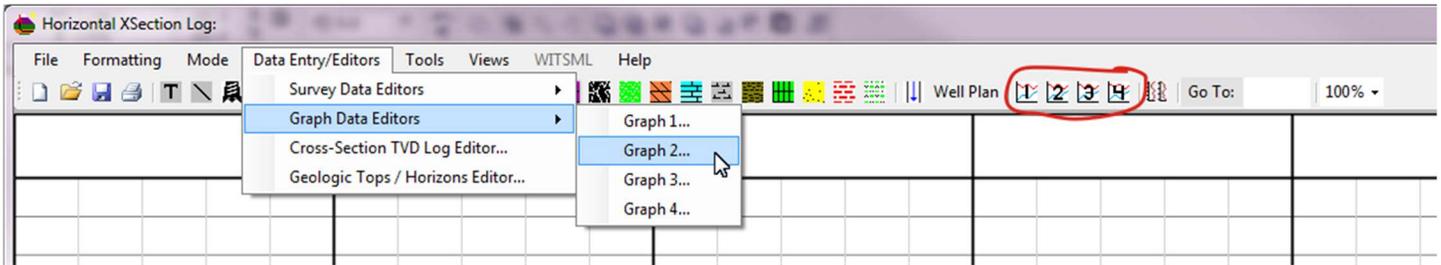


## Chapter 4 - Graph Data (ROP, Total Gas, Gamma, etc...)

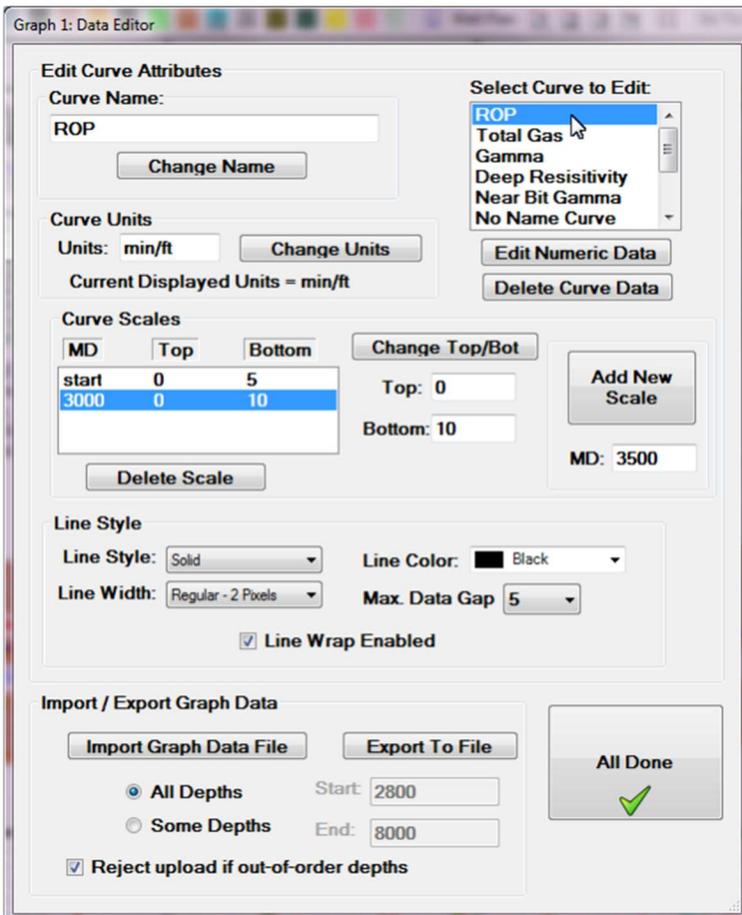
Horizontal XSection has four tracks, labeled Graph #1, Graph #2, Graph #3 and Graph #4, which are devoted to exhibiting data in a graph format. Usually this is drilling data, gas data, or MWD data. There are numerous ways to enter and edit the data.

### The Graph Editor

There are two methods to open the graph editor. The first is to click the menu item (on the main menu bar) Data Entry/Editors->Graph Data Editors->Graph 1..., Graph 2..., Graph3..., or Graph 4..., depending on which graph you want to edit. The other method is to click on the graph tool bar image (circled in Red in the below screen example) for the corresponding graph, 1 for graph one, 2 for graph two, etc.



