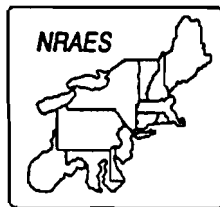


MILK HAULING COST ANALYSIS was originally developed by S. Payson, W. Wasserman, and W. Lesser as a joint project of Cornell University and the Agricultural Cooperative Service, U.S.D.A.

VERSION 2.0 was developed by J. Pratt, W. Wasserman, and S. Terise as a joint project of Cornell University and the Agricultural Cooperative Service, U.S.D.A.

Distributed with permission by the
Northeast Regional Agricultural Engineering Service (NRAES)



It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age or handicap. The University is committed to the maintenance of affirmative action programs which will assure the continuation of such equality of opportunity.

DISCLAIMER

Although these templates have been tested and the documentation reviewed, it is not possible to completely eliminate the possibility that errors still exist. Nor is it possible for NRAES or the authors to prevent you, the user, from modifying the formulas or text inadvertently or intentionally in such a way as to calculate incorrect results. Even if the results are calculated correctly, the assumptions of the analysis may limit their applicability to any particular decision.

THEREFORE, the template and documentation are provided on an "as is" basis. No warranty or representation, either expressed or implied, is made by NRAES with respect to this template, its quality, performance, merchantability, or fitness for a particular purpose. You, the user, assume the entire risk as to its quality and performance.

NOTE ON DISTRIBUTION

This material was prepared at the Department of Agricultural, Resource, and Managerial Economics, Cornell University, under contract to the Agricultural Cooperative Service, U.S. Department of Agriculture (#43-3J31-3-0007). The manual and program which are being distributed by the Cornell Department of Agricultural, Resource, and Managerial Economics should be considered the property of the Agricultural Cooperative Service. The material is not copyrighted and may be reproduced legally.

Every reasonable effort has been made to ensure that this version of the Milk Hauling Cost Analysis Program is correct both computationally and conceptually. However, no guarantee is offered that it is error-free and appropriate for the purposes to which it is intended or for any other use. Errors and limitations which become apparent will be investigated. However, no guarantee is offered that corrections can or will be made. Comments and inquiries should be addressed to:

James E. Pratt
ARME Dept.
Cornell University
Warren Hall
Ithaca, NY 14853-7801

Please address correspondence about program availability and cost to:

NRAES
Cornell University
Riley-Robb Hall
Ithaca, NY 14853-5701

The program and manual were prepared by James E. Pratt, working with Walter Wasserman and Sharon Trerise. Technical assistance with the manual preparation was provided by Wendy Barrett and editorial assistance was provided by Marcia Mogelonsky.

TABLE OF CONTENTS

	<u>page</u>
Note on Distribution	ii
Chapter 1 - Introduction	1
Program Purpose	1
Program Overview	2
Chapter 2 - Installation and General Guidelines	4
Installation	4
Hard disk installation	4
Floppy disk installation	4
Starting the Program	4
Program was Installed on Hard Disk	4
Program running on Floppy Disk	5
General Guidelines for Program Operation	5
Function keys	5
Help text	6
Help boxes	6
On-line help	6
Windows	6
Full-screen data entry and editing	7
Chapter 3 - Utilities	8
Print List of Trucks	8
Delete Truck	8
Delete a Composite Route	8
Specify Data Group Name	9
Specify Data Drive	10
Specify Units of Measure	10
Set Screen Colors	10
Return to Main Menu	11
Chapter 4 - Using the Program	12
The Main Menu	12
Calculating Hauling Costs	13
General guidelines for inputting data	16
Screen 1: General route data	16
Screen 2: Driver data	18
Screen 3: Fixed costs	18
Screen 4: Variable costs	24
Screen 5: Hauling cost analysis	25
Calculating Composite Route Costs	27
Creating your own composite route	28
Calculating Pool Payments	29

CHAPTER 1 - INTRODUCTION

Version 2.0

The Milk Hauling Cost Analysis computer program was first written in 1985 as part of a research agreement (#58-3531-3-0022) with the Agricultural Cooperative Service (ACS) of the United States Department of Agriculture. In its original form, the program was written in an interpreted BASIC computer language and was intended for use on IBM-PC's and compatibles with double floppy disk drives. Over the years, advances in computer technology have resulted in more and more DOS based machines which could not run the original version. As part of a renewed research agreement (#43-3J31-3-0007), the ACS sponsored an effort to make the program compatible with the newer generation of computers and to modify and enhance the program to be more in-line with modern user interfaces. Computationally, there have been no changes to the way in which the program does its cost analysis. **If you enter the same route and cost items in the new format which you entered in the previous version, you will obtain identical cost analysis results.** Changes which were made include a full-screen interface versus the line-mode editing of the previous version, on-line help screens for data entry items, a printer function so that you won't have to print screens, subdirectory and disk drive utilities, and a screen color management utility. All of these enhancements were intended to make the program easier to use and more flexible in order to accommodate current and future milk hauling situations.

Once the new version of the program has been installed on your computer, user's of the previous version of the program will encounter the changes immediately. Please be patient and follow the data entry screens carefully, because cost items are arranged in a new order. New user's should use the on-line help to clarify the meaning of any cost or route related data item which is not clear to them.

Program Purpose

The U.S. dairy industry is vitally dependent on an efficient and competitive transportation system for assembling and transporting milk from farms to processing plants, for performing interplant transfers of milk and milk products, and for the distribution of processed dairy products from plants to points of final demand. In many parts of the country, these operations are carried-out by independent contract haulers and transporters who own and operate their own vehicles. The independent owner-operator has generally proven the most economical and reliable option for accomplishing many milk industry transportation functions. This program is tailored for the milk assembly function and is intended to assist in 1) the determination and analysis of hauling costs for individual vehicles or multi-vehicle operations and 2) the estimation of equitable hauling rates for producers and haulers based on the prevailing hauling cost structure.

Program Overview

The rate paid to haulers for bulk milk assembly should, ideally, be negotiated on a route-by-route basis to accurately reflect the existing cost situation. Typically, however, a rate change is initiated by an individual or small group of haulers and justified on the basis of an increase in labor, fuel, or other costs. Because most cost increases affect all haulers, what began as a request for a rate adjustment by one or a few haulers becomes a concurrent request by all haulers. If the handler agrees to a rate increase while lacking specific information about the effect of the cost increase on individual routes, the increase is often applied as a flat, across-the-board adjustment. Such uniform rate changes in assembly systems with highly variable route conditions tend to favor some haulers over others. As a result, some assembly routes can be substantially more profitable than others. A detailed knowledge and application of assembly costs is essential for operating an efficient system.

The owner-operator of a small bulk milk assembly firm, who drives and maintains his own vehicles, has little time available to analyze his business. A quick method for estimating changing route costs should prove to be an essential management tool during periods of rapidly changing cost conditions or for seasonally reorganizing routes. The computer program described in this publication offers an easy method for developing a cost profile for an individual vehicle or group of vehicles, based on the route and cost characteristics attributable to that vehicle(s). It also allows for a quick analysis of how changes in individual cost items affect overall operating costs. The resultant estimates are useful to both handlers and haulers. Handlers may use the estimates in planning for anticipated future cost changes. Haulers must keep track of costs to be sure that rates are adequate to cover operating expenses and will permit the accumulation of capital for timely replacement of the fleet. Together, estimates provide a common basic framework under which rate negotiations can take place.

The cost estimates used in the program are developed using economic engineering techniques to combine individual cost items, from fuel and tires to vehicle purchase price and maintenance, into uniform operating costs per unit of product, time, and distance. These estimates may be classified as fixed and variable cost components. To make the calculations speedy and accurate, DOS-based micro-computers are used. With their assistance, the effect of a fuel price change on total cost per mile, for example, can be determined within seconds.

The program uses an abbreviated form of data entry by averaging day-to-day and seasonal route variability. The reliability of these estimates is, needless to say, directly related to the accuracy of the input data. Care should be exercised in developing the inputs so they are truly representative of the hauling situation being analyzed. The estimates include actual vehicle use costs only; other factors such as returns to management and risk are not included. The appropriate payments for management and risk vary widely from firm to firm such that no rule-of-thumb figures can be established. Allowances for these types of factors and other items specific to

particular haulers, such as the cost of additional services provided on an occasional basis, should be established during negotiations.

In past years, it was common for rates to reflect the hauler's out-of-pocket costs plus a premium for management and risk. This meant that haulers were compensated based on what they actually paid for their vehicles. During periods of relatively stable prices, this approach proved adequate, but problems appeared when replacement vehicle prices started moving up sharply. The hauler who had to replace his vehicle with a much more expensive new one found that he had not accumulated reserves to use for the purchase. One solution to this situation would be to raise the rate whenever a new truck is purchased. This would, however, not be equitable and would provide a strong incentive for all haulers to buy new equipment! A second and preferable procedure is to provide on-going payments with which the hauler may build some equity for the time when a replacement must be purchased. A reasonable improvement in equity should be assured if the rates are periodically adjusted to reflect the "current replacement" of a similar vehicle. This "replacement cost" approach is used in this bulletin. It will generally give a good approximation to the long-term costs faced by a hauler, but may not be appropriate in some cases, such as a route which would not be economical once the present vehicle wears out.¹

Data requirements for the program are substantial. In some cases a considerable initial effort will be required to establish a system for collecting and updating the necessary information. If it is done properly, this data collection procedure should lead to better record keeping and an improved understanding of the hauling system and the major factors influencing costs. If not, the estimates provided by the program will be inaccurate and misleading.

¹For a description, see D.R. Lee, et al., "A Cost-Based Rate System for Bulk Milk Assembly," Cornell University, Department of Agricultural Economics, A.E. Res. 85-9, April 1985.

