPUT THE TEMPERATURE DATA
        DO 169 K=1,10,1
          CC(K)(1:8)=' '
169     CONTINUE

C       INPUT TEMPERATURE DATA
        IST=7
170     CALL MENURD(RC,12,IST,10,CC,ITR)

C       INPUT THE USER SELECTION
171     CMD(1)=' '
        CALL MENURD(RC,12,11,11,CMD,ITT)

C       USERS WISHES TO RETURN
        IF (CMD(1) .EQ. 'X') RETURN

C       USER WISHES TO GO BACK TO THE SOURCE STRENGTH
        IF (CMD(1) .EQ. ' ') THEN
                     IST=7
```

```
                              ST(3)=1
                              CALL MENUWR(RC,12,11,11,CMD,0,1,ST)
                              CALL MESS(4,RC(12,1),RC(12,2),RC(12,3),1)
                              GOTO 170
                              ENDIF

C        USER SELECTED INVALID INPUT
         IF (CMD(1) .NE. 'C') GOTO 171

C        CHECK FOR VALID CLIMO INPUT
         DO 168 K=1,4,1
            CC(K)=CC(K+6)
168      CONTINUE
         CALL MENUCK(CC,CDATA,4,'F8.3',IERR)

C        INVALID CLIMO DATA ENTERED
         IF (IERR .NE. 0) THEN
                          ST(3)=1
                          IST=IERR+6
                          CMD(1)=' '
                          CALL MENUWR(RC,12,11,11,CMD,0,1,ST)
                          CALL MESS(1,RC(12,1),RC(12,2),RC(12,3),6)
                          GOTO 170
                          ENDIF

C        PROCESS AND DISPLAY THE DATA
180      CALL TCCM2(ITR,AUNIT,AFLAG,SKEY,SDATA,CDATA,TDATA,
     *               SMUNIT,SMFILE,MUNIT,MFILE)
         INP=' '
         GOTO 100
                           ENDIF


C        EFLAG = 10 INDICATES THAT ONE OF THE 4 REQUIRED FILES FOR THE
C                   SUBSTANCE-SOURCE DATA BASE WAS NOT FOUND.
C        EFLAG = 11 INDICATES THAT THE SPECIFIED SUBSTANCE WAS NOT FOUND.
C        ANY OTHER EFLAG INDICATES THAT THE SPECIFIED SOURCE WAS NOT FOUND.
         IF (EFLAG .EQ. 10) THEN
                            CALL MESS(18,RC(12,1),RC(12,2),RC(12,3),6)
                            GOTO 105
                            ENDIF
         IF (EFLAG .EQ. 11) THEN
                            IST=1
                            ELSE
                            IST=2
                            ENDIF
         ST(3)=1
         CMD(1)=' '
         CALL MENUWR(RC,12,11,11,CMD,0,1,ST)
         CALL MESS(5,RC(12,1),RC(12,2),RC(12,3),6)
         GOTO 5
                                                     ENDIF

C      ALLOW THE USER TO SEARCH THE DATA BASE
       FLAG2=.FALSE.
       IF (SKEY(1) .EQ. '?') THEN
          FLAG2=.TRUE.
          INQUIRE (FILE=SFILE1,EXIST=FLAG1)
          IF (.NOT. FLAG1) THEN
```

```
                          CALL MESS(18,RC(12,1),RC(12,2),RC(12,3),6)
                          GOTO 105
                          ENDIF

C        CALL ROUTINE TO DISPLAY A LIST OF THE POSSIBLE SUBSTANCES
         CALL SBQST(SKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *              ITR,EFLAG)

C        NO SUBSTANCE WAS FOUND THAT MATCHED TO BE DISPLAYED
         IF (EFLAG .NE. 0) THEN
                           ST(3)=1
                           CMD(1)=' '
                           CALL MENUWR(RC,12,11,11,CMD,0,1,ST)
                           CALL MESS(5,RC(12,1),RC(12,2),RC(12,3),6)
                           IST=2
                           GOTO 5
                           ENDIF
         INP='&'
                             ENDIF

C     USER INPUT A ? FOR THE SOURCE
      IF (SKEY(2) .NE. '?') GOTO 100

C     ROUTINE TO DISPLAY A LIST OF THE SOURCES THAT ARE POSSIBLE TO
C     CHOOSE FORM
      CALL SRCQST(SKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *            ITR,EFLAG)

C     NO SOURCES WERE FOUND THAT MATCHED TO BE DISPLAYED
      IF (EFLAG .NE. 0) THEN
                        ST(3)=1
                        CMD(1)=' '
                        CALL MENUWR(RC,12,11,11,CMD,0,1,ST)
                        CALL MESS(5,RC(12,1),RC(12,2),RC(12,3),6)
                        IST=1
                        GOTO 5
                        ENDIF
      INP='&'
      GOTO 100

      END
      SUBROUTINE TCCM1(ITR,AUNIT,AFLAG,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                CUNIT,CFILE,SFILE1,SFILE2,SFILE3,SFILE4,SKEY,
     *                SMUNIT,SMFILE,MUNIT,MFILE)

C*******************************************************************************
C  THIS SUBROUTINE ALLOWS THE USER TO MANUALLY ENTER 10,30,60 MIN SPEL'S AND
C  SOURCE STRENGTH AND Z FACTORS AND SPILL AREAS AND TEMPERATURES
C     VARIABLES PASSED:
C
C     SAME AS FOR TCCM
C*******************************************************************************

      CHARACTER*1    INP,CMD(1)
      CHARACTER*8    CC(14),EC(4)
      CHARACTER*7    CFILE,SFILE1,SFILE2,SFILE3,SFILE4,SMFILE,MFILE
      CHARACTER*40   SKEY(2)

      INTEGER        ITR,I,EFLAG,SUNIT1,SUNIT2,SUNIT3,SMUNIT,ST(3),
     *               SUNIT4,AUNIT,CUNIT,RC(16,3),ITT,MUNIT
```

```
      REAL          CDATA(4),TDATA(2),TEMP(4)
      REAL          SDATA(14)

      LOGICAL       AFLAG

      DATA ST/0,0,0/

      ITT=-1
      DO 5 I=1,14,1
         SDATA(I)= 0.0
         CC(I)(1:8)=' '
5     CONTINUE

C     CHECK TO SEE IF THE SUBSTANCE IS IN THE DATA BASE , IF IT IS
C     THEN THE GMW AND 10,30, AND 60 MIN PEL EXIST.
      INP='&'
      EFLAG=0

C     SEARCH THE SUBSTANCE-SOURCE DATA BASE FOR A MATCH
      CALL SSEAR(EFLAG,ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,INP,SKEY,
     *           SDATA,SFILE1,SFILE2,SFILE3,SFILE4,SMUNIT,SMFILE)

C     IF EFLAG = 11 THEN THE SUBSTANCE WAS NOT FOUND IN THE DATA BASE.
      IF (EFLAG .NE. 11) THEN
C        SUBSTANCE WAS FOUND IN THE DATA BASE
C        DISPLAY THE MENU AND THE DATA RETRIEVED FROM THE DATA BASE
         CALL MENUSV(SMFILE,110,RC,16,SMUNIT)
         ST(3)=0
         CALL MENUWR(RC,16,1,2,SKEY,0,1,ST)
         WRITE(CC(3)(1:8),'(F8.3)') SDATA(2)
         WRITE(CC(4)(1:8),'(F8.3)') SDATA(3)
         WRITE(CC(5)(1:8),'(F8.3)') SDATA(4)
         CALL MENUWR(RC,16,3,5,CC,0,1,ST)

C        EFLAG=12  ==> SOURCE NOT FOUND AND NO SOURCE STRENGTH AVAILABLE
         IF (EFLAG .NE. 12) WRITE(CC(6)(1:8),'(F8.3)') SDATA(11)

C        INPUT THE SOURCE STRENGTH FROM THE USER
125      CALL MENURD(RC,16,6,6,CC,ITR)
         IF (CC(6) .EQ. ' ') GOTO 125

C        CONVERT THE CHARATCER DATA TO REAL DATA
         EC(1)=CC(6)
         CALL MENUCK(EC,TEMP,1,'(F8.3)',IERR)

C        SINCE NO ERROR OCCURRED IN THE CONVERSION  ==> THE USER IS NOT GOING
C        TO USE THE Z FACTOR METHOD
         IF (IERR .EQ. 0) THEN
                          SDATA(11)=TEMP(1)
                          TDATA(1)=-1
                          TDATA(2)=-1
                          CC(7)(1:8)=' '
                          CC(8)(1:8)=' '
                          CC(9)(1:8)=' '
                          ST(3)=0
                          CALL MENUWR(RC,16,7,9,CC,0,1,ST)
                          IST=10
                          GOTO 170
                          ENDIF
```

```
C        USER IS GOING TO USE THE Z FACTOR METHOD  ==) ZFACTOR AND SPILL AREA
C        AND SPILL TEMPERATURE TO BE INPUT
         CC(6)(1:8)=' '
         WRITE(CC(7)(1:8),'(F8.3)') SDATA(5)
         ST(3)=0

C        DISPLAY THE Z FACTOR STORED IN THE DATABASE
         CALL MENUWR(RC,16,6,7,CC,0,1,ST)
         SDATA(11)=-1.0

C        INPUT THE SPILL PARAMETERS
         IST=7
130      CALL MENURD(RC,16,IST,9,CC,ITR)

C        INPUT THE TEMPERATURE DATA
         IST=10
170      CALL MENURD(RC,16,IST,13,CC,ITR)

C        SCANNING THE COMMAND INPUT LINE
160      CMD(1)=' '
         CALL MENURD(RC,16,14,14,CMD,ITT)

C        USER SELECTED TO RETURN
         IF (CMD(1) .EQ. 'X') RETURN

C        USER SELECTED TO GO BACK TO THE SOURCE STRENGTH INPUT LINE
         IF (CMD(1) .EQ. ' ') THEN
                              ST(3)=1
                              CALL MESS(4,RC(15,1),RC(15,2),RC(15,3),1)
                              CALL MENUWR(RC,16,14,14,CMD,0,1,ST)
                              GOTO 125
                              ENDIF

C        INVALID INPUT
         IF (CMD(1) .NE. 'C') GOTO 160

C        CHECK THE SOURCE STRENGTH OR Z FACTOR DATA TO BE VALID
         IF (SDATA(11) .NE. -1.) THEN
            IF (SDATA(11) .LE. 0) THEN
               CMD(1)=' '
               ST(3)=1
               CALL MENUWR(RC,16,14,14,CMD,0,1,ST)
               CALL MESS(1,RC(15,1),RC(15,2),RC(15,3),7)
               GOTO 125
                                  ENDIF
                                 ELSE
C           CONVERT THE CHARACTER DATA TO REAL DATA
            EC(1)=CC(7)
            EC(2)=CC(8)
            EC(3)=CC(9)
            CALL MENUCK(EC,TEMP,3,'F(8.3)',IERR)

C           ERROR OCCURRED IN THE CONVERSION PROCESS
            IF (IERR .NE. 0) THEN
                             CMD(1)=' '
                             ST(3)=1
                             CALL MENUWR(RC,16,14,14,CMD,0,1,ST)
                             CALL MESS(1,RC(15,1),RC(15,2),RC(15,3),7)
                             IST=IERR+6
                             GOTO 130
                             ENDIF
            DO 180 K=1,3,1
               IF (TEMP(K) .LE. 0) THEN
                  CMD(1)=' '
                  ST(3)=1
                  CALL MENUWR(RC,16,14,14,CMD,0,1,ST)
                  CALL MESS(1,RC(15,1),RC(15,2),RC(15,3),7)
                  IST=K+6
                  GOTO 130
                                   ENDIF
180         CONTINUE

C        PLACE Z FACTOR DATA INTO THE PROPER PLACES
         SDATA(5)=TEMP(1)
         TDATA(1)=TEMP(2)
         TDATA(2)=TEMP(3)
                                 ENDIF

C        CHECK FOR VALID CLIMO INPUT
         DO 175 I=1,4,1
            EC(I)=CC(I+9)
175      CONTINUE
         CALL MENUCK(EC,CDATA,4,'(F8.3)',IERR)

C        ERROR OCCURRED IN THE CONVERSION PROCESS
         IF (IERR .NE. 0) THEN
                          CMD(1)=' '
                          ST(3)=1
                          CALL MENUWR(RC,16,14,14,CMD,0,1,ST)
                          CALL MESS(1,RC(15,1),RC(15,2),RC(15,3),7)
                          IST=IERR+9
                          GOTO 170
                          ENDIF

                         ELSE
C        THE SUBSTANCE IS NOT IN THE DATA BASE
C        DISPLAY THE MENU AND THE SUBSTANCE AND THE SOURCE
         CALL MENUSV(SMFILE,111,RC,16,SMUNIT)
         ST(3)=0
         CALL MENUWR(RC,16,1,2,SKEY,0,1,ST)

C        INPUT THE 10,30, AND 60 MIN SPELS
         IST=3
220      CALL MENURD(RC,16,IST,6,CC,ITR)

C        INPUT THE SOURCE STRENGTH
225      CALL MENURD(RC,16,7,7,CC,ITR)
         IF (CC(7) .EQ. ' ') GOTO 225

C        CONVERT THE CHARACTER DATA TO REAL DATA
         EC(1)=CC(7)
         CALL MENUCK(EC,TEMP,1,'(F8.3)',IERR)

C        IF NO ERROR OCCURRED  ==)  USER WILL NOT USE Z FACTOR METHOD
         IF (IERR .EQ. 0) THEN
                          SDATA(11)=TEMP(1)
                          SDATA(5)=0.
                          TDATA(1)=-1
                          TDATA(2)=-1
                         CC(8)(1:8)=' '
                         CC(9)(1:8)=' '
                         CC(10)(1:8)=' '
                         ST(3)=0
                         CALL MENUWR(RC,16,8,10,CC,0,1,ST)
                         IST=11
                         GOTO 270
                         ENDIF

C        USER WILL USE THE Z FACTOR METHOD
         CC(7)(1:8)=' '
         ST(3)=0
         CALL MENUWR(RC,16,7,7,CC,0,1,ST)
         SDATA(11)=-1.0

C        INPUT THE Z FACTOR AND SPILL PARAMETERS
         IST=8
230      CALL MENURD(RC,16,IST,10,CC,ITR)

C        INPUT THE TEMPERATURE DATA
         IST=11
270      CALL MENURD(RC,16,IST,14,CC,ITR)

C        SCANNING THE COMMAND INPUT LINE
260      CMD(1)=' '
         CALL MENURD(RC,16,15,15,CMD,ITT)

C        USER SELECTED TO RETURN
         IF (CMD(1) .EQ. 'X') RETURN

C        USER SELECTED TO GO BACK TO THE GMW, 10, 30, 60 SPEL LINES
         IF (CMD(1) .EQ. ' ') THEN
                             ST(3)=1
                             CALL MESS(4,RC(16,1),RC(16,2),RC(16,3),1)
                             CALL MENUWR(RC,16,15,15,CMD,0,1,ST)
                             IST=3
                             GOTO 220
                             ENDIF

C        INVALID COMMAND
         IF (CMD(1) .NE. 'C') GOTO 260

C        CHECK THE GMW, 10, 30 AND 60 MIN PEL'S
         EC(1)=CC(3)
         EC(2)=CC(4)
         EC(3)=CC(5)
         EC(4)=CC(6)
         CALL MENUCK(EC,TEMP,4,'(F8.3)',IERR)

C        ERROR IN THE CONVERSION PROCESS
         IF (IERR .NE. 0) THEN
                         CMD(1)=' '
                         ST(3)=1
                         CALL MENUWR(RC,16,15,15,CMD,0,1,ST)
                         CALL MESS(1,RC(16,1),RC(16,2),RC(16,3),7)
                         IST=IERR+2
                         GOTO 220
                         ENDIF
          DO 285 K=1,4,1
             IF (TEMP(K) .LE. 0) THEN
```

```
                CMD(1)=' '
                ST(3)=1
                CALL MENUWR(RC,16,15,15,CMD,0,1,ST)
                CALL MESS(1,RC(16,1),RC(16,2),RC(16,3),7)
                IST=K+2
                GOTO 220
                                 ENDIF
            SDATA(K)=TEMP(K)
285      CONTINUE

C        CHECK THE SOURCE STRENGTH AND Z FACTOR
         IF (SDATA(11) .NE. -1.) THEN
            IF (SDATA(11) .LE. 0) THEN
               CMD(1)=' '
               ST(3)=1
               CALL MENUWR(RC,16,15,15,CMD,0,1,ST)
               CALL MESS(1,RC(16,1),RC(16,2),RC(16,3),7)
               GOTO 225
                                  ENDIF
                                 ELSE
            EC(1)=CC(8)
            EC(2)=CC(9)
            EC(3)=CC(10)
            CALL MENUCK(EC,TEMP,3,'F(8.3)',IERR)

C           ERROR IN THE CONVERSION PROCESS
            IF (IERR .NE. 0) THEN
                             CMD(1)=' '
                             ST(3)=1
                             CALL MENUWR(RC,16,15,15,CMD,0,1,ST)
                             CALL MESS(1,RC(16,1),RC(16,2),RC(16,3),7)
                             IST=IERR+7
                             GOTO 230
                             ENDIF
            DO 280 K=1,3,1
               IF (TEMP(K) .LE. 0) THEN
                  CMD(1)=' '
                  ST(3)=1
                  CALL MENUWR(RC,16,15,15,CMD,0,1,ST)
                  CALL MESS(1,RC(16,1),RC(16,2),RC(16,3),7)
                  IST=K+7
                  GOTO 230
                                   ENDIF
280         CONTINUE

C        PLACE Z FACTOR DATA INTO THE PROPER PLACES
         SDATA(5)=TEMP(1)
         TDATA(1)=TEMP(2)
         TDATA(2)=TEMP(3)
                                 ENDIF

C        CHECK FOR VALID CLIMO INPUT
         DO 275 I=1,4,1
            EC(I)=CC(I+10)
275      CONTINUE
         CALL MENUCK(EC,CDATA,4,'(F8.3)',IERR)

C        ERROR IN CONVERSION PROCESS
         IF (IERR .NE. 0) THEN
                          CMD(1)=' '
                          ST(3)=1
                          CALL MENUWR(RC,16,15,15,CMD,0,1,ST)
                          CALL MESS(1,RC(16,1),RC(16,2),RC(16,3),7)
                          IST=IERR+10
                          GOTO 270
                          ENDIF
                         ENDIF
C     MAKE THE TOXIC CORRIDOR CALCULATION
      CALL TCCM2(ITR,AUNIT,AFLAG,SKEY,SDATA,CDATA,TDATA,SMUNIT,SMFILE,
     *           MUNIT,MFILE)
      RETURN
      END
      SUBROUTINE TCCM2(ITR,AUNIT,AFLAG,SKEY,SDATA,CDATA,TDATA,
     -                 SMUNIT,SMFILE,MUNIT,MFILE)
C
C  ARGUMENT VARIABLE TYPES
C
      INTEGER      ITR,AUNIT,SMUNIT,MUNIT
      REAL         SDATA(1), CDATA(1), TDATA(1)
      CHARACTER*40 SKEY(1)
      CHARACTER*7  SMFILE,MFILE
      LOGICAL      AFLAG
C
C  PROGRAM VARIABLE TYPES
C
      REAL         PF, Q, GMW, PEL(3), WINDS,
     -             CORWID, DELTAT, SIGTH, DIST(3,2)
C  EXTERNAL FUNCTIONS
      REAL         OCEANT

C
C  INITIALIZE ARRAYS AND VARIABLES
C
      DO 10 I=1,3,1
         PEL(I)= -1.0
         IF (SDATA(I+1) .GT. 0.0) PEL(I)= SDATA(I+1)
         DO 20 J=1,2,1
            DIST(I,J)= -1.0
20       CONTINUE
10    CONTINUE
C
C  COMPUTE CORRIDOR BASED ON A 90% PROBABILITY LEVEL(PL):  FACTOR(PF)= 1.63
C
      PF= 1.63
C
C  DEFINE VARIABLES
C
      GMW= SDATA(1)
      WINDS= CDATA(1)
      SIGTH= CDATA(3)
      DELTAT= CDATA(4)
      Q= SDATA(11)
C
C  IF Q=-1, THE SOURCE STRENGTH MUST BE COMPUTED VIA THE SPILL EQUATION
C
      IF( Q.EQ.-1. ) THEN
        A= TDATA(1)
        TP= TDATA(2)
        Z= SDATA(5)
        Q= 1.66E-04 * (WINDS**.75) * A
     .   * (  1.0 + ( 4.3E-03 *(TP**2.0) )   ) * Z
        SDATA(11)= -Q
      ENDIF
C
C  COMPUT CORRIDOR LENGTHS
C
      DO 30 I=1,3,1
         IF (PEL(I) .GT. 0.) THEN
                             DIST(I,1)= OCEANT(PF,GMW,PEL(I),Q,DELTAT)
                             IF( SIGTH .GT. 0.0 ) THEN
                               DIST(I,2)= OCEANS(PF,GMW,PEL(I),Q,
     -                                            SIGTH,DELTAT)
                                                    ENDIF
                             ENDIF
30    CONTINUE
C
C
C  COMPUTE  CORRIDOR WIDTHS
C
     IF {WINDS.LE.3.0} THEN CORWID= 360.0
                             GO TO 35
     IF {SIGTH.GT.0.0} THEN CORWID= 6.0 * SIGTH
                             GO TO 35
     IF {WINDS.GT.10.0} THEN CORWID= 60.0
                      ELSE CORWID= 90.0
     ENDIF
35 CONTINUE
C
      CALL TCDISP( ITR,AUNIT,AFLAG,SKEY,SDATA,CDATA,TDATA,
     -             CORWID,DIST,SMUNIT,SMFILE,MUNIT,MFILE)
C
C
      RETURN
      END
      REAL FUNCTION OCEANT(PF,GMW,GLC,Q,DELTAT)
C
C  COMPUTE CORRIDOR LENGTH BASED ON THE DELTA-T VERSION OF THE OCEAN
C  BREEZE/DRY GULCH EQUATION
C
      REAL PF,GMW,GLC,Q,DELTAT
C
C  CHECK FOR VALID INPUT
C
      IF( (GMW .LE. 0.) .OR. (Q.LE.0.) .OR. (PF.LE.0.) ) RETURN
C
      OCEANT= PF* (   3.28
     .             *((29.75/GMW)**0.513)
     .             *((GLC/Q)**(-0.513))
     .             *((DELTAT+10)**2.53)      )
C
      RETURN
      END
      REAL FUNCTION OCEANS(PF,GMW,GLC,Q,SIGTH,DELTAT)
C
C  COMPUTE CORRIDOR LENGTH BASED ON THE SIGMA THETA VERSION OF THE OCEAN
C  BREEZE/DRY GULCH EQUATION
C
      REAL PF,GMW,GLC,Q,SIGTH,DELTAT
C
C  CHECK FOR VALID INPUT
```

```
C
      IF( (GMW .LE. 0.) .OR. (Q.LE.0.) .OR. (PF.LE.0.) ) RETURN
C
      OCEANS= PF* (   3.28
     .                *((357.0/GMW)**0.510)
     .                *((GLC/Q)**(-0.510))
     .                *(SIGTH**(-0.258))
     .                *((DELTAT+10)**2.208)     )
C
      RETURN
      END
      SUBROUTINE TCDISP(ITR,AUNIT,AFLAG,SKEY,SDATA,CDATA,TDATA,
     -                  CORWID,DIST,SMUNIT,SMFILE,MUNIT,MFILE)

