

Leveling and Constraining Usages

In TurboProject, resource or expense assignments are referred as *usages*. A *usage* is a specified amount of a resource or expense “used” in the course of completing an activity. The usage can be defined as a specified amount of work required to complete the activity (resource usage), or a particular amount of money that will be spent (expense usage). *Leveling* or smoothing of a resource or expense reduces the level of commitment of the resource or expense. As a powerful way to control the level of resource or expense usage, *constraining* reschedules activities such that the daily resource or expense usage level stays at or below the defined maximum level.

For leveling and constraining usages, TurboProject provides the **Level** and **Constrain** commands respectively.

Related Topics

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Level Dialog

The dialog allows you to view overallocated resources in your project, and where it is necessary to level them for a specified period of time. The dialog provides the **Overallocated Resources** table and a number of controls (radio buttons, data entry fields, pushbuttons).

Level

Leveling Mode

Within Available Float Only

Extension of Project Finish Date Allowed

Leveling Period Defined

By Resource Overallocation

By User

From: 09/01/97 To: 11/12/97

Overallocated Resources

	Resource	Level Fin	Priority	Start	Finish	MaxAvail	OverAlloca
1	Resource D	11/12/97		09/24/97	09/26/97	8.00	Yes
2				09/29/97	10/01/97		
3							

All Resources Highlighted Only

Level Now

Filter: <All Objects>

Sort: <None>

Pending... Clear Level... Undo Global Close Help

Leveling and Constraining Usages

The **Overallocated Resources** table displays a list of overallocated resources showing for every item the resource name, start date, finish date, maximal availability (hrs/day), percentage of overallocation. Using the two radio buttons located below the table, you can define a scope of leveling by selecting **All Resources** (default setting) or **Highlighted Only**. When the latter option is selected, highlight the table's row with a resource whose allocation you wish to level.

Two list boxes, **Filter** and **Sort**, let you select respectively filtering and sorting conditions for the table display. The first of the options helps to select a filter that will refresh the records displayed in the Overallocated Resources table. The **Filter** list box is accessible only when the **Extension of Project Finish Date Allowed** option is selected. New filters can be added to this list by using the **Organizer** dialog (<F8>). With the dialog displayed, select the **Filter** tab and then select the **Resource Overallocation** radio button; after that you can edit an existing filter criterion or create a new one. The **Sort** list box allows you to select a sort order for the records displayed in the **Overallocated Resources** table. The **Sort** list box is accessible only when the **Extension of Project Finish Date Allowed** option is selected. New sort criteria can be added to this list using the **Organizer** dialog (<F8>). With the **Organizer** dialog displayed, select the **Sort** tab and then select the **Resource Overallocation** radio button; after that you can edit an existing sort criterion or create a new one.

The two radio buttons of the **Leveling Mode** control group let you choose whether leveling must be done either only within a float currently available for your project or leveling may extend the project duration, shifting the project finish date beyond its original position on the time scale.

The options of the **Leveling Period Defined** control group allow you to make a choice between the leveling for a period defined by resource overallocation and the leveling defined by the user through two date entry fields, **From** and **To**.

Once you have specified your preferences for resource leveling, click **Level Now** to level you project's resource(s). To view activities whose resources have been leveled, click **Pending**. For details, refer to [Find Pending Activities](#).

Clicking the **Locate** button brings up the **Overallocation Locator** dialog that lets you locate, view and change the parameters of planning object(s) with overallocated resources.


Using the **Clear Level** option, you can reverse the last action performed by TurboProject when you used the **Level Now** option. To make TurboProject undo the project leveling as much as you need, use the **Undo Global** option.

