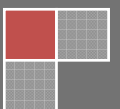
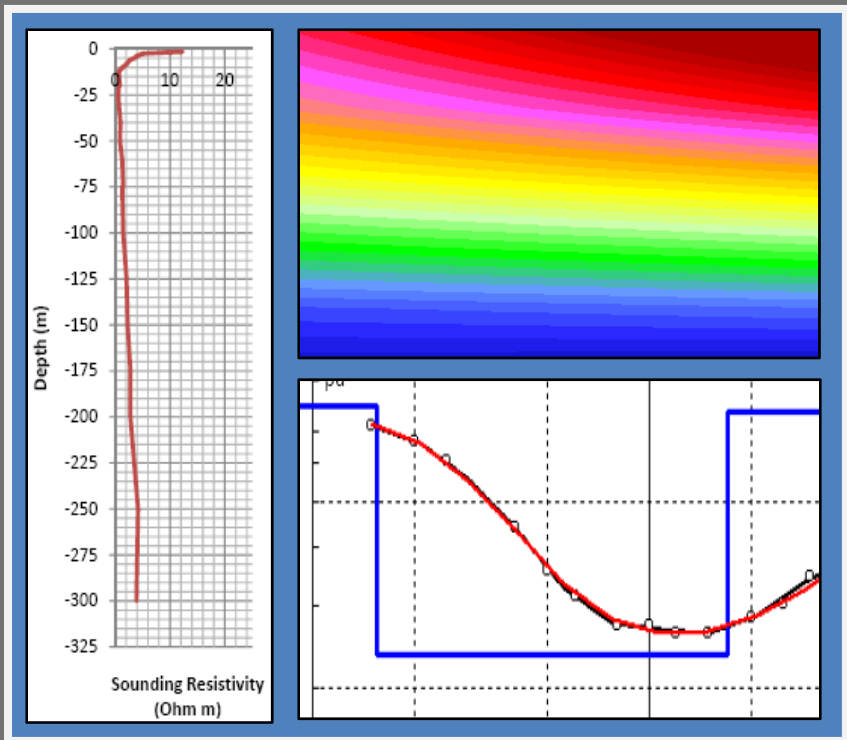


2009

# BASIC IP2 WIN TUTORIAL

Basic Principles in Using IP 2 Win Software



# **BASIC IP2 WIN TUTORIAL**

**Basic Principles in Using IP2 Win Software**

**ALVA KURNIAWAN**

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**2009**

## Foreword

Nowadays we are entering and living in a digital era where most of our activities are being helped by digital equipment. New invention in math, physics, and chemistry lead the world of engineering develops rapidly. A long time ago hydrogeologist and petrophysic scientist calculated and analyzed geoelectrical sounding data manually but now, the developing technology born new method to analyze geoelectrical sounding data.

Geoelectrical sounding data can be calculated and analyzed digitally by using IP2 Win Software. IP2 Win software can analyze induced polarization data with some electrode configuration like Wenner-Schlumberger, Wenner Alpha, Wenner Beta, etc. Using computer to help calculate and analyze data will save a lot of time. There is a fact that most of us will agree, computer has a very small possibility to make a mistake in calculation.

Unfortunately using IP2 Win is not easy. We need to be familiar with IP2 Win software tools so we can use that software effectively. By writing this tutorial book, I hope I could help people those are interested to use IP 2 Win software in order to help their work. This tutorial book just explain a basic step in using IP 2 Win from inputting data until creating cross section from two or more sounding points. Thank you very much for all people that help me to finish this book especially Mr. Tjahyo Nugroho Adji (Hydrogeologist) and Ms. Kurnia Widhayanti (Mathematics Scientist). I said thanks too for all Hydrogeology World's visitors for your visiting and contribution.

Yogyakarta, 28 May 2009

**Alva Kurniawan**

## 1. Introduction to IP2 Win Software

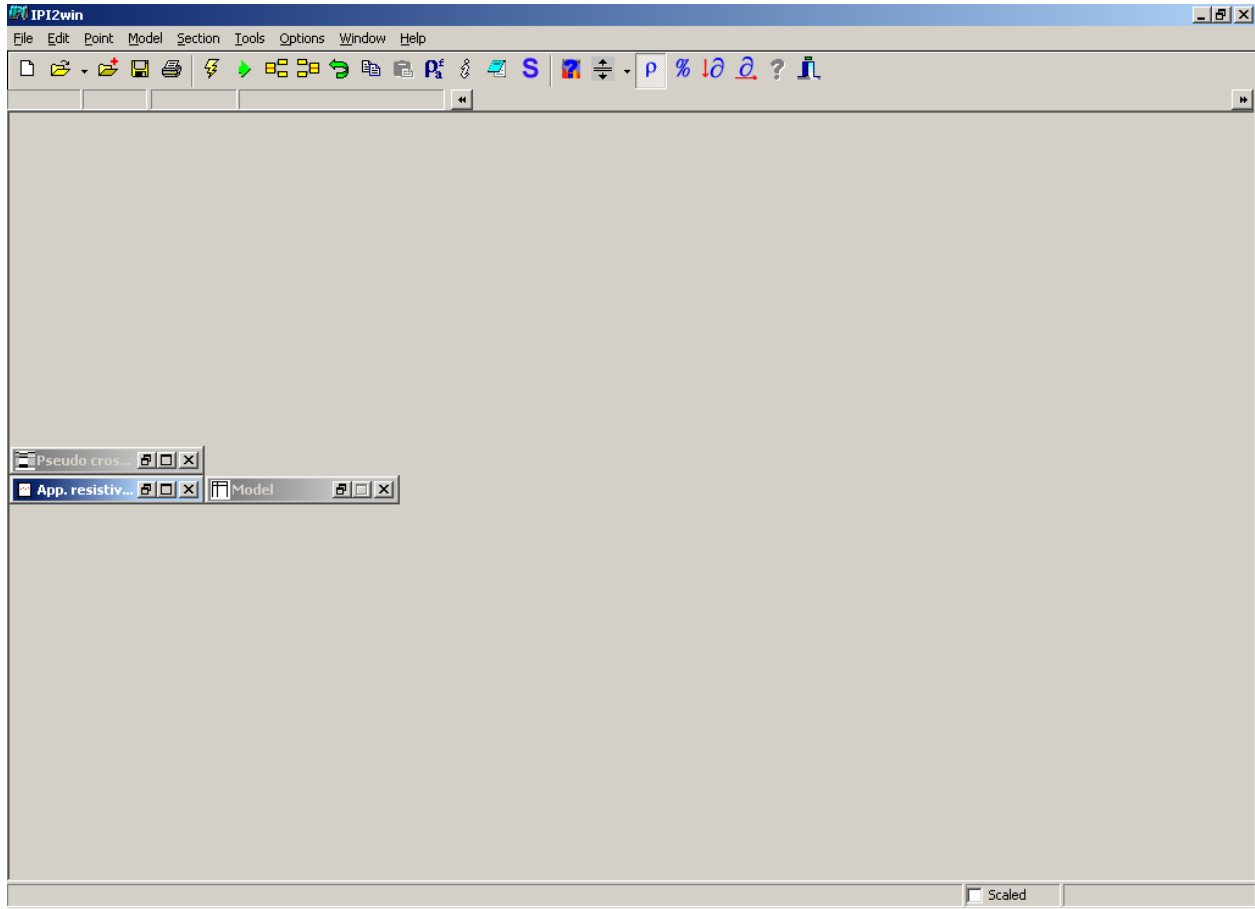
IP 2 Win is software for analyzing geoelectrical data from one or more VES (Vertical Electrical Sounding) points. IP2 Win can analyze data from some kinds of induced polarization's electrode configuration such as Schlumberger, Wenner- $\alpha$ , Wenner- $\beta$ , etc.

Using IP2 Win includes some steps. The first step in using IP Win is data input, the second step is data error correction, the next step is adding data point, and the last step is cross section creation. Data input can be done directly from field data (sounding data consist of AB/2, V, I, and K) or indirect field data (sounding data consist of AB/2 and Rho\_a).

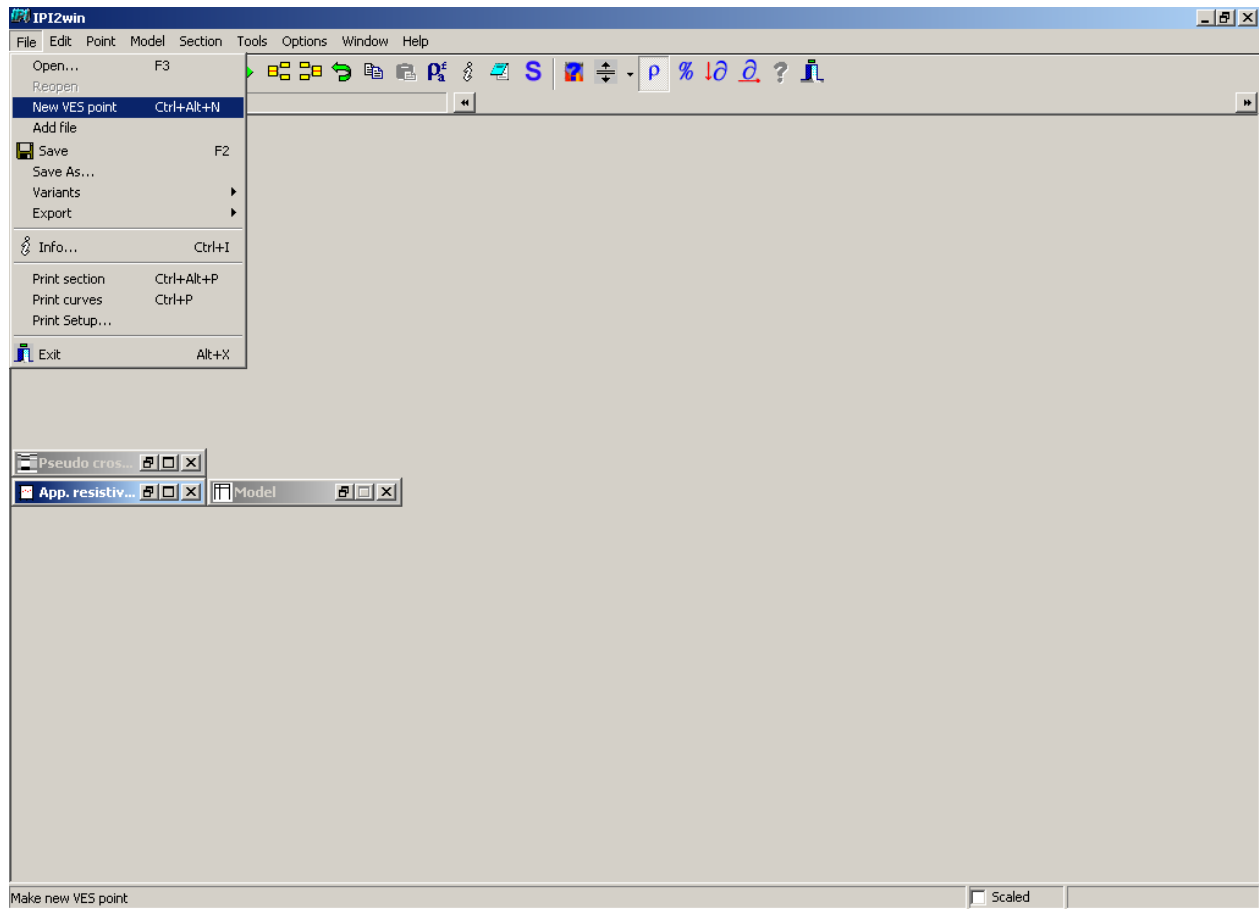
Output of sounding data that analyzed by using IP2 Win software are resistivity layer, log resistivity graph, resistivity-depth table, and pseudo cross section. The output can be exported in some data formats. Basic weakness of IP2 Win software is a bug that frequently occurs when analyzing data. That problem can be solved by restarting software.

Analyzing the output from IP2 Win software can be done based on Loke's book, Electrical Imaging Survey for Environmental and Engineering Studies. Further question about how to use IP2 Win can be asked in <http://alvathea.wordpress.com> or via email in [alva\\_the\\_a@yahoo.co.id](mailto:alva_the_a@yahoo.co.id).

