

Primavera Risk Analysis - Probabilistic Cash Flow and EVA



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1	Creating a Cash Flow	

If your project already has resources with costs assigned to your tasks then you will already have a cash flow. If not then the simplest way to create a cash flow is to create a resource that represents cash and then assign amounts of the resource to the tasks in your plan.

STEP 1 - Create a project

STEP 2 - Add the resource CASH to the project

1. *Plan | Resources.*
2. Enter CASH in the first free cell under *ID* and press return.
 The resource ID does not have to be called CASH.
3. Enter the description as Cash.
4. Change the *Type* to *Expenses*.
5. Changing the *Loading* to *Spread*. This will spread the cash assigned over the duration of the task.
 A Normal loading would use the cash assigned for each day of the task. So total would be cash assigned multiplied by the duration. Not what we want in this case!
6. Change the *Cost* to 1.
7. Leave other values as their defaults. *File | Close.*

STEP 3 - Assign the resource CASH to the tasks

Method 1 using the Task Details dialog

1. Click on the Resources tab in the Task Details dialog.
2. Use the drop down under ID and select CASH.
3. Enter the required amount.
4. Click onto the next task and repeat above steps.

Method 2 using a Gantt Chart column

This method is very useful for quickly assigning a chosen resource to tasks.

1. *Format | Columns*.
2. Click on the *Right Columns* tab.
3. Find and add the column *Calculated Value*.
4. Click on the Calculated Value column and you will see you have the opportunity to enter a column formula.
5. Click in the *Column Formula* edit box and enter: @DEM("CASH",U).
This formula means display the demand for the resource "CASH". The U means display units of cash assigned and is not case sensitive.
6. Change the other options to those shown below:

Top Heading: Cash

Selected Column

Top Heading:

Bottom Heading:

☒ Hide zeros ☐ Wrap text

☐ Do not print this column

☒ Total this column

Text Alignment:

Column Width:

Format:

Decimal Places:

Column Formula:

Summary/Monitors display:

7. Click *OK* to leave the Gantt Chart column dialog. You should see the new column you have created.
8. Type directly into the column to assign CASH to each task. Enter positive and negative values if required. Negative values are automatically formatted to be displayed using the bracketed accounting format (i.e. -\$1234.56 is displayed as (\$1234.56).

2 Risk - Probabilistic Cash Flow

If a project has uncertainty (most projects do) then there will be uncertainty about when money is spent and earned. This means that there will be uncertainty in the project's cash flow.

To see the impact of the project uncertainty on the cash flow you can run a risk analysis and choose to record the cash flow for each iteration. The probabilistic cash

flow data can then be displayed in the Risk Histogram View. This data can be used to create a probabilistic cash flow graph.

Creating a probabilistic cash flow


 You can assign positive and negative amounts of a resource to represent incoming and outgoing values. E.g. income and expenditure.

STEP 1 - Add cash flow to project

1. Open one of the samples that has cash and resources assigned e.g. Help | Open Samples | ExampleRegister-Rocket.plan.
OR **Create a project with a cash flow (Section 1)**

STEP 2 - Run the Risk Analysis

1. *Risk | Run Risk Analysis.*
2. Click *Options...*
3. Check the option *Save Probabilistic Cash Flow Data.*

 When calculating and recording the additional cash flow data you may notice an increase in the analysis time.

4. To change the collection period, start date and data collected click on the *Cash Flow...* button located next to the probabilistic cash flow check box:

Cash Flow Settings

Collection Period: month Define Custom...

Start Date: 12 Oct 05

Resources to collect data from

- ☒ _COST - Cost
- ☐ _EXPENSES - Expenses
- ☐ _LABOR - Labor
- ☐ _MATERIALS - Materials
- ☐ _NONLABOR - Non Labor
- ☐ FIX - Fixed cost
- ☐ VAR - Variable cost

Filters to use during data collection

- ☒ Entire Plan

Add Filter Edit Filter Remove Filter

Combinations of Resources and Filters to save during data collection

Resource	Filter						
_COST	Entire Plan	<input checked="" type="checkbox"/>					

Help OK Cancel

Figure: Cash Flow Settings dialog for defining Collection Period, Start Date and data collected.

5. Click **OK** | **OK** | **Analyze** and then click **Complete** to analyze.
6. Close the default report that is displayed after the analysis if it is not the Probabilistic Cash Flow.
7. **Reports** | **Probabilistic Cash Flow**.

