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COSCREEN98 Users Manual

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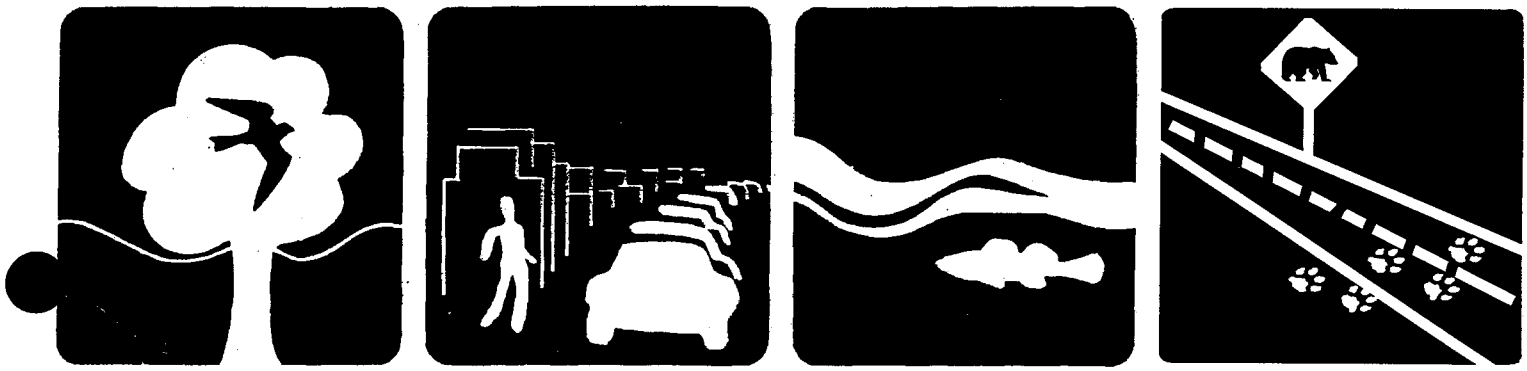

COSCREEN98
USER'S MANUAL

for the
FDOT Intersection Air Quality (CO) Screening Model

Developed at the University of Central Florida
by
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PREFACE

As with the original FDOT carbon monoxide (CO) screening test - COSCREEN - this new version, COSCREEN98, attempts to screen major intersections by using a hypothetical four-legged intersection. COSCREEN98, however, represents a major change from the original COSCREEN.

The original COSCREEN is based on CALINE3 analysis of an intersection for a specific set of temperatures. The original COSCREEN computes the critical distance based on year, traffic volume, speed, and environment (urban or rural). Using very conservative worst-case assumptions, it predicts CO concentrations at a variety of distances. It then inverts the process to produce a set of curves of "critical" distances. If a real receptor is further away from a real intersection than the critical distance, then the project does not exceed ambient air quality standards, indicating that the intersection passed the screening test. Receptors closer than the critical distance have the potential to violate air quality standards, and this indicates that the intersection requires further analysis.

COSCREEN98 requires only a few more input data than the original COSCREEN, but is much more accurate about predicted CO concentrations near the intersection. The user inputs the region, the environment, the traffic volume, the approach speed, the year, and up to ten real receptors. This model then uses MOBILE5a and CAL3QHC2 to evaluate the intersection. CAL3QHC2 is the model accepted by the U.S. Environmental Protection Agency (EPA) for dispersion modeling at intersections. Using MOBILE5a, emission factors are automatically developed for each analysis based on the location of the project, year, and speed. The location of the project impacts the temperatures and MOBILE5a options which are automatically set by COSCREEN98. The selected environment (urban, suburban or rural) impacts the surface roughness value and the background CO concentrations. The addition of the suburban option provides the user with additional flexibility. The one-hour and eight-hour CO concentrations (including background concentrations) are calculated at each specified receptor.

