

Wella users' guide

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Wella

Menu: Data Display data Processing About

Well name: Well-1 Properties

Created on: 1988-01-01
LAS format: version 2.0

Well information
 STRT, 1780.0000
 STOP, 1930.0000
 STEP, 0.1000
 NULL, -999.2500
 COMP, WELL, Well-1
 FLD, LOC, UNKNOWN
 CNTY, UNKNOWN
 STAT, UNKNOWN
 CTRY, UNKNOWN
 SRVC, UNKNOWN
 DATE, 1988-01-01
 API, CSZEA920—N8
 UNWL, CSZEA920—N8
 XCOORD, 739249.350000
 YCOORD, 107651.570000
 LAT, 46.307687
 LON, 20.207157
 ELEV, 85.660000
 ELEV_TYPE, KB

File name: Well-1 wla Depth points count: 1501

DEPTH	ATL	BIT	CAL	CN
1930	106.9131	8,5	8,2219	17,3024
1929.9	106.5834	8,5	8,1996	16,785
1929.8	104.9418	8,5	8,1774	16,2676
1929.7	103.3279	8,5	8,1549	15,7502
1929.6	101.714	8,5	8,1502	15,6287
1929.5	100.2592	8,5	8,1505	15,6287
1929.4	98.9709	8,5	8,1654	15,4909
1929.3	97.6826	8,5	8,2405	15,6461
1929.2	96.8655	8,5	8,315	16,6544
1929.1	96.591	8,5	8,3894	17,6626
1929	96.3166	8,5	8,4349	18,6709
1928.9	96.0285	8,5	8,4438	19,6792
1928.8	95.6817	8,5	8,453	20,5419
1928.7	95.3348	8,5	8,4622	21,3821
1928.6	94.988	8,5	8,4745	22,2521

Figure 1.1: The opening screen

1.1 Summary

This document is a users guide for the Wella system (Well Log Analysing System). Wella is a well log interpretation system. You can import *las* files and open *wla* files which is Wella's own format. You can display available well logs, make cross-plots, edit, and run interpretation formulas, and finally display well locations on a map.

1.2 First steps

1.2.1 Installation and start

Wella does not need to be installed. Copy and run. Copy the *wella.zip* file where you want to and unzip it. Start the *wella.exe*.

1.2.2 Import *las* files

If you want to import a *las* file click on *Data/Import LAS file* menu item (Fig. 1.1). After importing save data to Wella's format by clicking to *Data/Save changes to wla format* menu item. On the left side icon bar too the *Save changes to wla format* are available. Full functionalities are reached for *wla* format data only.

1.2.3 Open *wla* files

You can open the entire well data by clicking on *Data/Open wla file* or *Open* icons on the left iconostasis (Fig. 1.1).

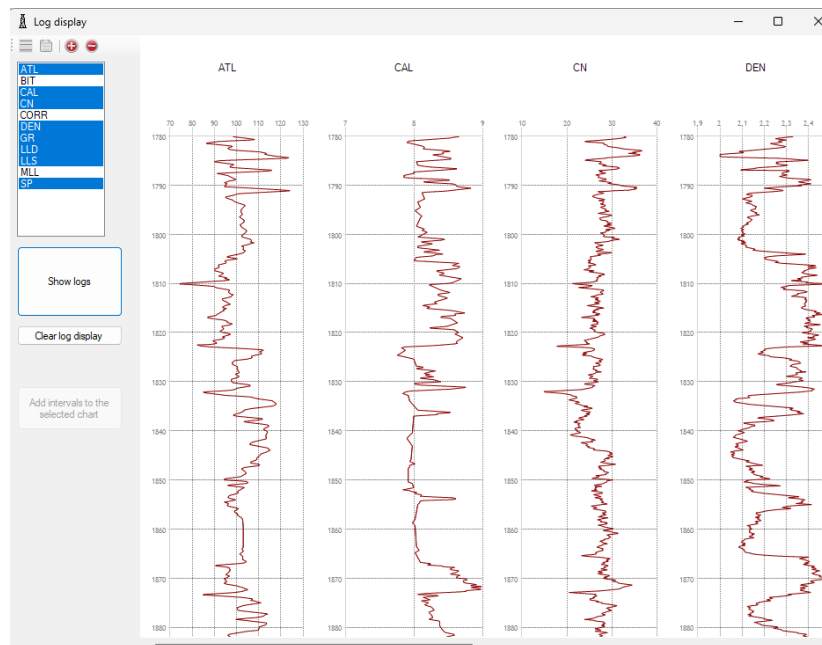


Figure 1.2: On the log display you can see the selected logs

1.2.4 Display well logs

To display logs click on *Display data/Show data as graphics* or *Display* icon on the left side (Fig.1.2).