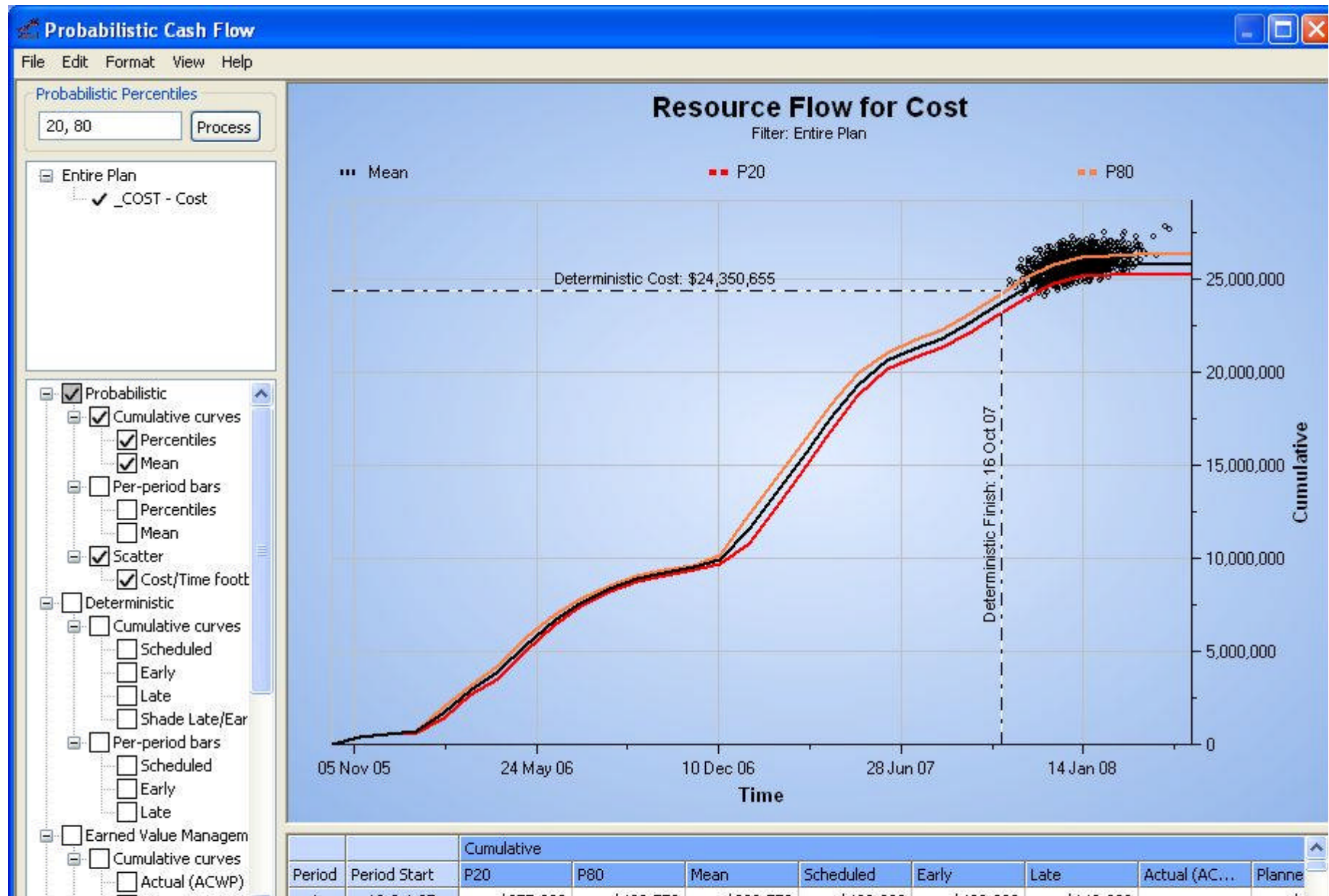


Figure: Probabilistic cash flow displaying P20, P80, Mean cumulative cash flows.

Copying probabilistic cash flow data

- *Edit | Copy data.*

Copying Graph

- *Edit | Copy picture to clipboard.*
- *Edit | Copy picture to file.*

Probabilistic Cash Flow Options

Once the probabilistic cash flow has been displayed the following options are available.

Probabilistic Percentiles - Enter the percentiles that you wish to include in the probabilistic cashflow. Separate percentiles values using commas.

Process button - Click after entering or changing the percentiles.

Probabilistic:

Cumulative curves

Percentiles - Display the curves for the percentiles that have been selected.