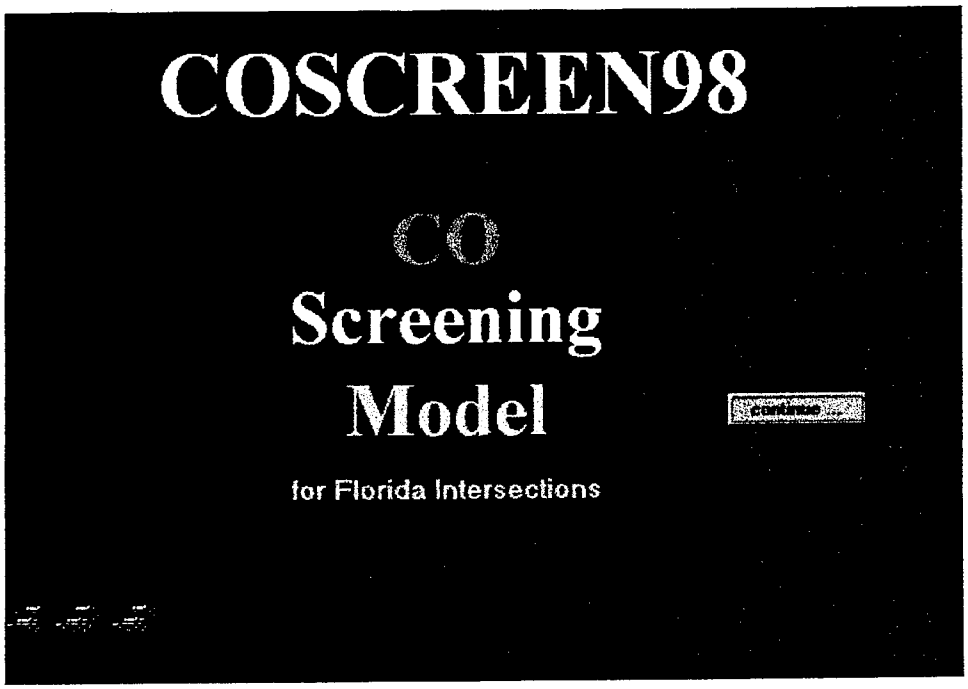

Figure 1. Opening Screen

INSTALLATION INSTRUCTIONS

Insert the COSCREEN98 disk to your A: or B: drive. Run setup by clicking on the program or typing in the drive (**A:** or **B:**) plus **setup**. Follow the instructions on the disk. Normal installation is to the C: drive, but it can be installed to another drive such as D: or E:. Windows 3.1 will generate a short-cut icon for COSCREEN98 in the program manager. In Windows 95 or Windows NT, begin COSCREEN98 by pressing the start button; the COSCREEN98 short-cut icon will be in the programs section. Note that the executable files for the original COSCREEN and COSCREEN98 have the same name. If you wish to keep the original COSCREEN, we suggest that you relocate it to a different directory or drive.

OPENING SCREEN

The opening screen as shown in Figure 1 lets you know you are in the right program. If you have time, you can watch the cars move across the screen as the title changes color like a traffic signal. To move to the heart of the program, click the Continue button.

