



**TNRCC**

**TNRCC Pollution Prevention Cost Accounting Software  
User Training Manual  
February 1, 1998**

## **Introduction**

The Pollution Prevention Cost Accounting Module will assist in conducting a cost analysis of industrial processes and practices. It allows you to compare the total cost of an existing process to the cost of a new process incorporating pollution prevention technology or practices. This cost comparison shows itemized costs as well as total cost of the old process compared to the new process. The software will also incorporate any capital costs associated with changing to a new process, account for depreciation and taxes, as well as analyze the net present value of adopting the new process. It will also calculate the amount of time it will take to recover any capital expenditures necessary to adopt the new process. Finally, you can generate a graphic of the actual savings generated by adopting the new process. This manual provides general instructions on how to conduct a comprehensive cost analysis of a process and specific instructions on installation and use of the Cost Accounting Module Software.

The TNRCC Environmental Cost Accounting Software is intended as a tool to do a simple cost analysis of pollution prevention options for an industrial process.

Small businesses who are looking for a simple and quick tool to evaluate the cost of implementing a pollution prevention option will find the TNRCC software adequate. In most cases, this simplified analysis will result in a similar conclusion as the more complex P2/Finance. However, should a business require a detailed analysis in which inflation, taxes or depreciation might be a major factor, P2/Finance would produce a more exact analysis. Also, in cases where the cost difference between two options being evaluated is very small, P2/Finance will provide a more accurate analysis.

This software is distributed by TNRCC Office of Pollution Prevention and Recycling and is intended for use by the regulated community. The software incorporates the Borland International, Inc. Database Engine which is included only for use with this software. Use of the Borland Database Engine included with this software for any purpose or with any software other than the Cost Accounting Module is a violation of International Copyright Laws.

## Hardware Requirements

Minimum PC hardware requirements to run the Pollution Prevention Cost Accounting Module are:

- 486 or Higher Processor
- Windows 3.1 or Higher or Windows 95
- 4 Mbytes RAM (8 Mbytes Recommended)
- 15 Mbytes space available on a hard drive

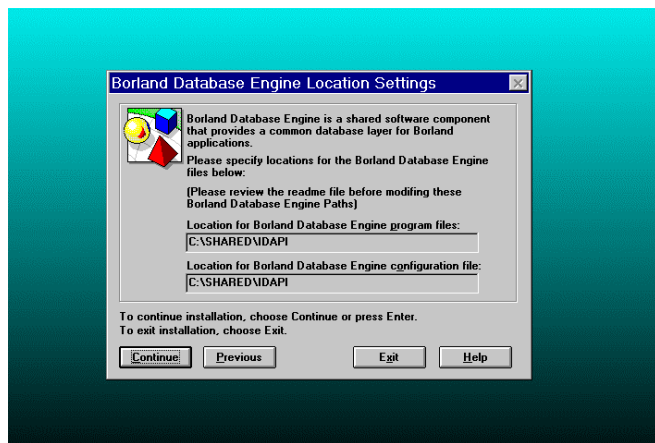
## Software Installation & Configuration

You should have received three 3.5 inch diskettes and the Users Manual with the Pollution Prevention Cost Accounting Module. The diskettes are:

- Borland Database Engine Disk 1 of 2
- Borland Database Engine Disk 2 of 2
- Cost Analysis Program Disk 1 of 1

## Installing the Borland Database Engine

Place the diskette labeled Borland Database Engine Disk 1 of 2 in your 3.5 inch drive.



Open Windows File Manger and select the 3.5 inch drive (normally A or B). Use your mouse to highlight then Doubleclick on the file, **Setup.exe**.

You will be asked to specify the directory for the database engine program files and the database engine configuration file on a screen similar to Figure 1. The setting for both should be

**C:\IDAPI**

Press <**Continue**> and follow the prompts on the screen until the database engine software is installed.