Mean - Display the mean cash flow.

Per-Period Bars

Percentiles - Display the percentiles as non-cumulative per-period bars (read values from left hand vertical axis).

Mean - Display the mean cash as non-cumulative per-period bars (read values from left hand vertical axis).

Scatter

Cost/Time football plot - Display the distribution of project costs and finish dates on the cash flow. Each iteration is represented with a point on the graph.

Deterministic:

Cumulative curves

Scheduled - Display the deterministic cumulative cashflow based on the task start and finish dates. In most cases this is the same as the Early Dates curve.

Early - Display the deterministic early cumulative cashflow based on the task early start and early finish dates.

Late - Display the deterministic late cumulative cashflow based on the task late start and late finish dates.

Shade Early/Early Envelope - Shade the envelope between the early and late date curves. Early and Late options must be checked.

Per-Period Bars

Scheduled - Display the deterministic per-period bars based on the task start and finish dates. In most cases this is the same as the Early Dates graph.

Early - Display the deterministic early per-period bars based on the task early start and early finish dates.

Late - Display the deterministic late per-period bars based on the task late start and late finish dates.

Earned Value Management

Cumulative Curves and Per-Period

Actual (ACWP) - Displays actual cost of the work performed. How much the work cost.

Planned (BCWS) - Displays budgeted cost of the work scheduled. The planned work.

Earned (BCWP) - Displays budgeted cost of the work performed. How much work has been completed.

Estimated - Displays the estimated cost expenditure based on the performance to date.

EV Metrics

- View | Earned Value Metrics.

See **Earned value cash flow (Section 3)**.

Settings

Show bars side by side - Check this options so that any per-period bars are displayed side by side rather than stacked on top of each other.

Show differences - Check this option to create a graph that displays the difference between two selected per-period values (see *Show Differences button* for further details and options).