      INTEGER       AUNIT,ITR,SMUNIT,RC(30,3),S(10),ROW,COL,MUNIT

      REAL          SDATA(1),CDATA(1),TDATA(1),PL,CORWID,DIST(3,2),TCP(6)

      CHARACTER*40 SKEY(1),DISP(30)
      CHARACTER*15 STAMP,STAMPS(2)
      CHARACTER*7  SMFILE,MFILE
      CHARACTER*1  INP(1),FORMFD

      LOGICAL       AFLAG

      DATA S/ 10*0 /
C
      S(2)= SMUNIT

C
C   INITIALIZE THE DISPLAY TEXT ARRAY
C
      DO 1 I=1,30
        WRITE(DISP(I)(1:40),'(40X)' )
1     CONTINUE
C
C  INITIALIZE THE FILE STORAGE SYSTEM
C
      CALL MENUDR(' '  ,1,1,0,-1,0,0)

C
C   PROCESS MENU ID=250
C
      CALL MENUSV(SMFILE,250,RC,30,SMUNIT)
C
C
      CALL TIME(STAMP)
      DISP(1)(1:15)= STAMP(1:15)
      STAMPS(1)= STAMP
      CALL DATE(STAMP)
      DISP(2)(1:15)= STAMP(1:15)
      STAMPS(2)= STAMP
      DISP(3)(1:40)= SKEY(1)(1:40)
      DISP(4)(1:40)= SKEY(2)(1:40)
      Q= ABS(SDATA(11))
      WRITE(DISP(5)(1:9),'(F9.2)') Q
C
      WRITE(DISP(6)(1:5),'(F5.1)') CDATA(1)
      WRITE(DISP(7)(1:5),'(F5.1)') CDATA(2)
      WRITE(DISP(8)(1:5),'(F5.1)') CDATA(3)
      WRITE(DISP(9)(1:5),'(F5.1)') CDATA(4)
C
      DCOR= CDATA(2)+180.
      IF( DCOR.GT.360. ) DCOR= DCOR-360.
      WRITE(DISP(10)(1:5),'(F5.1)') DCOR
      WRITE(DISP(11)(1:5),'(F5.1)') CORWID
C
      IF( CDATA(3) .GT. 0.0 ) THEN
         WRITE(DISP(18)(1:19),'(''OB/DG (SIGMA THETA)'')' )
      ENDIF
      DO 20 I=1,3,1
         ID1= I+11
         ID2= I+18
         ID3= I+14
        WRITE(DISP(ID1)(1:8) ,'(F8.1)' ) SDATA(I+1)
        IF( CDATA(3) .GT. 0.0 ) THEN
           WRITE(DISP(ID2)(1:11),'(F11.1)') DIST(I,2)
        ENDIF
        WRITE(DISP(ID3)(1:11),'(F11.1)') DIST(I,1)
20    CONTINUE

C
C  IF THE SOURCE STRENGTH WAS CALCULATED VIA THE SPILL EQUATION, SHOW DATA
C
      IF( SDATA(11).LT.0.0 ) THEN
        WRITE(DISP(22)(1:10),'(''SPILL DATA'')')
        WRITE(DISP(23)(1:29),'(''POOL AREA (SQ FT):  '',F9.1)')TDATA(1)
        WRITE(DISP(24)(1:29),'(''POOL TEMP.... (C):  '',F9.1)')TDATA(2)
        WRITE(DISP(25)(1:29),'(''Z FACTOR........ :  '',F9.3)')SDATA(5)
      ENDIF
C
      CALL MENUWR(RC,30,1,25,DISP,0,0,S)

C     IF THE ARCHIVE MODE IS ACTIVE, WRITE THE DISPLAY TO THE ARCHIVE FILE
      IF (AFLAG) CALL MENUDR(' ' ,1,1,0,-2,AUNIT,0)

C     PROCESS THE COMMAND LINE
40    INP(1)=' '
      CALL MENURD(RC,30,30,30,INP,-1)

C      USER WANTS TO PRINT THE DISPLAY
       IF( INP(1) .EQ. 'P' ) THEN
                            OPEN(15,FILE='/DEV/PRT')
                            IFORM= 12
                            FORMFD= CHAR(IFORM)
                            WRITE(15,'(A1)') FORMFD
                            CALL MENUDR(' ',1,1,0,-2,15,0)
                            WRITE(15,'(A1)') FORMFD
                            CLOSE(15)
                            ENDIF

C      USER WANTS TO PLOT THE TOXIC CORRIDOR
       IF( INP(1) .EQ. 'G' ) THEN
                            TCP(1)=DIST(1,1)
                            TCP(2)=DIST(2,1)
                            TCP(3)=DIST(3,1)
                            TCP(4)=CORWID
                            TCP(5)=DCOR
                            CALL TCGRPH(ITR,SMUNIT,SMFILE,MUNIT,MFILE,TCP,
     -                                  STAMPS)
```

```
                             RETURN
                             ENDIF

C     USER WANTS TO RETURN TO THE CALCULATION MENU
      IF( INP(1) .EQ. 'X' ) RETURN

      GO TO 40
      END
```

```
User - system    Date - 10/19/83    Time - 16:08:15    Filename - tcgrph.for

SYSTEM
10/19/83
16:08:15
TCGRPH.F
```

```
$BIGCODE
$SEGMENT %TCGRPH
      SUBROUTINE TCGRPH(ITR,SMUNIT,SMFILE,MUNIT,MFILE,TCP,STAMPS)

C*************************************************************************
C  THIS SUBROUTINE PROCESSES THE MAP DATA AND DRAWS THE MAPS ON THE PLOTTER
C      VARIABLES PASSED:
C
C      ITR    -  INTERACTIVE TERMINAL READ UNIT
C      SMUNIT  -  UNIT # TO OPEN MENU FILE (SMFILE)
C      SMFILE  -  MENU FILE NAME
C      MUNIT   -  UNIT # TO OPEN THE MAP FILES ON
C      MFILE   -  MAP HEADER FILE NAME (SUPER DIRECTORY FILE)
C      TCP     -  ARRAY TO HOLD THE TOXIC CORRIDOR PARAMATERS
C                 TCP(1) -
C                 TCP(2) -
C                 TCP(3) -
C      STAMPS  -  ARRAY TO HOLD THE TIME AND DATE THE CALCULATIONS WERE MADE
C
C      FLAG1   -  USED TO DETERMINE WHETHER THE PLOT IS ON AN OLD OR NEW MAP
C                 FALSE ==> NEW MAP
C                 TRUE  ==> OLD MAP
C*************************************************************************

      CHARACTER*48  IO,TT(2)
      CHARACTER*40  TEXT(2),TEMP,IOP,FNAME
      CHARACTER*20  ANNO
      CHARACTER*15  STAMPS(2)
      CHARACTER*7   SMFILE,MFILE
      CHARACTER*1   CMD(1),INP

      INTEGER       ITR,SMUNIT,MUNIT,RC(4,3),ST(3),HDR,IS,IE,WCS(3),
     *              ANGLE,RECNO,SN,ID,NPTS,EFLAG,MARKS(20),SYM

      REAL          TCP(6),FPI

      LOGICAL       FLAG,FLAG1,FLAG2

      DATA ST /0,0,0/
C    'MARKS' LINKS THE 20 TYPES OF MAP INFORMATION TO HOUSTON PLOTTER SYMBOLS
      DATA MARKS/ 0,2,3,0,0,0,0,4,0,0,0,0,0,0,0,5,1,0,0,0/

      ITT=-1
      FLAG1=.FALSE.
C     DISPLAY THE PLOT OPTIONS MENU
20    CALL MENUSV(SMFILE,301,RC,4,SMUNIT)

C     SCAN THE COMMAND INPUT LINE
25    CMD(1)=' '
      CALL MENURD(RC,4,1,1,CMD,ITR)

C     CHECK FOR VALID INPUT
      IF (INDEX('123X',CMD(1)) .EQ. 0) THEN
                                    CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),7)
                                    GOTO 25
                                    ENDIF
C     THE USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X') RETURN

C     PLOT ONLY CORRIDOR
```

```
      IF (CMD(1) .EQ. '1') THEN
                           ST(3)=1
                           RC(3,1)=20
                           RC(3,2)=1
                           RC(3,3)=33
                           TT(1)='ENTER SCALE FACTOR (FT/INCH)  ==)'
                           CALL MENUWR(RC,4,3,3,TT,0,7,ST)
                           RC(4,1)=20
                           RC(4,2)=35
                           RC(4,3)=8
15                         TT(1)(1:48)=' '
                           CALL MENURD(RC,4,4,4,TT,ITT)
                           READ(TT(1)(1:8),'(F8.0)',ERR=15) FPI

C                          PLOT THE CORRIDOR USING FPI SCALE FACTOR
                           CALL CORPLT(FPI,TCP,STAMPS)
                           GOTO 20
                           ENDIF

C     PLOT CORRIDOR ON OLD MAP
      IF (CMD(1) .EQ. '3') THEN
                           FLAG1=.TRUE.
                           ST(3)=1
                           RC(3,1)=20
                           RC(3,2)=1
                           RC(3,3)=41
                           TT(1)='REGISTER MAP AND PRESS RETURN TO CONTINUE'
                           CALL MENUWR(RC,4,3,3,TT,0,7,ST)
                           READ(ITR,'(A1)') INP
                           ENDIF

C     PLOT CORRIDOR ON NEW MAP
      INP=' '
      TEXT(1)(1:40)=' '
      TEXT(2)(1:40)=' '

C     DISPLAY THE MENU TO INPUT THE BASE AND MAP FILE NAMES
1000  CALL MENUSV(SMFILE,251,RC,4,SMUNIT)

C     CHECK TO SEE IF ? WAS USED
      IF (INP .EQ. '*') THEN
                        ST(3)=0
                        CALL MENUWR(RC,4,1,2,TEXT,0,1,ST)
                        GOTO 150
                        ENDIF

C     INPUT THE BASE AND MAP FILE NAMES
      IST=1
100   CALL MENURD(RC,4,IST,2,TEXT,ITR)

C     SCAN THE COMMAND INPUT LINE
150   CMD(1)=' '
      CALL MENURD(RC,4,3,3,CMD,ITT)

C     THE USER WISHES TO GO BACK TO THE FIRST BASE MAP FILE NAME
      IF (CMD(1) .EQ. ' ') THEN
                           ST(3)=1
                           CALL MESS(4,RC(4,1),RC(4,2),RC(4,3),1)
                           CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
                           IST=1
                           GOTO 100
                           ENDIF

C     THE USER SELECTED TO RETURN TO THE CORRIDOR OPTIONS MENU
      IF (CMD(1) .EQ. 'X') GOTO 20

C     INVALID INPUT
      IF (CMD(1) .NE. 'C') GOTO 150

C     IF THE USER SPECIFIED A ? FOR BASE MAP DISPLAY LIST
      IF (TEXT(1) .EQ. '?') THEN

C        FIRST CHECK TO SEE IF THE SUPER DIRECTORY IS AVAILABLE
         INQUIRE (FILE=MFILE,EXIST=FLAG)

C        IF NOT AVAILABLE THEN DISPLAY AN ERROR MESSAGE NOT FOUND
         IF (.NOT. FLAG) THEN
                         ST(3)=1
                         CMD(1)=' '
                         CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
                         CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
                         IST=1
                         GOTO 100
                         ENDIF

C        CALL ROUTINE TO DISPLAY THE LIST OF BASE MAPS AVAILABLE
         FNAME=MFILE
         CALL MQST(TEXT(1),MUNIT,FNAME,SMUNIT,SMFILE,ITR,EFLAG,
     *             42,252)

C        CHECK THAT NO ERROR OCCURRED WHILE TRYING TO DISPLAY THE LIST.
C        I.E.  THERE ARE NO ENTRIES IN THE SUPER DIRECTORY
         IF (EFLAG .NE. 0) THEN
                           ST(3)=1
                           CMD(1)=' '
                           CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
                           CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
                           IST=1
                           GOTO 100
                           ENDIF
         INP='*'

C        IF MAP FILE NAME IS KNOWN, THEN GO BACK AND FILL IN THE BASE MAP
C        FILE NAME IN THE MENU AND CONTINUE
         IF (TEXT(2) .NE. '?') GOTO 1000
                            ENDIF

C     CHECK IF THE BASE MAP EXISTS THAT THE USER SPECIFIED (PACKING REQUIRED)
      TEMP=TEXT(1)
      CALL PACK(TEMP,J)
      INQUIRE (FILE=TEMP,EXIST=FLAG)

C     IF BASE MAP FILE DOES NOT EXIST, THEN DISPLAY ERROR MESSAGE
      IF (.NOT. FLAG) THEN
                      ST(3)=1
                      CMD(1)=' '
                      CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
                      IST=1
                      IF (INP .EQ. '*')
     *                CALL MENUSV(SMFILE,251,RC,4,SMUNIT)
```

```
                      CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
                      GOTO 100
                      ENDIF

C     CHECK FOR A ? FOR THE MAP FILE NAME
      IF (TEXT(2) .EQ. '?') THEN

C        CALL ROUTINE TO DISPLAY A LIST OF THE MAP FILES CONTAINED IN THE
C        SELECTED BASE MAP
         CALL MQST(TEXT(2),MUNIT,TEMP,SMUNIT,SMFILE,ITR,EFLAG,
     *                50,253)

C        CHECK THAT NO ERRORS OCCURRED WHILE DISPLAYING THE LIST.  I.E.
C        THAT NO ENTRIES WERE FOUND IN THE BASE MAP FILE
         IF (EFLAG .NE. 0) THEN
                           ST(3)=1
                           CMD(1)=' '
                           CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
                           IST=2
                           IF (INP .EQ. '*')
     *                     CALL MENUSV(SMFILE,251,RC,4,SMUNIT)
                           CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
                           GOTO 100
                           ENDIF
         INP='*'
         GOTO 1000
                            ENDIF

C     CHECK THAT THE BASE MAP .MM FILE EXISTS
      IF ((J+1) .GT. 38) THEN
                         TEMP(38:40)='.MM'
                         ELSE
                         TEMP(J+1:J+3)='.MM'
                         ENDIF
      INQUIRE (FILE=TEMP,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
                      ST(3)=1
                      CMD(1)=' '
                      CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
                      IST=1
                      IF (INP .EQ. '*') CALL MENUSV(SMFILE,251,RC,4,SMUNIT)
                      CALL MESS(5 RC(4,1),RC(4,2),RC(4,3),7)
                      GOTO 100
                      ENDIF

C     OPEN THE BASE FILE THE USER SELECTED TO CHECK AND SEE IF THE MAP FILE
C     THE USER SELECTED CAN BE FOUND
      TEMP=TEXT(1)
      CALL PACK(TEMP,J)
      OPEN (MUNIT,FILE=TEMP,STATUS='OLD',ACCESS='DIRECT',RECL=50,
     *      FORM='FORMATTED')

C     READ IN THE HEADER DATA TELLING HOW MANY RECORDS ARE IN THE FILE
      READ(MUNIT,'(I4)',REC=1) HDR

C     SEARCH THE BASE MAP FILE FOR A MATCH TO THE SELECTED FILE NAME
      DO 200 I=2,HDR,1
         READ(MUNIT,'(A48)',REC=I) IO
         IF (IO(1:40) .EQ. TEXT(2)) GOTO 250
200   CONTINUE
```

```
C     NO MATCH FOUND, DISPLAY AN ERROR MESSAGE
      ST(3)=1
      CMD(1)=' '
      CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
      CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
      IST=2
      GOTO 100

C     MATCH FOUND IN THE BASE MAP FILE
250   CALL MESS(4,RC(4,1),RC(4,2),RC(4,3),1)
      CLOSE (MUNIT)

C     GET THE STARTING AND STOPPING LOCATION IN THE BASE MAP .MM FILE
C     WHERE THE SELECTED MAP DATA CAN BE FOUND
      READ(IO(41:48),'(2I4)') IS,IE
      ISS=IS
      IEE=IE

C     SET THE BASE MAP .MM FILE NAME
      IF ((J+1) .GT. 38) THEN
                         TEMP(38:40)='.MM'
                         ELSE
                         TEMP(J+1:J+3)='.MM'
                         ENDIF

C     OPEN THE BASE FILE .MM TO PROCESS THE MAP
      OPEN (MUNIT,FILE=TEMP,STATUS='OLD',ACCESS='DIRECT',RECL=42,
     *      FORM='FORMATTED')

C     READ IN THE FIRST RECORD, WHICH SHOULD BE THE MAP NAME
      READ(MUNIT,'(A40)',REC=IS) IOP

C     THE MAP NAME IN THE FILE MUST AGREE WITH THE MAP NAME GIVEN
      IF (IOP .NE. TEXT(2)) THEN
                            ST(3)=1
                            CMD(1)=' '
                            CALL MENUWR(RC,4,3,3,CMD,0,1,ST)
                            CALL MESS(20,RC(4,1),RC(4,2),RC(4,3),7)
                            CLOSE (MUNIT)
                            GOTO 150
                            ENDIF

C     READ IN THE VIRTUAL LOWER AND UPPER X AND Y
      READ(MUNIT,'(2F10.2)',REC=IS+7) VLX,VLY
      READ(MUNIT,'(2F10.2)',REC=IS+8) VUX,VUY

C     INITIALZE THE PLOT DEVICE, DRAW A FRAME AROUND THE MAP AREA AND TITLE
C     THE PLOT, CONVERT THE FLOATING POINT DATA TO INTEGER DATA
      IVLX=VLX
      IVLY=VLY
      IVUX=VUX
      IVUY=VUY
      CALL PLINIT(IVLX,IVLY,IVUX,IVUY)

C     IF OLD MAP THEN SELECT THE SITE WHERE THE CORRIDOR IS TO GO AND PLACE
C     THE LEGEND ON THE MAP WITH THE CORRIDOR INFORMATION
      IF (FLAG1) THEN
                 CALL TCLIST(ITR,SMUNIT,SMFILE,MUNIT,ISS,IEE,TCP,FLAG2)
                 CALL LEGEND(IVUX,IVUY,TCP,STAMPS)
```

```
                     CALL PLDONE
                     CLOSE (MUNIT)
                     FLAG1=.FALSE.
                     GOTO 20
                     ENDIF

C     FOR A NEW MAP DRAW A FRAME AROUND IT
      CALL FRAME(TEXT(2),IVLX,IVLY,IVUX,IVUY,1,0)

C     SET THE RECORD POINTER TO THE FIRST DATA RECORD
      IS=IS+15

C     CHECK TO SEE IF THE END OF THIS MAP FILE HAS BEEN REACHED
300   IF (IS .GT. IE) THEN

C                         FLAG2 ENABLES THE USER TO DRAW ONLY THE MAP WITHOUT
C                         DISPLAYING ANY CORRIDORS ON IT.
C                         TRUE  ==>  DISPLAY THE CORRIDOR DATA
C                         FALSE ==>  DO NOT DISPLAY CORRIDOR DATA
                          FLAG2=.TRUE.
                          CALL TCLIST(ITR,SMUNIT,SMFILE,MUNIT,ISS,IEE,TCP,FLAG2)
                          IF (FLAG2) CALL LEGEND(IVUX,IVUY,TCP,STAMPS)
                          CALL PLDONE
                          CLOSE (MUNIT)
                          GOTO 20
                          ENDIF

C     READ IN THE DATA ID RECORD
C     WCS IS AN INTEGER ARRAY THAT HOLDS THE W(EIGHT)C(OLOR)S(TYLE) OF
C     THE ITEM TO BE DRAWN
      READ(MUNIT,'(6I2,F4.2,2I4,A16)',REC=IS) ID,SN,NPTS,WCS(1),WCS(2),
     *                                        WCS(3),SCALE,ANGLE,RECNO,ANNO

C     READ IN THE ANNOTATION FOR DATA ITEM
      READ(MUNIT,'(2F10.2,A20)',REC=IS+1) AX,AY,ANNO

C     IF THE ANNOTATION IS NOT BLANK THEN PLOT THE TEXT
      IF (ANNO .NE. ' ') THEN
                            IAX=AX
                            IAY=AY
                            CALL PLTEXT(IAX,IAY,2,0,ANNO,20,WCS)
                            ENDIF

C     ID IS A POINT, THIS MEANS A MARKER NEEDS TO BE DRAWN
      IF (ID .EQ. 10) THEN
                          READ(MUNIT,'(2F10.2)',REC=IS+2) VX,VY
                          IVX=VX
                          IVY=VY
                          SYM= MARKS(SN)
                          CALL MARKER(SYM,IVX,IVY,WCS,SCALE,ANGLE)
                          IS=IS+3
                          GOTO 300
                          ENDIF

