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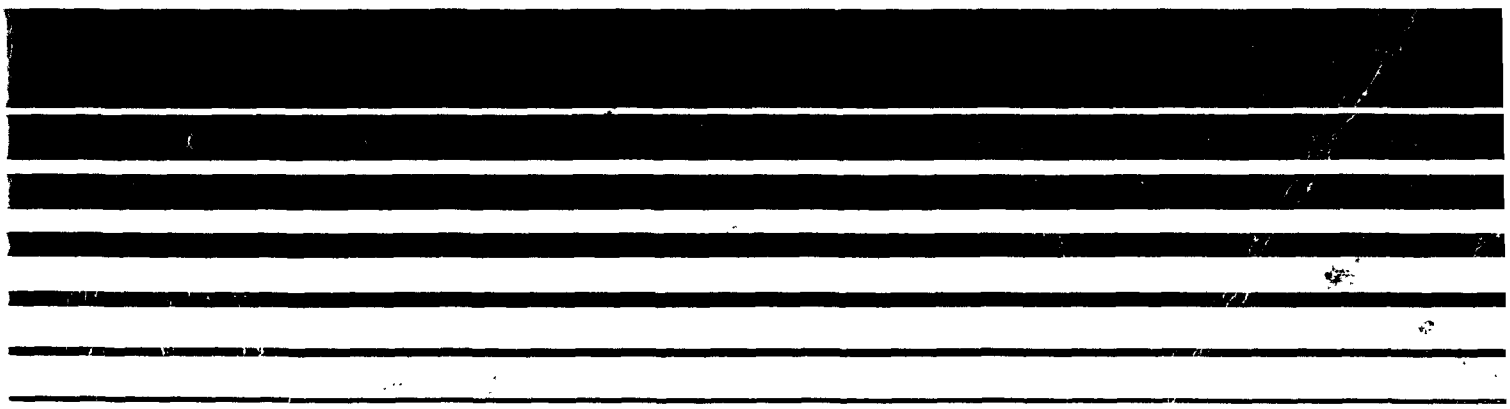
USER'S GUIDE TO TSCREEN

A MODEL FOR SCREENING TOXIC AIR POLLUTANT CONCENTRATIONS



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USER'S GUIDE TO TSCREEN

A MODEL FOR SCREENING TOXIC AIR POLLUTANT CONCENTRATIONS

By

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1.0 INTRODUCTION

The Techniques Evaluation Section (TES) of the Office of Air Quality Planning and Standards (OAQPS) provides guidance and recommendations on the application of air quality models for a variety of purposes. The continuing involvement in the Superfund toxic/hazardous pollutant impact activities has created a need for easy to use air quality screening modeling techniques. The EPA has developed the document "A Workbook Of Screening Techniques For Assessing Impacts of Toxic Air Pollutants", EPA-450/4-88-009, that can serve this purpose based on a set of logical and mathematical procedures. Pacific Environmental Services, Inc. (PES) has developed TSCREEN, A Model for Screening Toxic Air Pollutant Concentrations. This computer program implements the procedures in the workbook and is a screening model that can be easily used by State and local agencies.

To correctly analyze toxic emissions and their subsequent dispersion from one of many different types of possible releases from Superfund sites, the computer program TSCREEN should be used in conjunction with the workbook. With the use of these tools one can determine the type of release and what steps are to be followed so that the release can be simulated via an applicable computer model and then the dispersion characteristics and pollutant concentrations of the resulting plume calculated. The air toxics dispersion screening models imbedded in TSCREEN that are used for the various scenarios are SCREEN, RVD, and PUFF. Using TSCREEN, a particular release scenario is selected via input parameters, and TSCREEN automatically selects and executes the appropriate dispersion model to simulate that scenario. The model to be used and the appropriate worst case meteorological conditions are automatically selected based on criteria given in the workbook. TSCREEN has a front-end control program to the models that also provides, by use of interactive menus and data entry screen, the same steps as the workbook. The correct release scenario and associated characteristics of a toxic emissions release are selected with the help of on-screen text; graphics and data input is performed in a full-screen edit mode. TSCREEN saves the input data for each release scenario to a file that can be retrieved and later edited or executed. TSCREEN also provided a method of easily viewing and saving the modeling results for each modeled scenario.

2.0 GETTING STARTED

Hardware Requirements

TSCREEN is an IBM PC-based software application written and compiled in Microsoft™ BASIC Version 7.1 and Microsoft™ C Version 5.1. The program requires 500 kilobytes (K) of free Random Access Memory (RAM). Although TSCREEN may operate with certain memory resident programs installed, no attempt has been made to test its operation against all memory resident programs available today. If problems occur while TSCREEN and memory resident programs are running simultaneous, try removing the memory resident programs from memory and reexecute TSCREEN. The TSCREEN program files consisting of all executables and help related programs occupy about 1.5 megabytes (MB) of disk space. The source code, executables and a WordPerfect™ formatted manual require 2.3 MB of disk space. As scenario files are created, the hard disk space needed will increase. To install TSCREEN on hard disk systems make sure there is at least 1.5 MB of free disk space available to load and execute the program.

The computer running TSCREEN must be booted with the CONFIG.SYS file in the root directory of the boot up disk containing the following parameters in order to execute properly:

Files = 20
Buffers = 22

If the CONFIG.SYS file already has these statements with higher values assigned, then no modification is necessary, otherwise either add the needed statements or increase their value to that of the example and reboot the computer.

The files required to run TSCREEN are as follows:

AVETIME.EXE - The averaging time program
CHEMBASE.EXE - The chemical database program
CHEMBASE.DAT - The chemical parameter look-up database
CHEMBASE.IDX - The chemical database index file
CHEMHELP.HLP - The chemical database help file
CHEMHELP.IDX - The chemical database help index file
CHEMHELP.NDX - The chemical database help index file (link)
ERHANDLE.EXE - The error handling program
ERMSG.DAT - The error message file
GLOSS.HLP - The glossary file
GLOSS.NDX - The glossary file index (link)
GRAF.EXE - The graph device selection program
GRAPH.EXE - The graph generating program
HELPSYS.EXE - The help system program

PCXHELP.EXE - The graphics help program
PUFFTS.EXE - The PUFF model
RVDTS.EXE - The RVD model
SCREENTS.EXE - The SCREEN model
TSCREEN.EXE - The controlling program
TSCREEN.HLP - The graphics help screen (text)
TSCREEN.PCL - The graphics help screen (graphics)
TSHELP.NDX - The help file index (link)
TSHELP.HLP - The help file
TSHELP.IDX - The help system index
TSMAIN.EXE - The scenarios and model input program
VFONT101.FNT - The graph font file
VIEW.EXE - The model output viewer program

As TSCREEN scenarios are entered, the data are automatically saved in files using the following naming convention:

*.TSN - Scenario data files are RUN00001.TSN to RUN30000.TSN

First Time Installation

The complete package occupies a single 5¼ inch, double-sided, high-density diskette. TSCREEN must be installed on a hard disk in order to run. To install TSCREEN on a hard disk, check the available disk space by running the DOS program CHKDSK. To check to see if the DOS programs are accessible from the PATH setting simply type:

PATH

If the DOS sub-directory or sub-directories containing the DOS files is listed the type:

CHKDSK

at the hard disk prompt where TSCREEN is to be installed. If not, read your DOS manual to understand what you have to do to run CHKDSK. Check to make sure there is at least 1.5 MB of available disk space. If there is enough free disk space, then create a TSCREEN sub-directory from the root directory of the hard drive on which TSCREEN will be installed. The command to create a TSCREEN sub-directory off the main or root directory is:

```
CD\
MD TSCREEN
```

Once the sub-directory is created, insert the TSCREEN diskette in the high-density drive of the computer (usually the A drive on IBM AT-type machines) and copy the files from the diskette to the sub-directory by typing the command:

COPY A:*.* X:\TSCREEN

where X is the letter designation of the drive which TSCREEN is to be installed (where the sub-directory was created). Once the files are copied, the installation is complete. To start TSCREEN simply change the sub-directory by typing the command:

CD TSCREEN

Then, at the hard disk prompt where TSCREEN was installed, type:

TSCREEN

to start the program.

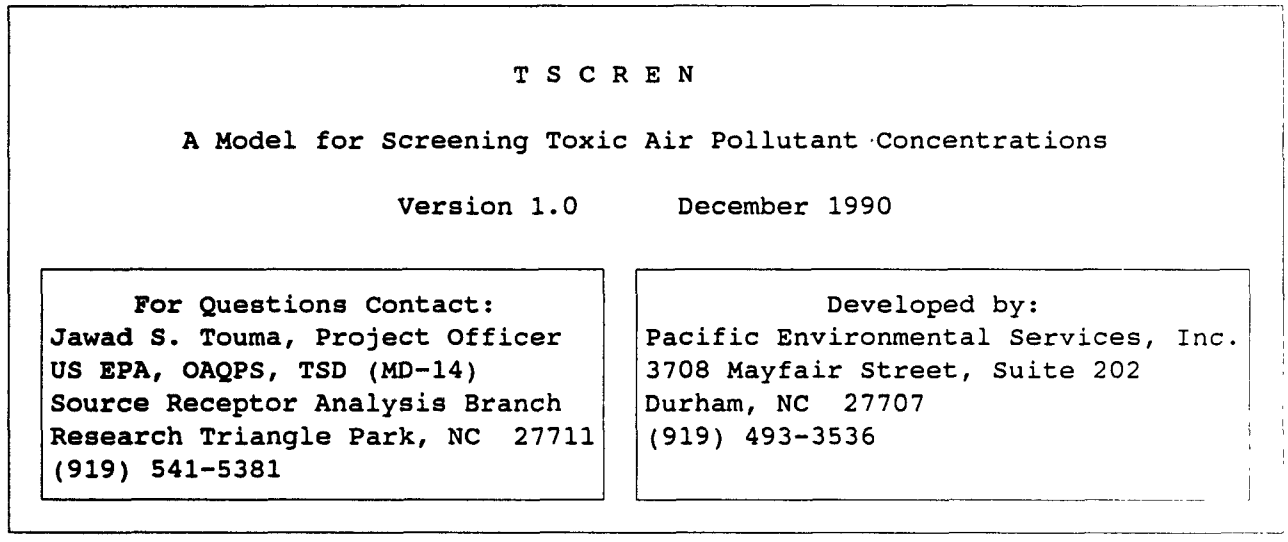
3.0 EXAMPLE SCENARIO

An example TSCREEN session is demonstrated in this section. For more information on the scenarios in TSCREEN, the document, "A Workbook Of Screening Techniques For Assessing Impacts OF Toxic Air Pollutants", EPA-450/4-99-009, should be referred to and used as an accompanying guide with this program.