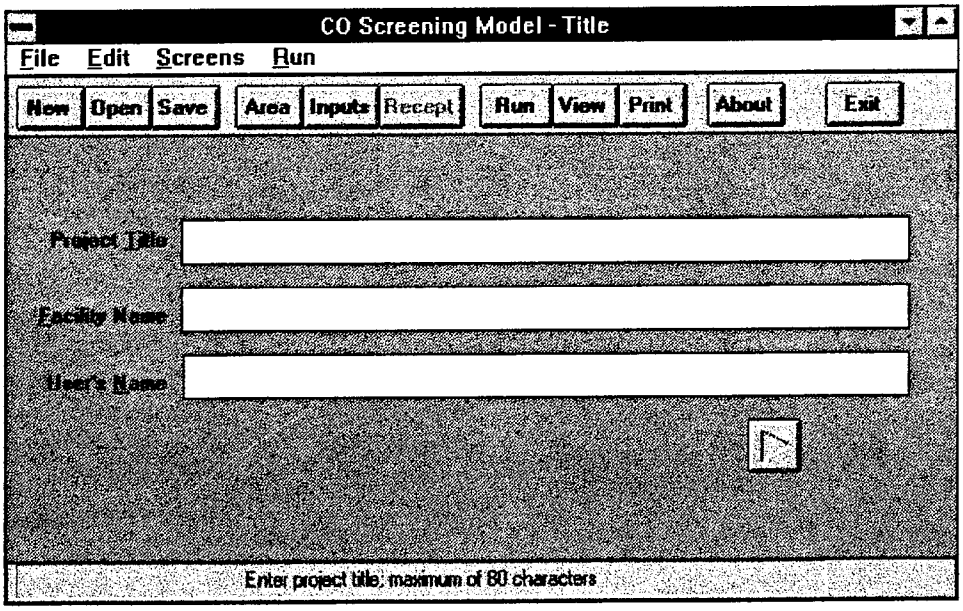

Figure 2. Title Screen

TITLE SCREEN

All input can be directed from the Title screen (Figure 2) using either the menu or the buttons. All buttons correspond to menu commands, but not all menu commands are available as buttons. The intent was to put the most frequently used buttons at your fingertips. Commands will be described below based on the menu list. Commands with an asterisk (*) are also available as buttons.

File Menu

*New** - clears existing data entry, allowing for completely new data.
*Open** - opens an existing COSCREEN98 input file so that you may view, edit or run the data.
*Save** - saves the displayed data to the opened input file. The Save button will open the Save As dialog box, if no file has been opened.
Save As -saves the displayed data to an input file named by the user.
*Print** - prints the displayed input data or the most recently run output file. Note that more flexibility is available in printing by printing from the text viewer.
*About** - displays information about the development of COSCREEN98.
*Exit** - leaves COSCREEN98.

Edit Menu

Cut - copies selected text to the clipboard and removes it from the screen.
Copy - copies selected text to the clipboard, but the text also remains at its current location.
Paste - copies text from the clipboard to the location of the cursor.
Delete- removes selected text from the screen.

Screens Menu

*Area** - opens the Area screen for the user to select the region where the project is located.
*Inputs** - opens the Inputs screen for the user to enter the environment (urban, suburban, or rural),

traffic volume, approach speed, year of analysis, and number of receptors.

*Receptors** - opens the Receptors screen for the user to enter the name and location of the receptors; this button or menu item is not available until the number of receptors has been entered on the Inputs screen.

*Viewer** - opens the Text Viewer screen for the user to view any text file; by default, the Text Viewer displays the most recent COSCREEN98 output.

Run Menu

*Run** - runs COSCREEN98 with the displayed input data; it is not necessary to save the data prior to running COSCREEN98

Data Entry

The other purpose of this screen is to enter titles for this analysis. Project Title, Facility Name and User's Name are entered in the text boxes. Up to 80 characters may be used to describe these parameters. These data are not required in order to run COSCREEN98.

Arrow Button

Clicking the arrow button opens the next screen, the Area screen, for data entry.

Information Panel

An information panel is located at the bottom of the screen. This provides information about the item over which the mouse pointer is located.

AREA SCREEN

This screen (as shown in Figure 3) is used for identifying the region in which the project is located. COSCREEN98 then identifies the corresponding temperatures and MOBILE5a options. The region is selected by clicking on it. Once the region is selected, the region is outlined, the region name appears in the region box, the temperatures are displayed and the MOBILE5a options are displayed if they apply to the selected region.

Six regions are available for selection. They were selected based on temperature and attainment history. The six regions are:

North Florida
Duval County (Jacksonville)
Central Florida
Pinellas and Hillsborough Counties (Tampa and St. Petersburg)
South Florida
Palm Beach, Broward, and Dade Counties (West Palm Beach, Fort Lauderdale, & Miami)

This window can be finicky in Windows 95. Do not move or drag this window. You are also more likely to have success if you use a 640 × 480 resolution or less.

