INVESTMENT ANALYSIS MONTHLY EXAMPLE WITH REVENUE & EXPENSES
Example USA

Including application of Incremental Cash Flow Analysis

INTRODUCTION
This is an investment analysis example where the investment generates revenues and incurs expenses, which are projected monthly in order to establish the monthly cash flows. It also illustrates the application of incremental cash flow analysis.

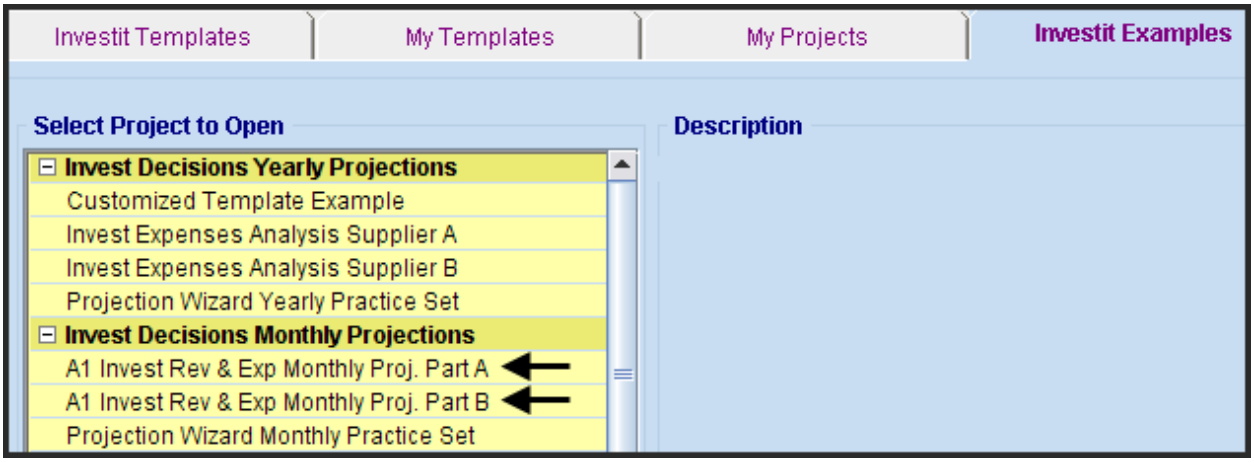
This example is for manufacturing but the analysis applies to profit and non profit organizations such as government, universities, hospitals and service industries. Any situation where;

1. An investment is made in plant, equipment or facilities to produce the product or service or to create cost savings.
2. The investment generates revenues from the sale of products or for the delivery of services.
3. Operating expenses are incurred for labor, materials, utilities, insurance, increased overhead etc.

VERIFYING YOUR ANALYSIS
You can compare your analysis against the two Investit Examples;

1. Invest Rev & Exp Monthly Proj. Part A

2. Invest Rev & Exp Monthly Proj. Part B



EXAMPLE
An organization is considering expanding their production facilities to generate more sales revenue.

OPTION A.
The organization can spend $11,000,000 to expand their New Jersey plant to increase the production and sales of Product A & B. What is there return on investment and is it acceptable?

OPTION B.
For $15,000,000 they can also add a new product called Product Z. In addition, if they spend $15,000,000 they can lower the unit cost of producing produce A and B resulting in additional savings.

The organizations minimum acceptable Internal Rate of Return (IRR)

The organizations minimum acceptable rate of return using the Internal Rate of Return is 12.00% (Before Tax). If the investment doesn't provide a return (IRR) of at least 12.00% it should be rejected.

The decision

Should the organization invest $11,000,000 or $15,000,000? This question is answered using incremental cash flow analysis. The steps are;

1. Enter the information for the $11,000,000 investment and save the project
2. Using "Save As" create a second copy of the $11,000,000 analysis with a new project name
3. Modify the copy of the $11,000,000 analysis to create the $15,000,000 analysis and save
4. Use the "Incremental Cash Flow Report" to compare the two options and to decide;
    a) Is the financial return on the $11,000,000 plant expansion acceptable?
    b) If the $11,000,000 investment is acceptable, can the $15,000,000 investment be justified?
    c) What is the financial return on the additional $4,000,000? Is it acceptable?

This is an example of **"Mutually Exclusive Investments"** The organization can;

1. Do nothing
2. Invest $11,000,000 to increase the sales of Product A & B or
3. Invest $15,000,000 to increase the sales of Products A & B and add product Z.

They can only choose one of the options.

OPTION A Should the $11,000,000 be invested?

Project Info Folder

Project Name: New Jersey $11M Expansion
Project Description: Increased production for Product's A & B
Analysis Period: 10 Years
Analysis Start Date: March 2010
Purchase Price: $11,000,000 *Note: this is not used in any calculations*

Investor Folder

Marginal Tax Rate (Including State Taxes): 35.00%
Capital Gain Rate: 35.00%
Recaptured Deprec. Rate: 35.00%
Desired Return or Discount Rate (Before Tax): 12.00%
Short Term Rates for calculating the Modified Internal Rate of Return (MIRR)
Short Term Financing Rate (Before Tax): 7.00%
Short Term Reinvestment Rate (Before Tax): 2.50%

Investment Folder

Investment: $11,000,000 Year 2010 March
Depreciation: 200% Declining Balance. Recovery Period: 7 years

Working Capital Folder

Working Capital: $200,000 Year 2010 March

Expenses Folder

Labor: $60,000 per month for 12 months then increasing at 2.00% per year compounding for 2 years then 3.00% compounding per year
Materials: 40.00% of Revenues
Repairs & Maintenance: $20,000 per Month for 12 months then increasing at 3.00% compounding per year
Utilities: $3,000 per month for 12 months then increasing at 4.00% compounding per year
Marketing and Sales Fixed Cost: $60,000 per month for 12 months then increasing at 4.00% per year compounding
Sales commission: 20.00% of revenue

Revenue Folder

The new facilities produce two product versions. Product A and B. Projected pricing and sales are;

Product A

Price: Year 1. $3,000 per Unit for the first 12 months then increasing at 3.00% per year compounding

Quantity (Sales per Month):

Year 2010: 100 per month.

Year 2011: 150 per month then increasing at 6.00% per year compounding

Product B

Price: Year 1. $4,500 per unit increasing at 4.00% per year compounding

Quantity (Sales per Month):

Year 2010: 50 per month for 12 months then increasing at 3.00% per year compounding for 2 years then 5.00% compounding per year

Financing Folder

The organization's bank approved the following loan to fund the expansion.

Start Date: March 2010

Type: Standard Mortgage

Amount: $3,000,000

Time Period: 7 years

Amortization Period: 7 years

Interest Rate: 7.00% per year

Payments: Monthly

Salvage Value Folder

Salvage Value: $300,000

Disposition Costs: 10.00% of Salvage Value

OPTION B Should $15,000,000 be invested?

Create a second version of the $11,000,000 investment using “Save As” and make the following changes

Project Info Folder

Project Name: Change to “New Jersey $15M Expansion”
Project Description: Change to “Production for Product’s A, B & Z”

Investor Folder

No change

Investment Folder

Investment: Change to $15,000,000

Working Capital Folder

Working Capital: Change to $260,000

Revenue Folder

Important Note:
Make the changes to the Revenue Folder before making the changes to the Expenses folder

Why? Because the “Materials” and “Sales Commission” expenses are a “% of the Revenue(s) for Products A, B & Z

The new facilities produce three product versions. Projected pricing and sales are;

Product A
No change

Product B
No change

Product Z
Add the information for the product Z

Price: Year 1. $2,100 per Unit increasing at 4.00% per year compounding
Quantity (Sales per Month):
Year 2010: 35 per month then increasing at 7.00% per year compounding

Expenses Folder

Labor: Change from $60,000 to $80,000 per Month for 12 months then increasing at 2.00% per year compounding” for 2 years then 3.00% compounding per year

Materials:
Change from 40.00% to 37.00% of Revenues
Change the “% of Revenue(s)” from 40.00% of the revenue for Product A & B to 37.00% of Products A, B **and Z**

Notes:
Material costs have been reduced from 40.00% to 37.00% of sales because of economies of scale

Repairs & Maintenance: Change from $20,000 per month to $25,000 per Month for 12 months then increasing at 3.00% compounding per year

Utilities: Change to $3,700 per month for 12 months then increasing at 4.00% compounding per year
Marketing and Sales Fixed Cost: Change from $60,000 to $70,000 per Month for 12 months then increasing at 4.00% per year compounding
Sales commission:
20.00% of revenue. No change
Change the "% of Revenue(s)" from 20.00% of the revenue for Product A & B to 2.00% of Products A, B **and Z**

Financing Folder

No change

Salvage Value Folder

Salvage Value: Change to $400,000

INSTRUCTIONS FOR ENTERING THE PROJECT

Template selection

The selection of the appropriate template is based on the following;

1. The analysis involves revenue and expenses
2. Projections are Monthly in order to establish the monthly cash flows
3. Use the “Project Comparison Report” or the “Incremental Cash Flow Report” to compare the two options

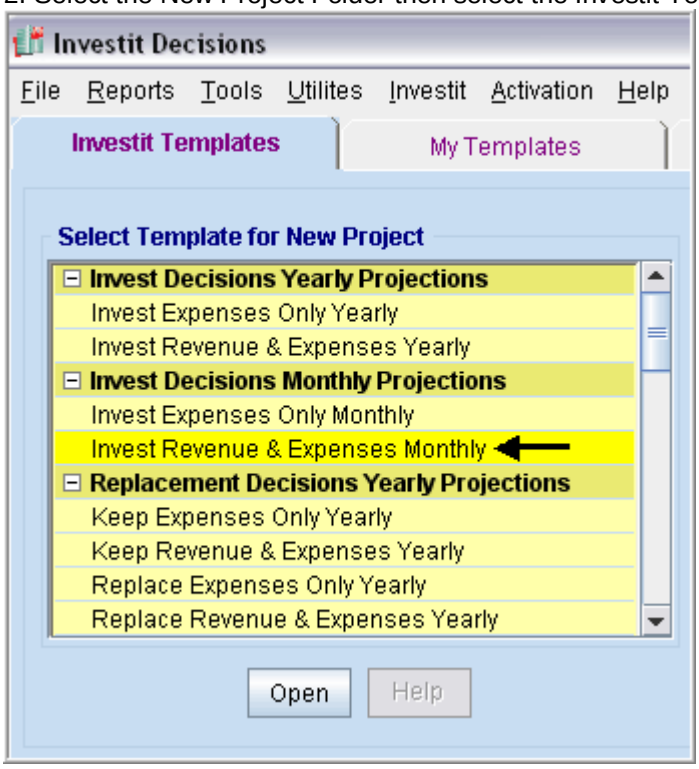
   Template: Invest Revenue & Expenses Monthly projections

INSTRUCTIONS FOR ENTERING OPTION A: $11,000,000 EXPANSION

Getting started

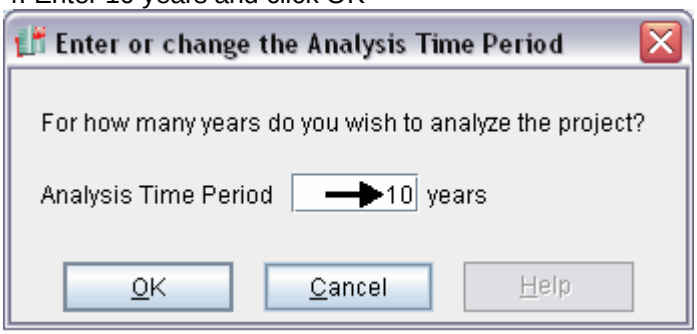
The first step is to open the Investit Template “Invest Revenue & Expenses Monthly” as follows:

1. Open Investit Decisions.
2. Select the New Project Folder then select the Investit Templates folder



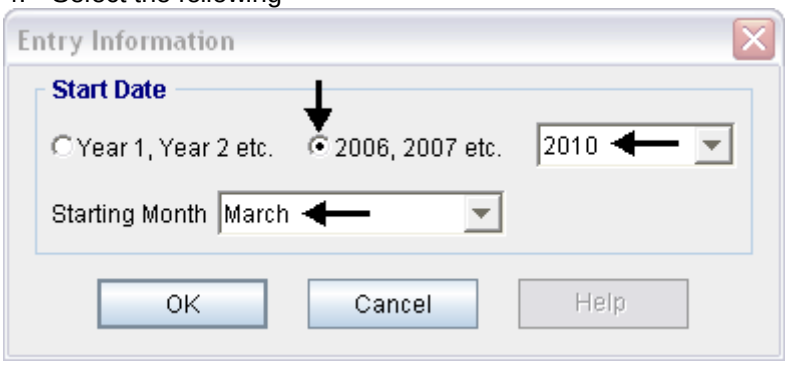
3. Select and open the Investit template “Invest Revenue & Expenses Monthly”. The analysis period dialog will open at this point.

4. Enter 10 years and click OK

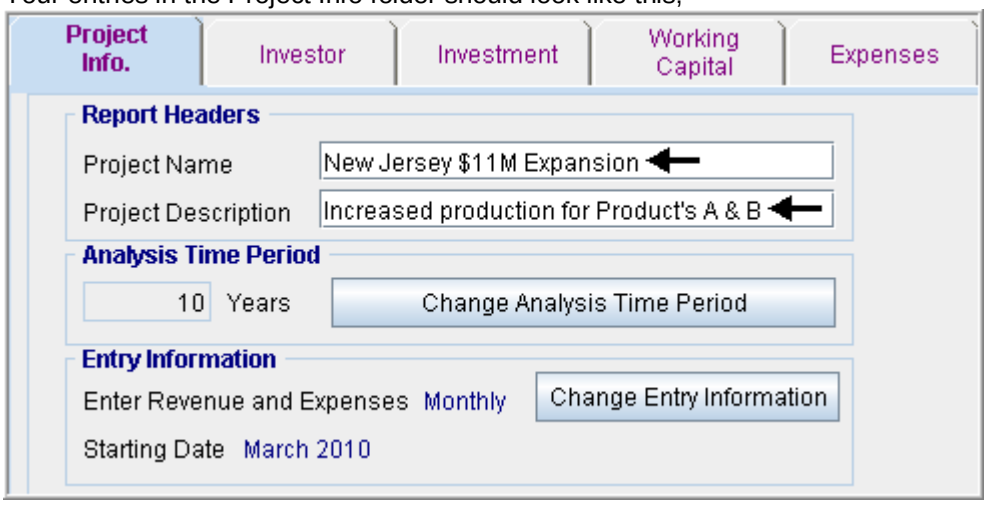


Project Info Folder

1. Enter the Project Name: New Jersey $11M Expansion
2. Enter Description: Increased production for Product's A & B
3. Click on the Change Entry Information button. A dialog window will pop up.
4. Select the following



Your entries in the Project Info folder should look like this;

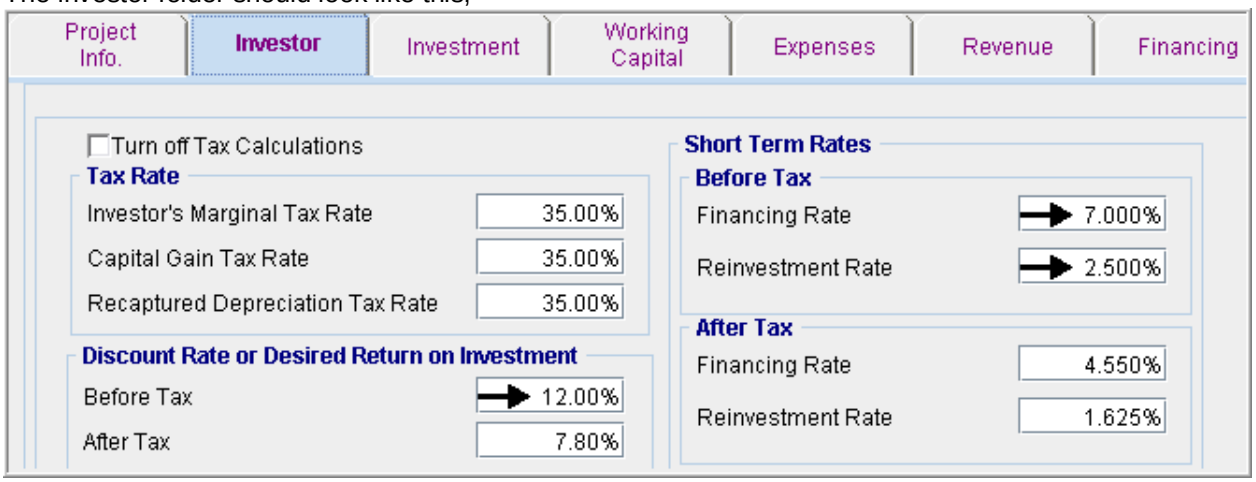


Investor Folder

1. Enter the Discount Rate Before Tax: 12.00%
   Notes: The Discount Rate is used to calculate the Net Present Value and Net Effective Rent
   The program automatically calculates the Discount Rate After Tax

