

7 Interactive Plot

Interactive plot is used for the viewing and optional plotting of acquired data either recorded as depth or time. Interactive plot is normally started from Acquisition by clicking on Action -> Record Up, or optionally Record Down or Record on Time. How the data is presented is initially controlled by the presentation that has been selected for each separate service. Note that even if interactive plot is closed that data continues to be acquired and recorded until the Action -> Stop command is invoked from acquisition.

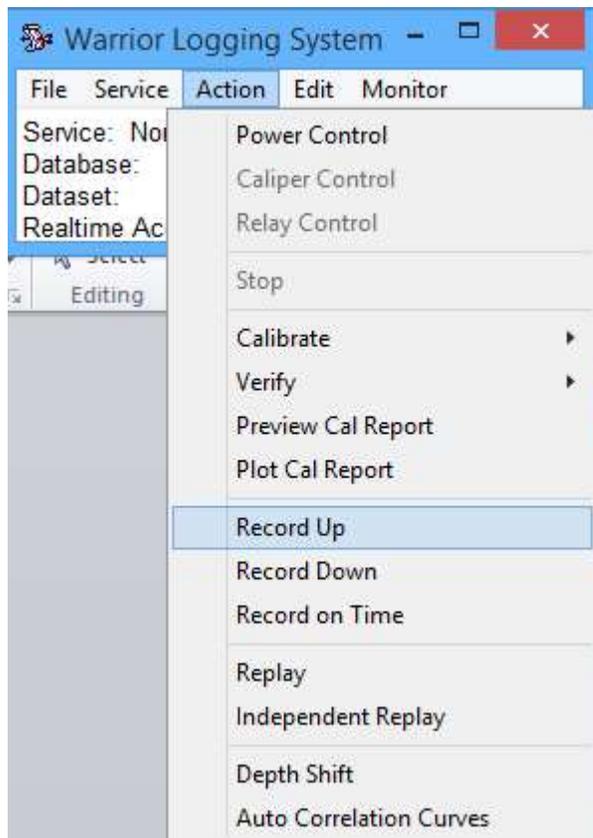


Fig. 7.1 Starting Interactive Plot from acquisition

Multiple instances of Interactive plot may be opened at the same time showing the same data with different presentations or with different passes of data even if they are not from the same database. To start an addition instance of Interactive plot from Acquisition, click on Action -> Replay or optionally Independent Replay. Replay will allow the user to view any previously recorded pass within the current database open in Acquisition, while Independent Replay allows the User to select a different database and open any pass within that database.

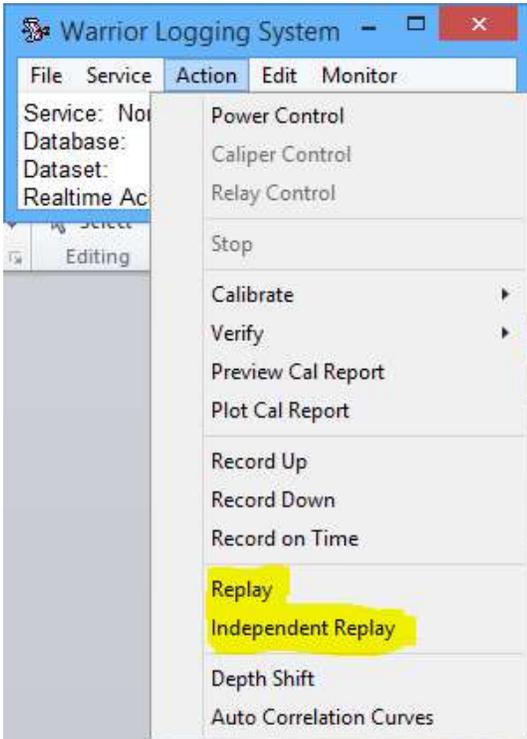


Fig. 7.2 Invoking additional instances of Interactive Plot from Acquisition.

Independent Replay functions the same as if Interactive Plot were started from the Warrior Software group.

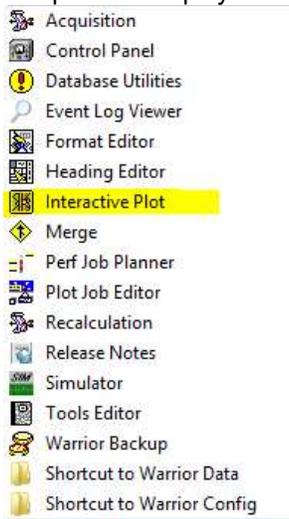


Fig. 7.3 Starting Interactive Plot from the Warrior Software group

7.1.1 Interactive Plot – File Selection – Select Dataset

If Interactive Plot is started from the Acquisition window the data will normally be immediately displayed on the screen. When Interactive Plot is started from the Warrior Software group no presentation is shown because the data to be displayed has not yet been selected. To select the data click on File -> Select Dataset . . . The User can then select a database file and then select a pass from that file. At that point, the data may still not be displayed on the screen.

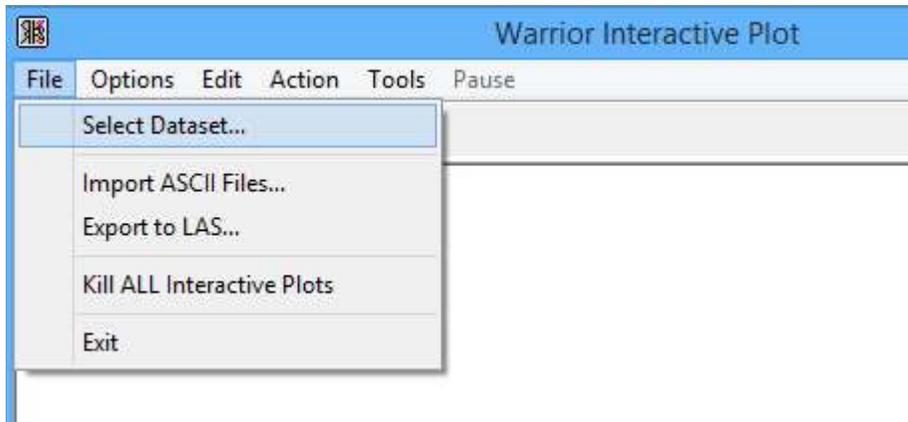


Fig. 7.4 Interactive Plot File Selection

To display the data click on Action -> Screen Plot or click on the monitor icon (third from left).