Program Running of Floppy Disk

1. Insert the Milk Hauling Analysis Program disk in your floppy disk drive. Be sure that disk drive is your default drive, ie. if the disk is in Drive A, you should have an A> prompt on your screen.
2. Type: HAULING and press <enter> .

GENERAL GUIDELINES FOR PROGRAM OPERATION

This version of the Milk Hauling Cost Analysis program has a number of special features programmed into it to make it more efficient to use. The following pages describe the features and their use.

Function Keys

To make the program easier and faster to operate, the function keys on your keyboard have been defined for specific tasks within the program. Each screen displays a row of ten boxes along the bottom of the screen, associated with the first ten function keys on your keyboard, [F1] through [F10]. When the name of a Function Key appears in one of the boxes, it means that key is active and can be used in that particular screen.

For the most part, the function keys perform the same tasks throughout the program. A Help Box appears at the bottom of most screens containing information about how to proceed from each screen using the function keys.

The role of each function key is described below.

[F1]		not used
[F2]	[SELECT]	Displays a list of items to select from to fill in the data item at your current cursor position.
[F3]	[HELP]	Displays a box containing detailed information about the data item at your current cursor position.
[F4]	[INSERT]	Insert an item in a list or sequence at your current cursor position.
[F5]	[REMOVE]	Remove the item at your current cursor position from the list or sequence.
[F6]	[CANCEL]	Ignore any changes made while in the current screen and return to the previous screen.

[F7]	[GoBACK]	Backup to the previous screen. Any changes made in the current screen are saved.
[F8]	[Go ON]	Proceed to the next logical screen. Any data entries or changes made in the current screen are saved.
[F9]	[MENU]	Jump to the Main Menu of the program.
[F10]	[EXIT]	Exit the program. (Only available from the Main Menu).

Help Text

Help information is available throughout the program.

Help Boxes appear at the bottom of each data input screen. They provide information on how to use the Function Keys to proceed from the current screen. They may contain messages indicating errors that have occurred in data entry and hints on how to correct the problem.

On-line HELP is accessible within the program. General HELP information covering use of the function keys, selecting items from a menu, etc. is available from selecting the Help option from the Main Menu. Specific HELP information about each data entry item on data entry screens is available by pressing the [F3], [HELP] function key while your cursor is positioned on the data item in question. A window will appear indicating what type of information is needed and/or what data is valid for that particular field.

From any Field Help Window, you can view the General Help Index if more information is required. Using the TAB key, move the cursor to the right to (Index), then press <enter>. The window that appears lists the same items as the Help Menu from Main Menu. Select the needed topic and press <enter>. After reviewing your topic, press <enter> to return to the input screen or move the cursor to (Index), then press <enter> to return to the Help Index Menu.

Windows

Windows are used in a number of areas of the program. The program may present a list window which allows you to select one specific item in the list. The Main Menu is an example of a list selection window. A list window includes the following features:

HIGHLIGHT BAR: This is used to indicate the item you wish to select. To move the Highlight Bar, press the up or down ARROW keys to highlight the item you want, then press <enter>.

OPTION BUTTON: You will also see Option Buttons at the bottom of the Window. A line cursor will be blinking under the item currently selected. You can press <enter> to select the current item highlighted or use the TAB key to move the selection cursor to the other button.

SCROLL REFERENCE BAR: This shows the window's relative position in relation to all information or options available for that window. To view other options or information, you can use the directional up or down ARROW keys or you may use the Page Up or Page Down keys. The block on the Scroll Reference Bar will automatically move, indicating how far you are from the top or bottom of the available options or information.

Full Screen Data Entry and Editing

This feature allows the user to move around the screen to enter or edit data. The cursor, which appears on the screen as a blinking half-block, will indicate where to enter data. You can move the cursor to the next data field using the <enter> or [TAB] key.

The following keys are used for data entry and editing:

ARROW keys are used to move the cursor around on the screen.

TAB key is used to move the cursor forward to the next data field(s) on the screen.

SHIFT and TAB key used simultaneously are used to move the cursor backward to the previous data field(s) on the screen.

BACKSPACE key allows you to erase or change old data within a data entry field.

ENTER key should be pressed after each field is answered to proceed to the next field.

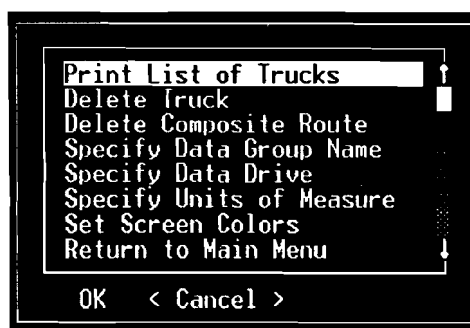
IMPORTANT NOTE: Re-entering/Correcting Numbers: Whenever you have mis-typed a number, you should re-enter the entire number and press <enter>.

The results of the program are, of course, only as good as the data entered by the user. Careful scrutiny of data inputs will help to assure that the program results are valid.

CHAPTER 3 - UTILITIES

The Utilities option of the Main Menu displays the Utilities Menu, which consists of the following items:

Utilities



Each utilities menu selection is described in detail below.

Print List of Trucks

Select this item to produce a printout of all truck names in the currently selected Data Group. See the description below of a Data Group.

Note: Be sure to have your printer turned on and ready before selecting this menu item.

Delete Truck

Select this item to delete the data for a particular truck from your stored data file. When this item is selected, a list of all trucks in the current Data Group is displayed. Select the name of the truck you wish to delete by using the Up and Down arrow keys to highlight the truck name and press <enter>. A message appears to ask if you are sure you wish to delete the selected truck. If so, press <enter>. If you do not wish to delete all data for the truck selected or you selected the incorrect truck, press the [TAB] key to move the cursor to <Cancel>, then press <enter>.

Delete a Composite Route

Select this item to delete a particular composite route from your stored data file. When this item is selected, a list of all composite routes in the current Data Group is displayed. Select the name of the composite route you wish to delete by using the Up and Down arrow keys to highlight the route name and press <enter>. A message appears to ask if you are sure you wish to delete the selected route. If so, press <enter>. If you do not wish to delete the data for the route selected or you selected the incorrect route, press the [TAB] key to move the cursor to <Cancel>, then press <enter>.

Specify Data Group Name

By using Data Groups, you have the option of organizing truck data into logical groupings. Each Data Group represents a separate data file containing all data for all the trucks in that group. Likewise a file exists which stores data for all composite routes created using data from trucks in the same Data Group.

HAULING is the default Data Group name the program uses unless you specify another name. For each Data Group defined, two data files are created using the Data Group Name as the first part of the filename. The following files would be created for a Data Group with the name "Westville":

WESTVILLE.TRK	(file containing all individual truck data)
WESTVILLE.CMP	(file containing all composite route data)

For those of you who will be entering and storing large amounts of data, i.e., data for a large number of routes, you might consider backing up your route information. This can be done by copying all or selected .TRK and .CMP files from the \HAUL20\ subdirectory to a floppy disk. Should it become necessary to re-install the program, simply copy the .TRK and .CMP files from the back-up floppy into the newly-installed \HAUL20\ subdirectory. Of course, these back-up files will only reflect the route and cost data at the time they were created. Back up all your data files--often.

An advantage of using Data Groups to group trucks and composite routes is to avoid having a very large number of trucks to select from each time you wish to edit data for a particular truck or recalculate summary information for a truck or composite route. For example, if you are calculating costs for more than one hauler, you may want to group all truck data for each hauler in a Data Group and name that Group with the Hauler's name, for example, Jones or Westville.

A disadvantage of using Data Groups is that you cannot define a composite route using data for trucks that have already been entered and stored in different Data Groups.

If you wish to change the current Data Group, select "Specify Data Group Name" from the Utilities menu. The program searches for all Data Groups on the current Data Drive and lists them in a box on the screen. Use the Up and Down arrow keys to select the Data Group you wish to access and press <enter>.

If you are creating a New Data Group, select "Add New Name" and press <enter>. You will be prompted to enter the name for the new data group. The name can be up to 8 characters in length, but cannot include blank spaces. Type in the new name and press <enter>. You will return to the Utilities menu.

After selecting a new Data Group Name or creating a new Data Group, all truck data entered and all composite routes created will be stored together under that Data Group Name.

Specify Data Drive

Select this option from the Utilities menu if you will be storing data files on a drive other than the current default drive. You will be prompted to enter the letter representing the drive you wish to use for data. Next you will be prompted to select a Data Group Name. HAULING is the default Data Group Name. If you are unsure how to respond, select HAULING with the highlight bar and press <enter>. See the description above, Specify Data Group Name, for further discussion on using Data Groups.

If you choose to add a new Data Group at this time, select "Add New Name" and press <enter>. Type in a name to represent the data you will be entering. The name can be up to 8 characters in length, but cannot contain any blank spaces. For example: JONES or AKRON-OH.

Press <enter> to return to the Utilities menu.

Specify Units of Measure

With this menu selection, you have the option of specifying either English (miles, pounds, etc.) or Metric (kilometers, kilograms, etc.) units. Text describing the units of measure on data entry and output screens will reflect your selection.

Highlight the desired unit of measure and press <enter>. To return to the Utilities Menu without changing the current setting, [TAB] to <Cancel> and press <enter>.

Set Screen Colors

Depending on the type of monitor you have, you may want to alter the colors used for displaying various parts of the data entry screens. This may be especially important for monochrome screens if some text appears very faint or illegible. Select "Set Screen Colors" from the Utilities Menu. Your cursor is positioned in a data entry field. Type a few characters to see how the data looks when entered. Use the function keys to scroll through the color options for each of the following settings:

[F1]	numbers or characters in a data entry field
[F3]	text on the screen (screen foreground)
[F4]	Function Key Box text (Function Key foreground)
[F5]	background of Function Key Boxes
[F6]	Screen background

When satisfied with the settings, press [F10] to Exit back to the Utilities Menu.

