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Determining Wastewater User Service Charge Rates

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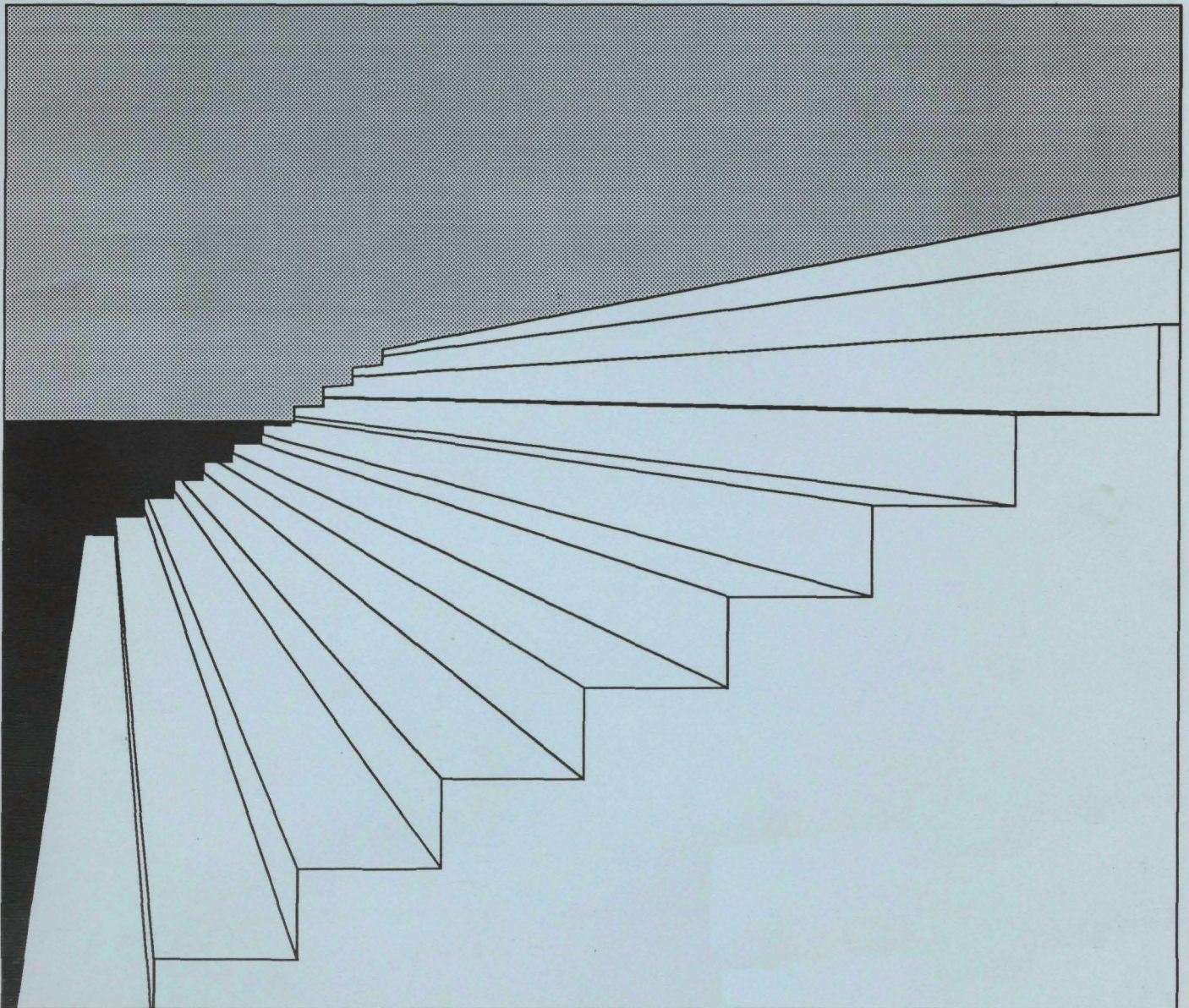http://trace.tennessee.edu/utk_mtaspubs/280

♻EPA

Determining Wastewater User Service Charge Rates

A Step By Step Manual

INTRODUCTION

Good financial management is a critical part of all wastewater operations. It allows you to establish the user service charge rates necessary to keep your utility financially healthy and running smoothly. This publication was designed to help small to medium-sized wastewater utility operations decide how much they should be charging their residential, commercial, and industrial customers for wastewater services. It includes a *Lotus 1-2-3* computer model program and manual procedures to help you calculate specific values for your system's user service charges.

Using a model computer program to help calculate your user service charge rates has many advantages. As you know, setting rates can be a difficult and time-consuming task, involving lots of paper, pages of statistics, and hours of work. Computers simplify these tasks. This computer program quickly and accurately calculates user service charge rates using specific information from your wastewater operations. In addition, once you have collected the basic information, this computer program makes it easy for you to see the effects of a change in different operating variables. Unfortunately, the program cannot make the difficult decision of when to increase user service charges. However, it will quickly give you information to support those decisions.

The computer program is designed to be as easy to use as possible. The only requirements are that you have an IBM-PC or PS/2 compatible computer and *Lotus 1-2-3*, version 2.01, 2.2, or higher. The program only requires that you have general familiarity with your computer and know how to start *Lotus 1-2-3*. The instructions in this manual and on the computer screen will lead you through the program.

INFORMATION YOU NEED

The computer program supplied with this manual will ask you for information about your wastewater system, its costs, treatment wasteload, and other information. To save time, have the following information at hand before starting the computer program:

- **financial statements.** The latest annual financial statements for your wastewater operations. If you combine the finances for water and

wastewater operations, you'll need to break the records down into separate water and wastewater accounts.

- **current user** service charge rate schedule. This is the existing rate schedule used to bill your customers. If your billing system doesn't use metered fresh water to bill for wastewater service, the program will need information on the number and type of customers.

- **total wastewater flow.** The total annual flow in gallons (**not** millions of gallons) treated by your treatment plant over the same 12-month period covered by the financial statements. (Multiply cubic feet by 7.5 to get gallons of flow.)

- **total metered water** flow (if applicable). The total annual metered drinking water in gallons (not millions of gallons) provided to your wastewater customers over the same 12-month period covered by the financial statements. The annual metered water flow should be sub-grouped by user type: residential, commercial/institutional, and industrial.

- **total industrial wastewater flow.** The program will require the total industrial wastewater flow through the treatment plant, for both metered and unmetered systems. If this figure is not available, you will have to estimate the flow.

- **total annual influent BOD and SS.** The pounds (not millions of pounds) of biochemical oxygen demand (BOD) and suspended solids (SS) treated by your plant over the same 12-month period covered by the financial statements.

- **the number of customers by type** (for unmetered water only). *Type* means residential single-family, one- and two-bedroom apartments, three-or-more bedroom apartments, commercial (such as stores, restaurants, office buildings) and institutional (such as churches, hospitals, government buildings), and industries. Normally, industrial wastewater is metered and analyzed by the wastewater utility to accurately assess each industrial user's service charges.

- **an IBM-compatible computer with** *Lotus 1-2-3,* **version 2.01, 2.2, or higher.** An IBM PC, PC-XT, or PS/2, or compatible with *Lotus 1-2-3,* version 2.01, 2.2 or higher and enough memory to run *Lotus 1-2-3.* The *Lotus 1-2-3* program included with this manual is available in 3.5"-730Kb format, or 5.25"-360Kb format. A fixed disk (hard disk) drive isn't required, but the files necessary to run the program may be copied to a fixed disk drive.

ASSUMPTIONS

The computer program is designed using the following assumptions:

- **wastewater flow.** The program uses an *equivalent dwelling unit* (EDU) methodology for unmetered fresh water systems. An equivalent dwelling unit (1.0 EDU) is a single-family detached residence. The program assumes a one- or two-bedroom apartment equals 0.75 EDU, a three-bedroom apartment or larger equals 1.0 EDU, a commercial/institutional user equals 2.5 EDUs, restaurants and taverns equal 10.0 EDUs, and industrial users are charged based on actual wastewater flows. Extraneous wastewater flows (i.e., infiltration and inflow) are distributed to users in the same manner as normal wastewater flows.

- **financial management.** The wastewater operations are assumed to be financially self-sufficient municipal utility operations.

- **uniform rates.** All users are billed on a uniform rate to assure fair and equitable distribution of the wastewater operational costs to each user. (For example, all users pay their proportionate share of the wastewater operational costs.) The uniform rate calculated by the program is based on total volume (gallons) of wastewater and the normal BOD and SS content for residential wastewater. The cost of treating high strength BOD and SS wastewater is included as a surcharge in the uniform industrial rate.