C     ID IS A LINE
      IF (ID .EQ. 11) THEN
         IS=IS+3
         NREC=NPTS/2+MOD(NPTS,2)
         IREC=1
         IPTS=0
```

AD-A141 405 A REAL-TIME AIR DISPERSION MODELING SYSTEM(U) SIERRA GEOPHYSICS INC REDMOND WA D E BLEEKER ET AL. APR 84 AFESC/ESL-TR-83-63 F08635-82-C-0374

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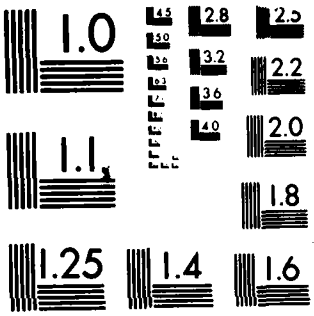

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
C        ARE ANY MORE LINE RECORDS TO BE READ
400      IF (IREC .GT. NREC) THEN
                             IS=IS+NREC
                             GOTO 300
                             ENDIF

C        FIND OUT HOW MANY POINTS ARE VALID ON THE RECORD
         IF ((IPTS+2) .GT. NPTS) THEN
                                 IFLG=1
                                 ELSE
                                 IFLG=2
                                 ENDIF
         IPTS=IPTS+IFLG

C        READ IN THE RECORD
         READ(MUNIT,'(4F10.2)',REC=IS+IREC-1) VX,VY,VX1,VY1

         IVX=VX
         IVY=VY
         IF (IREC .EQ. 1) THEN
                          CALL MOVETO(IVX,IVY)
                          ELSE
                          CALL LINETO(IVX,IVY,WCS)
                          ENDIF

C        IF THERE ARE TWO POINTS DISPLAY THE SECOND
         IVX=VX1
         IVY=VY1
         IF (IFLG .EQ. 2) CALL LINETO(IVX,IVY,WCS)
         IREC=IREC+1
         GOTO 400
                      ENDIF

C     ID IS A POLYGON --  END POINTS MUST BE CONNECTED
      IF (ID .EQ. 12) THEN
         IS=IS+3
         NREC=NPTS/2+MOD(NPTS,2)
         IREC=1
         IPTS=0

C        ARE ANY MORE LINE RECORDS TO BE READ
500      IF (IREC .GT. NREC) THEN
                             CALL LINETO(ISX,ISY,WCS)
                             IS=IS+NREC
                             GOTO 300
                             ENDIF

C        FIND OUT HOW MANY POINTS ARE VALID ON THE RECORD
         IF ((IPTS+2) .GT. NPTS) THEN
                                 IFLG=1
                                 ELSE
                                 IFLG=2
                                 ENDIF
         IPTS=IPTS+IFLG

C        READ IN THE RECORD
         READ(MUNIT,'(4F10.2)',REC=IS+IREC-1) VX,VY,VX1,VY1

         IVX=VX
         IVY=VY
         IF (IREC .EQ. 1) THEN
                          CALL MOVETO(IVX,IVY)
                          ISX=IVX
                          ISY=IVY
                          ELSE
                          CALL LINETO(IVX,IVY,WCS)
                          ENDIF

C        IF THERE ARE TWO POINTS DISPLAY THE SECOND
         IVX=VX1
         IVY=VY1
         IF (IFLG .EQ. 2) CALL LINETO(IVX,IVY,WCS)
         IREC=IREC+1
         GOTO 500
                      ENDIF

      END
      SUBROUTINE MQST(TEXT,MUNIT,FNAME,SMUNIT,SMFILE,ITR,EFLAG,
     *                IREC,IMN)

C*******************************************************************************
C  THIS SUBROUTINE DISPLAYS A LIST OF THE BASE FILE NAMES OR MAP FILE NAMES
C      VARIABLES PASSED:
C
C      MUNIT   -  UNIT # TO OPEN THE SUPER DIRECTORY OR BASE MAP FILES ON
C      FNAME   -  NAME OF FILE TO BE OPENED ON MUNIT
C      SMUNIT  -  UNIT # TO OPEN MENU FILE ON (SMFILE)
C      SMFILE  -  MENU FILE NAME
C      ITR     -  INTERACTIVE TERMINAL READ UNIT
C      IREC    -  RECORD LENGTH TO OPEN THE FILE WITH
C                 42  ==> SUPER DIRECTORY FILE
C                 50  ==> BASE MAP FILE
C      IMN     -  MENU NUMBER TO DISPLAY
C                 252  ==> SUPER DIRECTORY MENU
C                 251  ==> BASE MAP MENU
C
C      VARIABLES RETURNED:
C      TEXT    -  NAME OF BASE OR MAP FILE USER SELECTED
C      EFLAG   -  FLAG TO DETERMINE IF THERE WERE ANY ENTRIES IN THE FILE
C                 1  ==>  NO ENTRIES FOUND
C                 0  ==>  ENTRIES WERE FOUND
C*******************************************************************************

      CHARACTER*70  OUT(19)
      CHARACTER*40  IO,TEXT,FNAME
      CHARACTER*7   SMFILE
      CHARACTER*3   CMD(1)

      INTEGER       SMUNIT,RC(19,3),ST(3),ICNT,ITR,MUNIT,EFLAG,HD,
     *              IREC,IMN

      LOGICAL       FLAG1

      DATA ST/0,0,0/

C     OPEN THE FILE AND READ IN THE HEADER RECORD TO FIND OUT HOW MANY RECORDS
C     ARE IN THE FILE
      OPEN (MUNIT,FILE=FNAME,STATUS='OLD',RECL=IREC,ACCESS='DIRECT',
     *      FORM='FORMATTED')
```

```
      READ(MUNIT,'(I4)',REC=1) HD

C     SET THE ERROR FLAG
      EFLAG=0
      IF (HD .LE. 1) THEN
                     EFLAG=1
                     RETURN
                     ENDIF

5     ICNT=2
      FLAG1=.FALSE.

C     FORM THE LIST OF FILES THE USER CAN SELECT FROM
      DO 20 I=2,HD,1
         IF (.NOT. FLAG1) FLAG1=.TRUE.
         READ(MUNIT,'(A40)',REC=I) IO
         OUT(ICNT)(1:70)=' '
         WRITE(OUT(ICNT)(1:3),'(I3)') I
         OUT(ICNT)(6:70)=IO

C        CAN ONLY DISPLAY 19 NAMES ON THE SCREEN AT ONCE
         IF (ICNT .EQ. 19) THEN
           CALL MENUSV(SMFILE,IMN,RC,19,SMUNIT)
           CALL MENUWR(RC,19,2,19,OUT,0,1,ST)

C          INPUT THE USERS CHOICE
15         CMD(1)='    '
           CALL MENURD(RC,19,1,1,CMD,ITR)

C          USER SELECTED TO RETURN, CLOSE THE MAP UNIT FIRST
           IF (CMD(1) .EQ. 'X   ') THEN
                                  CLOSE (MUNIT)
                                  RETURN
                                  ENDIF

C          THE USER WANTS TO CONTINUE
           IF (CMD(1) .EQ. 'C   ') THEN
                                  ICNT=2
                                  FLAG1=.FALSE.
                                  GOTO 20
                                  ENDIF

C          CHECK FILE THE USER SELECTED IS IN THE USABLE RANGE
           READ(CMD(1)(1:3),'(I3)',ERR=15) II
           IF ((II .LT. 2).OR.(II .GT. HD)) GOTO 15

C          USER SELECTED A USABLE FILE, STORE IT IN TEXT, CLOSE THE FILE, AND
C          RETURN
           READ(MUNIT,'(A40)',REC=II) TEXT
           CLOSE (MUNIT)
           RETURN
                           ENDIF
      ICNT=ICNT+1
20    CONTINUE

C     THERE WERE LESS THAN 19 FILES TO DISPLAY
      IF (.NOT. FLAG1) GOTO 5

C     DISPLAY THE MENU AND THE FILE NAMES
      CALL MENUSV(SMFILE,IMN,RC,19,SMUNIT)
      CALL MENUWR(RC,19,2,ICNT-1,OUT,0,1,ST)

C     INPUT THE USERS CHOICE
25    CMD(1)='    '
      CALL MENURD(RC,19,1,1,CMD,ITR)

C     THE USER WANTS TO RETURN
      IF (CMD(1) .EQ. 'X  ') THEN
                             CLOSE (MUNIT)
                             RETURN
                             ENDIF

C     THE USER WANTS TO CONTINUE VIEWING THE LIST
      IF (CMD(1) .EQ. 'C  ') THEN
                             FLAG1=.FALSE.
                             GOTO 5
                             ENDIF

C     CHECK THAT THE USERS INPUT IS VALID
      READ(CMD(1)(1:3),'(I3)',ERR=25) II
      IF ((II .LT. 2).OR.(II .GT. HD)) GOTO 25

C     THE INPUT IS VALID, STORE THE VALID FILE NAME IN TEXT
      READ(MUNIT,'(A40)',REC=II) TEXT
      CLOSE (MUNIT)
      RETURN

      END
      SUBROUTINE TCLIST(ITR,SMUNIT,SMFILE,MUNIT,IS,IE,TCP,FLAG)

C*****************************************************************************
C  THIS SUBROUTINE IS USED TO INPUT THE SITE (COORDINATES) WHERE THE TOXIC
C  CORRIDOR IS TO BE PLOTTED
C     VARIABLES PASSED:
C
C     ITR      -  INTERACTIVE TERMINAL READ UNIT
C     SMUNIT   -  UNIT # TO OPEN MENU FILE (SMFILE) ON
C     SMFILE   -  MENU FILE NAME
C     MUNIT    -  UNIT # TO OPEN THE BASE MAP .MM FILE ON
C     IS       -  STARTING RECORD OF INTEREST IN BASE MAP .MM FILE
C     IE       -  ENDING RECORD OF INTEREST IN BASE MAP .MM FILE
C     TCP      -  TOXIC CORRIDOR PARAMETERS NEEDED TO PLOT THE CORRIDOR
C
C     VARIABLES RETURNED:
C
C     FLAG     -  FLAG TO DETERMINE WHETHER THE LEGEND WILL BE DRAWN ON THE MAP
C                 TRUE  ==>  THE LEGEND IS TO BE DRAWN
C                 FALSE ==>  THE LEGEND IS NOT TO BE DRAWN
C*****************************************************************************

      CHARACTER*20  TEXT(1)
      CHARACTER*10  DIG(2)
      CHARACTER*7   SMFILE
      CHARACTER*1   CMD(1),INP

      INTEGER       ITR,SMUNIT,IX,IY,IF1,RC(5,3),ITT,ST(3),WCS(3),NCOR

      REAL          TCP(6), DC(4), CORDIR, CORWID

      LOGICAL       FLAG
      DATA ST /0,0,0/
      DATA WCS /1,1,1/

      ITT=-1
      INP=' '
      TEXT(1)(1:20)=' '
      DIG(1)(1:10)=' '
      DIG(2)(1:10)=' '

C     DISPLAY THE MENU
1000  CALL MENUSV(SMFILE,254,RC,5,SMUNIT)

C     CHECK THAT A ? WAS USED FOR THE SITE
      IF (INP .EQ. '*') THEN
                        ST(3)=1
                        CALL MENUWR(RC,5,1,1,TEXT,0,1,ST)
                        WRITE(DIG(1)(1:10),'(I7)') IX
                        WRITE(DIG(2)(1:10),'(I7)') IY
                        CALL MENUWR(RC,5,2,3,DIG,0,1,ST)
                        GOTO 100
                        ENDIF

C     READ IN THE SITE NAME
25    CALL MENURD(RC,5,1,1,TEXT,ITR)

C     IF A ? WAS ENTERED FOR THE SITE, THEN DISPALY A LIST OF ALL POSSIBLE
C     SOURCES
      IF (TEXT(1) .EQ. '?') THEN
         CALL TCSITE(ITR,SMUNIT,SMFILE,MUNIT,IS,IE,TEXT(1),IX,IY)
                             INP='*'
                             GOTO 1000
                             ENDIF

C     READ IN THE COORDINATES
      IST=2
30    CALL MENURD(RC,5,IST,3,DIG,ITT)
      READ(DIG(1)(1:10),'(F10.0)',ERR=50) VX
      READ(DIG(2)(1:10),'(F10.0)',ERR=55) VY
      IX=VX
      IY=VY
      GOTO 100

C     ERROR RECOVERY FOR THE  COORDINATES
50    IST=2
      CALL MESS(1,RC(5,1),RC(5,2),RC(5,3),7)
      GOTO 30
55    IST=3
      CALL MESS(1,RC(5,1),RC(5,2),RC(5,3),7)
      GOTO 30

C     SCAN THE COMMAND INPUT LINE
100   CMD(1)=' '
      CALL MENURD(RC,5,4,4,CMD,ITT)

C     USER WANTS TO GO BACK TO THE SITE ENTRY
      IF (CMD(1) .EQ. ' ') THEN
                          ST(3)=1
                          CALL MENUWR(RC,5,4,4,CMD,0,1,ST)
                          CALL MESS(4,RC(5,1),RC(5,2),RC(5,3),1)
```

```
                              GOTO 25
                              ENDIF

C     USER WANTS TO RETURN, AND NOT DRAW THE LEGEND
      IF (CMD(1) .EQ. 'X') THEN
                              FLAG=.FALSE.
                              RETURN
                              ENDIF

C     USER WNATS TO DRAW THE CORRIDOR ON THE MAP AND A LEGEND
      IF (CMD(1) .EQ. 'P') THEN
C                             PLOT THE CIRCLES FOR 10, 30, 60 PEL AND 1800 FT
C                             PRIORITY ZONE
C
                              DC(1)= TCP(1)
                              DC(2)= TCP(2)
                              DC(3)= TCP(3)
                              DC(4)= 1800.0
                              CORWID= TCP(4)
                              CORDIR= TCP(5)

                              CALL DRWCOR(IX,IY,DC,4,CORWID,CORDIR)
C
                              RETURN
                              ENDIF

      GOTO 100
      END
      SUBROUTINE TCSITE(ITR,SMUNIT,SMFILE,MUNIT,IS,IE,SITE,IX,IY)

C*****************************************************************************
C  THIS SUBROUTINE SEARCHES THE BASE MAP .MM FILE AND LISTS ALL THE POSSSIBLE
C  SOURCES THAT COULD BE USED TO DRAW THE CORRIDOR AROUND
C     VARIABLES PASSED:
C
C     ITR      -  INTERACTIVE TERMINAL READ UNIT
C     SMUNIT   -  UNIT # TO OPEN MENU FILE (SMFILE) ON
C     SMFILE   -  MENU FILE NAME
C     MUNIT    -  UNIT # TO OPEN BASE MAP .MM ON
C     IS       -  STARTING RECORD IN BASE MAP .MM
C     IE       -  ENDING RECORD IN BASE MAP .MM
C
C     VARIABLES RETURNED:
C
C     SITE     -  SITE THAT THE USER SELECTED
C     IX       -  X COORDINATE OF THE SITE
C     IY       -  Y COORDINATE OF THE SITE
C*****************************************************************************

      CHARACTER*70  OUT(19)
      CHARACTER*40  ID
      CHARACTER*20  SITE
      CHARACTER*7   SMFILE
      CHARACTER*3   CMD(1)

      INTEGER       SMUNIT,RC(20,3),ST(3),ICNT,ITR,MUNIT,EFLAG,HD,
     *              IREC,IS,IE,IX,IY

      REAL          CO(19,2)
      LOGICAL        FLAG1

      DATA ST/0,0,0/

C     INITIALIZE THE CO-ORDINATE ARRAY TO ALL ZEROS
      DO 1 I=1,19,1
         CO(I,1)=0.
         CO(I,2)=0.
1     CONTINUE
      EFLAG=1

5     ICNT=2

C     IREC POINTS TO THE FIRST RECORD OF MAP DATA
      IREC=IS+15
      FLAG1=.FALSE.
20       IF (.NOT. FLAG1) FLAG1=.TRUE.
         READ(MUNIT,'(I2,2X,I2,18X,I2)',REC=IREC) NSYM,NPTS,LINK
         READ(MUNIT,'(A40)',REC=IREC+1) IO
         IREC=IREC+2
         IF (NSYM .NE. 10) IREC=IREC+1

C        INPUT THE X AND Y COORDINATE OF THE SITE
         READ(MUNIT,'(2F10.2)',REC=IREC) CO(ICNT,1),CO(ICNT,2)

C        SET IREC TO POINT TO THE NEXT RECORD
         IREC=IREC+(NPTS/2)+MOD(NPTS,2)

C        IF LINK = 1 THEN THE ITEM IN THE FILE IS A POTENTIAL SOURCE
         IF (LINK .NE. 1) GOTO 21

C        EFLAG IS USED TO DETERMINE WHETHER THERE WERE ANY ITEMS IN THE FILE
C        THAT WERE POTENTIAL SOURCES
C        EFLAG =0  ==>  NO POTENTIAL SOURCES
C        EFLAG =1  ==>  POTENTIAL SOURCES
         EFLAG=0

C        STORE OF THE SITE IN AN ARRAY
         OUT(ICNT)(1:70)=' '
         WRITE(OUT(ICNT)(1:3),'(I3)') ICNT
         OUT(ICNT)(6:25)=IO(21:40)

C        CAN ONLY DISPLAY 19 SITES ON THE SCREEN AT A TIME
         IF (ICNT .EQ. 19) THEN

C          DISPLAY THE MAIN MENU AND THE LIST OF SITES
           CALL MENUSV(SMFILE,255,RC,20,SMUNIT)
           CALL MENUWR(RC,20,2,19,OUT,0,1,ST)

C          INPUT THE USERS COMMAND
15         CMD(1)='    '
           CALL MENURD(RC,20,1,1,CMD,ITR)

C          USER SELECTED TO RETURN
           IF (CMD(1) .EQ. 'X   ') RETURN

C          USER WANTS TO CONTINUE AND SEE MORE OF LIST
           IF (CMD(1) .EQ. 'C   ') THEN
                                       ICNT=2
                                       FLAG1=.FALSE.
```

```
                                  GOTO 20
                                  ENDIF
C          CHECK THAT THE USER SELECTED A VALID SITE
           READ(CMD(1)(1:3),'(I3)',ERR=15) II
           IF ((II .LT. 2).OR.(II .GT. 19)) GOTO 15

C          STORE OFF THE SITE AND COORDINATES AND RETURN
           SITE(1:20)=OUT(II)(6:25)
           IX=CO(II,1)
           IY=CO(II,2)
           RETURN
                             ENDIF
      ICNT=ICNT+1
21    IF (IREC .LE. IE) GOTO 20
      IF (.NOT. FLAG1) GOTO 5

C     DISPLAY THE MENU AND ANY SITES NAMES FOUND
      CALL MENUSV(SMFILE,255,RC,20,SMUNIT)

C     IF THERE ARE NO SITES WHICH ARE POTENTIAL SOURCES DISPLAY A MESSAGE
C     AND ALLOW THE USER TO ONLY RETURN
      IF (EFLAG .NE. 0) THEN
                        CALL MESS(5,RC(20,1),RC(20,2),RC(20,3),7)
24                      CMD(1)='    '
                        CALL MENURD(RC,20,1,1,CMD,ITR)
                        IF (CMD(1) .NE. 'X   ') GOTO 24
                        RETURN
                        ENDIF
      CALL MENUWR(RC,20,2,ICNT-1,OUT,0,1,ST)

C     INPUT THE USERS SELECTION
25    CMD(1)='    '
      CALL MENURD(RC,20,1,1,CMD,ITR)

C     USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X   ') RETURN

C     USER SELECTED TO CONTINUE VIEWING THE LIST
      IF (CMD(1) .EQ. 'C   ') THEN
                             FLAG1=.FALSE.
                             GOTO 5
                             ENDIF

C     CHECK THAT THE USER SELECTED A VALID SITE
      READ(CMD(1)(1:3),'(I3)',ERR=25) II
      IF ((II .LT. 2).OR.(II .GT. 19)) GOTO 25

C     STORE OFF THE SITE AND COORIDINATES
      SITE(1:20)=OUT(II)(6:25)
      IX=CO(II,1)
      IY=CO(II,2)

      RETURN
      END
      SUBROUTINE DRWCOR(IX,IY,TCL,NCOR,CORWID,CORDIR)
C
C    ARGUMENT      TYPE           DESCRIPTION
C       IX        INTEGER*4     VIRTUAL X COORDINATE OF CORRIDOR STARTING POINT
C       IY           "             "    Y     "       "     "        "       "
```

```
C      TCL(NCOR)  REAL*4        TCL(1):  10 MIN PEL DISTANCE
C                               TCL(2):  30  "   "     "
C                               TCL(3):  60  "   "     "
C                               TCL(4-NCOR):  OPTIONAL CORRIDOR LENGTHS
C      NCOR       INTEGER*4     NUMBER OF CORRIDORS TO PLOT
C      CORWID     REAL*4        CORRIDOR WITH (DEGREES)
C      CORDIR     REAL*4            "     DIRECTION (DEGREES)
C
      INTEGER           IX, IY, NCOR
      REAL              TCL(NCOR), CORWID, CORDIR
C
C
C  PROGRAM VARIABLES
C
      INTEGER           WCS(3), IR, IX1, IY1, IX2, IY2, ICORL
      REAL              ANG1, ANG2, RADCOR, RADDIR
      CHARACTER*18      COORD(1)
C
C
                           WCS(1)= 0
                           WCS(3)= 1
                           ICORL= -1.
                           DO 10 I=1,3,1
                              IF( TCL(I).GT.0. ) THEN
                                IR=TCL(I)
                                ICORL= MAX0(IR,ICORL)
                                WCS(2)=I+4
                                CALL CIRCLE(IX,IY,IR,WCS)
                              ENDIF
10                        CONTINUE
C
                         IF( NCOR.GT.3 ) THEN
                           WCS(3)= 0
                           DO 20 I=4,NCOR,1
                              IF( TCL(I).GT.0. ) THEN
                                IR=TCL(I)
                                ICORL= MAX0(IR,ICORL)
                                WCS(2)=I+4
                                CALL CIRCLE(IX,IY,IR,WCS)
                              ENDIF
20                        CONTINUE
                         ENDIF
C
                         IF( ICORL.GT.0 ) THEN
                           RADCOR= CORWID/57.3
                           RADDIR= (90.-CORDIR)/57.3
                           ANG1= RADDIR - (RADCOR/2.0)
                           ANG2= RADDIR + (RADCOR/2.0)
                           IX1= IX+( ICORL*COS(ANG1) )
                           IY1= IY+( ICORL*SIN(ANG1) )
                           IX2= IX+( ICORL*COS(ANG2) )
                           IY2= IY+( ICORL*SIN(ANG2) )
                           CALL MOVETO(IX,IY)
                           WCS(1)= 0
                           WCS(2)= 1
                           WCS(3)= 0
                           CALL LINETO(IX1,IY1,WCS)
                           CALL MOVETO(IX,IY)
                           CALL LINETO(IX2,IY2,WCS)
                         ENDIF
```

```
C
                       RETURN
                       END

        SUBROUTINE LEGEND(VUX,VUY,TCP,STAMPS)
C
C  LEGEND PLOTS TIME, DATE AND CORRIDOR INFORMATION IN TEXT FORM
C
C  ARGUMENT        TYPE          DESCRIPTION
C    VUX          INTEGER      UPPER LEFT X VIRTUAL COORDINATE
C    VUY          INTEGER        "    "   Y   "         "
C   TCP(5)        INTEGER      CORRIDOR LENGTHS, WIDTH AND DIRECTION
C   TITLE(1)    CHARACTER*40   MAP TITLE
C  STAMPS(2)    CHARACTER*15   TIME AND DATE STAMPS
C
        INTEGER          VUX,VUY
        REAL             TCP(5)
        CHARACTER*15     STAMPS(2)
C
C
C  PROGRAM VARIABLES
C
        INTEGER          SPEL(3),WCS(3),SIZE,IX,IY,IX1,IY1
        CHARACTER*80     TS(1)
C
C
C  INITIALIZE LINE EXPOSURE LIMIT (SPEL) AND LINE ATTRIBUTE (WCS) ARRAYS
C
        SPEL(1)= 10
        SPEL(2)= 30
        SPEL(3)= 60
        WCS(1)= 0
        WCS(2)= 1
        WCS(3)= 0
C
        CALL CHRSIZ(3,SIZE)
        SIZE= 1.5*SIZE
        IX= VUX+(4*SIZE)
        IY= VUY-(4*SIZE)
        WRITE(TS(1)(1:22),'(''TIME:  '',A15)') STAMPS(1)
        CALL PLTEXT(IX,IY,3,0,TS(1),22,WCS)