The graph editor is divided into two Sections: The top section is called "Edit Curve Attributes", while the bottom section is called "Import / Export Graph Data".



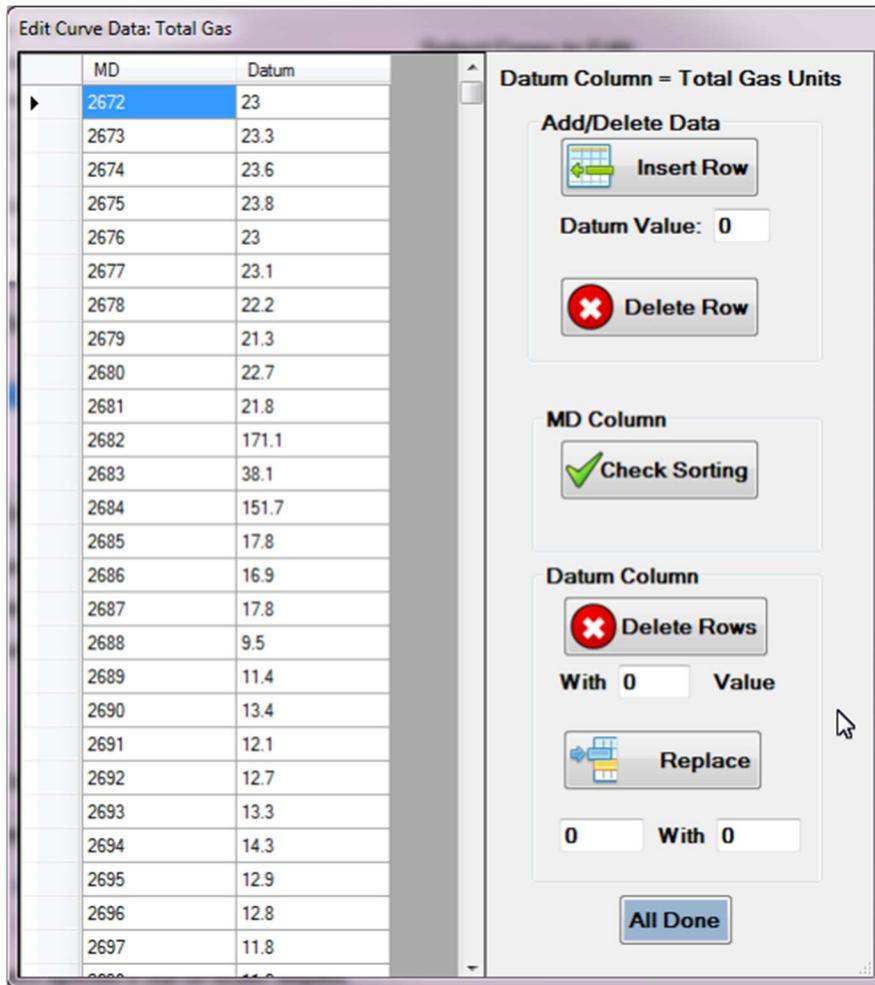
The "Edit Curve Attributes" takes up most of the window and is where the Curve Name, Curve Style, Curve Scales and Curve Units can be edited and the curve data deleted or edited.

The first step is to choose one of the 10 curves (updated from 6 in version 2.0) from the "Select Curve to Edit" list that is at the upper right of the window. When a curve is selected, the characteristics of that curve are displayed in the different parts of the "Edit Curve Attributes" section. Use the drop-down lists in the "Line Style" section to change the line characteristics. To change the Curve name, Graph Units or the Curve Scales, type the new values in the text areas and click the corresponding "Change..." button for the changes to take effect. To delete the curve data, select the curve and click the "Delete" button. Similarly, to edit curve data, select the curve and click the "Edit Numeric Data" button.

### Editing Curve Data

Most graph data will be imported to the log either as text files or from \*.las files. But there are instances where it is advantageous to edit or enter data directing using the Horizontal XSection editing features.

Select a curve to edit and click the "Edit Numeric Data" button to open the "Edit Curve Data" window (shown below).