2. Enter Short Term Rates Before Tax
   Financing Rate: 7.00%
   Reinvestment Rate: 2.50%

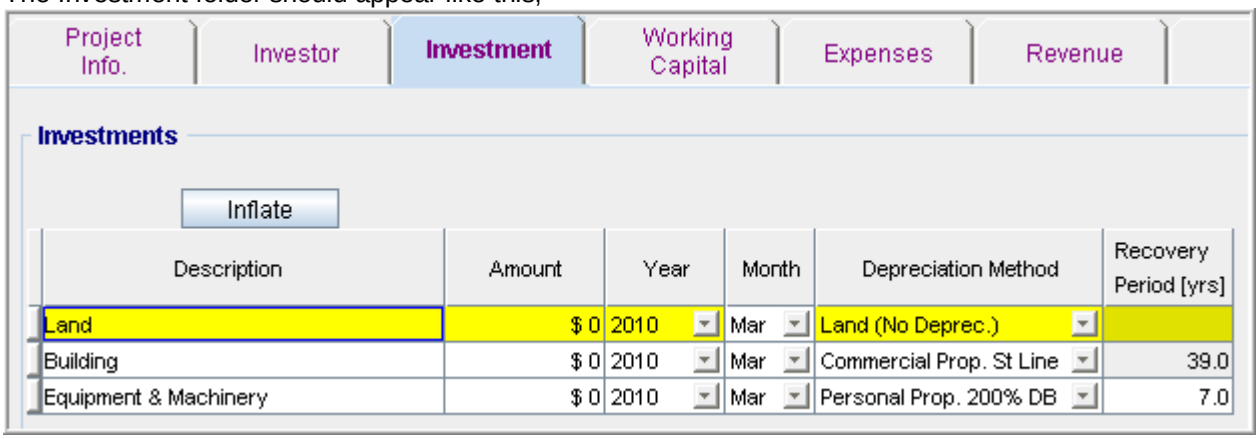
The investor folder should look like this;



Investment Folder

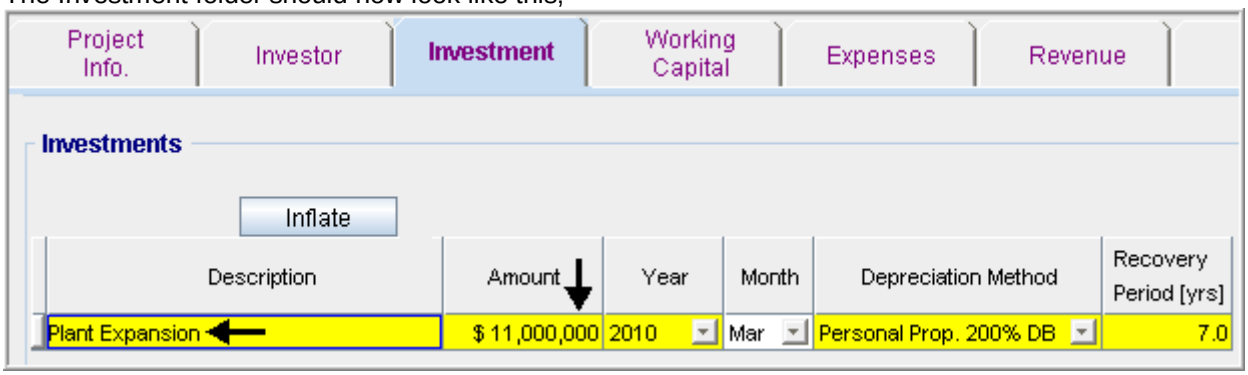
Investment: $11,000,000 Year 2010 March
Depreciation: 200% Declining Balance. Recovery Period: 7 years

The Investment folder should appear like this;



1. Individually Delete rows ‘Land’ and ‘Building’ by selecting the row and clicking on the “Delete” button.
2. Change ‘Equipment & Machinery’ to ‘Plant Expansion’
3. Complete the folder as follows

The Investment folder should now look like this;

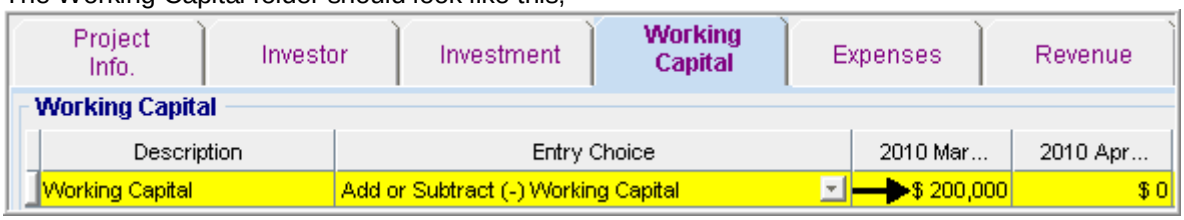


Working Capital Folder

Working Capital: $200,000 Year 2010 March

1. Enter $200,000 directly into the grid for 2010 March

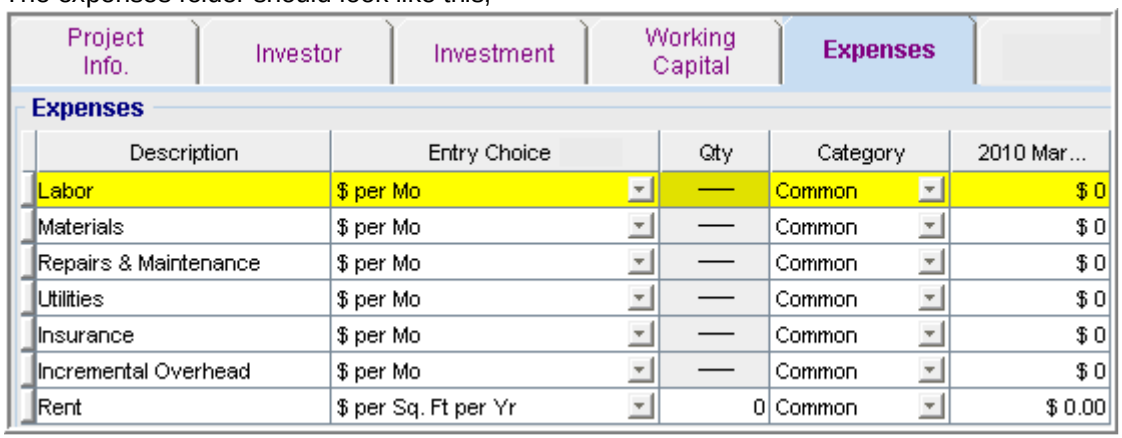
The Working Capital folder should look like this;



Expenses Folder

Labor: $60,000 per month for 12 months then increasing at 2.00% per year compounding for 2 years then 3.00% compounding per year
Materials: 40.00% of Revenues
Repairs & Maintenance: $20,000 per month for 12 months then increasing at 3.00% compounding per year
Utilities: $3,000 per month for 12 months then increasing at 4.00% compounding per year
Marketing & Sales Fixed Cost: $60,000 per month for 12 months then increasing at 4.00% per year compounding
Sales commissions: 20.00% of revenue

The expenses folder should look like this;



Steps for setting up the folder

1. Select row 2 'Materials'
2. Select the entry choice '% of Revenues'. The % of Revenue window will pop up. There will only be one option available check it and Press OK. We will have to return here after we set up the Revenue folder.

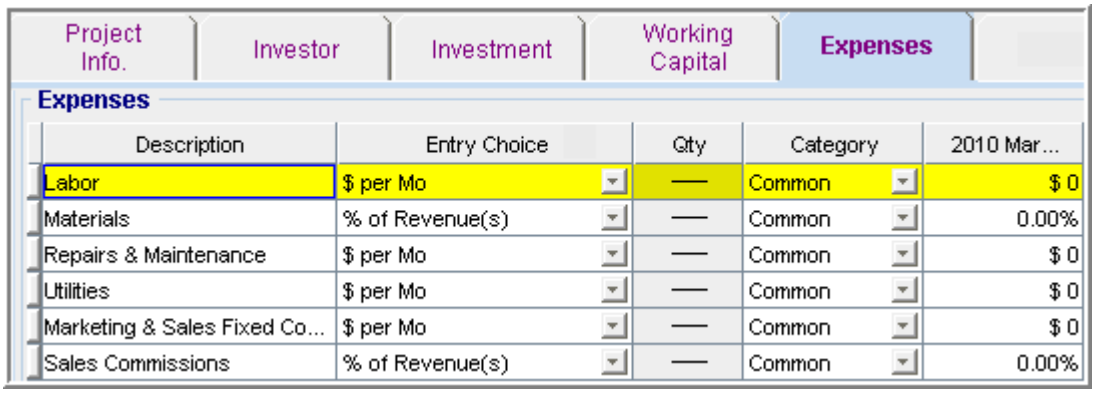
3. Select row with description 'Insurance'
4. Enter description 'Marketing & Sales Fixed Costs'

5. Select row with description 'Incremental Overhead'
6. Enter description 'Sales Commissions'.

7. Select entry choice '% of Revenue' The % of Revenue window will pop up. There will only be one option available check it and Press OK. We will have to return here after we set up the Revenue folder.

8. Select row with description 'Rent'
9. Click on the Delete button

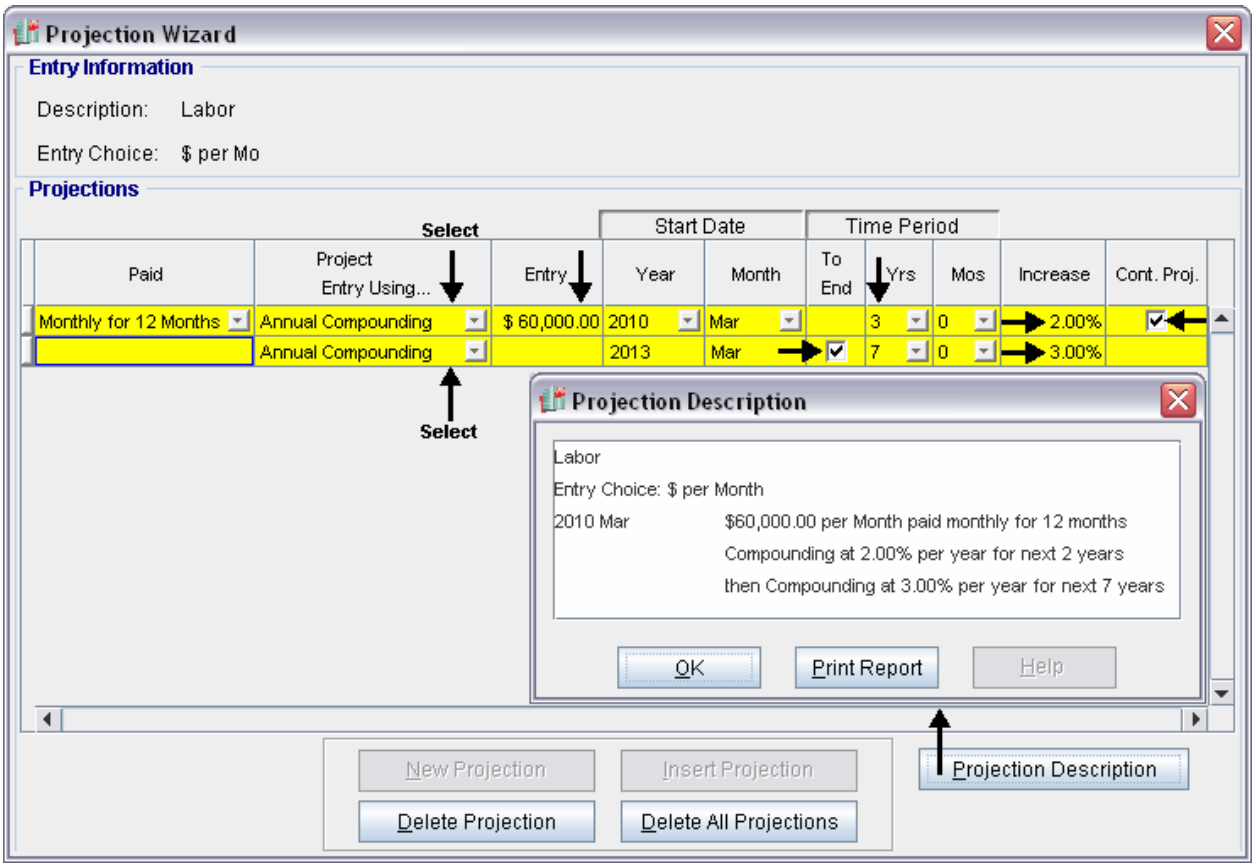
The Expenses folder should now look like this;



Entering the Expenses

Labor: $60,000 per month for 12 months then increasing at 2.00% per year compounding for 2 years then 3.00% compounding per year

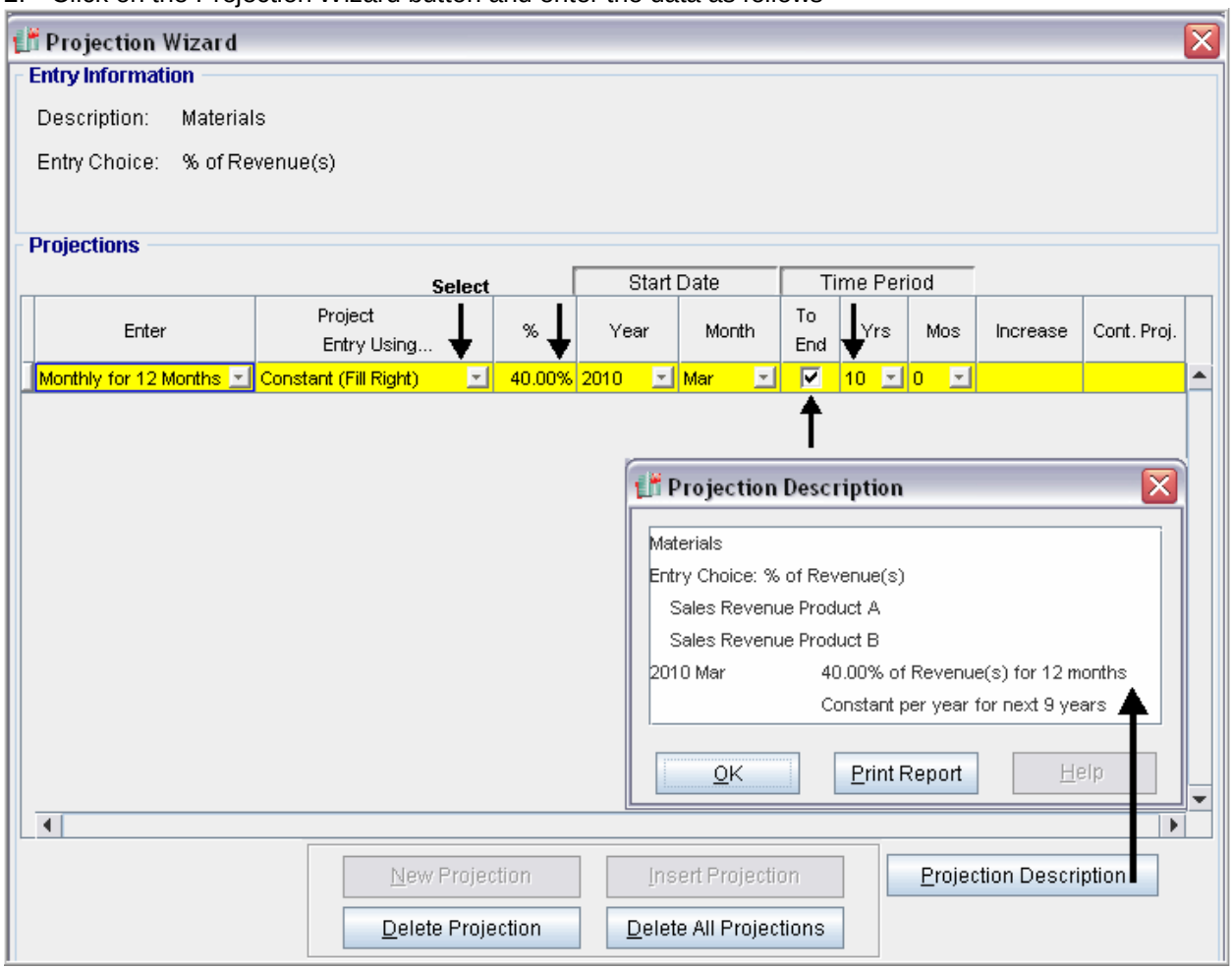
1. Select row 1 'Labor'
2. Click on the Projection Wizard button and enter the data as follows



3. Click OK on the Projection Description window to return to the Projection Wizard
4. Click OK on the Projection Wizard window to save your entries and return to the Expenses folder