Title Screen

Upon starting the program a title screen will appear as shown in Figure 1.

FIGURE 1.

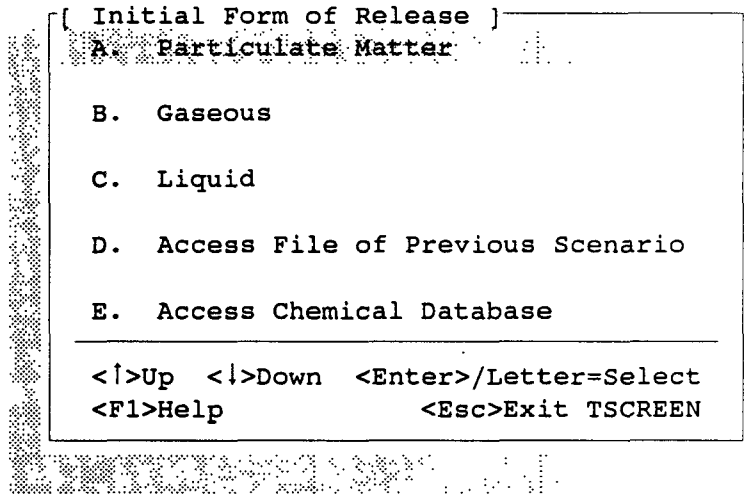


Press any key to begin...

Selection Windows

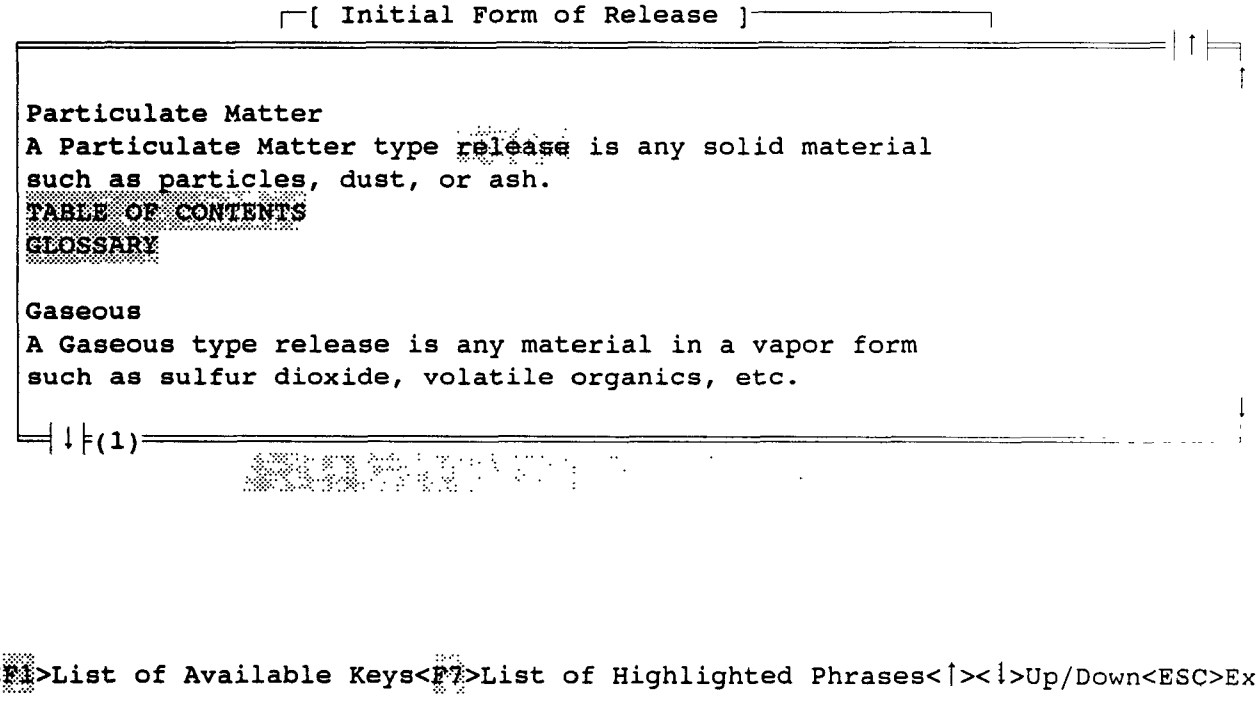
After pressing a key, the first selection window will appear to allow the selection of Initial Form of Release, access and retrieval of previously entered and saved sessions or accessing/updating of the chemical database. An example of this screen is shown in Figure 2.

FIGURE 2.



TSCREEN has help available at each point in the system, activated by pressing the F1 key. An example of pressing the F1 key from the first selection window (Initial Form of Release) is shown in Figure 3.

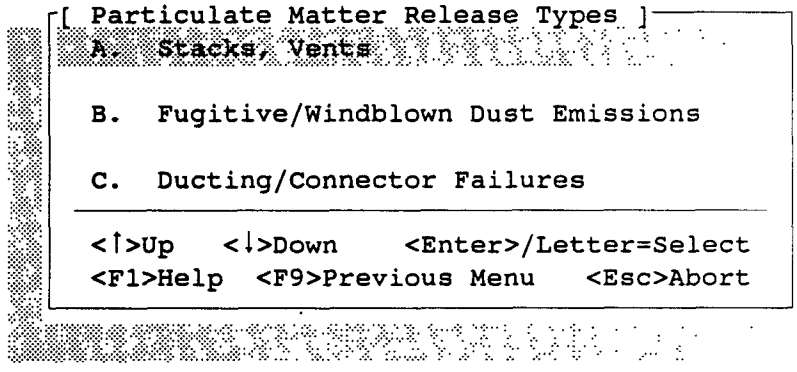
FIGURE 3.



The user can also see the help screen for the other parameters. Please see Section 5.0 for a detailed discussion on the use of the help system. Once a selection is made from the first

menu by using the arrow keys to highlight the desired release type and pressing the Enter key (point and shoot) or by directly pressing the letter key to the left of the desired release type, a second selection window will appear unique to the selection made from the first selection window. For example if 'A. Particulate Matter' is selected from the first selection window, a second selection window 'Particulate Matter Release Type' will appear as shown in Figure 4.

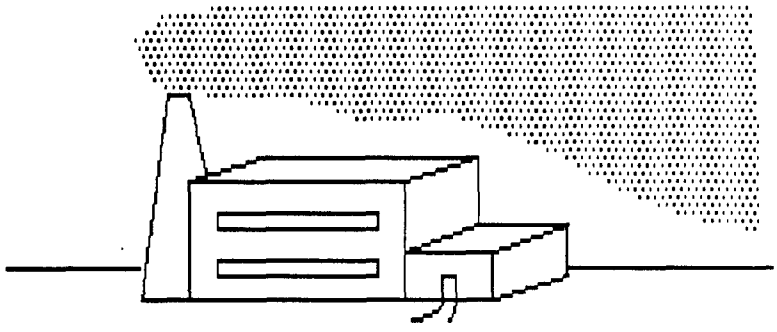
FIGURE 4.



The selections in this second menu of release types are specific to the Initial Form of Release selected from the first selection window. From this point selections can be made by point and shoot, direct selection or help can be accessed by pressing the F1 key. The user could also return to the previous selection window by pressing the F9 key. At the second selection window level, graphics type help is available for computers with Hercules, CGA, EGA or VGA type monitors and video cards. Otherwise help text appears without graphics. An example of this graphics help is shown in Figure 5.

FIGURE 5.

STACK RELEASES OF PARTICLES



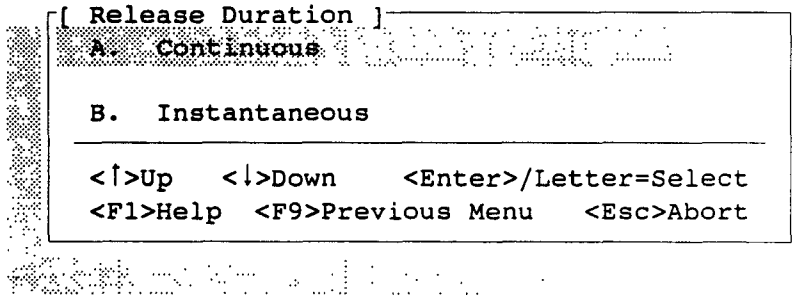
Similar Releases: Continuous emissions of particulate matter from vertical stacks and pipes or conventional points sources and some process vents when emission flow rates and temperature are known. Combustion sources and chemical reactors are typical emission sources that emit polluntants through stacks. These releases may also be due to a process failure such as a rupture disk release or failure of control equipment.

PRESS Esc TO EXIT HELP ↑ FOR PREVIOUS HELP SCREEN ↓ FOR NEXT HELP SCREEN

These graphics help screens can be scrolled through to aid the user in selecting the desired release type. Once the desired release type is viewed, pressing the Esc key will return the highlighted bar to the selection that matches the help screen.

Once a release type is selected from the second selection window, a third selection window will appear which allows for the selection of Continuous or Instantaneous Release Duration as shown in Figure 6.

FIGURE 6.