        IY= IY-SIZE
        WRITE(TS(1)(1:22),'(''DATE:  '',A15)') STAMPS(2)
        CALL PLTEXT(IX,IY,3,0,TS(1),22,WCS)
        IY= IY-(2*SIZE)
        CALL PLTEXT(IX,IY,3,0,'      CORRIDOR INFORMATION',26,WCS)
        IY= IY-(1.2*SIZE)
        CALL PLTEXT(IX,IY,3,0,'OCEAN BREEZE - DRY GULCH EQUATION',33,WCS)
        IY= IY-SIZE
        CALL PLTEXT(IX,IY,3,0,'   (BASED ONLY ON DELTA T)',26,WCS)
        WRITE(TS(1)(1:18),'(''DIRECTION:  '',F6.1)') TCP(5)
        IY= IY-(1.25*SIZE)
        CALL PLTEXT(IX,IY,3,0,TS(1),18,WCS)
        WRITE(TS(1)(1:18),'(''WIDTH    :  '',F6.1)') TCP(4)
        IY= IY-SIZE
        CALL PLTEXT(IX,IY,3,0,TS(1),18,WCS)
C
C  PLOT CORRIDOR LINES AND DESCRIPTIONS
C
```

```
        IY= IY-(2*SIZE)
        IX1= IX+(5*SIZE)
        DO 10 I=1, 3
          IF( TCP(I).GT.0.0 ) THEN
          WCS(2)= I+4
          WCS(3)= 1
          CALL MOVETO(IX,IY)
          CALL LINETO(IX1,IY,WCS)
          WCS(2)= 1
          WCS(3)= 0
          WRITE(TS(1)(1:16),'(''   :  '',I2,'' MIN SPEL'')') SPEL(I)
          IY1= IY- (SIZE/3)
          CALL PLTEXT(IX1,IY1,3,0,TS(1),16,WCS)
          IY= IY-SIZE
                            ENDIF
10      CONTINUE
        WCS(2)= 8
        WCS(3)= 0
        CALL MOVETO(IX,IY)
        CALL LINETO(IX1,IY,WCS)
        WCS(2)= 1
        IY1= IY-(SIZE/3)
        CALL PLTEXT(IX1,IY1,3,0,'   :  PRIORITY ZONE',18,WCS)
        IY1= IY1-SIZE
        CALL PLTEXT(IX1,IY1,3,0,'       (1800 FEET) ',18,WCS)
C
        RETURN
        END


        SUBROUTINE SCLPLT(IX,IY,FPI)
C
C    ARGUMENT          TYPE          DESCRIPTION
C      IX             INTEGER*4     VIRTUAL LOWER LEFT X COORDINATE OF SCALE PLOT
C      IY             INTEGER*4        "     "     "  Y       "       "    "    "
C     FPI             REAL*4        MAP SCALE (FT/INCH)
C
C  PROGRAM VARAIBLES
        INTEGER          IXX,IYY,IX1,IY1,IY2,WCS(3),IFPI
        REAL             VUINTS
        CHARACTER*20     TEMP(1)
C
        IXX= IX
        IYY= IY
        WCS(1)= 0
        WCS(2)= 1
        WCS(3)= 0
        IFPI= FPI
        WRITE(TEMP(1)(1:18),'(''1 INCH='',I6,'' FEET'')') IFPI
        CALL VUINCH(VUNITS)
        CALL PLTEXT(IXX,IYY,3,0,TEMP(1),18,WCS)
        IYY= IYY+ (VUNITS*.33)
        IY1= IYY+ (VUNITS*.1)
        IY2= IYY- (VUNITS*.1)
        IX1= IXX+ VUNITS
        CALL MOVETO(IXX,IYY)
        CALL LINETO(IX1,IYY,WCS)
        CALL MOVETO(IXX,IY1)
        CALL LINETO(IXX,IY2,WCS)
        CALL MOVETO(IX1,IY1)
        CALL LINETO(IX1,IY2,WCS)
        IXX= IXX+ (VUNITS*.5)
        IYY= IYY+ (VUNITS*.33)
        CALL MOVETO(IXX,IYY)
        IYY= IYY+ (VUNITS*1.5)
        CALL LINETO(IXX,IYY,WCS)
        IXX= IXX+ (VUNITS*.1)
        IYY= IYY- (VUNITS*.2)
        CALL LINETO(IXX,IYY,WCS)
        CALL PLTEXT(IXX,IYY,5,0,' NORTH',6,WCS)
C
        RETURN
        END


        SUBROUTINE FRAME(TITLE,VLX,VLY,VUX,VUY,COLOR,STYLE)
C
C    ARGUMENT          TYPE          DESCRIPTION
C     TITLE(1)        CHARACTER*40  MAP TITLE
C      VLX            INTEGER*4     VIRTUAL X LOWER LEFT COORDINATE
C      VLY            INTEGER*4        "    Y  "     "       "
C      VUX            INTEGER*4        "    X UPPER RIGHT    "
C      VUY            INTEGER*4        "    Y  "     "       "
C      COLOR          INTEGER*4     FRAME LINE COLOR
C      STYLE             "            "     "  STYLE
C
        INTEGER         VLX,VLY,VUX,VUY,COLOR,STYLE
        CHARACTER*40    TITLE(1)
C
C
C  PROGRAM VARIABLES
C
        INTEGER         WCS(3),  IX,IY,SIZE
C
C
C  LOAD LINE COLOR AND STYLE INTO WCS ARRAY
C
        WCS(1)= 0
        WCS(2)= COLOR
        WCS(3)= STYLE
C
C  DRAW FRAME AS DEFINED BY VIRTUAL COORDINATE LIMITS
C
        CALL MOVETO(VLX,VLY)
        CALL LINETO(VLX,VUY,WCS)
        CALL LINETO(VUX,VUY,WCS)
        CALL LINETO(VUX,VLY,WCS)
        CALL LINETO(VLX,VLY,WCS)
C
        CALL CHRSIZ(6,SIZE)
        IX= VLX+(5*SIZE)
        IY= VUY+(.5*SIZE)
        CALL PLTEXT(IX,IY,6,0,TITLE(1),40,WCS)
C
        RETURN
        END
        SUBROUTINE CORPLT(FPI,TCP,STAMPS)

        CHARACTER*15  STAMPS(2)
        REAL          FPI,TCP(5),TEMP(5),VUNITS

        CALL PLINIT(0,0,2300,1700)

        CALL VUINCH(VUNITS)

C       CONVERT THE CORRIDOR TO INCHES
        CORWID =TCP(4)
        CORDIR =TCP(5)
        DO 5 I=1,3,1
           TEMP(I)=TCP(I)
           IF (TEMP(I) .GT. 0.) THEN
                                 TEMP(I)=TEMP(I)/FPI
                                 TEMP(I)=TEMP(I)*VUNITS
                                 ENDIF
5       CONTINUE
        TEMP(4)= (1800./FPI) * VUNITS

C       DRAW THE CORRIDOR
        CALL DRWCOR(1100,875,TEMP,4,CORWID,CORDIR)

C       DRAW THE LEGEND
        IX= 1900
        IY= 1950
        CALL LEGEND(IX,IY,TCP,STAMPS)

C  DRAW THE SCALE
        IX= 2150
        IY= 0
        CALL SCLPLT(IX,IY,FPI)
C
C       FINISH THE PLOTTING
        CALL PLDONE

        RETURN
        END
```

```
User - system    Date - 10/19/83    Time - 16:01:41    Filename - plot.for

SYSTEM
10/19/83
16:01:41
PLOT.FOR
```

```
      SUBROUTINE PLINIT(VLX,VLY,VUX,VUY)
C
C  PLOTTER INITIALIZATION SUBROUTINE
C
C      ARGUMENTS         TYPE              DESCRIPTION
C        VLX            INTEGER*4      VIRTUAL LOWER LEFT X COORDINATE
C        VLY            INTEGER*4        "        "    "  Y     "
C        VUX            INTEGER*4        "     UPPER RIGHT X     "
C        VUY            INTEGER*4        "        "    "   Y     "
C
      INTEGER*4         VLX, VLY, VUX, VUY
C
C
C
      COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
      COMMON/PLTLOC/ VXY
C
      INTEGER*4         CHAN, PSTAT,VXY(4)
      REAL*4            SCALEX, SCALEY
C
C  COMMON BLOCK VARIABLES
C
C      VARIABLE          TYPE              DESCRIPTION
C        CHAN           INTEGER*4      CHANNEL ASSIGNED TO PLOTTER BY CROMIX
C        PSTAT(10)      INTEGER*4      STATUS INFORMATION FOR PLOTTER
C        SCALEX         REAL*4         X SCALE :  (PLOT UNITS/VIRTUAL UNITS)
         "
C        VXY(4)         INTEGER*4      VXY(1)= VLX
C                                      VXY(2)= VLY
C                                      VXY(3)= VUX
C                                      VXY(4)= VUY
C
C
C  PROGRAM VARIABLES
C
      INTEGER   IWX,IWY
      REAL*4    DX, DY, ASPECT, VSPECT
C
C
C   LOAD /PLTLOC/ COMMON BLOCK
C
      VXY(1)= VLX
      VXY(2)= VLY
      VXY(3)= VUX
      VXY(4)= VUY
C
C   CHECK Y/X ASPECT RATIO OF VIRTUAL LIMITS.  IF THE RATIO IS GREATER
C   THAN THE ASPECT RATIO OF THE PLOTTER (11/17)), THE SCALE FACTORS MUST
C   BE DEPENDENT ON THE Y DIMENSION OF THE PLOT
C
      DX= FLOAT(VUX-VLX)
      DY= FLOAT(VUY-VLY)
      VSPECT= DY/DX
      ASPECT= 17.0/30.0
C
      IF( VSPECT .GT. ASPECT ) THEN
              SCALEY= 1700.0/DY
              SCALEX= SCALEY
      ELSE
              SCALEX= 3000.0/DX
```

```
            SCALEY= SCALEX
      ENDIF
C
C  OPEN A CHANNEL TO THE HOUSTON PLOTTER WITH A CALL TO THE ASSEMBLY LEVEL
C  SUBROUTINE OPNDEV
C
      CALL OPNDEV('/DEV/PLOT',CHAN)
C
C  HOME THE PLOTTER, SET ABSOLUTE MODE, SET .005-INCH INCREMENTS
C
      CALL OUTDEV(';:HA EC5',8,CHAN)
C
C  SET THE ORIGIN 1 INCH IN AND UP FROM THE HOME POSITION
C
      CALL OUTDEV('U 100,100 ;:O',13,CHAN)
C
      RETURN
      END



      SUBROUTINE CHRSIZ(HT,SIZE)
C
C  CHRSIZE RETURNS THE SIZE OF PLOTTED CHARACTERS IN VIRTUAL UNITS GIVEN
C  THEN HEIGHT IN PLOTTER UNITS
C
C    ARGUMENT        TYPE          DESCRIPTION
C      HT          INTEGER*4     HEIGHT OF CHARACTERS IN PLOTTER UNITS
C     SIZE            "          SIZE OF CHARACTERS IN VIRTUAL UNITS
C
      INTEGER HT,SIZE
C
C
      COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
C
      INTEGER*4       CHAN, PSTAT
      REAL*4          SCALEX, SCALEY
C
C  COMMON BLOCK VARIABLES
C
C     VARIABLE        TYPE            DESCRIPTION
C       CHAN        INTEGER*4      CHANNEL ASSIGNED TO PLOTTER BY CROMIX
C       PSTAT(10)   INTEGER*4      STATUS INFORMATION FOR PLOTTER
C       SCALEX      REAL*4         X SCALE :  (PLOT UNITS/VIRTUAL UNITS)
        "
C
C
C  PROGRAM VARIABLES
C
      REAL    HEIGHT, PUNITS
C
C
C  SINCE THE HOUSTON IS SET TO .005 INCHES IN PLINIT, THE CHARACTER SIZE
C  IN INCHES IS: SIZE(IN)= .035+(HT*.035)
C
      HEIGHT= .035+ (HT*.035)
      PUNITS= HEIGHT/.005
      SIZE= PUNITS/SCALEY
C
```

```
        RETURN
        END



        SUBROUTINE PLREAD(STRING,CHARS)
C
C  PLREAD READS OUTPUT FROM THE PLOTTER
C
C    ARGUMENT        TYPE            DESCRIPTION
C     STRING         CHARACTER    UP TO 80 BYTES RECEIVED FROM THE PLOTTER
C     CHARS          INTEGER*2    NUMBER OF BYTES SENT BY THE PLOTTER
C
        CHARACTER*(*)  STRING
        INTEGER*4      CHARS
C
C
C  COMMON BLOCK /PLTVAR/ MUST HAVE BEEN INITIALIZED BY A CALL TO SUBROUTINE
C  PLINIT
C
        COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
C
        INTEGER*4       CHAN, PSTAT
        REAL*4          SCALEX, SCALEY
C
        CHARACTER*99 STR,DUM
C
        STR=' '
C       OPEN(8,FILE='/DEV/PLOT')
        CALL OPNDEV('/DEV/PLOT',ICHAN)
        WRITE(0,'('' PRESS RETURN TO BEGIN DIGITIZING'')')
        READ(0,'(A99)') STR

        CALL OUTDEV(';:EL ED',7,CHAN)
        ICNT= 16
        CALL INDEV(STR,ICNT,ICHAN)
C       WRITE(8,'(''';:EL ED'')')
C       READ(8,'(A99)') STR
        WRITE(0,'(I3/A99)') ICNT,STR

        WRITE(0,'('' PRESS RETURN TO BEGIN DIGITIZING'')')
        READ(0,'(A99)') STR

        CALL OUTDEV(';:EL ED',7,CHAN)
C       WRITE(8,'(''';:EL ED'')')
C       READ(8,'(A99)') STR
        ICNT= 16
        CALL INDEV(STR,ICNT,ICHAN)
        WRITE(0,'(I3/A99)') ICNT,STR

C
C       CLOSE(8)
        RETURN
        END


        SUBROUTINE DELAY
```

```
      DO 10 I=1,30000
        X=X*1.1+X*(-1.1)
10    CONTINUE
      RETURN
      END


      SUBROUTINE PLDONE
C
C  PLDONE RESETS THE PLOTTER AND CLOSES THE PLOT CHANNEL
C
C
C  COMMON BLOCK /PLTVAR/ MUST HAVE BEEN INITIALIZED BY A CALL TO SUBROUTINE
C  PLINIT
C
      COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
C
      INTEGER*4        CHAN, PSTAT
      REAL*4           SCALEX, SCALEY
C
C
C  PROGRAM VARIABLES
C
      CHARACTER*5      COMMND(1)
C
C
C  ASSEMBLE THE COMMAND TO RESET THE PLOTTER
C
      WRITE(COMMND(1)(1:5),100)
100   FORMAT( ' Z   ' )
      CALL OUTDEV(COMMND(1),5,CHAN)
C
C  CLOSE THE CHANNEL
C
      CALL CLSDEV(CHAN)
C
      RETURN
      END


      SUBROUTINE LINETO(VX,VY,LATT)
C
C  LINETO WILL DRAW A LINE TO THE COORDINATES VX,VY WITH LINE ATTRIBUTES
C  AS SPECIFIED IN ARRAY LATT
C
C       ARGUMENT       TYPE                  DESCRIPTION
C          VX        INTEGER*4          VIRTUAL X CORDINATE OF DRAW DESTINATION
C          VY        INTEGER*4             "    Y     "     "     "      "
C          LATT(3)   INTEGER*4          LATT(1):  LINE WEIGHT (NOT IMPLEMENTED)
C                                       LATT(2):  LINE COLOR
C                                       LATT(3):  LINE STYLE
C
      INTEGER*4        VX, VY, LATT(3)
C
C
C  COMMON BLOCK /PLTVAR/ MUST HAVE BEEN INITIALIZED BY A CALL TO SUBROUTINE
C  PLINIT
C
      COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
```

```
        INTEGER*4       CHAN, PSTAT
        REAL*4          SCALEX, SCALEY
C
        COMMON/PLTLOC/ VXY
C
        INTEGER*4       VXY(4)
C
C  COMMON BLOCK VARIABLES
C
C       VARIABLE        TYPE             DESCRIPTION
C         VXY(4)       INTEGER*4       VXY(1)= VLX
C                                      VXY(2)= VLY
C                                      VXY(3)= VUX
C                                      VXY(4)= VUY
C
C  PROGRAM VARIABLES
C
        CHARACTER*22    COMMND(1)
        INTEGER*4       COLOR, STYLE, PX, PY
        REAL*4          RPX, RPY
C
C
        COLOR= LATT(2)
        STYLE= LATT(3)
C  ADJUST ORIGIN AND
C  MULTIPLY VX, VY BY SCALE FACTORS TO OBTAIN PLOTTER UNITS
C
        RPX= FLOAT(VX-VXY(1)) * SCALEX
        RPY= FLOAT(VY-VXY(2)) * SCALEY
        PX=  INT(RPX)
        PY=  INT(RPY)
C
C  ASSEMBLE COMMAND FOR A MOVE WITH THE PEN DOWN
C
        WRITE(COMMND(1)(1:22),100) COLOR, STYLE, PX, PY
100     FORMAT(' P',I1,' L',I1,' D ',I5,',',I5,'  ')
C
        CALL OUTDEV(COMMND(1),22,CHAN)
C
        RETURN
        END


        SUBROUTINE MOVETO(VX,VY)
C
C  MOVETO WILL MOVE THE PEN TO THE COORDINATES VX,VY
C
C      ARGUMENT       TYPE                  DESCRIPTION
C         VX        INTEGER*4         VIRTUAL X CORDINATE OF MOVE DESTINATION
C         VY        INTEGER*4            "    Y     "     "    "      "
C
        INTEGER*4       VX, VY
C
C
C  COMMON BLOCK /PLTVAR/ MUST HAVE BEEN INITIALIZED BY A CALL TO SUBROUTINE
C  PLINIT
C
        COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
C
```

```
        INTEGER*4       CHAN, PSTAT
        REAL*4          SCALEX, SCALEY
C
        COMMON/PLTLOC/ VXY
C
        INTEGER*4       VXY(4)
C
C  COMMON BLOCK VARIABLES
C
C       VARIABLE        TYPE             DESCRIPTION
C         VXY(4)       INTEGER*4       VXY(1)= VLX
C                                      VXY(2)= VLY
C                                      VXY(3)= VUX
C                                      VXY(4)= VUY
C
C  PROGRAM VARIABLES
C
        CHARACTER*16    COMMND(1)
        INTEGER*4       PX, PY
C       REAL*4          RPX,RPX
C
C  ADJUST ORIGIN AND
C  MULTIPLY VX, VY BY SCALE FACTORS TO OBTAIN PLOTTER UNITS
C
        RPX= FLOAT(VX-VXY(1)) * SCALEX
        RPY= FLOAT(VY-VXY(2)) * SCALEY
        PX=  INT(RPX)
        PY=  INT(RPY)
C
C  ASSEMBLE THE COMMAND TO MOVE WITH THE PEN UP
C
        WRITE(COMMND(1)(1:16),100) PX, PY
100     FORMAT(' U ',I5,',',I5,'  ')
        CALL OUTDEV(COMMND(1),16,CHAN)
C
        RETURN
        END

        SUBROUTINE MARKER(MID,VX,VY,LATT,SCALE,ANGLE)
C
C  MARKER WILL DRAW A MARKER AT COORDINATES VX, VY
C
C      ARGUMENT       TYPE                DESCRIPTION
C         MID       INTEGER*4          MARKER TYPE (SEE HOUSTON PLOTTER DOC)
C         VX        INTEGER*4          VIRTUAL X CORDINATE OF MOVE DESTINATION
C         VY        INTEGER*4             "    Y      "     "     "     "
C         LATT(3)   INTEGER*4          LATT(1):  LINE WEIGHT (NOT IMPLEMENTED)
C                                      LATT(2):  LINE COLOR
C                                      LATT(3):  LINE STYLE
C         SCALE     REAL*4             HEIGHT SPECIFIER
C         ANGLE     INTEGER*4          MARKER ORIENTATION (NOT IMPLEMENTED)
C
C
        INTEGER*4       MID, VX, VY, LATT(3), ANGLE
        REAL*4          SCALE
C
C
C  COMMON BLOCK /PLTVAR/ MUST HAVE BEEN INITIALIZED BY A CALL TO SUBROUTINE
C  PLINIT
C
```

```
        COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
C
        INTEGER*4        CHAN, PSTAT
        REAL*4           SCALEX, SCALEY
C
C
C   PROGRAM VARIABLES
C
        CHARACTER*12     COMMND(1)
        INTEGER*4        COLOR, STYLE, HT
C
C
        COLOR= LATT(2)
        STYLE= LATT(3)
C
C   SET MARKER HEIGHT
C
        HT= INT(SCALE)
        IF( HT .LE. 0 ) HT=1
        IF( HT .GT. 5 ) HT=5
C
C   MOVE TO VX, VY
C
        CALL MOVETO(VX,VY)
C
C   ASSEMBLE THE COMMAND TO DRAW THE MARKER
C
        WRITE(COMMND(1)(1:12),100) COLOR, STYLE, HT, MID
100     FORMAT(' P',I1,' L',I1,' M',1X,I1,I1,1X)
        CALL OUTDEV(COMMND(1),12,CHAN)
C
        RETURN
        END



        SUBROUTINE PLTEXT(VX,VY,HT,ANG,STRING,NCHAR,LATT)
C
C   PLTEXT DRAWS TEXT PASSED IN 'STRING', BEGINNING AT VX,VY AND AT ANGLE ANG
C
C      ARGUMENT        TYPE                  DESCRIPTION
C         VX         INTEGER*4          VIRTUAL X CORDINATE OF DRAW DESTINATION
C         VY         INTEGER*4            "     Y       "      "      "     "
C         HT         INTEGER*4          HEIGHT OF TEXT IN VIRTUAL UNITS
C         ANG        INTEGER*4          ANGLE OF TEXT (0-360)
C        STRING      CHARACTER*(*)      ARRAY CONTAINING TEXT
C        NCHAR       INTEGER*4          NUMBER OF CHARACTERS TO DRAW
C        LATT(3)     INTEGER*4          LATT(1):  LINE WEIGHT (NOT IMPLEMENTED)
C                                       LATT(2):  LINE COLOR
C                                       LATT(3):  LINE STYLE
C
        INTEGER*4        VX, VY, HT, ANG, NCHAR, LATT(3)
        CHARACTER*(*)    STRING
C
C
C   COMMON BLOCK /PLTVAR/ MUST HAVE BEEN INITIALIZED BY A CALL TO SUBROUTINE
C   PLINIT
C
        COMMON/PLTVAR/ CHAN, PSTAT(10), SCALEX, SCALEY
C
```

```
      INTEGER*4       CHAN, PSTAT
      REAL*4          SCALEX, SCALEY
C
C
C  PROGRAM VARIABLES
C
      INTEGER*4       PH, SX, SY, COLOR, STYLE
      REAL*4          RADS
      CHARACTER*3Ø    COMMND(1)
C
C
      COLOR= LATT(2)
      STYLE= LATT(3)
      RADS= FLOAT(ANG)/57.35
      SX= NINT( 1ØØØ.*COS(RADS) )
      SY= NINT( 1ØØØ.*SIN(RADS) )
      PH= HT
      CALL MOVETO(VX,VY)
      WRITE(COMMND(1)(1:3Ø),1ØØ) COLOR,STYLE,PH,SX,SY
1ØØ   FORMAT(' P',I1,' L',I1,' S(S',I5,',X',I5,',Y',I5,')' )
      ICNT= 3Ø
      CALL OUTDEV(COMMND(1),ICNT,CHAN)
      CALL OUTDEV(STRING,NCHAR,CHAN)
      ICNT= 2
      CALL OUTDEV('_ ',ICNT,CHAN)
C
      RETURN
      END


      SUBROUTINE CIRCLE(VX,VY,VR,LATT)
C
C  CIRCLE DRAWS A CIRCLE AT VX, VY WITH RADIUS VR
C
C     ARGUMENT      TYPE                DESCRIPTION
C        VX       INTEGER*4         VIRTUAL X CORDINATE OF DRAW DESTINATION
C        VY       INTEGER*4            "    Y     "     "     "
C        VR       INTEGER*3         VIRTUAL RADIUS OF CIRCLE
C        LATT(3)  INTEGER*4         LATT(1):  LINE WEIGHT (NOT IMPLEMENTED)
C                                   LATT(2):  LINE COLOR
C                                   LATT(3):  LINE STYLE
C
      INTEGER*4       VX, VY, VR, LATT(3)
C
C
C  COMMON BLOCK /PLTVAR/ MUST HAVE BEEN INITIALIZED BY A CALL TO SUBROUTINE
C  PLINIT
C
      COMMON/PLTVAR/ CHAN, PSTAT(1Ø), SCALEX, SCALEY
C
      INTEGER*4       CHAN, PSTAT
      REAL*4          SCALEX, SCALEY
C
C
C  PROGRAM VARIABLES
C
      CHARACTER*27  COMMND(1)
      INTEGER*4     PX, PY, PR, COLOR, STYLE
C
```

```
      COLOR= LATT(2)
      STYLE= LATT(3)
C
C  FUNCTION ICOR RETURNS PLOTTER UNITS GIVEN A VIRTUAL COORDINATE AND SCALE
C
      PX= ICOR(VX,SCALEX)
      PY= ICOR(VY,SCALEY)
      PR= ICOR(VR,SCALEX)
C
      WRITE(COMMND(1)(1:27),100) COLOR, STYLE, PX,PY,PR
100   FORMAT(' P',I1,' L',I1,' CC',I5,',',I5,1X,I5,1X)
      ICNT= 27
      CALL OUTDEV(COMMND(1),ICNT,CHAN)
C
      RETURN
      END




      INTEGER FUNCTION ICOR(VU,SCALE)
C
C  ICOR COMPUTES PLOTTER UNITS GIVEN A VIRTUAL COORDINATE AND A SCALE FACTOR
C
C    ARGUMENT          TYPE                    DESCRIPTION
C      VU            INTEGER*4             VIRTUAL COORDINATE
C      SCALE         REAL*4                (PLOT UNITS)/(VIRTUAL UNITS)
C
      INTEGER*4 VU
C
C
C  PROGRAM VARIABLES
C
      REAL VCOR
C
C
      VCOR= FLOAT(VU) * SCALE
      ICOR= INT(VCOR)
C
      RETURN
      END
      SUBROUTINE VUINCH(VUNITS)
C
C     VUINCH COMPUTES THE PLOTTER UNITS/INCH.  FOR THE HOUSTON THERE ARE
C     200 PLOTTER UNITS/INCH
C
      INTEGER  CHAN,PSTAT

      REAL     VUNITS,SCALEX,SCALEY

      COMMON /PLTVAR/ CHAN,PSTAT(10),SCALEX,SCALEY

      VUNITS=200.0/SCALEX

      RETURN
      END
```

```
User - system    Date - 10/19/83    Time - 16:01:55    Filename - procdb.for

SYSTEM
10/19/83
16:01:55
PROCDB.F
```

```
$BIGCODE
$SEGMENT %PRDBSEG
       SUBROUTINE PROCD(ITR,PUNIT1,PUNIT2,PFILE1,PHFILE,SMUNIT,SMFILE)