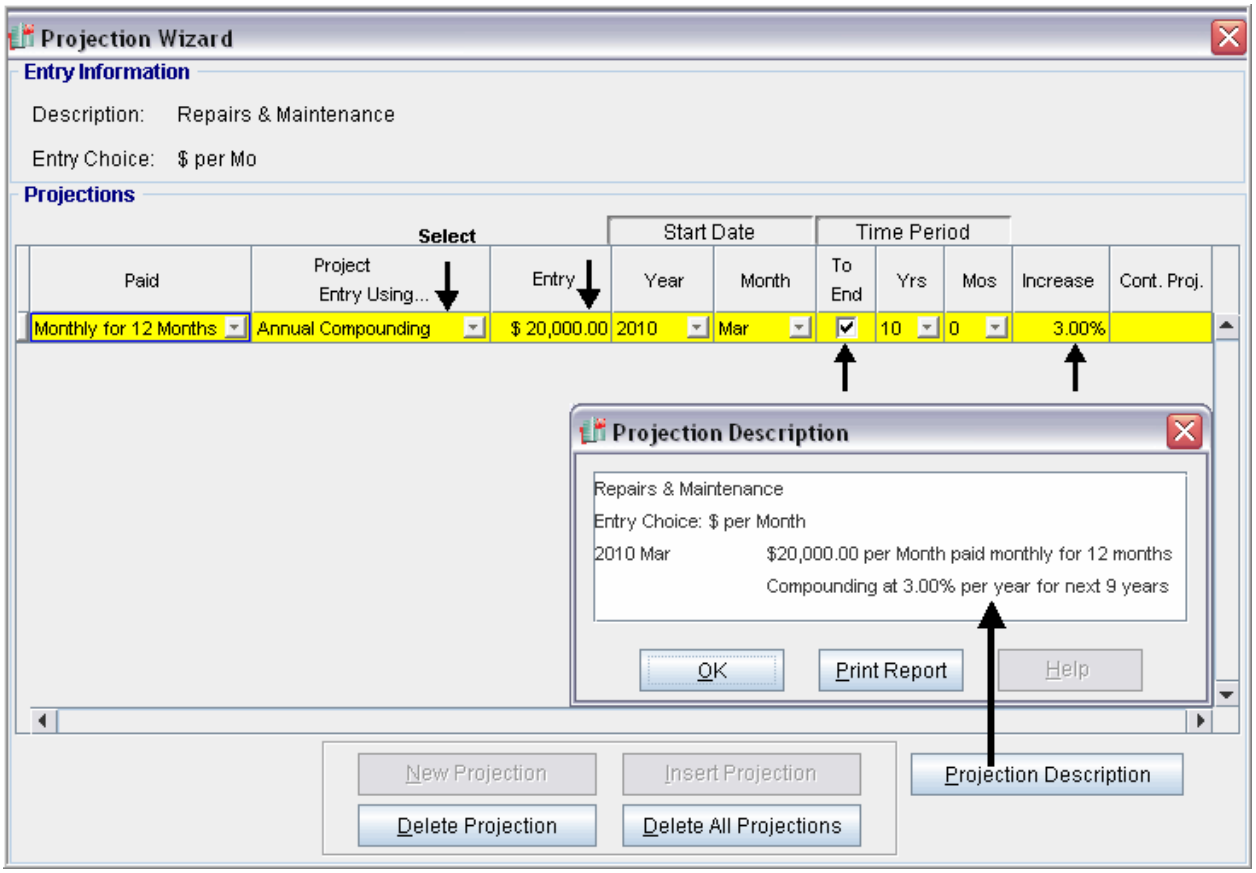
Materials: 40.00% of Revenues

1. Select row with description ‘Materials’
2. Click on the Projection Wizard button and enter the data as follows



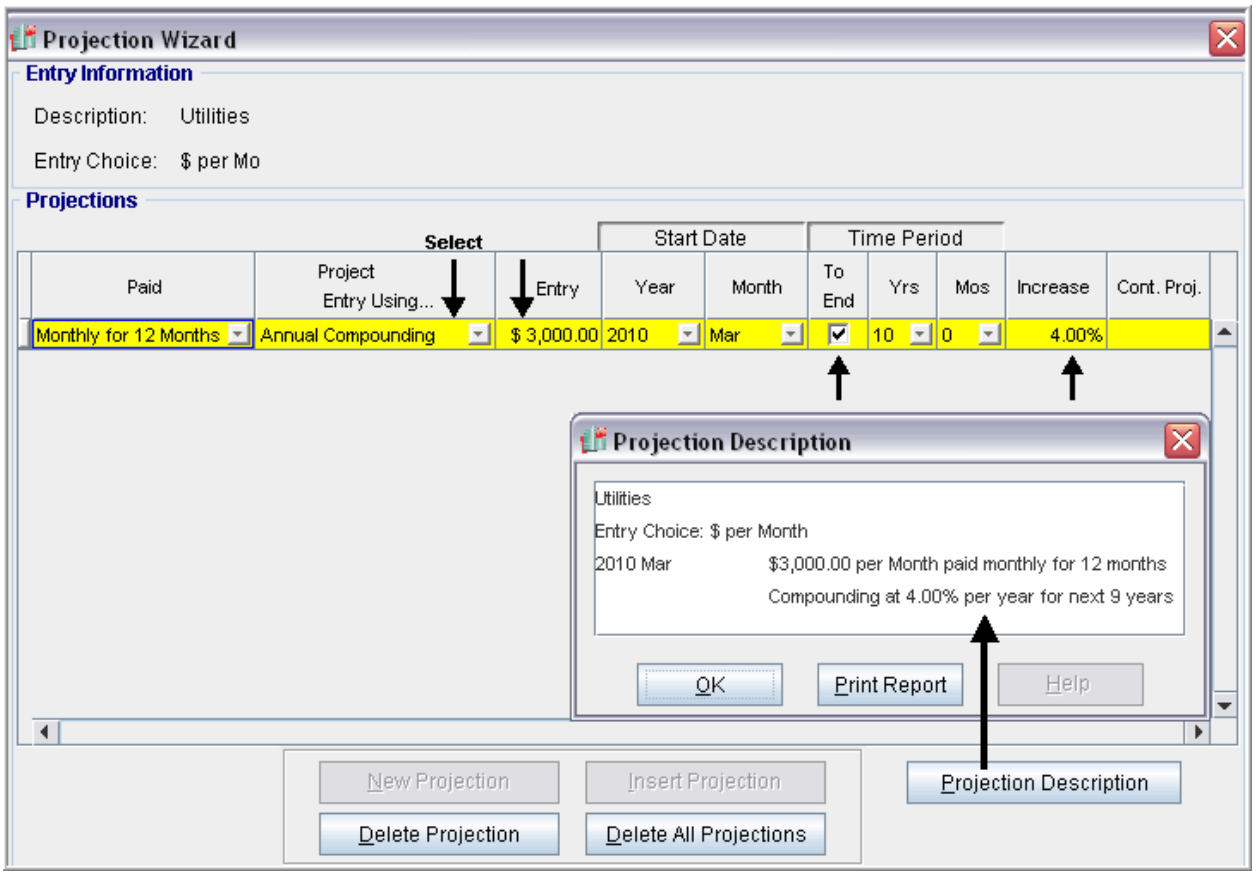
Repairs & Maintenance: $20,000 per month for 12 months then increasing at 3.00% compounding per year.

1. Select row with description ‘Repairs & Maintenance’
2. Click on the Projection Wizard button and enter the data as follows



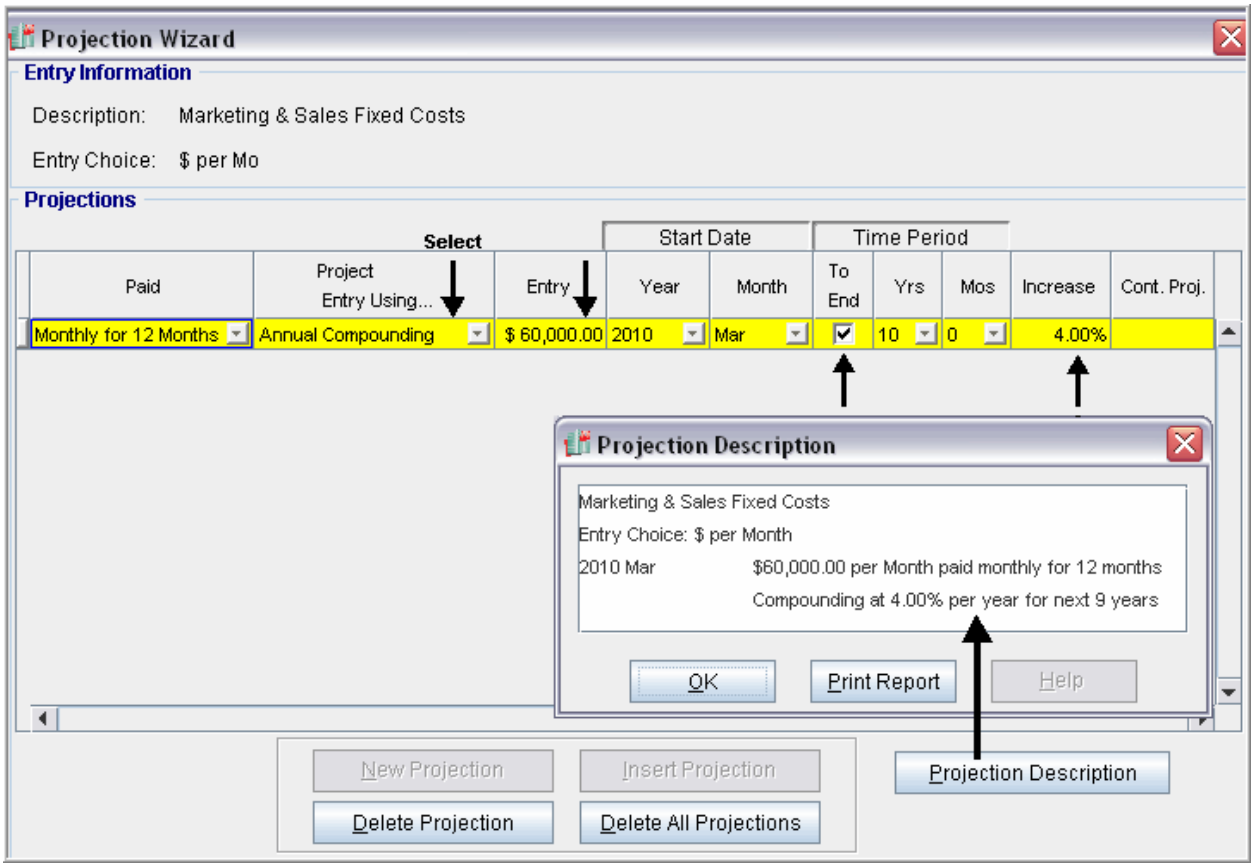
Utilities: $3,000 per month for 12 months then increasing at 4.00% compounding per year

1. Select row with description 'Utilities'
2. Click on the Projection Wizard button and enter the data as follows



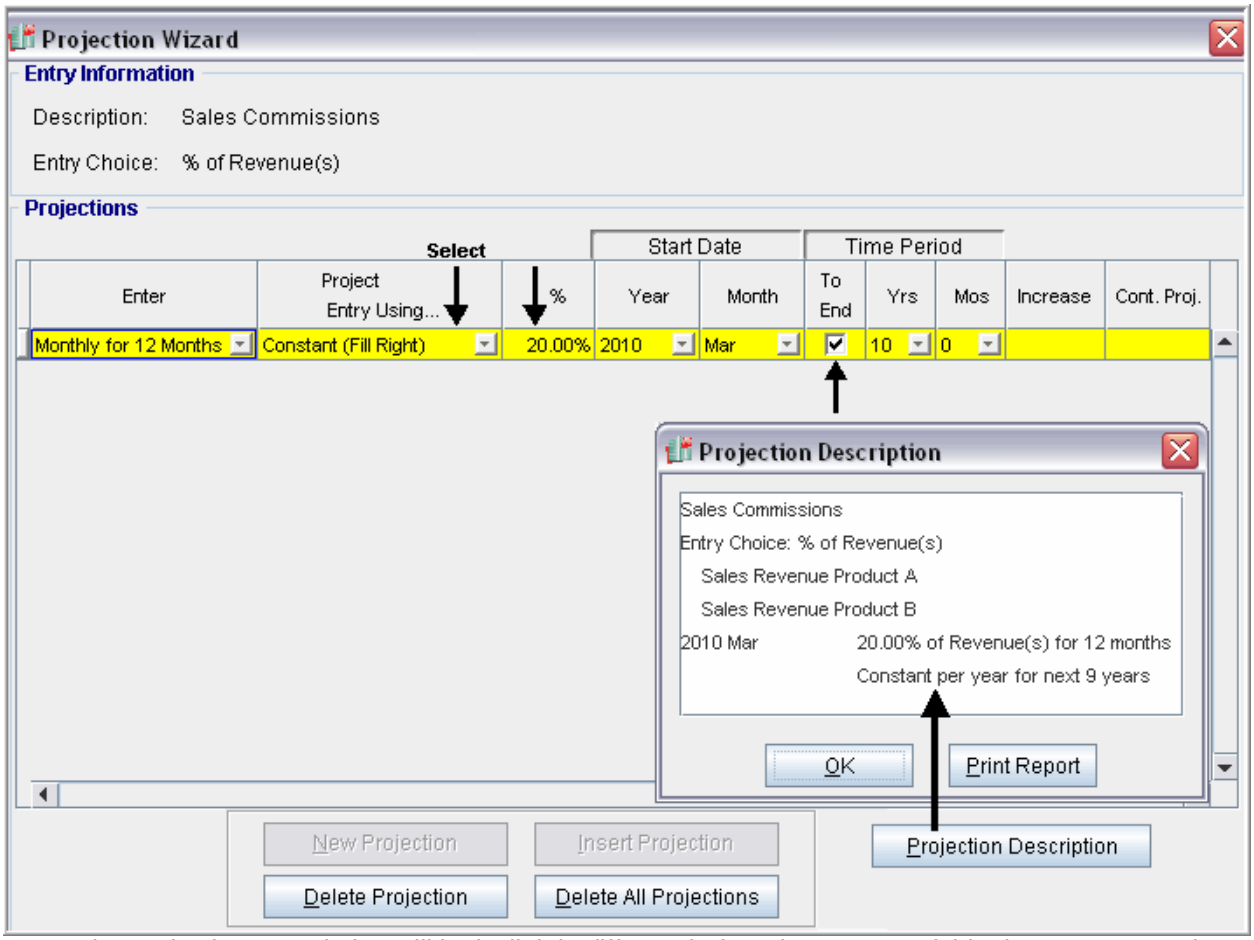
Marketing & Sales Fixed Cost: $60,000 per month for 12 months then increasing at 4.00% per year compounding

1. Select row with description ‘Marketing & Sales Fixed Cost’
2. Click on the Projection Wizard button and enter the data as follows



Sales commissions: 20.00% of revenue

1. Select row with description 'Sales Commissions'
2. Click on the Projection Wizard button and enter the data as follows



Note: The Projection Description will look slightly different before the Revenue folder is set up correctly as Product A and Product B have not been created yet.

Revenue Folder

Product A

Price: Year 2010. $3,000 per Unit for the first 12 months then increasing at 3.00% per year compounding

Quantity (Sales per Month):

Year 2010: 100 per month.