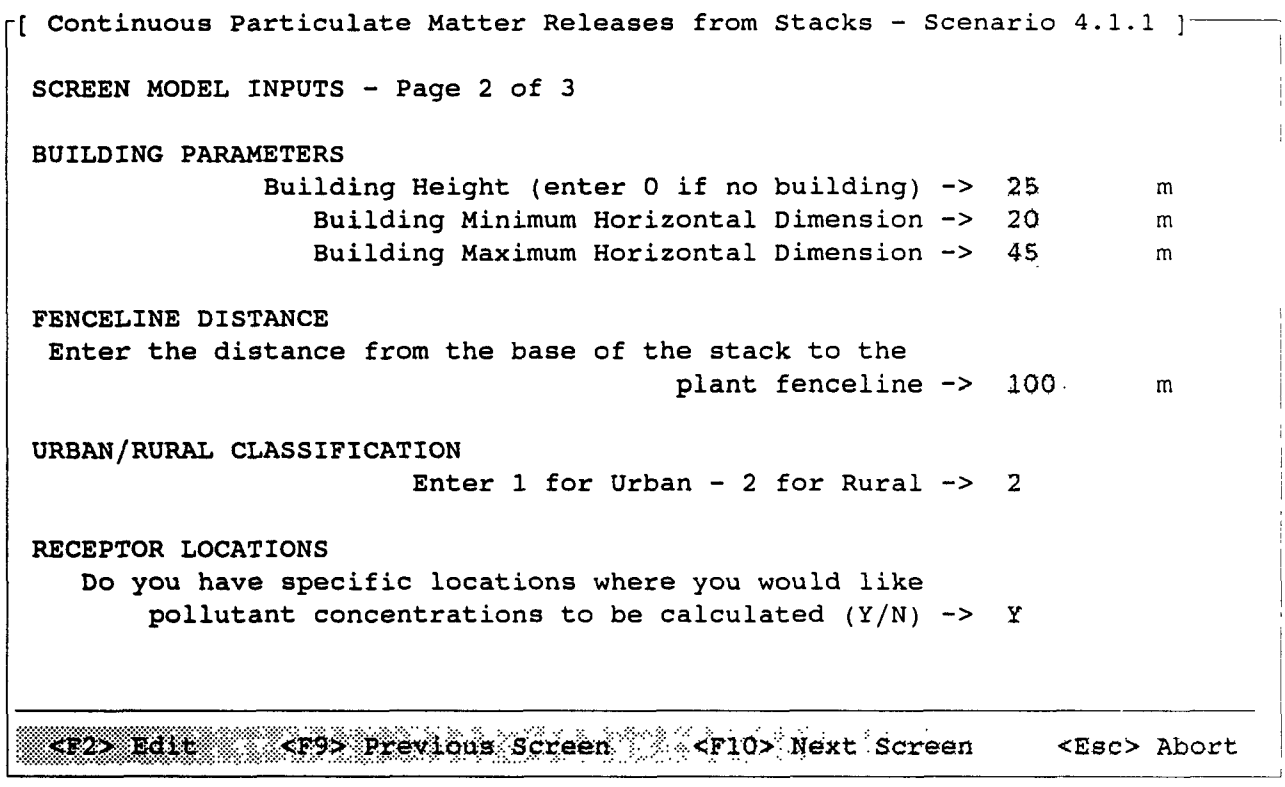
Data Entry Screens

Once the selection is made from this third selection window, unique data entry screens will appear for the selected scenario. These screens will guide the user through calculations that will select the appropriate dispersion model based on the data entered. For example, some of the screens calculate gas densities and others help calculate emission rates. In this example, the SCREEN model has now been selected based on user input. Data entry screens for this example are shown in Figures 7, 8, and 9.

FIGURE 7.

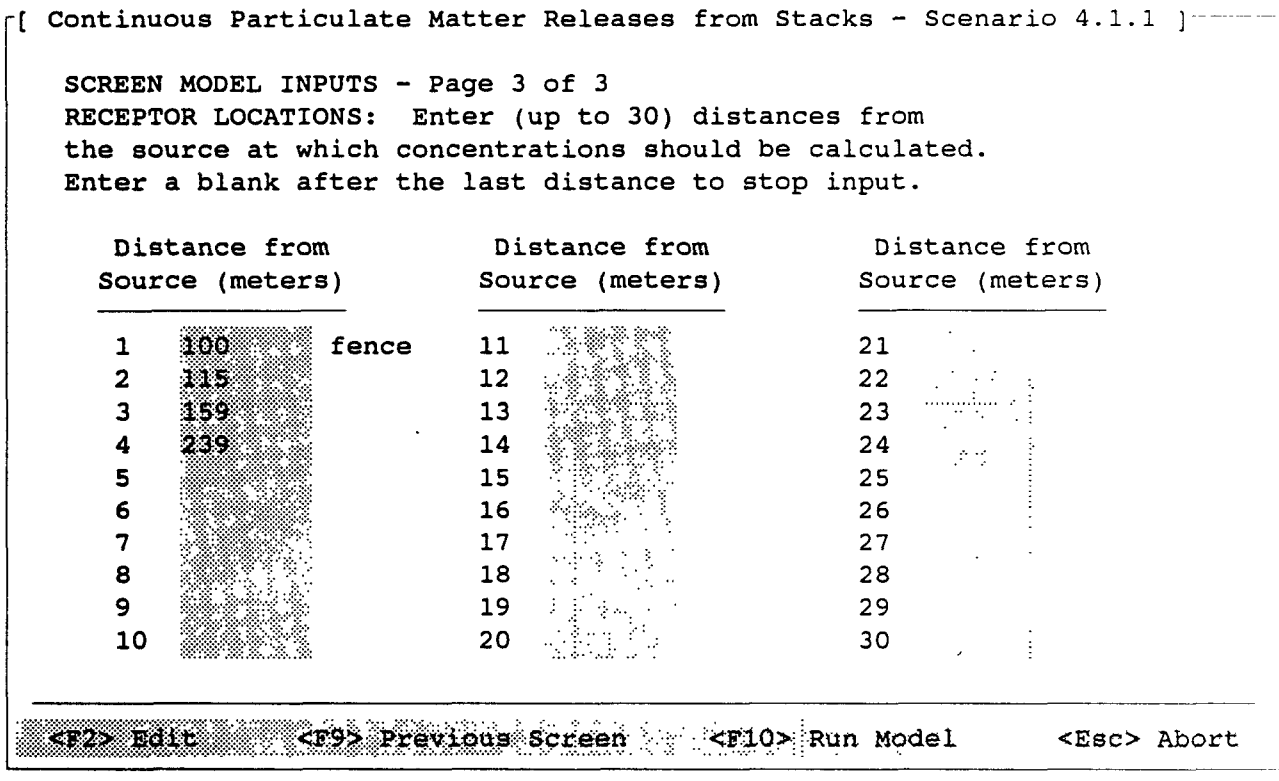
```
[ Continuous Particulate Matter Releases from Stacks - Scenario 4.1.1 ]
  Based on user input, SCREEN model has been selected.

  SCREEN MODEL INPUTS - Page 1 of 3
  Enter a unique title for this data's model run:
  Particulate Stack Release from Remedial Incineration

  RELEASE PARAMETERS
                                    Release Rate (Q) ->  120      g/s
                                       Exit Velocity ->  5        m/s
                            Release Height above Ground ->  20       m
                              Diameter at Release Point ->  1.5      m
                   Temperature of the Material Released ->  320      °K

  AMBIENT PARAMETERS
                                  Ambient Temperature ->  293      °K

 <F2> Edit   <F9> Previous Screen   <F10> Next Screen     <Esc> Abort
```

FIGURE 8.



Note that the selected SCREEN program automatically calculates concentrations for many receptors. If the user selects 'Y' for the last entry, pressing F10 will advance TSCREEN to the next page and allow the user to enter specified distances of interest that will be added to the automatic receptors. If the user enters 'N', SCREEN is executed with only the automatic number of receptors.

FIGURE 9.

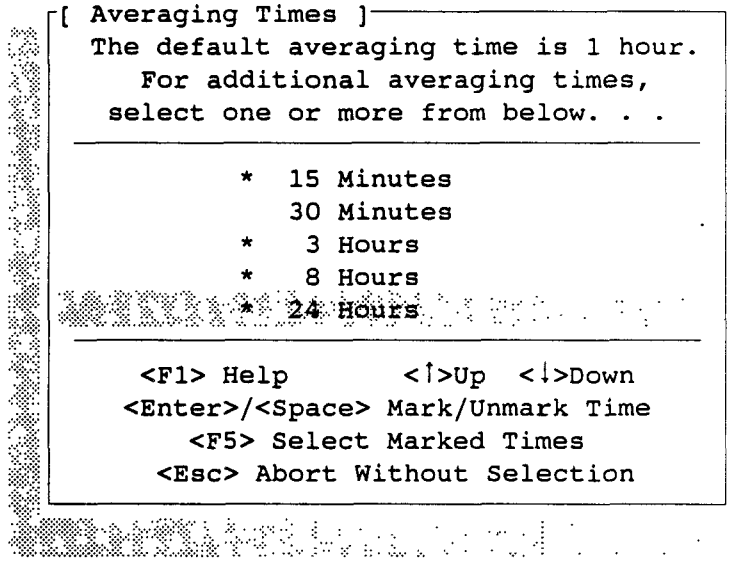


In Figure 9, the first distance is the fenceline distance specified on the previous page. This distance will appear automatically. All subsequent distances entered must be greater than the fenceline distance. After pressing F10, the SCREEN model is executed. As the program executes the user is shown what percent of the program is complete.

Averaging times

The default averaging time in the SCREEN model is 1 hour. If the SCREEN model is used and the release is a point source, the maximum concentration can be calculated for additional averaging times selected from the menu shown in Figure 10.

FIGURE 10.



Averaging times can be selected by pressing the Enter key or the Space bar to mark the averaging time with an asterisk. In Figure 10, concentrations for a 15 minute, 3 hour, 8 hour, and 24 hour averaging times will be calculated. After all of the desired averaging times have been selected, press F5 to proceed. The estimated concentrations for the new averaging times will appear at the end of the model output.

Model Output

When the model has completed execution, the output will be presented on the screen. TSCREEN does not calculate concentrations in complex terrain or for elevated receptors. An example of a model's output is shown in Figure 11. The user can scroll through the model output by using the various keys shown. The user can also graph, print or save the entire output to a file. The instructions for the keys used in viewing the model output are explained in Section 4.0 ENTER/EDIT SCENARIO DATA.