Return to Main Menu

Select this item from the Utilities Menu to return to the Main Menu of the Cornell Hauling Analysis program.

CHAPTER 4 - USING THE PROGRAM

After the program has been loaded, you may run the Milk Hauling Cost Analysis using the data you have on hand. We suggest, however, that you run through the program first with the test case we have included as part of the program. All the data boxes in the test case are already filled-in with the information needed to run a sample analysis. You can follow along with the test program on a screen-by-screen basis from beginning to end to see all the features the program provides.

When you are familiar with the test case, you may decide to repeat the example and replace the numbers given with ones for a particular route of your own. Once you have completed the analysis, the program allows you to save this modified route data using a new file name. You may also leave the test program at any point and start using the program with your own data.

THE MAIN MENU

This section briefly explains the options available to you from the main menu. It serves as a brief introduction to the functions of the program.

If the program was installed correctly using the instructions provided above (page 4), a title screen or logo screen (a screen with the title of the program) will be displayed when you start the program (Figure 1). This screen has no other purpose than to let you know you are in the program, and you can move on from it by typing any key, for example the space key. You should now see a new screen in front of you.

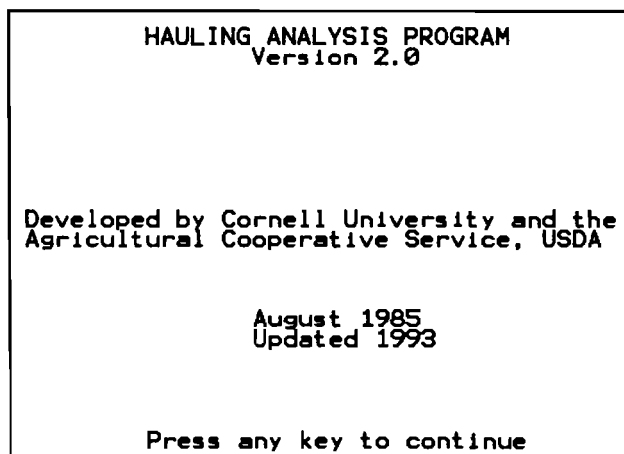


Figure 1

Following the logo screen is the main menu screen. This screen lists the major options or functions of the program available to you at this time (Figure 2). A brief description of the options you can access from the main menu is provided below.



Figure 2

- The first option allows you to calculate the hauling costs of any route by entering relevant information in a series of four different input screens.

The program asks you to fill-in daily route averages, driver data, fixed costs, and variable costs, and then presents you with a hauling cost analysis. You will be using

this option to create files for each of your trucks and to update information on truck routes. It should be noted that the terms truck and routes are used somewhat interchangeably throughout this manual, however it needs to be understood that the cost analysis is based on annual truck costs. Whereas many trucks operate only one route per day, there are numerous situations where trucks run multiple routes over a period of one or two days. A route is generally considered to encompass the time and distance over which a load of milk is assembled and delivered to a plant. A route may or may not include the trip home, depending on whether another route is begun upon leaving the plant. All routes that are run over a two day period should be included in analyzing daily truck costs.

- The second option calculates composite route costs. A composite route is an average of any number of truck data files. You select the routes that make-up the composite route; the program then recalculates all the information in every data entry and provides an average of all the figures provided for each data entry. For example, if you chose two routes to make up your composite route, one of which had a route of 100 miles and the other of which had a route of 120 miles, the composite route data entry for average miles would be 110 miles.

- The third option allows you to calculate pool payments, the estimated payments to producers and haulers for the composite route based on average costs of the composite route.

- The fourth option presents you with the utilities menu discussed above (page 8), and the fifth option, the Help Index, allows you to obtain further information, as described above (page 6).

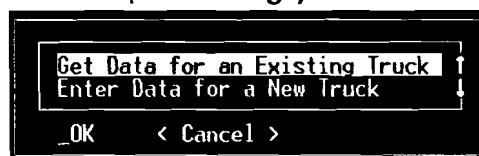
- The final option allows you to exit the system.

The following sections further explain these various options and how to use them.

CALCULATING HAULING COSTS

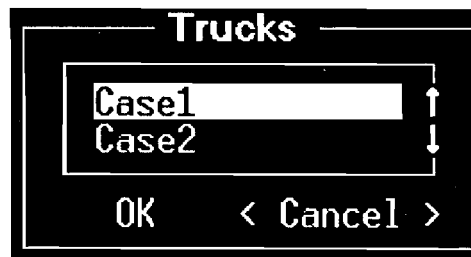
This option allows you to calculate the hauling costs associated with a particular truck and route. The information includes the route characteristics as well as the truck and driver costs. To select this option, highlight it on the main menu, using the Up or Down arrow key, and press <enter> .

You will then see a screen presenting you with two options:



Select the option you wish by using the Up or Down arrow, and press <enter> .

If you are a new user of the program, it is suggested that you work through the test data included with the program. To see the test data, select the first option (existing truck). The next screen presents a menu of existing trucks, including Case1 -- which is the truck used in the test data. In order to exhibit uniformity in calculations between Version 1.0 and Version 2.0, we have kept the input costs for Case1 the same as in Version 1.0. Because Version 1.0 was distributed in 1985, these numbers do not represent current costs.



Once you have selected Case1, press <enter> to move to the next screen. This screen, General Route Data, is already filled-in. Look at the material provided to get an idea of the type of data you will have to input when you use the program on your own. Note as well the instructions at the bottom of the screen.

To move to the next screen, press [F8]. The next screen asks for driver data. When you have finished looking at this screen, which is already filled-in with the information for Case1, press [F8] to move to the Fixed Costs screen, and [F8] again to move to the Variable Costs screen. Press [F8] again to move to the Hauling Cost Analysis screen, which provides a detailed computation of hauling costs based on information provided in the previous four screens.

If you have used the program before, you may wish to select the second option (Enter Data for a New Truck). You will then be asked to provide the name of the new truck, after which you will be expected to enter the data for the new truck. Please note that data items are requested in a different order than in the original version of the program.

The screens which follow are the same as those provided in the test case -- except they are blank. You must provide the data needed to complete them before you leave the screen. In some cases, if the data entered appears to be inconsistent, the program may ask you to verify some details. For example, in screen 1 (General Route Data), if the figure entered for Total Route Miles does not equal the total of Transportation Miles plus Assembly Miles, a window will appear on the screen asking you whether you wish to change the numbers.

NOTE: If you are unsure of the information required for any entry, push [F3] (help screen). A window with further information regarding that entry will appear on your screen. To return to the entry line, push <enter>. For more information concerning HELP options, see page 6 above.

When you have filled-in all the options for a screen, press [F8] to move to the next screen. The data required for each entry on each screen are as follows:

NOTE: In all entries, fractions must be entered as decimals.

HAULING COST ANALYSIS DATA SHEET

TRUCK (name or #): _____ DATE (ex.: 07-14-1993): _____

GENERAL ROUTE DATA

Total Route Miles _____ mi/day	Total Operating Time _____ hr/day
Assembly Miles _____ mi/day	Assembly Time _____ hr/day
Transport Miles _____ mi/day	Transport Time _____ hr/day
CWT Delivered _____ CWT/day	Plant Time _____ hr/day
Number of Farm Stops _____ /day	
Primary Destination _____	Secondary Destination _____

DRIVER DATA

	Driver 1	Driver 2	Driver 3
Name	_____	_____	_____
Standard Wages: \$/Hr	\$ _____	\$ _____	\$ _____
OR \$/Day	\$ _____	\$ _____	\$ _____
OR \$/Week	\$ _____	\$ _____	\$ _____
Standard Hrs/day	_____	_____	_____
Fringe Benefits: \$/Hr	\$ _____	\$ _____	\$ _____
OR % of Wages	_____	_____	_____

FIXED COSTS

OWNED TRUCK OR TRACTOR		OWNED TANK OR TANK TRAILER	
Replacement Cost	\$ _____	Replacement Cost	\$ _____
Expected Life (Yrs)	_____	Expected Life (Yrs)	_____
Salvage Value	\$ _____	Salvage Value	\$ _____
LEASED TRUCK OR TRACTOR		LEASED TANK OR TANK TRAILER	
Lease Fee/Month	\$ _____	Lease Fee/Month	\$ _____
Incl. Repair & Maint. (Y/N)	_____	Incl. Repair & Maint. (Y/N)	_____
Includes Tires (Y/N)	_____	Includes Tires (Y/N)	_____
ANNUAL FIXED COSTS			
Insurance	\$ _____	Garage	\$ _____
Registration Fees	\$ _____	Office	\$ _____
Federal Highway Use Tax	\$ _____	Management	\$ _____
Interest Rate	% _____	Utilities & Heat	\$ _____
OTHER ANNUAL FIXED COSTS			
Spare Trucks	\$ _____	Other	\$ _____

VARIABLE COSTS

OWNED		ADDITIONAL LEASE CHARGES	
Ave. Cost of New Tire	\$ _____	Per Mile Fee on Truck	\$ _____
Cost of Recapped Tire	\$ _____	Per Mile Fee on Trailer	\$ _____
Ave. Life of Tire (Mi)	_____	Per Mile Fee on Tires	\$ _____
Number of Tires	_____		
TRACTOR Repair/Mile	\$ _____	Mileage/Volume Taxes/Yr	\$ _____
TRAILER Repair/Mile	\$ _____	Average Tolls/Day	\$ _____
Other Variable Costs/Yr	\$ _____	Fuel Cost Per Gallon	\$ _____
		Ave. Miles/Gallon	_____

Figure 3

NOTE: MAKING CHANGES. At any point, you may wish to change some or all of the information you have entered for any truck, either because you have made an error in entering information, or because a specific situation has changed. To make changes, go to the appropriate data screen, move the cursor to the appropriate entry by pushing <enter> or <tab> to move through the entries, and type in the change you wish to enter. Push <enter> again to leave the entry you have changed. At the end of the analysis, be sure to save your changes by selecting the appropriate choice in the "save" window.