Year 2011: 150 per month then increasing at 6.00% per year compounding

Product B

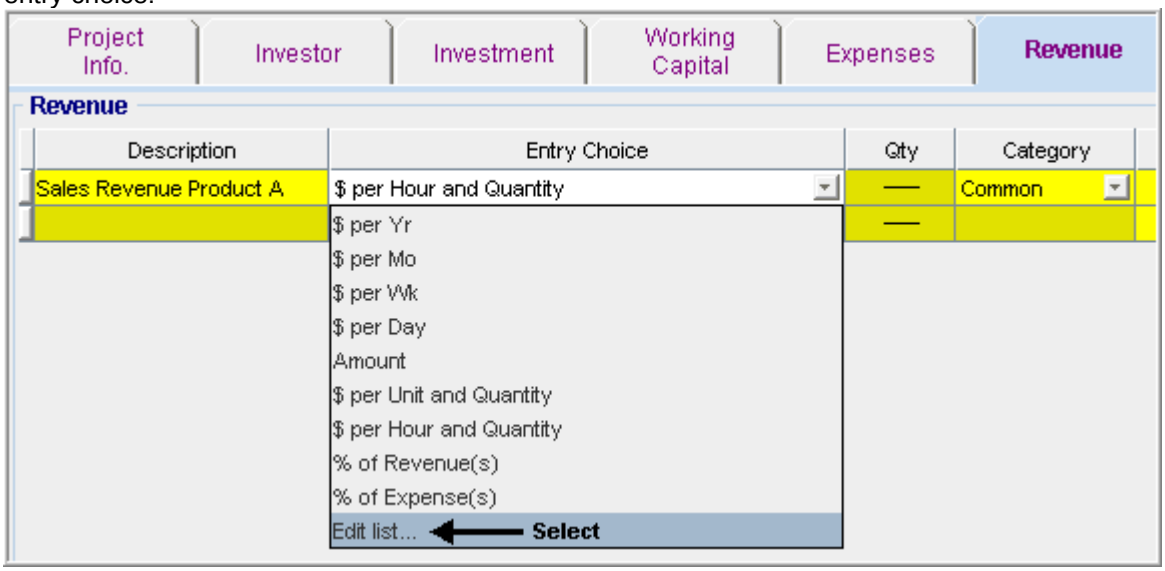
Price: Year 2010: $4,500 per unit for the first 12 months increasing at 4.00% per year compounding

Quantity (Sales per Month): Year 2010: 50 per month for 12 months then increasing at 3% per year compounding for 2 years then 5% compounding per year

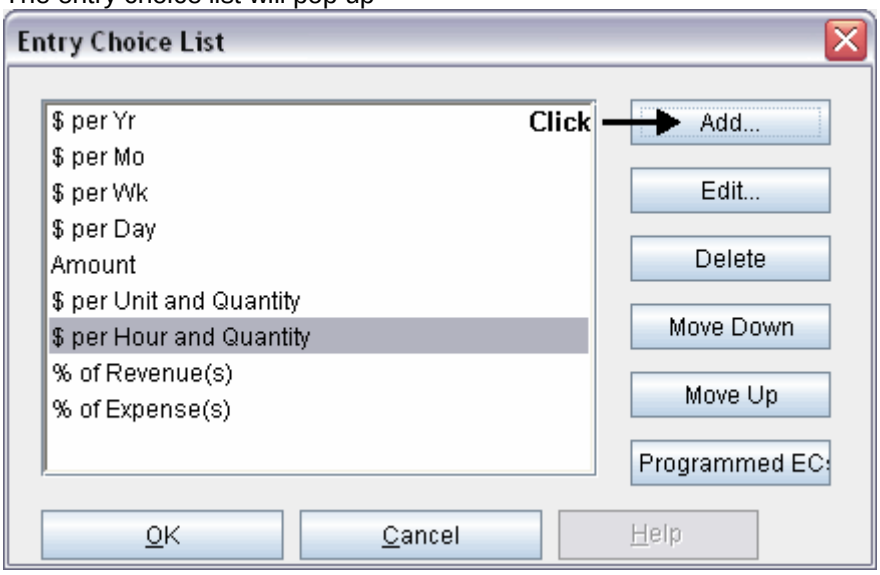
Steps for setting up the folder

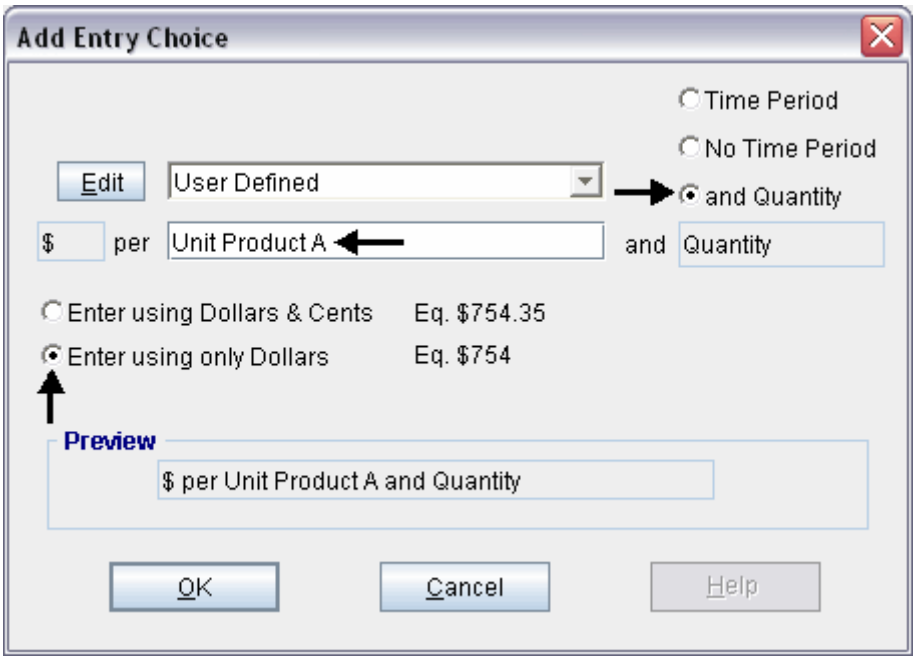
1. In row 1 enter the Description ‘Sales Revenue Product A’

In this example we are using a user defined entry choice. Follow the steps for setting up a user defined entry choice:



The entry choice list will pop up

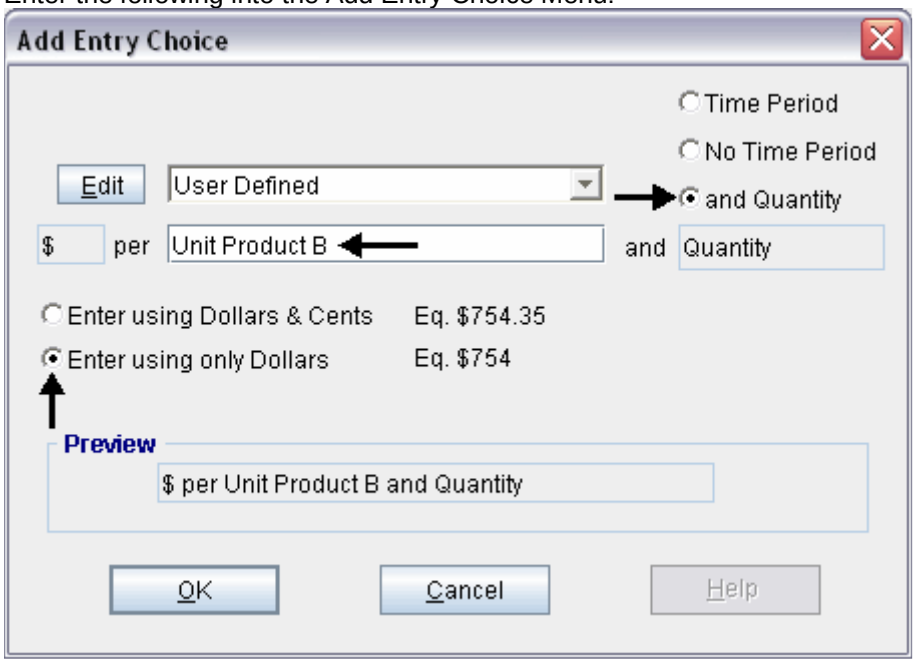




2. Select the entry choice you have just created

3. Press the ADD button to create a new row for Product B
4. Enter the Description 'Sales Revenue Product B'
   Product B also has its own user defined entry choice. Follow the same steps you did to create the entry choice for Product A.

Enter the following into the Add Entry Choice Menu:



Product A

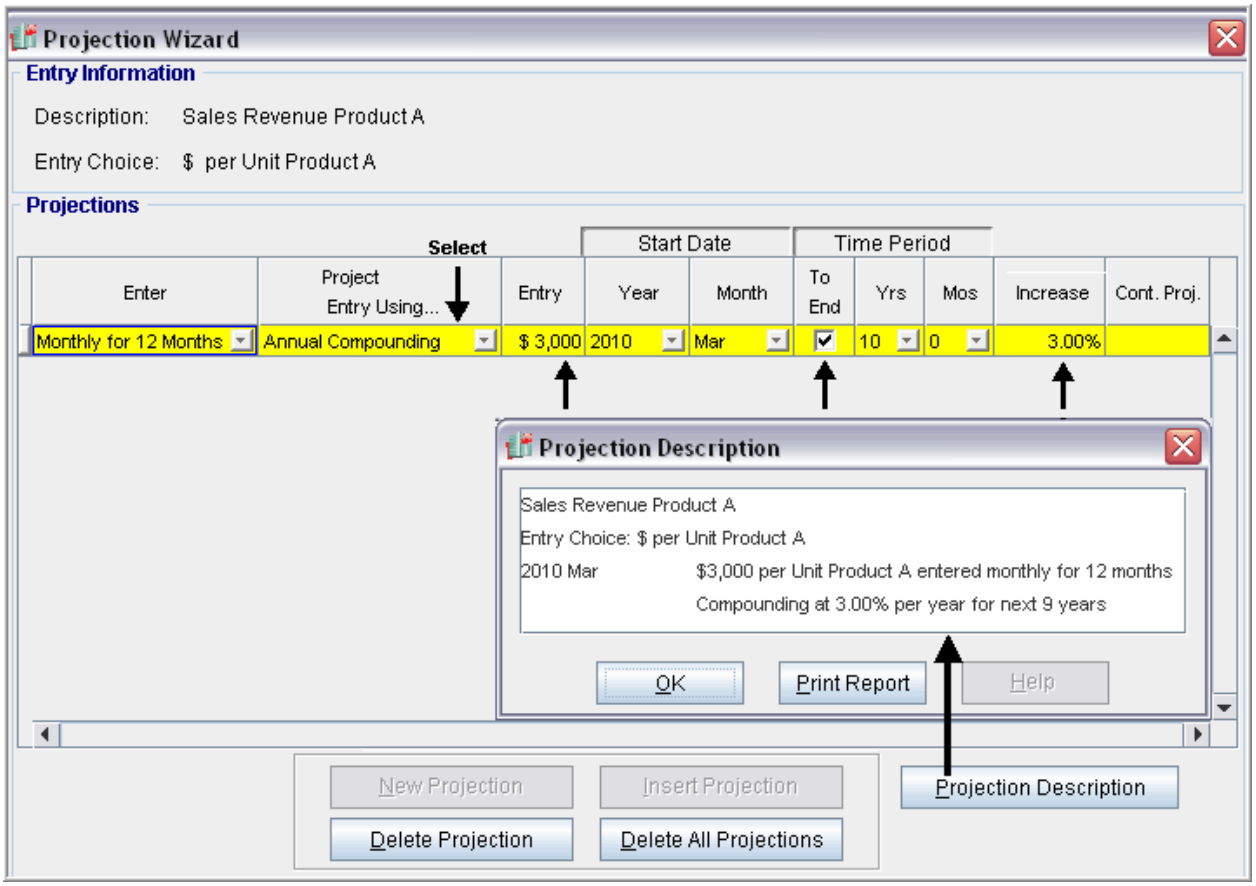
Price: Year 2010: $3,000 per Unit for the first 12 months then increasing at 3.00% per year compounding

Quantity (Sales per Month):

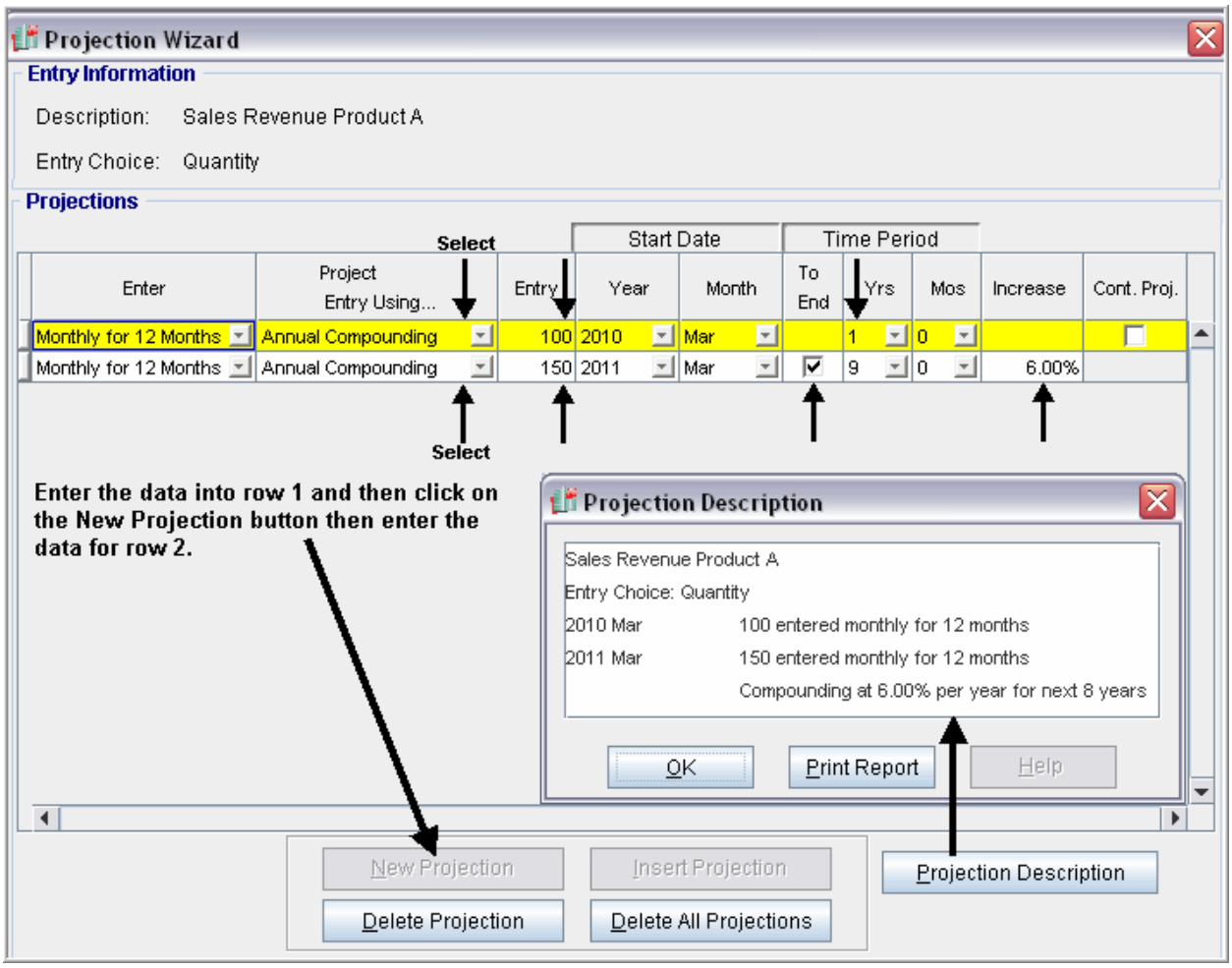
Year 2010: 100 per month.

Year 2011: 150 per month then increasing at 6.00% per year compounding

1. Select the row with the Description 'Sales Revenue Product A' and click on the Projection Wizard button.
2. Enter the following entries into the Projection Wizard



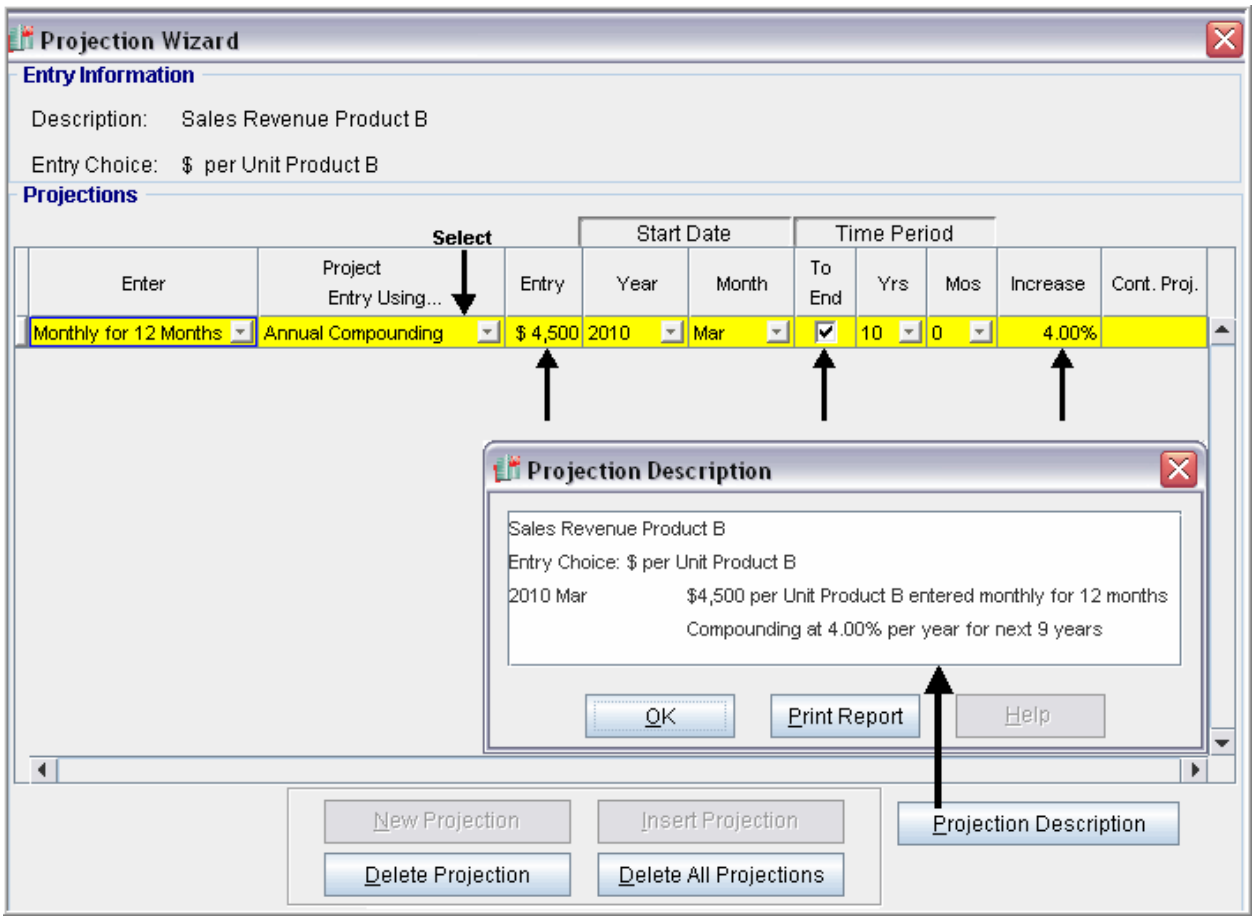
3. Select row 2 and click on the Projection Wizard to enter the Quantity for Product A
4. Enter the following entries into the Projection Wizard