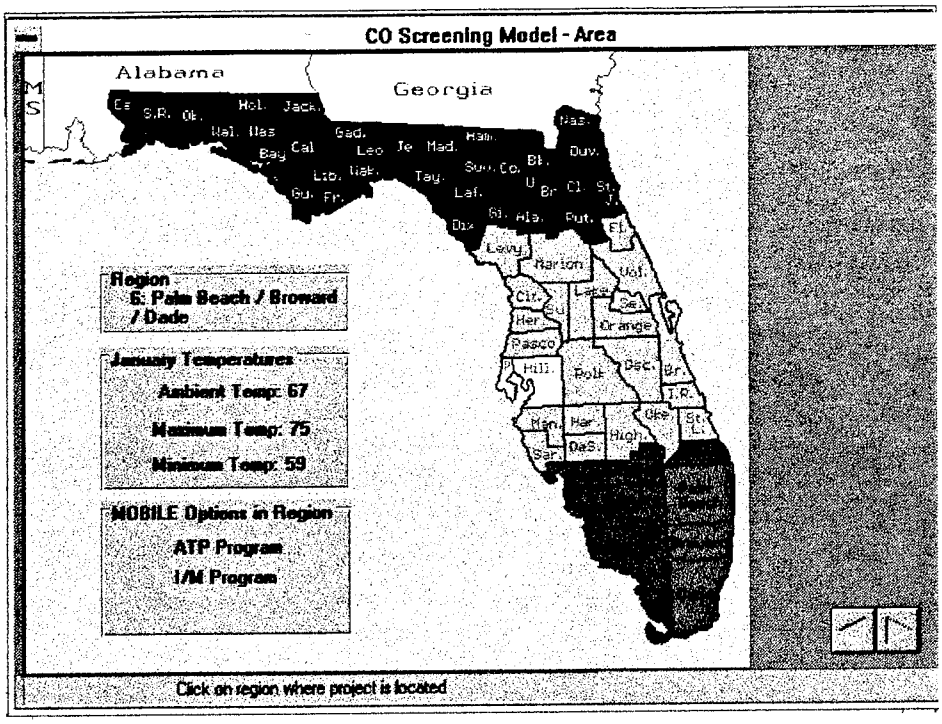

Figure 3. Area Screen

Arrow Button
Clicking the right arrow button opens the next screen, the Inputs screen, for data entry. Clicking the left arrow button returns you to the Title screen.

Information Panel
An information panel is located at the bottom of the screen. This provides information about the item over which the mouse pointer is located.

INPUTS SCREEN

You enter additional data in the Inputs screen as shown in Figure 4. Select the appropriate environment - urban, suburban, or rural. This impacts the surface roughness factor and background CO concentrations as shown in Table 1.

Enter the traffic data in the next box. Enter the maximum approach volume summed across the lanes coming from one direction. The value must be between 1000 and 9999 vehicles per hour. COSCREEN98 will divide the traffic into lanes including 15 percent in a separate left-turning lane. The next data entry is for the approach speed. This is the cruising speed of cars far removed from the stop line of the intersection. Acceptable speeds are between 15 and 65 miles per hour.

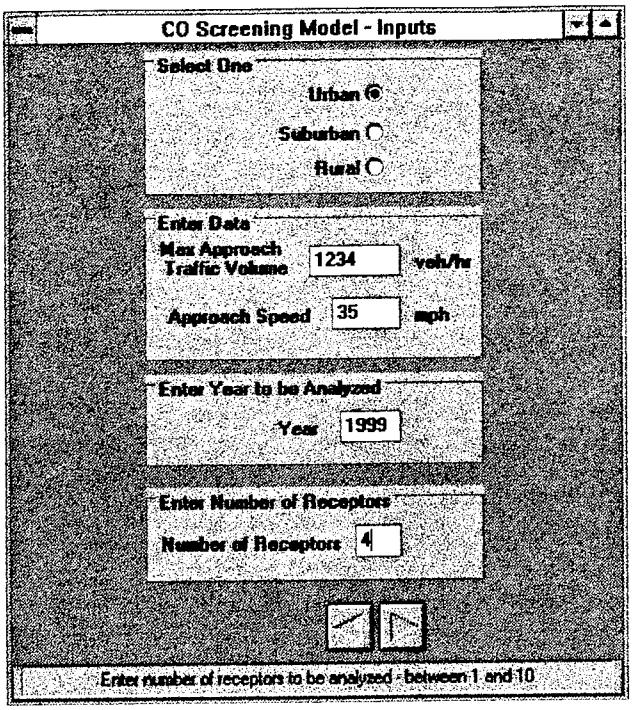

Figure 4. Inputs Screen

The year of analysis is entered in the third box. Years are limited by MOBILE5a; the most future date that can be accepted by MOBILE5a is 2020. The number of receptors are entered in the last box. COSCREEN98 will evaluate between 1 and 10 receptors. This value must be entered prior to proceeding to the Receptors screen.