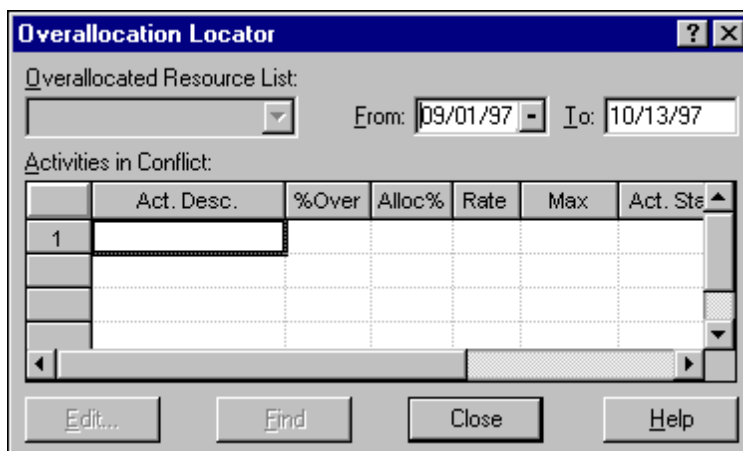
Overallocation Locator Dialog

The dialog helps you quickly locate, view and change the parameters of planning object(s) with that are causing resources to be overallocated at a rate that exceeds their allowed maximum availability.

Note: When a resource is allocated at a rate higher than its maximum availability, we refer to this situation as *resource overallocation*.

To open the dialog:

- Choose Schedule | Overallocation Locator.
- Or, click the Overallocation Locator icon  on the Edit toolbar.



The dialog displays a list of activities that are causing assignment conflicts for the resource selected in the Overallocated Resource List. If the profile pane of the current view is open, the profile will automatically refresh to display a profile for the resource name displayed in the overallocated resource list.

The **Overallocated Resource List** allows you to select from a dropdown list a resource that is currently overallocated on your project. As each resource is selected, the activities that are in conflict are automatically displayed in the **Activities in Conflict** table.

Two data entry fields, **From** and **To**, are used to determine the period over which TurboProject should search for activities contributing to the selected resources overallocation. If required, you can use these fields to define a specific period of your project's schedule for which TurboProject should search for activities in conflict.

The **Activities in Conflict** table displays key information on the activities that have caused an overallocation for the selected resource. Use the table's editable fields—**Rate** (resource rate), **Start** (activity's early start) and **Finish** (activity's early finish)—to customize the resource consumption or remove entirely the overallocation. If the changes you make remove the overallocation, the table will be refreshed and the activities will no longer be displayed.

Note: You can customize the layout of the **Activities in Conflict** table. To do this, place the mouse pointer onto the table, right-click and then choose **Layout**. This will open the Table Template Layout Editor where you can define a preferable layout for the **Activities in Conflict** table.

The **Edit** button opens the Activity Information form for the activity selected in the **Activities in Conflict** table. To do this, highlight the activity and then click **Edit**.