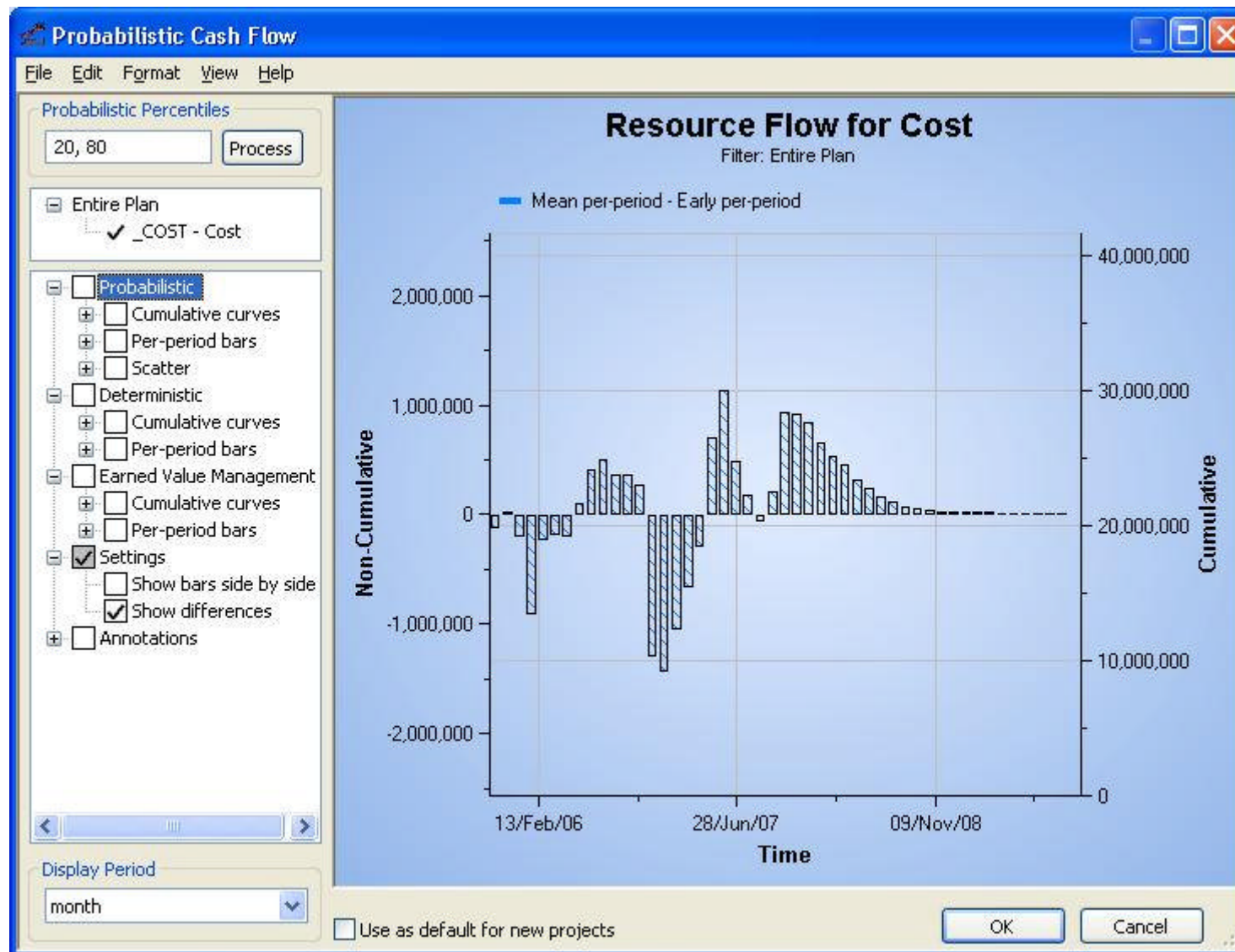


Figure: Cashflow with graph showing the difference between the per-period Mean and per-period deterministic expenditure.

Changing Differences

- Format | Difference Settings.

Use this command to modify the values used in the "Show differences" graph.

The Mean less the Early per-period is useful for comparing the probabilistic expenditure with the deterministic expenditure, i.e. Does the uncertainty and risk in our project mean we on average going to spend more or less than shown in our deterministic cashflow?

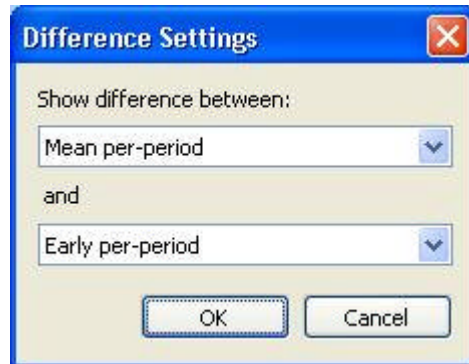


Figure: Difference Settings dialog for selecting the values to display in the graph.

Annotations:

Deterministic cost/finish - Check this option to add annotation for the deterministic finish and cost to the probabilistic cashflow (see figure below).

Percentile cost/finish - Check this option to shade the dates between the selected percentiles.

Data Date - Displays the date on the chart. If Data Date is outside the chart range you will not see it.

Estimated Cost/Finish - Using the CPI and SPI the deterministic cost is extrapolated to predict the Estimated Cost and Finish date for the project (project needs to be progressed).

CPI and SPI - Display the CPI and SPI on the graph (project needs to be progressed).

Display Period

Use this option to change the duration of the period that is used to draw and display the graph and data table. If the period selected is not a multiple of the existing collection period that was chosen when the risk analysis was run you will be asked if you wish to re-run the risk analysis with the required collection period. For example, if the collection period was months and you now wish to display weeks, the risk analysis is re-run with a weekly collection period. If the selected display period is a multiple of the existing collection period, e.g. changing from weeks to 4 weeks then the existing analysis data can be used without having to re-run the risk analysis.

Discount Settings

Discount settings can be applied to the cashflow. The default is to use a 0% discount rate, i.e. no discounting.

- *Format | Discount Settings.*

Yearly Discount Rate - percentage discount rate to apply.

Discount period - the period to apply the yearly discount rate.

Discount from - the date the discounting starts.



Figure: Discount Settings dialog used with NPV calculations.

3 Risk - Earned value graph

Earned Value Curves

Earned Value (EV) curves can be displayed on the probabilistic cash flow. These can be compared and contrasted with the results of the risk analysis.

- *Reports | Probabilistic Cash Flow.*
- Check the settings below Earned Value Management to choose earned value options required.