General Guidelines for Inputting Data

Figure 3 (see previous page) represents a reproduction of a Data Input Worksheet, which will make the entering of data in the following screens easier and more accurate. (A tear-out form which you may photocopy is included at the end of this document.) Fill in a Data Input Worksheet for each truck you are adding to your data bank, then transfer the information to the appropriate entry places.

Screen 1: General Route Data. This screen (Figure 4) asks for the daily averages for the truck you are analyzing. The first entry is for daily **TOTAL ROUTE MILES**. To calculate this figure, use the total average daily miles traveled from garage to garage. In the case where more miles are traveled one day than another, total the two days and divide by two.

Ex.	Day 1	110 miles
	Day 2	170 miles
	Total	280/2 = 140 Avg. miles per day

GENERAL ROUTE DATA		TRUCK ID: Case1	
--- DAILY Averages ---			
Total Route Miles	-139 mi/day	Total Operating Time	9.6 hr/day
Assembly Miles	52 mi/day	Assembly Time	5.8 hr/day
Transport Miles	87 mi/day	Transport Time	3.8 hr/day
CWT Delivered	477 cwt/day	Plant Time	. hr/day
Number of Farm Stops	14. /day		
Primary Destination: CUBA			
Secondary Destination:			
Help Box			
Press [F7] to GoBack to the previous screen			
Press [F8] to Go On to next input screen.			
HELP	GoBACK	Go ON	MnMENU
F3	F7	F8	F9

Figure 4

In our example we are running a 139-mile route on a daily basis. To enter this value simply type 139 followed by the enter key.

The remainder of the numbers will be entered in the same way. Each time you have completed an entry, press <enter> to move to the next entry. To correct an entry, use the backspace key to move back and correct the entry. **You must correct the whole number, not just a digit of it, to change the entry successfully.**

Entry 2 is the **TOTAL OPERATING TIME**. This figure should reflect the time period from the time the truck leaves the home garage in the morning until it returns upon completion of the daily schedule. Alternate day differences should be averaged to reflect proper truck and labor usage. This is a particularly critical input for accurate allocation of fixed and labor costs. In our example, we average 9.6 hours of total operating time.

Entry 3 is **ASSEMBLY MILES**. This is similar to entry 1 except that it includes only those miles between farms where milk is being picked-up. The average number of miles driven between the first farm and the last farm considering seasonal variations on a daily basis. If assembly mileage is different on alternate days, the two days should be averaged as in the daily route mile example. In our example, the distance traveled from first farm to last farm is 52 miles and we pick-up on a daily basis; hence our daily average is 52.

Entry 4 is **ASSEMBLY TIME**. The amount of time spent on farms and driving between farms from the first stop to the last stop on a daily basis. It should include a full day's pickup and alternate day variability would need to be averaged out as in previous examples. In our example, we average 5 hours and 48 minutes (5.8 hours) from first to last farm.

Entry 5 is **TRANSPORT MILES**. This refers to the average number of miles driven from the garage to the first farm, from the last farm to the plant, and from the plant back to the garage. If the transport miles are different on alternate days, the two days should be averaged. In our example, this figure averaged 87 miles per day.

Entry 6 is **TRANSPORT TIME**. This includes the time from garage to first farm, from last farm to the plant, and from the plant back to the garage. As with transport miles, this figure should represent an average. In our example, this figure was 3.8 hours per day.

Entry 7 is **CWT DELIVERED**. This number should reflect the average daily volume of milk picked-up and delivered to plants throughout the year. Variability due to seasonal volume and number of routes should be included. Use total annual hundredweights (CWT's) divided by the number of days the analyzed route is operated annually. In our case, we pick up an average of 47,700 pounds per day, or 477 CWT's.

Entry 8 is **PLANT TIME**. This figure is used in calculating fixed cost per hour. The figure should describe the average amount of time spent waiting at the plant including pumping and washing time. This is also a management factor which may limit opportunities for improving truck productivity. If a route includes plant time, then driver standard hours should reflect this additional time spent at the plant.

Entry 9 is **NUMBER OF FARM STOPS**. The total number of farm stops on a daily basis considering alternate day and seasonal fluctuations. Use the same averaging techniques as previously. In our example, we average 14 stops per day.

You are also asked to provide the primary and secondary destinations of the truck, below these entries. This information is not used by the program for calculations but is intended to be used as a management and route identification tool. Each entry may be no longer than 8 characters.

Once you have entered the pertinent information on this screen, you should press [F8] to move to the next screen.

SCREEN 2: DRIVER DATA (Figure 5).

You may enter the wages, hours, and fringe benefits for up to three drivers on this screen. This may become necessary in situations where a truck is used on a nearly round-the-clock basis and when different wage rates or overtime become a factor. This rate should not include fringe benefits since these are accounted for separately.

DRIVER DATA		TRUCK ID: Case1		
	Driver 1	Driver 2	Driver 3	
Name	LAVE			
Standard Wages: \$/Hr.	\$ 5.5	\$	\$	
OR \$/Day	\$	\$	\$	
OR \$/Week	\$	\$	\$	
Standard hrs/day	9.6			
Fringe Benefits: \$/Hr.	\$ 2.	\$	\$	\$
OR % of Wages	%	%	%	%
Help Box				
Press [F7] to GoBack to the previous screen				
Press [F8] to Go On to next input screen				
HELP F3		GoBACK Go ON MnMENU F7 F8 F9		

Figure 5

The first entry asks you to supply the name of the first driver. It can be up to 12 characters, including spaces. You will then be asked to supply the standard wages for the first driver, either the dollar amount per hour, per day or per week. Choose only one of these three options. In our example, we provided the wages per hour (\$5.5).

The next entry asks for the hours per day worked by that driver. This refers to the daily average hours the driver spends on the given route. In our example we estimated 9.6 hours per day.

The final entry asks for the fringe benefits that driver receives, either per hour or as a percentage of his or her wages. Choose only one of these options. We selected the dollar amount per hour (\$2) in our example.

Once you have completed the information for the first driver of the vehicle, you can fill-in the data for the other driver(s), if applicable. After you have filled in all the information on this screen, press [F8].

SCREEN 3: FIXED COSTS (Figure 6).

This screen asks for information concerning costs that do not vary with route mileage. You may input information concerning the owned or leased truck or tractor and the owned or leased tank or tank trailer. For each, the information required is the same: replacement cost, expected life, and salvage cost (if owned); or lease fees/month, includes repairs and maintenance, and includes tires, if the vehicle is leased.

TRUCK OR TRACTOR		TANK OR TANK TRAILER	
IF OWNED		IF OWNED	
Replacement Cost	\$ 65000	Replacement Cost	\$ 20000
Expected Life (Yrs)	6	Expected Life (Yrs)	10
Salvage Value	\$ 16000	Salvage Value	\$ 4000
IF LEASED		IF LEASED	
Lease Fee/Month	\$	Lease Fee/Month	\$
Includes Rep & Maint (Y/N):		Includes Rep & Maint (Y/N):	
Includes Tires (Y/N):		Includes Tires (Y/N):	
ANNUAL FIXED COSTS			
Insurance	\$ 2300	Garage	\$
Registration Fees	\$ 435	Office	\$
Federal Hwy Use Taxes	\$	Management	\$
Interest Rate (%)	13.0%	Utilities & Heat	\$
Spare Trucks	\$	Other Fixed Costs	\$ 2500
Help Box			
Press [F7] to GoBack to the previous screen			
Press [F8] to Go On to next input screen			
HELP F3		GoBACK Go ON MnMENU F7 F8 F9	

Figure 6

The **REPLACEMENT COST** refers to the current cost for a new truck equivalent to the truck currently used, or the replacement cost. Trucks are available with an extremely large selection of optional equipment from engines, axles and transmissions, down to radios, air conditioners and seats. To standardize cost estimates the specifications of a serviceable truck must be agreed upon by haulers and handlers. Examples of such specifications are listed in Figures 7 and 8. With these specifications, prices can be collected from cooperating new truck dealers. In most cases fleet prices will be assumed to apply.

Truck investment costs are frequently lumpy with a large initial investment (down payment), and stream of interest and repayment costs and finally a return in the form of the salvage value (trade-in or scrap value). In order to make a non-uniform series of costs and returns comparable, they are converted to an equivalent uniform annual series of payments. In our example, a new truck would cost \$65,000; hence we typed in "65000".

NOTE: It is not necessary or even possible to type in "\$" or "," in this entry, or in any other entries requiring dollar amounts.

The **EXPECTED LIFE (YRS)** takes into account the average amount of time the truck or tank will last. As a guideline for determining truck life, we propose using a concept we call useful vehicle life (UVL).

$$UVL = \frac{\text{No. of service miles before major engine overhaul}}{\text{Avg. no. of miles driven annually}}$$

The number you use should, of course, reflect your own experience in rotating trucks. In our example, we expect to trade a truck of this type after about 6 years.