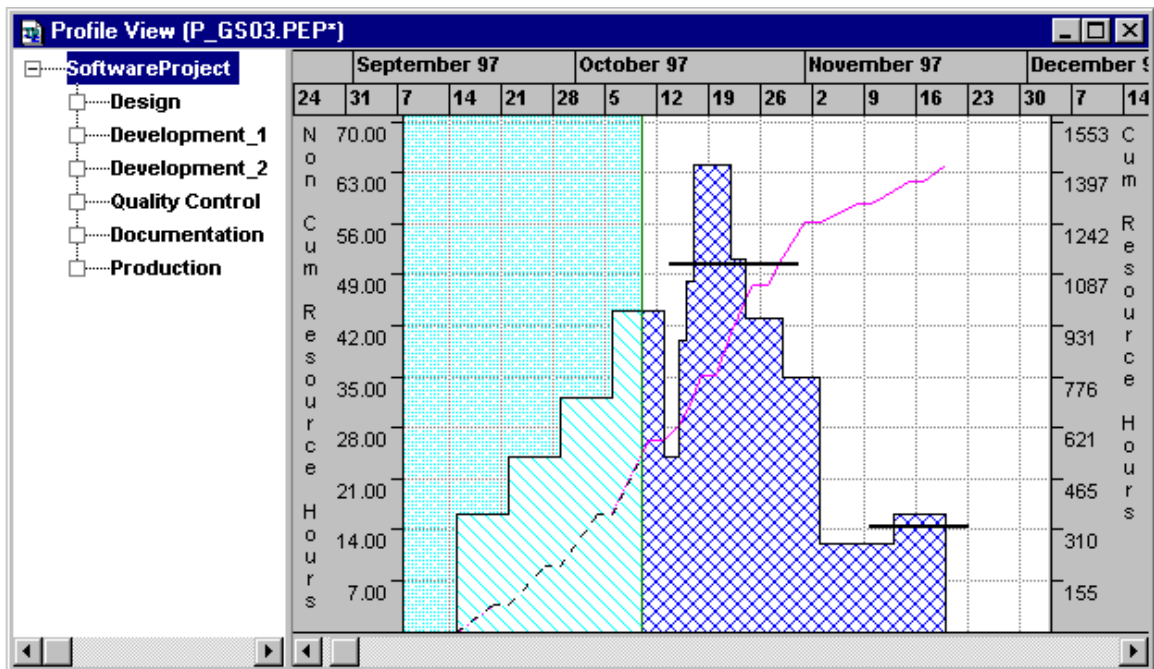
Use the **Find** button, whenever you need, to find the activity selected in the **Activities in Conflict** table in the current active view (Outline Gantt, Network, Profile, etc.). When you use the **Find** button, the active view will be refreshed to display the selected activity that will be highlighted both in the view pane and table (Gantt or Outline Gantt).

Constraining Profile

The **Constrain** command is a more powerful way to control the level of resource or expense usage. It allows you to define a maximum level of usage. TurboProject then reschedules activities so that the daily resource or expense usage level stays at or below the defined maximum level. This option may slip the end date of your project in order to stay below the constrain line.

You can constrain resources for any given time period and you can vary the level over time. For example, you may want to constrain a resource to eight hours a day for a few weeks and then change it to ten hours a day.

TurboProject provides multiple ways of constraining usages. You can constrain them to a constant level or vary the constraint over time using either the mouse or the **Constrain Line** dialog.



If you have a compressed timescale, and the mouse does not move in one-day increments, you should define the constraint in the **Constrain Line** dialog.

Related Topics

[Constraining Profile with Mouse](#)


[Constrain Line Dialog](#)

Constraining Profile with Mouse

With the help of the mouse, you can constrain usages to a constant level or vary the constraint over time.

To constrain a profile:

1. Place your cursor on the start date of the constraint and on the usage level where you want to constrain usages. You can use the date indicator on the status bar to position your cursor correctly.
2. With the left mouse button depressed, drag to the right; this will draw a constrain line across the profile. At the desired finish date, release the mouse button.
3. To add additional line segments, create a time-varying constraint. Hold <Ctrl> down when you begin drawing a line segment with the mouse.
4. Select **Constrain** from the **Schedule** menu. This will display the [Constrain Line](#) dialog.

Note: There are multiple ways to display the **Constrain Line** dialog box. Instead of the **Constrain** option from the **Schedule** menu, you can use the option of the same name from the local menu accessible with by a right-click of the mouse. You also can use the **Constrain** icon  on the TurboProject toolbar.


If you have drawn some constrain lines overlapping in time, you can select **Normalize** to rearrange your constrain levels so that they do not overlap and each period refers to its most constraining level.