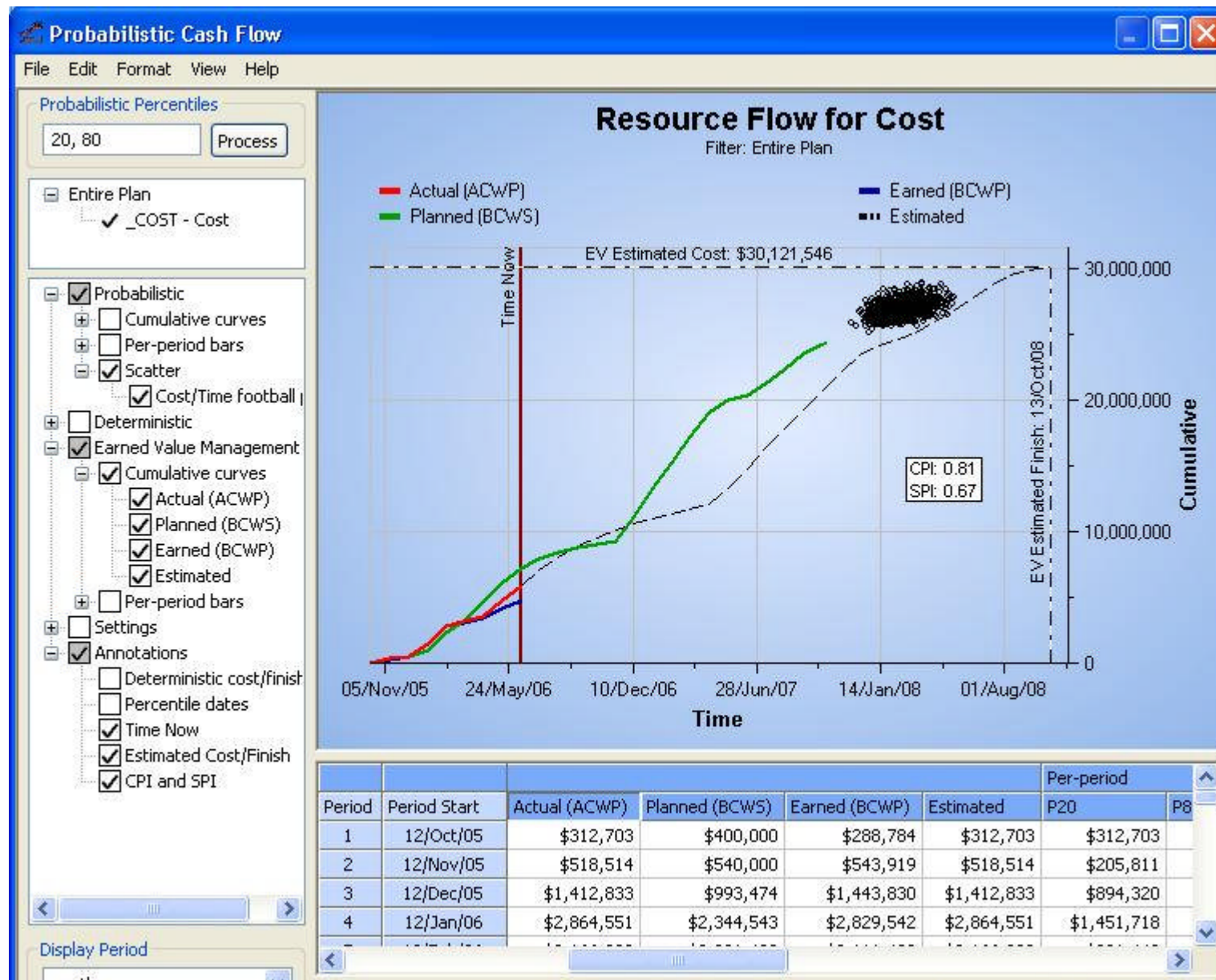
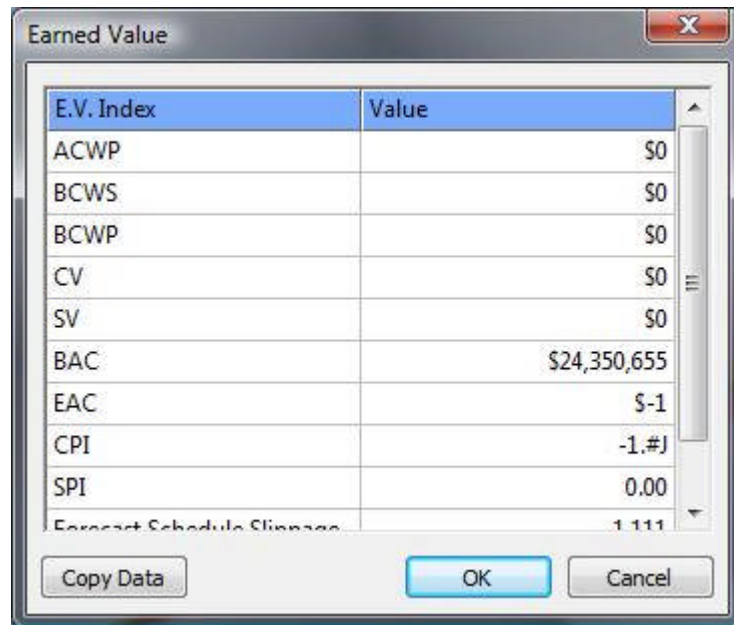


Figure: Probabilistic Cash flow with Earned Value curves displayed.