Arrow Buttons

Clicking the right arrow button opens the next screen, the Receptors screen, for data entry. The right arrow button will not open the Receptors screen unless a value for the number of receptors has been entered.

Clicking the left arrow button returns you to the Title screen.

Information Panel

An information panel is located at the bottom of the screen. This provides information about the item over which the mouse pointer is located.

Table 1. Parameters Impacted by Environment

Environment	Surface Roughness, cm	CO Background Concentration, ppm	
		1-hour	8-hour
Urban	321	5.0	3.0
Suburban	108	3.33	2.0
Rural	10	1.67	1.0

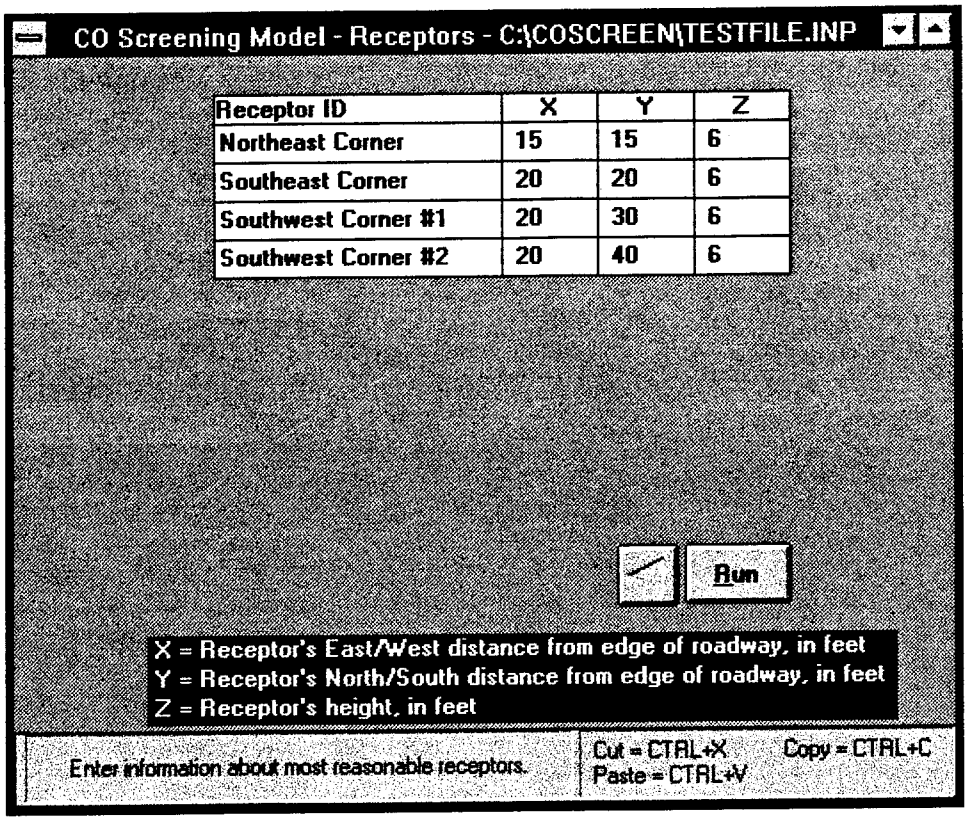

Figure 5. Receptors Screen

RECEPTORS SCREEN

The receptors screen as shown in Figure 5 displays the table for receptor input. The table is sized for the number of receptors based on the value from the Inputs screen. The first column allows you to identify the receptor using up to 20 alphanumeric characters.

Because this is a screening model, and because the hypothetical intersection is perfectly symmetrical with respect to both geometry and traffic volume, the CO concentration will be the same in each quadrant for a specified distance from the intersection. COSCREEN98 has its own coordinate system and develops coordinates for the receptors from the distances input by the user. Thus, the user must only enter the positive distance from the edge of the closest travel lane of the roadway to the receptor, and not the actual coordinates. In fact, the model will not accept negative distances. The results of the model are valid for any real receptor coordinates (whether positive or negative) as long as the distances are correct. All distances must be in feet.