5. Select **OK** to constrain the profile at the defined levels. To discard the above actions, select **Cancel**.

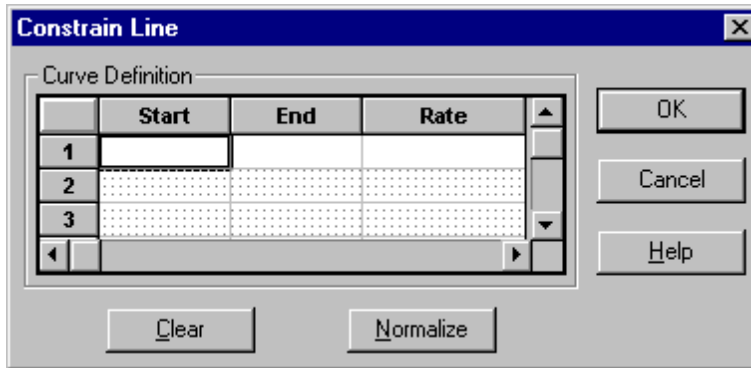
Constrain Line Dialog

The **Constrain Line** dialog serves to constrain usages to a constant level or vary the constraint over time, especially when the timescale is compressed, and you cannot move the mouse in one-day increments. With a profile histogram in view, you can use the **Constrain Line** dialog.

To open the **Constrain Line** dialog box:

- From the **Schedule** menu, choose **Constrain**.
- Or, click with the right mouse button, and from the displayed local menu select **Constrain**.
- Or, click on the **Constrain** button  of the TurboProject toolbar.

As a result, **Constrain Line** dialog is displayed.



Once the **Constrain Line** dialog is opened, it is possible to define a constraining condition.

To constrain a profile:

1. In the **Start** and **End** columns, enter the start and finish dates of the first constrain level.
2. Type the desired rate in the **Rate** field.
3. To define a second constrain level, move your cursor to the next row and enter a new start date, finish date, and rate. You can define as many constrain levels as you want.

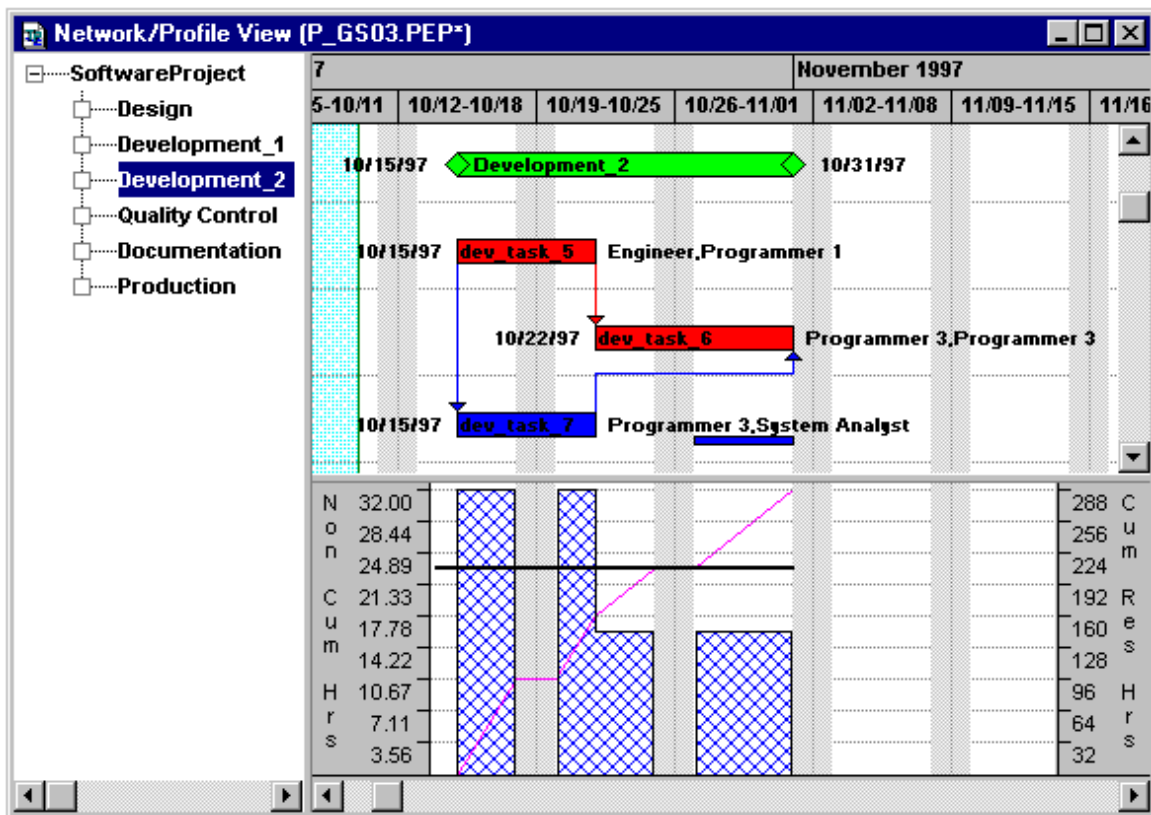
If you have defined some constrain lines that overlap in time, you can select **Normalize** to rearrange your constrain levels so that they do not overlap and each period refers to its most constraining level.