The title of the window will be the name of the curves whose data is being edited. Use the data table on the left and edit the data as desired. The right-hand part of the window has features to help with editing the data. The insert button will add a row below the highlighted or active cell, with a MD value of one foot greater than the highlighted cell, and a datum value that is set in the "Datum Value:" text area. The "Delete Row" button will delete the row of the highlighted or active cell. The "Check Sorting" button checks for out-of-order values in the MD Column. The "Delete Rows" button will delete all rows with a value in the "Datum" column equal to the value set by the user in the text area below the "Delete Rows" button. Similarly, the "Replace" button will replace every value in the datum column, set by the user, with the replacement value, also set by the user. This is useful when you are importing LAS files received from a directional drilling

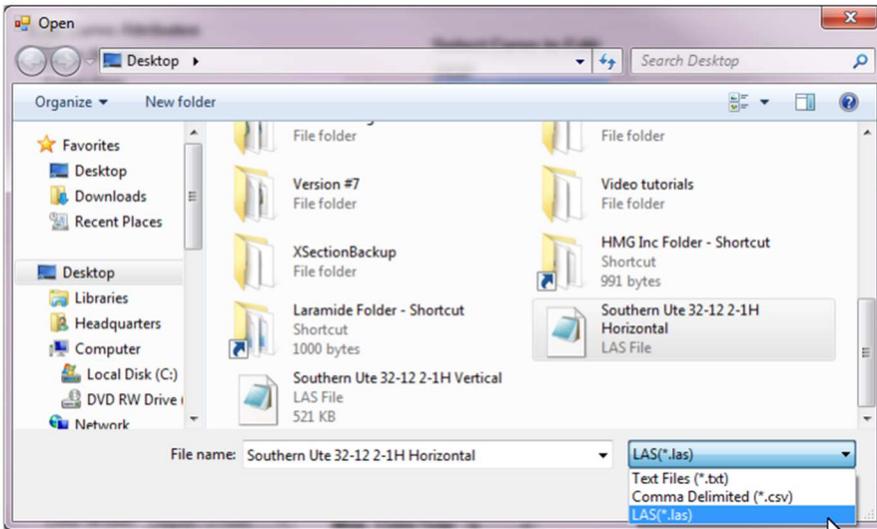
company. Often times the LAS file will have a "-999.00" or "-999.25" for missing or bad data. Use the above utilities to quickly delete or replace these bad values.

## Import Graph Data

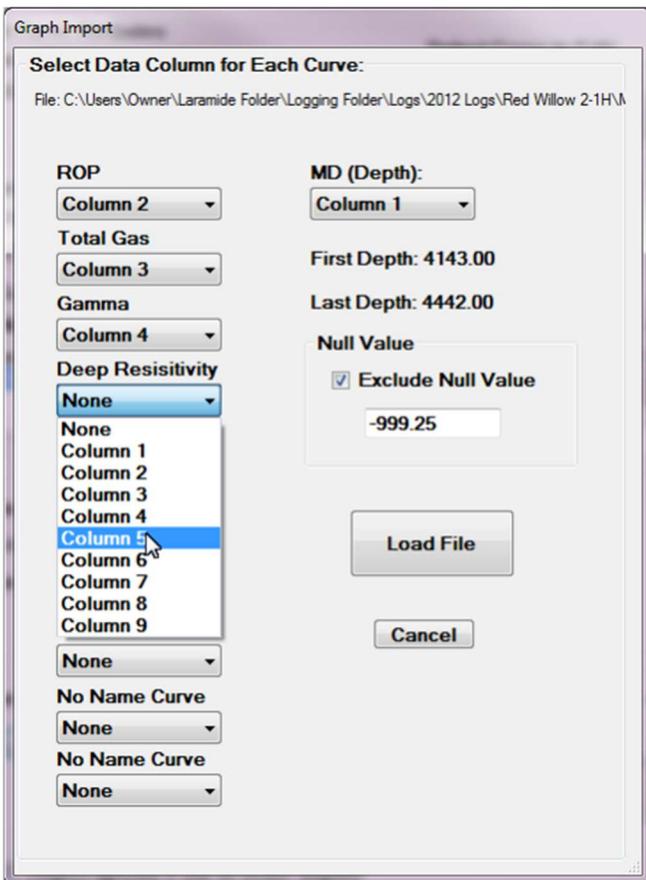
Usually, graph data will be imported. The Horizontal XSection can accept 3 types of files: text files (\*.txt) - either tab or space, comma separated files (\*.csv), and LAS files (\*.las).