Fig. 7.5 Displaying selected data

7.1.2 Interactive Plot – File Selection – ASCII Data

ASCII data files can be imported into a Warrior database by selecting the File -> Import ASCII Files ... selection. The existing database that has been selected can be written to an LAS file by selecting the File -> Export to LAS ... option.

Refer to the Database Utilities section 13.x.x

7.1.3 Interactive Plot – File Selection – Exit

The current active Interactive plot may be closed by click on File -> Exit. All Interactive plots that are open may be closed by click on File -> Kill ALL Interactive Plots.

7.2 Interactive Plot – Options

The Options selection of Interactive Plot allows the User to change the presentation of the current database pass selected. These options include the start and stop depths of the presentation regardless of the range of the acquired data. The format presentation file used to present curve data can be chosen. The vertical scale of a log pass can be set to certain standard values. The depth can be shown as either English Units of feet or Metric units of meters regardless of the units that depth was set at when the log was acquired. The data displayed can be shown as English units, Metric Units, or a mix of User defined Units regardless of the default unit selection shown in the Warrior Control panel for acquiring data. The scrolling rate of the

data can be selected so that if the plot screen is updated it will scroll quickly in the fast speed and more slowly in the normal speed.

If the check box – “Use private copy of presentation with this log” is checked than any changes made to the format presentation will only effect the passes in the current database that is being used. If the box is not checked, than any changes to the format presentation will be written to the presentation file that is saved in Warrior\Format folder and will be in effect when a new database is used.

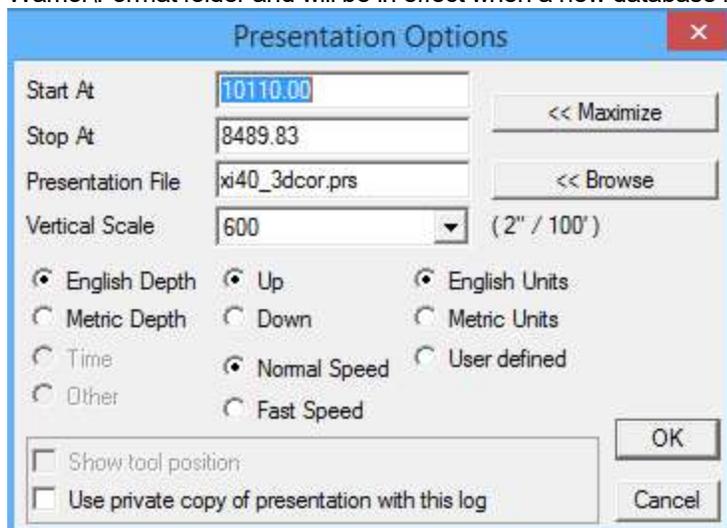


Fig. 7.6 Interactive Plot – Plot Options

7.3 Interactive Plot – Edit

Edit from Interactive Plot allows some addition features to be added to a log pass and also invokes some programs that can be accessed elsewhere.

7.3.1 Interactive Plot – Edit – Log Format

The Log Format selection will open up the Format Editor with the presentation for the current pass. If the pass is using a Private Copy of the presentation, it will be the private copy that is being edited. [See section 6](#) for more detail on the Format Editor.

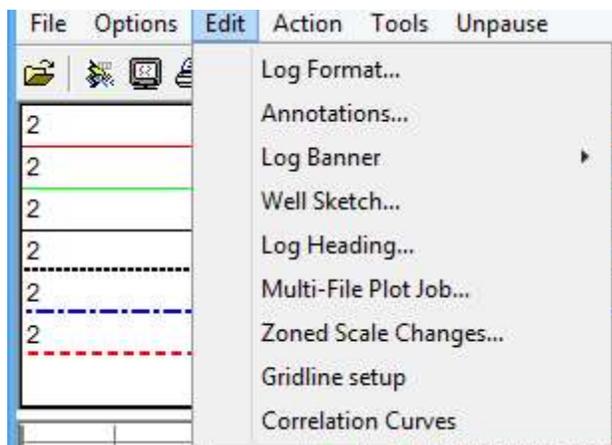


Fig. 7.7 Interactive Plot – Edit selections

7.3.2 Interactive Plot – Edit – Annotations

The Warrior software allows the user to place annotations or text on the plot. By clicking on any of the text shown in the three windows, the text selected will be placed in the bottom text box. The User can also type any text that he wants into the text box.

When the text has been entered in the text box, click the first icon, that looks like an arrow with an ab (<ab).

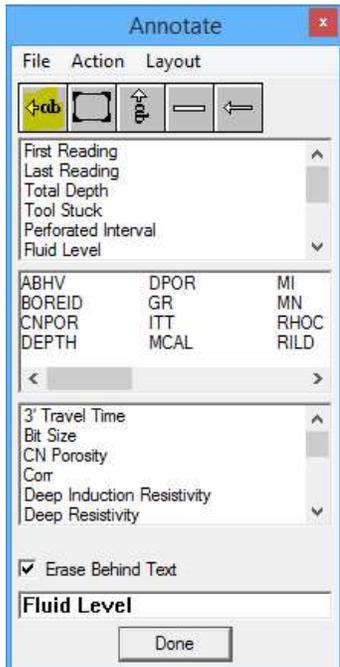


Fig. 7.8 Annotate Window

Now move the cursor across to the plot. You will see an arrow with abc. Position the tip of the arrow on the plot where you want the arrow of the annotation to be and then left click. If you right click, the direction of the arrow will rotate through left, up, right, down, and then two modes with no arrow. As long as the <ab icon in the Annotate window is active (shaded dark), every left mouse click will add another annotation to the plot. To change text, move to the annotate window, change text, move back to the plot, right click to set arrow direction and then left click to add the next annotation.