1.2.5 Create cross-plot

Cross-plots can be drawn by clicking on *Display data/cross plot* menu or *Diagram* icon on the left side (Fig. 1.3).

1.2.6 Map display

If you wonder the location of your well click on the *Display data/Map display* menu item or the *Globe* icon on the left side (Fig. 1.4).

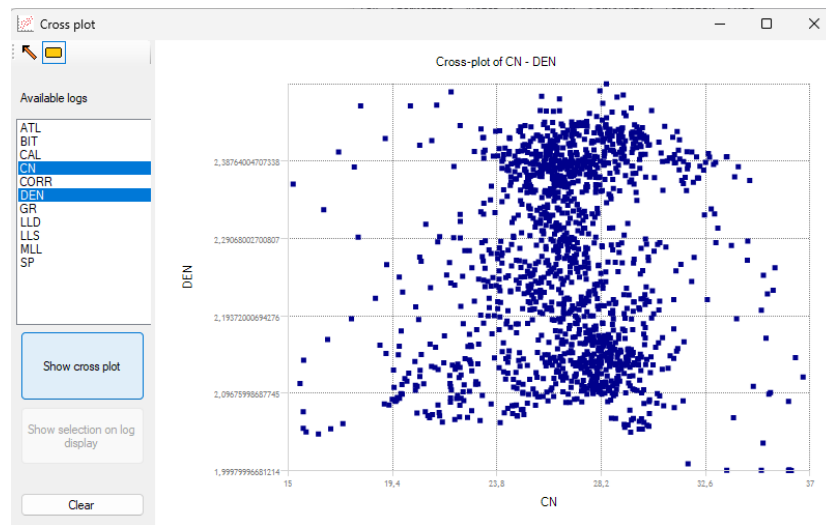


Figure 1.3: You create a cross-plot from any two selected logs

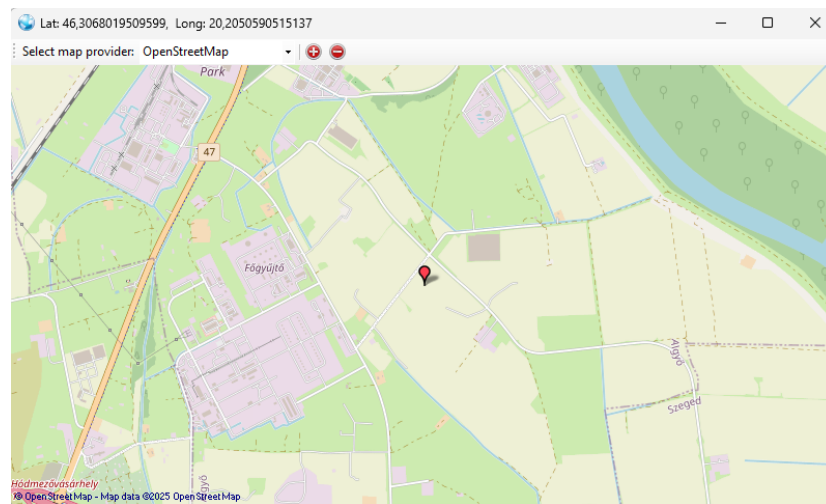


Figure 1.4: Well-1 on the map

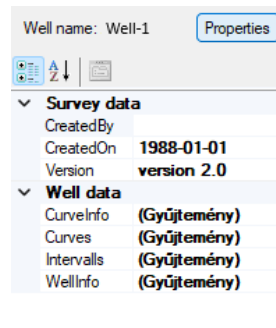


Figure 1.5: Wella data structure

1.3 Advanced functionalities

1.3.1 Wla Data Structure

Well data are organized into a special inner data format as it can be seen in Fig. 1.5. There are two groups: the *Survey data* and the *Well data*. *Well info* contains well name, well location coordinates, start and stop depth, elevation, etc.). *Curveinfo* contains log names and measure units. *Curves* contains log values. *Intervals* contains the boundaries of different rock bulks.

1.3.2 Select depth points by cross-plots

Make a cross-plot. Look at the outstanding or strange points and select them by using the rectangle or pointing selection tools. The selected points can be seen on a log display if you click on the *Show selection on log display* button.

1.3.3 Handling intervals

At first, the intervals were empty since the original *las* file did not contain interval data so you should create intervals. To do so let us open the log display with the desired logs. Click on the log where you want to identify the intervals. The background of the clicked chart changes to pale red.