## Installing The Cost Accounting Software

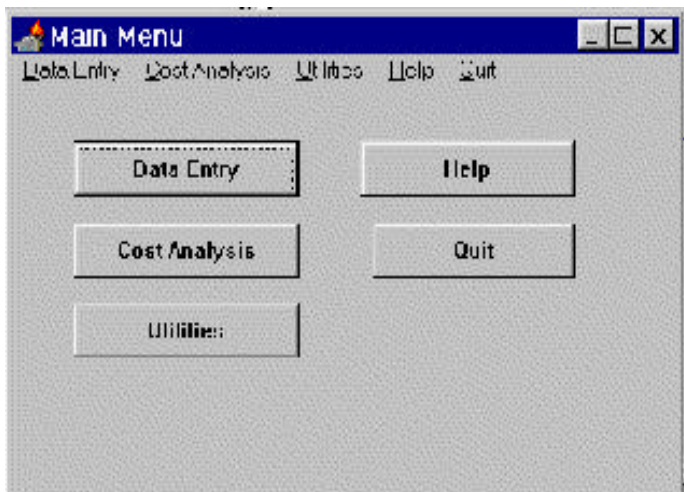
Place the diskette labeled Cost Accounting Program in your 3.5 inch drive. Use Windows File Manager to highlight and double click on the file named **Install.exe**.

You will be prompted for the drive letter where you wish to install the software. The default is **C**. Do not enter a **:** after the drive letter. If you wish to install the software on your **C** drive, Press **<Okay>**. The installation program will tell you when installation is complete. Use the mouse to press the **<Close>** Button. The software is now installed and ready to run.

## Starting the Cost Accounting Software

Use Windows File Manager and select the **c:\Finance2** directory to highlight and doubleclick the file **COST.EXE**.

The Cost Accounting Main Menu Screen will appear, Figure 2.



### Main Menu

The Main Menu allows you to access the various sections of the Cost Analysis Module. These sections are:

Data Entry - Accesses the module for entering Process Identification and Description Data as well as entering associated Cost Data.

Cost Analysis - Accesses the module for comparing the costs for different processes. This process includes the capability to do a net present value analysis of any capital costs

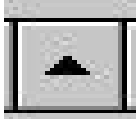
associated with a process option.

Utilities - Opens the module which allows you to save key process and cost data to either your a or b floppy drive, clear or delete any data in the system, or edit lookup tables.

Help - Opens the Help file.

Quit - Closes all files and exits the Cost Analysis Module.

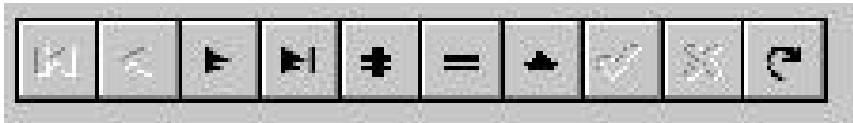
To access the various sections of the Cost Analysis Module you can use your mouse to activate the Menus at the top of the form or Press the corresponding Pushbuttons. You can also use hot



keys to activate each section. Press the <Alt> key and then press the letter key corresponding to the underlined letter in the menu item you wish to access. For example to access the Data Entry Section, you can use Press the Data Entry pushbutton, left click your mouse pointer on the Data Entry menu item or press <Alt>

<D>.

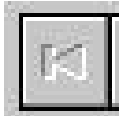
Before looking at specific sections of the Cost Analysis Module, you need to learn the use of control buttons common throughout the software. The tool bar at the top of the form, Figure 3, is used to control movement and editing of the data tables in all sections of the software.



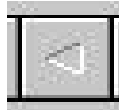
As you move your mouse pointer to press any of these buttons you will see a one

line hint which will help you remember the button's function. These functions are described below:

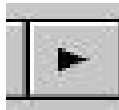
Move to First record in the selected data table.



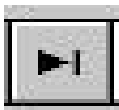
Move to the previous record in the selected data table.



Move to the next record in the selected data table.



Move to the last record in the selected data table.

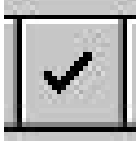


Insert a blank record into the selected data table.

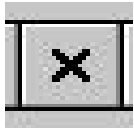


Put the selected data table into Edit mode (add, change or delete data).

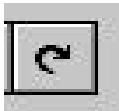
Post any data changes to the selected data table.



Undo the last change made to the selected data table (must be done before the record is posted).