Product B

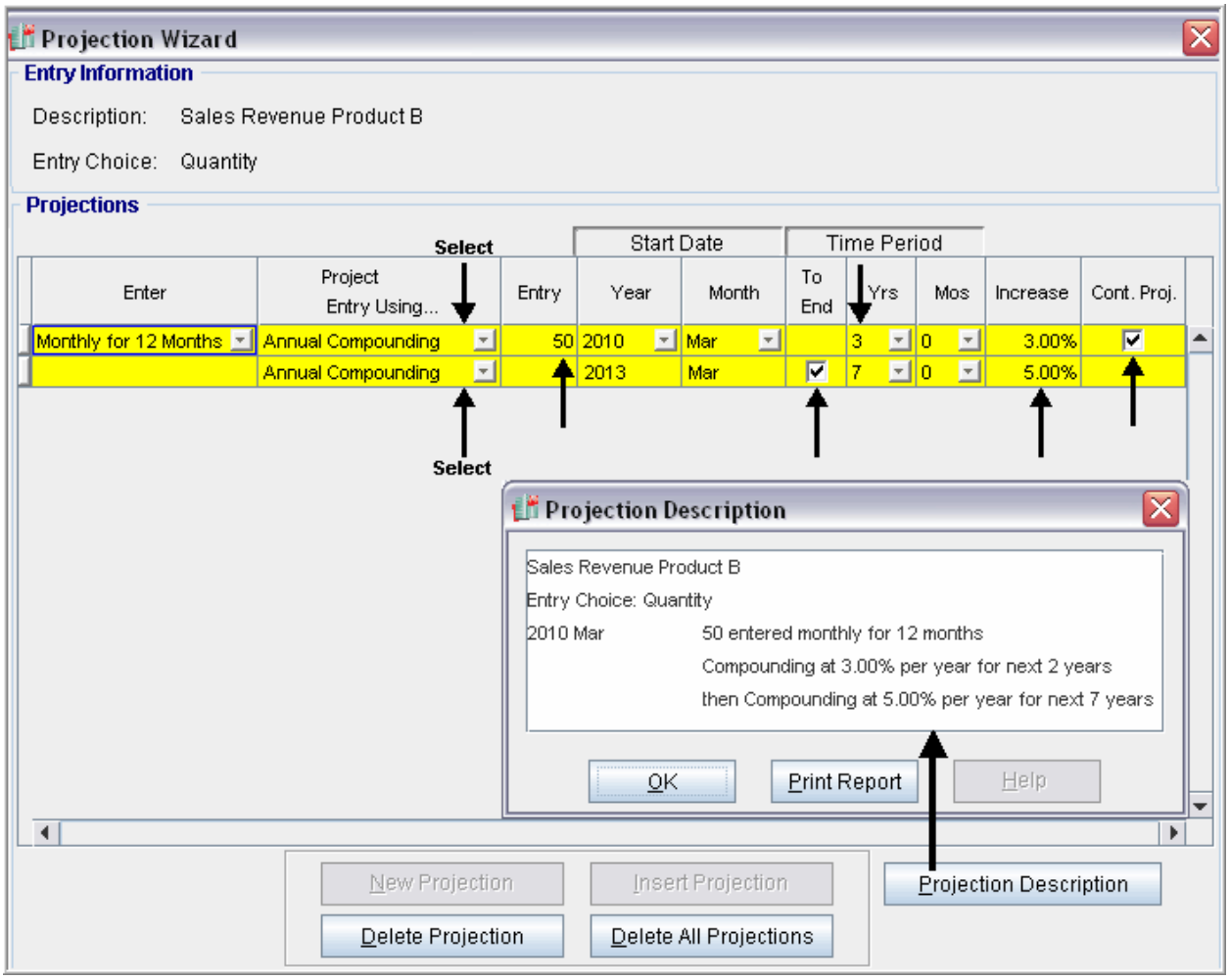
Price: Year 2010: $4,500 per unit for the first year increasing at 4.00% per year compounding
Quantity (Sales per Month): Year 2010: 50 per month for 12 months then increasing at 3% per year compounding for 2 years then 5% compounding per year

1. Select the row with the Description 'Sales Revenue Product B' and click on the Projection Wizard button.
2. Enter the following entries into the Projection Wizard



3. Select row 4 and click on the Projection Wizard to enter the Quantity for Product B

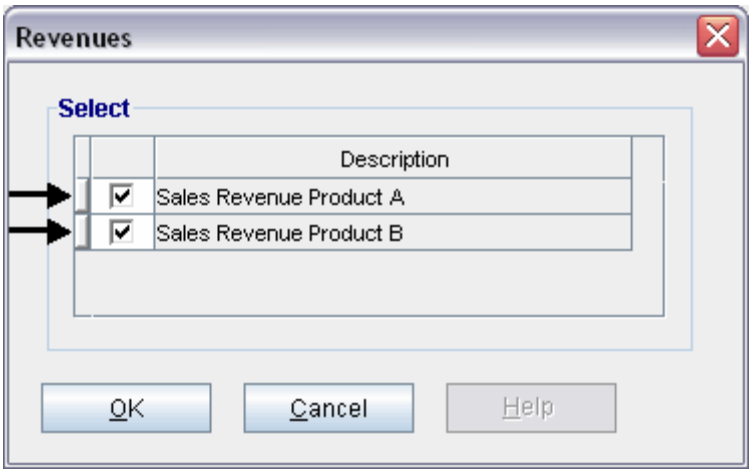
4. Enter the following entries into the Projection Wizard



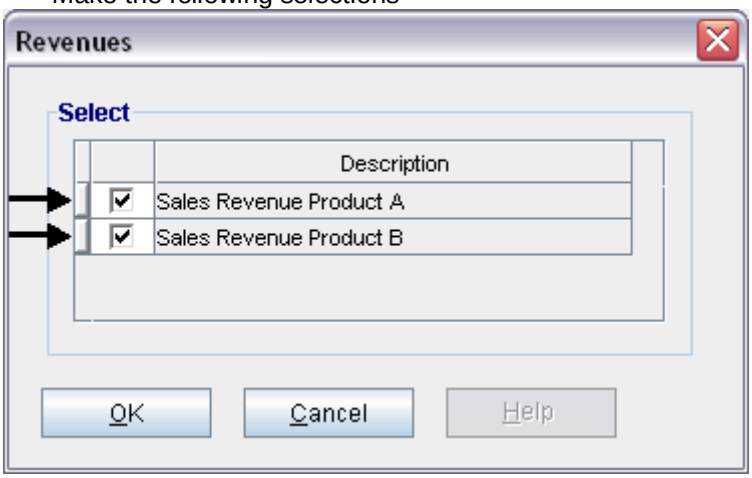
Expenses Folder

Now that the Revenues have been entered the expenses that used the entry choice '% of Revenues' need to be revisited. This is why for Project B we will update the Revenue folder first.

1. Select the row with the Description 'Materials' and click the '% of Revenues' button (lower left corner). Make the following selections



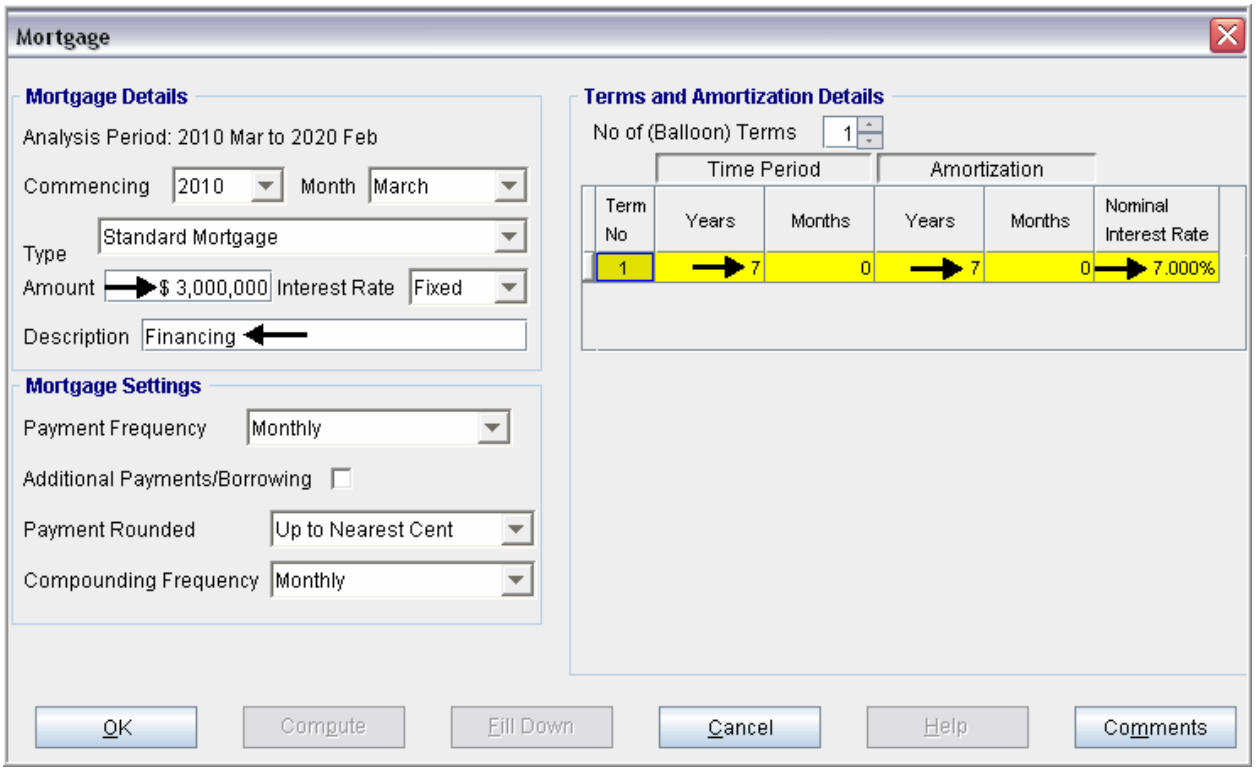
2. Select the row with the Description ‘Sales Commissions’ and click the ‘% of Revenues’ button. Make the following selections



Financing Folder

The organization’s bank approved the following loan to fund the expansion.
Start Date: March 2010
Type: Standard Mortgage
Amount: $3,000,000
Time Period: 7 years
Amortization Period: 7 years
Interest Rate: 7.00% per year
Payments: Monthly

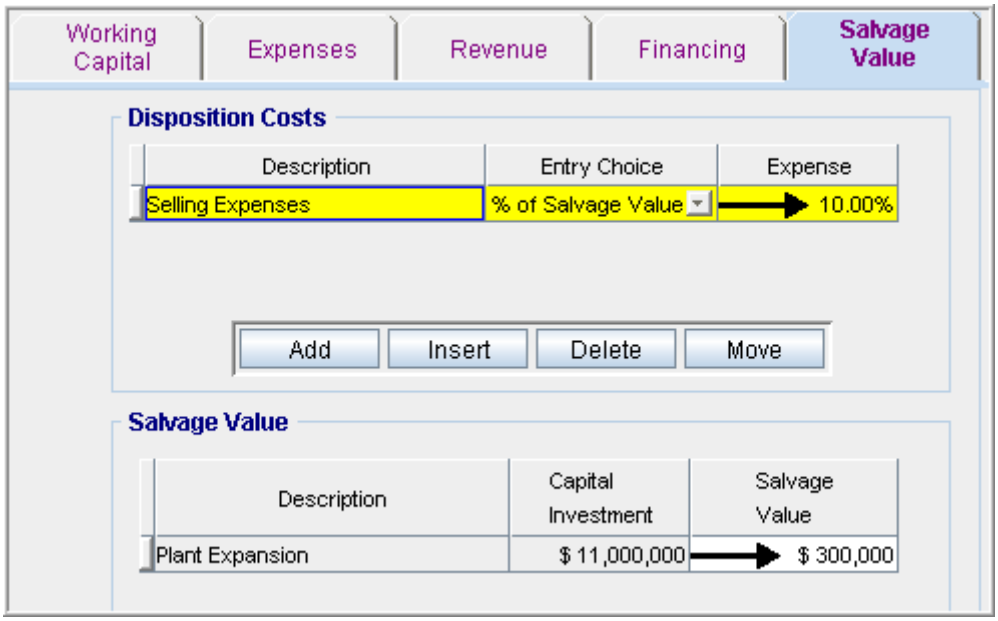
1. Click on the Add Mortgage button and enter the following into the Mortgage window



Salvage Value Folder

Salvage Value: $300,000
Disposition Costs: 10.00% of Salvage Value

1. Enter the following into the Salvage Value folder



Save This Project

INSTRUCTIONS FOR ENTERING OPTION B: $15,000,000 EXPANSION

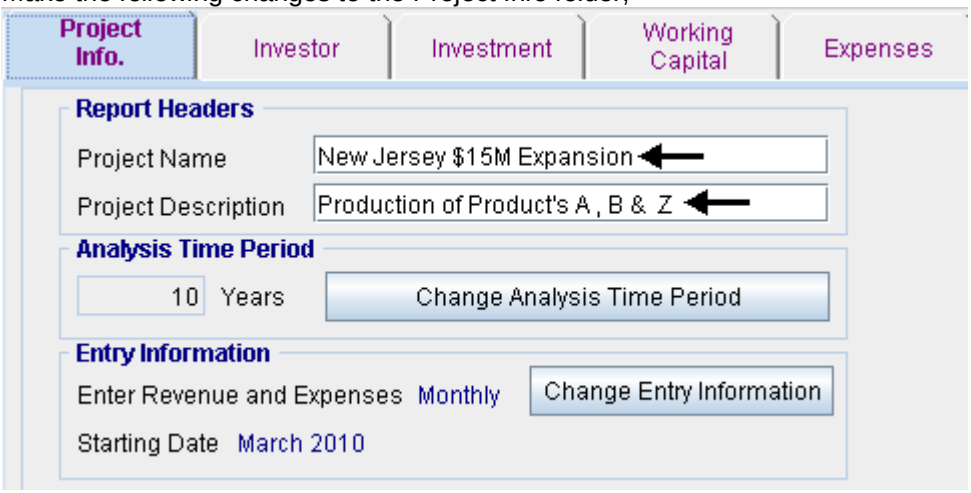
Getting started
The first step is to create a duplicate of Project A.

1. Open Project A within Investit Decisions.
2. Go to the File menu and select Save As.
3. Change the name to Project B and save

Project Info Folder

Project Name: Change to "New Jersey $15M Expansion"
Project Description: Change to "Production for Product's A, B & Z"

Make the following changes to the Project Info folder;

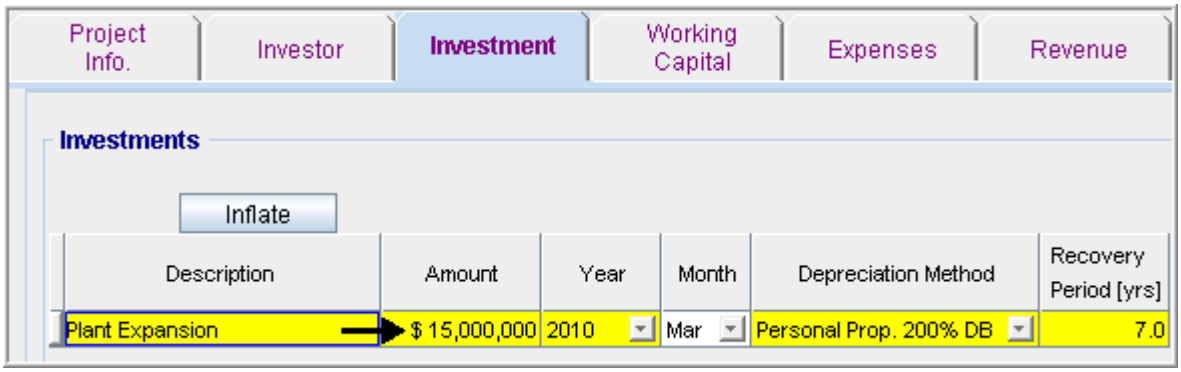


Investor Folder

The Investor folder is unchanged.