Once placed on the plot, annotations positions can be changed or the annotation can be removed. In the annotate window, select the <ab icon so that it is not active (all icons have the same shading). Move the cursor back to the plot and click on the desired annotation. When selected it will show as black with white text (it may be necessary to pause the plot to be able to select the annotation). You can now right click to change arrow orientation and then left click to move it to a new position. To remove the annotation, check that the <ab icon is not active and then select the annotation. In the annotate window choose "Action -> Delete Selected Annotation (DEL)". Once selected, the annotation can also be removed by clicking on the Delete key on the keyboard.

There three groups of default annotations shown in the annotate window. The first group are text that appears in the annotate window no matter what is plotted. The second group is Warrior database mnemonics for all of the Database items that are in the presentation. The third group contains "translations" for the mnemonics in the second window and all of the labels that are used on the curves.

The list of curves in the first group can be edited and the translations can be changed. Click on "File -> Edit Default Annotation Text" to open the file Warrior\config\annotate.ini.

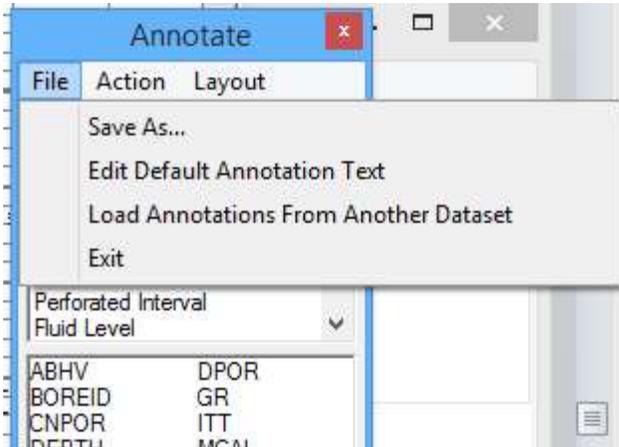


Fig. 7.9 Annotate File selection

The [Always] group must be a sequential number list that contains the text that the User wants. The order can be rearranged and items added as long as the list remains sequentially numbered.

The [Translations] group allows for common labels to be shown for Warrior mnemonics used in the presentation. For example, if GR is in the current presentation, the translation “Gamma Ray” will show up in the third window of the annotate window.

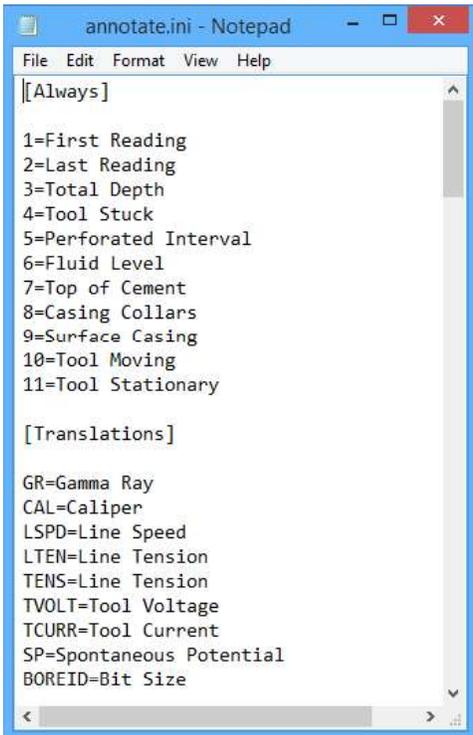


Fig. 7.10 Annotate.ini file

The second icon in the annotate window allows the user to place a graphical image onto the plot. The third icon is for vertical text, but is currently not functional. The fourth icon will place a horizontal bar on the plot. The fifth icon has no function. The graphical image and the bar are placed and removed in the same manner as text.



Warning!

Annotations are placed at a depth and horizontal position on the plot. This means that if the presentation is changed, the pass is depth shifted, scales changed, or anything that would affect the position of the curve data, annotations are not moved and do

not necessarily point to the curve that they originally pointed at.

7.3.3 Interactive Plot – Edit – Log Banner

Log Banners are additions that can be attached to a log pass. The banners may be placed at the top and / or bottom of the log pass. Click in the area where the text will appear and type in the desired text. When finished, click on File -> Save and then File -> Exit.

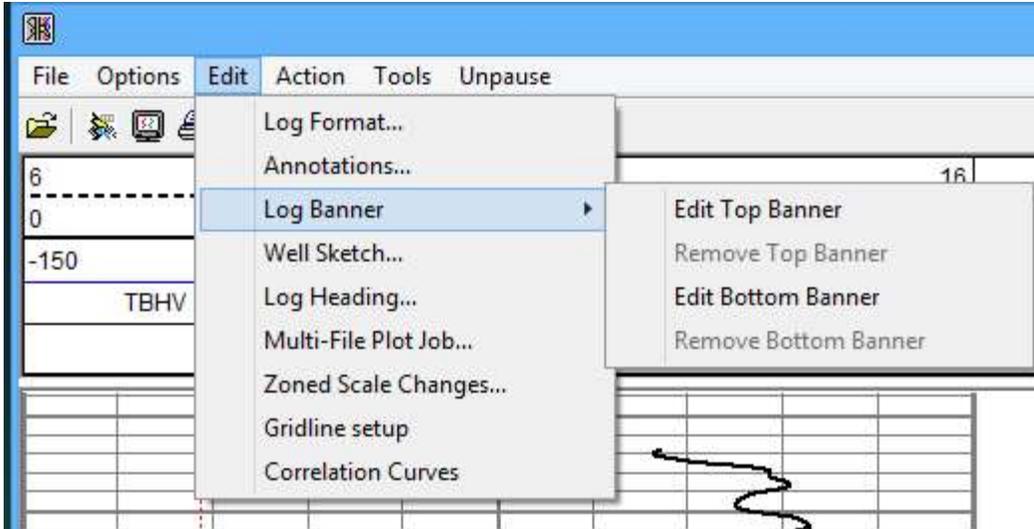


Fig. 7.11 Edit Log Banner



Fig. 7.12 Entering text in log banner

Log Banners are very similar to headings in that they are a text file with a .WLB extension that the User can easily edit. There are several variations that are supplied with the Warrior software. To select a different style, click on File -> Select Format. The Select Banner Format window will open shown the banners that are available in the Warrior\Format folder.

