D12 • Formation Testers

Using this new option, it is possible to load and process data from Formation Tests and the results of their interpretation, i.e. discrete values of reservoir pressure, mobility (or permeability). Each individual point can be assigned a legend and a quality indicator. The points are displayed in specific tracks, with their legend and a color indicative of quality. Lines can then be drawn, calculated, or modified interactively in order to get the fluid gradients and the contacts. All relevant results are added on the logs, which may also display continuous channels coming from open-hole logs for instance.

Calling the Formation Tester option amounts to creating a specific object in the data hierarchy, below the Survey level. A Formation Tester object comprises a number of channels, for the reservoir pressure, mobility, and permeability. Specific data types in the Emeraude database are:

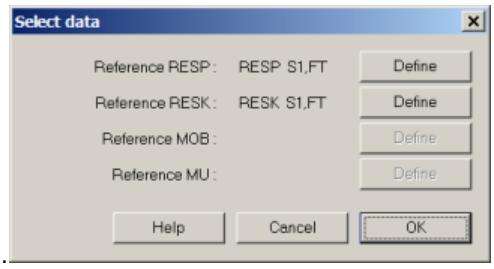
Data Type	Default built-in mnemonic
Formation pressure	RESP
Formation mobility	RESM
Formation permeability	RESK

D12.1 • Loading

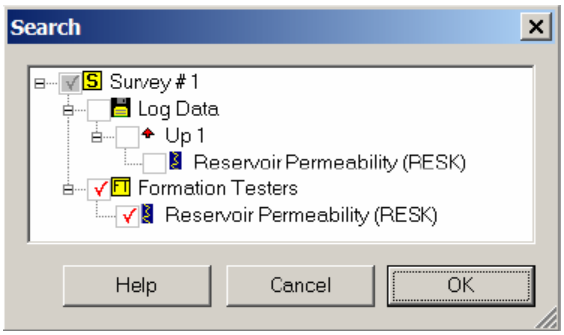
Formation test channels should be loaded in the passes of a Survey (i.e. using the Load option of the survey panel). All depths of interest should be loaded in one go, i.e. do not load the data as multiple discrete stations, but as a versus depth information. You can load from distinct sources; for instance the pressure vs. depth could be in one file, and the mobility/pressure vs. depth in another one.

D12.2 • Creating the FT object and selecting components

Once the survey contains at least a "Formation permeability" or "Formation mobility", and a "Formation pressure", the "Formation testers" option of the Special panel is enabled. When you click on this button you access the dialog below to select Data:



The "Define" buttons are used to select the desired channels. They open a selective data browser indicating only the candidate locations/channels - see opposite. These options/dialogs can be used to select or unselect. When OK is given after a selection, a copy of the source is made. Under the data browser, a node materializes the.



D12.3 • Assigning each point a label and status

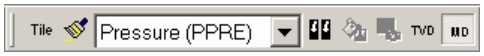
When the channels have been selected, the main dialog is displayed. A "Label" column can be used to assign a label to each point ("Normal" – "Supercharged" – "Dry" can be accessed with a right click, or anything else can be typed in directly). Note you can select several cells together, and then right click to access the desired label/status for all of them. A "Status" column is also included and the content of the cells can be changed by repeated clicks between "Good" – "Medium" – "Bad". Note also that the "Select Data" button calls the selection dialog shown above. A Copy button can be used after making a selection in the grid, to copy that selection to the clipboard.

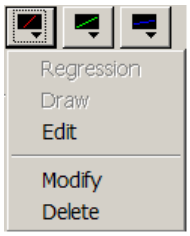
D12.4 • Plotting

The Formation testers option automatically creates views to display the reservoir permeability/mobility and pressure. On this views the channels appear with markers, with their label, and each point is displayed with a color representative of its status (green=good, orange=medium, red=bad). Note that if the survey contains other permeability channels coming from open-hole, they will also appear on the view as seen above (white curve).

D12.5 • Gradients and contacts

Once linearity have been decided, it is possible to create lines, by least square, or by drawing on the views. Provision has been made for an unlimited number of layers, and within each layer for three lines representative of water, oil, and gas gradients. If the well is deviated, and with loaded data defined versus MD, you should load a TVD channel in the General Well Data (using the Load Well Data option of the Document panel). Once the TVD channel is loaded, the display can be dynamically switched to TVD using the last 2 icons of the Display toolbar (see below). Only after switching the display to TVD should you seek and define the linearity.

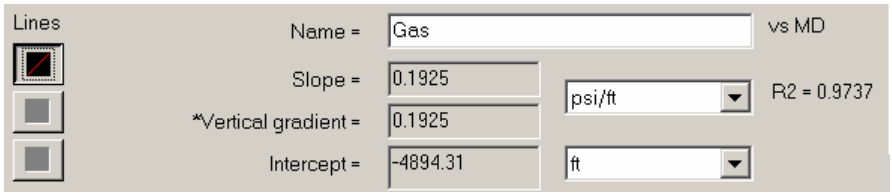




Layers are created / deleted with the button next to the layer drop list. The menu for creating the lines is found under the colored buttons, as seen opposite. When selecting "Regression" "Draw" or "Modify" the dialog is hidden and the operation is conducted directly on the formation pressure view as follows:

- Regression: click for the first limit, drag, and then release for the second limit. After the range is selected a dialog pops up that gives the option to either select all the point, the good only, or the good + medium only.
- Draw: click for the start point, drag and then release for the end point
- Modify: a central cursor can be seized that moves the line up and down. At each extremity, two more cursors can be grabbed to rotate the line.

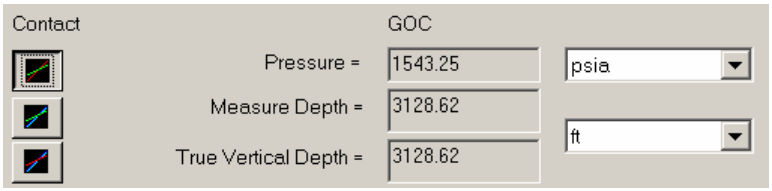
The results are seen in the lower part of the dialog. In this part, it is also possible to edit directly the values (after selecting "Edit" in the appropriate menu).



A name can be typed in for each line. Next to this name is the indication of the scale where the line was created (MD or TVD). The slope is the actual slope on the line native scale. The vertical gradient is either the slope, if the line is created versus TVD, or the actual slope divided by the cosine of the average deviation in the line interval otherwise. Once again, let us insist on the fact that if the deviation is significant and not constant, you should load a TVD channel in the General Well Data, and toggle the display to TVD before defining the lines. For a line defined by regression, R2, the determination coefficient is displayed. Recall that a value of 1 is indicative of a good fit, whereas 0 is the opposite. To change the line, you can select among the following options:

- Edit and change the slope/intercept values directly. This option is enabled only the display mode (TVD or MD) is the mode where the line was created.
- Modify the line interactively,
- Delete the current line and re-perform a Regression/Draw action.

Once at least two lines have been defined (on the same scale), Emeraude automatically computes their intersection, and displays the results under the “Contacts” section.



Annotations are automatically created to display the pressure gradient for each line and contact depth values on the reservoir pressure view. Those annotations are moveable and their properties (but not the content) can be modified.