Earned Value Metrics

Earned Value metrics can be displayed.

- Display the Probabilistic Cash Flow.
- View | Earned Value Metrics.



The screenshot shows a software window titled "Earned Value" with a table of metrics. The table has two columns: "E.V. Index" and "Value". The metrics listed are ACWP, BCWS, BCWP, CV, SV, BAC, EAC, CPI, SPI, and Forecast Schedule Slippage. The values for these metrics are: ACWP (\$0), BCWS (\$0), BCWP (\$0), CV (\$0), SV (\$0), BAC (\$24,350,655), EAC (\$-1), CPI (-1.4), SPI (0.00), and Forecast Schedule Slippage (1.111). At the bottom of the window are buttons for "Copy Data", "OK", and "Cancel".

E.V. Index	Value
ACWP	\$0
BCWS	\$0
BCWP	\$0
CV	\$0
SV	\$0
BAC	\$24,350,655
EAC	\$-1
CPI	-1.4
SPI	0.00
Forecast Schedule Slippage	1.111

Figure: EV Metrics displayed.

ACWP - Actual cost of the work performed. How much the work cost.

BCWS - Budgeted cost of the work scheduled. The planned work.

BCWP - Budgeted cost of the work performed. How much work has been completed.

CV - Cost Variance. Value of the cost against the work completed.

SV - Schedule Variance. Value of the work against the plan.

BAC - Budget at completion. The total project budget.

EAC - Estimate at Completion. Final cost based estimate based on cost performance.

CPI - Cost Performance Index. The efficiency of work for the cost.

SPI - Schedule Performance Index. How efficient the worked performed is against the planned work.

Forecast Schedule Slippage - Extra time needed to finish the work.

Forecast Cost Slippage - Extra money needed to finish the work.

4 PDF Documentation and Printing Help

PDF Documentation

Some of the on-line help (e.g. tutorials) can be found in the *Documentation* folder that is created when the Primavera Risk Analysis software is installed. The documentation is saved in the Adobe PDF format.

The default installation folder for the documentation is:

C:\Program Files\Oracle\Primavera Risk Analysis\Documentation

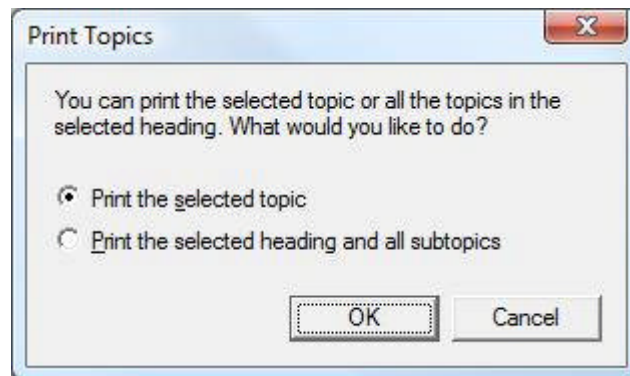
Printing an individual help topic

After printing a help topic, Windows can sometimes freeze the help file. If this occurs, right-click on the Primavera Risk Analysis help application icon in Windows Start menu Taskbar (usually located at the bottom of the screen) and choose *Restore*.

1. Select the required topic.
2. Click on the *Print* button.



3. Choose *Print the selected topic*.



Printing a chapter of the help

After printing a chapter of the help, Windows can sometimes freeze the help file. If this occurs right-click on the Primavera Risk Analysis help application icon in Windows Start menu Taskbar (usually located at the bottom of the screen) and choose *Restore*.

1. Select the required chapter.
2. Click on the *Print* button
3. Choose *Print the selected heading and all the subtopics*.

The example below has the Risk Tutorial - Part 1 selected. Clicking on the *Print* button and selecting *Print the selected heading and all the subtopics* will print out the whole of the 'Risk Tutorial - Part 1'.