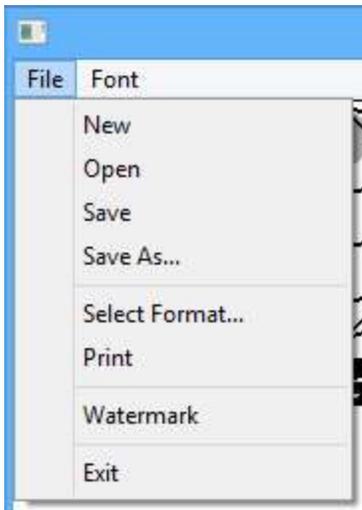


Fig. 7.13 Log Banner File Selections

Once the banner has been saved and the banner editor closed, the banner does not appear on the screen. However, when the log pass is printed through Interactive Plot or as part of a Plot Job, the banners will be included as part of that pass.

7.3.4 Interactive Plot – Edit – Well Sketch

The Well Object Editor allows the user to show certain well objects on the plot that would represent a well bore configuration. These objects include but are not limited to strings of casing and tubing, plugs, packers, and nipples. To be able to see the well objects once they have been configured, the presentation must contain WELLOBJ as a Graphic Strip.

Any track may be used, but the graphic strip will cover the width of the track regardless of the left and right values used.

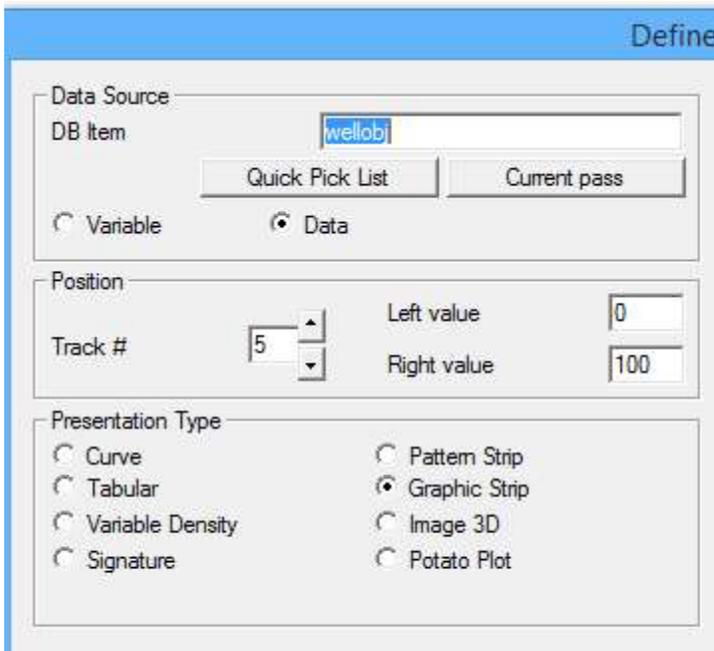


Fig. 7.14 WELLOBJ plotted as Graphic Strip

It is not necessary but if the wellbore gets complicated with multiple strings of casing, the first thing to do is to go to the Settings selection and set the “Width of Diagram” to the well bore size. This way all casing sizes can be entered as the dimensional values that they are. Measurement units for Depth and Object size can also be set from here.

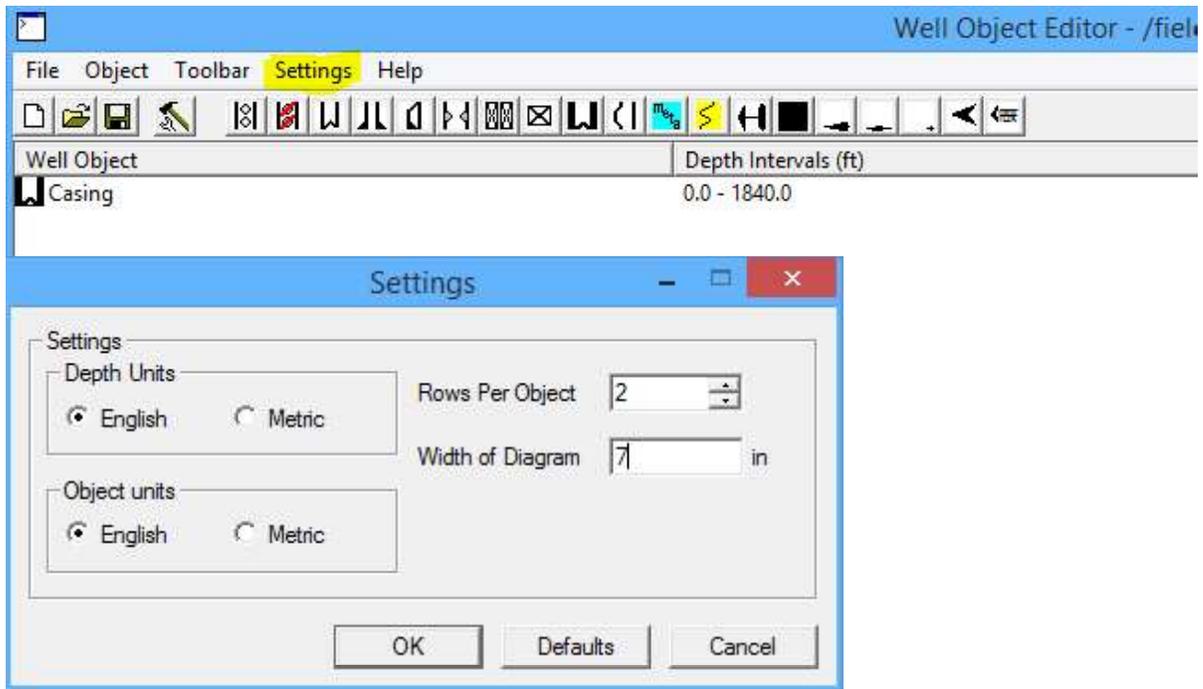


Fig. 7.15 Well Object Editor Menu and Toolbar and Settings

The object that an icon represents can be identified by holding the mouse cursor on the icon. To demonstrate the well sketch we will do an example. We will start by going to settings and setting the width of the diagram to 8.625 to represent a 8 5/8” well bore. Next we will click on the Casing Icon.