The "X" column is used for entering the east or west distance from the **edge** of the closest travel lane of the roadway to the receptor. This is not the same as the x-coordinate that you may have developed for your intersection, but is the x-***distance*** from the **edge** of the closest travel lane of the roadway. The "Y" column is similar except that it is the north or south distance from the **edge** of the closest travel lane of the roadway to the receptor. (If your intersection is not oriented east/west and

north/south, use distances perpendicular to the roadway.) COSCREEN98 generates its own coordinates for the receptors from these distances. All distances must be entered in feet.

The "Z" column is for entering the receptor height in feet. A typical value is 6 feet.

To begin entering data, click on any cell in the table. Tabbing will always move the cursor to the next cell. Up and down arrow keys will also move the cursor. The left and right arrow keys will move the cursor to the appropriate cell if the current cell is empty.

Editing may be done by using the short-cut keys, CTRL+X for cutting, CTRL+C for copying, and CTRL+V for pasting.

Run
The Run button allows you to run COSCREEN98 from this screen without returning to the title screen. COSCREEN98 runs with the displayed input data; it is not necessary to save the data prior to running COSCREEN98.

Arrow Button
Clicking the left arrow button returns you to the Title screen.

Information Panel
An information panel is located at the bottom of the screen. This provides information about the item over which the mouse pointer is located.

RUNNING COSCREEN98

COSCREEN98 may be run from either the Title screen or the Receptors screen. It uses the displayed data as input; it is not necessary to save the data prior to running COSCREEN98. COSCREEN98 does a check to make sure that all necessary data have been entered. If any piece of data is missing, COSCREEN98 returns you to the appropriate screen for data entry.

With all data entered, COSCREEN98 goes to the DOS shell to run MOBILE5a and COEFMOB5[1] to determine emission factors. Various information will scroll across the screen as these programs run. When the emission factors are computed, a message box[2] appears. Click on OK. COSCREEN98 will continue its analysis using CAL3QHC2 and C3OUTPUT[1]. Again information will scroll across the DOS screen. A message box[2] appears when the analysis is completed. Click on OK. The Text Viewer will then appear with the results.

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[1] COEFMOB5 and C3OUTPUT are internal programs which extract the data from MOBILE5a and CAL3QHC2, respectively.

[2] In Windows95, it will be necessary to exit the DOS shell prior to the message box appearing. You will be prompted to do this.