4. When you are finished defining the constrain lines, select **OK** to constrain the profile at the defined levels. To close the dialog without constraining, select **Cancel**.

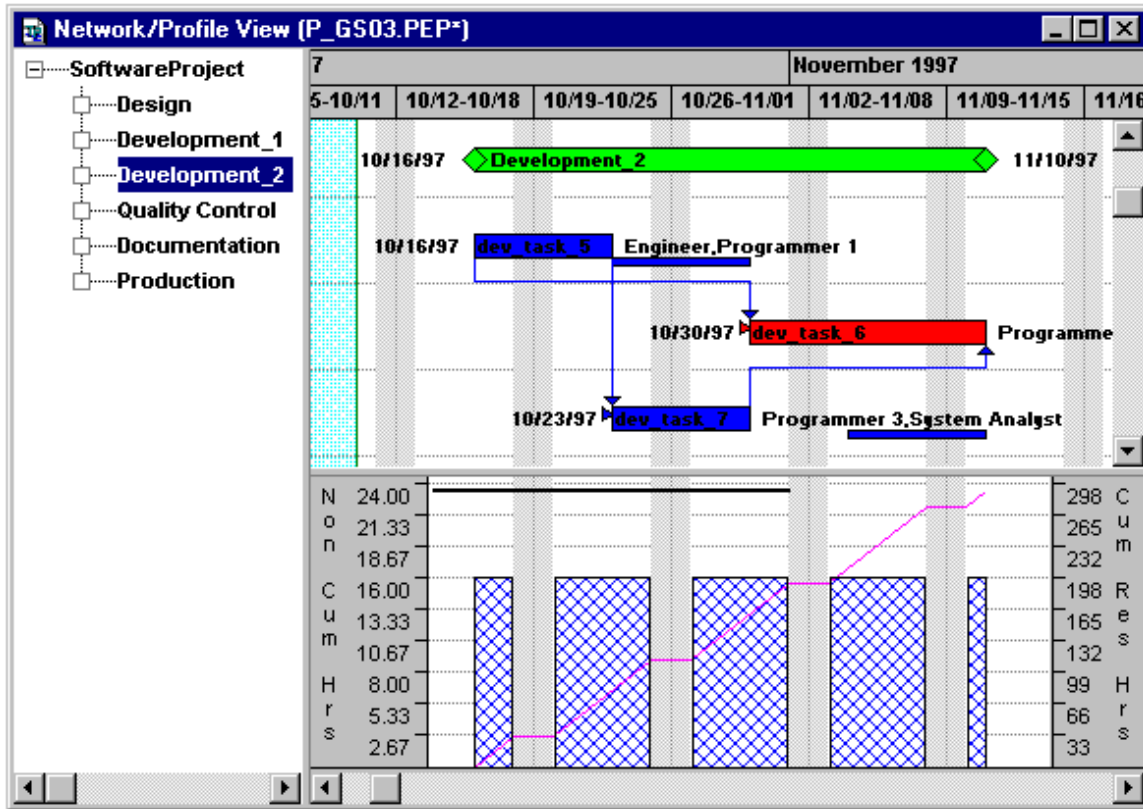
Viewing Leveling/Constraining Results

When you have successfully leveled or constrain a profile, TurboProject reschedules a set of activities by imposing a start date on each of them.