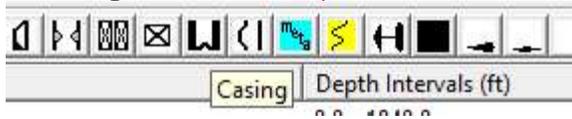


Fig. 7.16 Identifying Icons

The first string of Casing that we will put in will be 7” surface casing from surface down to 105 feet. Enter the depth interval from 0-105, and the width of object as 7 inches. Notice that the Horizontal positions are automatically adjusted to fit the diagram and casing size. Click [OK] to save that string of casing.

The next string will be 5 ½” casing from surface down to 1600 feet. On this string we are going to check “Yes” to the show bond. If the dataset being presented has bond curves, it will use the BONDIX to show shading as a representation of bonded pipe.

The last string of casing will be put in as a liner from 1550 -1850 and will be 4 ½”. We will also show bonding on this string.

Casing [X]

Properties

Depth Intervals (ft)

Annotations

Horizontal Position

Left % Right %

Casing shoe Show casing shoe

Size

Width of Object in Inflation Factor (%)

Show Bond Yes No

Show bonded above BONDIX of...

Color Edit

OK Defaults Cancel

Casing [X]

Properties

Depth Intervals (ft)

Annotations

Horizontal Position

Left % Right %

Casing shoe Show casing shoe

Size

Width of Object in Inflation Factor (%)

Show Bond Yes No

Show bonded above BONDIX of...

Color Edit

OK Defaults Cancel

Casing [X]

Properties

Depth Intervals (ft)

Annotations

Horizontal Position

Left % Right %

Casing shoe Show casing shoe

Size

Width of Object in Inflation Factor (%)

Show Bond Yes No

Show bonded above BONDIX of...

Color Edit

OK Defaults Cancel

Fig. 7.17 Entering casing depths for stings of casing

Now let's put a bridge plug and packer into our well. We want to put a plug at 1800'. We could type in 1800, but the problem with a single depth entry for plugs and packer is that it centers the image at the depth. So if you want the top of the plug or packer to be at a depth, you need to put in a zone (usually 4' or 5' looks good even if the plug is not that long) in this case 1800-1805. At the same time we will enter an annotation "Plug @ 1800".

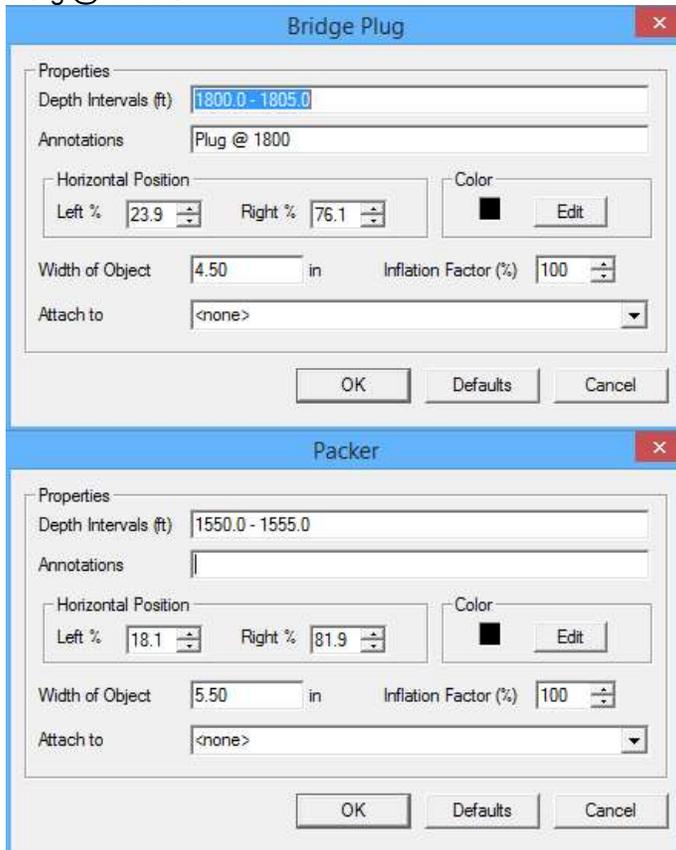


Fig 7.18 Showing a plug in 4 ½" Casing at 1800' and packer in 5 ½" at 1550"

The next thing that we want is some tubing in our well from surface to 1620'. To make the picture look esthetically pleasing, the tubing should fit the hole in our packer. The hole in the packer is 1/3 the width of the packer. Since we set the packer in 5 ½ the tubing should be 1.84. As long as we are at it, let's put a seating nipple in the tubing at 1565"