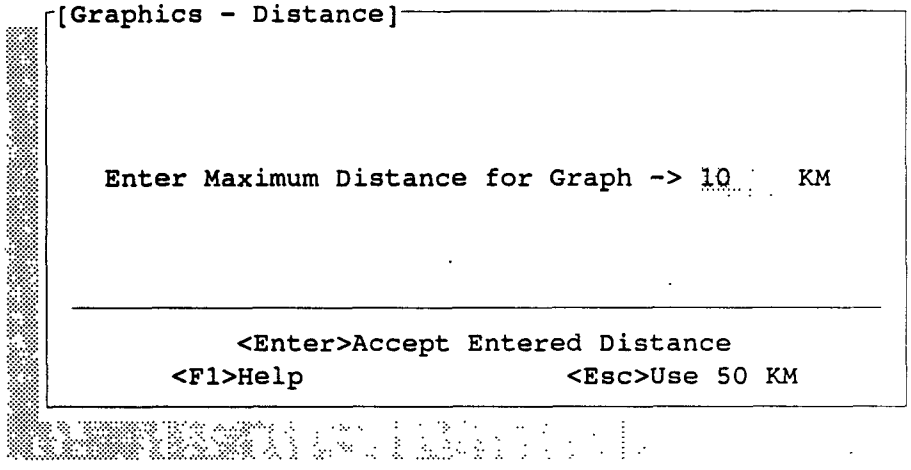
FIGURE 11.

```
[ MODEL OUTPUT ]--------[ Top Row: 1  Left Column: 1  Length: 158 ]----------
1                                                                      07-11-
                                                                       12:46:

  *** SCREEN-1.1 MODEL RUN ***
  *** VERSION DATED  88300 ***

 Particulate Stack Release from Remedial Incineration

 SIMPLE TERRAIN  INPUTS:
    SOURCE TYPE              =    POINT
    EMISSION RATE (G/S)      =    120.0
    STACK HEIGHT (M)         =    20.00
    STK INSIDE DIAM (M)      =     1.50
    STK EXIT VELOCITY (M/S)=      5.00
    STK GAS EXIT TEMP (K)    =   320.00
    AMBIENT AIR TEMP (K)     =   293.00
    RECEPTOR HEIGHT (M)      =      .00
    IOPT (1=URB,2=RUR)       =     2
    BUILDING HEIGHT (M)      =    25.00
    MIN HORIZ BLDG DIM (M)   =    20.00
    MAX HORIZ BLDG DIM (M)   =    45.00
-------------------------------------------------------------------------------
    <↑>, <↓>, Alt<↑>, Alt<↓>,  <←->, <->→>, <PgUp>, <PgDn>, <Home>, <End>
          <G> Graph    <P> Print    <F> Save to File    <Esc> Exit
```

Graph

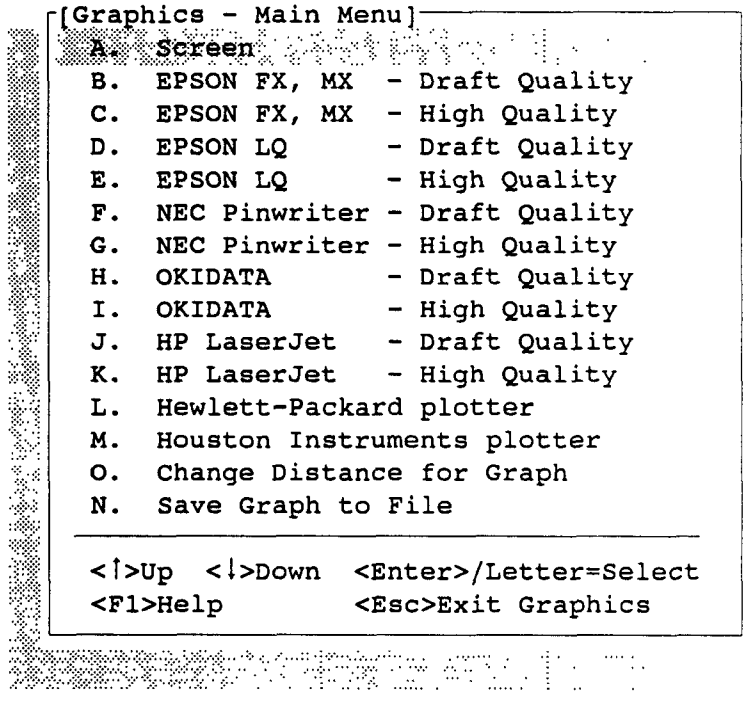
If the Graph option is selected, a plot of the concentrations vs distances will be drawn. The following window will appear first as shown in Figure 12.

FIGURE 12.



Once a distance has been specified the following menu will appear as shown in Figure 13.

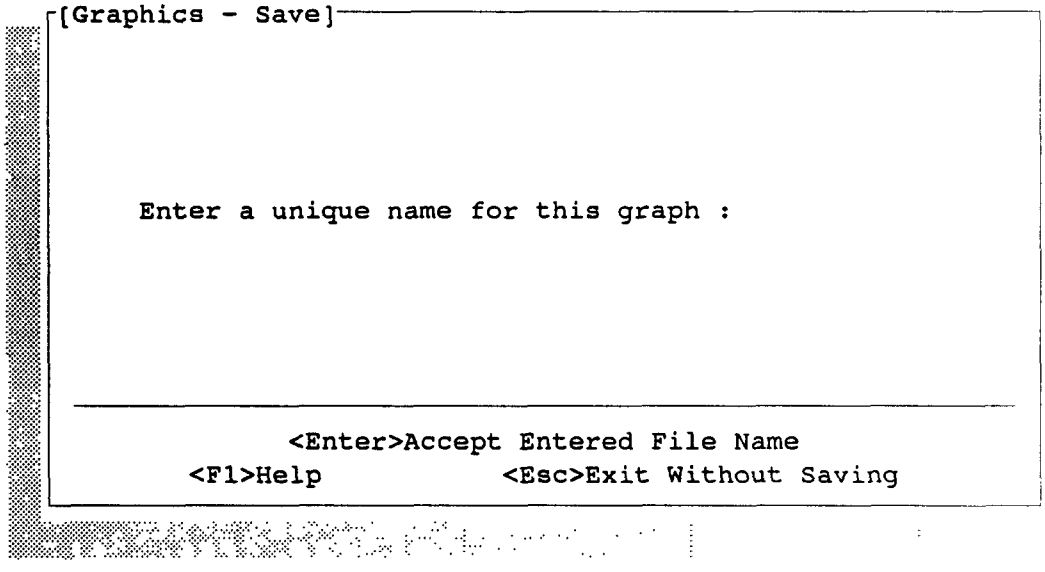
FIGURE 13.



From this menu the output device for the graph is selected. Note that if your computer does not have the ability to display graphics, the option 'A. Screen' will not be on this menu. If a printer is selected then the output device is LPT1. If a plotter if selected then the output device is COM1. Before printing the graph, be sure that the printer is connected and online. After exiting from the Graphics menu the user is returned to the model output. Consult your printer's user's manual to determine which of the above printers is compatible with your printer.

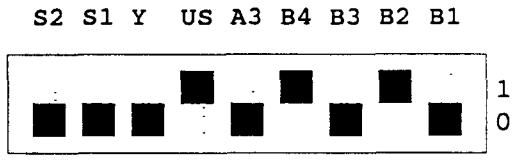
If 'N. Save Graph to File' is chosen the window shown in Figure 14 will appear. If you chose to save the graph's data, then the graph can be generated at a later time using the GRAF program. To generate an old graph, type GRAF <graph filename> from the DOS command line and then the window in Figure 12 will appear followed by the menu shown in Figure 13.

FIGURE 14.



If you are using a plotter, the DOS MODE command should be used to configure your computer's communications port to correctly match the communications settings of the plotter. For example, the Hewlett-Packard 7475A plotter has a set of switches located on the back of the plotter which allows you to set the communications parameters. A common setting for these switches is shown in Figure 15.

FIGURE 15.



The DOS MODE command which should be used to correspond to these settings is:

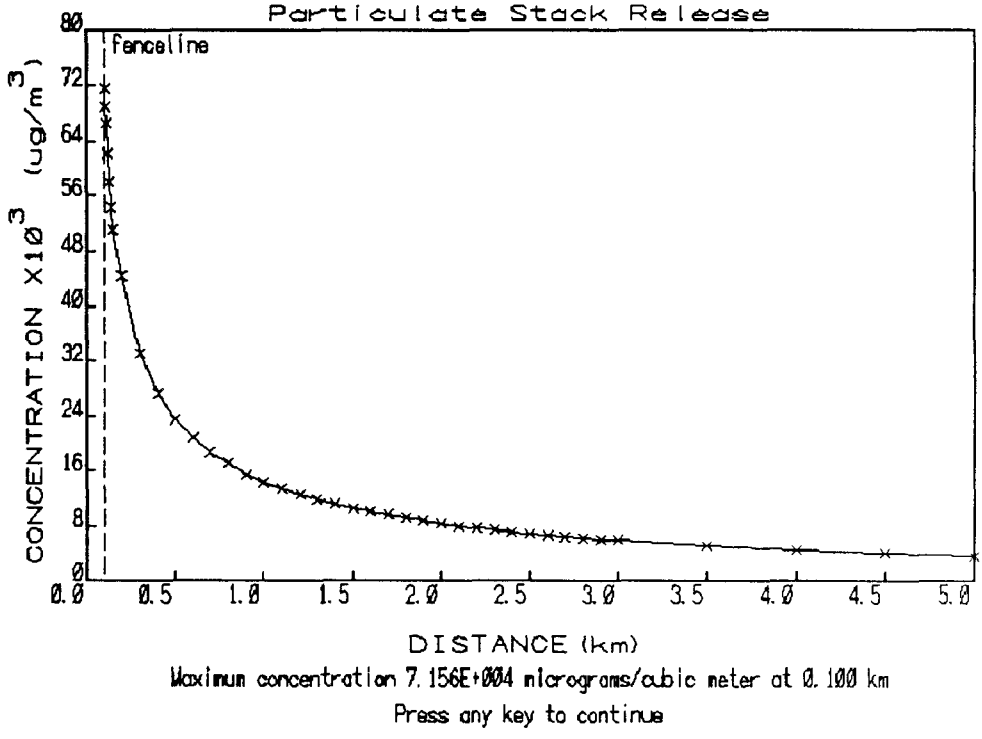
MODE COM1:96,E,7,1

This command sets serial port 1 (COM1) to 9600 baud with even parity, seven data bits, and 1 stop bit.

Each plotter has unique methods of setting the communications parameters. You should use the plotter's manual for the plotter configuration in conjunction with your DOS manual's explanation on the use of the MODE command to be certain that your computer and plotter are configured correctly.