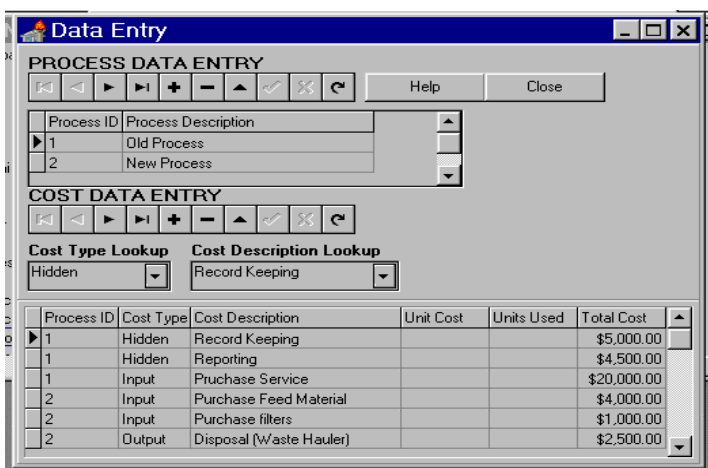
Refresh the data being shown on the form (to show the most current data).



To edit or insert data in a data table, you should first ensure that the table is in Edit mode by pressing the Edit button and then you can left click your mouse pointer on the desired field to turn the cursor on in that field. To move forward to the next field you can press <Enter> after your changes are made, press <Tab> or left click the mouse pointer on the desired field. To move back to a previous field in a record press <Shift> <Tab>. In most cases, your data changes will be posted to the data tables before you close this section, but to be sure you don't lose any changes, you should press Post before closing the form.

## Data Entry Module

The Data Entry form is shown in Figure 4. This form is used to enter all process and cost data.



The screenshot shows a software window titled "Data Entry". It is divided into two main sections: "PROCESS DATA ENTRY" and "COST DATA ENTRY".

**PROCESS DATA ENTRY** section includes a table with the following data:

Process ID	Process Description
1	Old Process
2	New Process

**COST DATA ENTRY** section includes two lookup dropdowns: "Cost Type Lookup" (set to "Hidden") and "Cost Description Lookup" (set to "Record Keeping"). Below these is a table with the following data:

Process ID	Cost Type	Cost Description	Unit Cost	Units Used	Total Cost
1	Hidden	Record Keeping			\$5,000.00
1	Hidden	Reporting			\$4,500.00
1	Input	Purchase Service			\$20,000.00
2	Input	Purchase Feed Material			\$4,000.00
2	Input	Purchase filters			\$1,000.00
2	Output	Disposal (Waste Hauler)			\$2,500.00

The Data Entry Form is divided into two sections, the Process Data Entry Section and the Cost Data Entry Section. To Move from field to field within a section, you can press <Tab> to move forward one field or <Shift> <Tab> to move back a field.

The Process Section is composed of two fields, the Process ID field which is a one to

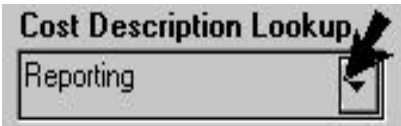
three digit identifier for a process and the Process Description which is a 40 character description of that process.

The Cost Section consists of six fields which are described below:

Process ID - A one to three digit identifier which corresponds to a Process ID listed in the Process Section. Any Cost listed should have a corresponding Process listed in the process section. You will have to manually select the Process ID in the Cost Section.



Cost Type - The Cost Type will be either Input, Output or Hidden. You may use the Cost Type Lookup window for help. Press the Button in the Lookup Window, Figure 5, and then use the mouse to highlight the appropriate choice.



Cost Description - This field is a 25 character description of the cost . Use the Cost Description Lookup window for help in entering this data. This window will provide help in determining what types of costs should be recorded for a given process. Press the

Button, Figure 6, for a list of costs and highlight the appropriate cost.

Unit Cost - The cost per unit of a material used in the associated process. This is not a mandatory field.

Units Used - The number of units of the material associated with the Unit Cost used annually. This is not a mandatory field.

Total Cost - The total cost in dollars. This can be the Unit cost times the number of units used or another number.

## **Exercise : Entering Processes and Costs**

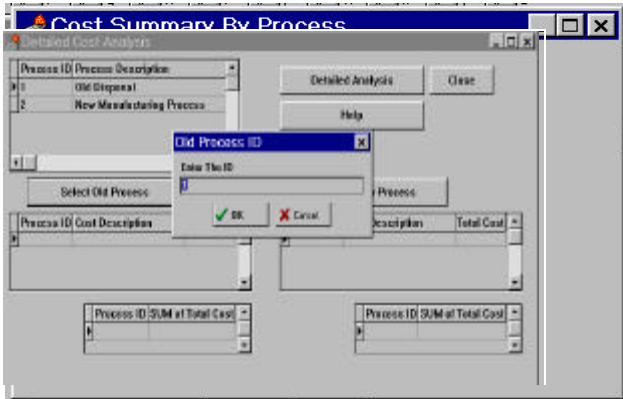
You will enter the process and cost data contained in the **Exercise Cost Comparison**. **Please follow along with the instructor and do not get ahead.**

The current process of disposing product will have a Process ID of **1** and Process Description of **Old Process**.