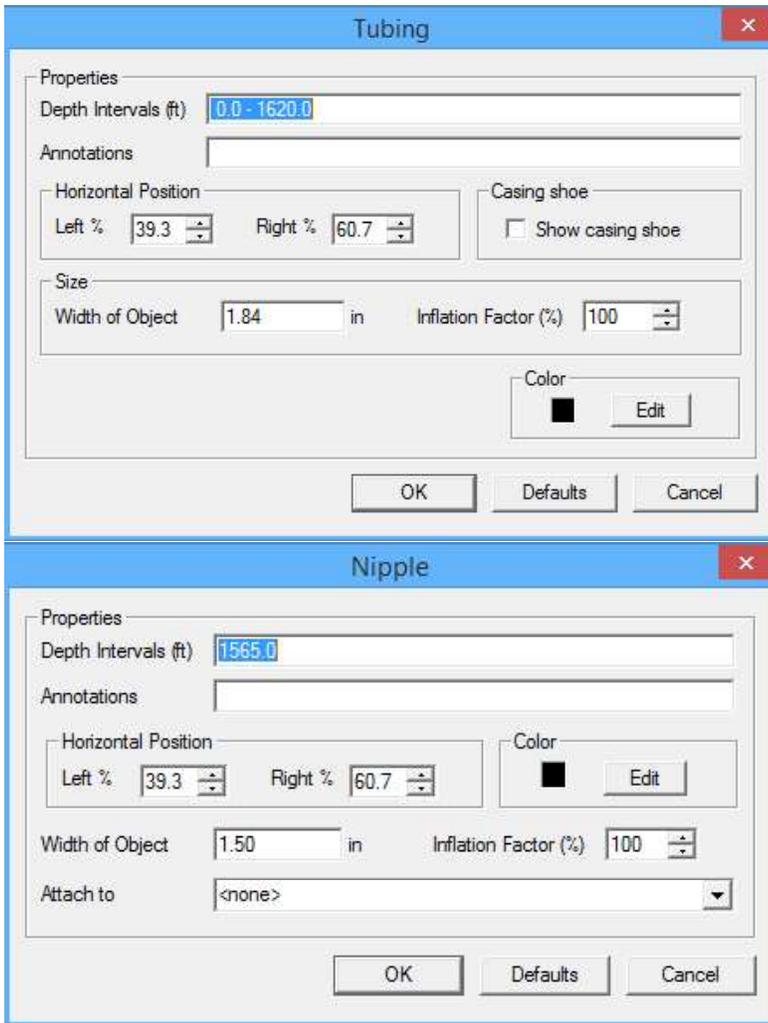


Fig. 7.19 Tubing to fit 5 ½" Packer and seating nipple at 1565'

The last thing that we want to do to our well sketch is to add some perforations. Zones are entered by top depth, a hyphen (or minus sign), and bottom depth. Multiple zones can be entered by separating each zone with a space or comma. Single shots can be entered by putting just the single depth. In the example below we have zones from 1630-1640, 1650-1655, and 1660-1667 with a single shot at 1683.

Use the left% and Right% to position the perforations. The default is 0 and 20. In this example, that puts the perforations into the area where the bond index is shaded and makes them difficult to see. Since the 4 ½" casing starts at 17.9%, I started the perforations at 18% and kept them 20% wide. This puts them inside the edge of the 4 ½" Casing.

Just as an example, I have also added some squeezed perforations, that use a slightly different image than normal perforations, from 1630-1680. I positioned these at -20% to 0% to show that well sketch images do not have to remain in the track that the WELLOBJ image is place. Any percentage can be used, but it is based on the track that the WELLOBJ image was placed in.

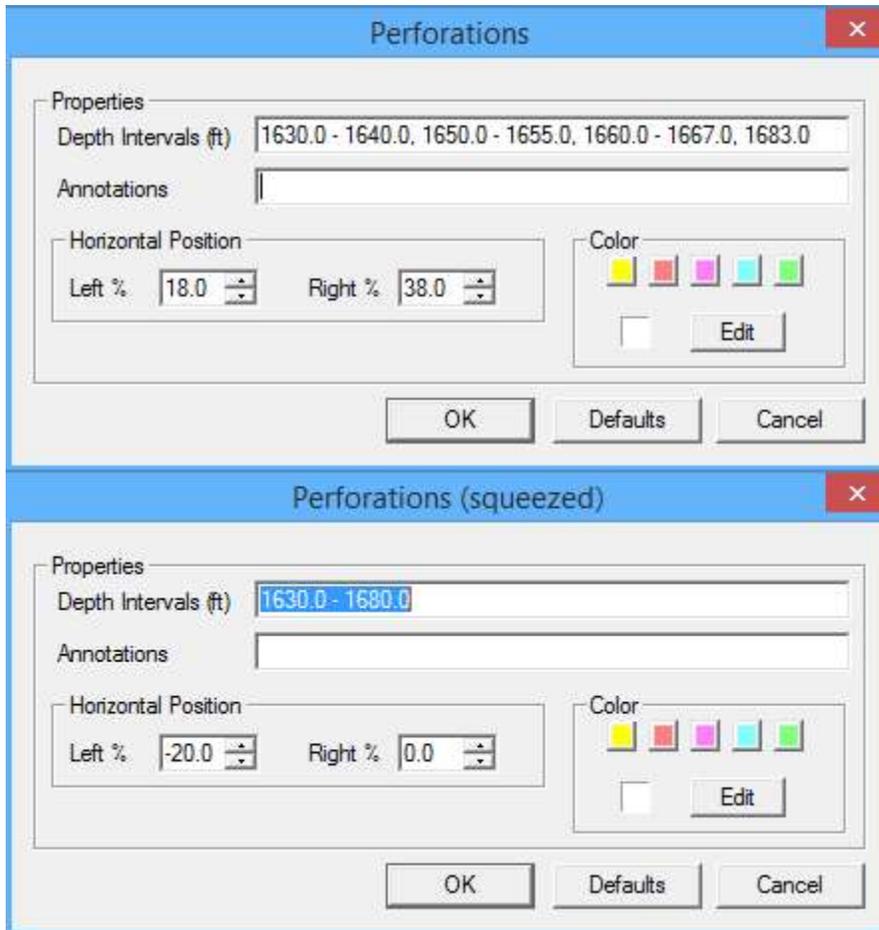


Fig. 7.20 Entering Perforations

Annotations that are added from the well object will always be placed in the middle of the object. Should you want to move the annotation, you would need to “Edit -> Annotations” from Interactive Plot and then move them.