Once a selection is made, an example of the graph is shown in Figure 16.

FIGURE 16.



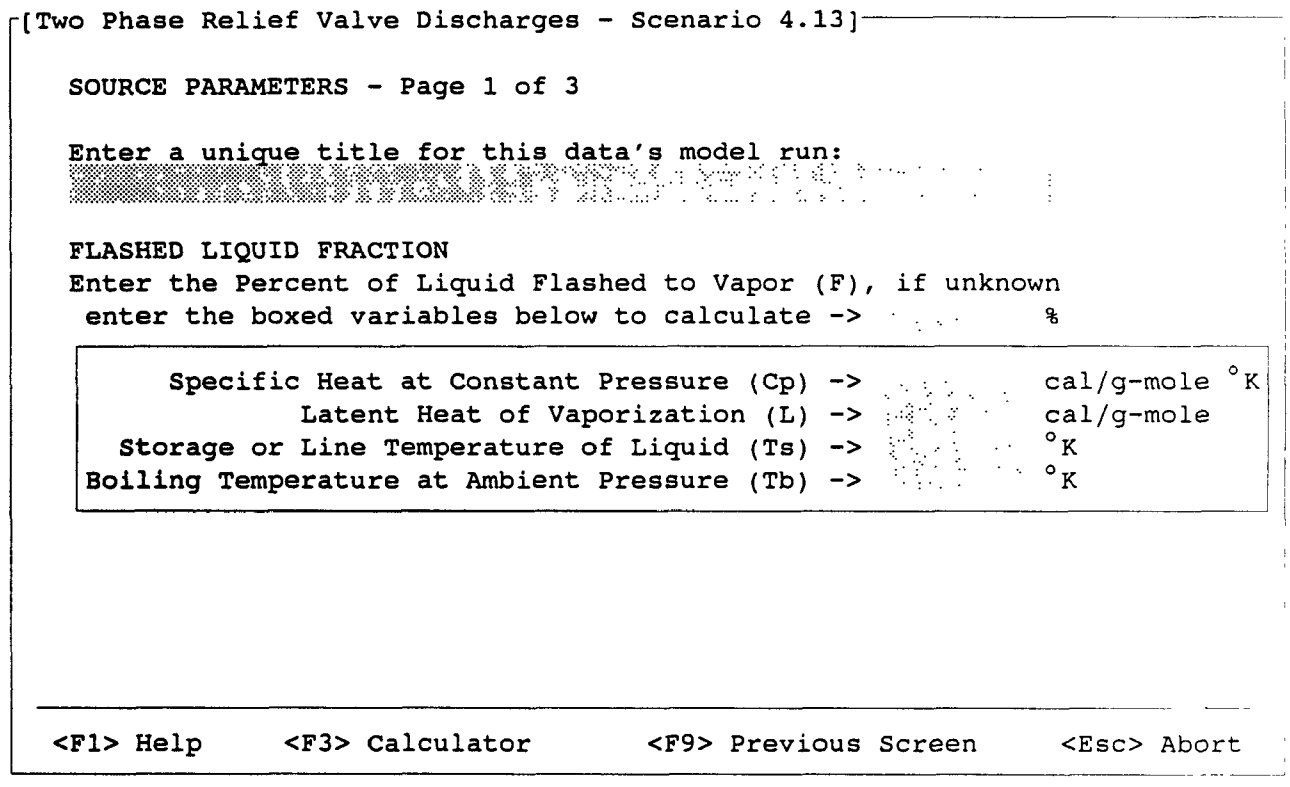
4.0 ENTER/EDIT SCENARIO DATA

This section provides a description of the use of the various keys and data entry procedures.

Data Fields

A typical data entry screen is shown in Figure 17.

FIGURE 17.



Commands active while editing data fields include:

F1 - Help on current field or chemical database, depending on field
F3 - Calculator
F9 - Return to previous screen
Esc - Abort entry and return to primary selection window

The keys that can be used for editing while in the highlighted data entry fields are as follows:

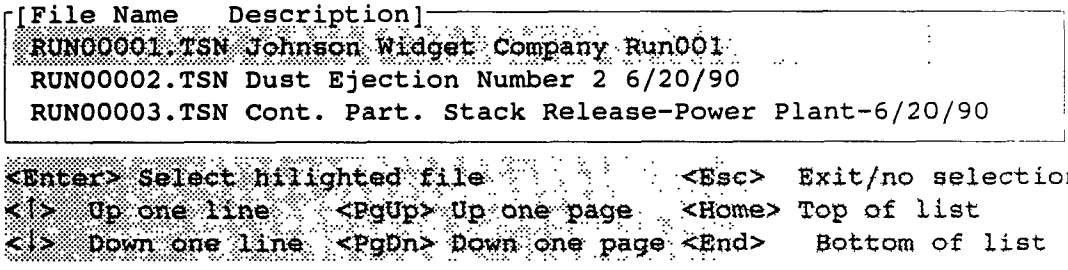
Insert or Ins - toggle insert/overwrite mode (cursor changes size)
Delete or Del - delete character at cursor position
left arrow - move cursor left one character
right arrow - move cursor right one character
Control key and left arrow - move cursor left one word
Control key and right arrow - move cursor right one word
Backspace - move cursor back one character and delete character
Home - move cursor to beginning of data in field
End - move cursor to end of data in field
Control key and End key - delete data from cursor to end of field

Valid entry into numeric fields are numbers, minus signs(-), plus signs(+), a decimal(.), and the letter E or e to stand for scientific notation (6.02E026 = 6.02e026 = 6.02E+26 = 6.02e+26 = 6.02 x 10^{26}).

Titles

An important data field in TSCREEN for rerunning old scenarios is the 'Enter a unique title for this data's model run: ' field. This field should contain a unique title for each run. Several ways to make the title unique are to give the facility name or add example 1, example 2, etc, or the date and time to the title. This is helpful when the selection 'D. Access File of Previous Scenario ' option is used from the first selection window. The 'File Name Description' window will appear allowing the user to view the file names and titles of all previously run scenarios. A previous scenario may be selected to either run again or update the data for another run. This window is shown in Figure 18. This title will also appear on the graph. However, only the first 42 characters of the title will be appear as the title on the graph.

FIGURE 18.

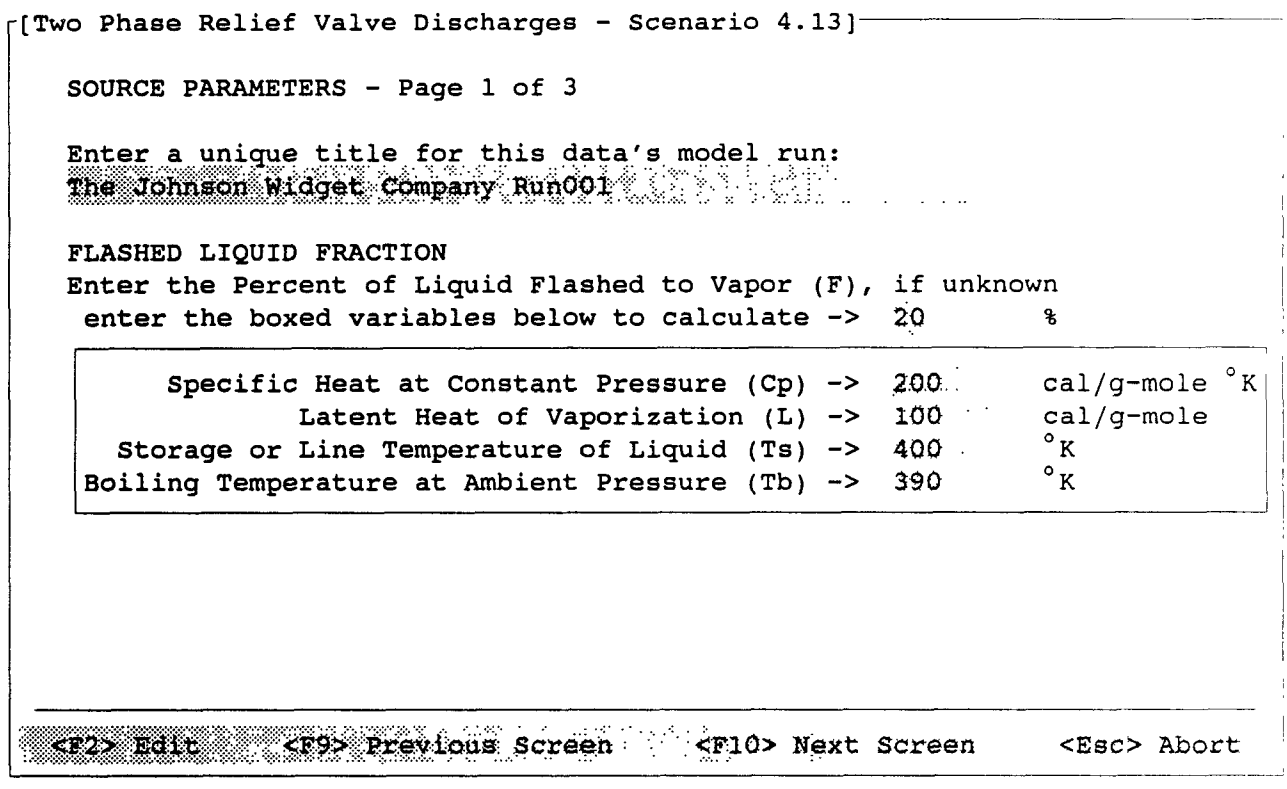


From this window a previous scenario's data can be reloaded by highlighting that scenario's title and pressing the Enter key. The selection will take the user to the beginning and the first selection window will reappear with the highlighted bar on the 'Initial Form of Release' of the selected scenario. By pressing the Enter key again the second selection window will appear with the highlighted bar on the preselected 'Release Type'. By continuing to pressing the Enter key, the third selection window and the data entry screens of the scenario are displayed with the data fields filled with the loaded scenario's data. Selections can be changed at any point, but changing the selections on the selection windows will cause the retrieved data to be lost until it again selected from the 'File Name Description' window.