The New Manufacturing Process will have a Process ID of **2** and a Process Description of **New Manufacturing Process**.

## Cost Analysis Menu

The Cost Analysis Menu allows you to access three cost related sections.

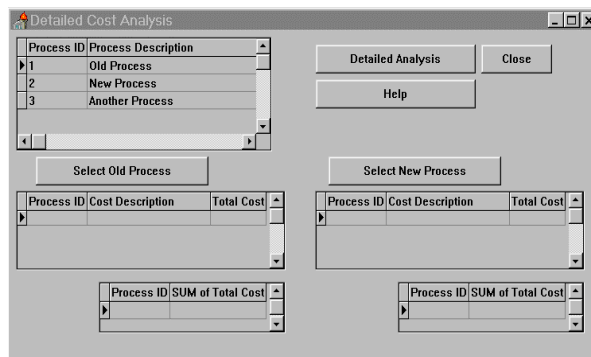


Cost Summary by Process - This section shows each type of cost and the amount associated with all processes entered into the module. This screen is shown at Figure 7.

Itemized Cost Summary - This section shows you the total cost amount associated with all processes entered into the module. This screen is shown at Figure 8

Process ID	Cost Type	Cost Description	Total Cost
1	Hidden	Record Keeping	\$5,000.00
1	Hidden	Reporting	\$4,500.00
1	Input	Purchase Service	\$20,000.00
2	Input	Purchase Feed Material	\$4,000.00
2	Input	Purchase filters	\$1,000.00
2	Output	Disposal (Waste Hauler)	\$2,500.00
3		Old Process - less hidden	\$20,000.00

Detailed Cost Analysis/Comparison - This section allows you to choose two processes of any that you entered and then displays the itemized and if you desire the total cost for both processes so that you can compare the amounts. This section also allows you to do a detailed cost comparison which incorporates the cost of any capital investments into a new process and determines the net present value of savings realized for adopting a new process. This screen is shown at Figure 9.



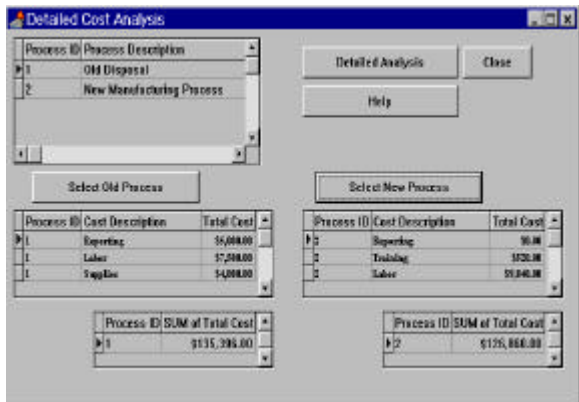
Print Data - This Module will allow the user to print copies of Process and Cost data which exists in the Cost Analysis module.

## Detailed Cost Analysis

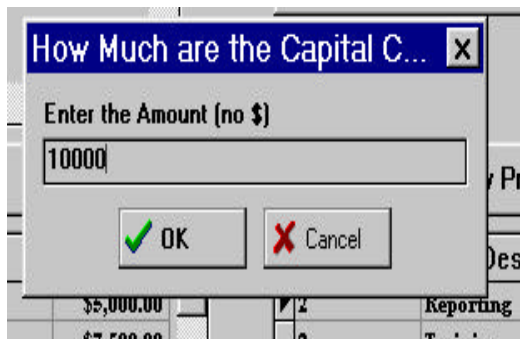
In most cases, the user will want to see a detailed cost analysis which includes a Net Present Value calculation of cash flow if any capital or one time costs are incurred by adopting the new option. To perform this analysis, you must first select the two Processes which you would like to compare. First, Press the Select Old Process Button and the Prompt to enter the old Process ID will appear. Note that the old process prompt defaults to **1** (Figure 10) and the new process prompt defaults to **2**. To select the appropriate Process ID Type in the number you desire and use the mouse to Press the **OK** Button or Press **Enter**.