C**********************************************************************
C  THIS SUBROUTINE MANAGES THE PROCEDURE DATA BASE
C     VARIABLES PASSED:
C
C     ITR     -  INTERACTIVE TERMINAL READ UNIT
C     PUNIT1  -  UNIT # TO OPEN THE PROCEDURE DIRECTORY FILE ON
C     PUNIT2  -  UNIT # TO OPEN THE PROCEDURE FILE ON
C     PFILE1  -  DIRECTORY FILE NAME
C     PHFILE  -  PROCEDURE HELP FILE NAME
C     SMUNIT  -  UNIT # TO OPEN MENU FILE (SMFILE) ON
C     SMFILE  -  MENU FILE NAME
C**********************************************************************

      CHARACTER*1  CMD(1)
      CHARACTER*7  PFILE1,PHFILE,SMFILE

      INTEGER      ITR,PUNIT1,PUNIT2,SMUNIT,RC(2,3)

C     DISPLAY THE MAIN MENU AND INPUT USER SELECTION
1     CALL MENUSV(SMFILE,140,RC,2,SMUNIT)
2     CMD(1)=' '
      CALL MENURD(RC,2,1,1,CMD,ITR)

C     CHECK FOR A VALID INPUT
      IF (INDEX('1234X',CMD(1)) .EQ. 0) THEN
                              CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),7)
                              GOTO 2
                                         ENDIF

C     USER SELECTED TO VIEW THE HELP FILES
      IF (CMD(1) .EQ. '1') CALL PHELP(ITR,PUNIT1,PHFILE,SMUNIT,SMFILE)

C     USER SELECTED TO DELETE A FILE FROM THE DATA BASE
      IF (CMD(1) .EQ. '2') CALL PDEL(ITR,PUNIT1,PUNIT2,PFILE1,SMUNIT,
     *                                SMFILE)

C     USER SELECTED TO ADD TO THE DATA BASE
      IF (CMD(1) .EQ. '3') CALL PADD(ITR,PUNIT1,PUNIT2,PFILE1,SMUNIT,
     *                                SMFILE)

C     USER SELECTED TO SEARCH THE DATABASE
      IF (CMD(1) .EQ. '4') CALL PSEAR(ITR,PUNIT1,PUNIT2,PFILE1,SMUNIT,
     *                                SMFILE)

C     USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X') RETURN

      GOTO 1
      END
      SUBROUTINE PHELP(ITR,PUNIT,PHFILE,SMUNIT,SMFILE)
C**********************************************************************
C  THIS SUBROUTINE DISPLAYS THE HELP FILE FOR THE PROCEDURE DATA BASE
C     VARIABLES PASSED:
C
C     ITR     -  ITERACTIVE TERMINAL READ UNIT
C     PUNIT   -  UNIT # TO OPEN THE HELP FILE (PHFILE) ON
```

```
C     PHFILE  -  PROCEDURE HELP FILE NAME
C     SMUNIT  -  UNIT # TO OPEN MENU FILE (SMFILE) ON
C     SMFILE  -  MENU FILE NAME
C*****************************************************************************
      CHARACTER*80  TLINE,LINE
      CHARACTER*7   PHFILE,SMFILE
      CHARACTER*1   CMD(1)

      INTEGER       ITR,PUNIT,SMUNIT,RC(3,3)

      LOGICAL       FLAG

C     DISPLAY THE MAIN MENU AND INPUT THE USER SELECTION
1     CALL MENUSV(SMFILE,145,RC,3,SMUNIT)
2     CMD(1)=' '
      CALL MENURD(RC,3,1,1,CMD,ITR)

C     CHECK FOR A VALID INPUT
      IF (INDEX('123X',CMD(1)) .EQ. 0) THEN
                         CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),7)
                         GOTO 2
                                        ENDIF

C     USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X') RETURN

C     CHECK TO SEE THAT THE HELP FILE EXISTS, IF NOT DISPLAY ERROR MESSAGE
      INQUIRE (FILE=PHFILE,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
                      CALL MESS(15,RC(2,1),RC(2,2),RC(2,3),7)
                      GOTO 2
                      ENDIF

C     CLEAR THE SCREEN AND OPEN THE HELP FILE
      CALL CLEAR(7,0)
      OPEN (PUNIT,FILE=PHFILE,STATUS='OLD')

C     SET UP THE SEARCH KEY FOR THE FILE TO BE DISPLAYED.

      TLINE(1:80)='*X*'
      TLINE(2:2)=CMD(1)

C     READ IN LINE FROM THE HELP FILE
5     READ(PUNIT,'(A80)') LINE

C     LOOK FOR THE KEY
      IF (TLINE(1:3) .EQ. LINE(1:3)) THEN

C               DETERMINE HOW MANY LINE ARE TO BE DISPLAYED
                READ(LINE(4:5),'(I2)') IG
                J=0

C               START TO DISPLAY THE LINES ON THE SCREEN
                DO 20 I=1,IG,1
                   READ(PUNIT,'(A80)') LINE
                   J=J+1
                   CALL MENUDR(LINE,J,1,2,0,1,1)

C                  CAN ONLY DISPLAY 22 LINES ON THE SCREEN AT ONCE
                   IF (J .EQ. 22) THEN
```

```
C                     END-OF-FILE REACHED DISPLAY MESSAGE
                      IF (I .EQ. IG) THEN
                         CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),7)
                         READ(ITR,'(A1)') CMD(1)
                         CLOSE (PUNIT)
                         GOTO 1
                                     ELSE

C                        MORE TO BE DISPLAY (PRESS RETURN TO CONTINUE)
                         CALL MESS(16,RC(3,1),RC(3,2),RC(3,3),7)
                         READ(ITR,'(A1)') CMD(1)
                         CALL CLEAR(7,0)
                         J=0
                                     ENDIF
                                         ENDIF
20                 CONTINUE

C                  END-OF-FILE REACHED
                   CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),7)
                   READ(ITR,'(A1)') CMD(1)
                   CLOSE (PUNIT)
                   GOTO 1
                              ENDIF

      GOTO 5
      END
      SUBROUTINE PADD(ITR,PUNIT1,PUNIT2,PFILE1,SMUNIT,SMFILE)

C****************************************************************************
C  THIS SUBROUTINE ADDS ENTRIES TO THE PROCEDURE DATA BASE.  THERE IS A FILE
C  THAT CONTAINS A LIST OF ALL THE FILES ON THE SYSTEM AND NAME OF THE
C  PROCEDURES ASSOCIATED WITH THOSE FILES
C      VARIABLES PASSED:
C
C      ITR      -  INTERACTIVE TERMINAL READ UNIT
C      PUNIT1   -  UNIT # TO OPEN PFILE1 ON
C      PUNIT2   -  UNIT # TO OPEN THE PROCEDURE FILE ON
C      PFILE1   -  DIRECTORY FILE NAME
C      SMUNIT   -  UNIT # TO OPEN MENU FILE (SMFILE) ON
C      SMFILE   -  MENU FILE NAME
C****************************************************************************

      CHARACTER*80  LINE
      CHARACTER*40  PKEY(1),CIN,TEXT(2)
      CHARACTER*7   PFILE1,EFILE,SMFILE,PFILE2
      CHARACTER*1   CMD(1)

      INTEGER       ITR,PUNIT1,PUNIT2,SMUNIT,RC(5,3),ST(3)

      LOGICAL       FLAG1,FLAG2

      DATA ST/0,0,0/

      ITT=-1
      PKEY(1)(1:40)=' '
      TEXT(1)(1:40)='ENTER "ABORT//" TO ABORT THE FILE'
      TEXT(2)(1:40)='ENTER "END//" TO SAVE THE FILE'
      FLAG2=.FALSE.
```

```
C     DISPLAY THE MAIN MENU
100   CALL MENUSV(SMFILE,146,RC,5,SMUNIT)

      IF (FLAG2) THEN
                 ST(3)=0
                 IF (PKEY(1) .NE. ' ')
     *              CALL MENUWR(RC,5,1,1,PKEY,0,1,ST)
                 GOTO 15
                 ENDIF

C     INPUT THE PROCEDURE FILE NAME
5     CALL MENURD(RC,5,1,1,PKEY,ITR)
      FLAG2 =.FALSE.

C     SCANNING THE COMMAND INPUT LINE
15    CMD(1)=' '
      CALL MENURD(RC,5,2,2,CMD,ITT)

C     USER SELECTED TO GO BACK TO THE PROCEDURE INPUT LINE
      IF (CMD(1) .EQ. ' ') THEN
                           ST(3)=1
                           CALL MENUWR(RC,5,2,2,CMD,0,1,ST)
                           CALL MESS(4,RC(5,1),RC(5,2),RC(5,3),1)
                           GOTO 5
                           ENDIF

C     USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X') RETURN

C     INVALID INPUT
      IF (CMD(1) .NE. 'C') GOTO 15

C     A BLANK PROCEDURE NAME IS NOT ALLOWED
      IF (PKEY(1) .EQ. ' ') THEN
                            CALL MESS(20,RC(5,1),RC(5,2),RC(5,3),7)
                            GOTO 15
                            ENDIF

C     CHECK IF THE DIRECTORY FILE EXISTS
      INQUIRE (FILE=PFILE1,EXIST=FLAG1)

C     CREATE THE DIRECTORY FILE
      IF (.NOT. FLAG1) THEN
              OPEN (PUNIT1,FILE=PFILE1,STATUS='NEW',FORM='UNFORMATTED',
     *              ACCESS='DIRECT',RECL=48)
                       NREC=1

C                      WRITE THE HEADER RECORD
                       WRITE(PUNIT1,REC=1) NREC
                       WRITE(PUNIT1,REC=2) NREC
                       CLOSE (PUNIT1)
                       ENDIF

C     CHECK TO SEE IF THE PROCEDURE IS ALREADY IN THE DATA BASE
      OPEN (PUNIT1,FILE=PFILE1,STATUS='OLD',ACCESS='DIRECT',
     *      FORM='UNFORMATTED',RECL=48)

C     FIND OUT HOW MANY FILES ARE ALREADY IN THE DATA BASE
      READ(PUNIT1,REC=1) NREC
```

```
C     CHECK TO SEE IF THE PROCEDURE ALREADY EXISTS
      DO 20 I=2,NREC,1
         READ(PUNIT1,REC=I) CIN

C        PROCEDURE FOUND
         IF (CIN .EQ. PKEY(1)) THEN
                               CALL MESS(2,RC(5,1),RC(5,2),RC(5,3),7)
                               CLOSE (PUNIT1)
                               GOTO 15
                               ENDIF
20    CONTINUE

C     FIND THE PROC FILE THAT IS TO BE USED.  THE FORM WILL BE PROCXX, WHERE
C     XX =0,1,2,...,99
      DO 25 I=0,99,1
         PFILE2=EFILE(I)
         PFILE2(1:4)='PROC'
         INQUIRE (FILE=PFILE2,EXIST=FLAG1)
         IF (.NOT. FLAG1) GOTO 30
25    CONTINUE

C     TO MANY FILES EXIST
      CALL MESS(21,RC(5,1),RC(5,2),RC(5,3),7)
      GOTO 15

C     DISPLAY THE DIRECTION ABOUT END AND ABORT
30    ST(3)=1
      CALL MENUWR(RC,5,3,4,TEXT,0,1,ST)

C     INPUT THE USERS OPTION
      CMD(1)=' '
      CALL MENURD(RC,5,2,2,CMD,ITT)

C     USER SELECTED RETURN
      IF (CMD(1) .EQ. 'X') THEN
                           CLOSE (PUNIT1)
                           RETURN
                           ENDIF

C     OPEN THE PROCEDURE FILE, THE USER IS GOING TO CREATE
      OPEN (PUNIT2,FILE=PFILE2,STATUS='NEW')

C     CLEAR THE SCCREEN AND TURN THE CURSOR ON
      CALL CLEAR(7,0)
      CALL ONOFF(1)

C     READ THE USERS LINE OF TEXT
35    READ(ITR,'(A80)') LINE

C     USER DECIDED NOT TO SAVE THE PROCEDURE FILE
      IF (LINE .EQ. 'ABORT//') THEN
                               CLOSE (PUNIT1)
                               CLOSE (PUNIT2,STATUS='DELETE')
                               FLAG2=.TRUE.
                               CALL ONOFF(0)
                               GOTO 100
                               ENDIF

C     USER WANTS TO SAVE THE PROCEDURE FILE
      IF (LINE .EQ. 'END//') THEN
```

```
                             CLOSE (PUNIT2)
                             NREC=NREC+1
                             WRITE(PUNIT1,REC=NREC) PKEY,PFILE2
                             III=NREC+1
                             WRITE(PUNIT1,REC=III) PKEY,PFILE2
                             WRITE(PUNIT1,REC=1) NREC
                             CLOSE (PUNIT1)
                             CALL ONOFF(0)
                             PKEY(1)(1:40)=' '
                             FLAG2=.TRUE.
                             GOTO 100
                             ENDIF

C     WRITE THE LINE TO THE PROCEDURE FILE PROCXX
      WRITE(PUNIT2,'(A80)') LINE
      GOTO 35


      END
      SUBROUTINE PSEAR(ITR,PUNIT1,PUNIT2,PFILE1,SMUNIT,SMFILE)
C*****************************************************************************
C  THIS SUBROUTINE SEARCHES THE PROCEDURE DATA BASE  AND WILL DISPLAY THE FILE
C  THAT THE USER SELECTS
C     VARIABLES PASSED:
C
C     ITR      -  INTERACTIVE TERMINAL READ UNIT
C     PUNIT1   -  UNIT # TO OPEN PFILE1 ON
C     PUNIT2   -  UNIT # TO OPEN PROCEDURE FILE ON
C     PFILE1   -  PROCEDURE DIRECTORY FILE
C     SMUNIT   -  UNIT # TO OPEN MENU FILE (SMFILE) ON
C     SMFILE   -  MENU FILE NAME
C*****************************************************************************

      CHARACTER*70  OUT(19)
      CHARACTER*40  PKEY
      CHARACTER*7   PFILE1,PFILE2,EFILE,SMFILE
      CHARACTER*2   CMD(1),TEMP

      LOGICAL       FLAG1,FLAG2,FLAG3

      INTEGER       ITR,JJ,CNT,PUNIT1,PUNIT2,RC(20,3),SMUNIT,NREC,ST(3)

      DATA ST/0,0,0/

C     DISPLAY THE MAIN MENU
100   CALL MENUSV(SMFILE,147,RC,20,SMUNIT)

C     CHECK TO SEE THAT THE PROCEDURE DATA BASE EXISTS
      INQUIRE (FILE=PFILE1,EXIST=FLAG1)

C     PROCEDURE DIRECTORY FILE NOT FOUND
      IF (.NOT. FLAG1) THEN
                       CALL MESS(18,RC(20,1),RC(20,2),RC(20,3),7)
5                      CMD(1)=' '
                       CALL MENURD(RC,20,1,1,CMD,ITR)
                       IF (CMD(1) .EQ. 'X  ') RETURN
                       GOTO 5
                       ENDIF
```

```
C     OPEN THE PROCEDURE DIRECTORY FILE
      OPEN (PUNIT1,FILE=PFILE1,STATUS='OLD',ACCESS='DIRECT',
     *      FORM='UNFORMATTED',RECL=48)

C     FOUND OUT HOW MANY RECORS ARE IN THE FILE
      READ(PUNIT1,REC=1) NREC
      FLAG1=.TRUE.
      FLAG2=.TRUE.
15    CNT=2

C     PROCESS THE DIRECTORY FILE AND GET THE PROCEDURE NAMES
      DO 20 I=2,NREC,1
         READ(PUNIT1,REC=I) PKEY,PFILE2
         FLAG2=.FALSE.
         FLAG1=.FALSE.
         OUT(CNT)(1:70)=' '
         WRITE(OUT(CNT)(2:3),'(I2)') I
         OUT(CNT)(6:70)=PKEY

C        CAN ONLY DISPLAY 19 PROCEDURE NAMES ON THE SCREEN AT A TIME
         IF (CNT .EQ. 19) THEN
            CALL MENUWR(RC,20,2,19,OUT,0,1,ST)

C           INPUT THE USER SELECTION
45          CMD(1)='  '
            CALL MENURD(RC,20,1,1,CMD,ITR)

C           USER SELECTED TO RETURN
            IF (CMD(1) .EQ. 'X ') THEN
                                  CLOSE (PUNIT1)
                                  RETURN
                                  ENDIF

C           USER SELECTED TO CONTINUE VIEWING THE LIST
            IF (CMD(1) .EQ. 'C ') THEN
                                  FLAG1=.TRUE.
                                  CALL MENUSV(SMFILE,147,RC,20,SMUNIT)
                                  CNT=2
                                  GOTO 20
                                  ENDIF

C           VALIDATE THE USERS INPUT
            READ(CMD(1),'(BN,I2)',ERR=45) JJ
            IF ((JJ .LE. 1).OR.(JJ .GT. NREC)) GOTO 45
            READ(PUNIT1,REC=JJ) PKEY,PFILE2
            INQUIRE (FILE=PFILE2,EXIST=FLAG3)
            IF (.NOT. FLAG3) GOTO 45

C           USER SELECTED A VALID PROCEDURE FILE NUMBER SO DISPLAY THE FILE
            CLOSE (PUNIT1)
            CALL PROPRO(ITR,PFILE2,PUNIT1)
            GOTO 100

                          ENDIF
         CNT=CNT+1
20    CONTINUE

      IF ((FLAG1).AND.(.NOT. FLAG2)) GOTO 15
      IF ((FLAG1).AND.(FLAG2))
     *   CALL MESS(22,RC(20,1),RC(20,2),RC(20,3),7)
```

```
         READ(PUNIT1,REC=I) PKEY,PFILE2
         FLAG2=.FALSE.
         FLAG1=.FALSE.
         OUT(CNT)(1:70)=' '
         WRITE(OUT(CNT)(2:3),'(I2)') I
         OUT(CNT)(6:70)=PKEY
         IF (ISTART .EQ. -1) ISTART=I
         IEND=I

C        CAN DISPLAY ONLY 19 AT A TIME ON THE SCREEN
         IF (CNT .EQ. 19) THEN
            CALL MENUWR(RC,20,2,19,OUT,0,1,ST)

C           INPUT THE USERS SELECTION
45          CMD(1)(1:18)=' '
            CALL MENURD(RC,20,1,1,CMD,ITR)

C           USER SELECTED TO RETURN
            IF (CMD(1) .EQ. 'X') THEN
                                     CALL PCOMP(PUNIT1,PFILE1)
                                     CLOSE (PUNIT1)
                                     RETURN
                                     ENDIF

C           USER SELECTED TO CONTINUE VIEWING THE LIST
            IF (CMD(1) .EQ. 'C') THEN
                                     ISTART=-1
                                     FLAG1=.TRUE.
                                     CALL MENUSV(SMFILE,148,RC,20,SMUNIT)
                                     CNT=2
                                     GOTO 20
                                     ENDIF

C           DELETE THE FILES FROM THE PROCEDURE DIRECTORY
            INP=CMD(1)
            CALL PROPDE(PUNIT1,PFILE1,INP,ISTART,IEND)
            GOTO 45

                          ENDIF
         CNT=CNT+1
20    CONTINUE

      IF ((FLAG1).AND.(.NOT. FLAG2)) THEN
                                         CALL PCOMP(PUNIT1,PFILE1)
                                         GOTO 15
                                         ENDIF
      IF ((FLAG1).AND.(FLAG2))
     *   CALL MESS(22,RC(20,1),RC(20,2),RC(20,3),7)
      CALL MENUWR(RC,20,2,CNT-1,OUT,0,1,ST)

C     INPUT THE USER SELECTION
35    CMD(1)(1:18)=' '
      CALL MENURD(RC,20,1,1,CMD,ITR)

C     USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X') THEN
                           CALL PCOMP(PUNIT1,PFILE1)
                           CLOSE (PUNIT1)
                           RETURN
                           ENDIF
```

```
C     NOT 19 PROCEDURE FILES TO DISPLAY
      CALL MENUWR(RC,2Ø,2,CNT-1,OUT,Ø,1,ST)

C     INPUT THE USERS SELECTION
35    CMD(1)='  '
      CALL MENURD(RC,2Ø,1,1,CMD,ITR)

C     USER SELECTED TO RETURN
      IF (CMD(1) .EQ. 'X ') THEN
                            CLOSE (PUNIT1)
                            RETURN
                            ENDIF

C     USER SELECTED TO CONTINUE VIEWING LIST
      IF (CMD(1) .EQ. 'C ') THEN
                            FLAG1=.TRUE.
                            CALL MENUSV(SMFILE,147,RC,2Ø,SMUNIT)
                            GOTO 15
                            ENDIF

C     CHECK THAT THE USER SELECTED A VALID PROCEDURE FILE
      READ(CMD(1),'(BN,I2)',ERR=35) JJ
      IF ((JJ .LE. 1).OR.(JJ .GT. NREC)) GOTO 35
      READ(PUNIT1,REC=JJ) PKEY,PFILE2
      INQUIRE (FILE=PFILE2,EXIST=FLAG3)
      IF (.NOT. FLAG3) GOTO 35

C     USER SELECTED A VALID PROCEDURE FILE
      CLOSE (PUNIT1)
      CALL PROPRO(ITR,PFILE2,PUNIT1)
      GOTO 1ØØ

      END
      SUBROUTINE PROPRO(ITR,PFILE,PUNIT)

C*****************************************************************************
C  THIS SUBROUTINE PROCESS THE PROCEDURE FILE.  IT DISPLAYS THE FILE ON THE
C  SCREEN 23 LINES AT A TIME
C     VARIABLES PASSED:
C
C     ITR    -  INTERACTIVE TERMINAL READ UNIT
C     PUNIT  -  UNIT # TO OPEN THE PROCEDURE FILE (PFILE) ON
C     PFILE  -  PROCEDURE FILE NAME TO DISPLAY
C*****************************************************************************

      CHARACTER*8Ø  DLINE
      CHARACTER*7   PFILE
      CHARACTER*1   INP(1),FMFEED

      INTEGER       PUNIT,RC(1,3)

      LOGICAL       FLAG1,IFLAG

      RC(1,1)=23
      RC(1,2)=34
      RC(1,3)=1

C     CLEAR THE SCREEN AND OPEN THE PROCEDURE FILE PROCXX
      CALL CLEAR(7,Ø)
      OPEN (PUNIT,FILE=PFILE,STATUS='OLD')

      IFLAG=.FALSE.
30    FLAG1=.TRUE.
C     DISPLAY 22 LINES OF TEXT ON THE SCREEN
      DO 10 I=1,22,1
         READ(PUNIT,'(A80)',END=15) DLINE
         IF (FLAG1) THEN
                    FLAG1=.FALSE.
                    CALL CLEAR(7,0)
                    ENDIF
         CALL MENUDR(DLINE,I,1,2,0,1,1)
10    CONTINUE
      GOTO 16

15    IFLAG=.TRUE.

16    IF (IFLAG) CALL MENUDR('END OF FILE REACHED',23,62,7,0,1,1)
      CALL MENUDR('SELECT OPTION (X OR C OR P)  ==>',23,1,2,0,1,1)

C     INPUT USERS SELECTION
20    INP(1)=' '
      CALL MENURD(RC,1,1,1,INP,ITR)

C     USER SELECTED TO RETURN
      IF (INP(1) .EQ. 'X') THEN
                        CLOSE (PUNIT)
                        RETURN
                        ENDIF

C     USER SELECTED TO PRINT THE PROCEDURE FILE
      IF (INP(1) .EQ. 'P') THEN
                        CLOSE(PUNIT)
                        OPEN(PUNIT,FILE=PFILE,STATUS='OLD')
                        IF= 12
                        FMFEED= CHAR(IF)
C                      OPEN THE PRINTER ON UNIT 15
                        OPEN(15,FILE='/DEV/PRT')
                        READ(PUNIT,'(A80)',END=220) DLINE
200                     CONTINUE
C                      SEND FORM FEED
                          WRITE(15,'(A1)') FMFEED
                          DO 210 I=1,22
                            READ(PUNIT,'(A80)',END=220) DLINE
                            WRITE(15,'(A80)') DLINE
210                       CONTINUE
                        GO TO 200
C
220                     CONTINUE