Now click on the small layer icon on the upper left side iconostasis. If you move your mouse over the pale red chart and click where you want to put the boundary a blue line will appear. This is the lower boundary of the new layer. The upper one is the previous boundary bottom line. Further layers can be created with the same method. If you want to save the intervals click on the save icon in the same iconostasis (Fig. 1.7).

It needs to be emphasized this save function saves the result until you exit the program. If you want to save the newly created intervals for further actions click on the *Save changes* icon in the left side iconostasis or *Data/Save changes to wla format* menu item. If you want to zoom in or zoom out the charts click on the relevant buttons.

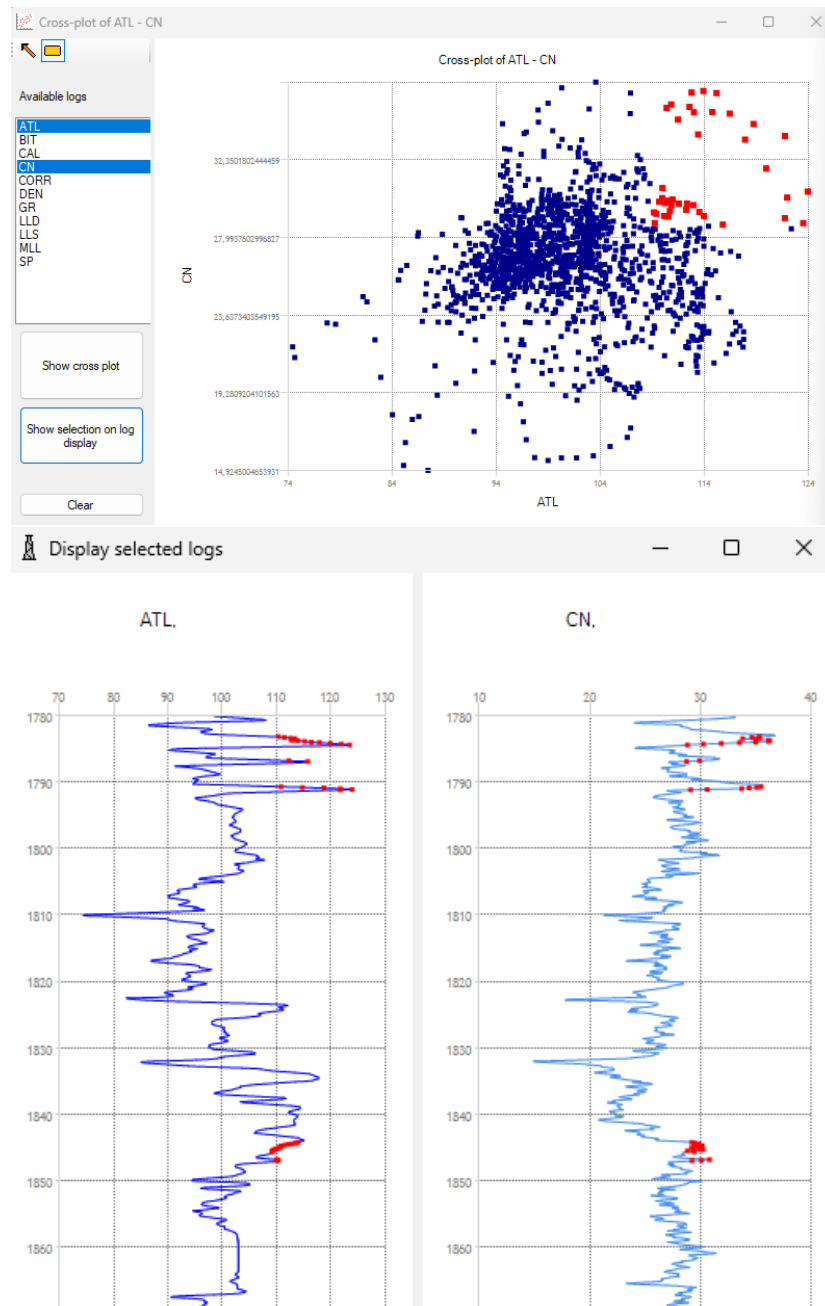


Figure 1.6: Select depth point by cross-plots

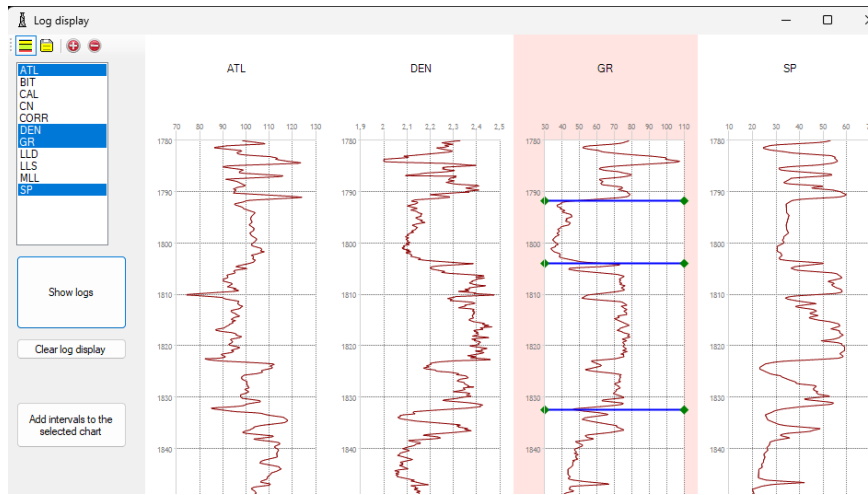


Figure 1.7: The result of interval creation

The removal of an existing log (raw or computed data) can be done by selecting a log in the datagrid and deleting it by right-clicking the mouse. The insertion of a new layer can be done by saving the computed logs. Do not forget to save changes by clicking *Save changes* icon.

Intervals can have descriptive data. After creation, these fields contain automatically generated, fictive data. If you want to give realistic data, such as formation description you can do it with the right mouse click when a small text box appears where you can type the desired text. By pushing the Enter button this text is saved. Later, if you want to see what formation is in a certain position click to a point and a small textbox appears with the description.

1.3.4 Processing data

You can compute petrophysical parameters from logs with *Processing* menu. There are some submenus in it such as *Formula editor* and *Clustering*.

Formula editor