Note: TurboProject uses the critical path method (CPM) to calculate the schedule. Scheduling with the critical path method enables project managers to easily recognize the important parts of a project. The CPM determines the *critical path(s)* of a project — the sequences of work in a project that are essential to meeting project goals. The critical path provides valuable feedback to the planner. Once you have connected the activities and events on the planning screen, TurboProject displays the critical activities and events in red (or the selected color for critical activities), and the non-critical activities in blue (or the selected color for non-critical activities).



When TurboProject imposes a start date on an activity, a small triangle appears to the left of the activity bar and the start date appears in the Constraint control group of the **Schedule** tab in the activity form.



The activities on which TurboProject has imposed a start date are flagged as *pending*. Marking the rescheduled activities in this way allows you to easily find them in your project and remove the target start dates of all of them if you want to undo the scheduling changes.

Note: Once you perform either the **Level** or **Constrain** command, the pending flag is removed from the first set of activities and any new activities that TurboProject reschedules become "pending."

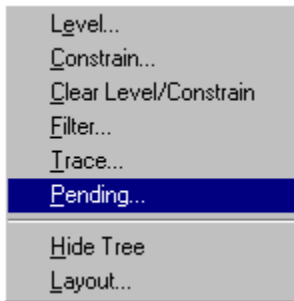
Find Pending Activities

While leveling and constraining your project usages, you usually work with the Network/Profile or Outline Gantt/Profile view. If you have a small project with all activities in one network, you can view the effects of the **Level** or **Constrain** command by changing to the Network pane of a Network/Profile view or the Chart pane of the Outline Gantt/Profile view and then locating the activities which display a small triangle to their left. In most cases, however, it is more convenient to use the **Pending** command directly from the local menu in the Profile pane. This command displays a list of all activities that meet the pending criteria.

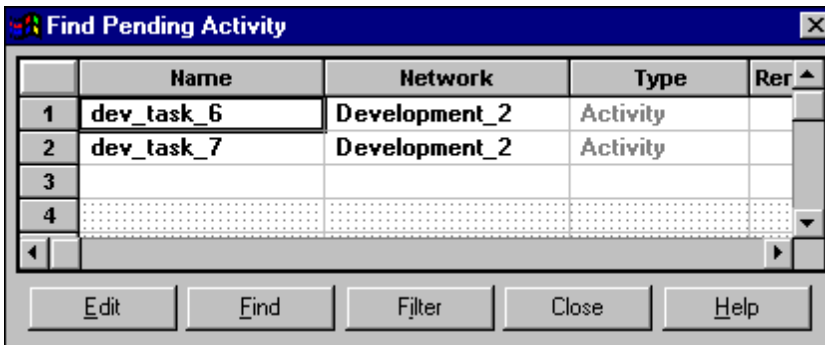
To use the Pending command for locating pending activities, do as follows:

1. After leveling/constraining by using the options of either the Profile or Network/Profile view or the Outline Gantt/Profile view, right-click within the Profile pane to activate the local menu.