                        WRITE(15,'(A1)') FMFEED
                        CLOSE(PUNIT)
                        CLOSE(15)
                        RETURN
                        ENDIF

C     USER SELECTED TO CONTINUE VIEWING THE PROCEDURE FILE
      IF (INP(1) .EQ. 'C') THEN
                        IF (IFLAG) THEN
                                   IFLAG=.FALSE.
                                   CLOSE (PUNIT)
```

```
                                    OPEN (PUNIT,FILE=PFILE,STATUS='OLD')
                                    ENDIF
                        GOTO 30
                        ENDIF
      GOTO 20
      END
      SUBROUTINE PDEL(ITR,PUNIT1,PUNIT2,PFILE1,SMUNIT,SMFILE)

C********************************************************************************
C  THIS SUBROUTINE DELETES PROCEDURE FILES FROM THE PROCEDURE DIRECTORY FILE
C  ONLY
C     VARIABLES PASSED:
C
C     ITR      -  INTERACTIVE TERMINAL READ UNIT
C     PUNIT1   -  UNIT # TO OPEN LISTING FILE (PFILE1) ON
C     PUNIT2   -  UNIT # TO OPEN PROCEDURE FILE ON
C     PFILE1   -  PROCEDURE LISTING FILE NAME
C     SMUNIT   -  UNIT # TO OPEN MENU FILE (SMFILE) ON
C     SMFILE   -  MENU FILE NAME
C********************************************************************************

      CHARACTER*70  OUT(19)
      CHARACTER*40  PKEY
      CHARACTER*18  CMD(1),INP
      CHARACTER*7   PFILE1,PFILE2,EFILE,SMFILE

      INTEGER       ITR,JJ,CNT,PUNIT1,PUNIT2,ISTART,IEND,ST(3),RC(20,3)

      LOGICAL       FLAG1,FLAG2,FLAG3

      DATA ST/0,0,0/

C     DISPLAY THE MAIN MENU
      CALL MENUSV(SMFILE,148,RC,20,SMUNIT)

C     CHECK TO SEE THAT THE PROCEDURE DATA BASE EXISTS
      INQUIRE (FILE=PFILE1,EXIST=FLAG1)

C     NO PROCEDURE DIRECTORY FILE, DISPLAY A MESSAGE
      IF (.NOT. FLAG1) THEN
                       CALL MESS(18,RC(20,1),RC(20,2),RC(20,3),7)
5                      CMD(1)(1:18)=' '
                       CALL MENURD(RC,20,1,1,CMD,ITR)
                       IF (CMD(1) .EQ. 'X') RETURN
                       GOTO 5
                       ENDIF

C     OPEN THE PROCEDURE DIRECTORY FILE
      OPEN (PUNIT1,FILE=PFILE1,STATUS='OLD',ACCESS='DIRECT',
     *      FORM='UNFORMATTED',RECL=48)

C     FIND OUT HOW MANY RECORDS ARE IN IT
15    READ(PUNIT1,REC=1) NREC
      ISTART=-1
      FLAG1=.TRUE.
      FLAG2=.TRUE.
      CNT=2

C     DISPLAY THE PROCEDURE FILES ON THE SCREEN
      DO 20 I=2,NREC,1
```

```
C     USER SELECTED TO CONTINUE VIEWING THE LIST
      IF (CMD(1) .EQ. 'C') THEN
                           CALL PCOMP(PUNIT1,PFILE1)
                           CALL MENUSV(SMFILE,148,RC,20,SMUNIT)
                           GOTO 15
                           ENDIF

C     DELETE AND COMPRESS THE PROCEDURE DIRECTORY FILE
      INP=CMD(1)
      CALL PROPDE(PUNIT1,PFILE1,INP,ISTART,IEND)
      GOTO 35

      END
      SUBROUTINE PROPDE(PUNIT1,PFILE1,L,ISTART,IEND)

C*******************************************************************************
C  THIS PROCEDURE DELETES THE PROCEDURE FILE NAME FROM THE DIRECTORY AND
C  COMPRESS THE FILE
C      VARIBLES PASSED:
C
C      PUNIT1  -  UNIT # TO OPEN THE PROCEDURE DIRECTORY FILE ON
C      PFILE1  -  PROCEDURE DIRECTORY FILE NAME
C      L       -  LIST OF THE FILES TO BE DELETEED
C      ISTART  -  STARTING FILE NUMBER
C      IEND    -  ENDING FILE NUMBER
C*******************************************************************************

      CHARACTER*48  XOUT
      CHARACTER*18  L
      CHARACTER*8   FMT
      CHARACTER*7   PFILE1
      CHARACTER*1   C1
      INTEGER       PUNIT1,CNT,JS,ST,POS(8),IL,ISTART,IEND

      XOUT='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
      FMT='(BN,IXX)'
      CNT=1
      ST=1
      DO 100 I=1,18,1
         IF (ST .EQ. 1) THEN
                        I1=INDEX('0123456789 ',L(I:I))
                        IF (I1 .EQ. 11) GOTO 100
                        IF (I1 .EQ. 0) THEN
                           CALL MENUDR('INVALID',1,55,7,0,1,1)
                           CALL MENUDR(L,1,63,2,0,1,1)
                           C1=L(I:I)
                           CALL MENUDR(C1,1,62+I,7,0,1,1)
                           RETURN
                                       ENDIF
                        JS=I
                        ST=2
                        GOTO 100
                        ENDIF
         IF (ST .EQ. 2) THEN
                        I1=INDEX('0123456789 ,',L(I:I))
                        IF (I1 .EQ. 0) THEN
                           CALL MENUDR('INVALID',1,55,7,0,1,1)
                           CALL MENUDR(L,1,63,2,0,1,1)
                           C1=L(I:I)
                           CALL MENUDR(C1,1,62+I,7,0,1,1)
                           RETURN
                                       ENDIF
                        IF (I1 .NE. 12) GOTO 100
                        IL=I-JS
                        IF (IL .GE. 10) THEN
                           WRITE(FMT(6:7),50) IL
50                         FORMAT(I2)
                                        ELSE
                           FMT(7:7)=' '
                           WRITE(FMT(6:6),55) IL
55                         FORMAT(I1)
                                        ENDIF
                        READ(L(JS:I-1),FMT) POS(CNT)
                        CNT=CNT+1
                        ST=3
                        GOTO 100
                        ENDIF
         IF (ST .EQ. 3) THEN
                        I1=INDEX('0123456789 ',L(I:I))
                        IF (I1 .EQ. 11) GOTO 100
                        IF (I1 .EQ. 0) THEN
                           CALL MENUDR('INVALID',1,55,7,0,1,1)
                           CALL MENUDR(L,1,63,2,0,1,1)
                           C1=L(I:I)
                           CALL MENUDR(C1,1,62+I,7,0,1,1)
                           RETURN
                                       ENDIF
                        JS=I
                        ST=2
                        ENDIF
100   CONTINUE

      IF (ST .EQ. 2) THEN
                     IL=I-JS
                     IF (IL .GE. 10) THEN
                        WRITE(FMT(6:7),50) IL
                                     ELSE
                        FMT(7:7)=' '
                        WRITE(FMT(6:6),55) IL
                                     ENDIF
                     READ(L(JS:18),FMT) POS(CNT)
                     ENDIF

      DO 150 I=1,CNT,1
         IF ((POS(I) .LT. ISTART).OR.(POS(I) .GT. IEND)) GOTO 150
         I1=6+POS(I)-ISTART
         CALL MENUDR('DELETED',I1,55,7,0,1,1)
         WRITE(PUNIT1,REC=POS(I)) XOUT
150   CONTINUE

      RETURN
      END
      SUBROUTINE PCOMP(PUNIT,PFILE)

C******************************************************************************
C  THIS SUBROUTINE COMPRESSES THE PROCEDURE LIST FILE
C     VARIABLES PASSED:
C
C     PUNIT  -  UNIT # PFILE IS OPEN ON
```

```
C     PFILE  -  NOT USED
C*****************************************************************************

      CHARACTER*48  LINEIN,XOUT
      CHARACTER*7   PFILE

      INTEGER       PUNIT,NREC,I

      XOUT='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'

C     FIND OUT HOW MANY RECORDS ARE IN THE FILE
      READ(PUNIT,REC=1) NREC
      I=2

C     UPDATE THE HEADER RECORD TO REFLECT THE COMPRESSION
100   IF (I .GT. NREC) THEN
                       WRITE(PUNIT,REC=1) NREC
                       RETURN
                       ENDIF

C     INPUT THE PROCEDURE FILE NAME
      READ(PUNIT,REC=I) LINEIN

C     IF IT IS ALL X'S THEN MOVE THE FILE DOWN ONE
      IF (LINEIN .EQ. XOUT) THEN
                            DO 200 J=I,NREC-1,1
                               READ(PUNIT,REC=J+1) LINEIN
                               WRITE(PUNIT,REC=J) LINEIN
200                         CONTINUE
                            NREC=NREC-1
                            GOTO 100
                            ENDIF
      I=I+1
      GOTO 100

      END
```

```
User - system    Date - 10/19/83    Time - 16:02:19    Filename - ssdb.for

SYSTEM
10/19/83
16:02:19
SSDB.FOR
```

```
$bigcode
$segment %ssdbseg
      SUBROUTINE SSSIP(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,SFILE1,
     *                 SFILE2,SFILE3,SFILE4,SHFILE,SMUNIT,
     *                 SMFILE)

C  THIS SUBROUTINE MANAGES THE SUBSTANCE-SOURCE DATA BASE

      CHARACTER*1    OPT,CMD(1)
      CHARACTER*7    SFILE1,SFILE2,SFILE3,SFILE4,SHFILE,SMFILE
      CHARACTER*40   SKEY(2)

      REAL           SDATA(14)

      INTEGER        ITR,eflag,SUNIT1,SUNIT2,SUNIT3,SUNIT4,SMUNIT,
     *               RC(2,3)

1     CALL MENUSV(SMFILE,170,RC,2,SMUNIT)
2     CMD(1)=' '
      CALL MENURD(RC,2,1,1,CMD,ITR)

C     CHECK FOR A VALID INPUT
      IF (INDEX('12345X',CMD(1)) .EQ. 0) THEN
                        CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),6)
                        GOTO 2
                                     ENDIF

      OPT=' '
      IF (CMD(1) .EQ. '1') CALL SHELP(ITR,SUNIT1,SHFILE,SMUNIT,SMFILE)
      IF (CMD(1) .EQ. '2') CALL SDEL(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                          SFILE1,SFILE2,SFILE3,SFILE4,SMUNIT,
     *                          SMFILE)
      IF (CMD(1) .EQ. '3') CALL SADD(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                          SFILE1,SFILE2,SFILE3,SFILE4,SMUNIT,
     *                          SMFILE)
      IF (CMD(1) .EQ. '4') CALL SMOD(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                          SFILE1,SFILE2,SFILE3,SFILE4,SMUNIT,
     *                          SMFILE)
      IF (CMD(1) .EQ. '5') CALL SSEAR(EFLAG,ITR,SUNIT1,SUNIT2,SUNIT3,
     *                           SUNIT4,OPT,SKEY,SDATA,SFILE1,SFILE2,
     *                           SFILE3,SFILE4,SMUNIT,SMFILE)
      IF (CMD(1) .EQ. 'X') RETURN

      GOTO 1
      END
      SUBROUTINE SHELP(ITR,SUNIT,SHFILE,SMUNIT,SMFILE)

      CHARACTER*80   TLINE,LINE
      CHARACTER*7    SHFILE,SMFILE
      CHARACTER*1    CMD(1)

      INTEGER        ITR,SUNIT,SMUNIT,RC(3,3)

      LOGICAL        FLAG

1     CALL MENUSV(SMFILE,175,RC,3,SMUNIT)
2     CMD(1)=' '
      CALL MENURD(RC,3,1,1,CMD,ITR)

C     CHECK FOR A VALID INPUT
```

```
      IF (INDEX('1234X',CMD(1)) .EQ. 0) THEN
                         CALL MESS(11,RC(2,1),RC(2,2),RC(2,3),6)
                         GOTO 2
                                        ENDIF

      IF (CMD(1) .EQ. 'X') RETURN
      INQUIRE (FILE=SHFILE,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
                      CALL MESS(15,RC(2,1),RC(2,2),RC(2,3),6)
                      GOTO 2
                      ENDIF

      CALL CLEAR(7,0)
      OPEN (SUNIT,FILE=SHFILE,STATUS='OLD')
      TLINE(1:80)='*X*'
      TLINE(2:2)=CMD(1)
5     READ(SUNIT,'(A80)') LINE
      IF (TLINE(1:3) .EQ. LINE(1:3)) THEN
                READ(LINE(4:5),'(I2)') IG
                J=0
                DO 20 I=1,IG,1
                   READ(SUNIT,'(A80)') LINE
                   J=J+1
                   CALL MENUDR(LINE,J,1,2,0,1,1)
                   IF (MOD(I,22) .EQ. 0) THEN
                      IF (I .EQ. IG) THEN
                         CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),7)
                         READ(ITR,'(A1)') CMD(1)
                         CLOSE (SUNIT)
                         GOTO 1
                                     ELSE
                         CALL MESS(16,RC(3,1),RC(3,2),RC(3,3),6)
                         READ(ITR,'(A1)') CMD(1)
                         CALL CLEAR(7,0)
                         J=0
                                     ENDIF
                                         ENDIF
20                 CONTINUE
                   CALL MESS(19,RC(3,1),RC(3,2),RC(3,3),6)
                   READ(ITR,'(A1)') CMD(1)
                   CLOSE (SUNIT)
                   GOTO 1
                              ENDIF

      GOTO 5
      END
      SUBROUTINE SADD(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,
     *                SFILE1,SFILE2,SFILE3,SFILE4,SMUNIT,
     *                SMFILE)
C  THIS SUBROUTINE ADDS ELEMENTS TO THE SUBSTANCE-SOURCE DATA BASE

      CHARACTER*40  T1(2),CINIT1,CINIT2,TEMP0
      CHARACTER*8   T2(11)
      CHARACTER*7   SFILE1,SFILE2,SFILE3,SFILE4,SMFILE
      CHARACTER*1   INP(1)

      INTEGER       ISET,ITR,I,J,SUNIT1,SUNIT2,SUNIT3,IST,JST,
     *              SUNIT4,RC(13,3),ST(3),ITT,HD1,HD2,HD4

      INTEGER       SINIT1(10),HD3(10)
      REAL          S2(10),S3(4),S4(11)

      LOGICAL       FLAG,FLAG1,FLAG2,FLAG3,FLAG4

      DATA ST /0,0,0/

      ITT=-1

2000  DO 5 I=1,11,1
         T2(I)(1:8)=' '
5     CONTINUE
      T1(1)(1:40)=' '
      T1(2)(1:40)=' '

C     DISPLAY THE MAIN MENU
      CALL MENUSV(SMFILE,180,RC,13,SMUNIT)

C     READ IN THE SUBSTANCE AND THE SOURCE FROM THE MENU
      IST=1
415   CALL MENURD(RC,13,IST,2,T1,ITR)

C     CHECK TO SEE IF THE SUBSTANCE OR SOURCE IS BLANK
C     CAN NOT GO ON IF EITHER SUBSTANCE OR SOURCE IS BLANK
      IF ((T1(1) .EQ. ' ').OR.(T1(2) .EQ. ' ')) THEN
         IF (T1(2) .EQ. ' ') IST=2
         IF (T1(1) .EQ. ' ') IST=1
         GOTO 415
                                                 ENDIF
      IF ((T1(1) .EQ. '?').OR.(T1(2) .EQ. '?')) THEN
         IF (T1(2) .EQ. '?') IST=2
         IF (T1(1) .EQ. '?') IST=1
         GOTO 415
                                                 ENDIF


C     CHECK TO SEE IF THE SUBSTANCE IS IN THE DATA BASE    IF SO DISPLAY
C     THE GMW, 10, 30 AND 60 MIN PEL AND DO NOT ALLOW THEM TO BE MODIFIED
C
C     ISET=2 ==) THAT THE USER ENTERED SUBSTANCE DATA AND SHOULD BE ALLOWED
C     TO CHANGE IT.
C     ISET=3 ==) THE SUBSTANCE DATA CAME FROM THE DATA BASE AND THE USER
C     SHOULD NOT BE ALLOWED TO CHANGE IT.
      ISET=2
      INQUIRE (FILE=SFILE1,EXIST=FLAG)
      IF (FLAG) THEN
         OPEN (SUNIT1,FILE=SFILE1,STATUS='OLD',ACCESS='DIRECT',
     *            FORM='UNFORMATTED',RECL=120)
         READ(SUNIT1,REC=1) HD1
         DO 450 I=2,HD1,1
            READ(SUNIT1,REC=I) CINIT1,SINIT1,S2
            IF (CINIT1 .EQ. T1(1)) THEN
               DO 460 J=1,5,1
                  WRITE(T2(J+2)(1:8),'(F8.4)') S2(J)
460            CONTINUE
               ST(3)=0
               CALL MENUWR(RC,13,3,7,T2,0,1,ST)
               CLOSE (SUNIT1)
               ISET=3
               JST=8
               GOTO 320
                                     ENDIF
450      CONTINUE
         CLOSE (SUNIT1)
                ENDIF


C     DISPLAY THE REST OF THE MENU INCLUDING GMW, 10, 30, 60 MIN
C     PELS IF NECESSARY.
      IST=3
420   CALL MENURD(RC,13,IST,7,T2,ITR)

      JST=8
320   CALL MENURD(RC,13,JST,11,T2,ITR)


C     SCANNING THE COMMAND INPUT ROW
200   INP(1)=' '
      CALL MENURD(RC,13,12,12,INP,ITT)
      IF (INP(1) .EQ. ' ') THEN
                           ST(3)=1
                           CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                           CALL MESS(4,RC(13,1),RC(13,2),RC(13,3),2)
                           IF (ISET .EQ. 3) THEN
                                            JST=8
                                            GOTO 320
                                            ENDIF
                           IF (ISET .EQ. 2) THEN
                                            IST=3
                                            GOTO 420
                                            ENDIF
                           DO 210 J=1,7,1
                              T2(J)(1:8)=' '
210                        CONTINUE
                           IST=1
                           GOTO 415
                           ENDIF
      IF (INP(1) .EQ. 'X') RETURN
      IF (INP(1) .EQ. 'R') GOTO 2000
      IF (INP(1) .NE. 'A') GOTO 200



C     CHECK THE REQUEST FOR ERRORS
      CALL MENUCK(T2,S4,11,'(F4.4)',IERR)
      IF (IERR .NE. 0) THEN
                       INP(1)=' '
                       ST(3)=1
                       CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                       CALL MESS(1,RC(13,1),RC(13,2),RC(13,3),6)
                       IST=IERR
                       IF (IERR .LE. 7) GOTO 420
                       GOTO 320
                       ENDIF


C     THE GMW, 10, 30, 60 MIN PELS AND THE SOURCE STRENGTH ARE NOT
C     ALLOWED TO BE ZERO.
      DO 180 I=3,6,1
         IF (S4(I) .LE. 0.0) THEN
```

```
                             IST=I
                             INP(1)=' '
                             ST(3)=1
                       CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                       CALL MESS(1,RC(13,1),RC(13,2),RC(13,3),6)
                             GOTO 420
                             ENDIF
180   CONTINUE
      IF (S4(8) .LE. 0.0) THEN
                          JST=8
                          INP(1)=' '
                          ST(3)=1
                       CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                       CALL MESS(1,RC(13,1),RC(13,2),RC(13,3),6)
                          GOTO 320
                          ENDIF

C     LOAD THE S2(1-10) AND S3(1-4) ARRAYS
      S3(1)=S4(8)
      S3(2)=S4(9)
      S3(3)=S4(10)
      S3(4)=S4(11)
      DO 181 I=1,10,1
         S2(I)=0.0
181   CONTINUE
      DO 182 I=1,5,1
         S2(I)=S4(I+2)
182   CONTINUE

C     IF NO DATA BASE EXISTS THEN INITIALIZE IT
      INQUIRE (FILE=SFILE1,EXIST=FLAG)
      IF (.NOT. FLAG) THEN
                       OPEN (SUNIT1,FILE=SFILE1,STATUS='NEW',
     *                       ACCESS='DIRECT',FORM='UNFORMATTED',RECL=120)
                       OPEN (SUNIT2,FILE=SFILE2,STATUS='NEW',
     *                       ACCESS='DIRECT',FORM='UNFORMATTED',RECL=40)
                       OPEN (SUNIT3,FILE=SFILE3,STATUS='NEW',
     *                       ACCESS='DIRECT',FORM='UNFORMATTED',RECL=40)
                       OPEN (SUNIT4,FILE=SFILE4,STATUS='NEW',
     *                       ACCESS='DIRECT',FORM='UNFORMATTED',RECL=16)

C                       INITIALIZE THE HEADERS
                        HD1=1
                        WRITE(SUNIT1,REC=1) HD1
                        WRITE(SUNIT2,REC=1) HD1
                        WRITE(SUNIT3,REC=1) HD1
                        WRITE(SUNIT4,REC=1) HD1
                        WRITE(SUNIT1,REC=2) HD1
                        WRITE(SUNIT2,REC=2) HD1
                        WRITE(SUNIT3,REC=2) HD1
                        WRITE(SUNIT4,REC=2) HD1
                        CLOSE(UNIT=SUNIT1)
                        CLOSE(UNIT=SUNIT2)
                        CLOSE(UNIT=SUNIT3)
                        CLOSE(UNIT=SUNIT4)
                        ENDIF

      OPEN (SUNIT1,FILE=SFILE1,STATUS='OLD',RECL=120,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT2,FILE=SFILE2,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT3,FILE=SFILE3,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT4,FILE=SFILE4,STATUS='OLD',RECL=16,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')


C     CHECK FOR SUBSTANCE IN THE SUBSTANCE DATA BASE
      READ(SUNIT1,REC=1) HD1
        DO 35 I=2,HD1,1
           READ(SUNIT1,REC=I) CINIT1,SINIT1
           IF (CINIT1 .EQ. T1(1)) THEN
                         READ(SUNIT2,REC=1) HD2
                         DO 42 J=2,HD2,1
                              READ(SUNIT2,REC=J) CINIT2
                              IF (CINIT2 .EQ. T1(2)) THEN

C                             SEE IF THE ENTRY ALREADY EXISTS
25                            DO 26 K=1,9,1
                               IF (SINIT1(K) .EQ. J) THEN