There are no built-in methods to compute any petrophysical parameters, but the *Formula editor* menu item or the $E = mc^2$ button helps you construct any method. *Formula editor* can be seen in the Fig. 1.81.8.

Select proper logs for computation from *Logs to select for the computation* list. Multiselect is possible of course. To accept these logs click on *Add selected logs to the list for computation* button. After that, select an existing formula or create your own. Formulas use symbols a , b or c . The first log on the list connects to a , the second to b , and the third to c , etc. Available quantifiers are $+$, $-$, $*$, $/$. You can use parentheses $()$ too. Use the following syntax for exponentiation: **Pow**($a, 2.25$) function for $a^{2.25}$

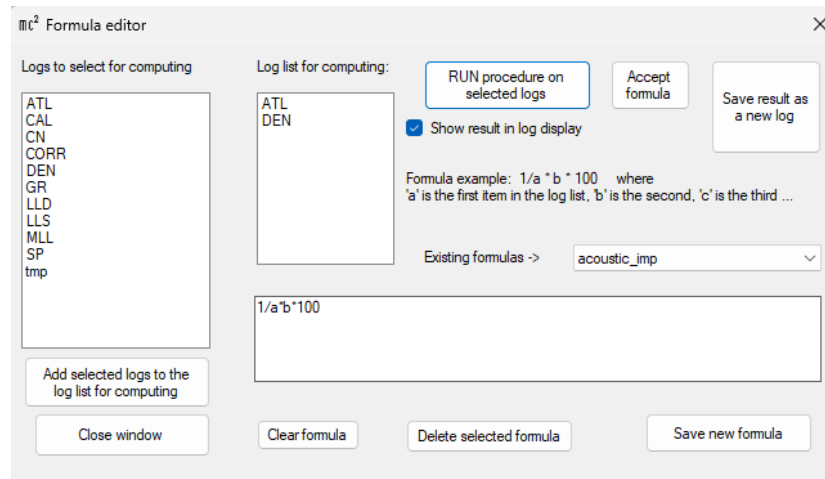


Figure 1.8: The *Formula editor* window

or **Pow**($a, 3$) for a^3 . **Log10**(100) is the logarithm, **Ln**(1) is the natural logarithm. Be careful, the function names are case sensitive.

If the formula is right, click on *Accept formula*, and click on *Run procedure on the selected logs* button. The result is temporarily stored in a log named *tmp*. If you check the *Show result in log display* check box you can see the result in a log display (Fig. 1.9). If you want to save the result for further work click on the *Save result as a new log*. After saving the window closes.

If we did not save the result *tmp* log was lost. If you create your special formula you save it by clicking on the *Save new formula* button. If a certain formula is not necessary you delete it with the proper button.

Clustering

Recently only the k-means method was implemented only. Click on *Procedure/Clustering/K-means* menu item to start clustering. In the dialog window, you can set the necessary parameters such as the *Number of clusters* and *Iteration maximum* (Fig. 1.10). The result of clustering can be seen on the Fig. 1.11.