The **SALVAGE VALUE** is one of the more difficult to estimate accurately. Dealers can give a good indication of what a particular five-year-old truck is worth today. This, however, will not necessarily indicate future salvage values because new truck prices have been rising rapidly in recent years, carrying used and junk truck prices up with them. The problem of estimating future salvage values is therefore one of projecting the rate of inflation for this equipment. Individual judgment must be used. A 20% of replacement cost rule-of-thumb is being used by some individuals in the industry. In the example, we expect the truck to be worth about \$16,000 as salvage, hence we entered 16000.

The next entry is **LEASE FEE/MONTH**. This entry, and the two following ones, apply to haulers who lease their trucks. You should fill-in the appropriate cost, if your truck is leased. Truck leasing has become much more prevalent in recent years. This fee is the monthly charge for the truck chassis. In situations where the chassis and tank are leased as a unit and it is difficult to make a separate allocation, the entire monthly fee should then be entered here. The tank leasing fee should then be omitted. Also omit filling-in any other costs that are covered under the leasing fee. Since the truck being used in our example is owned, we left this value blank.

BASE SPECIFICATIONS

MAKE: FREIGHTLINER - 1994
MODEL: FLD12064ST
TYPE: T/A DIESEL CONVENTIONAL
 SET BACK FRONT AXLE

WB: 220"
BBC: 162"
CA: 104" ACTUAL
CA: 89" EFFECTIVE
GCW: UP TO 80,000#

POWER TRAIN

ENGINE: SERIES 60 - 12.7 - 355/400
TRANSMISSION: 9 SPEED OVERDRIVE
REAR AXLE: 40,000#
REAR AXLE RATIO: 4.1/1

25" DECK PLATE - RECESSED
 NEED RELEASE WATER FILTER
 SYNTHETIC LUBE FOR TRANSMISSION
 SYNTHETIC LUBE FOR REAR AXLE
 15 1/2" 2 PLATE CERAMIC CLUTCH

SUSPENSION

FRONT AXLE: 12,000#
FRONT SPRINGS: 12,000# TAPER LEAF
FRONT SHOCK ABSORBERS
REAR SPRINGS: 40,000# AIRLINER

CAB EQUIPMENT

ALUMINUM CONSTRUCTION
 RH HEATED MOTO MIRROR/LH STATIONARY
 RCCC INSTRUMENT PANEL
 ELECTRONIC TACHOMETER/SPEEDOMETER
 WARNING BUZZER & LIGHT OIL/COOLANT
 EMERGENCY FLASHER SYSTEM
 INTEGRAL, UNDER DASH AIR CONDITIONER,
 1 FOUR SPEED FAN W/OUTLETS IN DASH,
 FLOOR HEAT OUTLETS, & WINDOW DEFROSTING
 DUAL HEAD LAMPS, RECTANGULAR, HALOGEN
 COMBINATION STOP, TAIL/BACK UP LIGHTS
 TURN SIGNALS
 AERODYNAMIC MARKER LIGHTS
 ELECTRIC WINDSHIELD WIPERS & WASHERS-INTERMITTENT

TIRES

FRONT: 11R22.5 X 14 PR-STEER AXLE
REAR: 11R22.5 X 14 PR-DRIVE AXLE

WHEELS

FRONT & REAR: 22.5x8.25 STEEL DISC
WHEEL SEALS, FRONT AND REAR: OIL

ELECTRICAL SYSTEM

ALTERNATOR: 105-AMP
BATTERY: 4-12V - 625CCA EACH
STARTER: 12V WITH OVERCRANK PROTECTION
BATTERY BOX - SPLIT

BRAKES

TYPE: FULL AIR CAM
DUMMY GLAD HANDS/TRAILER CABLE HOLDER
FRONT: 15" x 4" CAM
REAR: 16 1/2" x 7" CAM
AIR COMPRESSOR: 13.2 CU. FT.
AIR VALVES-4lb. CRACK PRESSURE

FUEL TANKS

150 GALLON ALUMINUM LH
 150 GALLON ALUMINUM RH
 DUAL SUCTION/RETURN FUEL LINES
 EQUIFLO FLEX SYSTEM

CAB COMPONENTS

DRIVERS SEAT: HIGH BACK-AIR SUSPENSION-NATIONAL
PASSENGER SEAT: HIGH BACK-AIR SUSPENSION-NATIONAL
AIR HORN - DUAL 14" WITH SHIELDS
HEAVY DUTY CAB KIT

MISCELLANEOUS

AIR DRYER
 220" WHEELBASE
 SPRING SET PARKING BRAKE
 ON-OFF FAN DRIVE
MANIFEST POUCH - LH DOOR
 UPPER EXHAUST STACK TURNOUT
 BUG SCREEN
 ROOF MOUNTED CB LOCATION
 POWER SUPPLY FOR CB RADIO WITH TWIN ANTENNAS
 LOCK-UP RESTRICTION INDICATOR
 POLYURETHANE PAINT ON CAB
 SLIDE BAR, B.O.C., FOR TRAILER CONNECTION
 HEAVY DUTY DRIVELINE
 HUCK BOLTED CHASSIS FRAME
 CUSTOM INTERIOR (BLACK)
 DRY TYPE AIR CLEANER-FIREWALL MOUNTED
 LEFT HAND RELEASE FOR 5TH WHEEL
 H.D. REAR SUSPENSION PACKAGE
 STEEL FRAME RAILS - .344" X 3 1/2 x 10.188"

FIBERGLASS HOOD
 AUTOMATIC SLACK ADJUSTERS
 8" CONVEX MIRROR - CHROMED - LH
 8" CONVEX MIRROR - CHROMED - RH
 RH LOWER DOOR VIEW WINDOW
 3 POINT SEAT BELTS/RETRACTORS
 AERODYNAMIC FRONT BUMPER

ENGINE EQUIPMENT

EXHAUST-VERTICAL EXTREME OUTBOARD
 STAINLESS STEEL MUFFLER SHIELD
 COOLING SYSTEM UPRATE
 AIR INTAKE TOP OF COWL
 POWER STEERING
 LOW COOLANT LEVEL ALARM
 TORQUE LIMITING CLUTCH BRAKE

FRAME

110,000 PSI YIELD STRENGTH
 STEEL CROSSMEMBERS
 LEFT HAND BACK OF CAB ACCESS

REMARKS:

CERTIFIED FOR 50 STATES
 MAXIMUM GOVERNED ROAD SPEED 65 MPH
 ANTICIPATED 5TH WHEEL HEIGHT-MAXIMUM
 AIR SLIDE - 48" HIGH

Figure 7. Sample Specifications for a 1994 Freightliner

THE OPTIONS ON THIS PAGE ARE IN ADDITION TO OR IN LIEU OF THE BASE SPECIFICATIONS ON PREVIOUS PAGE

COLOR: CAB WHITE:

FRAME BLACK:

WHEELS WHITE:

SERIES 60 IDLE TIMER SHUTDOWN

JACOBS ENGINE BRAKE

BRIGHT FINISH EXHAUST SYSTEM

CLOTH SEAT INSERTS

ADJUSTABLE TELESCOPING TILT STEERING COLUMN

AM/FM STEREO CASSETTE RADIO/CLOCK/WEATHERBAND

EXTERIOR SUN VISOR - PAINTED

POWER R.H. WINDOW

FLUSH MOUNTED BACK OF CAB UTILITY LIGHT - 1

RECESSED ROAD LIGHTS

AIR SUSPENSION DUMP VALVE

RUBBER FLOOR MATS WITH DOUBLE INSULATION

ARM RESTS - DRIVER AND PASSENGER SEATS

FONTAINE 24" AIR SLIDE 5TH WHEEL

48" INTEGRAL SLEEPER CAB WITH AIR RIDE SUSPENSION

INNERSPRING MATTRESS

HEATER/AIR CONDITIONER WITH CONSTANT TEMPERATURE CONTROL

SLEEPER CURTAIN BETWEEN CAB AND SLEEPER AREA

2 ADDITIONAL RADIO SPEAKERS IN SLEEPER AREA

2 DOME LIGHTS WITH READING LIGHT

ADDITIONAL CAB AND SLEEPER INSULATION

12V ELECTRICAL OUTLET IN SLEEPER AREA

ROOF FAIRINGS WITH TRIM TABS AND CAB EXTENDERS

Figure 8. Sample Specifications for a 1994 Freightliner (continued)

If the truck is leased, you should also indicate whether the fee includes repairs and maintenance, by entering Y (yes) or N (no).

The next entry is TRAILER/TANK COST NEW (IF OWNED). This entry is for those haulers who own their trailers or tanks. It is the cost of replacing a tank/trailer at current prices, available from the suppliers. Annual costs are calculated in the same manner as truck costs (see above). In the example, we used a new tank costs of \$20,000, so we entered 20000.

The sixth entry is TRAILER/TANK EXPECTED LIFE IN YEARS (IF OWNED). This is again for those who own their trailers or tanks. Trailer and tank life becomes a function of the type and amount of use it receives. Tank life is generally considered to be 10 or more years. In our example, we estimated a 10-year life-span for the tank.

The seventh entry is TRAILER/TANK SALVAGE VALUE (IF OWNED). This is again for those haulers who own their tanks or trailers. Use book or current scrap metal values which have remained relatively constant over time, or if tanks are rehabilitated, use expected net value to compute this figure. In the example we estimate the tanks have a salvage value of \$4000.

The eighth entry is any PER MONTH FEE ON TRAILER/TANK (IF LEASED). This entry is for those haulers who lease their tanks or trailers. When separate leasing fee is available for a trailer or tank, it can be included here. When truck and trailer/tank are leased as one unit the monthly fee can be included under monthly truck fee. This item should then remain at "0". In our example, we own our tanks hence we just left a zero value.

The next section of the screen asks for annual fixes costs for the operation.