  A surcharge occurs only when the program determines that the BOD or SS concentration of the wastewater treated by your plant exceeds that normally expected from domestic sewage. (*Normal* domestic strength wastewater is assumed to contain .002294 pounds of BOD and SS per gallon, or 2,294 pounds per 1 million gallons of wastewater.) The program then assumes that industry is the source of the excess treatment load and develops an industrial surcharge rate.

  Some wastewater utilities use the *declining block rate* structure, where higher volume users pay a lower rate per 1,000 gallons of wastewater treated. This approach isn't used by this program because it doesn't equitably charge users for the cost of wastewater services.

STARTING THE PROGRAM

Before using the computer program, you're encouraged to first read through this manual and assemble the required information.

COPY THE DISK

Make a back-up copy of the program disk, use the back-up copy, and put the original disk in a safe place. If you have a hard disk, you can copy either the version 2.01 files (**RATE201.WK1** and **NEWRATES.PRN**) or the version 2.2 (or higher) files (**RATE.WK1** and **NEWRATES.PRN**) from the floppy disk that came with the manual onto your hard disk drive. **Be sure to copy both files; both are necessary.**

LOAD *LOTUS 1-2-3*

Load *Lotus 1-2-3* on your computer in the normal manner.

LOAD RATE.WK1

Make sure that *Lotus 1-2-3* knows where to look for the **RATE.WK1** files by setting the directory with the SLASH KEY (/) *File-Directory* sequence, and then typing the appropriate directory (**A:** or **C:\LOTUS** if your files are on a fixed disk, etc.). Follow the usual *Lotus* file retrieve sequence by pressing SLASH KEY *File-Retrieve*, and load **RATE.WK1**.

When **RATE.WK1** loads, it begins an automatic program that will lead you through the entire process. Read the screens carefully; follow the instructions shown on each screen and observe the rules that follow.

GENERAL INSTRUCTIONS

To enter the information for a specific question, type the appropriate response and press ENTER. While you're typing, the information being typed will appear at the top of the screen. You may correct errors in a line you are entering by using BACKSPACE and the left and right ARROW keys, and re-typing. After you press ENTER (RETURN key), the information will appear in the proper location on the screen. In some parts of the program where the data is necessary to calculate new

rates, you'll have a second chance to edit your entries on the entire screen before going on to the next screen.

When entering numbers into the program, **don't use commas or currency signs.** The program will insert commas and currency signs where necessary. If you wish to enter a decimal, such as dollars and cents, you must type the decimal point. For example, $3 would be entered simply as **3** (no currency sign), while $2.75 would be entered as **2.75** (decimal point, but still no currency sign). Three million (3,000,000) would be entered as **3000000** (no commas).

If you follow the directions, you shouldn't have any difficulty. However, if you become completely lost or enter the wrong information, the program can be stopped by holding down the CTRL (Control) key and pressing the BREAK key once. After pressing this key sequence, an *error* message will flash on the screen; just press ENTER once, and then re-load the program from the disk to re-start. This is usually not necessary; even if the information entered is incorrect, the program will still run through to completion.

Occasionally, you'll type something or do something the program doesn't expect or won't accept. An electronic beep will sound. This is neither disastrous nor unusual, even for experienced *Lotus 1-2-3* users. There is always a reason; study the screen and follow the directions carefully, and the beeps will be minimized.

After running the program, the results of your work — the information you enter and the recommended new rates — will be saved to a text file named **NEWRATES.PRN. This file should never be erased!** If you want to see the results of a program run, print the file using a word processor or copy it to another directory. You can print or copy the file, but don't erase or delete the original file.

It's not necessary or recommended that you save the **RATE.WK1** file after running the program. However, if you are proficient with *Lotus 1-2-3*, you can save the file under a different name. To save the spreadsheet file, rename it so that the original **RATE.WK1** file remains intact.

If you are an EPA wastewater construction grantee, you may wish to calculate only the user charge (operations, maintenance, and equipment replacement) rates. To accomplish this, simply enter a 0 for principal and interest payments on the WASTEWATER COLLECTION AND TREATMENT EXPENSES screen, and exclude all revenues collected for debt service.

INTRODUCTORY SCREENS

After starting **RATE.WK1**, an introductory screen appears, as shown in Figure 1.

Welcome to

**DETERMINING
WASTEWATER USER SERVICE CHARGE RATES**

developed for the
U. S. Environmental Protection Agency
by the
Municipal Technical Advisory Service
University of Tennessee
1991

(Please press the ENTER key to continue.)
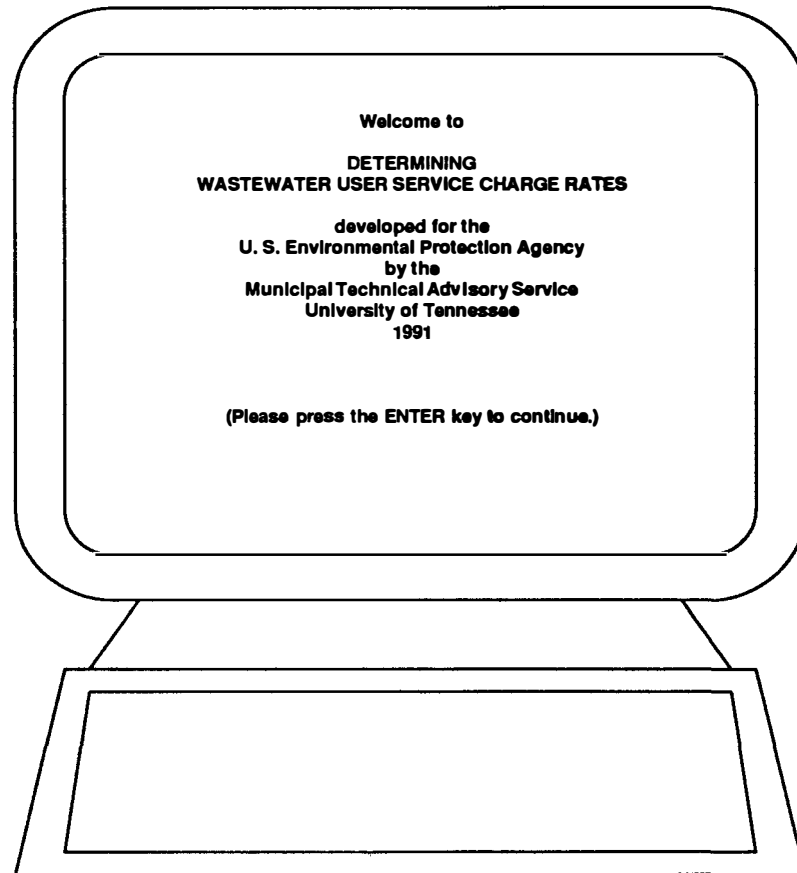
**Figure 1:
Introductory
Screen**

Pressing ENTER takes you to a second screen that asks for the name of your jurisdiction (city, county, district, etc.), which may be up to 72 characters long. Please don't try to bypass this screen: the program uses your jurisdiction name to track some of its actions. You must type an entry and press ENTER before the program will proceed.

The next two screens give basic instructions on what information the program will need, as shown in Figures 2 and 3 on the next page. Read the first screen, press ENTER, then read the second screen and press ENTER again. You will be presented with three choices at the top of the screen: *CONTINUE, QUIT,* or *READ THE INSTRUCTIONS AGAIN.* You can move the highlighted cursor from choice to choice with the SPACE BAR or the right and left ARROW keys. The second line of the screen will show explanatory text for each choice as you move from one choice to the next. Make a choice by highlighting the text with the cursor and pressing ENTER.

Anytown, USA
Determining User Service Charge Rates

This Lotus 1-2-3 program will help you to determine your user service charges for wastewater treatment. You should read through the manual which accompanies this program before proceeding. If you haven't read the manual, you should choose "QUIT" after reading this screen and the next screen.

To use the Wastewater User Service Charge Rates Program, you should have the following information at hand:
(1) The latest financial statements and/or budgets for your wastewater operation, including all revenues and expenses;
(2) If you meter water consumption, you need the current billing schedule (rates per 1,000 gallons of wastewater treated);

Please press ENTER for more instructions

Figure 2:
First
Instruction
Screen

(3) If you do NOT meter or estimate water consumption, you need the number of wastewater customers in each of the following classes:
  (a) Single-family residences;
  (b) Apartments with 1-2 bedrooms, and with 3 or more bedrooms;
  (c) Commercial and institutional users other than restaurants;
  (d) Restaurants; and
  (e) Industries.
(4) The actual total annual wastewater flow of your plant and the total flow of all industrial users (in gallons).
(5) If you meter water use, total annual metered water flow broken down by type of user (residential, commercial, and industrial).
(6) The biochemical oxygen demand (BOD) and suspended solids (SS) (both in pounds) content of the wastewater which comes into the plant (influent) each year.