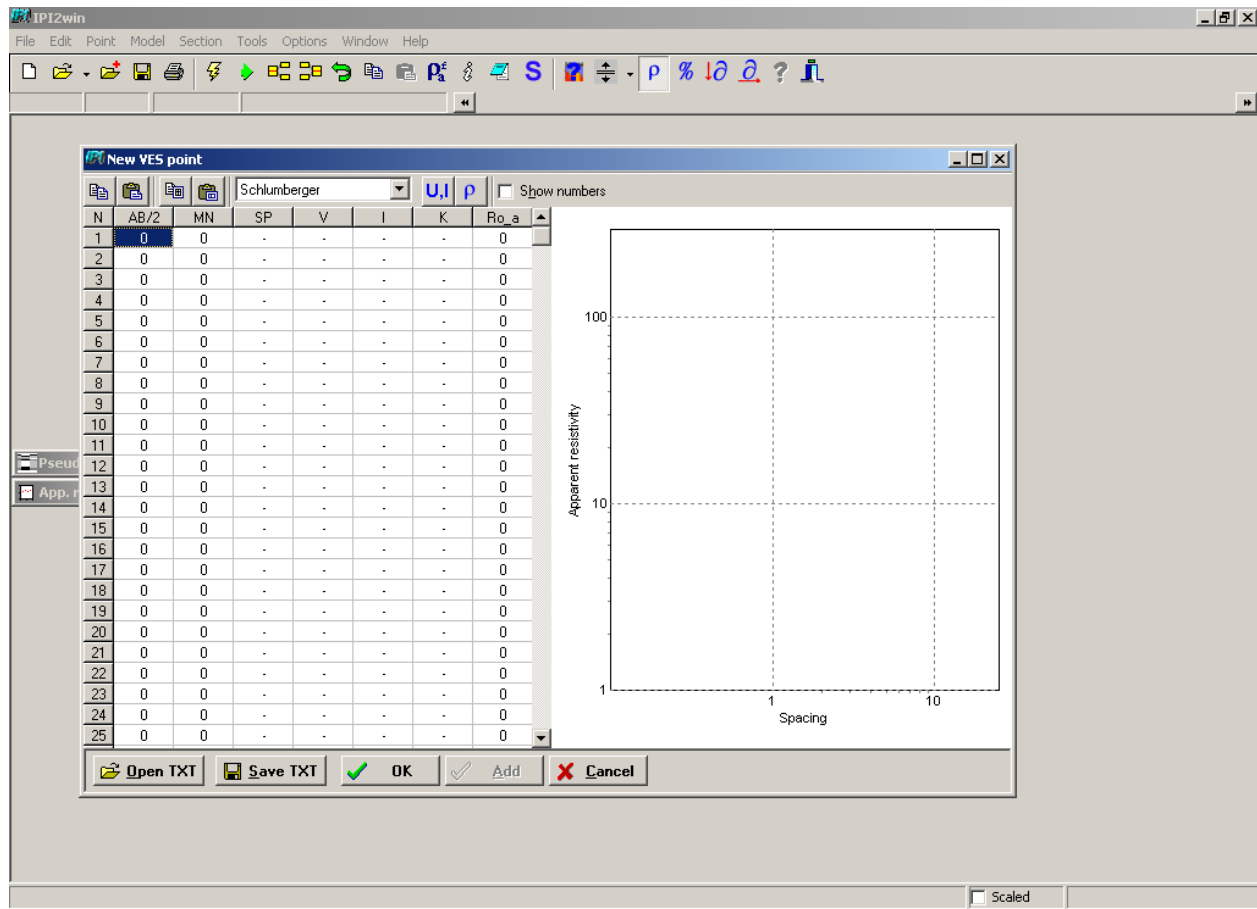
## 2. VES data Input in IP2 Win



Run IP2 Win program, so there will be a window like picture above.



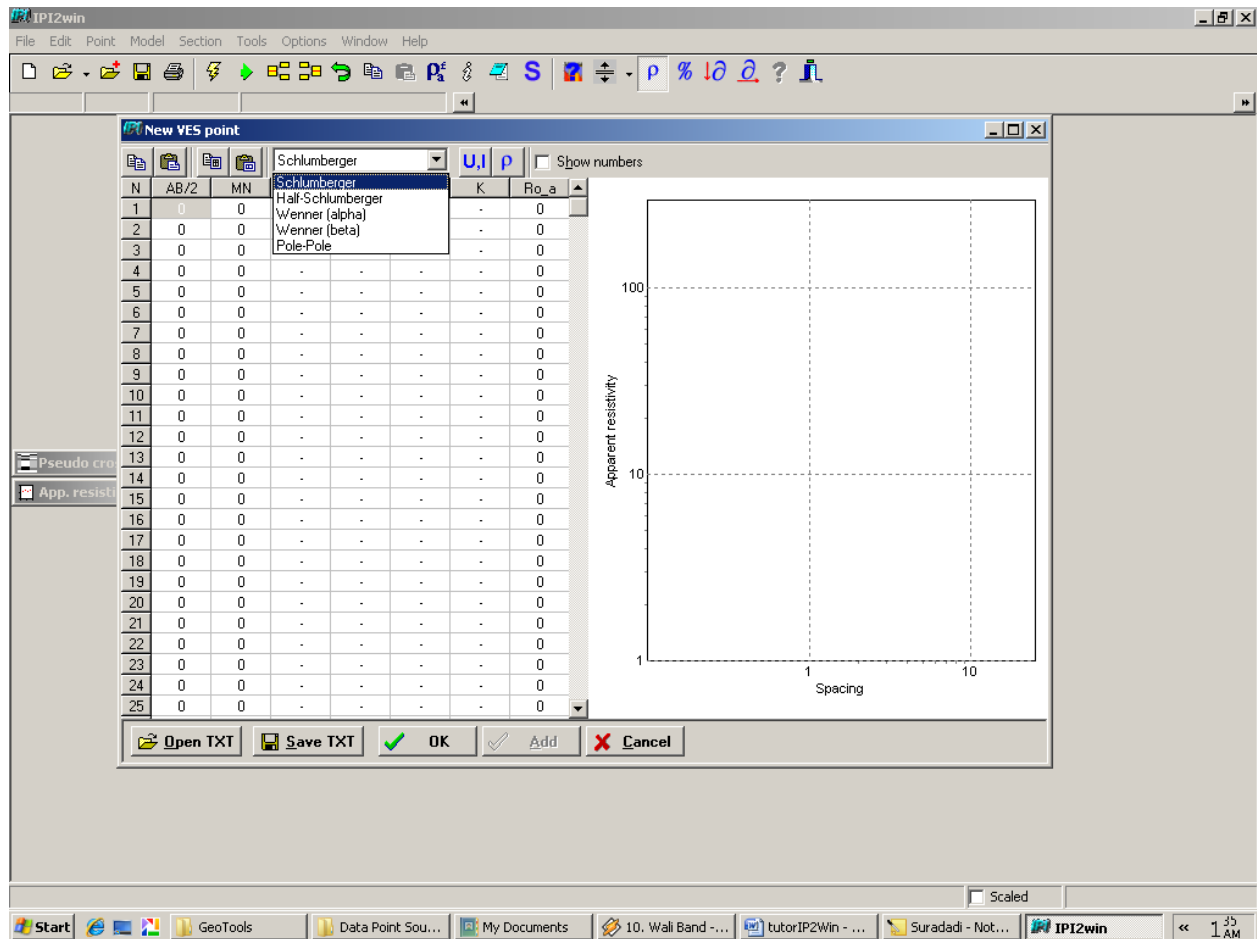
Next click File>New VES point like the picture above.



New VES Point window will come out like the picture above.

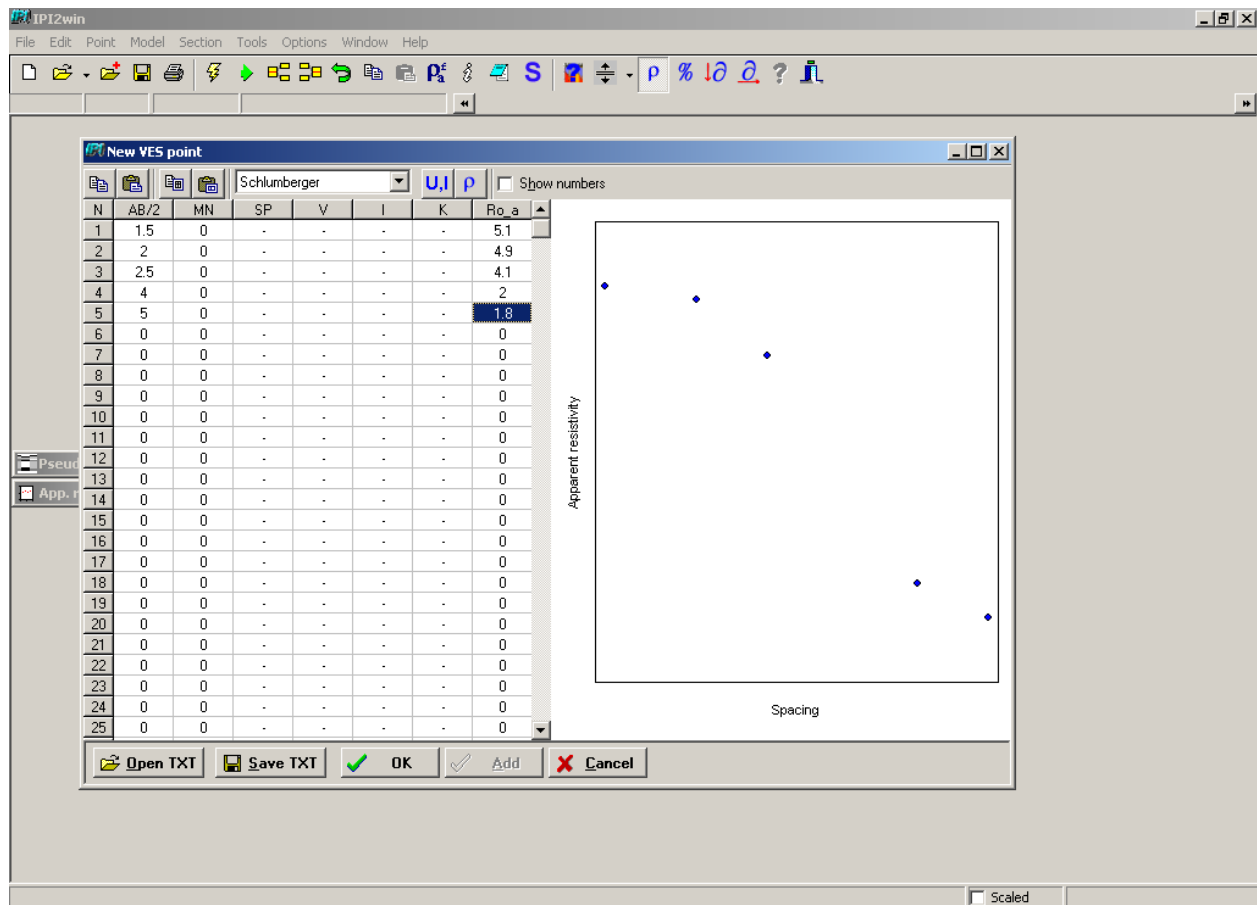
**Note:**

*AB/2 column is used for AB/2(distance between two electrode that inject electric current to the ground) data input, MN column is used for MN data input (distance between two electrode that catch injected electric current), SP is used for self potential data input, V for inputting voltage data, I for inputting electric current data, and K inputting geometric factor data. Rho\_a column is apparent resistivity data column (Rho\_a is the result from electrical resistivity and geometric factor calculation value).*



Choosing electrode configuration is important before inputting data, as example Schlumberger's electrode configuration was chosen.