                          CALL MESS(2,RC(13,1),RC(13,2),RC(13,3),6)
                               GOTO 1000
                                                      ENDIF
26                            CONTINUE
                              IF (SINIT1(10) .NE. 0) THEN
                                 READ(SUNIT1,REC=SINIT1(10)) CINIT1,
     *                                                        SINIT1
                                 GOTO 25
                                                     ENDIF



                              READ(SUNIT1,REC=I) CINIT1,SINIT1
                              READ(SUNIT4,REC=1) HD4
                              HD4=HD4+1
                              WRITE(SUNIT4,REC=1) HD4
                              III=HD4+1
                              WRITE(SUNIT4,REC=HD4) S3
                              WRITE(SUNIT4,REC=III) S3
28                            DO 27 KK=1,9,1
                                 IF (SINIT1(KK) .EQ. 0) THEN
                                    SINIT1(KK)=J
                                    III=I+1
                                    WRITE(SUNIT1,REC=I) CINIT1,SINIT1,S2
                                    WRITE(SUNIT1,REC=III) CINIT1
                                    READ(SUNIT3,REC=I) HD3
                                    HD3(KK)=HD4
                                    WRITE(SUNIT3,REC=I) HD3
                                    WRITE(SUNIT3,REC=III) HD3
                          CALL MESS(3,RC(13,1),RC(13,2),RC(13,3),6)
                                    GOTO 1000
                                                        ENDIF
27                            CONTINUE
                              IF (SINIT1(10) .EQ. 0) THEN
                                 HD1=HD1+1
                                 SINIT1(10)=HD1
                                 WRITE(SUNIT1,REC=I) CINIT1,SINIT1,S2
```

```
              WRITE(SUNIT1,REC=1) HD1
              DO 29 K=2,1Ø,1
                 SINIT1(K)=Ø
                 HD3(K)=Ø
29            CONTINUE
              SINIT1(1)=J
              HD3(1)=HD4
              III=HD1+1
              WRITE(SUNIT1,REC=HD1) CINIT1,SINIT1,S2
              WRITE(SUNIT3,REC=HD1) HD3
              WRITE(SUNIT1,REC=III) CINIT1
              WRITE(SUNIT3,REC=III) HD3
        CALL MESS(3,RC(13,1),RC(13,2),RC(13,3),6)
              GOTO 1ØØØ
                                  ENDIF
           I=SINIT1(1Ø)
           READ(SUNIT1,REC=I) CINIT1,SINIT1
           GOTO 28
                                  ENDIF
42    CONTINUE

C     ADD NEW SOURCE TO THE SOURCE DATA BASE
      HD2=HD2+1
      WRITE(SUNIT2,REC=1) HD2
      III=HD2+1
      WRITE(SUNIT2,REC=HD2) T1(2)
      WRITE(SUNIT2,REC=III) T1(2)
      READ(SUNIT4,REC=1) HD4
      HD4=HD4+1
      WRITE(SUNIT4,REC=1) HD4
      III=HD4+1
      WRITE(SUNIT4,REC=HD4) S3
      WRITE(SUNIT4,REC=III) S3
46    DO 45 JJ=1,9,1
         IF (SINIT1(JJ) .EQ. Ø) THEN
            SINIT1(JJ)=HD2
            WRITE(SUNIT1,REC=I) CINIT1,SINIT1,S2
            READ(SUNIT3,REC=I) HD3
            HD3(JJ)=HD4
            WRITE(SUNIT3,REC=I) HD3
        CALL MESS(3,RC(13,1),RC(13,2),RC(13,3),6)
            GOTO 1ØØØ
                                ENDIF
45    CONTINUE
      IF (SINIT1(1Ø) .EQ. Ø) THEN
         HD1=HD1+1
         SINIT1(1Ø)=HD1
         WRITE(SUNIT1,REC=I) CINIT1,SINIT1,S2
         WRITE(SUNIT1,REC=1) HD1
         DO 47 K=2,1Ø,1
            SINIT1(K)=Ø
            HD3(K)=Ø
47       CONTINUE
         SINIT1(1)=HD2
         HD3(1)=HD4
         III=HD1+1
         WRITE(SUNIT1,REC=HD1) CINIT1,SINIT1,S2
         WRITE(SUNIT3,REC=HD1) HD3
         WRITE(SUNIT1,REC=III) CINIT1
         WRITE(SUNIT3,REC=III) S3
```

```
                            CALL MESS(3,RC(13,1),RC(13,2),RC(13,3),6)
                            GOTO 1000
                                                ENDIF
                         I=SINIT1(10)
                         READ(SUNIT1,REC=I) CINIT1,SINIT1
                         GOTO 46
                                 ENDIF
35    CONTINUE



C     A NEW ADDITION IS TO BE MADE TO SUB.DB
C     THE SOURCE IS IN SOUR.DB BUT THE SUBSTANCE IS NEW IN SUB.DB
      READ(SUNIT2,REC=1) HD2
      DO 50 J=2,HD2,1
         READ(SUNIT2,REC=J) CINIT2
         IF (CINIT2 .EQ. T1(2)) THEN
                         DO 55 I=2,10,1
                            SINIT1(I)=0
                            HD3(I)=0
55                       CONTINUE
                         HD1=HD1+1
                         SINIT1(1)=J
                         READ(SUNIT4,REC=1) HD4
                         WRITE(SUNIT1,REC=1) HD1
                         III=HD1+1
                         WRITE(SUNIT1,REC=HD1) T1(1),SINIT1,S2
                         WRITE(SUNIT1,REC=III) T1(1)
                         HD4=HD4+1
                         JJJ=HD4+1
                         WRITE(SUNIT4,REC=HD4) S3
                         WRITE(SUNIT4,REC=JJJ) S3
                         WRITE(SUNIT4,REC=1) HD4
                         HD3(1)=HD4
                         WRITE(SUNIT3,REC=HD1) HD3
                         WRITE(SUNIT3,REC=III) HD3
                         CALL MESS(3,RC(13,1),RC(13,2),RC(13,3),6)
                         GOTO 1000
                                  ENDIF
50    CONTINUE


C     A NEW ADDITION IS TO BE MADE TO BOTH SUB.DB AND SOUR.DB
C     THE SUBSTANCE AND THE SOURCE ARE NOT IN THE DATA BASE.
      READ(SUNIT4,REC=1) HD4
      DO 60 I=2,10,1
         SINIT1(I)=0
         HD3(I)=0
60    CONTINUE
      HD1=HD1+1
      HD2=HD2+1
      SINIT1(1)=HD2
      WRITE(SUNIT1,REC=1) HD1
      WRITE(SUNIT2,REC=1) HD2
      WRITE(SUNIT1,REC=HD1) T1(1),SINIT1,S2
      WRITE(SUNIT2,REC=HD2) T1(2)
      III= HD1+1
      JJJ= HD2+1
      WRITE(SUNIT1,REC=III) T1(1)
      WRITE(SUNIT2,REC=JJJ) T1(2)
      HD4=HD4+1
      WRITE(SUNIT4,REC=HD4) S3
      WRITE(SUNIT4,REC=1) HD4
      KKK= HD4+1
      WRITE(SUNIT4,REC=KKK) S3
      HD3(1)=HD4
      WRITE(SUNIT3,REC=HD1) HD3
      WRITE(SUNIT3,REC=III) HD3
      CALL MESS(3,RC(13,1),RC(13,2),RC(13,3),6)
1000  CLOSE (SUNIT1)
      CLOSE (SUNIT2)
      CLOSE (SUNIT3)
      CLOSE (SUNIT4)
      ISET=1
      GOTO 200

      END
      SUBROUTINE SSEAR(EFLAG,ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,OPT,SKEY,
     *                 SDATA,SFILE1,SFILE2,SFILE3,SFILE4,SMUNIT,SMFILE)
C  THIS SUBROUTINE SEARCHES FOR ELEMENTS FROM THE SOURCE-SUBSTANCE DATA BASE

      CHARACTER*1    INP(1),OPT,OPT1
      CHARACTER*40   CINIT1,CINIT2,SKEY(1),TC(1)
      CHARACTER*8    TEMP(8)
      CHARACTER*7    SFILE1,SFILE2,SFILE3,SFILE4,SMFILE

      INTEGER        ITR,I,SUNIT1,SUNIT2,SUNIT3,SUNIT4,SMUNIT,
     *               RC(4,3),ST(3),RCC(7,3),EFLAG,HD

      INTEGER        SINIT1(10),HD3(10)

      REAL           SDATA(1),S2(10),S3(4)

      LOGICAL        FLAG1,FLAG2,FLAG3,FLAG4

      DATA ST /0,0,1/

      ITT=-1
      OPT1=' '

      IF (OPT .EQ. '&') GOTO 20

100   SKEY(1)(1:40)=' '
      SKEY(2)(1:40)=' '
105   CALL MENUSV(SMFILE,181,RC,4,SMUNIT)

C     IF ALREADY BEEN IN THE MENU ALLOW THE USER TO QUIT
      IF (OPT1 .EQ. '*') THEN
                          ST(3)=0
                          CALL MENUWR(RC,4,1,2,SKEY,0,1,ST)
                          GOTO 15
                          ENDIF

      IST=1
5     CALL MENURD(RC,4,IST,2,SKEY,ITR)
```

```
C     CHECK THE REQUEST FOR ERRORS
      IF ((SKEY(1) .EQ. ' ') .OR. (SKEY(2) .EQ. ' ')) THEN
               IF (SKEY(2) .EQ. ' ') IST=2
               IF (SKEY(1) .EQ. ' ') IST=1
               GOTO 5
                                                      ENDIF

C     SCANNING THE COMMAND INPUT ROW
15    INP(1)=' '
      CALL MENURD(RC,4,3,3,INP,ITT)
      IF (INP(1) .EQ. ' ') THEN
                           ST(3)=1
                           CALL MENUWR(RC,4,3,3,INP,Ø,1,ST)
                           CALL MESS(4,RC(4,1),RC(4,2),RC(4,3),1)
                           IST=1
                           GOTO 5
                           ENDIF
      IF (INP(1) .EQ. 'X') RETURN
      IF (INP(1) .NE. 'S') GOTO 15

C     ALLOW THE QUESTION MARK TO BE ANSWERED
      IF ((SKEY(1) .EQ. '?').OR.(SKEY(2) .EQ. '?')) THEN
         INQUIRE (FILE=SFILE1,EXIST=FLAG1)
         INQUIRE (FILE=SFILE2,EXIST=FLAG2)
         IF ((.NOT.FLAG1).OR.(.NOT.FLAG2)) THEN
            CALL MESS(18,RC(4,1),RC(4,2),RC(4,3),7)
            GOTO 15
                                           ENDIF
         IF (SKEY(1) .EQ. '?') THEN
            CALL SBQST(SKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)
            IF (EFLAG .NE. Ø) THEN
                              ST(3)=1
                              CALL MENUWR(RC,4,3,3,INP,Ø,1,ST)
                              CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),1)
                              IST=2
                              GOTO 5
                              ENDIF
                                     ENDIF
         IF (SKEY(2) .EQ. '?') THEN
            CALL SRCQST(SKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)
            IF (EFLAG .NE. Ø) THEN
                              ST(3)=1
                              CALL MENUWR(RC,4,3,3,INP,Ø,1,ST)
                              CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),1)
                              IST=1
                              GOTO 5
                              ENDIF
                                     ENDIF
         OPT1='*'
         GOTO 1Ø5
                                                               ENDIF

C     CHECK THAT THE DATABASES EXISTS
2Ø    INQUIRE (FILE=SFILE1,EXIST=FLAG1)
      INQUIRE (FILE=SFILE2,EXIST=FLAG2)
      INQUIRE (FILE=SFILE4,EXIST=FLAG4)
      INQUIRE (FILE=SFILE3,EXIST=FLAG3)
      IF ((.NOT. FLAG1).OR.(.NOT. FLAG2).OR.
     *    (.NOT. FLAG3).OR.(.NOT. FLAG4)) THEN
                          IF (OPT .EQ. '&') THEN
                                            EFLAG=10
                                            RETURN
                                            ENDIF
            CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
                                          GOTO 15
                                          ENDIF

C     OPEN THE DATABASES
      OPEN (SUNIT1,FILE=SFILE1,STATUS='OLD',RECL=120,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT2,FILE=SFILE2,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT3,FILE=SFILE3,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT4,FILE=SFILE4,STATUS='OLD',RECL=16,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')

      FLAG1=.FALSE.
      FLAG2=.FALSE.
      FLAG4=.FALSE.
      READ(SUNIT1,REC=1) HD
      DO 25 I=2,HD,1
         READ(SUNIT1,REC=I) CINIT1,SINIT1,S2
         IF ((SKEY(1) .EQ. CINIT1).OR.(SKEY(1) .EQ. '*')) THEN
                   READ(SUNIT3,REC=I) HD3
                   FLAG3=.FALSE.
                   ICNT=12
                   DO 30 II=1,9,1
                      IF (SINIT1(II) .EQ. 0) GOTO 30
                      FLAG1=.TRUE.
                      DO 80 IJ=1,5,1
                         SDATA(IJ)=S2(IJ)
80                    CONTINUE
                      READ(SUNIT2,REC=SINIT1(II)) CINIT2
                      IF ((CINIT2 .EQ. SKEY(2)).OR.
     *                   (SKEY(2) .EQ. '*')) THEN

                        READ(SUNIT4,REC=HD3(II)) S3
                        DO 81 IJ=1,4,1
                           SDATA(10+IJ)=S3(IJ)
81                      CONTINUE
                        IF (OPT .EQ. '&') THEN
                                          CLOSE (SUNIT1)
                                          CLOSE (SUNIT2)
                                          CLOSE (SUNIT3)
                                          CLOSE (SUNIT4)
                                          RETURN
                                          ENDIF

                        FLAG2=.TRUE.
C      FLAG3 IS A SWITCH USED TO DECIDE WHETHER TO WRITE HEADER
C      FLAG3 = .FALSE.  ==) WRITE HEADER
C      FLAG3 = .TRUE.   ==) DO NOT WRITE THE HEADER
                        IF (.NOT. FLAG3) THEN
                           FLAG3=.TRUE.
                           CALL MENUSV(SMFILE,184,RCC,7,SMUNIT)
                           ST(3)=0
                           TC(1)=CINIT1
                           CALL MENUWR(RCC,7,1,1,TC,0,1,ST)
                           DO 40 K=1,5,1
                              WRITE(TEMP(K+1)(1:8),'(F8.3)') S2(K)
40                         CONTINUE
                           ST(3)=0
                           CALL MENUWR(RCC,7,2,6,TEMP,0,1,ST)
                                         ENDIF

                           DO 65 K=1,4,1
                              WRITE(TEMP(K)(1:8),'(F8.1)') S3(K)
65                         CONTINUE
                           CALL MENUDR(CINIT2,ICNT,1,2,0,1,1)
                           CALL MENUDR(TEMP(1)(1:8),ICNT,41,2,0,1,1)
                           CALL MENUDR(TEMP(2)(1:8),ICNT,51,2,0,1,1)
                           CALL MENUDR(TEMP(3)(1:8),ICNT,61,2,0,1,1)
                           CALL MENUDR(TEMP(4)(1:8),ICNT,71,2,0,1,1)
                           ICNT=ICNT+1

                                             ENDIF
30                 CONTINUE

C      FLAG2 IS IS TO TELL IF ANYTHING WAS WRITTEN TO THE SCREEN
C      FLAG2 = .TRUE.  ==) SOMETTHING IS ON TTHE SCREEN
C      FLAG2 = .FALSE.  ==) NOTHING WAS WRITTEN ON THE SCREEN
                   IF (FLAG2) THEN
50                 INP(1)=' '
                   CALL MENURD(RCC,7,7,7,INP,ITT)
                   IF (INP(1) .EQ. 'X') THEN
                                        CLOSE (SUNIT1)
                                        CLOSE (SUNIT2)
                                        CLOSE (SUNIT3)
                                        CLOSE (SUNIT4)
                                        OPT1='*'
                                        GOTO 100
                                        ENDIF
                   IF (INP(1) .EQ. 'C') THEN
                                        FLAG1=.FALSE.
                                        FLAG2=.FALSE.
                                        FLAG4=.TRUE.
                                        GOTO 25
                                        ENDIF
                   GOTO 50
                   ENDIF

                                                          ENDIF
25    CONTINUE

      IF (((FLAG1).AND.(FLAG2)).OR.(FLAG4)) THEN
                                            CLOSE (SUNIT1)
                                            CLOSE (SUNIT2)
                                            CLOSE (SUNIT3)
                                            CLOSE (SUNIT4)
                                            OPT1='*'
                                            GOTO 100
                                            ENDIF
      IF (.NOT. FLAG1) THEN
                       IF (OPT .EQ. '&') THEN
                                         EFLAG=11
                                         CLOSE (SUNIT1)
                                         CLOSE (SUNIT2)
                                         CLOSE (SUNIT3)
                                         CLOSE (SUNIT4)
                                         RETURN
                                         ENDIF
                       IST=1
                       GOTO 35
                       ENDIF
      IF (.NOT. FLAG2) THEN
                       IF (OPT .EQ. '&') THEN
                                         EFLAG=12
                                         CLOSE (SUNIT1)
                                         CLOSE (SUNIT2)
                                         CLOSE (SUNIT3)
                                         CLOSE (SUNIT4)
                                         RETURN
                                         ENDIF
                       IST=2
                       ENDIF
35    INP(1)=' '
      ST(3)=1
      CALL MENUWR(RC,4,3,3,INP,0,1,ST)
      CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
      CLOSE (SUNIT1)
      CLOSE (SUNIT2)
      CLOSE (SUNIT3)
      CLOSE (SUNIT4)
      GOTO 5

      END
      SUBROUTINE SDEL(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,SFILE1,SFILE2,
     *                SFILE3,SFILE4,SMUNIT,SMFILE)
C  THIS SUBROUTINE DELETES ELEMENTS FROM THE SOURCE-SUBSTANCE DATA BASE

      CHARACTER*1    INP(1),OPT
      CHARACTER*40   CINIT1,CINIT2,DKEY(2),TC(1)
      CHARACTER*8    TEMP(10)
      CHARACTER*7    SFILE1,SFILE2,SFILE3,SFILE4,SMFILE

      INTEGER        ITR,RC(4,3),I,SUNIT1,SUNIT2,SUNIT3,SUNIT4,ST(3),
     *               RCC(7,3),SMUNIT,EFLAG

      INTEGER        SINIT1(10),HD3(10),HD,SAV(10),SAV1(10)

      REAL           S2(10),S3(4)

      LOGICAL        FLAG1,FLAG2,FLAG3,FLAG4

      DATA ST/0,0,0/

      ITT=-1
      OPT=' '
100   DKEY(1)(1:40)=' '
      DKEY(2)(1:40)=' '
105   CALL MENUSV(SMFILE,185,RC,4,SMUNIT)

      IF (OPT .EQ. '&') THEN
                        ST(3)=0
                        CALL MENUWR(RC,4,1,2,DKEY,0,1,ST)
                        GOTO 15
                        ENDIF
      IST=1
5     CALL MENURD(RC,4,IST,2,DKEY,ITR)

C     CHECK THE REQUEST FOR ERRORS
      IF ((DKEY(1) .EQ. ' ') .OR. (DKEY(2) .EQ. ' ')) THEN
               IF (DKEY(2) .EQ. ' ') IST=2
               IF (DKEY(1) .EQ. ' ') IST=1
               GOTO 5
                                                 ENDIF

C     SCANNING THE COMMAND INPUT ROW
15    INP(1)=' '
      CALL MENURD(RC,4,3,3,INP,ITT)
      IF (INP(1) .EQ. ' ') THEN
                             ST(3)=1
                             CALL MENUWR(RC,4,3,3,INP,0,1,ST)
                             CALL MESS(4,RC(4,1),RC(4,2),RC(4,3),1)
                             IST=1
                             GOTO 5
                             ENDIF
      IF (INP(1) .EQ. 'X') RETURN
      IF (INP(1) .NE. 'D') GOTO 15

C     ALLOW THE QUESTION MARK TO BE ANSWERED
      IF ((DKEY(1) .EQ. '?').OR.(DKEY(2) .EQ. '?')) THEN
         INQUIRE (FILE=SFILE1,EXIST=FLAG1)
         INQUIRE (FILE=SFILE2,EXIST=FLAG2)
         IF ((.NOT.FLAG1).OR.(.NOT.FLAG2)) THEN
            CALL MESS(18,RC(4,1),RC(4,2),RC(4,3),7)
            GOTO 15
                                            ENDIF
         IF (DKEY(1) .EQ. '?') THEN
            CALL SBQST(DKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)
            IF (EFLAG .NE. 0) THEN
                                ST(3)=1
                                CALL MENUWR(RC,4,3,3,INP,0,1,ST)
                                CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),1)
                                IST=2
                                GOTO 5
                                ENDIF
                                       ENDIF
         IF (DKEY(2) .EQ. '?') THEN
            CALL SRCQST(DKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)
            IF (EFLAG .NE. 0) THEN
                                ST(3)=1
                                CALL MENUWR(RC,4,3,3,INP,0,1,ST)
                                CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),1)
                                IST=1
                                GOTO 5
                                ENDIF
                                       ENDIF
         OPT='&'
         GOTO 105
                                                         ENDIF

C     CHECK THAT THE DATA BASES EXIST
      INQUIRE (FILE=SFILE1,EXIST=FLAG1)