If you have this information at hand, press ENTER and select CONTINUE; otherwise press ENTER and select QUIT, and return to this program later.

Please press ENTER when you have read this screen.

Figure 3:
Second
Instruction
Screen

METERED/UNMETERED SCREEN

This screen (Figure 4) asks you to identify how you determine users' wastewater flow (*METERED* or *UNMETERED*). Your choice here will determine the direction the program follows from this point on. Use the SPACE BAR or ARROW keys to make a choice, and press ENTER.

METERED/UNMETERED

Is your fresh water supply METERED or UNMETERED?

**(Press the right or left ARROW key
to select "METERED" or "UNMETERED")**
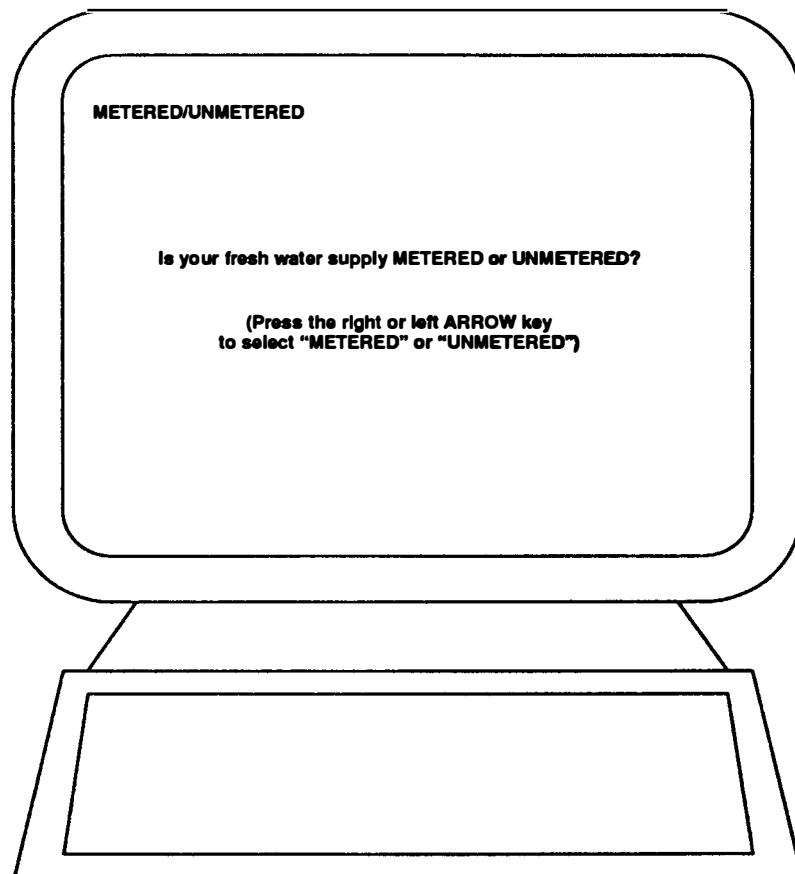
**Figure 4:
Metered/
Unmetered
Screen**

CURRENT WASTEWATER BILLING SCHEDULES (METERED ONLY)

This screen, shown in Figure 5 with example data, asks you to enter your current billing schedule (per 1,000 gallons of use) for wastewater user service charges. This information is used for comparison purposes at the end of the program, where new wastewater bills are compared to the average bills under the existing rates for billing classes you enter on this screen. It begins by asking for the first step, beginning with zero usage.

Anytown, USA
Determining User Service Charge Rates
METERED water

Current Wastewater Services Billing Schedule
Monthly Rates
++

Total Gallons Treated		Rate per
From ...	To ...	1,000 gallons
0	2,000	$2.00
2,001	4,000	1.90
4,001	6,000	1.80
6,001	10,000	1.50
10,001		1.40

**Figure 5:
Metered Water
Billing Schedule
(with example
data)**

Type the first usage figure, with no commas (for example, 2000), and press ENTER. Then enter the rate per 1,000 gallons for this class (no currency signs or commas; only decimal points if necessary). When you press ENTER, the program starts the next step by taking the previous figure and adding 1 to it. Continue entering steps as before. **You may enter up to 10 rate steps, but no more. You must enter at**

least two rate steps for the program to proceed. When you enter your last step (for example, **10,000 gallons and above**), leave the *To* step blank and press SMALL CAPS ENTER. In version 2.01, type a 0 and press EN- TER. Then enter the rate for that step. The program then displays the *EDIT MENU* (see page 11). If your rate structure uses uniform rates (the same rate per 1,000 gallons for all levels of usage), just enter two rate steps at that rate.

ENTERING CUSTOMERS BY TYPE (UNMETERED ONLY)

If you choose *UNMETERED* water on the *METERED/UNMETERED* screen, a message (see Figure 6) says you will be asked to provide information about the number of customers by type of users. This information is essential to arriving at recommended rates for a flat rate wastewater user service charge system.

ENTERING THE NUMBER OF CUSTOMERS BY TYPE OF USER

On the next screen, you will be asked to enter the number of customers by type of user (residential, apartments, commercial, etc.). This information is necessary to evaluate the the amount of waste being treated by your plant and determine if a surcharge for industrial users is necessary.

Please press ENTER when you are ready to proceed.

**Figure 6:
Instructions for
Unmetered
Users**

Pressing ENTER takes you to a screen, shown in Figure 7 with example data. You should enter the number of customers by class (no commas in the number). If you don't have any customers in a particular class, enter a zero. After entering the last figure, the *EDIT MENU* will appear.

```
Anytown, USA
Determining User Service Charge Rates
Number of Users by Type - UNMETERED WATER


                                            NUMBER of
           TYPE OF CUSTOMER                 CUSTOMERS

Single Family Residences                       8,000
Apartments (1-2 bedroom)                       1,500
Apartments (3 or more bedrooms)                1,000
Commercial/Institutional                         900
Restaurants and Taverns                          100
Industrial                                       100
```

**Figure 7:
Entering
Numbers of
Unmetered
Users by Type
(with example
data)**

EDIT MENU

The *EDIT MENU* is a feature that will appear on a number of screens after you enter the last data item on the screen. It allows you to make changes to any of the data you have just entered before leaving the screen. Highlighting *YES* and pressing ENTER displays a message explaining that an entry can be changed by highlighting it with the cursor (use the up, down, left, and right ARROW keys), typing the new data, and pressing ENTER. Only the data you entered on this screen should be changed. Changing any other information on the screen could have unpredictable and possibly unpleasant results!

If you change an item on the screen and press ENTER, you will be asked if there are any other changes to be made. A *NO* selection lets you move to the next screen by pressing ENTER.

WASTEWATER OPERATIONAL EXPENSES

The next screen (see Figure 8) is an introduction to entering your wastewater collection and treatment expenses. This portion of the program will require the use of your financial statement(s).