ANNUAL INSURANCE should be the actual amount of insurance on the truck which operates the given route. Annual rates for liability and cargo are available from insurance agents and brokers. A standardized policy should be used. Such a policy might include \$300,000-\$500,000 liability, collision for the value of the truck with \$200-\$500 deductible and cargo coverage in case of upset. Some states, like New York, mandate other coverage. In our example we spent \$2300 annually on truck insurance. In most cases, a \$1,000,000 to \$2,000,000 umbrella policy would also be included. Current insurance costs in New York state average \$3,536 for a straight chassis.

ANNUAL REGISTRATION FEES. This entry should be the annual total costs of registering the truck and trailer. The fee is based on size/weight, and is available from the State Department of Motor Vehicles. In our example, we pay \$435 per year to register the truck. Current registration on a straight chassis in New York state averages \$637.

The next entry is FEDERAL HIGHWAY USE TAXES PER YEAR. This entry should be the estimate of this year's total federal highway taxes that are NOT

MILEAGE- OR VOLUME-BASED. This should be only fixed or flat rate highway taxes; any variable highway taxes will be entered later in the program. In the example, there were no federal highway taxes on this truck based on the 1984 schedule. This tax was recently revised based on number of axles and truck weight. Details can be had from the Department of Transportation. The tax should be calculated on an annual basis.

The next entry is the **ANNUAL INTEREST RATE** that you pay on borrowing money. The interest rate reflects the value and cost of capital tied up in the truck and tank over their service lives. This includes financing of trucks, buildings, and so on and hence should be an estimated average value. Due to continued interest rate fluctuation, no standardized procedure is recommended for determining the appropriate rate. Your local lending institution can assist you in determining the appropriate current rate. In our example we continued to use the previous average between 8% and 10%.

NOTE: You should enter this value as a % and not as a decimal, for example, we entered the number 13.

The following entries may not be applicable to all situations. We did not use them in our calculations for Case1, but you may incur some of them in the running of your operation. They should be filled-in if they apply to your case.

SPARE TRUCKS. This should include this truck's share of the annual fixed costs of those vehicles that are registered and insured on an annual basis, but are not routinely used as substitute vehicles.

GARAGE. This truck's share of the annual depreciation of the physical structure used to house the vehicle and for other milk hauling-related activities.

OFFICE. This truck's share of the annual cost of secretarial help, office supplies, equipment, and other administrative costs.

MANAGEMENT. This truck's share of an annual figure that should reflect the cost of salaried management personnel, including time spent by owners on management activities. Time spent by owners on relief driving or repair and maintenance should not be included here, but in the appropriate categories.

UTILITIES & HEAT. This truck's share of the annual cost of heating the garage and office, plus electricity and telephone expenses.

OTHER FIXED COSTS. This truck's share of any other fixed cost items deemed to affect profits.

SCREEN 4: VARIABLE COSTS (Figure 9). This screen contains information on the variable costs, or costs that vary with the number of miles driven for this particular route/s.

VARIABLE COSTS		TRUCK ID: Case1	
OWNED		Additional LEASE Charges	
Ave. Cost of A New Tire	\$ -225	Per Mile Fee on Truck	\$
Cost of a Recapped Tire	\$ 100	Per Mile Fee on Trailer	\$
Total Life of Tire (miles)	60000	Per Mile Fee on Tires	\$
Number of Tires	10		
TRACTOR Repair & PM/Mile	\$.1	Mileage/Volume Taxes/Yr	\$
TRAILER Repair & PM/Mile	\$.05	Average Tolls/Day	\$
Other Variable Costs/Yr	\$	Fuel Cost/Gallon	\$ 1.2
		Ave. Miles/Gallon	5.
Help Box			
Press (F7) to GoBack to the previous screen			
Press (F8) to calculate and display route costs			
HELP	GoBACK	Go ON	MnMENU
F3	F7	F8	F9

Figure 9

The first part of the screen takes into account variable costs for owned vehicles. The first entry, **AVERAGE COST OF A NEW TIRE**, is based on average current dealer prices, and should include both steering and drive tires, if applicable. In our example, we put this cost at \$225. Current cost averages around \$360.

The next entry is **COST OF A RECAPPED TIRE IF OWNED**, and should be the average cost of recapping a single tire. We estimated approximately \$100 per tire to recap our bias tires.

TOTAL LIFE OF A TIRE (miles) is also an estimate, and should include a new tire and one recap. In our example, the average tire life was 60,000 miles. The increased use of radial tires and more over-the-road hauling has increased the average life to 94,000 miles.

NUMBER OF TIRES. The value should include all the tires on the truck except the spares. In most cases this would be reflected in the number of axles and whether it involves a trailer. In some parts of the country a drop axle is used to distribute weight when the truck is loaded. Because these tires only receive wear part of the time it would be appropriate to reduce the number of tires proportionately, i.e., only count two of the four tires on a drop axle if they are run only one-half of the time. In our example we have a 10-wheel truck and hence entered the number 10.

The following information should be provided for leased vehicles. Because the truck used in our example was owned, not leased, we left these figures blank. You should have this information available if your vehicle is leased.

PER MILE FEE ON TRUCK. This entry is for those haulers who lease their trucks, hence if you own your trucks you should leave this entry as a zero. If you do lease your trucks then this value should be the per mile fee for the truck that runs the particular route.

PER MILE FEE ON TRAILER. This is similar to the above, so if you own your trailer skip over this. Again, this is a per mile average fee for the trailer used on the given route. In our example we had a 10-wheeler with no trailer so we skipped over this entry.

PER MILE FEE ON TIRES. This entry is to be used by those haulers who do not buy their tires but instead lease them on a per mile basis. The value should be an average per mile estimate of your cost of leasing your tires.

The bottom half of the screen requires information about maintenance, tolls, fuel, and other variable costs. TRACTOR REPAIR & PM/Mile and TRAILER REPAIR & PM/mile are among the most difficult to estimate. An individual truck/trailer repair cost record is the best way to determine a meaningful cost per mile. Repair costs should include parts and labor over the life of the truck/trailer, divided by total truck miles. Since repair costs increase with vehicle age, major engine repairs should be amortized across the expected life of the truck or trailer. Note that tire costs are not included in this estimate. Preventative maintenance per mile includes the parts and labor involved with routine vehicle maintenance, including oil, chassis lubrication, filters, and any other item replaced as part of a routine periodic maintenance program. The cost can be calculated on an annual per mile basis according to total distance and service intervals recommended by the manufacturer. Our estimates for tractor repair and preventative maintenance were \$0.10/mile; for trailer repair and preventative maintenance, the figure was \$0.03/mile.

OTHER VARIABLE COSTS/YEAR. Included here are miscellaneous costs that are distance or volume related, but not included in other categories-- for example, the charge in a truck leasing contract that accounts for costs which vary with distance travelled.

MILEAGE/VOLUME TAXES/yr. This tax category is included to allow for state or local road taxes that are variable with either mileage, volume or both. It would include the annual cost per truck for this type of tax. You should estimate the total yearly payment based on the truck that runs the given route. In our example we have omitted this tax since many states do not have any. New York State does have a ton/mile tax which would apply here.

AVERAGE TOLLS/DAY. This value should include all bridge and expressway tolls for the given route on a per day basis. In the example we had no tolls so we left the value as a zero.

FUEL COST/GALLON. Use average local pump price. In our example we had an average of \$1.20 per gallon, hence we entered the value 1.2.

The **AVERAGE MILES/GALLON** is the fuel consumption rate for the truck. This should be an average value based on several runs. Use operator's record or an estimate from truck dealer to compute the figure accurately. In our example we used an average of 5 miles per gallon.

NOTE: To avoid calculation errors, you must enter Average Miles per Gallon. If you do not enter a value, a window will appear on the screen to remind you to do so. You can select <edit> to enter a value or <default>, at which point 5 miles/gallon will automatically be entered.

SCREEN 5: HAULING COST ANALYSIS (Figure 10). This screen provides the hauling cost analysis for the truck data you have entered.

NOTE: The figures for the test case are provided in parentheses after each calculation so that you may follow along on the screen.

The first group of calculations on this screen are fixed costs. First is **ANNUAL TOTAL FIXED COSTS (\$23,041)**. This value is your total projected fixed costs for the year for this truck route, that is, costs that are not dependent on mileage or volume of milk hauled. You may consider these costs as overhead costs of hauling this particular route/s. The next fixed cost is similar to the first except it is divided by the number of operating hours in the year for this truck route and hence is your **FIXED COSTS PER HOUR (\$6.58/hr)**.

HAULING COST ANALYSIS		TRUCK: Case1
FIXED COSTS: Annual Total	\$23041	
Fixed Costs per Hour		\$6.58 /Hr
VARIABLE COSTS: Annual Total	\$21520	
Variable Cost per Mile		\$0.42 /Mile
LABOR COSTS: Annual Total	\$26280	
Labor Costs per Hour		\$7.50 /Hr
TOTAL COSTS: Annual Total	\$70841	
Annual Total Costs per CWT		\$0.41 /CWT
Total Costs per Mile		\$1.40 /Mile
Total Fixed & Labor Costs per Hour		\$14.08 /Hr
Help Box		
Press P to print a Report of this information		
Press [F7] to display/edit input costs for this Route		
Press [F8] to save data for this truck		
GoBACK Go ON MnMENU		
F7 F8 F9		

Figure 10

The second group is variable costs, or costs that are mileage based. The first is the **ANNUAL TOTAL VARIABLE COSTS (\$21,520)** for this truck. This value is based on the length of the route, gas mileage, tire costs, etc. The second variable cost is this same number divided by the total number of miles traveled in the year on this route, and hence is **VARIABLE COST PER MILE (\$0.42)** of hauling for this truck.