Well Sketches are kept by runs. So every pass in a run of a dataset will have the same well sketch. If the User want to have different sketches, they must be entered in a pass on a different run number. (/field/well/run1/pass1 and /field/well/run1/pass2 would have the same well sketch while /field/well/run2/pass3 could have a different well sketch) .

It is possible for the User to create their own well objects to be used in a well sketch, but it is outside of the scope of this document. If this need

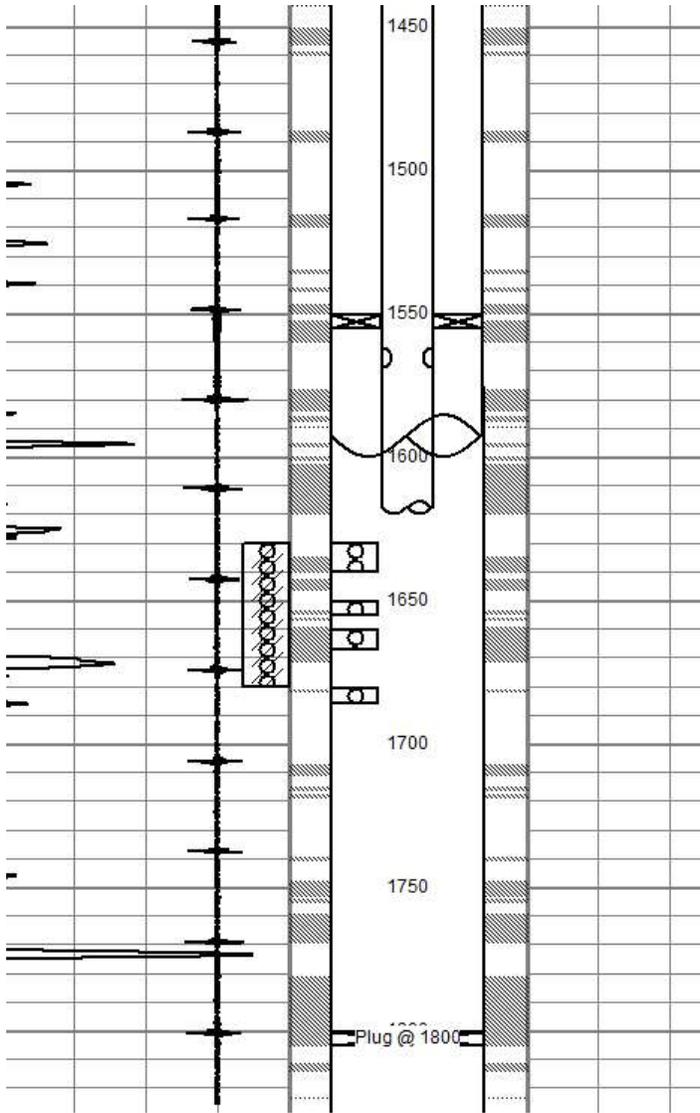


Fig. 7.21 Well Sketch example image

7.3.5 Interactive Plot – Edit – Log Heading

Clicking on “Edit -> Log Heading” from Interactive Plot invokes the Heading Editor. [See Section 5](#) for a discussion of the Heading editor.

7.3.6 Interactive Plot – Edit – Multi-File Plot Job

Clicking on “Edit -> Multi-File Plot Job” from Interactive Plot invokes the Plot Job Editor. [See Section 9](#) for a discussion of the Plot Job Editor.

7.3.7 Interactive Plot – Edit – Zoned Scale Changes

Zone scale changes allow the User to display curves with different scales in different parts of a pass and to shut the curve off if desired. If the current presentation does not have any curves that have been enabled for zone scale changes, a warning will come up to notify the User. If the [Yes] button is clicked, the Format Editor will open with the current presentation.

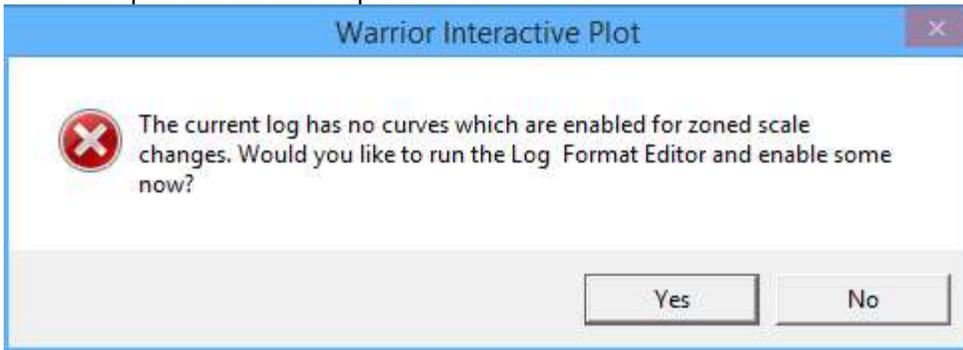


Fig. 7.22 Zone Scale change invoked with no zoned scale curves

With the Format Editor open, click on the curve that you wish to have the zoned scale changes, then click [Change]. Check the box for Zonable Scales, then click [OK]. Save the presentation in the Format Editor and Exit.