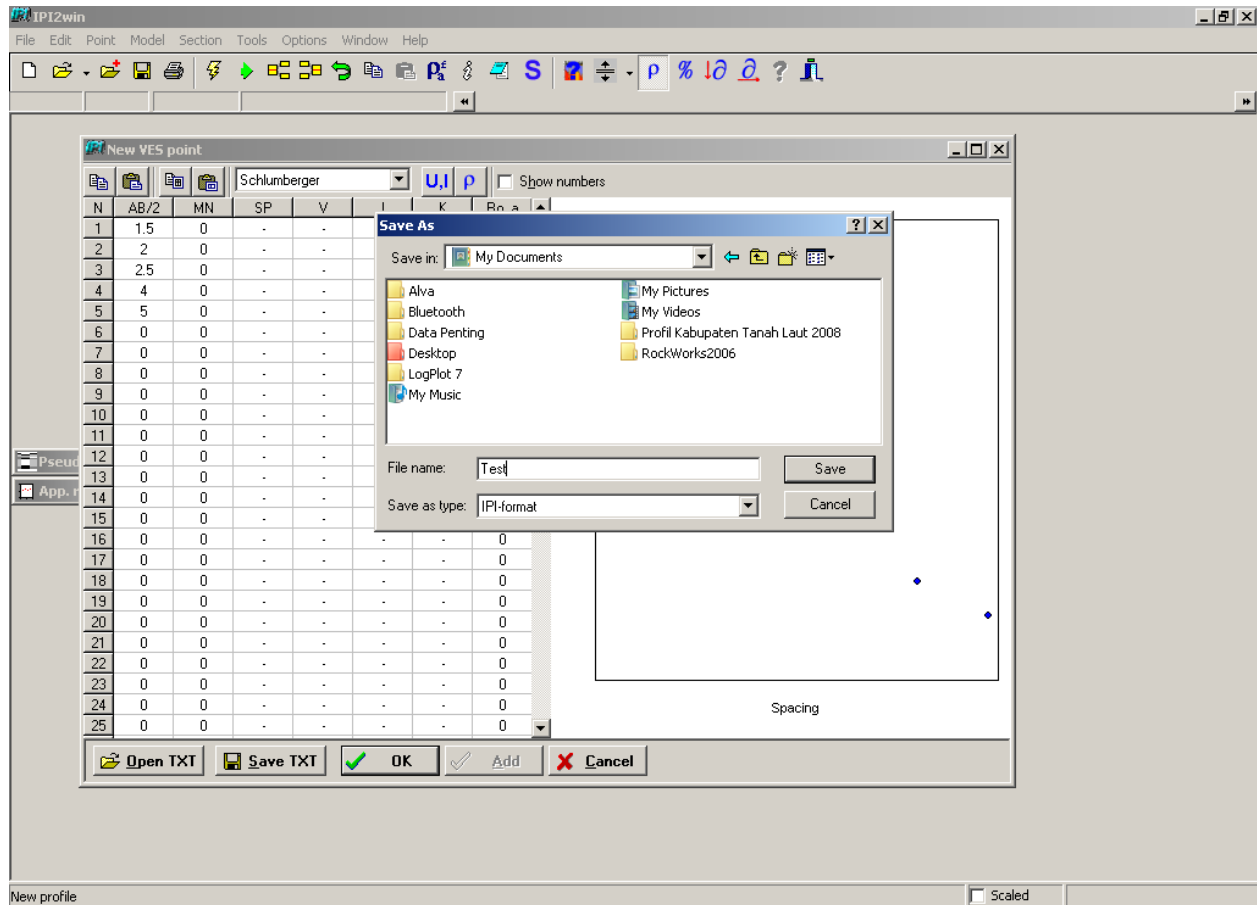




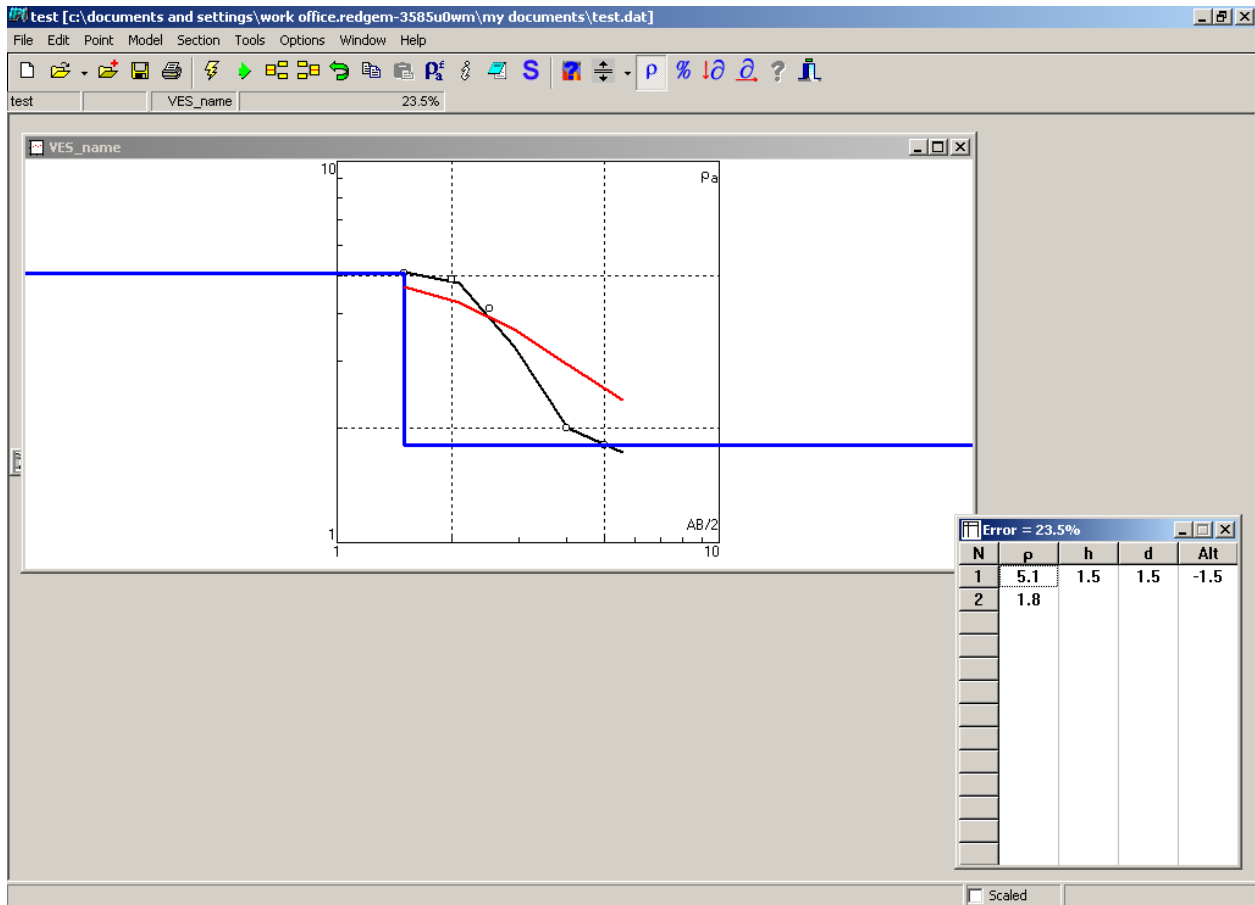
Data are inputted in column by clicking the column. After data were inputted, points will be plotted in a graph beside the VES column, then click OK button.

**Note:**

Data can be saved in \*.txt format by clicking Save TXT button.



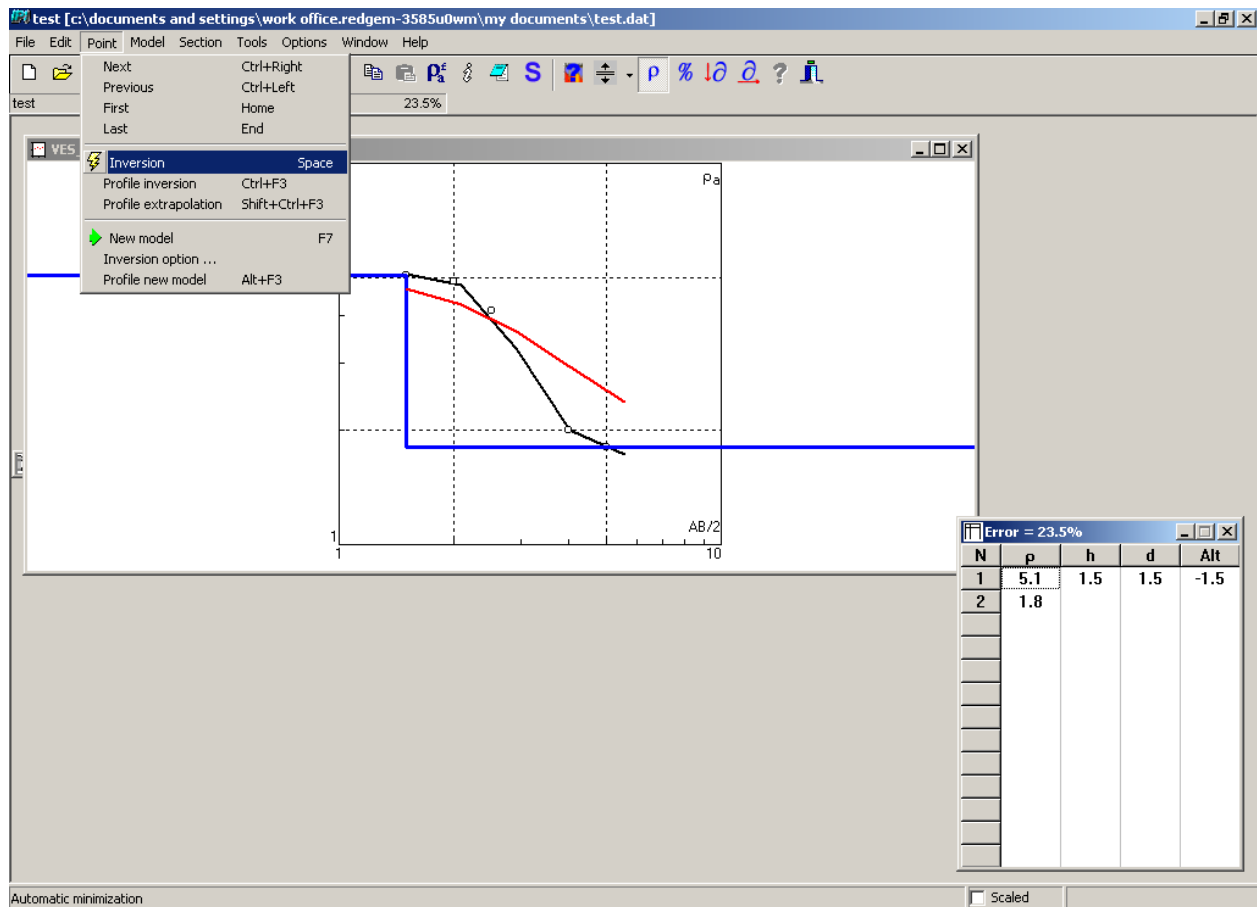
Save as window will come out then decide where the inputted data will be saved as VES data file. Give it a name, as example "Test", and then click Save Button.



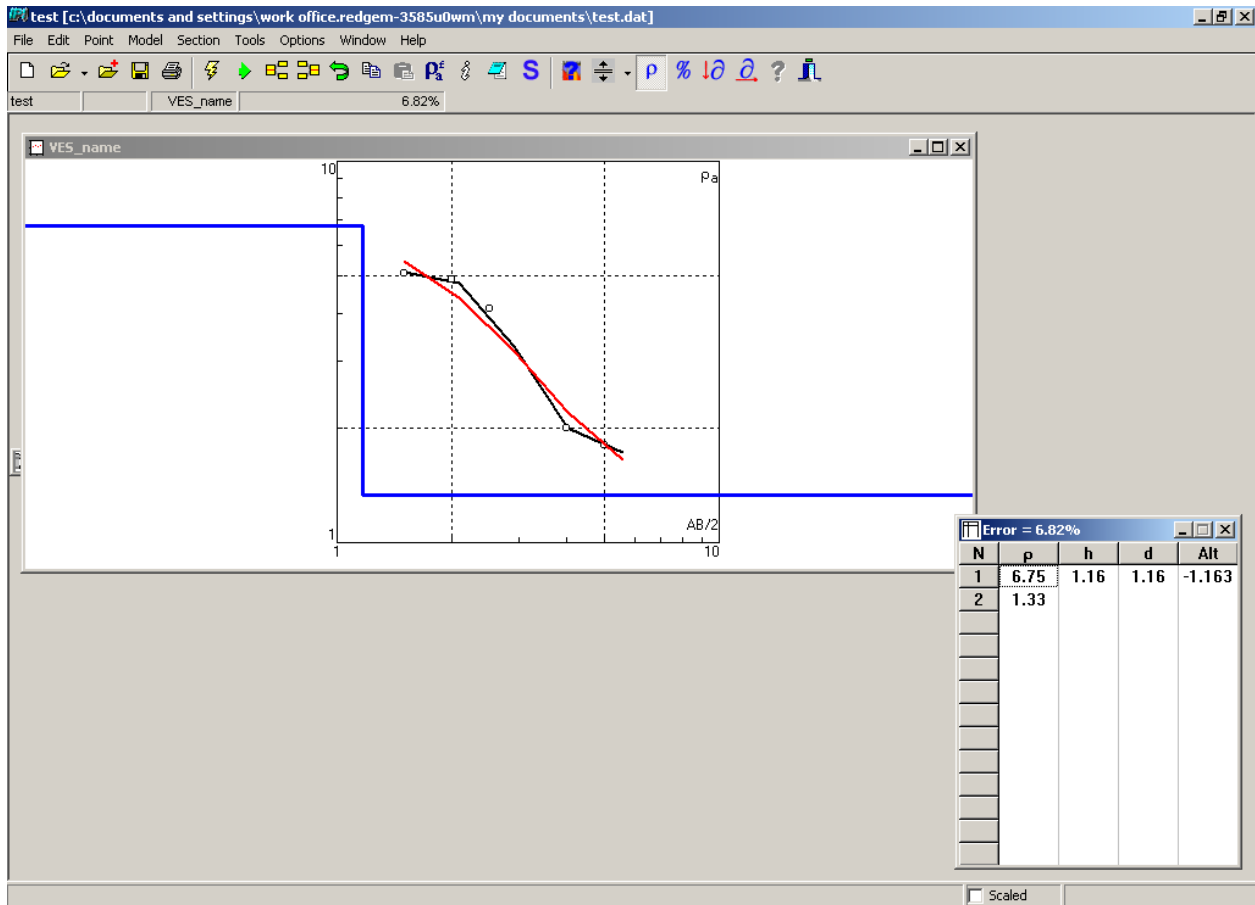
Curves and table will be displayed from saved VES file.

**Note:**

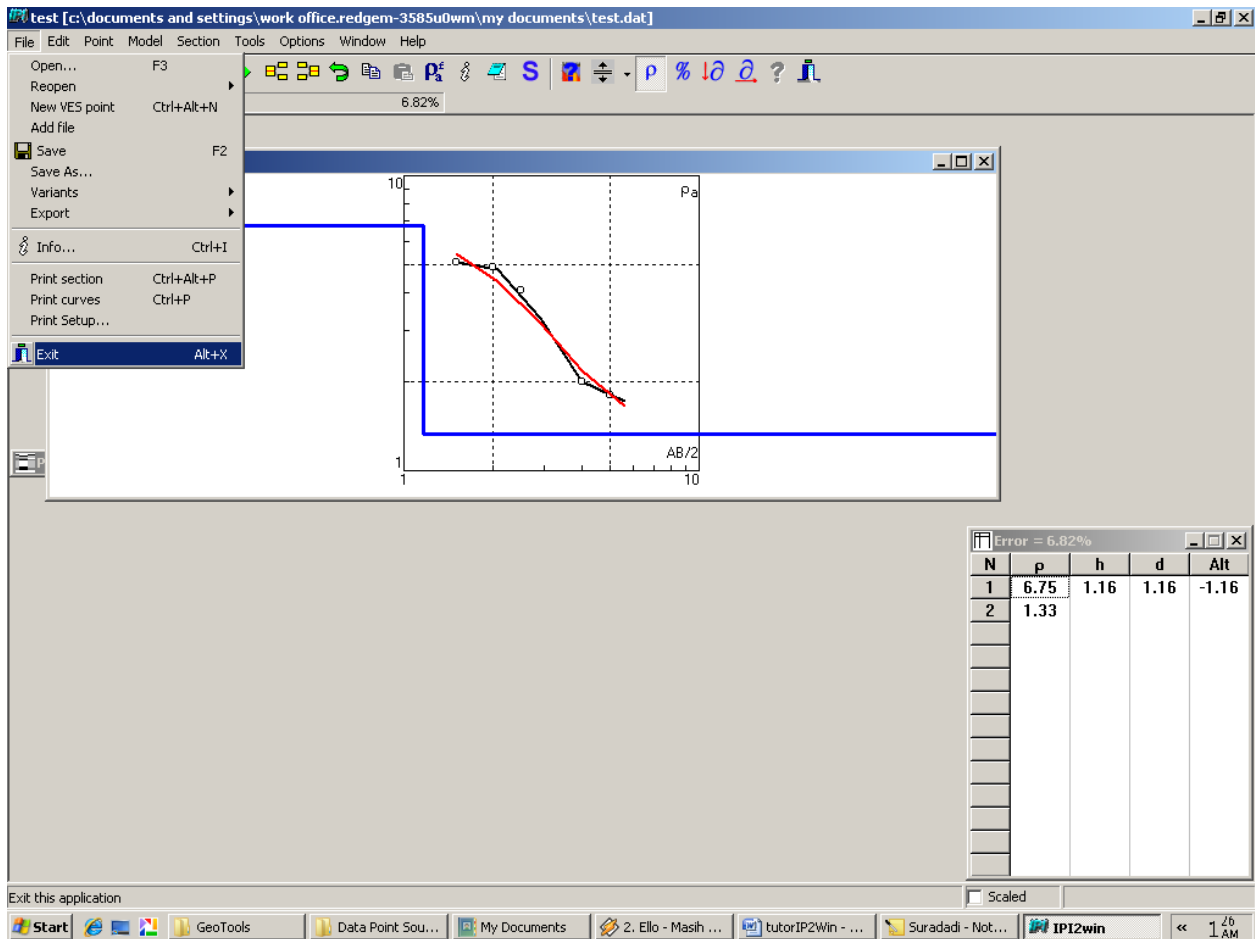
Table gives information about resistivity layer. Resistivity value in each ground layer is displayed in  $\rho$  column. Alt column is altitude column or depth from VES point elevation (the picture above showed VES value elevation in 0 m so Alt value is -1.5 m, if VES elevation value in 5 m then Alt value will be 3.5 m). Information of depth from surface is displayed in d column. Information of each layer thickness with different resistivity value is displayed in d column. Red and Blue curve give information about the relation between AB/2 and apparent resistivity value. Blue curve give information about resistivity value variation.