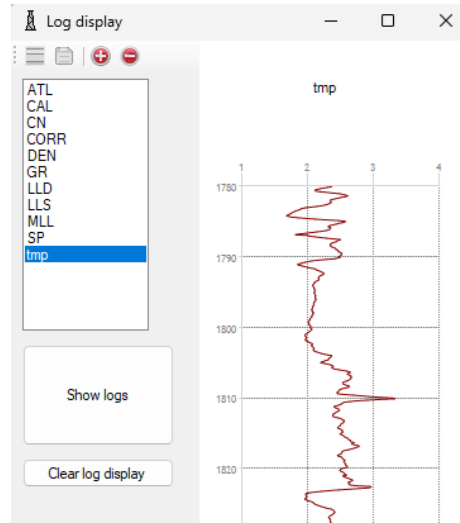
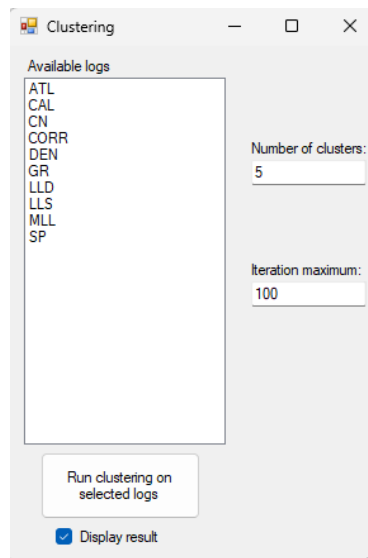
Figure 1.9: The result on the *Log display*

Figure 1.10: The k-means dialog window

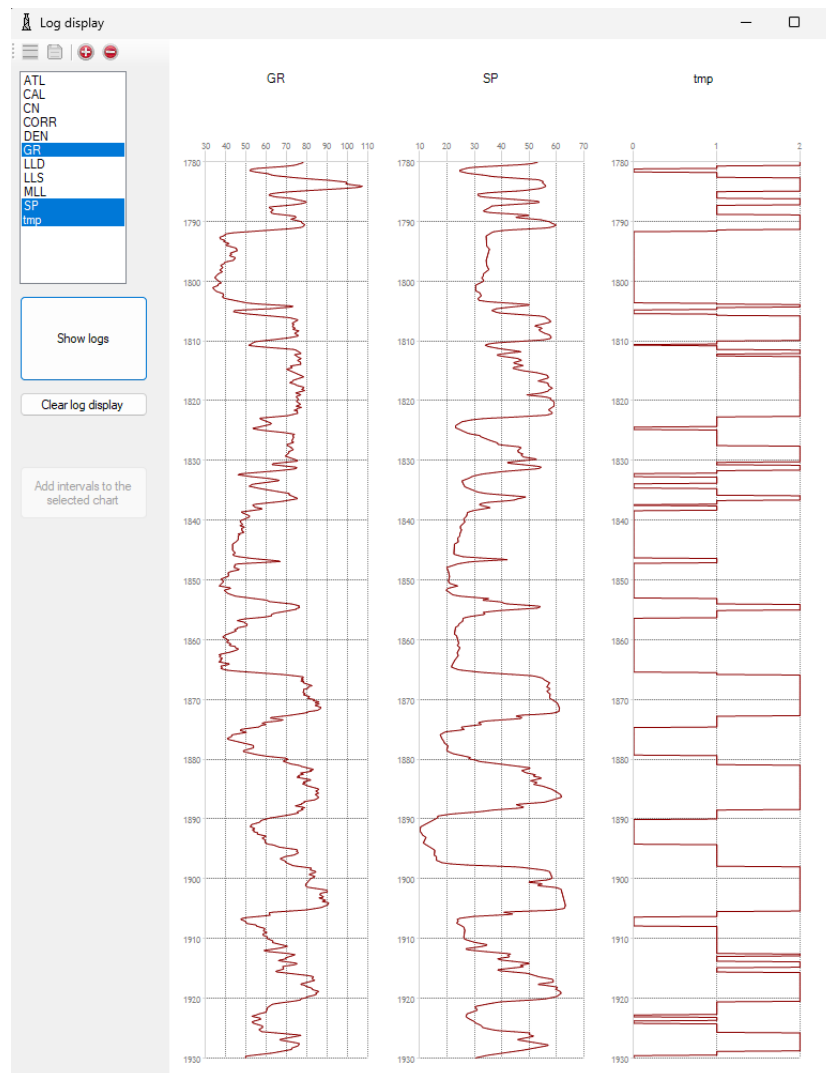


Figure 1.11: The result of K-means clustering