Leveling and Constraining Usages

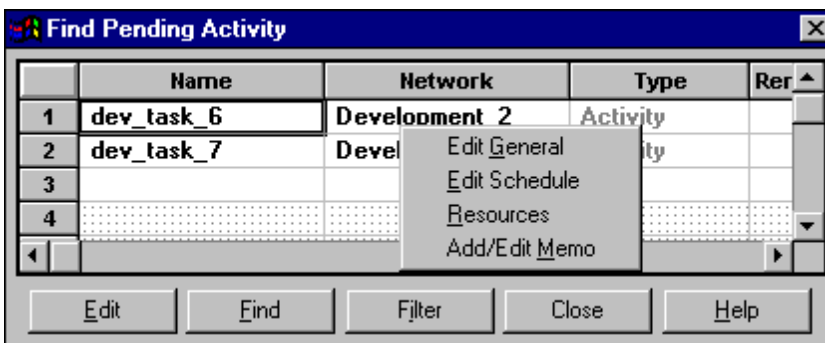


- From the local menu, select **Pending**.
As a result, the **Find Pending Activity** dialog appears, listing all pending activities.



- To locate an activity in the view, highlight it in the table, and then select **Find**. The highlighted activity appears in the view.
You may need to move the **Find Pending Activity** dialog or scroll the planning screen slightly to view the activity.
- To locate the next activity, highlight it in the table and select **Find** again.
- To close the **Find Pending Activity** dialog, click **Close**.

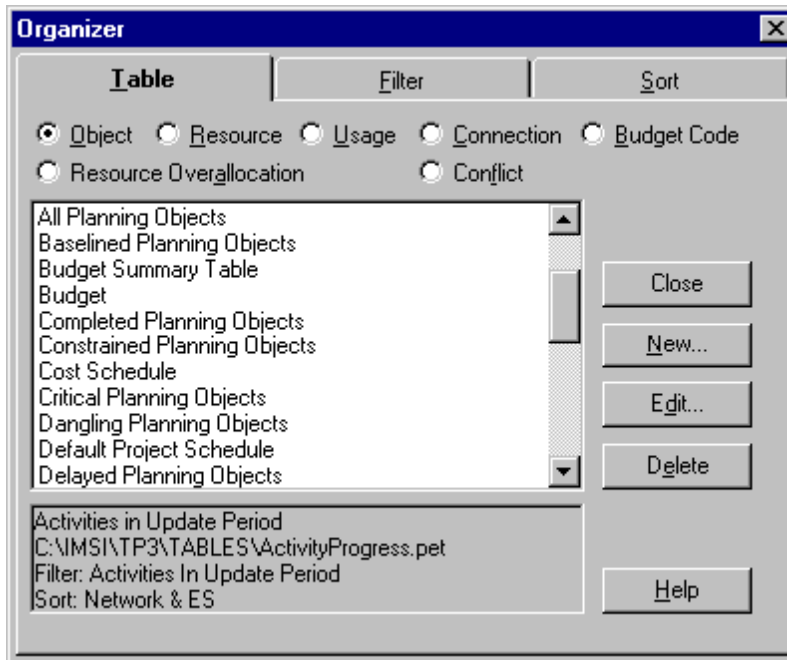
Using the **Edit** option of the **Find Pending Activity** dialog, you can edit the selected activity. On selecting the **Edit** button, the activity form is displayed. You can also edit the selected activity with a right click, provided the mouse cursor points to this activity in the table of the **Find Pending Activity** dialog. On this clicking, the local menu is displayed.



Selecting **Edit General**, **Edit Schedule**, **Resources**, or **Add/Edit Memo**, permits you to access the corresponding tab of the activity information form

To display/print the list of pending activities:

1. Press <F9> to display the **Table Organizer** dialog.



2. From the Table Template list, select **Pending Activities Scheduled by Level or Constrain**. The table containing all pending activities with target starts is displayed.
3. To print this table, select **Print** from the **File** menu. As the result, you will have a hard copy of pending activities list.

Removing Imposed Start Dates

If you want to remove the imposed start date for a few activities, you may want to edit each individual activity form for each activity. However, if you want to remove the imposed start date for all pending activities or for activities that have been targeted by the previous **Level** or **Constrain** commands, you should use the **Undo Level/Constrain** command in the **Schedule** menu.