Investment Folder

Plant Expansion: Change to $15,000,000



Working Capital Folder

Working Capital: Change to $260,000

Revenue Folder

Important Note:

Make the changes to the Revenue Folder before making the changes to the Expenses folder

Why? Because the "Materials" and "Sales Commission" expenses are a "% of the Revenue(s) for Products A, B & Z

The new facilities produce three product versions. Projected pricing and sales are;

Product A
No change

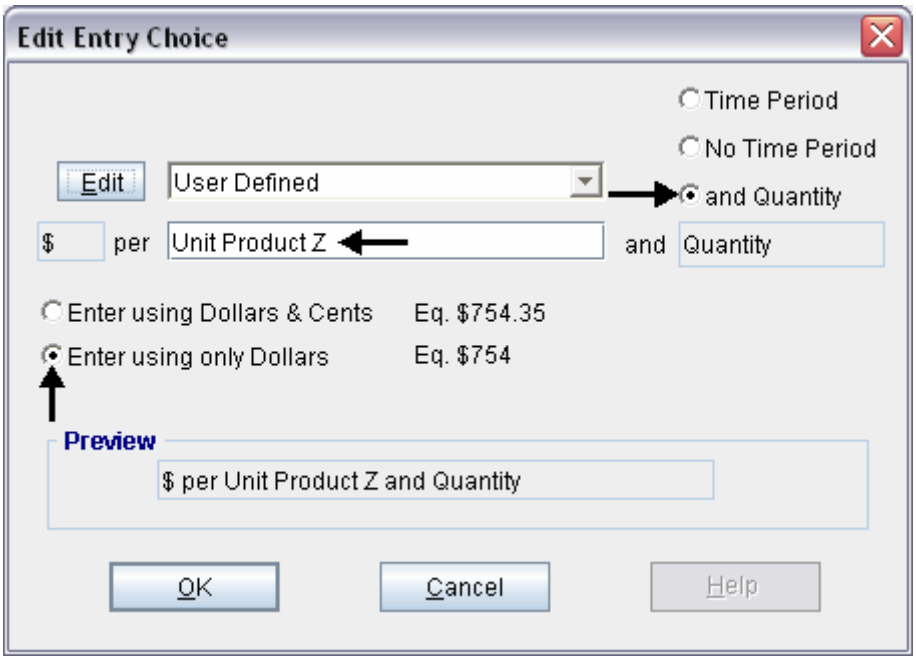
Product B
No change

Product Z
Add the information for the product Z

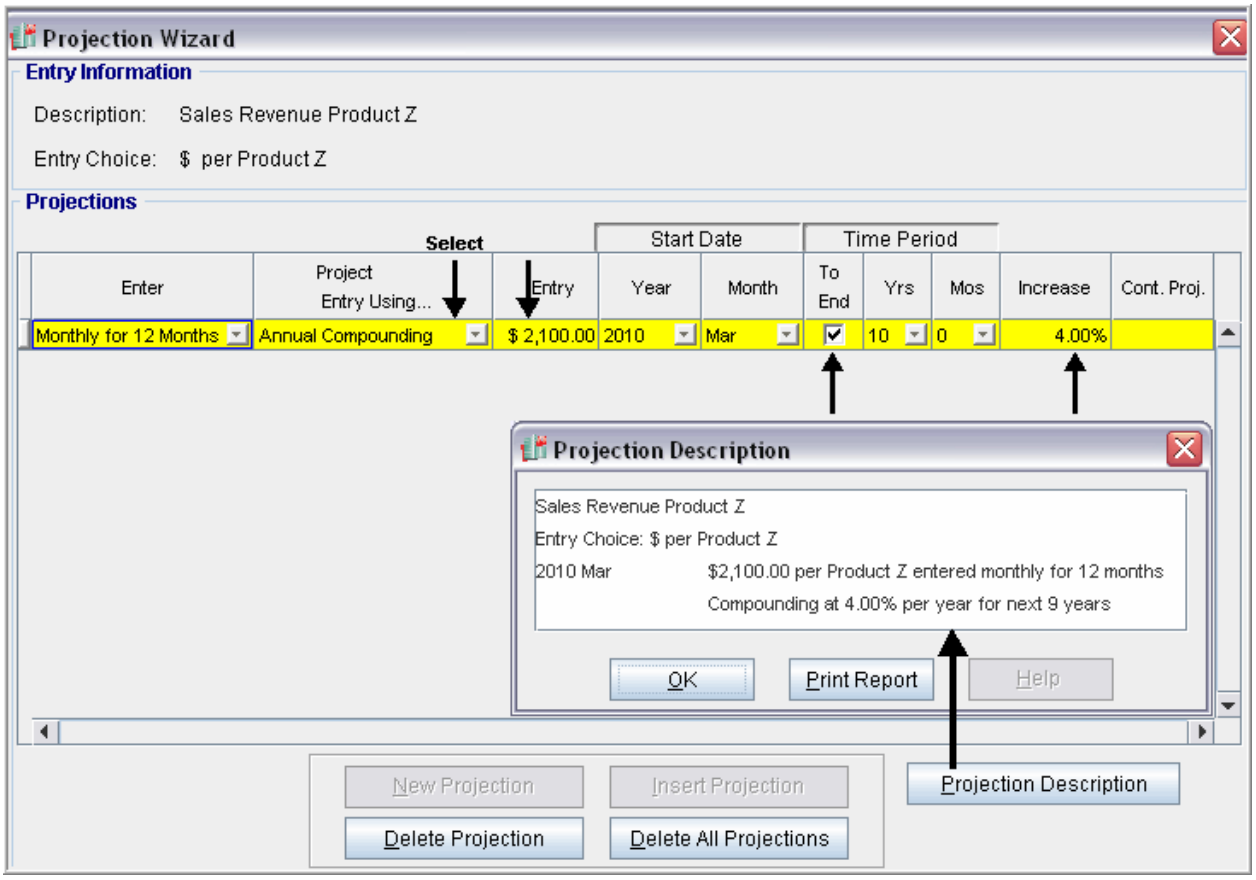
Price: Year 2010: $2,100 per Unit for the first 12 months increasing at 4.00% per year compounding
Quantity (Sales per Month): Year 2010: 35 per month then increasing at 7.00% per year compounding

Steps for setting up the Revenue folder

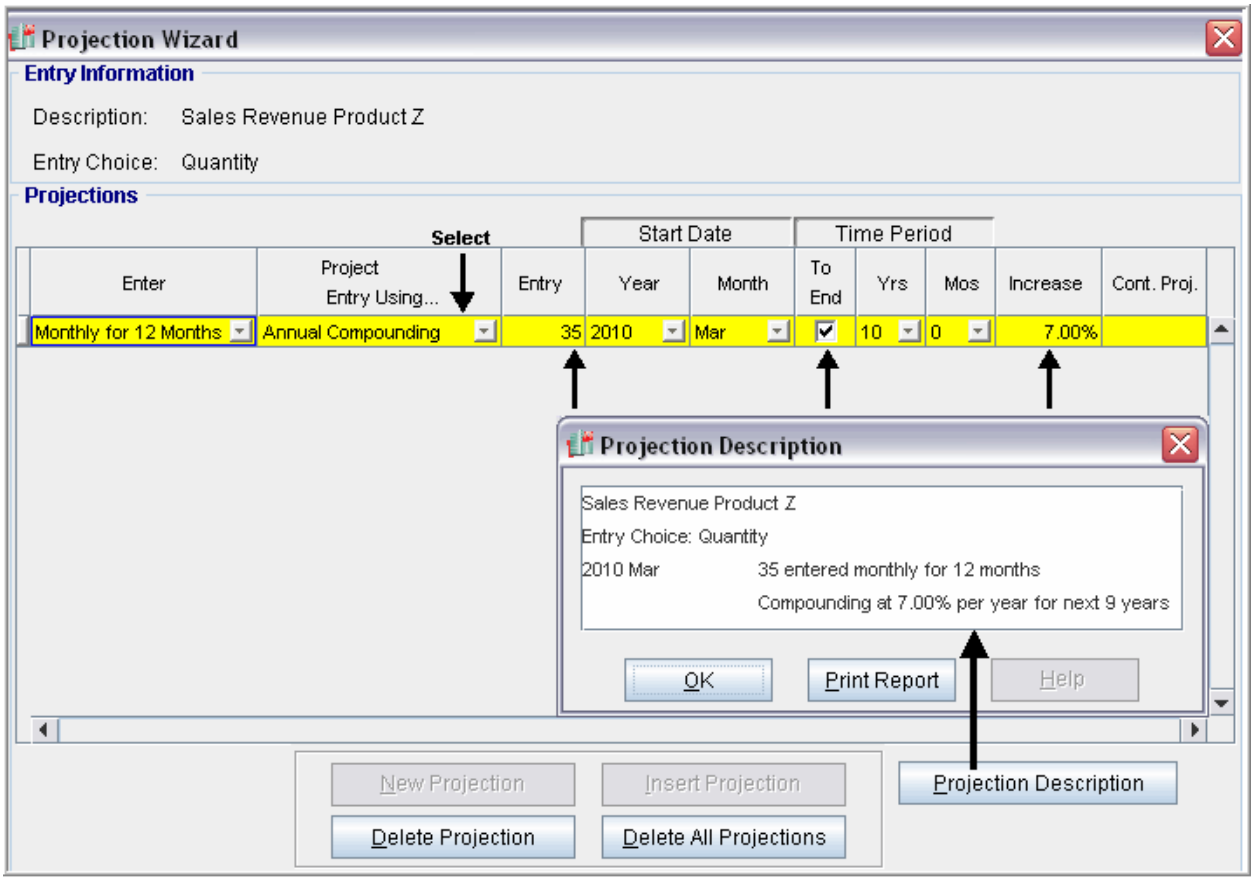
1. Press the "ADD" to create Product Z.
2. Enter the Description 'Sales Revenue Product Z'
3. Create the following entry choice (same procedure as pages 18-19)



4. Click on the Project Wizard button.
5. Enter the following into the Projection Wizard



6. Select the Quantity row for Product Z and click on the Projection Wizard button
7. Enter the following into the Projection Wizard



Expenses Folder

Labor: Change from $60,000 to $80,000 per Month for 12 months then increasing at 2.00% per year compounding for 2 years then 3.00% compounding per year

Materials:
Change from 40.00% to 37.00% of Revenues
Change the "% of Revenue(s)" from 40.00% of the revenue for Product A & B to 37.00% of Products A, B **and Z**

Notes:
Material costs have been reduced from 40.00% to 37.00% of sales because of economies of scale

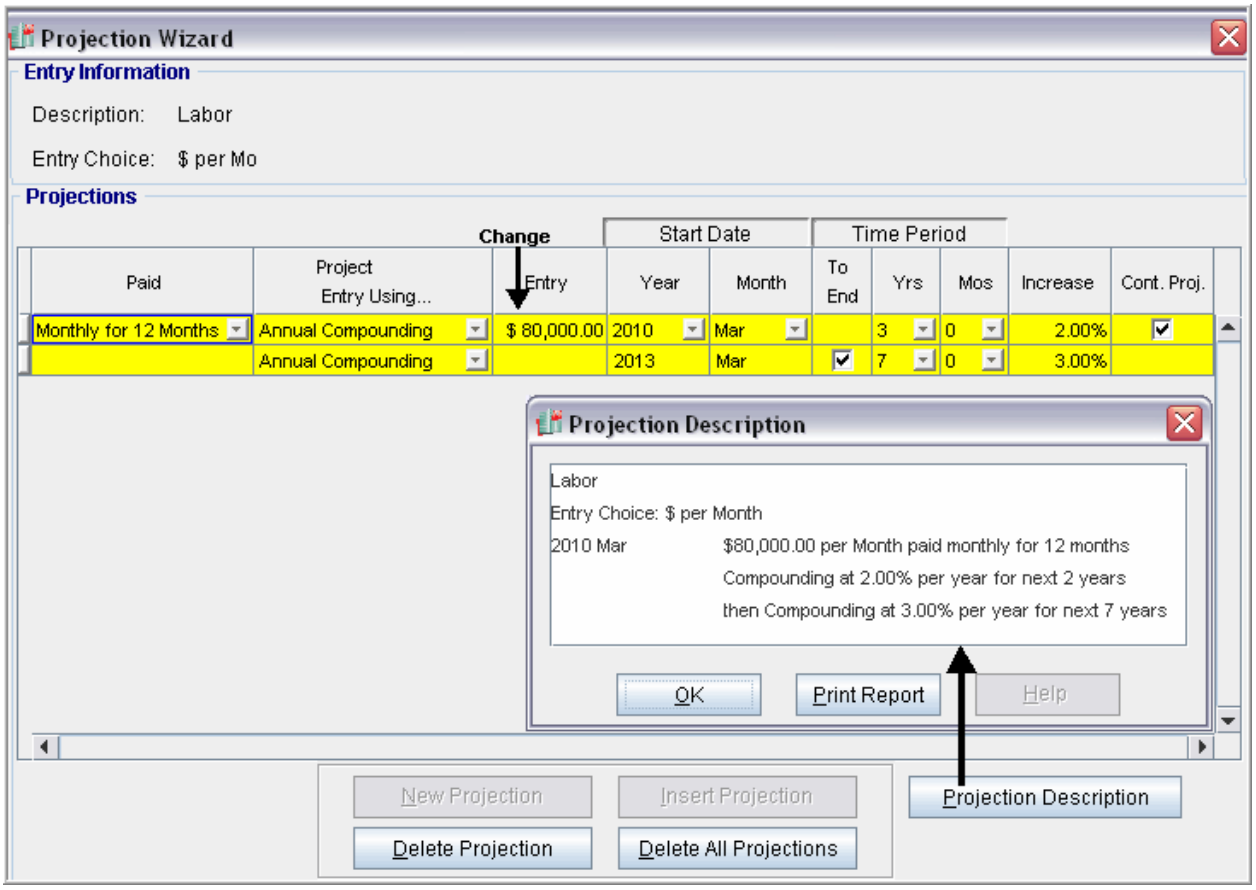
Repairs & Maintenance: Change from $20,000 per month to $25,000 per Month for 12 months then increasing at 3.00% compounding per year

Utilities: Change to $3,700 per month for 12 months then increasing at 4.00% compounding per year

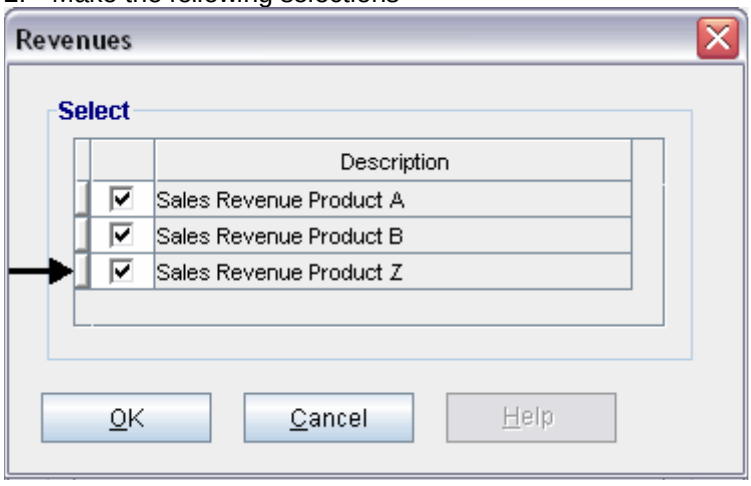
Marketing and Sales Fixed Cost: Change from $60,000 to $70,000 per Month for 12 months then increasing at 4.00% per year compounding

Sales commission:
20.00% of revenue. No change. Change the "% of Revenue(s)" from 20.00% of the revenue for Product A & B to 20.00% of Products A, B **and Z**

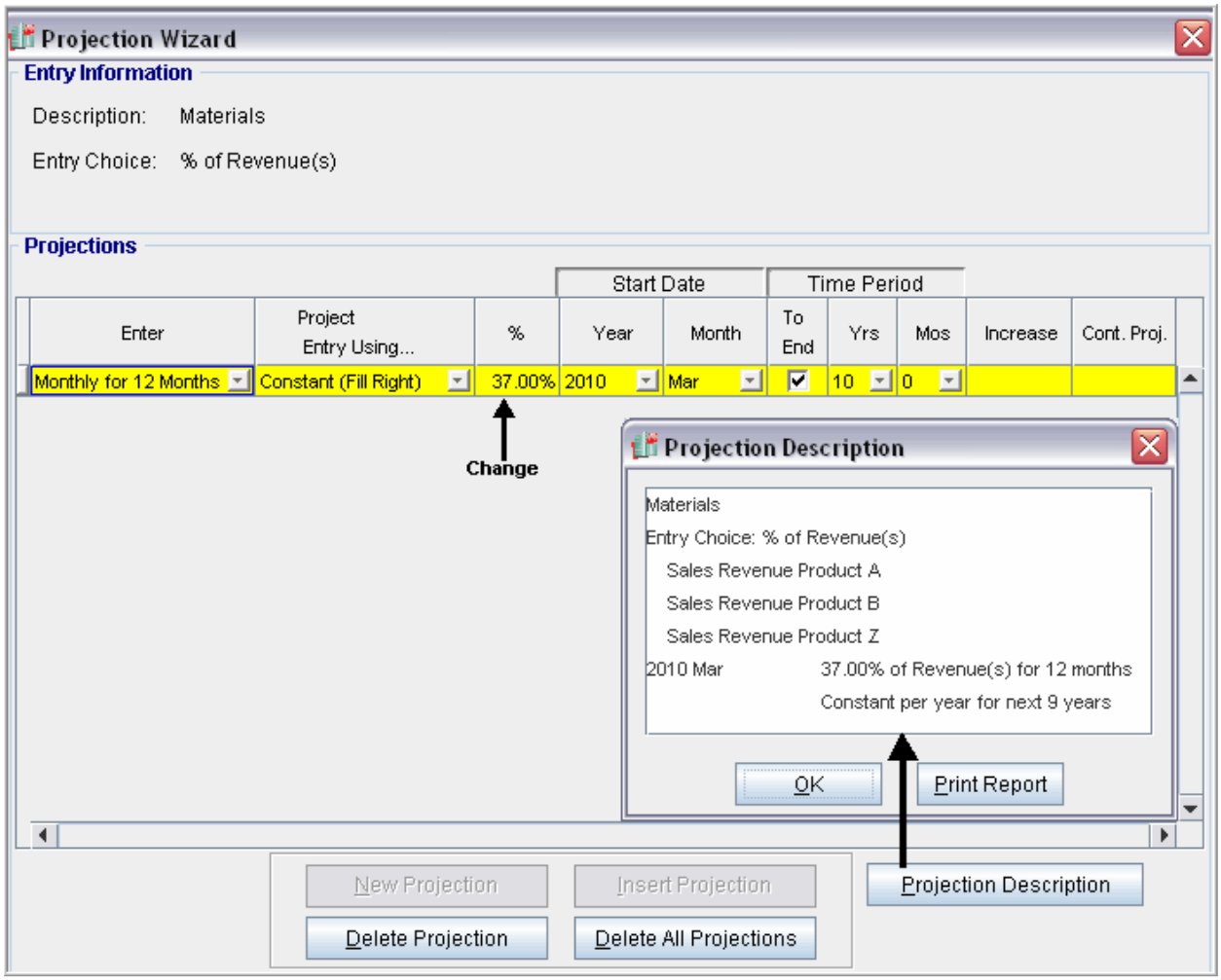
1. Select the row with the description ‘Labor’ and click on the Projection Wizard button
2. Enter the following into the Projection Wizard