Data error is displayed on table title bar (error level in the example above is about 23.5%). Data error can be corrected automatically by clicking Point>Inversion. Manual data correction can be done by dragging the curve.



The result from data correction appeared in the graph and error value on table title bar like picture above (there was a value decreasing from 23.5% to 6.82 %).

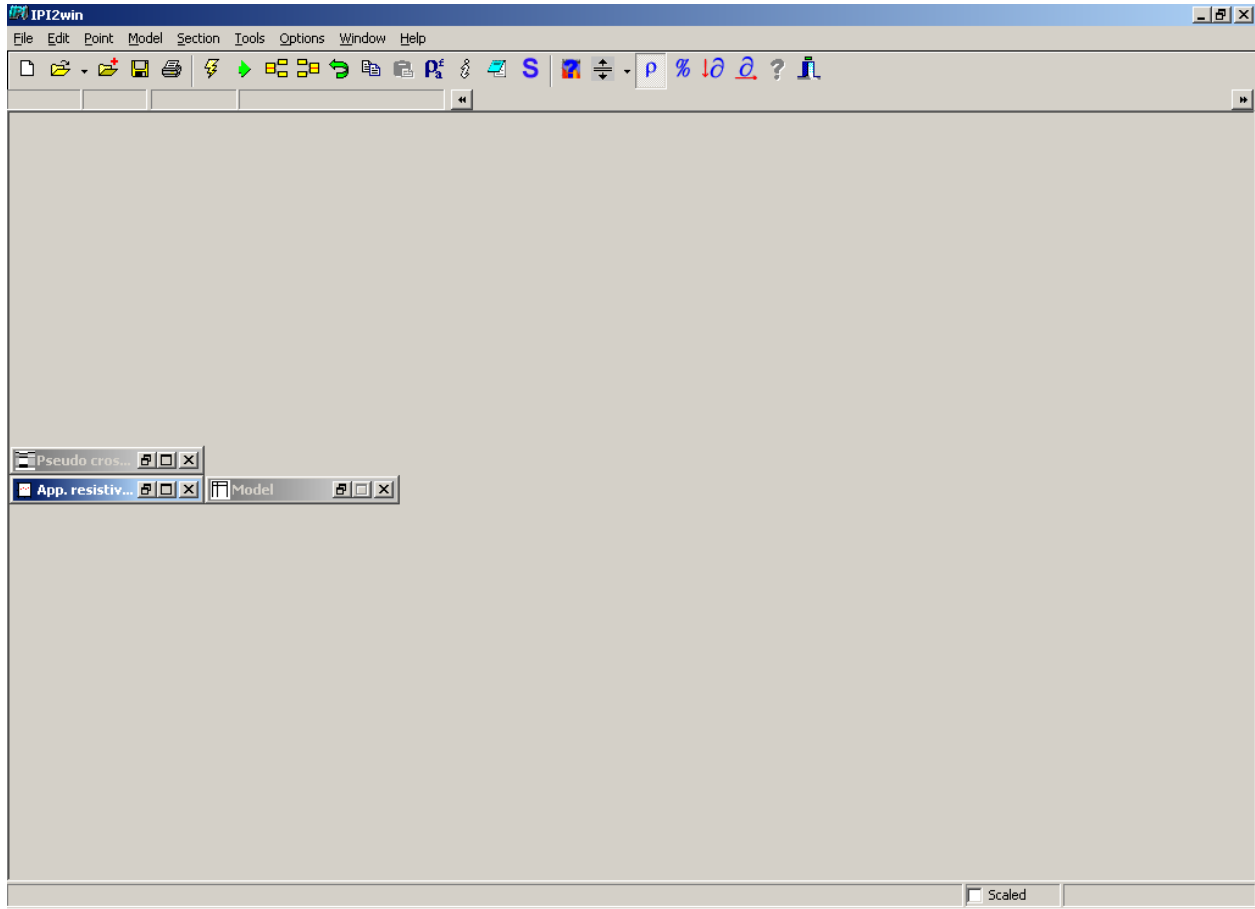


Close IP2 Win software by clicking File>Exit. Run IP2 Win software again to input another VES point data.

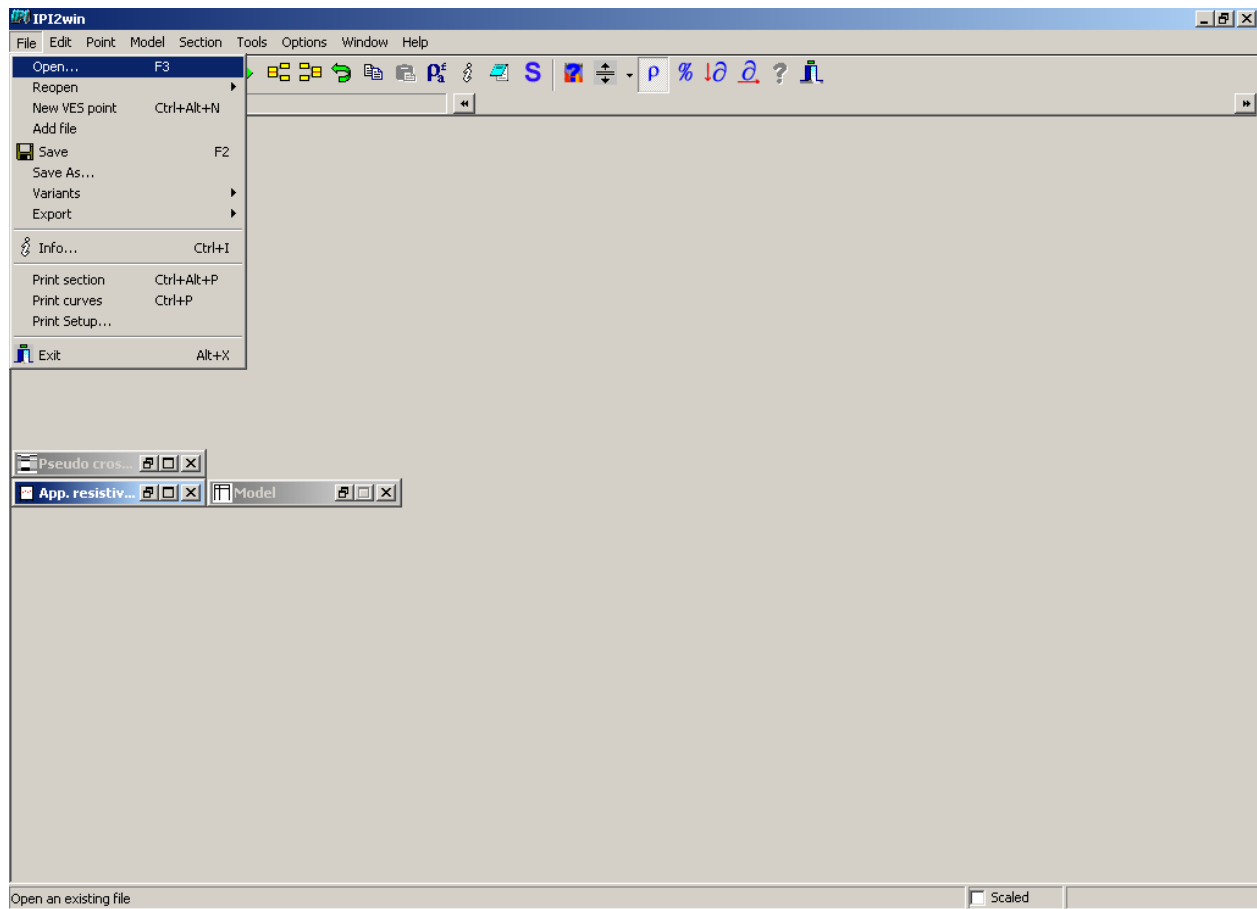
**Note:**

- Every change made in IP2 Win will be automatically saved. That automatically save setting is default but, if the automatically save setting is off click File>Save for saving file.
- Inputting another VES point data also the next data analyzing with IP2 Win can be done after restarting IP2 Win software (there is a bug in IP2 Win software that appeared if IP2 Win Software is not restarted).

### 3. VES Data Join and Creating Pseudo Cross Section

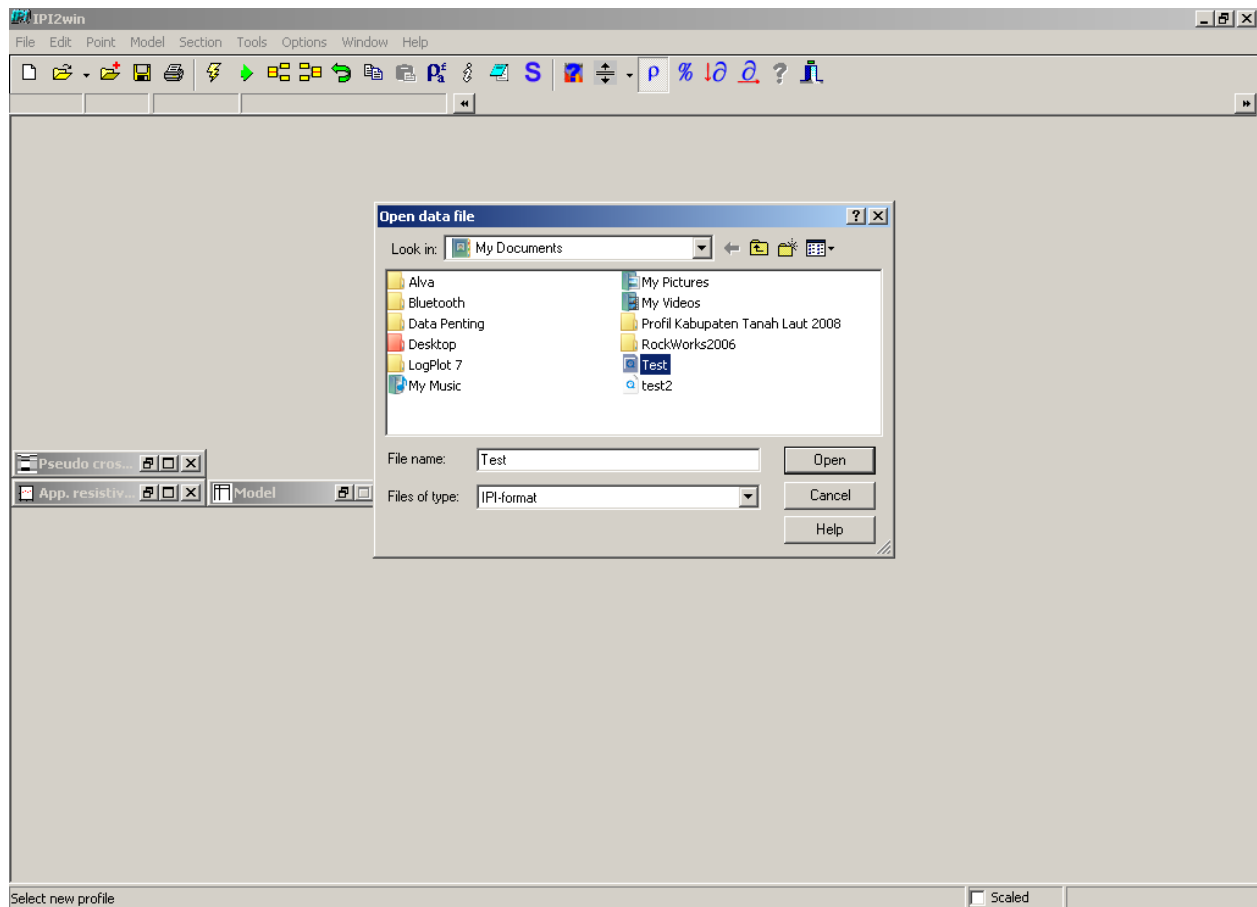


Re run IP2 Win software.