Each of the different file types has their advantages. Text files are easy to create and can be edited in Windows Notepad. Comma separated files, are a type of text file that can easily be open by Microsoft Excel bypassing the "Text Import Wizard". If you are going to do a lot of editing of data using Microsoft Excel I suggest saving files in this format. Finally, LAS (\*.las) files are ubiquitous in the oil patch. Usually these will be files given to you by a third-party vender, like a WMD, Directional Driller or a download from an EDR.

To import data files for either graph track, open the graph editor as outlined above and click the "Import Graph Data File" button at the bottom in the "Import / Export Graph Data" section. Select the file type you wish to import (as shown in the screenshot example).



After a file is selected, a "Graph Import" window will appear that has drop-menus for each graph curve. The program assumes that the MD will be column number 1, though the user can change the MD column. It also displays the first and last value for the column the user chooses for the MD (Depth). For the other curves, the user needs to choose from the available columns in the drop down menu. This means that the user must know what column is for which curve before importing a text or a comma separated value file. When the appropriate columns have been chosen for the correct curves, click the "Load File" button. Once columns are selected for a particular graph track, the "Graph Import" window will remember the columns selected for each curve from the previous file upload session.



One advantage of importing LAS files is that the columns are delineated with a name that usually describes the data in the file.

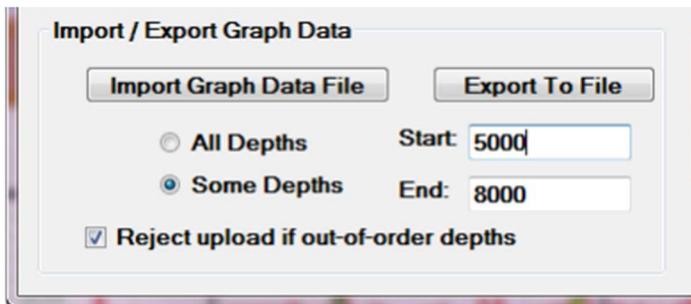
### Overwriting Data

When data is loaded for a curve that already has data, the loading file will overwrite and delete any data after the first measured depth of the loaded file. For example, if you have ROP data from 1000' to 2000' MD and load a ROP data file that begins at 1900' MD and goes to 3000' MD, the loading file will overwrite the data from 1900' MD to 2000' MD. After loading this ROP data file, the ROP curve will have data that goes from 1000' MD to 3000' MD. However, if you were to then load an ROP file that goes from 2500' MD to 2600' MD, the program would overwrite the data from 2500' MD to

2600' MD and delete all the data from 2600' MD to 3000' MD. Hence, the curve would now have data that goes from 1000' MD to 2600' MD. The purpose behind this is to make it easy to add sidetrack data to an existing curve file, without having to delete any data by hand.

### All Depths / Some Depths

The import editor also gives the user the ability to upload all the data from a given file, or by selecting the "Some Depths" radio button, selected depths for importing.



### Out-Of-Order-Depths

By default, the program will reject a file that has its MD out of order, unless the user un-clicks the "Rejects upload if out-of-order depths" check box in the "Graph Editor" window before loading a file. In which case, the program will load the file no matter the order of the MD column - this may

result in a less-than-desirable graph. However, it is a simple process to use the "Check Order" button and the "Delete Button" in the "Edit Curve Data" window, discussed earlier, to quickly clean up any out-of-order data.

### Linear or Semi-Log Scales

The graph tracks can employ either linear or semi-logarithmic scales. The selection is made using the formatting menu (See Chapter 2). The linear scale option allows for more customization of the log scale. Each curve may have a different scale, and scales can be changed numerous times for each curve. Moreover, top and bottom values can be changed and curve wrap can be enabled or disabled.

A graph with a semi-log scale has fewer options. The semi-log scale is useful for displaying curves with a wide range of values. Most often, a semi-logarithmic scale is employed for Total Gas and Gas Chromatograph data which records values in units and parts per million, respectively. Semi-log scales always have a minimum value of 1. Maximum values are set in the graph editor and can range from 100 to 1,000,000. The direction of the semi-log scale is either normal (higher values at the top), or reverse (higher values at the bottom) and are set in the formatting menu for the particular graph in question. No scale changes are allowed in a semi-log graph, and all curves share the same scale minimum and maximum values.

### Export Files

The program also allows user to export individual graph curves as single tab-delimited text (\*.txt) files or comma separated files (\*.csv).