As you select the Process ID's for analysis, itemized lists of costs for each process will appear along with the total annual cost (excluding capital costs) for each process, Figure 11.

To look at a detailed report of annual cash flow, cost of loans to cover capital costs or to conduct a net present value analysis of the resulting cash flow, press the **Detailed Analysis** button.



You will be prompted or asked if there are any Capital Costs associated with the new process. If there are and you select **Yes** you will be asked for the amount, Figure 12. You should enter the amount.



Next, you will be asked the amount of those capital costs, if any, which are subject to depreciation. You will then be asked for the length, in years, of the depreciation period. You will be asked if the costs are paid with a loan. If you answer **No**, the software will conduct the cashflow analysis as if the capital costs is paid in full the first year. If you answer **Yes**, you will be asked for the interest rate, in percent, and the period, in months of the loan.

Next, you will see the Detailed Analysis screen which will allow you to **Calculate Payment**. This will show you the monthly payment on the loan and the total cost of the load. The **Update Savings** button will then appear. Pressing this button will show you the cash flow generated by adopting a process for a ten year period. You will also see the amount of time in years it will take to recover any capital costs.

Then, you can adjust the cash flow for depreciation and taxes by pressing the appropriate button. You will be prompted for a tax rate. This should include the total tax rate for local + state + federal taxes.

Finally, you can select the **Calculate NPV** button. You may select the period, in years, for the NPV calculation as well as the discount rate for the calculation. The software will display the resulting Net Present Value for the cash flow.

## How To Conduct A Pollution Prevention Cost Analysis

This chapter provides a cost analysis exercise which will allow you to use the software and simultaneously learn how to conduct a cost analysis. This exercise will be based on a fictional chemical milling facility.

This facility conducts a coating process, and is in a non-attainment area. The facility is currently producing VOC emissions in excess of the hourly rate allowed under current air quality regulations. In addition, the potential emissions of over 100 tons per year of VOC make this facility a major source and subject to Title V permitting.

There are currently two types of coating material suitable for this facility available on the market.

**Toluene Based:** Produces high VOC emissions. Toluene is a Hazardous Air Pollutant. Extremely flammable. Proven technology, but industry is moving away from Toluene based products because of environmental impacts.

**Water Based:** Produces no VOC emissions. Requires no control equipment. Is not hazardous. Fairly new product, expensive now, but since the largest players in this industry are moving to water based, future prices will probably be lower.

There are two possible methods of applying the coating material.

1. Use of a spray gun, the method currently in use.
2. Use of a dip tank

Given this background information we can begin the cost analysis.

Determine what process in the facility is causing the problem and what alternative processes might yield a solution. In our example, the process causing the problem is spraying the aluminum parts with a toluene based coating material. Based on the information given we can see that alternative processes are a water based spray process, a toluene based dip process, or a water based dip process.

In the Cost Accounting Software you can now enter the different processes which will be considered for our cost analysis.

Process ID	Process Description
1	Toluene Based Spray
2	Water Based Spray
3	Toluene Based Dip
4	Water Based Dip

Once you have identified the processes which will be evaluated, you must look at each process individually to determine all costs associated with each process. The costs associated with a process are generally grouped into three categories: Input Costs, Output Costs, and Hidden Costs.

The Input costs include such things as labor, raw material costs, maintenance, utilities (electricity, water, etc.), or training.

The Output costs might include such things as shipping, waste disposal, or packaging.

The hidden costs can include a number of factors. A list of some of the more commonly occurring is shown below

- permit application costs
- transportation costs
- environmentally related fees
- reporting costs
- storage costs
- record keeping
- inspection and monitoring costs
- wastewater treatment costs

A more comprehensive list is included as a lookup table in the Cost Accounting Software. This lookup table can be edited to include additional types of costs. You can use the tables included below to identify the various costs associated with the four processes which were previously identified.