Calculated Fields

Some of the data entry screens have fields that can be input directly or calculated automatically from certain other parameters. The alternative parameters will be located inside a box directly below the unknown parameter. Figure 19 shows an example of a calculated field where the percent liquid flashed to vapor is not known. Enter or the <↓> can be pressed and the data fields in the box below the percent liquid flashed to vapor field can be completed. Once all entries are completed and Enter pressed, the percent liquid flashed to vapor will automatically be calculated and will appear in the field above the box. However, if the screen is reedited and the calculated field is changed then the other parameter fields making up the calculated value will be blanked out. If the percent liquid flashed to vapor is known it can be entered directly and the program will automatically skip over the parameter fields in the box.

FIGURE 19.



End of Screen Action

Once data entry on the screen has been completed, the program presents the user with a chance to visually review the data entered on the current screen before the selected model is run. As shown in Figure 17, the only active keyboard commands are highlighted at the bottom of the screen:

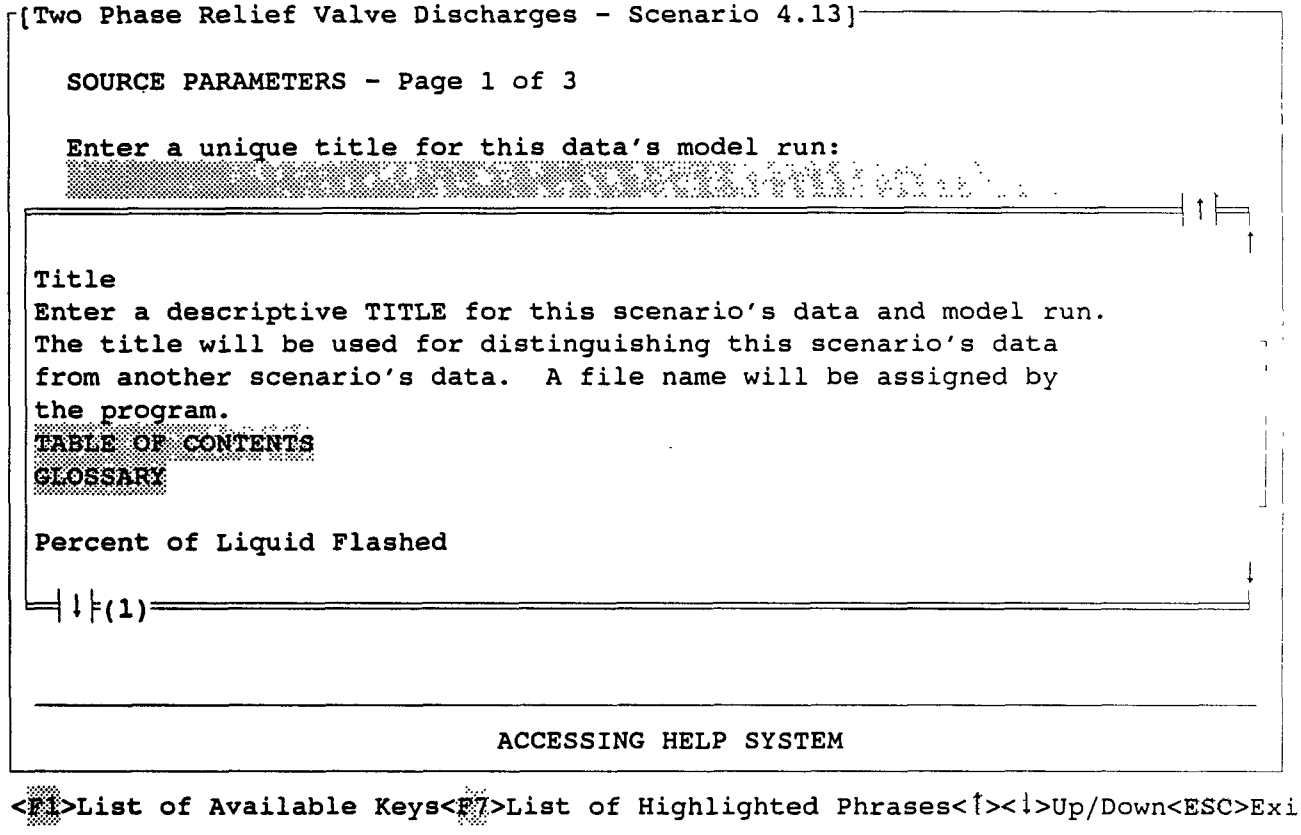
F2 - Edit the current screen
F9 - Return to previous screen
F10 - Proceed to next screen
Esc - Abort current scenario and return to primary selection window

Field Sensitive Help

The help facility (see Section 5.0) can be accessed by pressing the F1 key from any of the selection windows or data entry fields. After pressing the F1 key a window with help text will appear to further define or clarify the current data entry field. The user can then

scroll up or down through the help text and view help for other data fields. The chemical parameter data entry fields will access help for that data field. Then after exiting the help window, the main menu of the chemical look-up database will appear. An example of a help screen is shown in Figure 20.

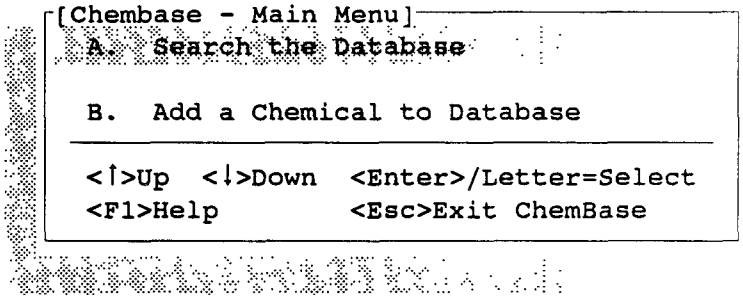
FIGURE 20.



Chemical Look-up Database

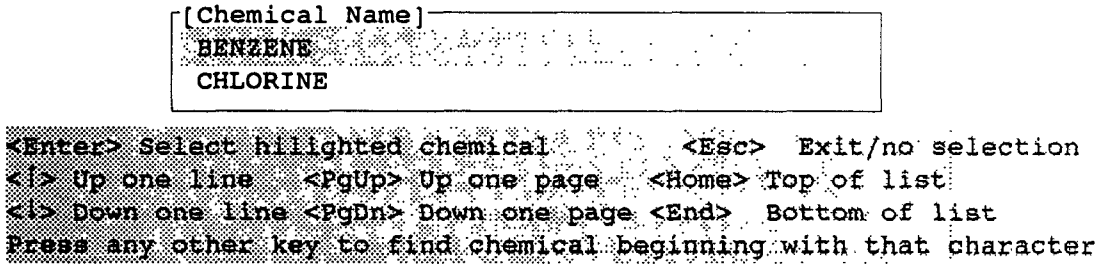
The chemical look-up database is a table of chemicals and their associated parameters that are applicable to TSCREEN. TSCREEN is initially distributed with only two chemicals; any desired chemicals and their associated parameters must be added by the user to suit their specific needs. The chemical database can be accessed in two ways: selecting 'E. Access Chemical Database' from the primary selection window or by pressing the F1 key and then exiting the help window in a chemical parameter data entry field. By accessing the chemical database from the primary selection window, a menu is presented as shown in Figure 21.

FIGURE 21.



To search the chemical database for a specific chemical (selection A), a scrollable window appears with the available chemical names as shown in Figure 22.

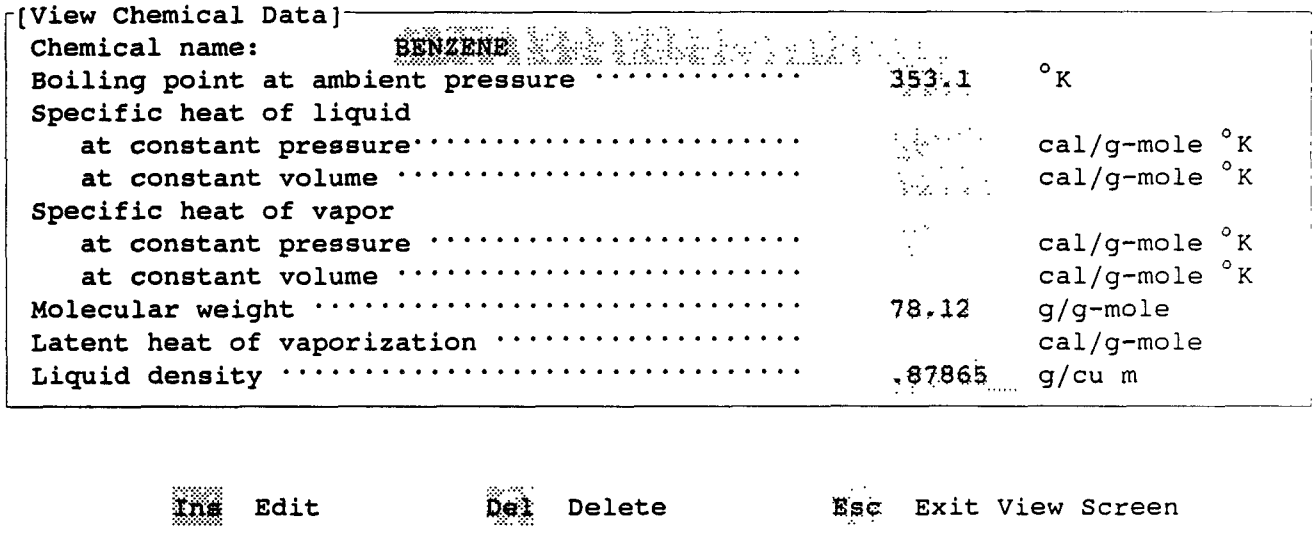
FIGURE 22.



The chemical names contained in the database will be displayed in alphabetic order. The chemical names are selected by the point and shoot method - once the desired chemical is highlighted, Enter is pressed to view the chemical's parameters. The highlighted bar can be moved directly to first chemical name starting with a certain letter just by pressing that letter key. The 'Chemical Name' window will size itself proportionally to the number of chemical names contained in the database up to the number of chemical names that can fit on the screen.

The add and search (look-up) screens are identical in appearance and are shown in Figure 23.

FIGURE 23.



In the look-up mode, parameters for a chemical may be updated or the chemical name and associated chemical parameters can be deleted from the database. In the add mode chemical names and their associated parameters can be appended to the chemical database.