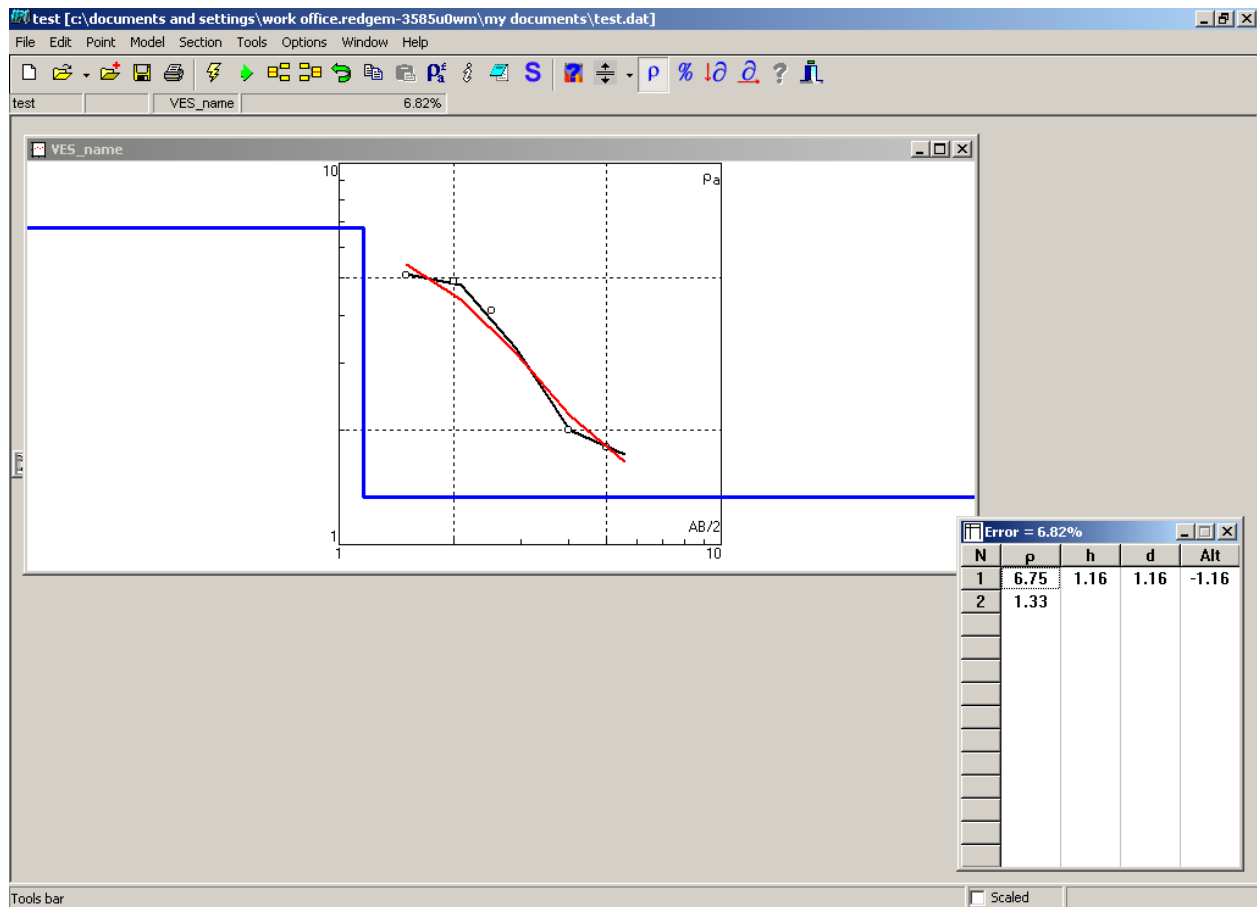


Click File>Open.

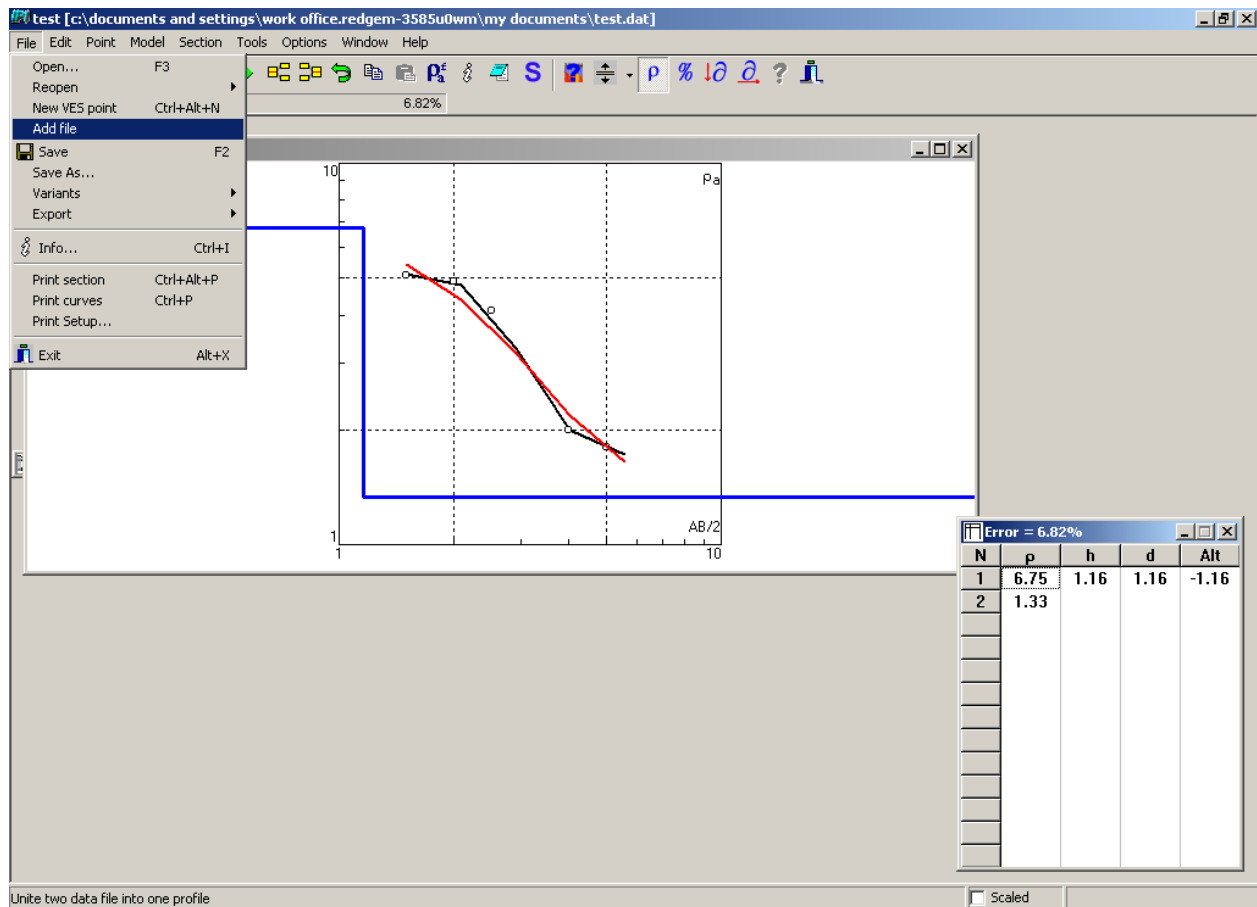




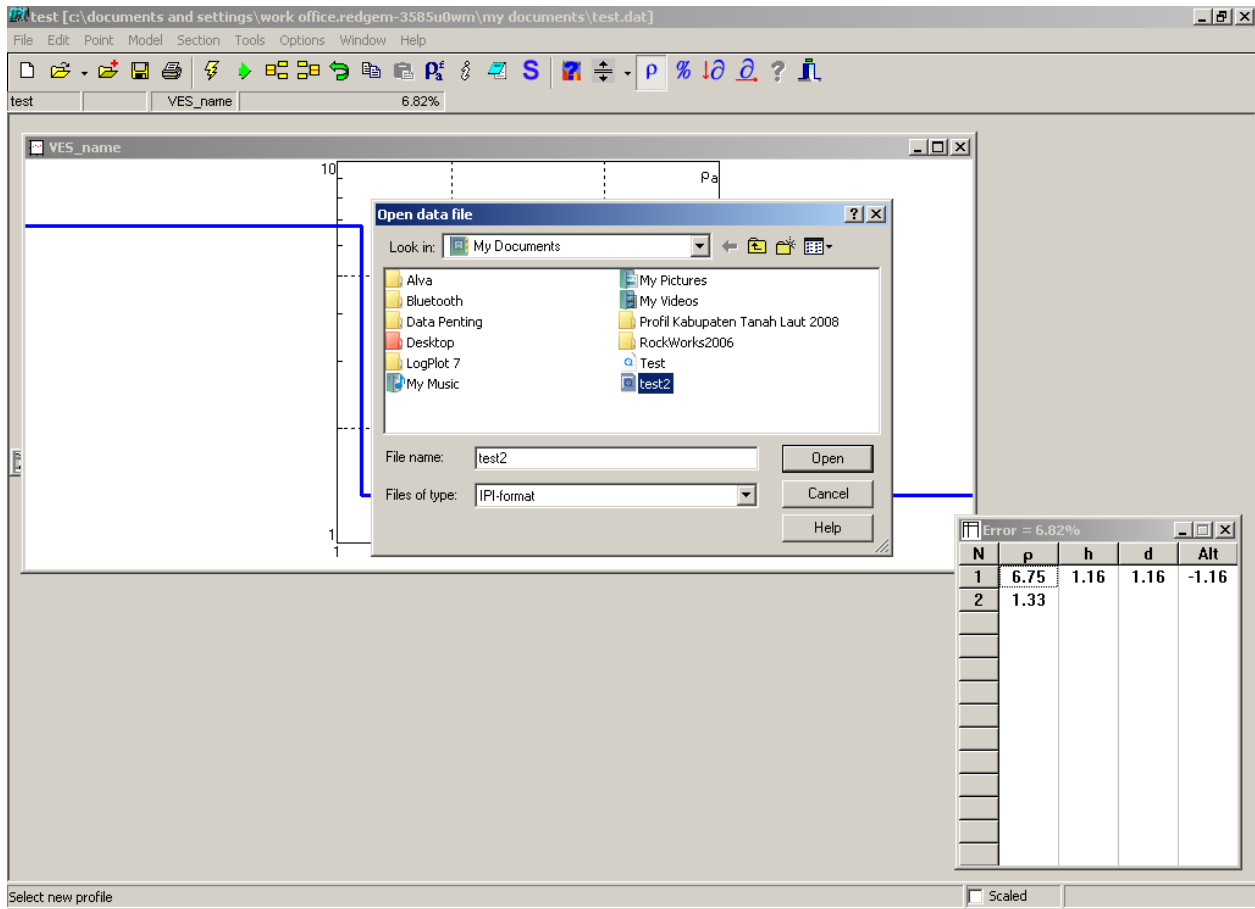
Window Open Data File will appear, choose previous saved VES file as example “Test”, and then click open.



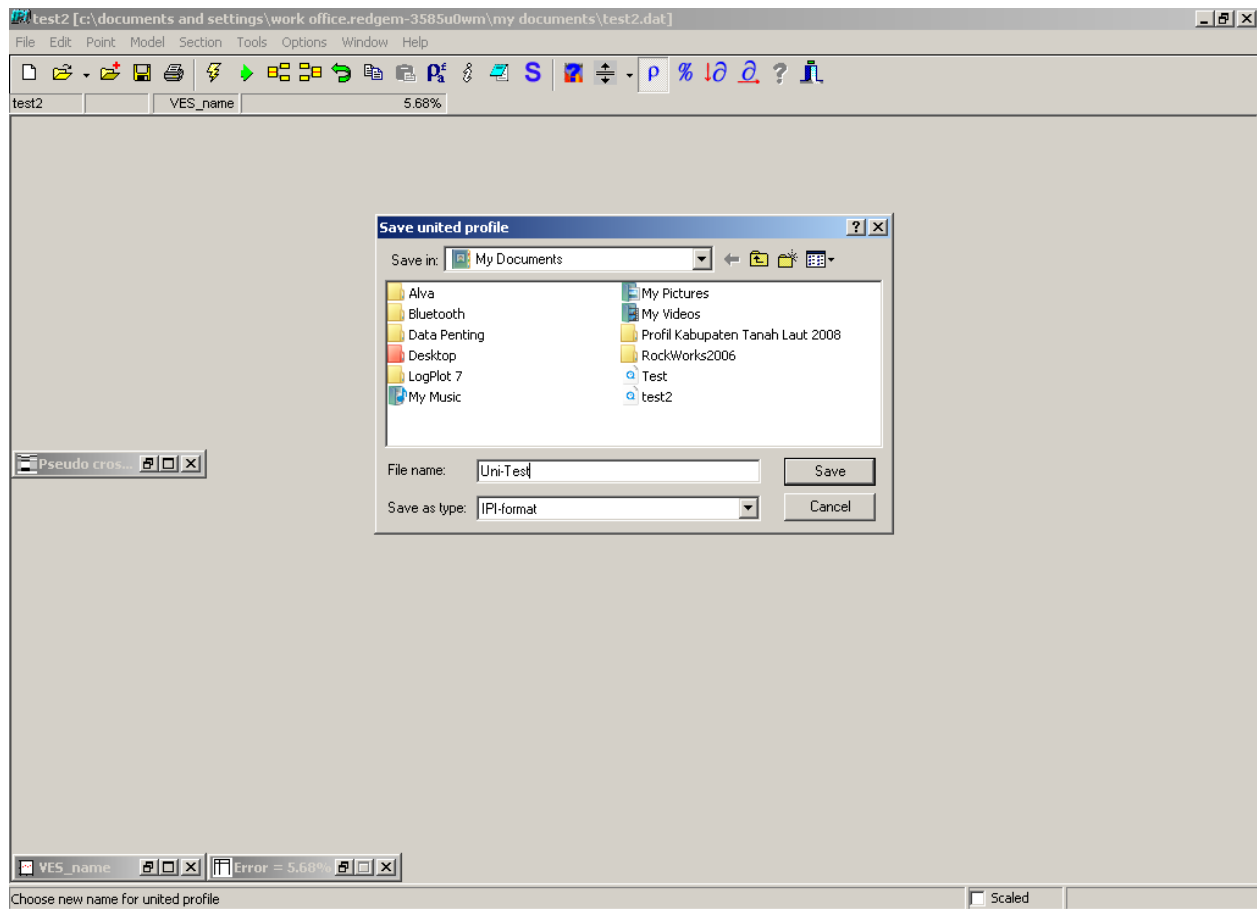
Curves and Table will come out from choosed VES file.