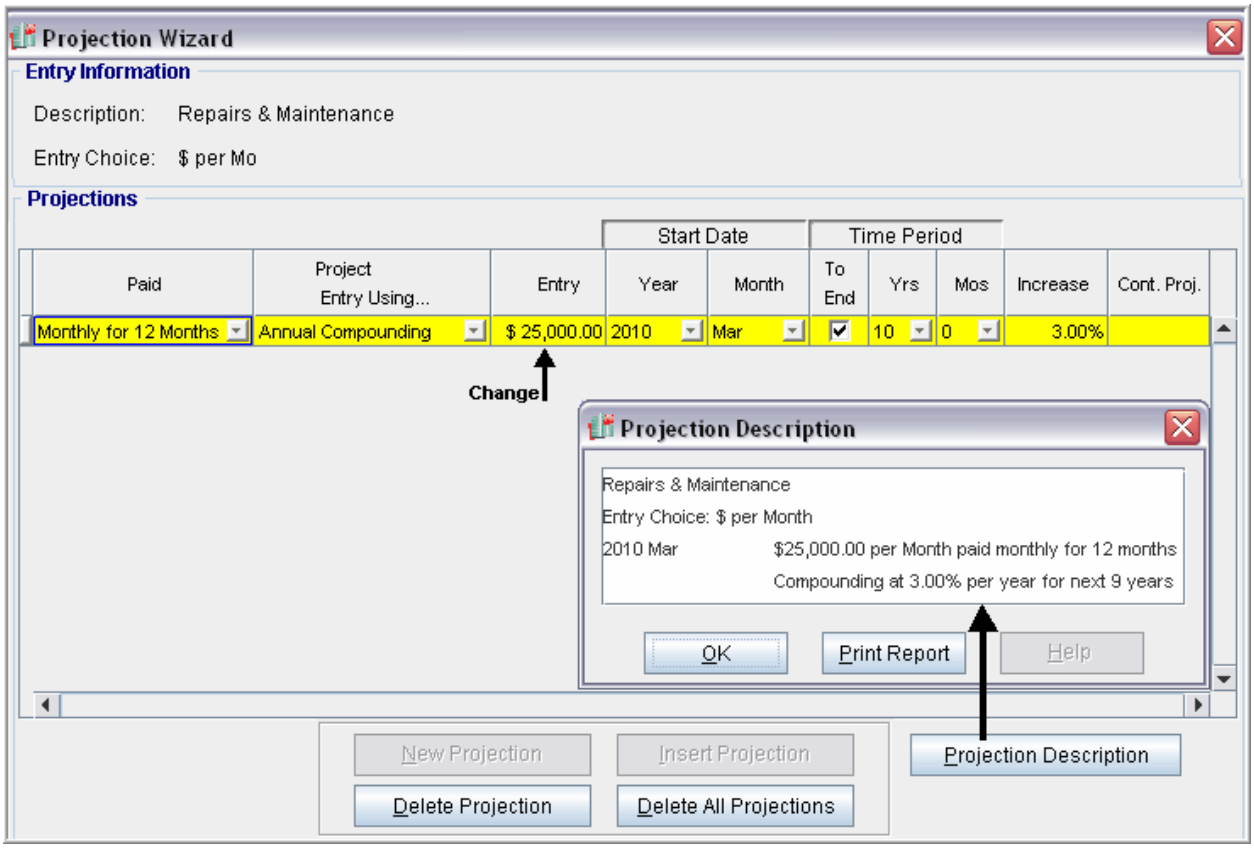
1. Select the row with the description ‘Materials’ and click on the ‘% of Revenues’ button
2. Make the following selections



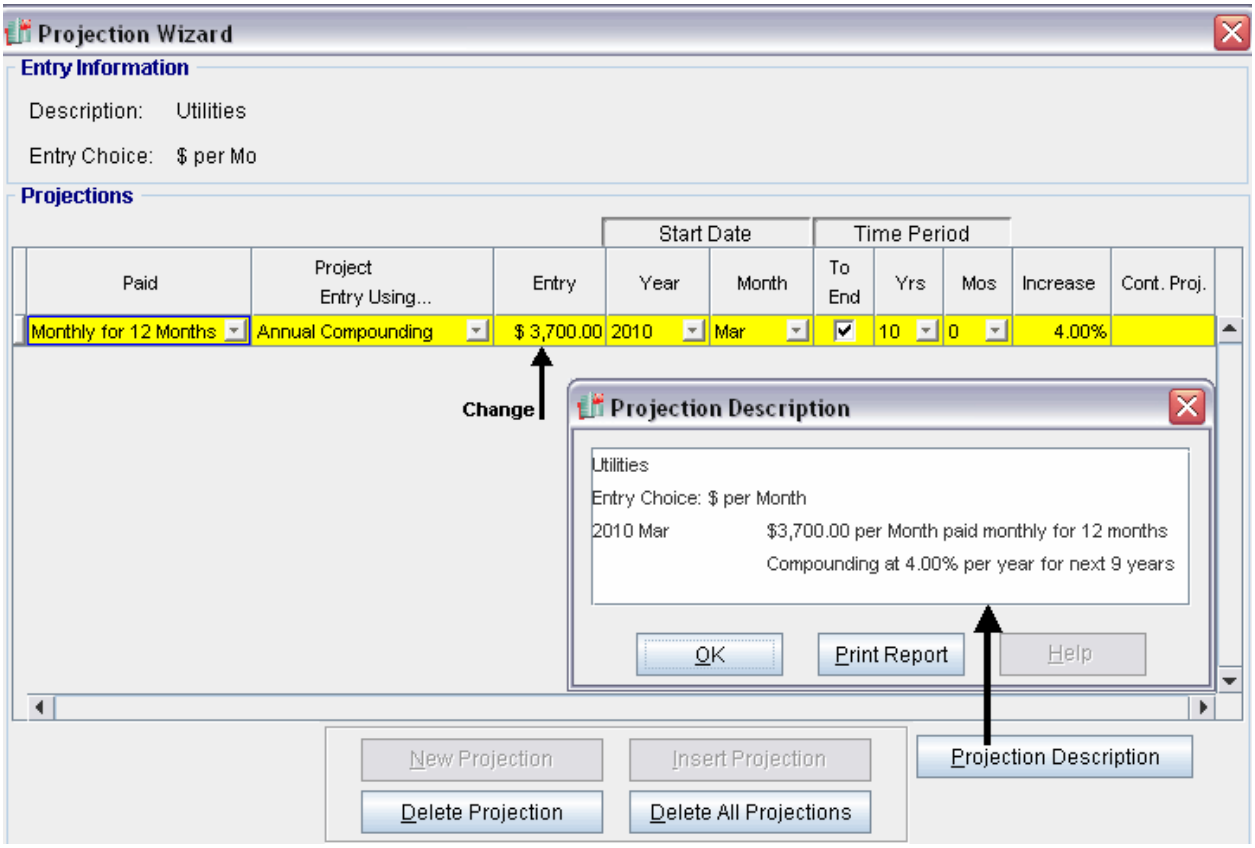
3. Click on the Projection Wizard button and enter the following



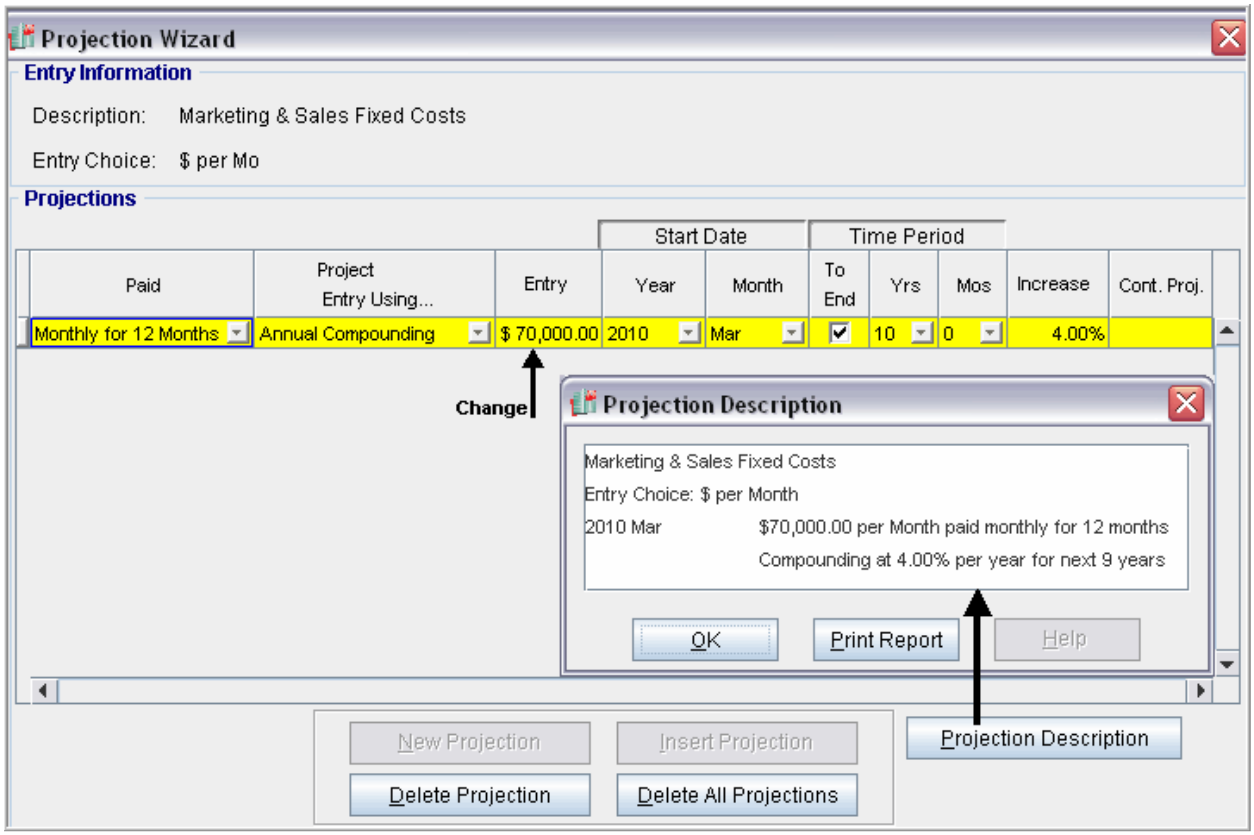
1. Select the row with the description 'Repairs & Maintenance' and click on the Projection Wizard button
2. Enter the following into the Projection Wizard



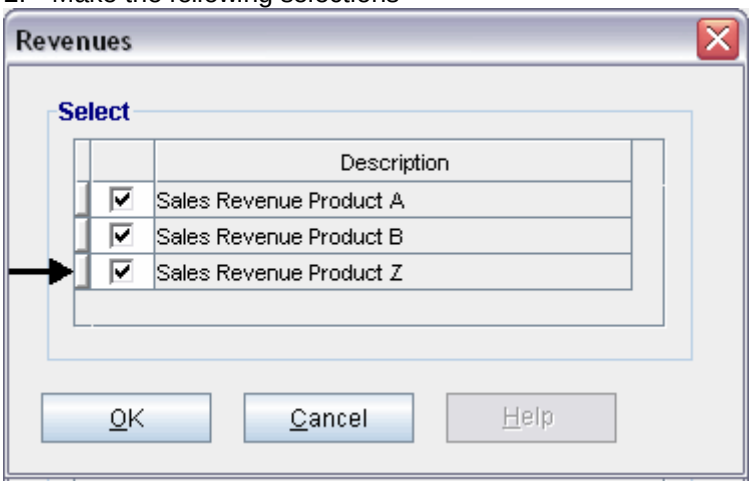
1. Select the row with the description ‘Utilities’ and click on the Projection Wizard button
2. Enter the following into the Projection Wizard



1. Select the row with the description ‘Marketing & Sales Fixed Costs’ and click on the Projection Wizard button
2. Enter the following into the Projection Wizard



1. Select the row with the description ‘Sales Commissions’ and click on the ‘% of Revenues’ button
2. Make the following selections

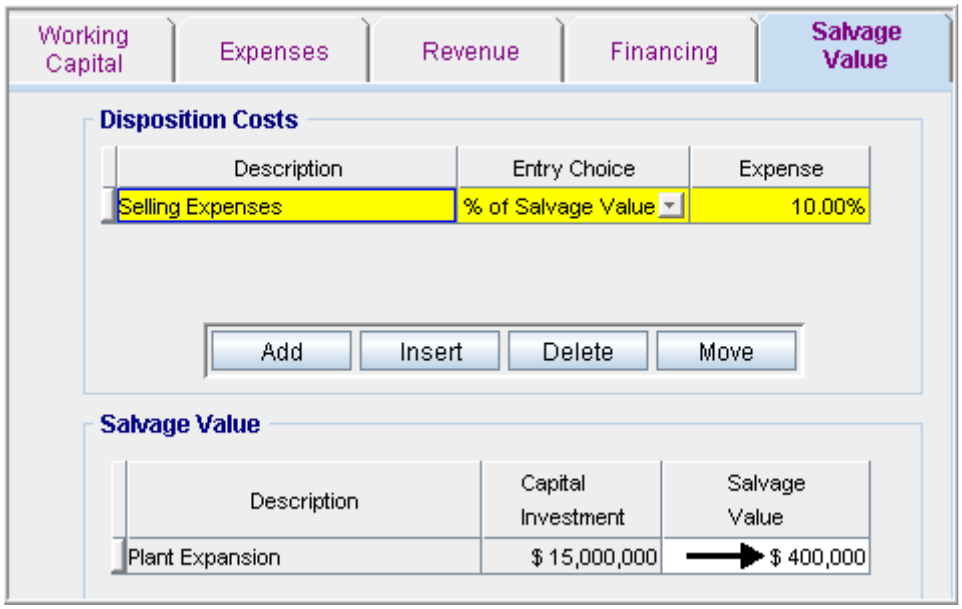


3. The entries in the Projection Wizard remain unchanged

Financing Folder

No change

Salvage Value Folder
Salvage Value: Change to $400,000



SAVE YOUR PROJECT

DECIDING BETEEN THE TWO OPTIONS A & B

To decide between the two options use the;

a. The Project Comparison Report and
b. The Incremental Cash Flow Report

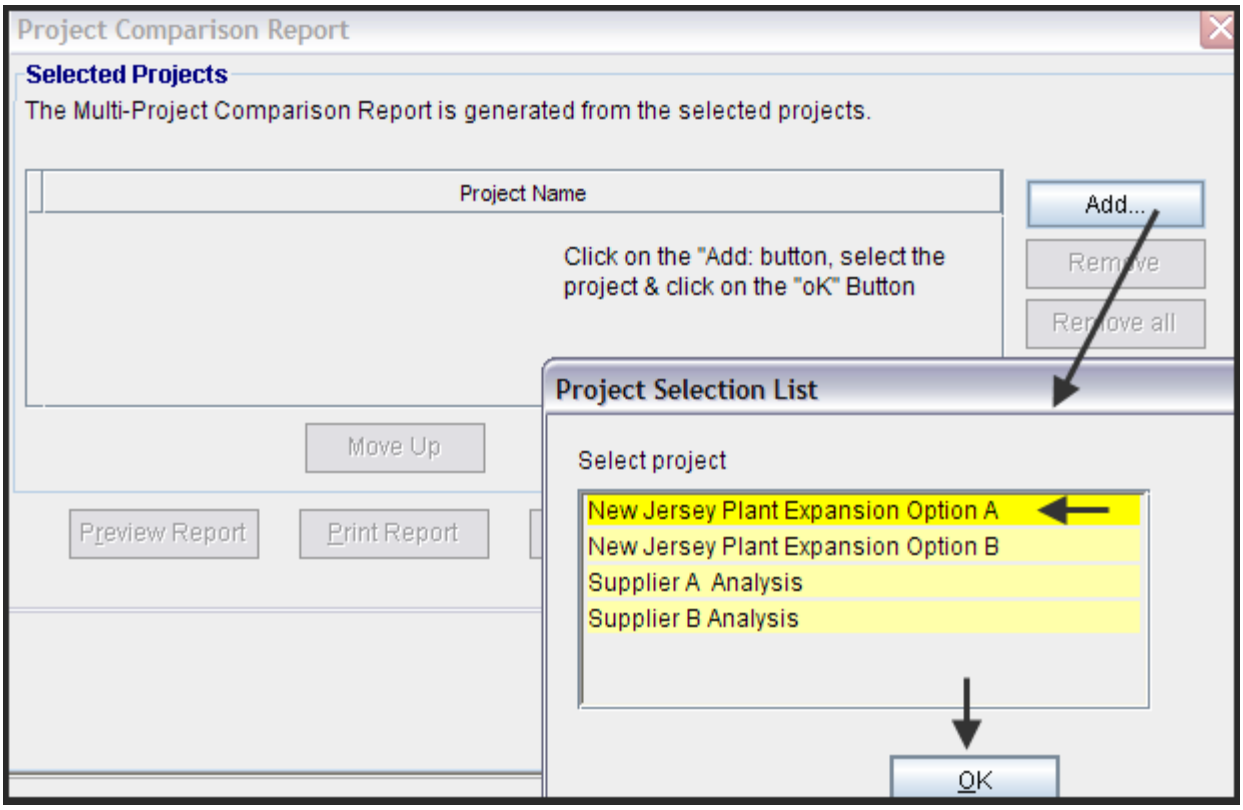
Project Comparison Report

Up to four projects can be compared side by side.