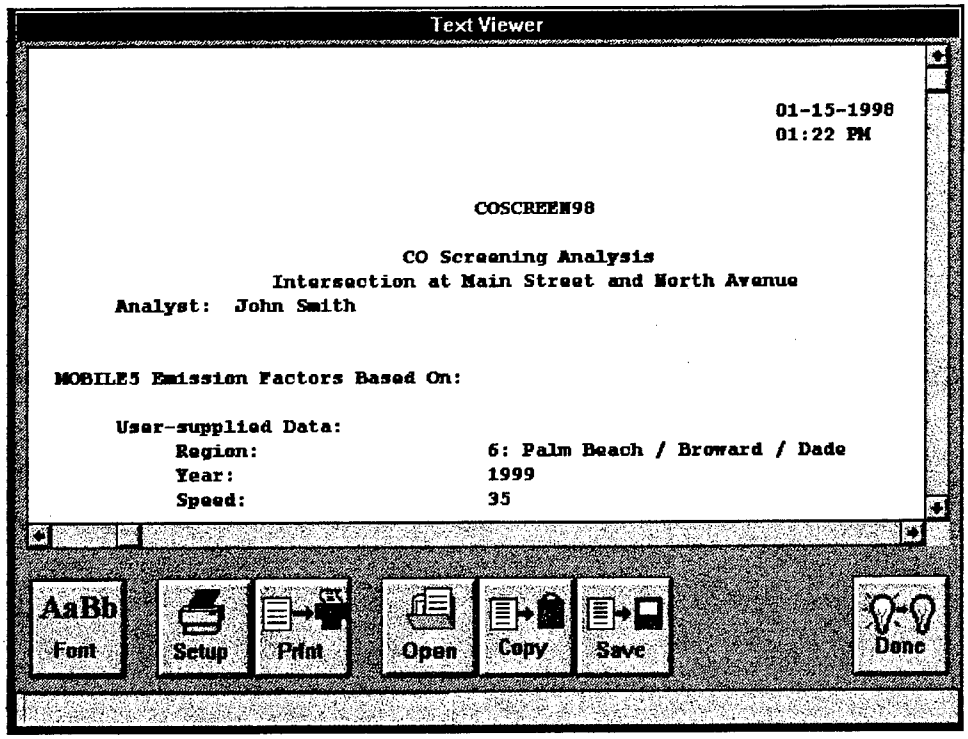

Figure 6. Text Viewer Screen

TEXT VIEWER

The Text Viewer screen in Figure 6 immediately displays the results of the COSCREEN98 analysis. The screen can also be directly accessed by clicking the View button on the Title screen or Viewer from the Screens menu on the Title screen. By default, the most recent COSCREEN98 run will be displayed, but the viewer can be used to view any text file. If the file does not fit in the text viewer window, click on the scroll bars to view different portions of your file.

Editing can be done in this screen, but this is not intended as a text editor. Several other options are available on this screen. They are described in the following paragraphs.

Font Button
The font can be changed by selecting the Font button. The COSCREEN98 output is designed for font Courier 10. Changing the font may result in lines running off the paper - text does not wrap around. This button may be most useful when viewing and printing other files.

Setup Button
The Setup button selects the printer and paper type. COSCREEN98 is designed for the portrait format. This button is particularly useful when printing other files that may require the landscape format.

Print Button
The Print button is for printing the displayed file. Both the Setup and Print buttons are related to the particular print manager in your computer.

Open Button
The Open button allows you to open any other text file for viewing. If the output file has not been saved, you will be prompted to save it prior to opening another file. Even if you do not save it at this time, the output file is still available as *coscreen.out* until the next COSCREEN98 run.

Copy Button
The Copy button copies the displayed file to the clipboard. The file can then be copied into another program, such as a word processing program for inclusion in an air quality report.

Save Button
The Save button opens the Save box and saves the displayed file to the file named or selected by you.

Done Button
The Done button returns you to the Title screen. If the output file has not been saved, you will be prompted to save it.

Information Panel
An information panel is located at the bottom of the screen. This provides information about the item over which the mouse pointer is located.

EXAMPLE

An example input and output file follow. They are identified as *testfile.inp* and *testfile.out*. The analysis is for an urban intersection in Region 6. The maximum traffic volume is expected to be 1234 vehicles per hour in the year 1999. The approach speed is expected to be 35 miles per hour. Four locations were selected as most reasonable sites for receptors. (Refer to Florida Department of Transportation's Project Development and Environment Manual, Part 2, Chapter 16, for assistance in identifying most reasonable receptor locations.)

Example Input File

```
"CO Screening Analysis"
"Intersection at Main Street and North Avenue"
"John Smith"
6
321,1234,35,1999,4
"Northeast Corner",15,15,6
"Southeast Corner",20,20,6
"Southwest Corner #1",20,30,6
"Southwest Corner #2",20,40,6
```

Example Output File

01-15-1998
01:22 PM

COSCREEN98

CO Screening Analysis
Intersection at Main Street and North Avenue
Analyst: John Smith

MOBILE5 Emission Factors Based On:

User-supplied Data:

Region:	6: Palm Beach / Broward / Dade
Year:	1999
Speed:	35

Default Data:

Ambient Temperature:	67
Maximum Temperature:	75
Minimum Temperature:	59
MOBILE Options:	ATP Program
	I/M Program

Facility Data:

Max Approach Traffic Volume:	1234 veh/hour
Environment:	Urban
Background Concentration:	1-hr = 5.0 ppm
	8-hr = 3.0 ppm

Receptor Data:

Receptor Name	East-West Distance from Intersection	North-South Distance from Intersection	Receptor Height
Northeast Corner	15	15	6
Southeast Corner	20	20	6
Southwest Corner #1	20	30	6
Southwest Corner #2	20	40	6

All distances are in feet

****

RESULTS

Receptor Name	Max 1-Hr Conc (ppm)	Max 8-Hr Conc (ppm)
Northeast Corner	11.4	6.8
Southeast Corner	10.8	6.5
Southwest Corner #1	10.2	6.1
Southwest Corner #2	9.7	5.8

Maximum concentrations include background CO

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