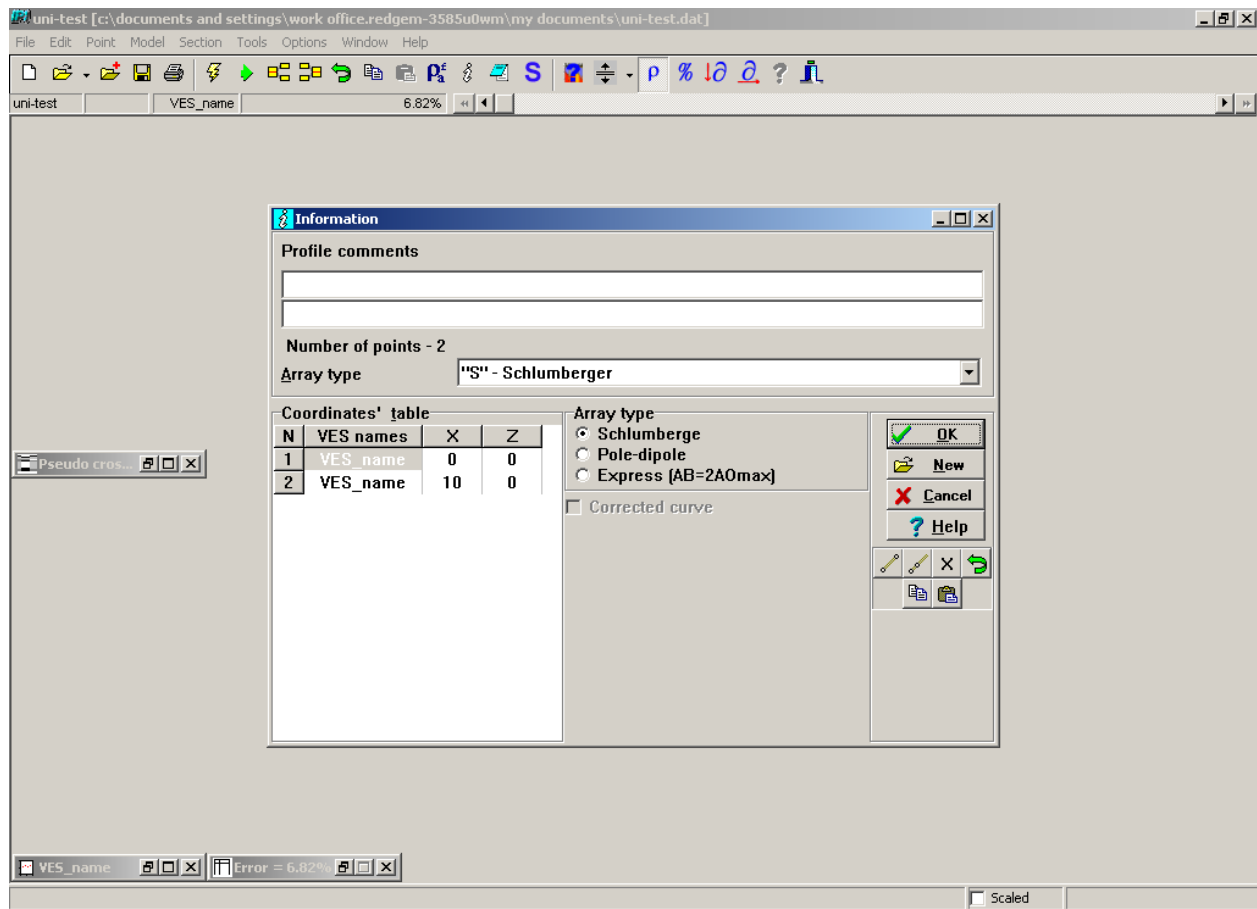
Click File>Add file for joining VES data.



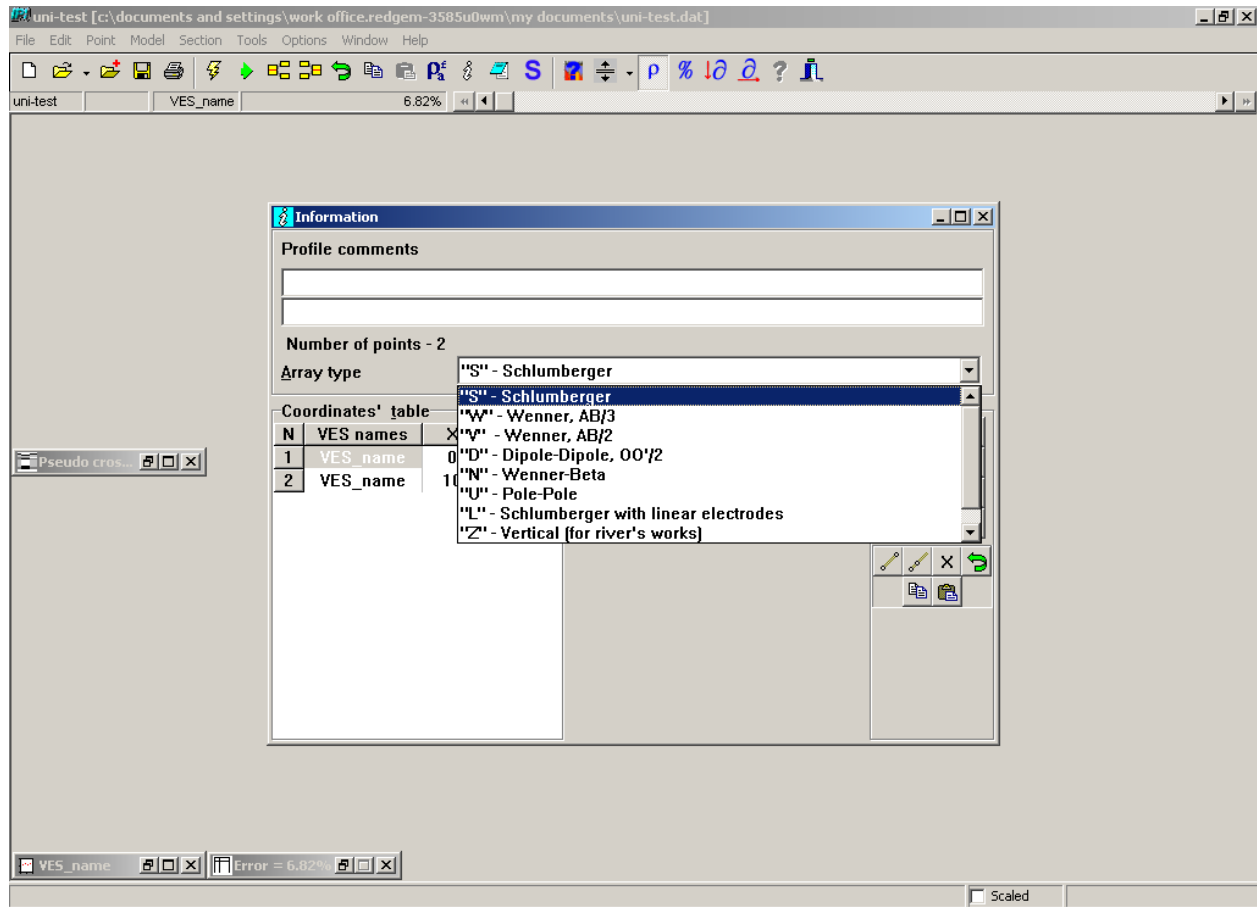
Open data file window will appear. Choose another saved VES file (VES file from another data input), as example "Test 2". It will be joined with previous chosen VES file. Click Open button.



Save United Profile window will appear, decide where the united file of VES 1 file (Test) and VES 2 file (Test 2) will be stored. Give it name and click Save button.



Information window will appear. N column on Coordinate Table is number of joined VES point. VES names column is name of each VES point (can be changed by clicking the VES\_name in VES names column). X is distance between united VES points and Z is elevation of each VES points.



Choose Array type from the joined data as example Schlumberger (Chosen array must be same as the first chosen electrode configuration). Click OK button.

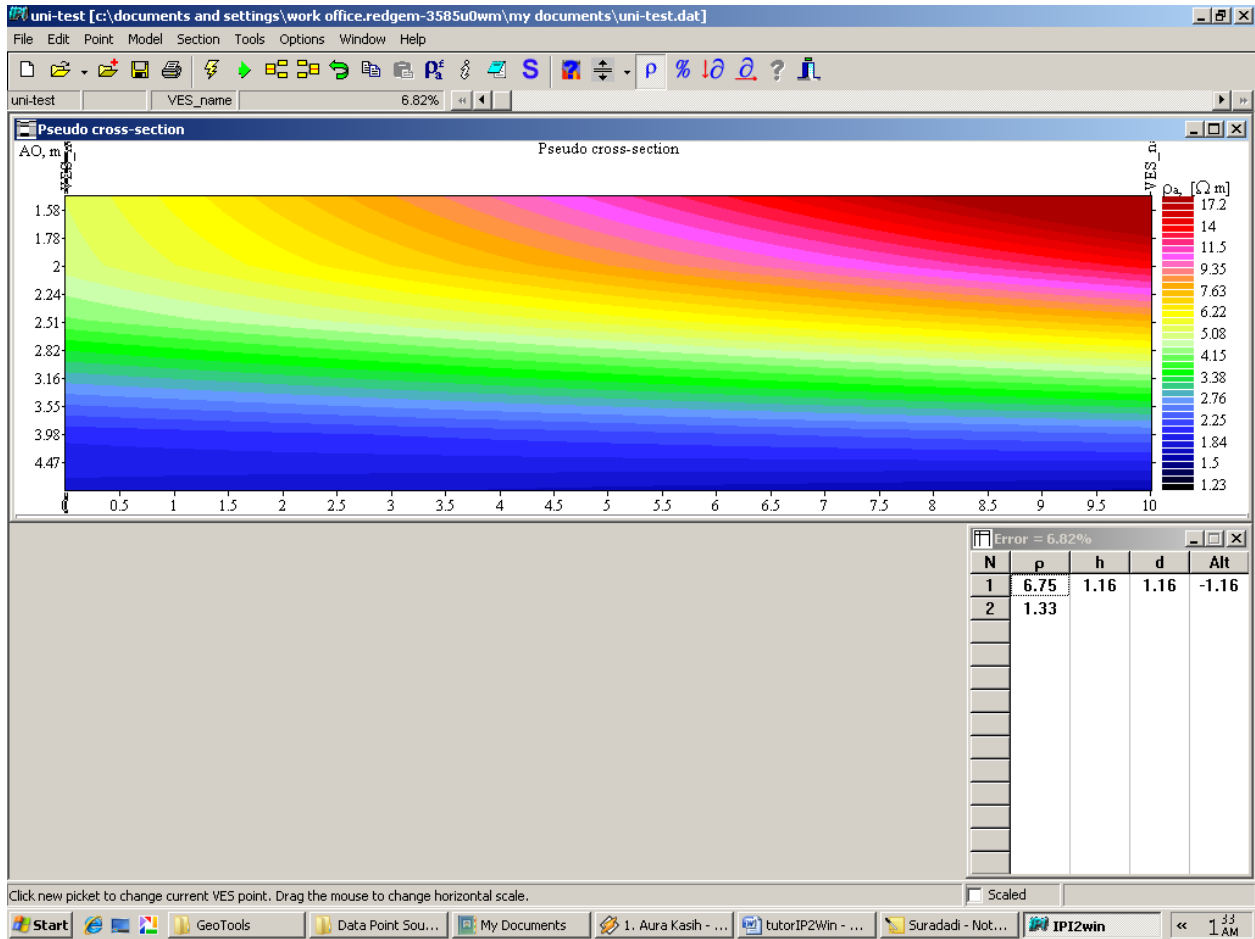
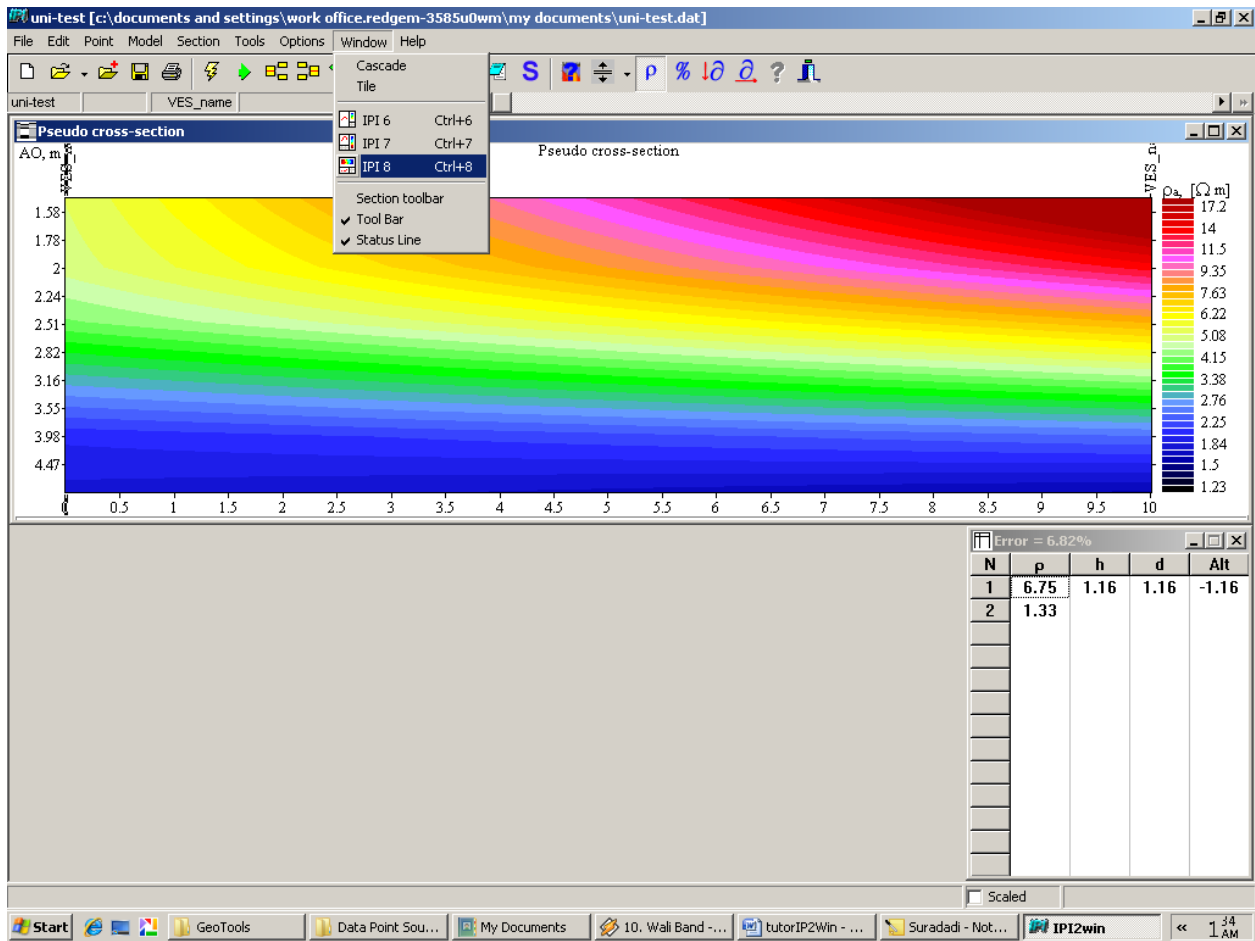
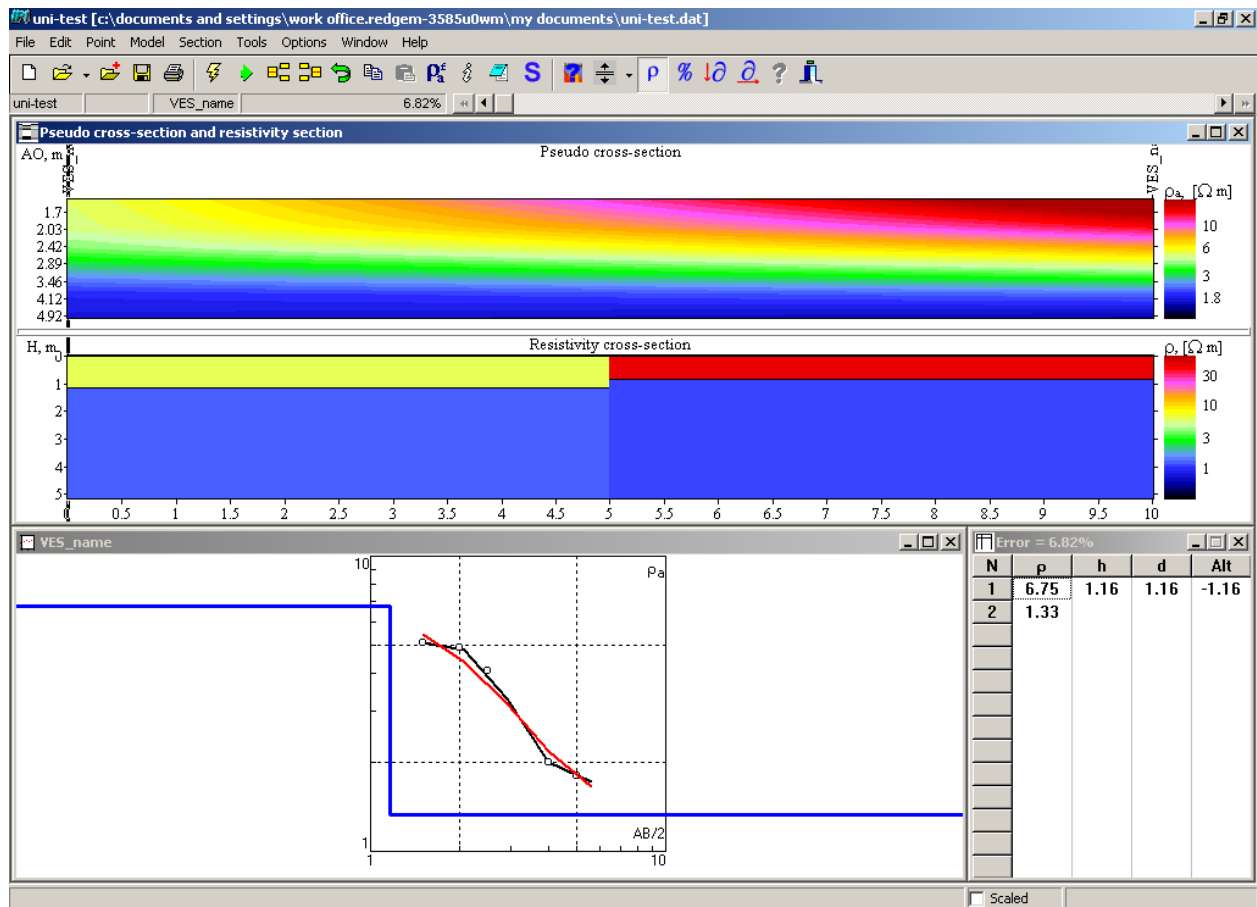