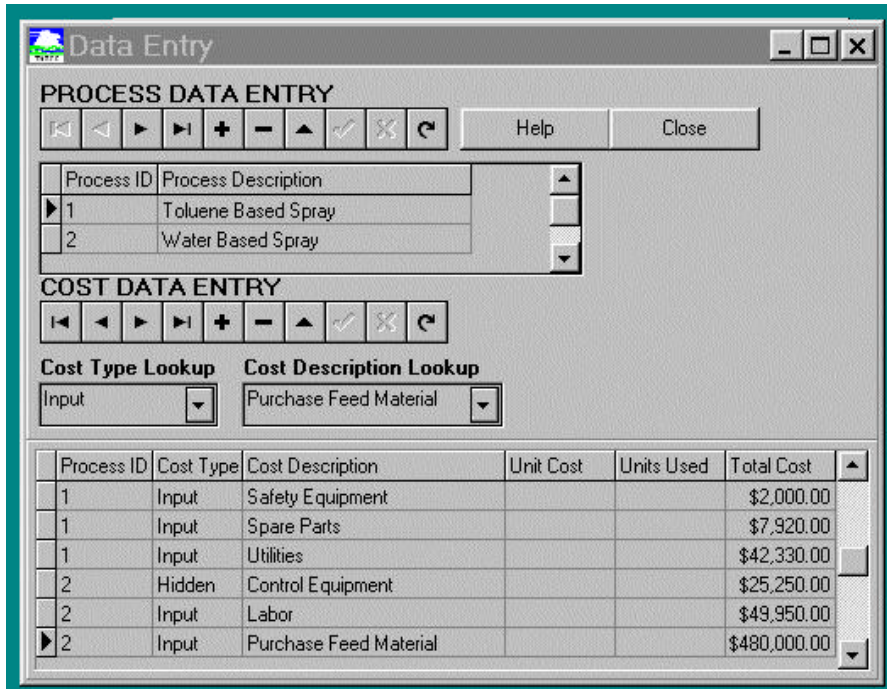
**PROCESS COST DATA**

Toluene Based Spray		Water Based Spray	
Cost Description	Cost	Cost Description	Cost
Purchase Coating material	\$168,000.00	Purchase Coating material	\$480,000.00
Labor	\$49,950.00	Labor	\$49,950.00
Utilities	\$42,330.00	Utilities	\$21,072.00
Operate Control System	\$110,276.00	Operate Control System	\$25,250.00
Permit Costs	\$1,300.00	Permit Costs	\$150.00
Environmental Fees	\$4,998.00	Environmental Fees	\$1,650.00
Maintenance	\$52,236.00	Maintenance	\$3,325.00
Record Keeping	\$4,000.00	Record Keeping	\$1,500.00
Insurance	\$3,000.00	Insurance	\$1,000.00
Sampling & Testing	\$3,000.00	Sampling & Testing	\$1,000.00
Safety Equipment	\$2,000.00	Safety Equipment	\$1,000.00
Purchase Equipment	\$74,623.00	Purchase Equipment	\$4,750.00
Spare Parts	\$7,920.00	Spare Parts	\$750.00
Toluene Based Dip		Water Based Dip	
Cost Description	Cost	Cost Description	Cost
Purchase Coating material	\$82,320.00	Purchase Coating material	\$235,200.00
Labor	\$49,950.00	Labor	\$38,700.00
Utilities	\$42,330.00	Utilities	\$21,072.00
Operate Control System	\$153,679.00	Operate Control System	\$38,500.00
Permit Costs	\$1,300.00	Permit Costs	\$150.00
Environmental Fees	\$4,998.00	Environmental Fees	\$1,250.00
Maintenance	\$56,776.00	Maintenance	\$7,329.00
Record Keeping	\$4,000.00	Record Keeping	\$1,500.00
Insurance	\$3,500.00	Insurance	\$1,000.00
Sampling & Testing	\$3,000.00	Sampling & Testing	\$1,000.00
Safety Equipment	\$2,000.00	Safety Equipment	\$1,000.00
Purchase Equipment	\$81,109.00	Purchase Equipment	\$18,324.00
Spare Parts	\$4,500.00	Spare Parts	\$1,000.00