ENTERING YOUR WASTEWATER OPERATIONAL COSTS

On the next screen, you will be asked to enter your system's total cost of operations. The figures you will be asked to enter include the typical items for your wastewater collection AND treatment operations:
- Salaries and benefits
- Utilities
- Equipment replacement fund (reserve for replacement) contributions
- Chemicals, supplies and parts
- Contract services
- Administrative costs and office supplies
- Principal and interest payments
- Any other costs
As you enter these figures, help will be available to explain what each category includes. Help is also in the manual. Please include ALL costs; the help screens are just "reminders," not comprehensive lists.
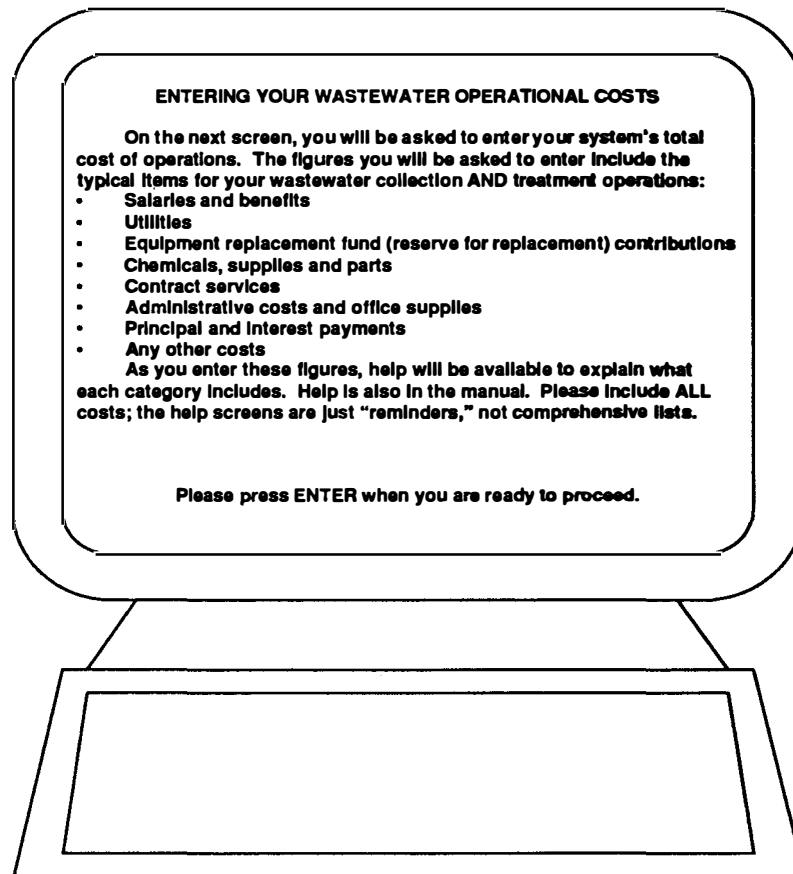
Please press ENTER when you are ready to proceed.

**Figure 8:
Instructions
for Entering
Operational
Costs**

After reading the introductory screen, press ENTER and the data entry screen will appear (see Figure 9). You will be prompted for the fiscal year covered by the figures you are about to enter. Just type the year (for example, **1990**). Don't type FY; the program will add that prefix. If the figures are for a 12-month period other than a fiscal year, you may edit the FY prefix after completing data entry on this screen by using the *EDIT MENU* that appears following the last entry.
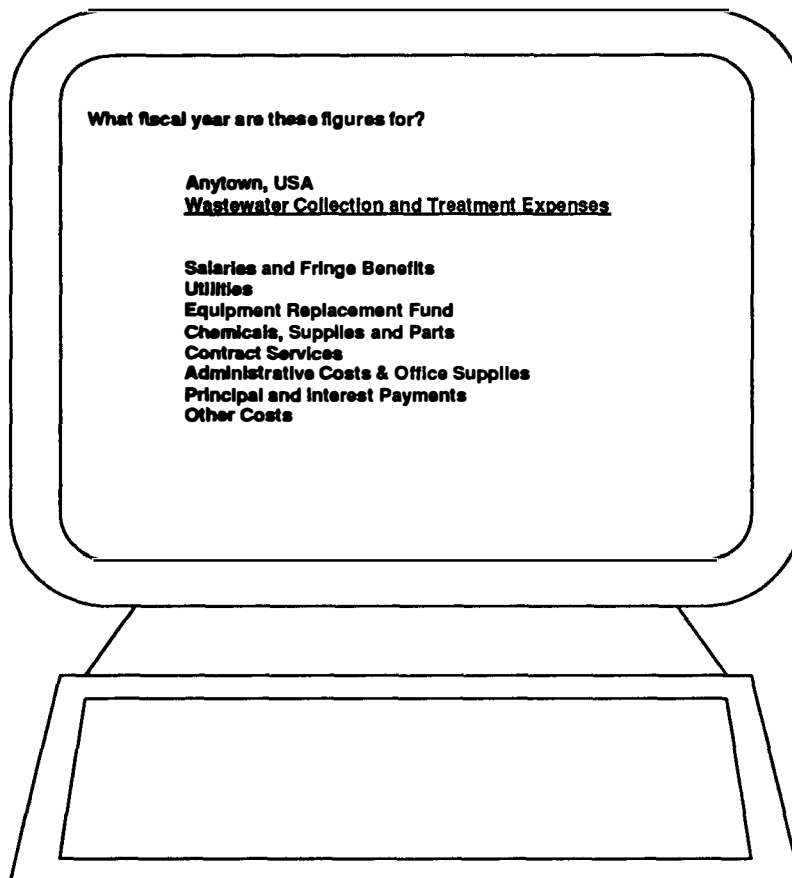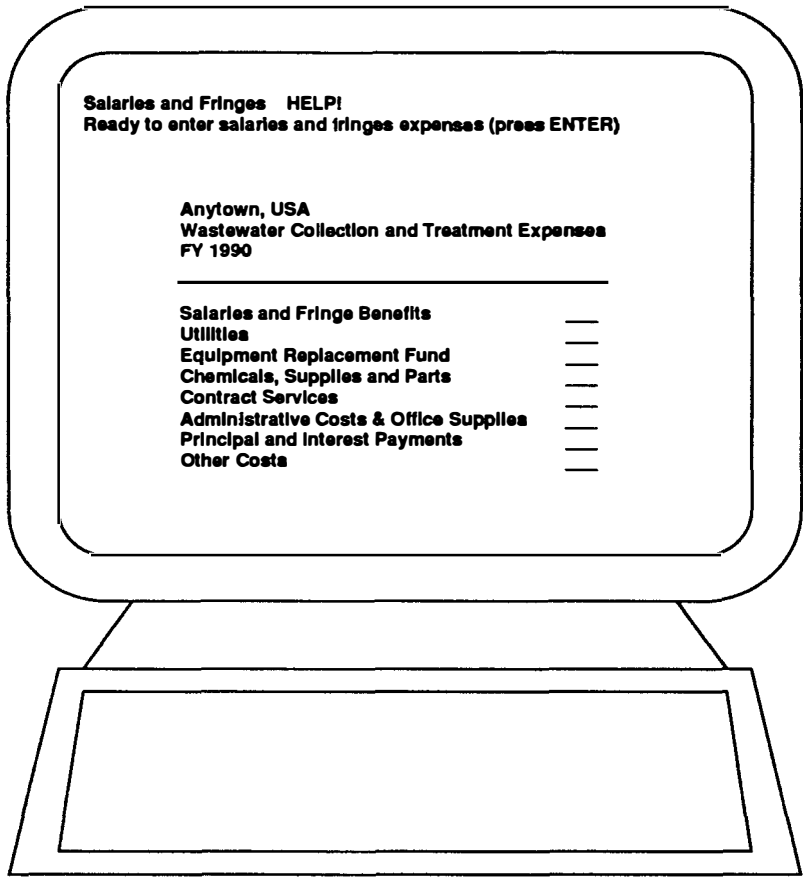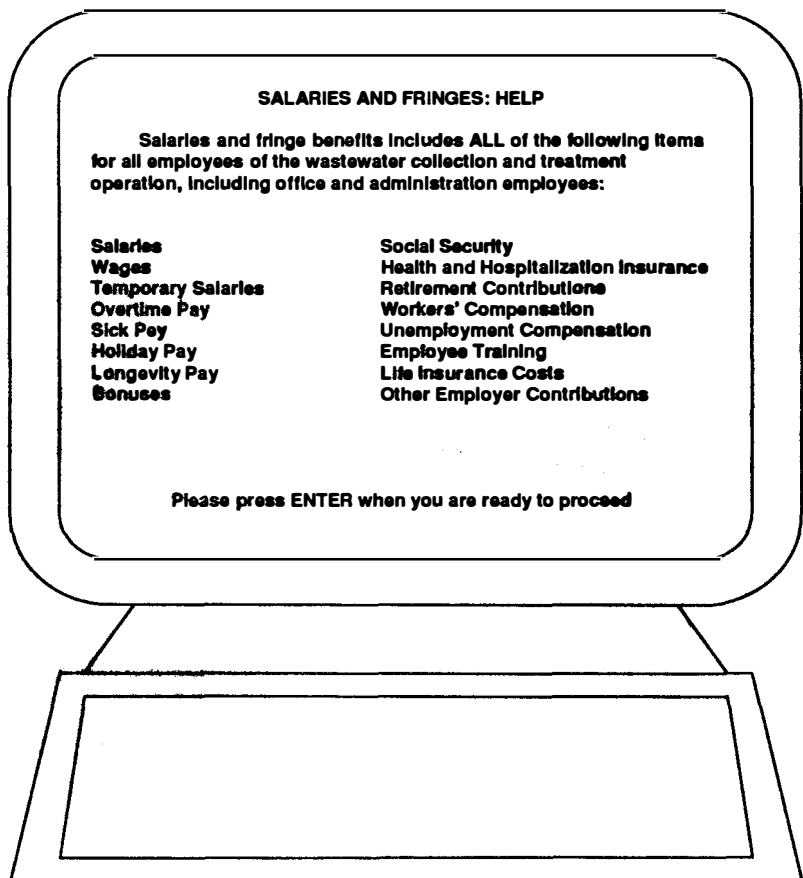
13