Table and Pseudo Cross Section (colorful layers) will appear. Colorful layers are a representation of resistivity value distribution from two or more interpolated VES data.

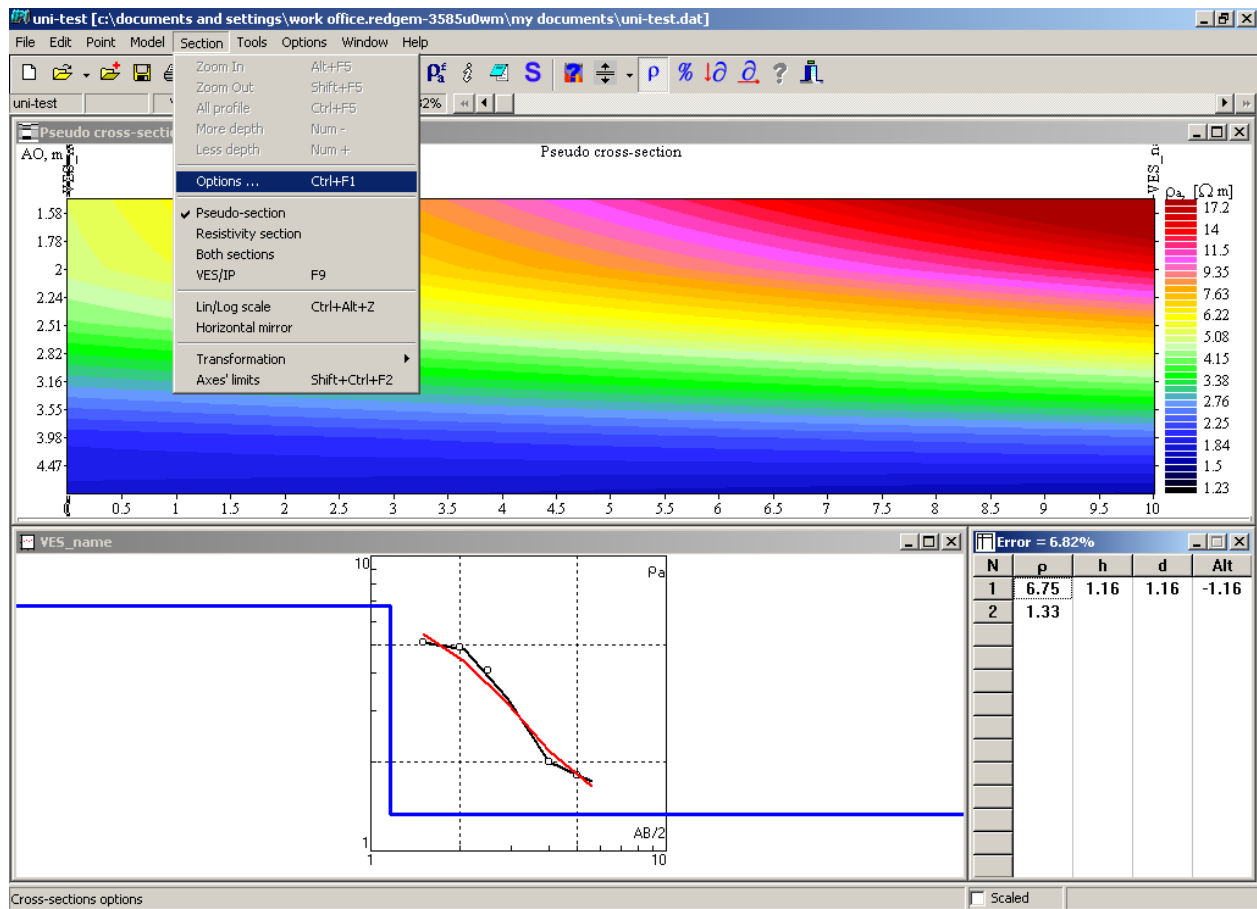




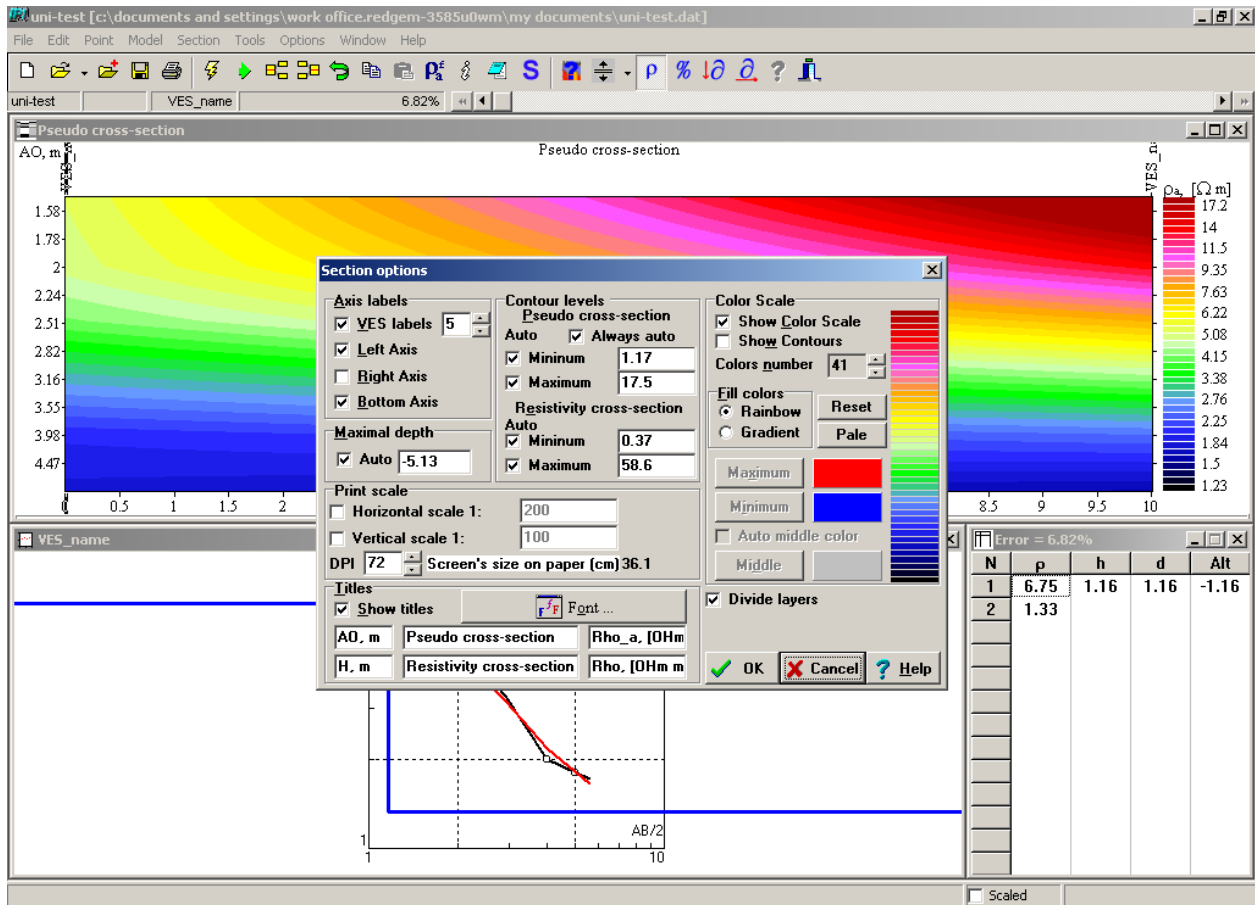
For changing IP2 Win display, click Window>IPI 6 or Window>IPI 7 or Window>IPI 8 (as example IP 8).