      INQUIRE (FILE=SFILE2,EXIST=FLAG2)
      INQUIRE (FILE=SFILE4,EXIST=FLAG4)
      INQUIRE (FILE=SFILE3,EXIST=FLAG3)
      IF ((.NOT. FLAG1).OR.(.NOT. FLAG2).OR.
     *    (.NOT. FLAG3).OR.(.NOT. FLAG4)) THEN
                                  CALL MESS(5,RC(4,1),RC(4,2),RC94,3),7)
                                          GOTO 15
                                          ENDIF

C     OPEN THE DATABASES
      OPEN (SUNIT1,FILE=SFILE1,STATUS='OLD',RECL=120,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT2,FILE=SFILE2,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT3,FILE=SFILE3,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT4,FILE=SFILE4,STATUS='OLD',RECL=16,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')

      FLAG1=.FALSE.
      FLAG2=.FALSE.
      FLAG4=.FALSE.
      READ(SUNIT1,REC=1) HD
      DO 25 I=2,HD,1
         READ(SUNIT1,REC=I) CINIT1,SINIT1,S2
         IF ((DKEY(1) .EQ. CINIT1).OR.(DKEY(1) .EQ. '*')) THEN
                   READ(SUNIT3,REC=I) HD3
                   FLAG1=.TRUE.
                   FLAG3=.FALSE.
                   ICNT=12
                   ICNTT=0
                   DO 30 II=1,9,1
                      IF (SINIT1(II) .EQ. 0) GOTO 30
                      READ(SUNIT2,REC=SINIT1(II)) CINIT2
                      IF ((CINIT2 .EQ. DKEY(2)).OR.
     *                   (DKEY(2) .EQ. '*')) THEN

                        ICNTT=ICNTT+1
                        SAV(ICNTT)=SINIT1(II)
                        SAV1(ICNTT)=II
                        FLAG2=.TRUE.
                        READ(SUNIT4,REC=HD3(II)) S3

                        IF (.NOT. FLAG3) THEN
                           FLAG3=.TRUE.
                           CALL MENUSV(SMFILE,184,RCC,7,SMUNIT)
                           ST(3)=0
                           TC(1)=CINIT1
                           CALL MENUWR(RCC,7,1,1,TC,0,1,ST)
                           DO 40 K=1,5,1
                              WRITE(TEMP(K+1)(1:8),'(F8.3)') S2(K)
40                         CONTINUE
                           ST(3)=0
                           CALL MENUWR(RCC,7,2,6,TEMP,0,1,ST)
                                         ENDIF

                           DO 65 K=1,4,1
                              WRITE(TEMP(K)(1:8),'(F8.1)') S3(K)
65                         CONTINUE
                           CALL MENUDR(CINIT2,ICNT,1,2,0,1,1)
                           CALL MENUDR(TEMP(1)(1:8),ICNT,41,2,0,1,1)
                           CALL MENUDR(TEMP(2)(1:8),ICNT,51,2,0,1,1)
                           CALL MENUDR(TEMP(3)(1:8),ICNT,61,2,0,1,1)
                           CALL MENUDR(TEMP(4)(1:8),ICNT,71,2,0,1,1)
                           ICNT=ICNT+1

                                             ENDIF
30                 CONTINUE

                   IF (FLAG2) THEN
50                 INP(1)=' '
                   CALL MENURD(RCC,7,7,7,INP,ITT)
                   IF (INP(1) .EQ. 'X') THEN
                                        CLOSE (SUNIT1)
                                        CLOSE (SUNIT2)
                                        CLOSE (SUNIT3)
                                        CLOSE (SUNIT4)
                                        OPT='&'
                                        GOTO 100
                                        ENDIF
                   IF (INP(1) .EQ. 'C') THEN
                           FLAG1=.FALSE.
                           FLAG2=.FALSE.
                           FLAG4=.TRUE.
                           DO 80 JG=1,ICNTT,1
                              SINIT1(SAV1(JG))=0
                              HD3(SAV1(JG))=0
80                          CONTINUE
                            WRITE(SUNIT1,REC=I) CINIT1,SINIT1,S2
                            WRITE(SUNIT3,REC=I) HD3
                            GOTO 25
                                     ENDIF
                   GOTO 50
                           ENDIF

                                                          ENDIF
25    CONTINUE

      IF (((FLAG1).AND.(FLAG2)).OR.(FLAG4)) THEN
                                            CLOSE (SUNIT1)
                                            CLOSE (SUNIT2)
                                            CLOSE (SUNIT3)
                                            CLOSE (SUNIT4)
                                            OPT='&'
                                            GOTO 100
                                            ENDIF
      IF (.NOT. FLAG2) IST=2
      IF (.NOT. FLAG1) IST=1

35    INP(1)= ' '
      ST(3)=1
      CALL MENUWR(RC,4,3,3,INP,0,1,ST)
      CALL MESS(5,RC(4,1),RC(4,2),RC(4,3),7)
      CLOSE (SUNIT1)
      CLOSE (SUNIT2)
      CLOSE (SUNIT3)
      CLOSE (SUNIT4)
      GOTO 5

      END
      SUBROUTINE SMOD(ITR,SUNIT1,SUNIT2,SUNIT3,SUNIT4,SFILE1,SFILE2,
     *                SFILE3,SFILE4,SMUNIT,SMFILE)
C  THIS SUBROUTINE MODIFIES ELEMENTS FROM THE SOURCE-SUBSTANCE  DATA BASE

      CHARACTER*1   INP(1),OPT
      CHARACTER*40  CINIT1,CINIT2,MKEY(2)
      CHARACTER*8   TEMP(11)
      CHARACTER*7   SFILE1,SFILE2,SFILE3,SFILE4,SMFILE

      INTEGER       ITR,SUNIT1,SUNIT2,I,SUNIT3,SUNIT4,RC(13,3),ST(3),
     *              IERR,ITT,EFLAG
      INTEGER       SINIT1(10),HD,HD3(10)

      LOGICAL       FLAG1,FLAG2,FLAG3,FLAG4

      REAL          S2(10),TDATA(11),S3(4)

      DATA ST/0,0,0/

      OPT=' '
      ITT=-1
100   MKEY(1)(1:40)=' '
      MKEY(2)(1:40)=' '
105   CALL MENUSV(SMFILE,186,RC,13,SMUNIT)

      IF (OPT .EQ. '&') THEN
                        ST(3)=0
                        CALL MENUWR(RC,13,1,2,MKEY,0,1,ST)
                        GOTO 15
                        ENDIF

C     READ IN THE SUBSTANCE AND THE SOURCE FROM THE MENU
      IST=1
5     CALL MENURD(RC,13,IST,2,MKEY,ITR)

C     CHECK TO SEE IF THE SUBSTANCE OR THE SOURCE IS BLANK
C     CAN NOT GO ON IF EITHER SUBSTANCE OR SOURCE IS BLANK
      IF ((MKEY(1) .EQ. ' ') .OR. (MKEY(2) .EQ. ' ')) THEN
         IF (MKEY(2) .EQ. ' ') IST=2
         IF (MKEY(1) .EQ. ' ') IST=1
         GOTO 5
                                                      ENDIF

C     SCANNING THE COMMAND INPUT ROW
15    INP(1)=' '
      CALL MENURD(RC,13,12,12,INP,ITT)
      IF (INP(1) .EQ. ' ') THEN
                           ST(3)=1
                           CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                           CALL MESS(4,RC(13,1),RC(13,2),RC(13,3),1)
                           IST=1
                           GOTO 5
                           ENDIF
      IF (INP(1) .EQ. 'X') RETURN
      IF (INP(1) .NE. 'M') GOTO 15

C     ALLOW THE QUESTION MARK TO BE ANSWERED
      IF ((MKEY(1) .EQ. '?').OR.(MKEY(2) .EQ. '?')) THEN
         INQUIRE (FILE=SFILE1,EXIST=FLAG1)
         INQUIRE (FILE=SFILE2,EXIST=FLAG2)
         IF ((.NOT.FLAG1).OR.(.NOT.FLAG2)) THEN
            CALL MESS(18,RC(13,1),RC(13,2),RC(13,3),7)
            GOTO 15
                                           ENDIF
         IF (MKEY(1) .EQ. '?') THEN
            CALL SBQST(MKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)
            IF (EFLAG .NE. 0) THEN
                              ST(3)=1
                              CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                              CALL MESS(5,RC(13,1),RC(13,2),RC(13,3),1)
                              IST=2
                              GOTO 5
                              ENDIF
                                     ENDIF
         IF (MKEY(2) .EQ. '?') THEN
            CALL SRCQST(MKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)
            IF (EFLAG .NE. 0) THEN
                              ST(3)=1
                              CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                              CALL MESS(5,RC(13,1),RC(13,2),RC(13,3),1)
                              IST=1
                              GOTO 5
                              ENDIF
                                     ENDIF
         OPT='&'
         GOTO 105
                                                               ENDIF

C     CHECK TO SEE THAT ALL THE NECESSARY DATA BASES  EXIST
      INQUIRE (FILE=SFILE1,EXIST=FLAG1)
      INQUIRE (FILE=SFILE2,EXIST=FLAG2)
      INQUIRE (FILE=SFILE3,EXIST=FLAG3)
      INQUIRE (FILE=SFILE4,EXIST=FLAG4)
      IF ((.NOT. FLAG1).OR.(.NOT. FLAG2).OR.
     *    (.NOT. FLAG3).OR.(.NOT. FLAG4)) THEN
                              CALL MESS(18,RC(13,1),RC(13,2),RC(13,3),7)
                                          GOTO 15
                                          ENDIF


C     CHECK TO SEE IF THE SUBSTANCE IS IN THE DATA BASE
      OPEN (SUNIT1,FILE=SFILE1,STATUS='OLD',RECL=120,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      READ(SUNIT1,REC=1) HD
      DO 20 I=2,HD,1
         READ(SUNIT1,REC=I) CINIT1,SINIT1,S2
         IF (MKEY(1) .EQ. CINIT1) GOTO 25
20    CONTINUE
      IST=1
      INP(1)=' '
      ST(3)=1
      CALL MENUWR(RC,13,12,12,INP,0,1,ST)
      CALL MESS(5,RC(13,1),RC(13,2),RC(13,3),7)
      CLOSE (SUNIT1)
      GOTO 5

C     CHECK TO SEE IF THE SOURCE IS IN THE DATA BASE
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25    OPEN (SUNIT2,FILE=SFILE2,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
32    DO 30 II=1,9,1
         IF (SINIT1(II) .EQ. 0) GOTO 30
         READ(SUNIT2,REC=SINIT1(II)) CINIT2
         IF (MKEY(2) .EQ. CINIT2) GOTO 35
30    CONTINUE
      IF (SINIT1(10) .NE. 0) THEN
         I=SINIT1(10)
         READ(SUNIT1,REC=I) CINIT1,SINIT1,S2
         GOTO 32
                             ENDIF
      IST=2
      ST(3)=1
      INP(1)=' '
      CALL MENUWR(RC,13,12,12,INP,0,1,ST)
      CALL MESS(5,RC(13,1),RC(13,2),RC(13,3),7)
      CLOSE (SUNIT1)
      CLOSE (SUNIT2)
      GOTO 5

35    OPEN (SUNIT3,FILE=SFILE3,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT4,FILE=SFILE4,STATUS='OLD',RECL=16,
     *      ACCESS='DIRECT',FORM='UNFORMATTED')
      READ(SUNIT3,REC=I) HD3
      READ(SUNIT4,REC=HD3(II)) S3

C     CONVERT THE BINARY DATA TO ALPHA DATA
      DO 40 K=3,7,1
         WRITE(TEMP(K)(1:8),'(F8.3)') S2(K-2)
40    CONTINUE
      DO 41 K=8,11,1
         WRITE(TEMP(K)(1:8),'(F8.3)') S3(K-7)
41    CONTINUE

C     BLANK OUT THE COMMAND LINE
      ST(3)=1
      INP(1)=' '
      CALL MENUWR(RC,13,12,12,INP,0,1,ST)

C     OUTPUT THE STORED DATA
      ST(3)=0
      CALL MENUWR(RC,13,3,11,TEMP,0,1,ST)

      IST=3
55    CALL MENURD(RC,13,IST,11,TEMP,ITR)

C     SCANNING THE COMMAND INPUT ROW
60    INP(1)=' '
      CALL MENURD(RC,13,12,12,INP,ITT)
      IF (INP(1) .EQ. ' ') THEN
                           IST=3
                           ST(3)=1
                           CALL MESS(4,RC(13,1),RC(13,2),RC(13,3),1)
                           CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                           GOTO 55
                           ENDIF
      IF (INP(1) .EQ. 'X') THEN
                           CLOSE (SUNIT1)
                           CLOSE (SUNIT2)
                           CLOSE (SUNIT3)
                           CLOSE (SUNIT4)
                           OPT='&'
                           GOTO 100
                           ENDIF
      IF (INP(1) .NE. 'M') GOTO 60

C     CHECK THE REQUEST FOR ERRORS
      TEMP(1)(1:8)=' '
      TEMP(2)(1:8)=' '
      CALL MENUCK(TEMP,TDATA,11,'(F8.3)',IERR)
      IF (IERR. NE. 0) THEN
                       INP(1)=' '
                       ST(3)=1
                       CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                       CALL MESS(1,RC(13,1),RC(13,2),RC(13,3),7)
                       IST=IERR
                       GOTO 55
                       ENDIF
      DO 61 K=3,6,1
         IF (TDATA(K) .LE. 0.0) THEN
                                IST=K
                                INP(1)=' '
                                ST(3)=1
                                CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                               CALL MESS(1,RC(13,1),RC(13,2),RC(13,3),7)
                                GOTO 55
                                ENDIF
61    CONTINUE
      IF (TDATA(8) .LE. 0) THEN
                           IST=8
                           INP(1)=' '
                           ST(3)=1
                           CALL MENUWR(RC,13,12,12,INP,0,1,ST)
                           CALL MESS(1,RC(13,1),RC(13,2),RC(13,3),7)
                           GOTO 55
                           ENDIF

C     LOAD THE S2 AND S3 ARRAYS WITH THE NEW DATA
      S3(1)=TDATA(8)
      S3(2)=TDATA(9)
      S3(3)=TDATA(10)
      S3(4)=TDATA(11)
      DO 42 K=1,10,1
         S2(K)=0.0
42    CONTINUE
      DO 43 K=1,5,1
         S2(K)=TDATA(K+2)
43    CONTINUE

      WRITE(SUNIT4,REC=HD3(II)) S3
      DO 44 I=2,HD,1
         READ(SUNIT1,REC=I) CINIT1,SINIT1
         IF (CINIT1 .EQ. MKEY(1)) GOTO 45
44    CONTINUE
45    WRITE(SUNIT1,REC=I) CINIT1,SINIT1,S2
80    IF (SINIT1(10) .NE. 0) THEN
         I=SINIT1(10)
         READ(SUNIT1,REC=I) CINIT1,SINIT1
         WRITE(SUNIT1,REC=I) CINIT1,SINIT1,S2
         GOTO 80
                              ENDIF
      CLOSE (SUNIT1)
      CLOSE (SUNIT2)
      CLOSE (SUNIT3)
      CLOSE (SUNIT4)
      OPT='&'
      GOTO 100

      END
      SUBROUTINE SBQST(SKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)

      CHARACTER*70  OUT(19)
      CHARACTER*40  SKEY(1),HEAD,THEAD,SHEAD
      CHARACTER*7   SFILE1,SFILE2,SMFILE
      CHARACTER*3   CMD(1)

      INTEGER       SUNIT1,SUNIT2,SMUNIT,RC(19,3),ST(3),ICNT,ITR,
     *              EFLAG,HD,HDR(10)

      LOGICAL       FLAG1

      DATA ST/0,0,0/

      EFLAG=1
      OPEN (SUNIT1,FILE=SFILE1,STATUS='OLD',RECL=120,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT2,FILE=SFILE2,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      READ(SUNIT1,REC=1) HD
5     ICNT=2
      FLAG1=.FALSE.
      DO 20 I=2,HD,1
         IF (.NOT. FLAG1) FLAG1=.TRUE.
         READ(SUNIT1,REC=I) HEAD,HDR
         ICHECK=0
         DO 13 JG=1,9,1
            IF (HDR(JG) .NE. 0) ICHECK=1
13       CONTINUE
         IF (ICHECK .EQ. 0) GOTO 20
         IF (SKEY(2) .NE. '*') THEN
         IF (SKEY(2) .NE. '?') THEN
            DO 12 K=1,9,1
               IF (HDR(K) .EQ. 0) GOTO 12
               READ(SUNIT2,REC=III) SHEAD
               IF (SHEAD .EQ. SKEY(2)) GOTO 11
12          CONTINUE
            GOTO 20
                                ENDIF
                                ENDIF
         DO 10 J=2,I-1,1
            READ(SUNIT1,REC=J) THEAD
            IF (THEAD .EQ. HEAD) GOTO 20
10       CONTINUE
11       EFLAG=0
         OUT(ICNT)(1:70)=' '
         WRITE(OUT(ICNT)(1:3),'(I3)') I
         OUT(ICNT)(6:70)=HEAD
         IF (ICNT .EQ. 19) THEN
           CALL MENUSV(SMFILE,182,RC,19,SMUNIT)
           CALL MENUWR(RC,19,2,19,OUT,0,1,ST)
15         CMD(1)='   '
           CALL MENURD(RC,19,1,1,CMD,ITR)
           IF (CMD(1) .EQ. 'X  ') THEN
                                  CLOSE (SUNIT1)
                                  CLOSE (SUNIT2)
                                  RETURN
                                  ENDIF
           IF (CMD(1) .EQ. 'C  ') THEN
                                  ICNT=2
                                  FLAG1=.FALSE.
                                  GOTO 20
                                  ENDIF
           READ(CMD(1)(1:3),'(I3)',ERR=15) II
           IF ((II .LT. 2).OR.(II .GT. HD)) GOTO 15
           READ(SUNIT1,REC=II) SKEY(1)
           CLOSE (SUNIT1)
           CLOSE (SUNIT2)
           RETURN
                           ENDIF
      ICNT=ICNT+1
20    CONTINUE
      IF (EFLAG .NE. 0) RETURN
      IF (.NOT. FLAG1) GOTO 5
      CALL MENUSV(SMFILE,182,RC,19,SMUNIT)
      CALL MENUWR(RC,19,2,ICNT-1,OUT,0,1,ST)
25    CMD(1)='   '
      CALL MENURD(RC,19,1,1,CMD,ITR)
      IF (CMD(1) .EQ. 'X  ') THEN
                             CLOSE (SUNIT1)
                             CLOSE (SUNIT2)
                             RETURN
                             ENDIF
      IF (CMD(1) .EQ. 'C  ') THEN
                             FLAG1=.FALSE.
                             GOTO 5
                             ENDIF
      READ(CMD(1)(1:3),'(I3)',ERR=25) II
      IF ((II .LT. 2).OR.(II .GT. HD)) GOTO 25
      READ(SUNIT1,REC=II) SKEY(1)
      CLOSE (SUNIT1)
      CLOSE (SUNIT2)
      RETURN

      END
      SUBROUTINE SRCQST(SKEY,SUNIT1,SUNIT2,SFILE1,SFILE2,SMUNIT,SMFILE,
     *                 ITR,EFLAG)

      CHARACTER*70  OUT(19)
      CHARACTER*40  SKEY(1),HEAD,THEAD,SHEAD
      CHARACTER*7   SFILE1,SFILE2,SMFILE
      CHARACTER*3   CMD(1)

      INTEGER       SUNIT1,SUNIT2,SMUNIT,RC(19,3),ST(3),ICNT,ITR,
     *              EFLAG,HD,HD1

      INTEGER       HDR(10)
      LOGICAL       FLAG1

      DATA ST/0,0,0/

      EFLAG=1
      OPEN (SUNIT1,FILE=SFILE1,STATUS='OLD',RECL=120,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      OPEN (SUNIT2,FILE=SFILE2,STATUS='OLD',RECL=40,ACCESS='DIRECT',
     *      FORM='UNFORMATTED')
      READ(SUNIT2,REC=1) HD
5     ICNT=2
      FLAG1=.FALSE.
      DO 20 I=2,HD,1
         IF (.NOT. FLAG1) FLAG1=.TRUE.
         READ(SUNIT2,REC=I) SHEAD
         IF (SKEY(1) .NE. '*') THEN
         IF (SKEY(1) .NE. '?') THEN
            READ(SUNIT1,REC=1) HD1
            DO 12 K=2,HD1,1
               READ(SUNIT1,REC=K) HEAD,HDR
               IF (HEAD .NE. SKEY(1)) GOTO 12
               DO 13 KK=1,9,1
                  IF (HDR(KK) .EQ. I) GOTO 11
13             CONTINUE
12          CONTINUE
            GOTO 20
                               ENDIF
                               ENDIF
11       EFLAG=0
         OUT(ICNT)(1:70)=' '
         WRITE(OUT(ICNT)(1:3),'(I3)') I
         OUT(ICNT)(6:70)=SHEAD
         IF (ICNT .EQ. 19) THEN
           CALL MENUSV(SMFILE,183,RC,19,SMUNIT)
           CALL MENUWR(RC,19,2,19,OUT,0,1,ST)
15         CMD(1)='    '
           CALL MENURD(RC,19,1,1,CMD,ITR)
           IF (CMD(1) .EQ. 'X  ') THEN
                                  CLOSE (SUNIT1)
                                  CLOSE (SUNIT2)
                                  RETURN
                                  ENDIF
           IF (CMD(1) .EQ. 'C  ') THEN
                                  ICNT=2
                                  FLAG1=.FALSE.
                                  GOTO 20
                                  ENDIF
           READ(CMD(1)(1:3),'(I3)',ERR=15) II
           IF ((II .LT. 2).OR.(II .GT. HD)) GOTO 15
           READ(SUNIT2,REC=II) SKEY(2)
           CLOSE (SUNIT1)
           CLOSE (SUNIT2)
           RETURN
                           ENDIF
      ICNT=ICNT+1
20    CONTINUE
      IF (EFLAG .NE. 0) RETURN
      IF (.NOT. FLAG1) GOTO 5
      CALL MENUSV(SMFILE,183,RC,19,SMUNIT)
      CALL MENUWR(RC,19,2,ICNT-1,OUT,0,1,ST)
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```
25    CMD(1)='    '
      CALL MENURD(RC,19,1,1,CMD,ITR)
      IF (CMD(1) .EQ. 'X  ') THEN
                            CLOSE (SUNIT1)
                            CLOSE (SUNIT2)
                            RETURN
                            ENDIF
      IF (CMD(1) .EQ. 'C  ') THEN
                            FLAG1=.FALSE.
                            GOTO 5
                            ENDIF
      READ(CMD(1)(1:3),'(I3)',ERR=25) II
      IF ((II .LT. 2).OR.(II .GT. HD)) GOTO 25
      READ(SUNIT2,REC=II) SKEY(2)
      CLOSE (SUNIT1)
      CLOSE (SUNIT2)
      RETURN

      END
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