**Figure 9:
Entering
Collection and
Treatment Costs
(fiscal year)**
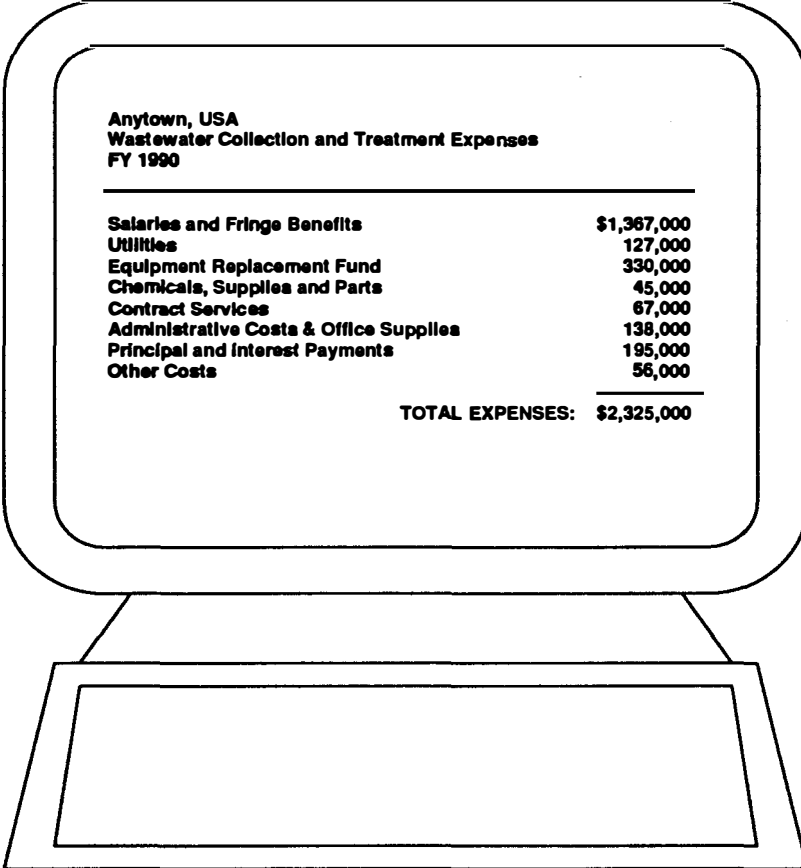
This screen is different from the other screens of the program in that it offers help in classifying your expenditures. After entering the fiscal year and pressing ENTER, a menu choice for *SALARIES AND FRINGES* appears (see Figure 10). Moving the highlighted cursor to *HELP!* and pressing ENTER takes you to a screen of explanatory information on *SALARIES AND FRINGES* (see Figure 11). After reading the screen, return to the *EXPENSES* screen by pressing ENTER. You then must highlight the expense item title and press ENTER again before typing an amount. Continue in the same way through all of the items on the screen. After you have entered all the figures, the program will compute the total (see Figure 12 on page 15), and the *EDIT MENU* will appear after you enter the last item. Remember, no **commas** and **no currency signs.**

14

Salaries and Fringes   HELP!
Ready to enter salaries and fringes expenses (press ENTER)

Anytown, USA
Wastewater Collection and Treatment Expenses
FY 1990
_____

Salaries and Fringe Benefits   ___
Utilities   ___
Equipment Replacement Fund   ___
Chemicals, Supplies and Parts   ___
Contract Services   ___
Administrative Costs & Office Supplies ___
Principal and Interest Payments   ___
Other Costs   ___

**Figure 10:
Entering Salaries
and Fringes**

SALARIES AND FRINGES: HELP

Salaries and fringe benefits includes ALL of the following items
for all employees of the wastewater collection and treatment
operation, including office and administration employees:

Salaries	Social Security
Wages	Health and Hospitalization Insurance
Temporary Salaries	Retirement Contributions
Overtime Pay	Workers' Compensation
Sick Pay	Unemployment Compensation
Holiday Pay	Employee Training
Longevity Pay	Life Insurance Costs
Bonuses	Other Employer Contributions

Please press ENTER when you are ready to proceed

**Figure 11:
Salaries and
Fringes**

Anytown, USA
Wastewater Collection and Treatment Expenses
FY 1990

Salaries and Fringe Benefits	$1,367,000
Utilities	127,000
Equipment Replacement Fund	330,000
Chemicals, Supplies and Parts	45,000
Contract Services	67,000
Administrative Costs & Office Supplies	138,000
Principal and Interest Payments	195,000
Other Costs	56,000
TOTAL EXPENSES:	**$2,325,000**

Figure 12: Wastewater Collection and Treatment Expenses (with example data)

Following is the text of the *EXPENSES HELP* screens for easy reference:

SALARIES AND FRINGES: HELP

Salaries and fringe benefits includes **all** of the following items for all employees of the wastewater collection and treatment operation, including office and administration employees:

- salaries,
- wages,
- temporary salaries,
- overtime pay,
- sick pay,
- holiday pay,
- longevity pay,
- bonuses,
- Social Security,
- health and hospitalization insurance,
- retirement contributions,
- workers' compensation,
- employee training,
- life insurance costs, and
- other employer contributions.

UTILITIES: HELP

Utilities includes any expenditure for natural gas, electric power, telephones, and water service for the treatment plant and the collection system. Be sure to include the power costs for operation of collection system pumps and lift stations, as well as any charges for telephone lines required to monitor and control the collection system. Utilities may also include the cost of refuse collection for the treatment plant.

EQUIPMENT REPLACEMENT: HELP

Each wastewater operation should have some method of setting aside funds for the replacement of major equipment items. One of the most frequently used techniques is an *equipment replacement fund* or *reserve for equipment replacement*. This should include any funds your wastewater operation sets aside to pay for future repair and/or replacement of items such as lift pumps, vehicles, and other major pieces of equipment used to collect and treat wastewater.

CHEMICALS, SUPPLIES, AND PARTS: HELP

This category includes all of the following typical items, and any similar items:

- treatment chemicals,
- laboratory supplies,
- gas, oil, diesel fuel, grease, etc.,
- machinery and equipment parts,
- automotive parts,
- electrical, painting, plumbing, and carpentry supplies,
- repair parts for collection lines,
- consumable tools,
- concrete, metal, and plastic pipe and culverts used for repairs,
- cement, crushed stone, gravel, sand, and dirt,
- building materials,
- asphalt, and
- other repair and maintenance supplies.

CONTRACT SERVICES: HELP

This category includes any services purchased from providers who are not part of the wastewater operation. Typical items include:

- freight, express, and truck charges,
- contract printing and duplication services,
- legal services,
- data processing services,
- architectural and engineering services,

- plant and collection system repair and maintenance services,
- automotive repair and maintenance services, and
- leased equipment costs.

ADMINISTRATIVE COSTS AND OFFICE SUPPLIES: HELP

Administrative costs includes any expenditures that could be considered indirect, overhead, and/or not directly attributable to the actual collection and treatment of wastewater. Included in this category would be any costs of utility billing and revenue collection, management of the wastewater system, and office supplies. Typical items of expenditure would include:

- postage,
- travel costs,
- data processing costs,
- printing, publications, subscriptions, and professional dues,
- office and utility billing supplies,
- wastewater share of water meter-reading costs,
- delinquent accounts collection costs,
- liability and structural insurance, and
- rents and leases.

PRINCIPAL AND INTEREST: HELP

This category includes the annual debt service cost associated with borrowing and repaying money for the wastewater system. The annual payments on bonds, notes, revenue anticipation notes, state and/or federal loans, mortgages, and any other short or long-term debt should be included. In addition to the annual principal and interest on these loans, bank service charges, bond sale expenses, and costs associated with redeeming bond coupons should be included as well.

OTHER EXPENSES: HELP

This category covers any expenditure items you may not have included elsewhere. Be aware that most "other" items can often be properly accounted for under *Administrative Costs*. This category would include the amount of any actual annual funds placed in a specific reserve account for facility replacement or depreciation.