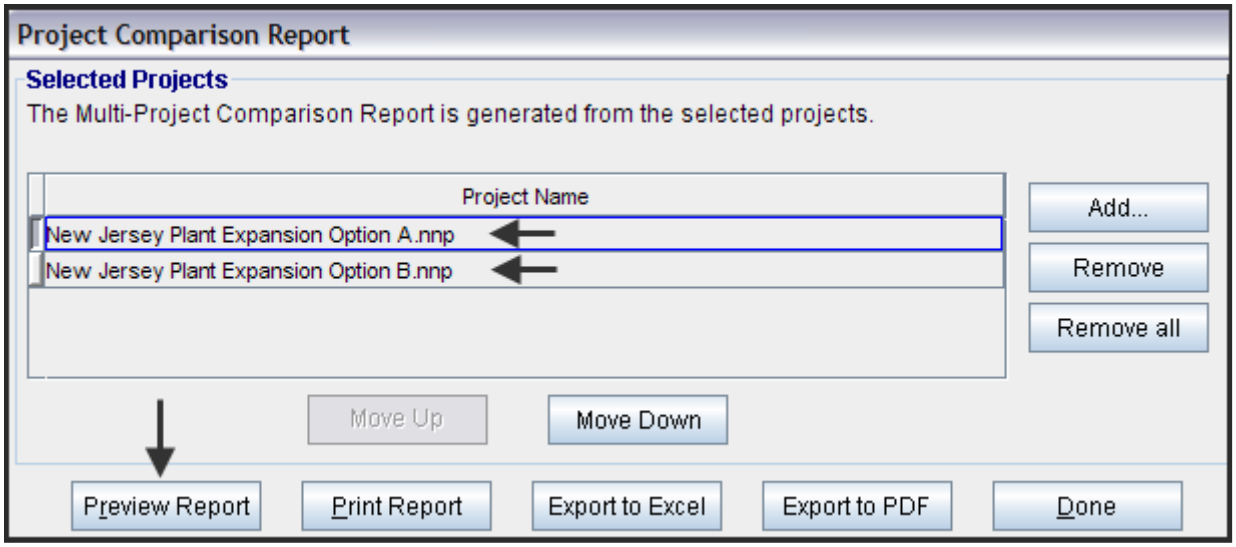
Step involved in selecting the projects for the Project Comparison Report.

1. Select the Project Comparison Report on the Reports menu

2. On the Project Comparison Report dialog click on the “Add” button to display the Report Selection List. Select the Project and click ‘Ok”. Repeat the process to add another project.



3. The diagram below shows selected projects to be displayed in the “Project Comparison Report”



Sample Project Comparison Report

Project Comparison Report (Before Tax)

Net Cash Flow(Before Tax)

Year		New Jersey Plant Expansion Option B	New Jersey Plant Expansion Option A
	0	(12,260,000)	(8,200,000)
	1	400,524	260,664
	2	1,313,054	1,081,752
	3	1,594,339	1,302,700
	4	1,950,658	1,592,230
	5	2,302,442	1,874,437
	6	2,702,670	2,198,421
	7	3,177,436	2,575,515
	8	4,241,409	3,547,184
	9	4,794,616	3,988,114
	10	6,034,120	4,955,488
	Total	16,251,268	15,176,505

Financial Return Before Tax

Internal Rate of Return (IRR)	13.42%	17.14%
MIRR	9.60%	11.85%
Short term financing rate	7.000%	7.000%
Short term reinvestment rate	2.500%	2.500%
Net Present Value (NPV)	$ 1,016,747 at 12.00%	$ 2,642,992 at 12.00%
Annual Equivalency	$ 179,948 at 12.00%	$ 467,768 at 12.00%
Benefit to Cost Ratio	1.05 at 12.00%	1.21 at 12.00%
Payback Period (Years)	6.63	5.95
Discounted Pay Back Period (Years)	9.48 at 12.00%	8.27 at 12.00%

Interpretation and Decision

The organizations minimum acceptable return (IRR) is 12.00% before tax.

On initial inspection it appears that both options exceed the desired return (IRR) of 12.00% and they should proceed with Option B and invest $12,260,000. This conclusion is incorrect.

They should choose the option that;

1. Provides the highest Net Present Value (NPV)
2. The highest Benefit to Cost Ratio

This is Option A, which has a Net Present Value (NPV) at 12.00% of $2,642,992 compared to $1,016,747 for Option B

This can be clearly seen using Incremental Cash Flow Report

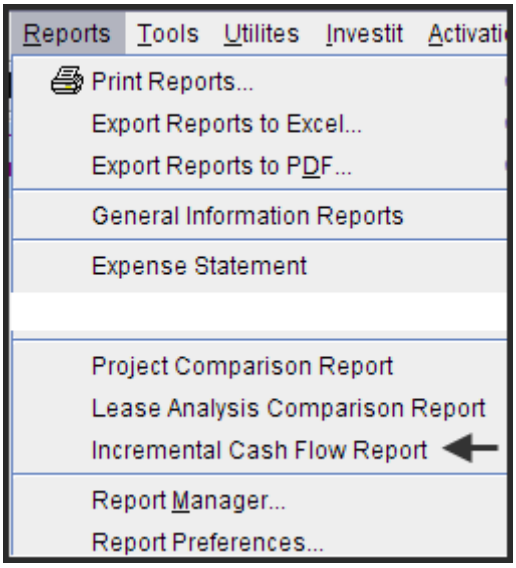
Incremental Cash Flow Report

When carrying out “Incremental Cash Flow Analysis” the largest investment goes first for the Incremental Cash Flow Report.

In this example select Option B for $12,260,000 first, and then subtract Option A the $8,200,000 investment as follows…

Steps

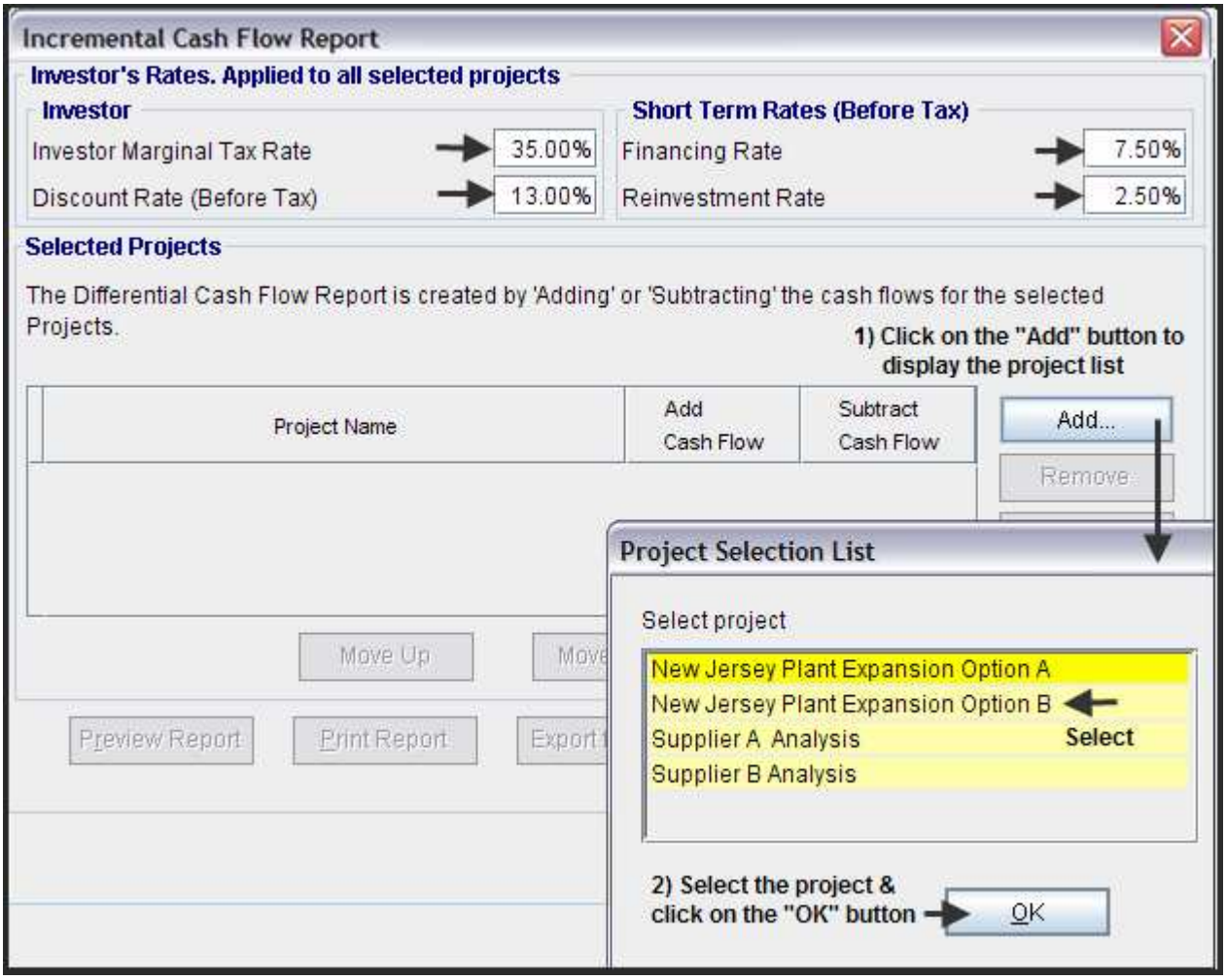
Select the Incremental Cash Flow on the Report menu



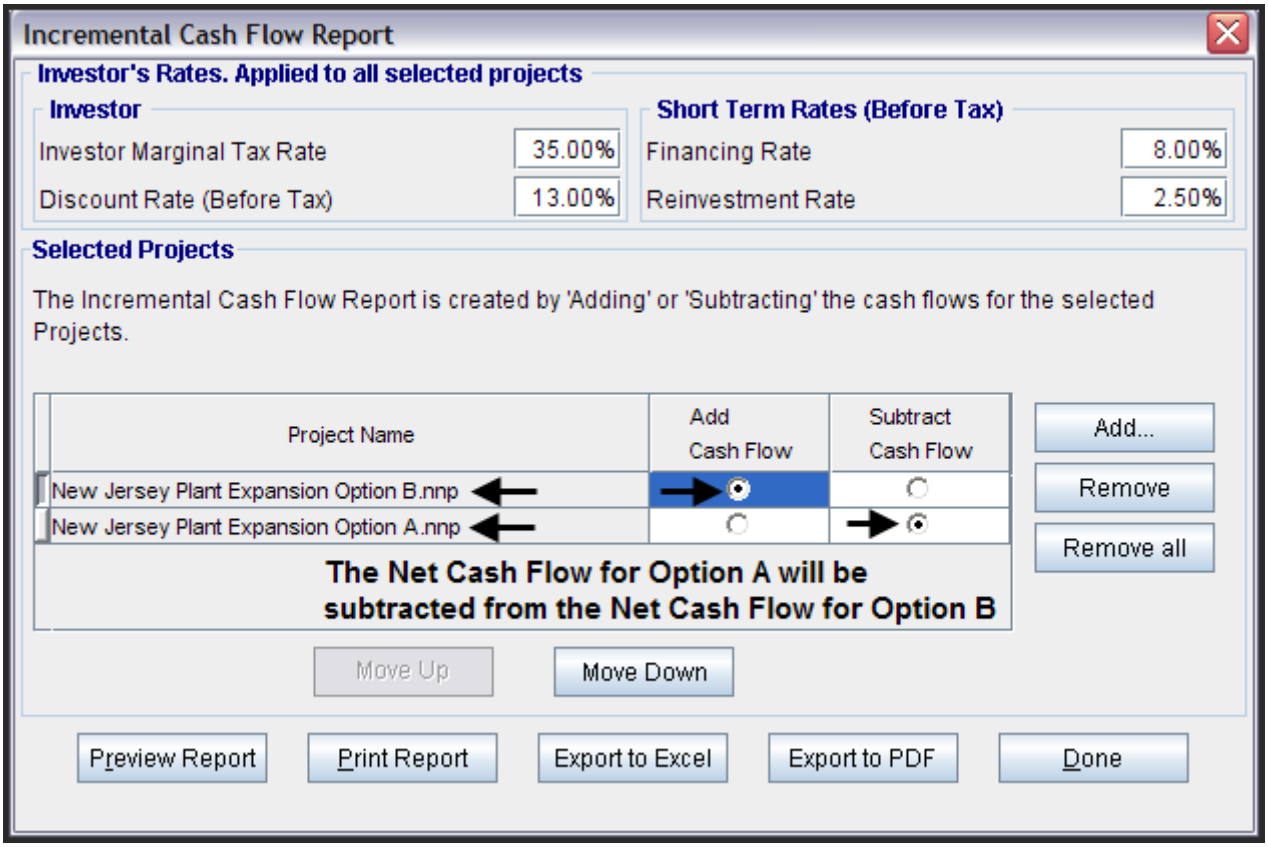
Enter;

Investor's Marginal Tax Rate
Discount Rate
Short Term Rates

On the "Incremental Cash Flow Report" dialog click on the "Add" button to display the Report Selection List. Select the Project and click 'Ok". Repeat the process to add another project. The Option B project was selected first because it the investment of $12,260,000 is larger than the $8,200,000 investment for Option A.



The selected projects for the Incremental Cash Flow Report are:



Click on the “Preview Report” button to display the “Incremental Cash Flow Report”

Incremental Cash Flow Report (Before Tax)

The Net Cash Flow for Option A is subtracted from the Net Cash Flow for Option B to give the "Incremental Cash Flow"

Net Cash Flow(Before Tax)

		Plus New Jersey Plant Expansion Option B	Minus New Jersey Plant Expansion Option A	Incremental Net Cash Flow (Before Tax)
Year	0	(12,260,000)	(8,200,000)	(4,060,000)
	1	400,524	260,664	139,860
	2	1,313,054	1,081,752	231,303
	3	1,594,339	1,302,700	291,639
	4	1,950,658	1,592,230	358,427
	5	2,302,442	1,874,437	428,006
	6	2,702,670	2,198,421	504,248
	7	3,177,436	2,575,515	601,921
	8	4,241,409	3,547,184	694,225
	9	4,794,616	3,988,114	806,502
	10	6,034,120	4,955,488	1,078,632
	Total	16,251,268	15,176,505	1,074,763

Before Tax Financial Return

Internal Rate of Return (IRR)	13.42%	17.14%	3.48%
Net Present Value (NPV) at 13.00%	$ 291,595	$ 2,047,009	($ 1,755,414)
Modified Internal Rate of Return (MIRR)	9.60%	11.85%	3.16%
Short term financing rate	7.50%	7.50%	7.50%
Short term reinvestment rate	2.50%	2.50%	2.50%
Annual Equivalency at 13.00%	$ 53,738	$ 377,242	($ 323,504)
Benefit to Cost Ratio at 13.00%	0.99	1.15	N/A
Payback Period	6.63 years	5.95 years	9.00 years
Discounted Pay Back Period at 13.00%	9.84 years	8.56 years	N/A

Interpretation and conclusion

If the organization's minimum acceptable rate of return (IRR) is 12.00%, both Option A and Option B seem to be acceptable because they both provide a return (IRR) higher than 12.00%.

However, the return (IRR) on the incremental investment of $4,060,000 for Option B is 3.48%, which is far below the minimum acceptable value of 12.00%. In this case Option B should be rejected and Option A accepted.

The other approach is to select the project with the highest Net Present Value (NPV), which is Option A

Both the 'Incremental Cash Flow" approach or choosing the option with the highest Net Present Value (NPV) will result in the same choice when dealing with mutually exclusive investments.