If the user enters the chemical database from a data entry field, a value from the database can be returned to that field. A pointer '►' will appear beside the value that will be returned. For example if the user were in a molecular weight input field, the user could press F1 and help for that field would appear. After pressing ESC to exit the help system, the main menu of the chemical database would appear. The user would select 'A. Search the Database' and then choose the desired chemical. The chemical look-up screen would appear as above, but the molecular weight field would be as follows:

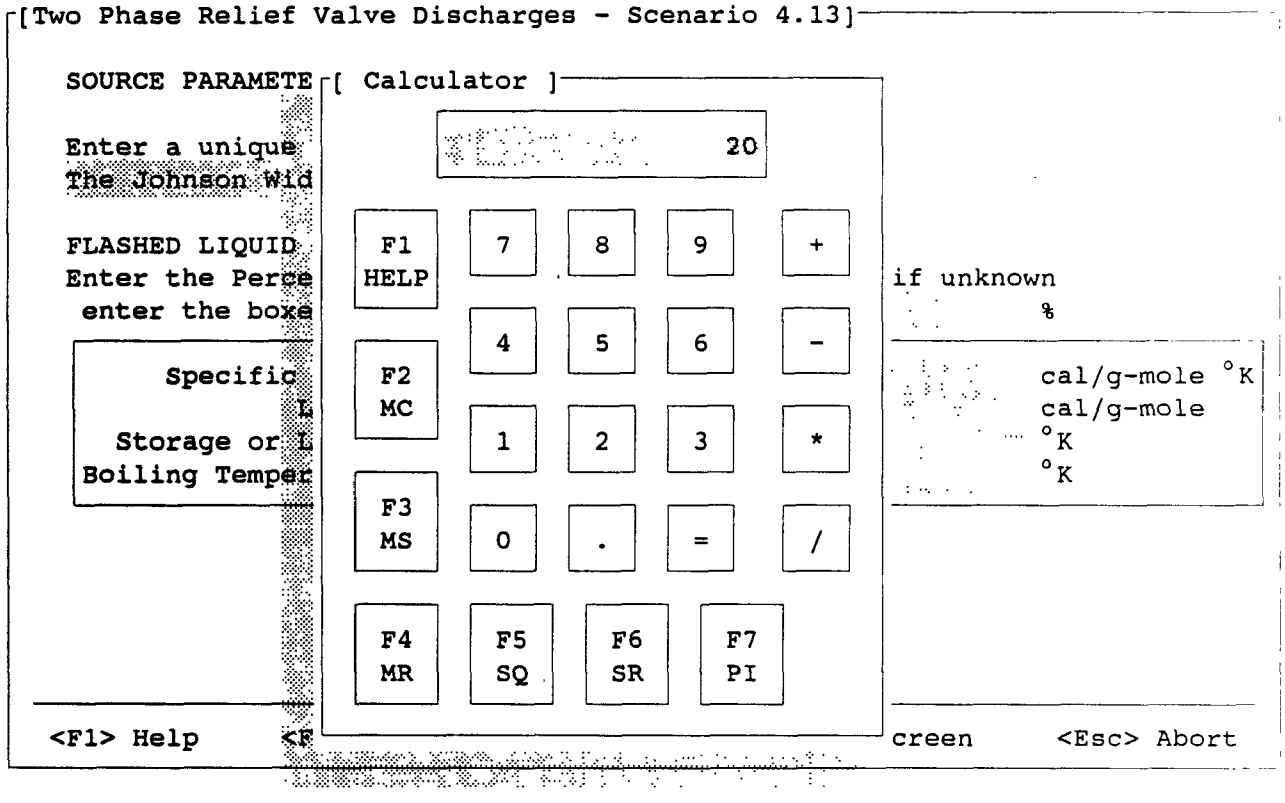
```
Molecular weight ..... ►78.12  g/g-mole
```

Pressing Enter at this point would exit the chemical database and return the value 78.12 to the molecular weight input field.

Calculator

When entering data, a calculator is available on-line to perform any needed calculations. The calculator is accessed by pressing the F3 key from any data entry field. The results of a calculation can be passed directly from the calculator to the entry field by pressing the equals (=) key. While in the calculator a help screen on the calculator's functions can be accessed by pressing the F1 key. The calculator has several built-in functions that include memory clear, memory store, memory recall, square, square root and pi. An example of the calculator is shown below in Figure 24.

FIGURE 24.



Model Output

Upon completing the last screen of data entry for the scenario the F10 command is 'Run Model' and not 'Next Screen'. When the F10 key is pressed, the entered data is saved to a file on the disk and will be accessible to the user by the Scenario Title entered at the start of each scenario's data entry. The selected dispersion model then executes. The SCREEN model will execute for 3 to 10 minutes, the RVD model for 1 to 5 minutes and the PUFF model for 1 to 5 minutes depending on the data and the computer setup on which TSCREEN is running. The model output will appear on the screen in a window as shown in Figure 25.

FIGURE 25.

```
[ MODEL OUTPUT ]--------[ Top Row: 1  Left Column: 1  Length: 158 ]--------
 1                                                                    07-11-
                                                                      12:46:

   *** SCREEN-1.1 MODEL RUN ***
   *** VERSION DATED  88300 ***

  Continuous Particulate Stack Release from Power Plant

  SIMPLE TERRAIN INPUTS:
     SOURCE TYPE             =    POINT
     EMISSION RATE (G/S)     =    1200.
     STACK HEIGHT (M)        =    20.00
     STK INSIDE DIAM (M)     =     1.50
     STK EXIT VELOCITY (M/S)=     5.00
     STK GAS EXIT TEMP (K)   =   400.00
     AMBIENT AIR TEMP (K)    =   293.00
     RECEPTOR HEIGHT (M)     =      .00
     IOPT (1=URB,2=RUR)      =     2
     BUILDING HEIGHT (M)     =    25.00
     MIN HORIZ BLDG DIM (M) =    20.00
     MAX HORIZ BLDG DIM (M) =    45.00
-------------------------------------------------------------------------------
     <↑>, <↓>, Alt<↑>, Alt<↓>,  <◄->, <-►>, <PgUp>, <PgDn>, <Home>, <End>
           <G> Graph    <P> Print    <F> Save to File    <Esc> Exit
```

The model output can be scrolled line by line up or down by pressing the up or down arrow keys. The output can be put into a continuous scroll up or down by pressing the Alt - up or down arrow key combinations and stopped by pressing any key. The output can be scrolled a full screen at a time by pressing the Page Up or Page Down keys. By pressing the Home key the output display will show the top of the output listing and by pressing the End key the display will show the end of the output listing. The row number of the model output displayed in the top row of the output window is shown on the first line of the screen with the column number of the model output displayed in the first column of the output window and the total number of lines in the output listing.

To get a listing of the output on a printer press the 'P' key. To avoid some common printing problems, before selecting printed output, make sure that a printer is connected to the computer, that the printer's power is on, that the printer is online and that there is plenty of paper loaded in the printer. To get a graph of the concentrations vs distances press the 'G' key. To save the output data to a file press the 'F' key and give a filename for the output data set as shown in Figure 26.

FIGURE 26.

```
[ MODEL OUTPUT ]--------[ Top Row: 1  Left Column: 1  Length: 158 ]----------
 1                                                                      07-11-
                                                                        12:46:

   *** SCREEN-1.1 MODEL RUN ***
   *** VERSION DATED  88300 ***

  Continuous Particulate Stack Release from Power Plant

  SIMPLE TERRAIN INPUTS:
     SOURCE TYPE            =    POINT
     EMISSION RATE (G/S)    =    1200.
     STACK HEIGHT (M)       =    20.00
     STK INSIDE DIAM (M)    =     1.50
     STK EXIT VELOCITY (M/S)=     5.00
     STK GAS EXIT TEMP (K)  =   400.00
     AMBIENT AIR TEMP (K)   =   293.00
     RECEPTOR HEIGHT (M)    =      .00
     IOPT (1=URB,2=RUR)     =     2
     BUILDING HEIGHT (M)    =    25.00
     MIN HORIZ BLDG DIM (M) =    20.00
     MAX HORIZ BLDG DIM (M) =    45.00
-------------------------------------------------------------------------------
            Enter a unique title for this output :  PPOUTPUT.TXT
```

If the model's output has been saved, it can be reviewed using the VIEW program. To view the saved output type VIEW <filename> from the DOS command line where filename is a file containing the model output. The model's output can be edited with a word processor once it has been saved.

5.0 HELP SYSTEM

The help system included with TSCREEN is field sensitive. As a result when the F1 key is pressed from a data entry field, help for that field will appear for that data entry field. The user also has the ability to scroll up and down through the help text in order to view help for other data fields. A complete list of the keys available in the help system can be displayed by pressing the F1 key.

Within the help entries certain words will be highlighted. These highlighted words are hyperlinks to other sections in the help text. Hyperlinks are keywords that are indexed to point to other keywords or to a particular place in the text. You can move to the new section by pressing F7 to get a list of the highlighted words in the current help window. Then, scroll down that list to the hyperlink you wish to choose and press Enter. Alternatively, if a mouse is available, you can move the cursor to the highlighted word in the help window and click the mouse's button.

The highlighted words in the help entries are hyperlinked to definitions in the help systems glossary. If one of these words is selected, a second help window will appear with the glossary definition of the word selected. From that entry in the glossary, you can scroll up and down through other entries in the glossary. The entire help text is connected so that after you have scrolled above the beginning of the glossary, you can continue scrolling through the rest of the help text.