OTHER REVENUES

Other revenues are all revenues that come into the wastewater system other than user service charges and surcharges. An introductory screen explains *other revenues* (see Figure 13).

ENTERING "OTHER REVENUES" INFORMATION

On the next screen, you will be asked to enter all revenues other than user service charges. "Other" revenue includes connection fees, special assessments, interest on investments, and any other revenue derived from any source other than user service charges and surcharges, including any minimum fixed fee charged to users that is not related to wastewater usage.

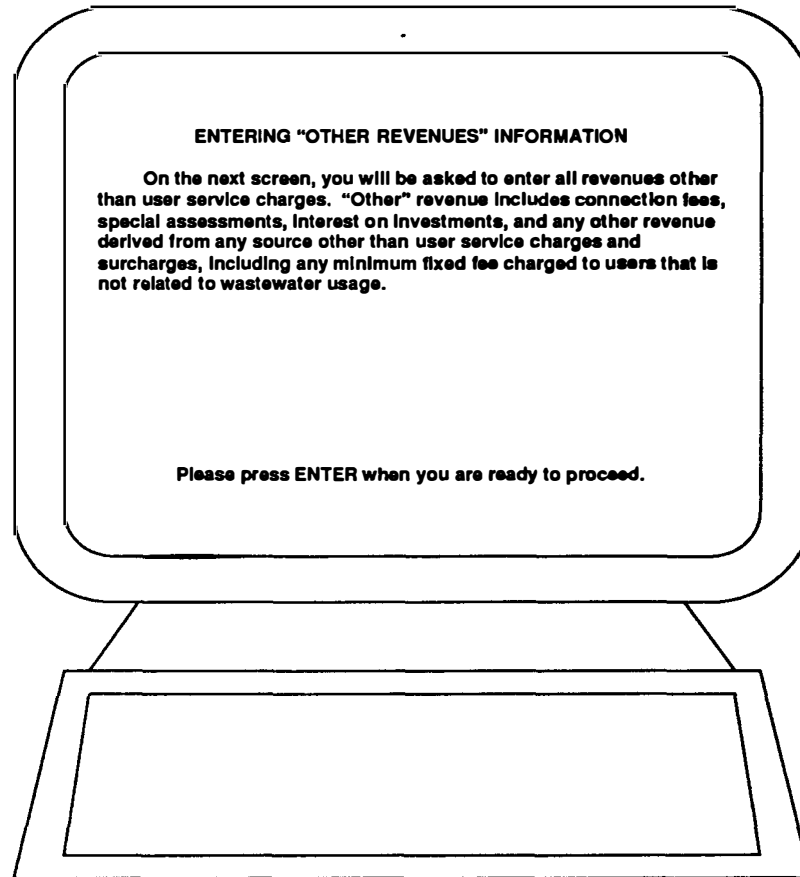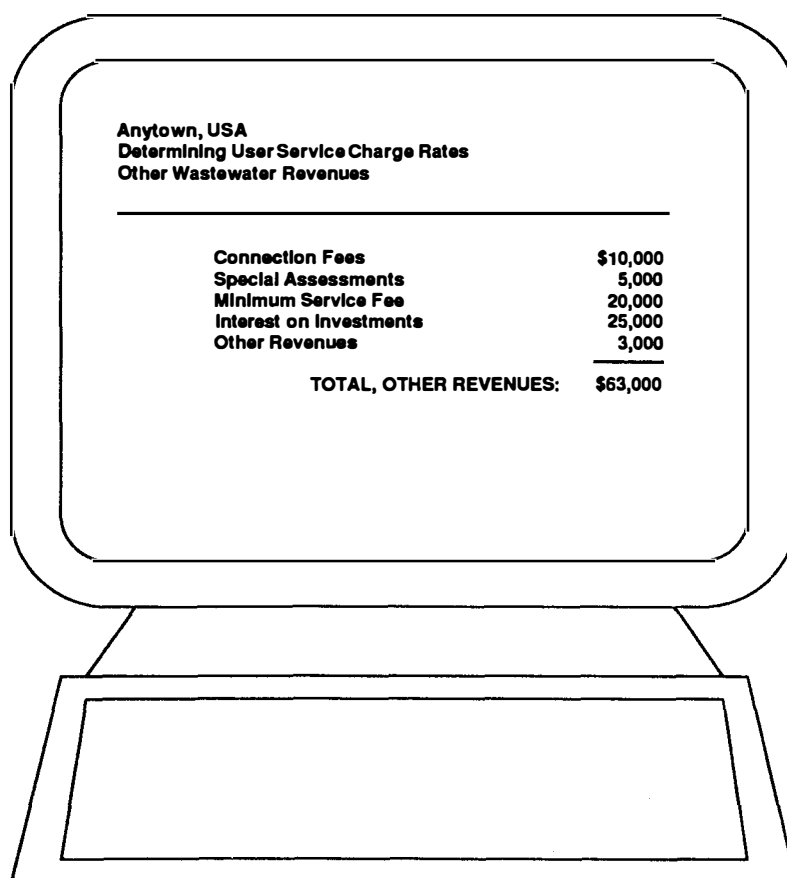Please press ENTER when you are ready to proceed.

**Figure 13:
Instructions
for Entering
Other Revenues**

At the *OTHER REVENUES* data entry screen (see Figure 14), you're asked to enter all other revenues. While the listing may not be comprehensive, please enter all operating revenues other than user service charges and surcharges in some category on this screen. This screen follows the format of the preceding screens, prompting for each entry. The program then calculates a total, and allows use of the *EDIT MENU* after the last entry.

Anytown, USA
Determining User Service Charge Rates
Other Wastewater Revenues

Connection Fees	$10,000
Special Assessments	5,000
Minimum Service Fee	20,000
Interest on Investments	25,000
Other Revenues	3,000
TOTAL, OTHER REVENUES:	**$63,000**

Figure 14:
Entering Other
Revenues
(with example
data)

TREATMENT PLANT STATISTICS

Instructions on entering wastewater flow and BOD and SS statistics for your treatment plant appear on the next screen (see Figure 15).
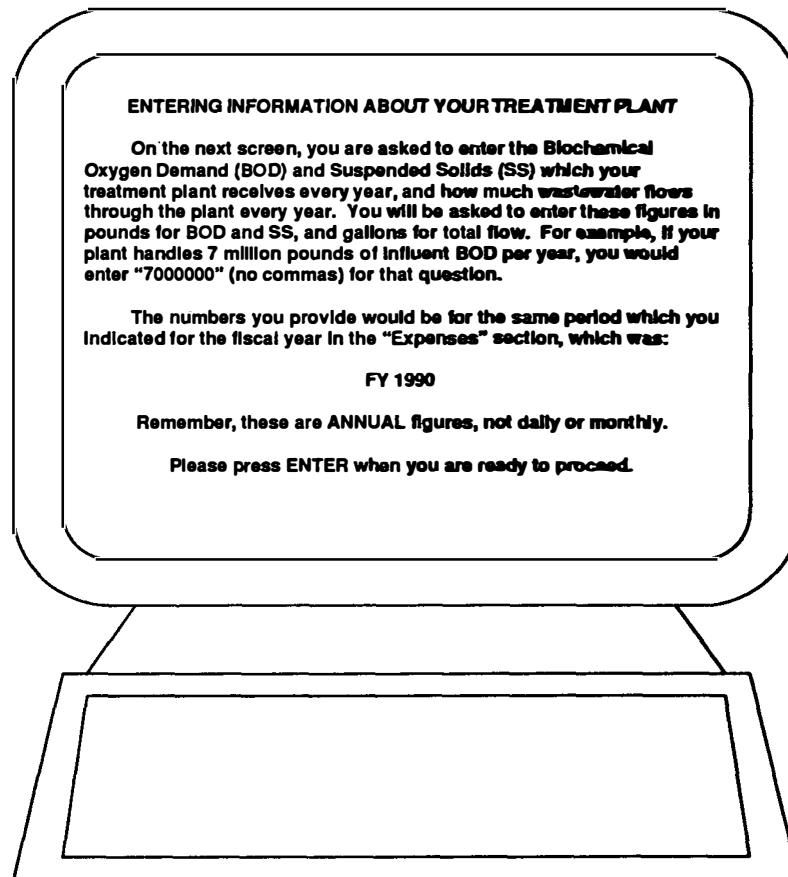
ENTERING INFORMATION ABOUT YOUR TREATMENT PLANT

On the next screen, you are asked to enter the Biochemical Oxygen Demand (BOD) and Suspended Solids (SS) which your treatment plant receives every year, and how much wastewater flows through the plant every year. You will be asked to enter these figures in pounds for BOD and SS, and gallons for total flow. For example, if your plant handles 7 million pounds of influent BOD per year, you would enter "7000000" (no commas) for that question.