**There is an additional \$50,000.00 of one time capital cost associated with either of the dip processes**

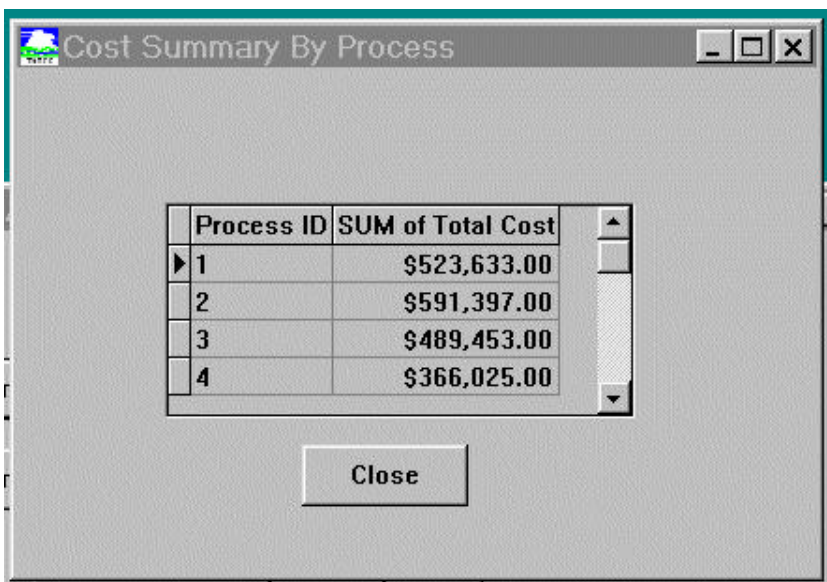
The costs that you want to enter into the Data Entry Section of the Cost Accounting Software are the annually recurring costs for each process.

As you enter the costs the data entry screen should appear as in the graphic below.



Once you have entered the cost data for all four options available in this case you can do a cost analysis and comparison. First, you select the two Options you wish to compare. In this case we will compare Option number 1 and Option number 4.

To see the overall annual cost for each option, on the **Main Menu** Press the **Cost Analysis** Button. Next, from the **Cost Analysis** Menu Press the **Summary By Process** button. The resulting screen will show you the annual cost for each process.



The **Itemized Summary** Button on the

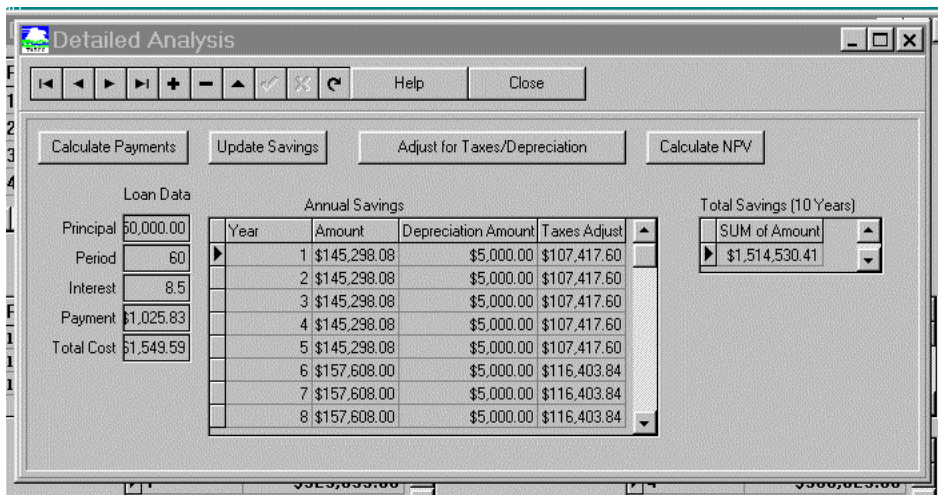
Cost **Analysis** Menu provides the user with an itemized list of cost items for each option.

The **Detailed Analysis** Button will allow the user to compare the costs between two options and consider the effects of non recurring capital costs, depreciation, and taxes on the resulting cash flow to determine of selecting a particular process option is a good financial decision.

When you press the Detailed Analysis Button you will be Asked if there are any capital costs associated with adopting a new process. If you answer yes, the program will ask for the amount of the cost and how much of that cost is subject to depreciation and ask for the period, in years, over which this amount should be depreciated. You will then be asked if the capital costs are paid with a loan. If you answer yes, you will be asked for the annual interest rate of the loan and the payback period in months.

The next screen you see will be a tabular display of the annual cash flow for adopting the new process option. If you used a loan to pay for any capital costs you can press the **Calculate Payment** button to see the monthly loan payment and total amount paid to retire the loan.

The **Update Savings** button will show the tabular display of the resulting annual cash flow after the loan payments are considered and show the payback period in years for return on your investment in the new process option.



Pressing the **Adjust for Taxes/Depreciation** button will ask you for your tax rate, in percent. This is a total tax rate and should include federal, state and local tax rates. You will then see the cash flow table adjusted for the depreciation and taxes. Finally, the **Calculate NPV** button will calculate the net present value

of the cash flow for the number of years you select. Traditionally, if this value is positive, the costs of the new process option are considered a good investment.