The third group of costs is labor costs, which are not included in either of the above figures. The first is **ANNUAL TOTAL LABOR COSTS (\$26,280)** for hauling this route/s. This is just the money paid to your drivers over the entire year to haul this route/s, including wages and fringe benefits. The second figure is **LABOR COSTS PER HOUR (\$7.50)** of hauling this route/s. This number is simply the total wage and fringe benefits paid to your drivers per hour to haul this route/s.

The final group of numbers is the total cost. These numbers are the aggregate of the above figures. The first figure is **ANNUAL TOTAL COST (\$70,841)**, which is the total yearly cost of hauling this route or routes. The second is **ANNUAL TOTAL COSTS PER CWT (\$0.41/CWT)**, which is the total annual average cost of hauling each hundredweight of milk. The third cost is **TOTAL COSTS PER MILE (\$1.40/mile)**. This is just the total annual cost of hauling milk for this truck per each mile driven. Finally, the last figure is **TOTAL FIXED AND LABOR COSTS/HOUR (\$14.08/hr)**. This figure is the per hour fixed and labor cost of hauling this route, that is, it subtracts out the variable costs.

Once your hauling analysis is complete, you can choose one of three options, as described at the bottom of the screen. You can print out a report which reproduces the information you supplied in the entries for all five screens. To do this, make sure your printer is turned on, and type the letter p. You do not have to press <enter>; the report will print automatically.

You may wish to edit (change or correct) the information in any entry of any screen. To do this, simply select [F7] and you will be taken through the screens again so that you may make any necessary changes.

You may wish to save the data -- and you SHOULD save the data for each truck you input. To do this, select [F8].

CALCULATING COMPOSITE ROUTE COSTS

The second option in the main menu screen allows you to develop composite routes and calculate their costs. As described above, a composite route is the average of any number of truck data files. The composite route data calculated by this program will provide you with figures for a single composite route that will have the averaged characteristics of all the individual truck information files used.

NOTE: To distinguish between regular truck data files and composite route files a special ending is added automatically to the names of the composite routes. This special ending is ".CMP", short for composite. When you create a composite route you will give the route a name similar to the way you do for regular truck data files, except that the program will automatically attach the ".CMP" to the name.

To calculate composite route costs, first select that option from the main menu, by highlighting it and pressing <enter>. You will then see a screen that allows you to choose either



In order to see how this aspect of the program works, we suggest that you first follow along with the test case provided as part of your software. In order to do this, select the first option from this screen. You would also choose this option to access any composite routes you have already devised.

If you are familiar with this part of the program, or if you wish to compile your own new composite route using your own data, then select the second option (Select trucks for a new composite route) from the screen. Instructions on how to proceed from this option are provided below.

Once you have selected the first option (Use an existing composite route), a new screen with a menu of composite routes will appear. In our test case, there is only one choice on this menu -- called "CASE3." If you had been working with the program and had already put together other composite routes, their names would appear here as well.

To see the test case, select that option from the composite route menu. A screen titled Trucks Included in Calculating Costs for this Composite Route will then appear. You will notice that there are two trucks entered here already Case1 and Case2. Case1 is the truck used to illustrate the first part of the program -- Calculating Hauling Costs. Case2 is provided simply for illustrative purposes, so that you may see the way in which this part of the program averages the information from more than one truck. Press [F8] to move to the next screen.

Screen 1: General Route Data. This is the same screen as you saw in the first part of the program, but the numbers in all the entries have been calculated by averaging the information for the Case1 and Case2 vehicles. This calculation has been done automatically by the program. To move through the screens press [F8].

Screen 2: Driver Data.

Screen 3: Fixed Costs.

Screen 4: Variable Costs.

These screens also contain all the same information as the corresponding screens in the first part of the program, but with entry figures calculated by averaging the information from the files that make up the composite route. In our example, the information is from Case1 and Case2. Press [F8] to move through these screens.

Screen 5: Hauling Cost Analysis. This final screen, like the one in the first part of this program, displays hauling costs based on the information provided in the previous screens. The figures provided here represent the various costs for the composite route composed of Case1 and Case2.

Creating Your Own Composite Routes

If you have opted to create a new composite route, select the second option (Select trucks for a new Composite Route) from the menu screen described above. The next screen will ask you to assign a name to the new composite route. It can be up to 15 characters, including spaces. Once you have chosen a name for the route, press <enter>.

NOTE: MAKING CHANGES. At any point, you may wish to change some or all of the information you have entered for any truck, either because you have made an error in inputting information, or because a specific situation has changed. To make changes, go to the appropriate data screen, move the cursor to the appropriate entry by pushing <enter> to move through the entries, and type in the change you wish to enter. Push <enter> again to leave the entry you have changed. At the end of the analysis, be sure to save your changes by selecting the appropriate choice in the "save" window.

You will then see a screen entitled Trucks Included in Calculating Costs for this Composite Route. You will notice that the name you have chosen appears in the upper right-hand corner of this screen. In order to fill-in this screen, you have three options, listed at the bottom of the screen.

If you push [F2], you will see a window displaying the list of trucks that are stored in the program (trucks for which data have already been entered in the first part of the program). You can select a truck to put in your composite route by highlighting it using the up and down arrows, and pressing <enter>. The cursor on the screen will automatically move to the next position, and you can then add another truck from the [F2] window. You may have up to 48 trucks in the composite route.

If you choose [F4], you will see the same window as with [F2], from which you can select a truck. [F4] allows you to insert the truck in any space on the 48-space list -- for example, if you had filled in 12 trucks and you wanted to add a thirteenth, you would move the cursor to the appropriate position and use [F4] to insert the truck. This key is useful if you want to change around your composite route by adding and deleting trucks.

Choose [F5] to delete a truck from the composite route.

After you have chosen the trucks you wish to include in your composite route, push [F8] to go to the next screens, as described above in the test used for this part of the program. The information in the entries of each of the following four screens represent the average of the information you provided for all the trucks in your composite route. The final screen (similar to Figure 10 on page 26) provides the hauling cost analysis for the composite route.

Once your composite route hauling cost analysis is complete, you can choose one of three options, as described at the bottom of the screen. You can print out report, which reproduces the information you supplied in the entries for all five screens. To do this, make sure your printer is turned on, and type the letter p. The report will print out automatically.

You may wish to edit (change or correct) the information in any entry of any screen. To do this, simply select [F7] and you will be taken through the screens again so that you may make any necessary changes.

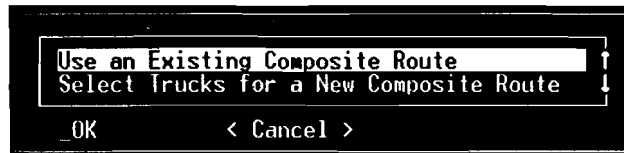
You may wish to save the data -- and you SHOULD have already saved the individual truck data you input. To do this, select [F8].

CALCULATING POOL PAYMENTS

Option three of the main menu allows you to calculate pool payments. By using this option, you will be able to calculate estimated payments to producers and haulers for

the composite routes you devised, based on the average costs of the composite routes. The information in this part of the program requires a knowledge of the basics of entering truck/route data costs, which was explained above, in the first section of this chapter. If you have not already done so, you should review this earlier material before proceeding with this part of the program.

To access this option, select it from the main menu using the Up and Down arrows to highlight it. Then push <enter>. You will then see a screen which offers the following choices:



We suggest that you choose the first option and continue to follow the test case provided as part of your software to familiarize yourself with this aspect of the program.

If you are already familiar with this part of the program, you may either choose this option to access an existing route you have devised yourself (all existing composite routes are listed in the menu that follows this screen). You may prefer to choose the second option, Select Trucks for a New Composite Route, which will be discussed below.

After you have selected the first option, you will see a screen that provides a menu of composite routes. Select "CASE3" from this menu in order to review the test case provided.

The next screen is entitled "Trucks Included in Calculating Costs for this composite Route," and is the same screen used in the second part of the program (calculating composite route costs). The information in this screen is already filled-in with the trucks selected as components of the composite route, in this instance, Case1 and Case2.

NOTE: MAKING CHANGES. At any point, you may wish to change some or all of the information you have entered for any truck, either because you have made an error in inputting information, or because a specific situation has changed. To make changes, go to the appropriate data screen, move the cursor to the appropriate entry by pushing <enter> to move through the entries, and type in the change you wish to enter. Push <enter> again to leave the entry you have changed. At the end of the analysis, be sure to save your changes by selecting the appropriate choice in the "save" window.

After you have reviewed this screen, press [F8] to move to the next screen, entitled "Default Values for Pool Payment Calculations" (Figure 11).

This screen anticipates the costs of various aspects of your operation by providing values for each of eight entries. These default values can be changed if your situation is different from the one they describe. The parameters used to determine each default value are listed below.

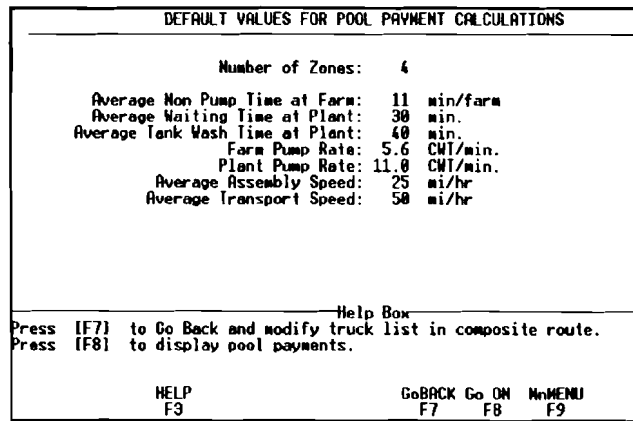


Figure 11

NOTE: For further information about any of the entries in this screen, move the cursor to the appropriate entry and push [F3]. A help screen window with more information will appear. To leave the help screen and return to the screen, push <enter>.