The numbers you provide would be for the same period which you indicated for the fiscal year in the "Expenses" section, which was:

FY 1990

Remember, these are ANNUAL figures, not daily or monthly.

Please press ENTER when you are ready to proceed.

**Figure 15:
Instructions
for Entering
Treatment Plant
Statistics**

After reading the information screen, pressing ENTER takes you to a data entry screen (see Figure 16 on the next page) where the first item requested is *ANNUAL WASTEWATER FLOW*. This should be annual — not monthly or daily flow — and it should be in gallons — not hundreds, or thousands, or millions of gallons. It may seem cumbersome typing all those zeros, but it ensures accuracy in the rate calculations and avoids the confusion of using terms such as "MGD" or "flow in 000s." The next three items follow the same format: annual influent BOD, SS figures in pounds (not long or short tons or hundredweight), and total annual industrial wastewater flow. All four of these figures are critical to determining the user service charge basic rate and the industrial surcharge, if any. The annual total wastewater and industrial wastewater flows, BOD, and SS figures are for the same reporting period (fiscal year or other 12-month period) that was used for the *WASTEWATER OPERATIONAL EXPENSES* figures.

```
Anytown, USA
Determining User Service Charge Rates
Treatment Plant Information
(ANNUAL FIGURES)                                    FY 1990


    What was the total ANNUAL flow
    through your treatment plant
    (in gallons):                                  1,000,000,000

    How much influent BOD did your
    treatment plant receive
    (in ANNUAL pounds):                            2,500,000

    How much influent SS did your
    treatment plant receive
    (in ANNUAL pounds):                            2,200,000

    Total ANNUAL INDUSTRIAL
    WASTEWATER flow:                               100,000,000
```

**Figure 16:
Entering
Treatment
Plant Statistics
(with example
data)**

For jurisdictions that use metered water to bill wastewater operational costs, two additional items are requested at the bottom of the screen (see Figure 16a): annual metered water flow figures in gallons for residential, and commercial/institutional wastewater treatment users.

```
    Total ANNUAL RESIDENTIAL
    METERED WATER flow:                            750,000,000

    Total ANNUAL
    COMMERCIAL/INSTITUTIONAL
    METERED WATER flow:                            50,000,000

    Total METERED WATER FLOW                       900,000,000
```

**Figure 16a:
Entering
Metered Water
Flow (with
example data)**

RECOMMENDED USER SERVICE CHARGE RATES

The last step in the program is the actual calculation of the basic user service charge per 1,000 gallons of wastewater treated, and an industrial surcharge per 1,000 gallons, if required. The resulting information is placed, for metered water systems, in a table that compares typical wastewater service charge bills under existing rates and the new recommended rate, including any industrial surcharges (see Figure 17).
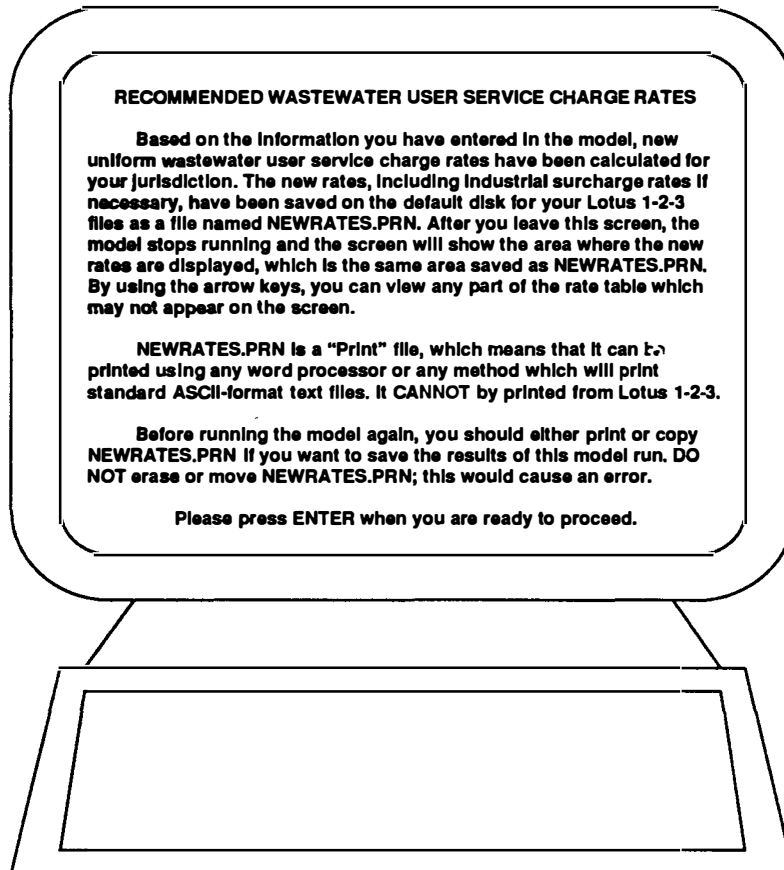
Anytown, USA
Determining User Service Charge Rates
New Wastewater Rates Table - METERED WATER

Rates per 1,000 gallons treated

User Type & Gallons Used	Current Rate per 1,000G	New Rate per 1,000G	New Monthly Bill
Residential, Commercial and Institutional			
3,000	$2.00	$2.31	$ 6.92
5,000	1.90	2.31	11.53
Industrial			
3,000	$2.00	$4.38	$13.13
5,000	1.90	4.38	21.89

Figure 17: Recommended Rates - Metered Systems (with example data)

For unmetered systems, the results are presented on text screens (see Figures 18 and 19) containing the new basic service charge rate, the industrial service charge rate including any surcharge, and estimates of bills for typical residential and commercial users.

RECOMMENDED WASTEWATER USER SERVICE CHARGE RATES

Based on the Information you have entered in the model, new uniform wastewater user service charge rates have been calculated for your jurisdiction. The new rates, including industrial surcharge rates if necessary, have been saved on the default disk for your Lotus 1-2-3 files as a file named NEWRATES.PRN. After you leave this screen, the model stops running and the screen will show the area where the new rates are displayed, which is the same area saved as NEWRATES.PRN. By using the arrow keys, you can view any part of the rate table which may not appear on the screen.

NEWRATES.PRN is a "Print" file, which means that it can be printed using any word processor or any method which will print standard ASCII-format text files. It CANNOT by printed from Lotus 1-2-3.

Before running the model again, you should either print or copy NEWRATES.PRN if you want to save the results of this model run. DO NOT erase or move NEWRATES.PRN; this would cause an error.

Please press ENTER when you are ready to proceed.

Figure 18: Recommended Wastewater User Service Charge Rates

```
Anytown, USA
Determining Wastewater User Service Charge Rates
New Wastewater Rates Table - UNMETERED WATER

The new wastewater user charge for residential customers at the rate of
$2.08 per 1,000 gallons results in a "flat rate" monthly bill for a
residential customer of:

                                              $ 11.64


The new wastewater "flat rate" monthly bills for other users are as
follows:
Apartments (1&2 bedroom):                     $  8.73
Apartments (3+ bedrooms):                     $ 11.64
Restaurants and Taverns:                      $116.39
Commercial/Institutional:                     $ 29.10

The new wastewater user charge rate for industrial customers,
including any surcharge:

                     $3.94 per 1,000 gallons
```

**Figure 19:
Recommended
Rates -
Unmetered
Systems (with
example data)**

The recommended new rates and the information you entered into the program is placed in a text file named **NEWRATES.PRN**, which is saved to the default directory for your *Lotus 1-2-3* worksheet files. This is a standard ASCII text file which can be printed with any word processor or any other software that can print ASCII files.

PRINTING FROM *WORDPERFECT 5.0* OR *5.1*

To print **NEWRATES.PRN** with *WordPerfect 5.0* or *5.1*, start *WordPerfect* the way you normally would, press <F5> *List Files*, and type in the full name of the directory where **NEWRATES.PRN** was saved, which should be the default directory for your *LOTUS 1-2-3* files, such as C:\123 or C:\123\FILES or C:\LOTUS, etc. Find **NEWRATES.PRN** in the list of files, highlight it and press <1> or <R> to retrieve the file just as you would a normal *WordPerfect* document. Alternatively, press <SHIFT> <F10> *Retrieve,* and type in the full directory path and name of the file, and press ENTER. The file will be converted to *WordPerfect* format as it is retrieved. You will want to edit the file before printing because it will contain extra blank lines at the beginning, at one location in the middle of the first page, and at the end of the text. You may also need to adjust the margins and/or type size.