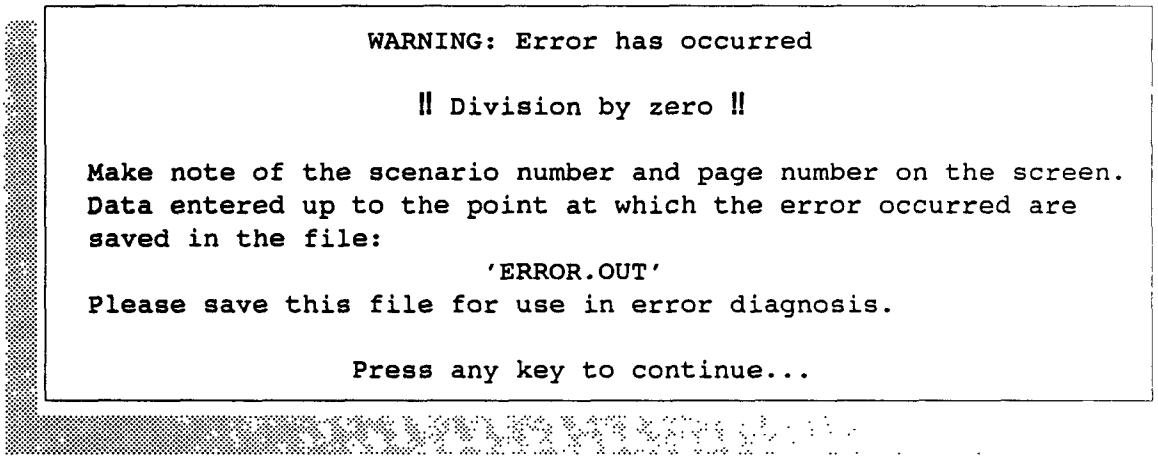
At the end of each data entry help, TABLE OF CONTENTS and GLOSSARY are highlighted. You can also select these hyperlinks in the same manner described above. If TABLE OF CONTENTS is selected, you will move to the beginning of the help text where there are hyperlinks to all the sections in the program. If GLOSSARY is selected, the glossary window will appear on the screen and you will be at the beginning of the glossary.

The help text is organized such that the table on contents is first followed by help for the data entries and the glossary is at the end.

6.0 ERROR HANDLING

If an error occurs while TSCREEN is running a window like the one shown in Figure 27 will appear.

FIGURE 27.



Data saved up to the point at which the error occur will be saved in the file ERROR.OUT. In addition the error message will be appended to the end of this file. Data from that run will also be saved in the highest numbered RUN*.TSN file. Both of these files should be saved for error diagnosis.

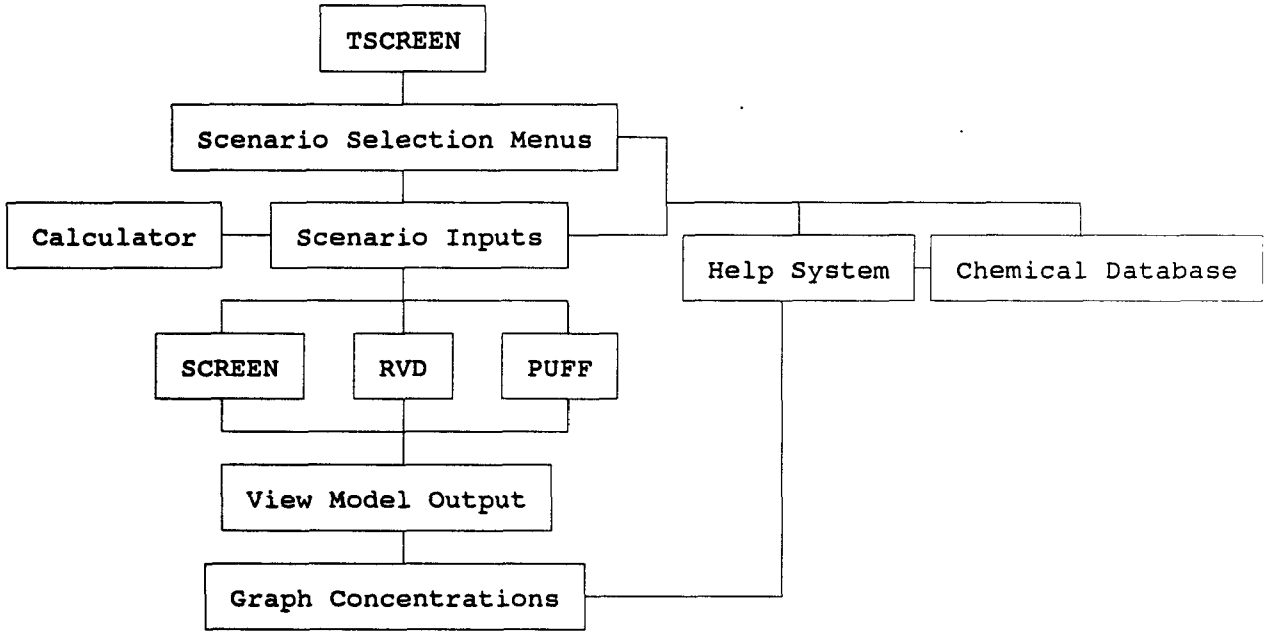
If an error occurs while a model is running the ERROR.OUT file will contain the data that was sent to the model and the error message. The highest numbered RUN*.TSN file will contain the data you entered into TSCREEN. Save both of these files for error diagnosis.

After exiting the window shown in Figure 27 you will return to the 'Initial Form of Release' menu shown in Figure 2.

7. 0 SYSTEM FLOW

Figure 28 illustrates the logic flow of TSCREEN. The help system and chemical database can be accessed from the scenario selection menus or from the scenario inputs. The calculator can only be accessed from the scenario inputs. After the scenario inputs, either the SCREEN, RVD, or PUFF model is run. Once the model has been run, the output is displayed and the user has the option to generate a graph of concentrations vs. distances.

FIGURE 28.



8.0 BACKING UP DATA

The file BACKUP.COM that comes with DOS must be in the DOS PATH as explained in section 2.0 GETTING STARTED. To backup the data enter the command:

BACKUP X:\TSCREEN*.* A: /S

where X is the drive letter where the TSCREEN system resides. Note that it is important to back up every time data is edited or added in case of a hard disk failure.

The number of backup disks needed depend upon the amount of data entered into the system. As more data is entered, more backup disks will be required to store the data. These disks must be formatted prior to backing up the data files. Backup disks should be labeled accordingly and stored in a safe place.

To ward off data corruption, rotating back up disks is recommended. Rotating backup diskettes consists of 2 or 3 sets of backup diskettes that are rotated when the backup procedure is called. In using a rotating backup procedure you can minimize the possibility of backing up bad data and having corrupt files on the system and on the backup disks.

The BACKUP.COM program fits as much data on one disk as it is physically capable of storing. If the program is in the middle of backing up a file it will split it and store the remaining part of the file on another disk(s). These backed up files are not DOS compatible files, therefore copy them to another disk but not to the hard disk. The only way these files can be used is to first restore them with the DOS RESTORE.COM program (discussed below). These diskettes are created for backup purposes only and are to be restored only when the data files on the hard disk have become damaged beyond repair.

The command to restore the data files is:

RESTORE A: X: /S

where X is the drive letter where the TSCREEN system resides. Note that the RESTORE.COM file must be in the DOS PATH in order to execute this program from any prompt. This command should be used only when there has been damage done to the data files on the hard disk!

9.0 NOTES ON COMPILING THE SOURCE CODE

The procedure described on this page is only for those who wish to make changes in the source code and recompile it. Only someone with experience using computers and preferably with compilers should attempt this procedure.

TSCREEN is written in and compiled with Microsoft™ BASIC Version 7.1 and Microsoft™ C Version 5.1. Four BASIC libraries were used: ProBas™ Version 4.01, ProBas ToolKit™ Version 2.1, and ProBas HyperHelp ToolKit™ Version 1.0 by Hammerly Computer Services, Inc. and PCX Programmer's Toolkit™ Version 3.5 by Genus Microprogramming. One C library was used: INGRAF™ Version 2.10 by Sutrasoft. The program source code is available from the SCRAM Bulletin Board phone (919) 541-5742. Technical questions should be directed to Jawad S. Touma; Office of Air Quality Planning and Standards; Technical Support Division; Source Receptor Analysis Branch (MD-14); Research Triangle Park, NC 27711, phone (919) 541-5381. The procedure for compiling the source code is as follows:

BASIC Version 7.1 or later, C Version 5.1 or later, ProBas™ Version 4.0 or later, ProBas HyperHelp ToolKit™ Version 1.0 or later, ProBas ToolKit™ Version 2.1 or later, PCX Programmer's Toolkit™ Version 3.5 or later, and INGRAF™ Version 2.10 or later are necessary to compile the source code. All of the .BAS (BASIC) files and .C (C) files should be on a hard disk with the following files:

BASIC
- BC.EXE
- LINK.EXE
- BCL71EFR.LIB

ProBas
- PROBAS.LIB with ToolKit routines installed
- HYPER.OBJ (Object file compiled from HYPER.BAS contained in ProBas HyperHelp ToolKit™)
- STRWMENU.OBJ (Object file compiled from STRWMENU.BAS contained in ProBas ToolKit™)

PCX
- PCX_QB.LIB

C

CL.EXE
LINK.EXE
MLIBCE.LIB
SLIBCE.LIB
[STRING.H]
[STDIO.H]
[STDLIB.H]
[PROCESS.H]
[MATH.H]
[DOS.H]
[IO.H]

The files in brackets are included with the Microsoft C compiler

INGRAF

INGRAF.LIB
IGEXTERN.H

The COMPILE.BAT, LOPTION0, LOPTION1, LOPTION2, LOPTHELP, LOPTTS, LOPTAVE, LOPTGRAF, LOPTGRPH, LOPTPCX, and LOPTERR files from the source code diskette should also be present in the same directory. Note that you may have to change the path specifications in these files as well as in the C files and the BASICS files. Then simply type COMPILE and compilation is automatic. The resulting program files will be TSMAIN.EXE, VIEW.EXE, CHEMBASE.EXE, HELPSYS.EXE, TSCREEN.EXE, AVETIME.EXE, GRAF.EXE, GRAPH.EXE, PCXHELP.EXE, and ERHANDLE.EXE. Several other files will be created with the .OBJ extension and can be deleted upon successful compilation.

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(Please read Instructions on the reverse before completing)

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16. ABSTRACT

This user's guide describes how to start, enter/edit, use help system, back up data and compile the TSCREEN model. TSCREEN is a model for estimating ambient pollutant concentrations for a variety of release scenarios from Superfund sites and other sources of air toxics releases. This computer program implements the procedures developed in a document entitled "A Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants," EPA-450/4-88-009 and should be used in conjunction with this workbook. TSCREEN has a front-end control program that also provides, by use of interactive menus and data entry screens, the same steps as the workbook. An extensive help system is provided to guide the user. Text edit and graphical display capabilities are also provided.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Hazardous Waste Assessment Toxic Air Pollutants Dense Gas Models Air Quality Dispersion Model Superfund	Dispersion Modeling Meteorology Air Pollution Control	13B

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