NUMBER OF ZONES: Each zone is considered to be 10 miles wide, except for the first zone, which extends 15 miles. Hence, the zones extend 15 miles, 25 miles, 35 miles, and so on outward from your base of operation. The default value for this entry is 4, which means that there are four zones encompassed by your composite route. If the value is different than 4 zones, you may change it by typing over the numeral with a different one.

AVERAGE NON-PUMP TIME AT FARM: This refers to all the routine time spent at the farm other than pumping time, calculated from the time the truck pulls into the driveway until the time it leaves the farm. The default value is 11 minutes; if your composite route stops result in a different time, you may change the value, as appropriate.

AVERAGE WAITING TIME AT PLANT: This reflects the average waiting time at most plants under normal conditions. There are numerous situations, particularly during high production months, the waiting time may be longer. The default value is 30 minutes; you may change it to reflect longer (or shorter) waiting times.

AVERAGE TANK WASH TIME AT PLANT: This reflects the time spent washing a 6,000 gallon tank with a CIP system. The default value is set at 40 minutes.

FARM PUMP RATE: This figures represents a cross-section of pumping rates from small- to large-volume situations. The default value selected in 1985 was 5.6 CWT/min. A current value would be around 6.0 CWT/min.

PLANT PUMP RATE: This figure is based on the current pumping rates at major receiving bays. The default value selected in 1985 was 11.0 CWT/min. A current value would be around 13.0 CWT/min.

AVERAGE ASSEMBLY SPEED: This represents the driving speed between farms under variable seasonal conditions. The default is set at 25 miles per hour.

AVERAGE TRANSPORT SPEED: This figure represents the driving speed from the garage to the first farm, from the last farm to the plant, and from the plant back to the garage. The default is set to 50 miles per hour; you may change it (as well as any of the default values listed above) if your situation is different than the one set forth here.

Once you have reviewed this screen, press [F8] to display the pool payments (Figure 12).

The next screen itemizes the pool payments for your composite route, to the producers and to the haulers. The figures are based on the information provided in the previous screens.

COMPOSITE ROUTE: Case3		POOL PAYMENTS		Number of Zones: 4
PRODUCER PAYMENTS				
Stop Charges:	\$ 11.66	Volume Charges per CWT:	\$ 0.08	
-----		Zone Charges per CWT -----		
Zone 1 Charge	\$ 0.062			
Zone 2 Charge	\$ 0.093			
Zone 3 Charge	\$ 0.124			
Zone 4 Charge	\$ 0.155			
HAULER PAYMENTS				
Stop Payment per Farm Stop	\$ 5.03			
Mileage Payment per Mile	\$ 0.82			
Volume Payment per CWT	\$ 0.08			
Help Box				
Press P to print a Report of this information				
		GoBACK	Go ON	MnMENU
		F7	F8	F9

Figure 12

The top half of the screen itemizes the PRODUCER PAYMENTS. The STOP CHARGE is a fixed charge to be given to each farm stop on the route. In our example an estimated \$11.66 should be charged to each farmer on the route per stop. The second charge is a VOLUME CHARGE PER CWT. This is the fee to be charged to each producer on a per hundredweight basis. For example, the estimated volume charge per producer on the test composite route is \$0.08 per hundredweight.

The final charges are ZONE CHARGES, which are based on the distance of the farmers from the distribution center. The first zone is considered to be up to 15 miles out while the second is between 15 and 25 miles, the third between 25 and 35 miles, with the remaining zones increasing by 10 miles at a time. These charges are also based on volume. In our example, those producers in zone 1 are charged an estimated \$0.062 per hundredweight, while those in zone 2 \$0.093 per hundredweight, and so on.

The lower half of the screen itemizes the HAULER PAYMENTS. The first figure is the STOP PAYMENT PER FARM STOP. This value is an estimate of the per stop payment to the hauler for the given composite route. In the example the hauler is paid \$5.03 for each farm on the route. The second payment is the MILEAGE PAYMENT PER MILE. In our example the hauler is paid an estimated \$0.82 per mile traveled on the route. Finally, the remaining payment is a VOLUME PAYMENT PER CWT. In our example the program estimates a payment of \$0.08 per hundredweight picked up. Again, all of these numbers may be adjusted to take into consideration other factors.

To print a summary report of the pool payments, press p, and the report will automatically be printed out. You do not need to press <return>; make sure your printer is turned on.

To compute pool payments for a new composite route, select the second option (Select Trucks for a New Composite Route). You will then be asked to provide a name -- up to 15 characters, including spaces -- for the new composite route. After you have given the new route name, proceed in selecting the trucks for the route as was done in the second option (Calculate Composite Route Costs -- see pages 27-29 above). Then select [F8] to move to the default value screen. You may make any changes to this screen, as discussed above. When you have finished with the default screen, press [F8] to display the pool payment screen. You may print out this report by pressing p.

HAULING COST ANALYSIS DATA SHEET

TRUCK (name or #): _____

DATE (ex.: 07-14-1993): _____

GENERAL ROUTE DATA

Total Route Miles _____ mi/day	Total Operating Time _____ hr/day
Assembly Miles _____ mi/day	Assembly Time _____ hr/day
Transport Miles _____ mi/day	Transport Time _____ hr/day
CWT Delivered _____ CWT/day	Plant Time _____ hr/day
Number of Farm Stops _____ /day	
Primary Destination _____	Secondary Destination _____

DRIVER DATA

	Driver 1	Driver 2	Driver 3
Name	_____	_____	_____
Standard Wages: \$/Hr	\$ _____	\$ _____	\$ _____
OR \$/Day	\$ _____	\$ _____	\$ _____
OR \$/Week	\$ _____	\$ _____	\$ _____
Standard Hrs/day	_____	_____	_____
Fringe Benefits: \$/Hr	\$ _____	\$ _____	\$ _____
OR % of Wages	_____	_____	_____

FIXED COSTS

<p>OWNED TRUCK OR TRACTOR</p> <p>Replacement Cost \$ _____</p> <p>Expected Life (Yrs) _____</p> <p>Salvage Value \$ _____</p> <p>LEASED TRUCK OR TRACTOR</p> <p>Lease Fee/Month \$ _____</p> <p>Incl. Repair & Maint. (Y/N) _____</p> <p>Includes Tires (Y/N) _____</p> <p>ANNUAL FIXED COSTS</p> <p>Insurance \$ _____</p> <p>Registration Fees \$ _____</p> <p>Federal Highway Use Tax \$ _____</p> <p>Interest Rate % _____</p> <p>OTHER ANNUAL FIXED COSTS</p> <p>Spare Trucks \$ _____</p>	<p>OWNED TANK OR TANK TRAILER</p> <p>Replacement Cost \$ _____</p> <p>Expected Life (Yrs) _____</p> <p>Salvage Value \$ _____</p> <p>LEASED TANK OR TANK TRAILER</p> <p>Lease Fee/Month \$ _____</p> <p>Incl. Repair & Maint. (Y/N) _____</p> <p>Includes Tires (Y/N) _____</p> <p>Garage \$ _____</p> <p>Office \$ _____</p> <p>Management \$ _____</p> <p>Utilities & Heat \$ _____</p> <p>Other \$ _____</p>
---	--

VARIABLE COSTS

<p>OWNED</p> <p>Ave. Cost of New Tire \$ _____</p> <p>Cost of Recapped Tire \$ _____</p> <p>Ave. Life of Tire (Mi) _____</p> <p>Number of Tires _____</p> <p>TRACTOR Repair/Mile \$ _____</p> <p>TRAILER Repair/Mile \$ _____</p> <p>Other Variable Costs/Yr \$ _____</p>	<p>ADDITIONAL LEASE CHARGES</p> <p>Per Mile Fee on Truck \$ _____</p> <p>Per Mile Fee on Trailer \$ _____</p> <p>Per Mile Fee on Tires \$ _____</p> <p>Mileage/Volume Taxes/Yr \$ _____</p> <p>Average Tolls/Day \$ _____</p> <p>Fuel Cost Per Gallon \$ _____</p> <p>Ave. Miles/Gallon _____</p>
--	--

Other Agricultural, Resource, and Managerial Economics Research Bulletins
(Formerly A.E. Res. publications)

<u>No.</u>	<u>Title</u>	<u>Author(s)</u>
93-06	Agricultural Diversity and Cash Receipt Variability for Individual States	Loren W. Tauer Tebogo Seleka
93-07	Valuation of Plant Variety Protection Certificates	William Lesser
93-08	Evaluating U.S. Generic Milk Advertising Effectiveness Using an Imperfect Competition Model	Nobuhiro Suzuki Harry M. Kaiser John E. Lenz Olan D. Forker
93-09	An Analysis of Alternatives to the Dairy Price Support Program	Harry M. Kaiser
93-10	Royalty Collection for Patented Livestock	William Lesser
93-11	Dairy Farm Management Business Summary New York State 1992	Stuart F. Smith Wayne A. Knoblauch Linda D. Putnam
93-12	Supermarket Prices Redux	Rosemary Chi William Lesser
93-13	The Structure of the Milk Hauling Industry in New York and Pennsylvania	Eric Erba James Pratt Walter Wasserman
93-14	The Political Economy of a Crop Insurance Experiment	Jerry R. Skees
94-01	Fresh Fruit and Vegetable Procurement Dynamics: The Role of The Supermarket Buyer	Edward W. McLaughlin Debra J. Perosio

These publications should be requested by R.B. 93(or 94)-# from:

Bonnie Gloskey
Publications Office
Cornell University
52 Warren Hall
Ithaca, NY 14853-7801
607/255-2102