PRINTING FROM *MICROSOFT WORD*

To print **NEWRATES.PRN** with *Microsoft Word,* start *Word* the way you normally would and select TRANSFER and then LOAD. Next type the full path and name of the file (e.g. C:\123\NEWRATES.PRN) and press ENTER. You cannot use the <F1> key to list files in LOAD because **NEWRATES.PRN** doesn't end in .DOC like a standard *Word* document. The file will be converted to *Word* format as it is retrieved. You will want to edit the file before printing because it will contain extra blank lines at the beginning, at one location in the middle of the first page, and at the end of the text. You may also need to adjust the margins and/or type size.

PRINTING FROM IBM *DOS* OR *MS-DOS*

To print **NEWRATES.PRN** directly from *DOS,* leave *Lotus 1-2-3* or any other application and get to a *DOS* prompt (C:>, A:>, etc.). Make sure you are in the directory which contains your complete copy of *DOS.* On a hard disk system, this will usually be C:\DOS or C:\BIN or sometimes just C:\ if you keep *DOS* in your root directory.

Type *Print* [drive][path]\NEWRATES.PRN, and press ENTER. Drive is the letter of the drive where the **NEWRATES.PRN** file is saved, and path is the directory or subdirectory where it is stored. For example, *Print* C:\LOTUS\FILES\NEWRATES.PRN. *DOS* will respond with a question: "Name of list device [PRN]:." PRN is the default destination for the file, and represents the printer attached to your computer, or the first printer (LPT1 in *DOS* parlance) attached to your network. If you want to print the file to any other port or device (LPT2, COM1, COM2, etc.) you should type it in here. Otherwise, just press ENTER and **NEWRATES.PRN** will print on the printer attached to your computer's parallel printer port.

RE-STARTING THE PROGRAM

If you want to see the effect of changing the expenses, revenues, or other variables on your wastewater rates, you can do this by re-starting the program from the beginning. The results of the program run you just completed **(NEWRATES.PRN)** should be viewed and printed before running the program using different assumptions because the initial results will be replaced in that file by new results.

How the Program Works and Calculating New Rates Manually

The *Lotus 1-2-3* program which calculates your wastewater user service charges is designed to minimize the time and effort required for this task. If you wish to gain a more complete understanding of the program, the following worksheet describes how the program calculates the user service charge rates. You can use the step-by-step worksheet to manually calculate new user rates if you don't have access to an IBM-compatible computer with *Lotus 1-2-3*.

If you meter fresh water, fill in items 1 through 4a.
If you don't meter fresh water, enter only items 3 and 4a.

Annual Residential Metered Water Flow (gallons) _____ 1

Annual Commercial/Institutional Metered Water Flow (gallons) _____ 2

Annual Industrial Metered Water Flow or Wastewater Flow (gallons) _____ 3

    Total Annual Metered Water Flow (1+2+3) _____ 4

    Total Annual Wastewater Flow _____ 4a

If you don't meter fresh water, fill in Items 5 - 11.

Type of Unit	Number of Units	EDUs per unit	Total EDUs (Units x EDUs per)	
Single family residences	_____	1.00	_____	5
Apartments (1-2 bedrooms)	_____	0.75	_____	6
Apartments (3+ bedrooms)	_____	1.00	_____	7
Commercial/Institutional	_____	2.50	_____	8
Restaurants and taverns	_____	10.00	_____	9
Industries	_____			
Grand Total EDUs (5+6+7+8+9)			_____	10

Non-Industrial Wastewater Flow
[Item 4a *minus* Item 3] _____ 11

For both metered and unmetered systems, fill in Items 12 - 19, and 20 - 23 or 26 - 32.

Total Annual Influent BOD (pounds) _____ 12

Calculate Normal Annual Influent BOD (pounds)
[Item 4a *times* .002294 pounds per gallon] _____ 13

Calculate Excess BOD
[Item 12 *minus* Item 13] If Item 12 is less than Item 13, enter 0. _____ 14

Percentage Excess BOD
[(Item 14 *divided by* Item 13) x 100] _____ 15

Total Annual Influent SS (pounds) _____ 16

Calculate Normal Annual Influent SS (pounds)
[Item 4a *times* .002294 pounds per gallon] _____ 17

Calculate Excess SS
[Item 1t *minus* Item 17] If Item 16 is less than Item 17, enter 0. _____ 18

Percentage Excess SS
[(Item 18 *divided by* Item 17) *times* 100] _____ 19

If both Items 15 and 19 equal zero, then complete Items 20 through 23 and the appropriate metered item (24) or unmetered items (25 through 25e).

Total Expenses (see pages 11-16) _____ 20

Other Revenue (see pages 17-18) _____ 21

Net Expenses [Item 20 *minus* Item 21] _____ 22

1,000s of Gallons Wastewater [Item 4a *divided by* 1,000] _____ 23

Metered Water

Actual Wastewater Rate (per 1,000 gallons)
[Item 22 *divided by* Item 23] _____ 24

New User Service Charge Rate (per 1,000 gallons)
[Item 24 *times* (Item 4a *divided by* Item 4)] _____ 24a

Unmetered Water

New User Service Charge Rate (per 1,000 gallons)
[Item 22 *divided by* Item 23]   _____ 25

    Residential, per month
    [(((Item 11 *divided by* 12,000) *divided by* Item 10)
    times Item 25]   _____ 25a

    Apartments, 1-2 bedroom, per month
    [Item 25a *times* 0.75]   _____ 25b

    Apartments, 3+ bedrooms, per month)
    [Item 25a *times* 1.00]   _____ 25c

    Commercial/Institutional, per month
    [Item 25a *times* 2.50]   _____ 25d

    Restaurants/Taverns, per month
    [Item 25a *times* 10.00]   _____ 25e

If either item 15 or 19 is greater than zero, then complete Items 26 through 32 and the appropriate metered items (33 through 34b) or unmetered items (35 through 36a).

Total Expenses (see pages 11-16)   _____ 26

Other Revenue (see pages 17-18)   _____ 27

Net Expenses [Item 26 *minus* Item 27]   _____ 28

1,000s of Gallons Wastewater [Item 4a *divided by* 1,000]   _____ 29

Enter Item 15 or 19, whichever is greater   _____% 30

Portion of Treatment Costs Attributable to
Normal Strength Wastewater
[100 *divided by* (100 *plus* Item 30)]   _____ 31

Portion of Treatment Costs
Attributable to Excess BOD or SS
[Item 30 *divided by* (100 *plus* Item 30)]   _____ 32

Metered Water

Actual Wastewater Rate (per 1,000 gallons)
[(Item 28 *times* Item 31) *divided by* Item 29] _____ 33

New User Service Charge Rate (per 1,000 gallons)
[Item 33 *times* (Item 4a *divided by* Item 4)] _____ 33a

Actual Industrial Wastewater
Surcharge Rate (per 1,000 gallons)
[(Item 28 *times* Item 32) *divided by* (Item 3 *divided by* 1,000)] _____ 34

New Industrial Wastewater
Surcharge Rate (per 1,000 gallons)
[Item 34 *times* (Item 4a *divided by* Item 4)] _____ 34a

Total New Industrial User Service Charge Rate
(per 1,000 gallons) [Item 33a *plus* Item 34a] _____ 34b

Unmetered Water

New User Service Charge Rate (per 1,000 gallons)
[(Item 28 *times* Item 31) *divided by* Item 29] _____ 35

> Residential, per month
> [((Item 11 *divided by* 12,000) *divided by* Item 10)
> *times* Item 35] _____ 35a

> Apartments, 1-2 bedroom, per month
> [Item 35a *times* 0.75] _____ 35b

> Apartments, 3+ bedrooms, per month
> [Item 35a *times* 1.00] _____ 35c

> Commercial/Institutional, per month
> [Item 35a *times* 2.50] _____ 35d

> Restaurants/Taverns, per month
> [Item 35a *times* 10.00] _____ 35e

New Industrial Wastewater
Surcharge Rate (per 1,000 gallons)
[(Item 28 *times* Item 32) *divided by* (Item 3 *divided by* 1,000)] _____ 36

Total New Industrial User Service Charge Rate
(per 1,000 gallons) [Item 35 *plus* Item 36] _____ 36a

ACKNOWLEDGMENTS