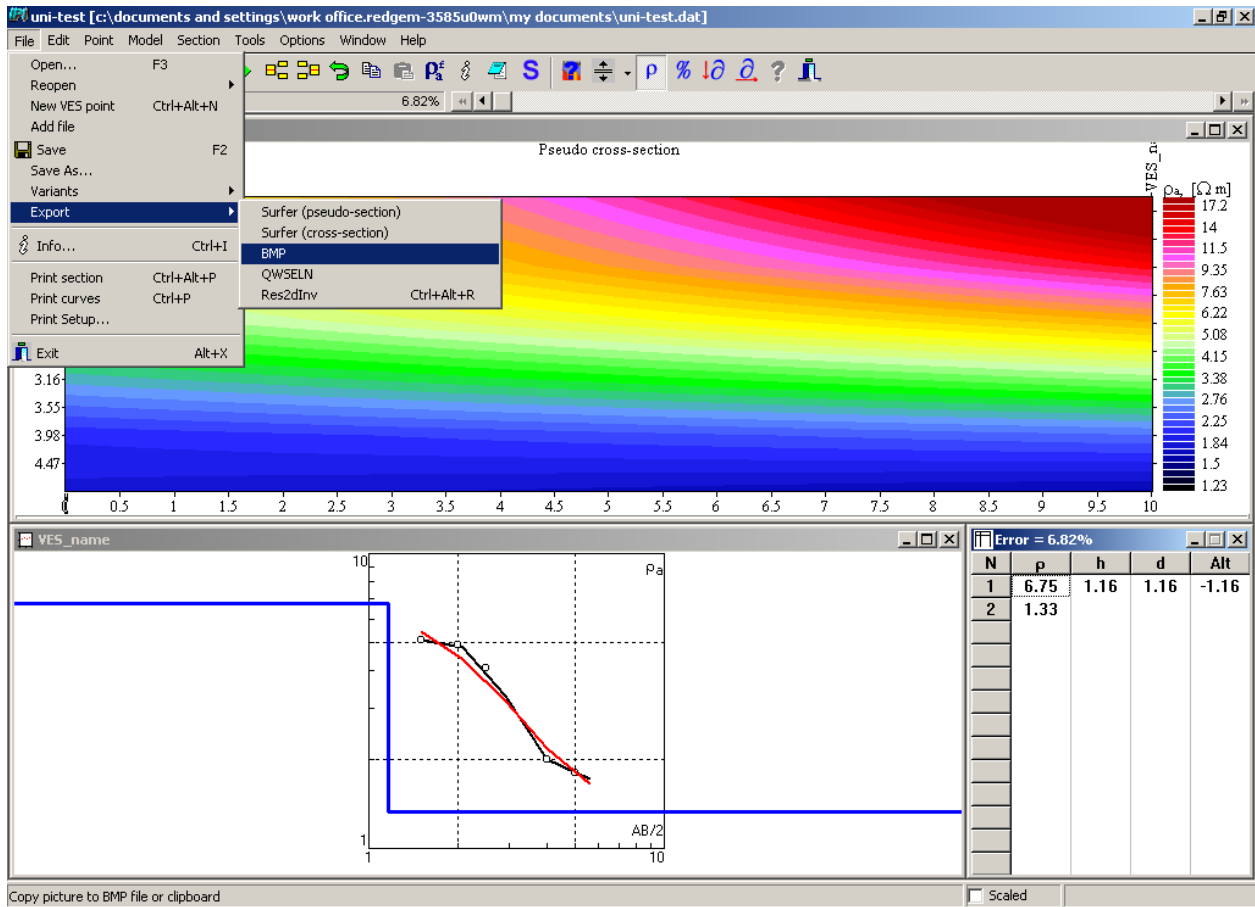
The display will be changed like picture above.



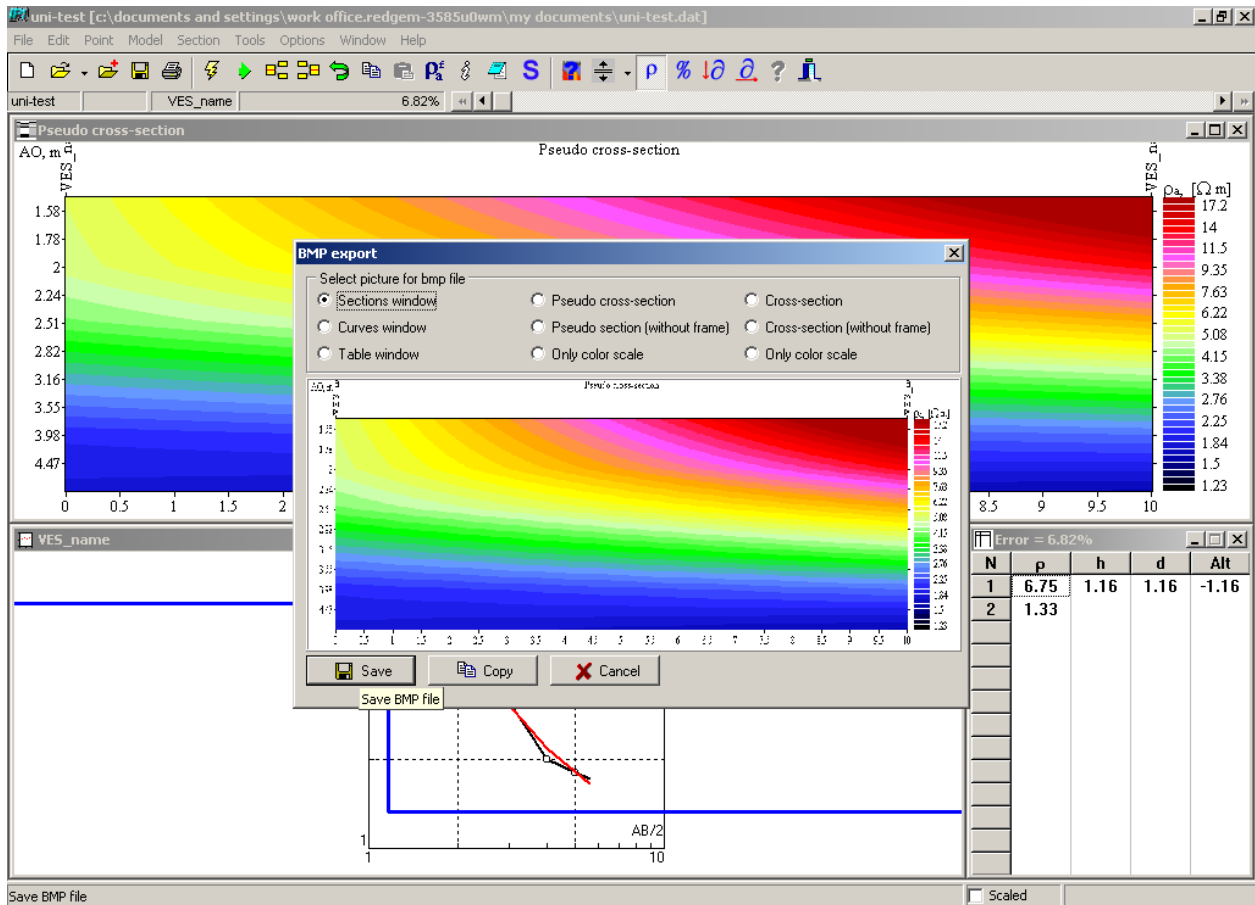
Pseudo Cross Section and Resistivity Cross Section display can be set by clicking Section>Options.



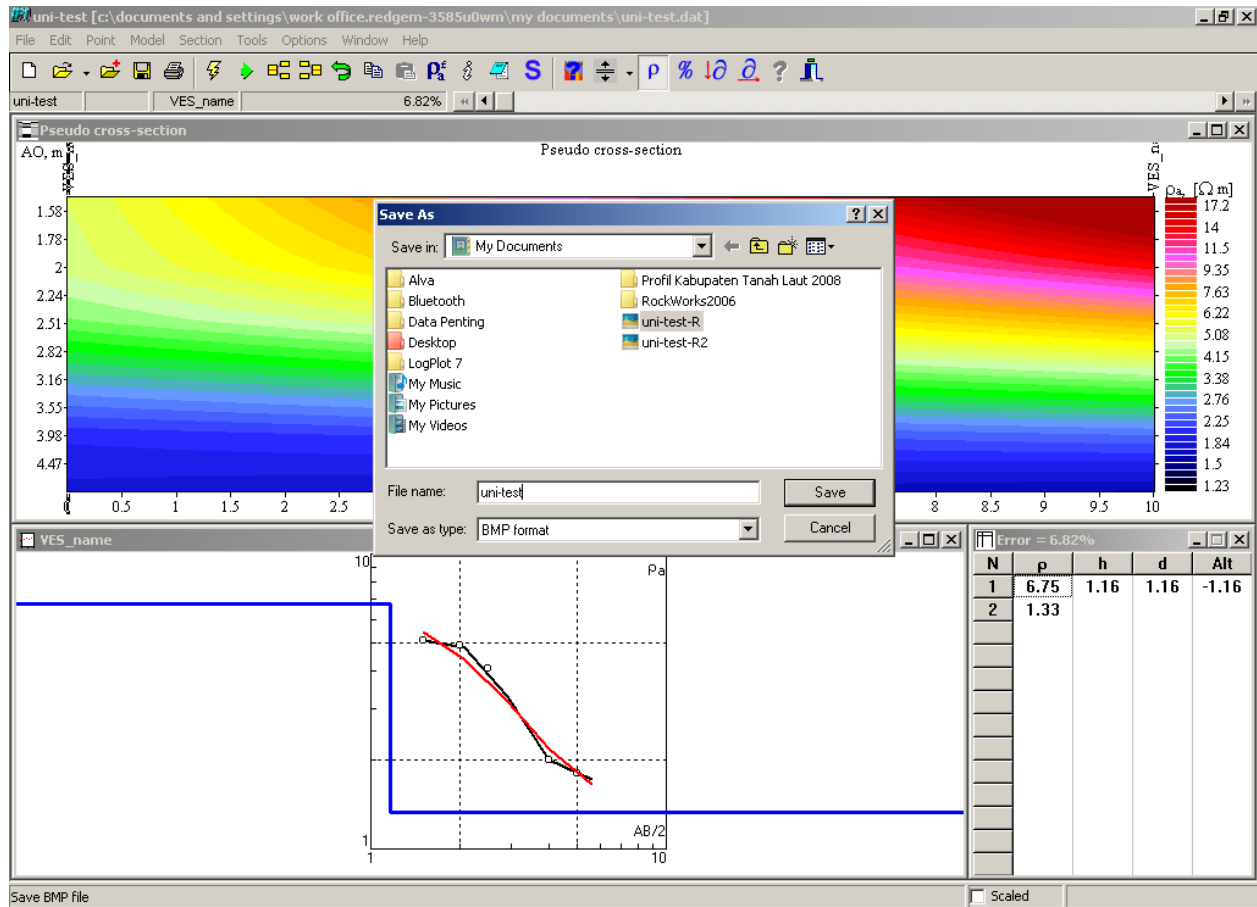
Section options window will appear.



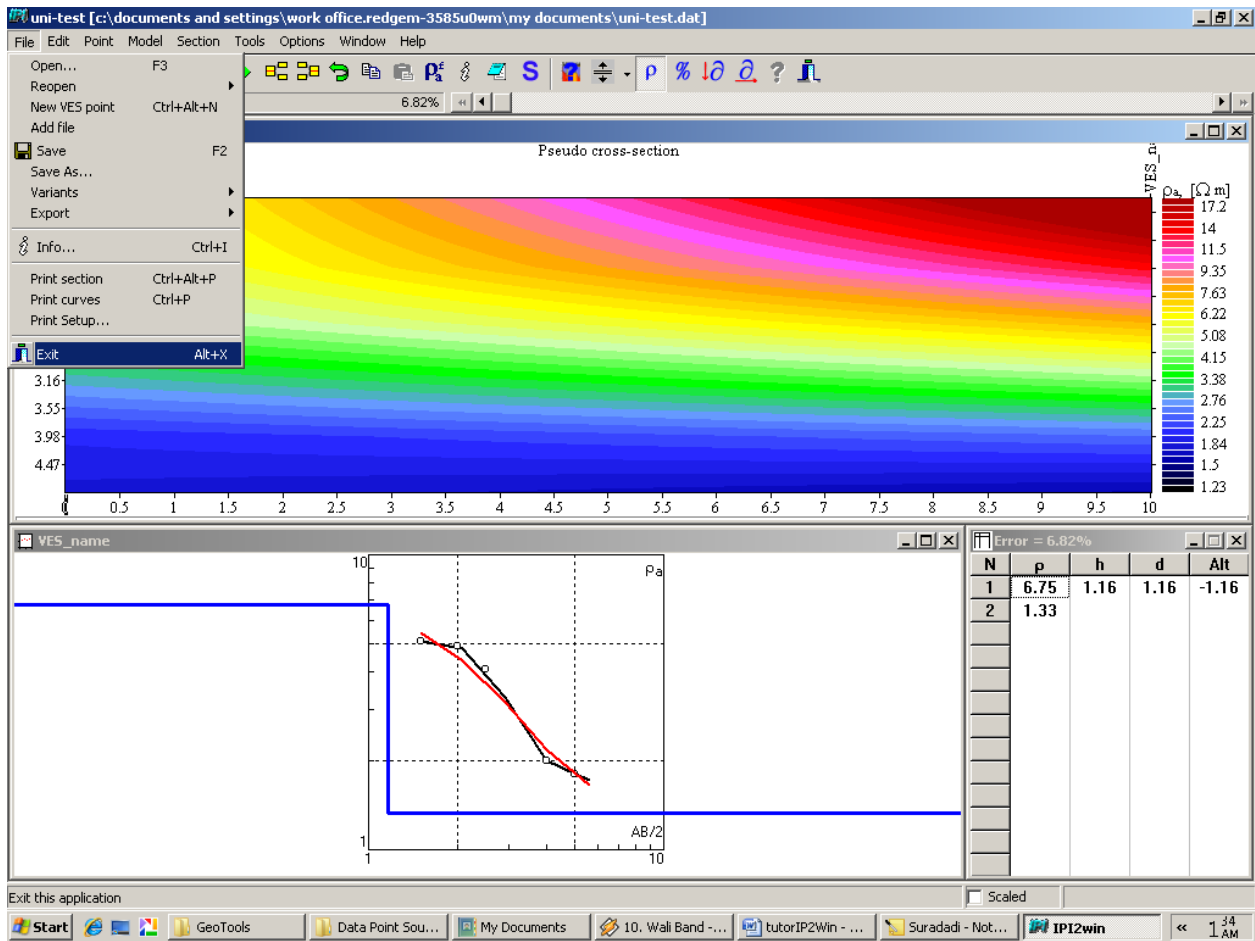
For exporting section, curve, and table in image format (BMP), click on File>Export>BMP. Data can be exported in another file formats such as Surfer, QWSELN, and Res2dInv.



When choosing BMP to export data, choose the part that will be exported then click Save button.



Save As window will appear. Decide the location where the image file will be stored, give it name, and then click Save button.



For joining another VES data, Restart IP 2 Win software by close the software and re run it.

**Note:**

*Joined VES file can be added again with another VES data by joining joined VES file with another single or joined VES file. The steps for joining joined VES file are same as the VES joining steps above.*