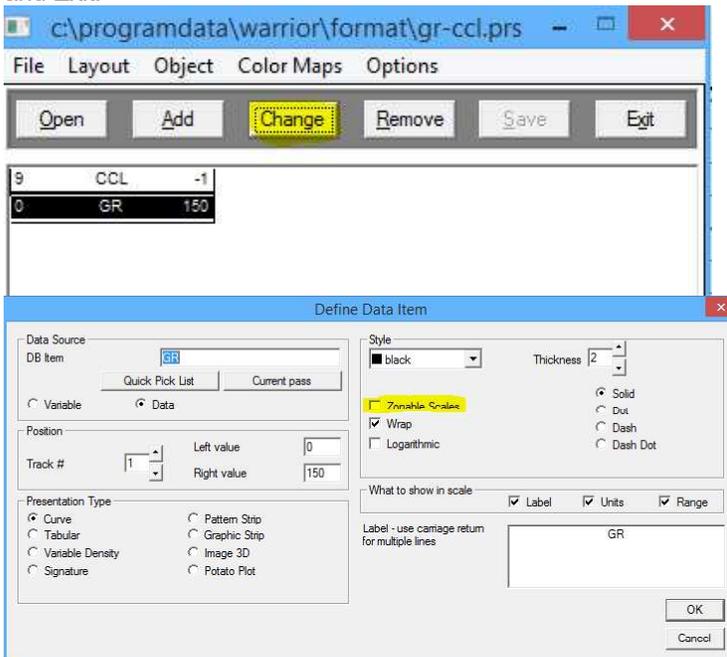


Fig. 7.23 Setting up Zoned Scale changes in Format Editor

Now when Edit -> Zoned Scale Changes is selected, the zoned scales window for the pass will come up with any zonable curves show. In this case GR and LTEN are shown, each with a left scale value and a right scale value. The only zone that is shown is from the top of the pass to the bottom of the pass. To create new zones, click on the [Zones] button. We are going to put in a zone change at 1750, type 1750 into the "Insert a new change " box and have that selected. For illustration purposes, we also want to put a zone change in at 1700.

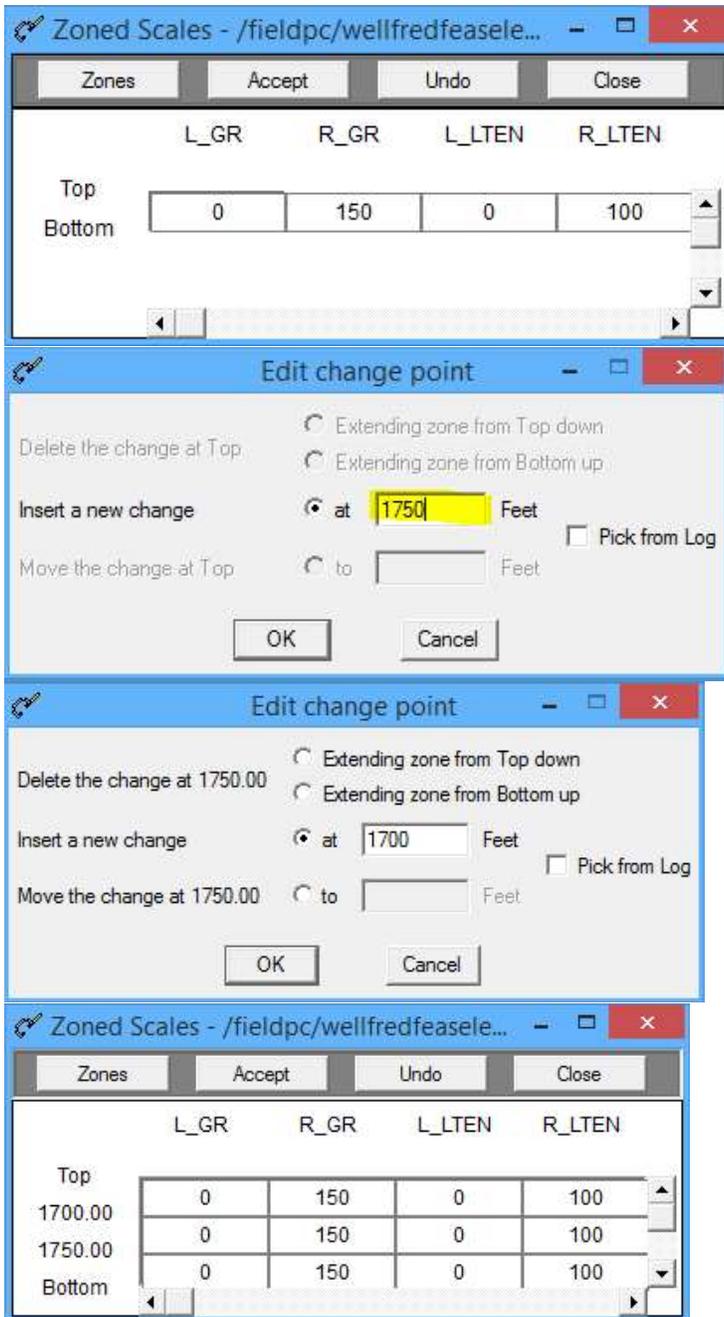


Fig. 7.24 Zoneable Scales

Now we need to edit the scales in the different zones. From 1750 to bottom, we will leave them unchanged. From 1700 to 1750, we will make it 0 on the left and 100 on the right. From top to 1700, we will set both left and right values to 0 to turn off the curves. Once the scales have been edited, click the [Accept] button to complete the changes. Click [Close] to close the Zoned Scales window.

	L_GR	R_GR	L_LTEN	R_LTEN
Top	0	0	0	100
1700.00	0	100	0	100
1750.00	0	150	0	100
Bottom				

Fig. 7.25 Scales changed on zones

Zoned scale changes do not automatically refresh the Interactive Plot to show the changes. To refresh the screen the User could reselect the log pass but more common is to do "Action -> Screen Plot" twice or click the Screen Plot Icon twice. Fig. 7.27 show the same log pass before and after the scale changes that we have done in this example.

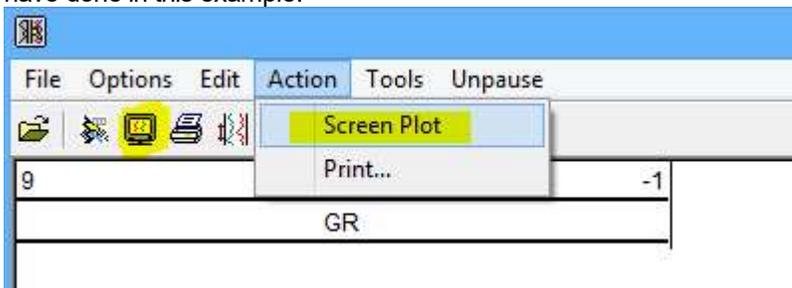


Fig. 7.26 Refreshing the screen with Screen Plot

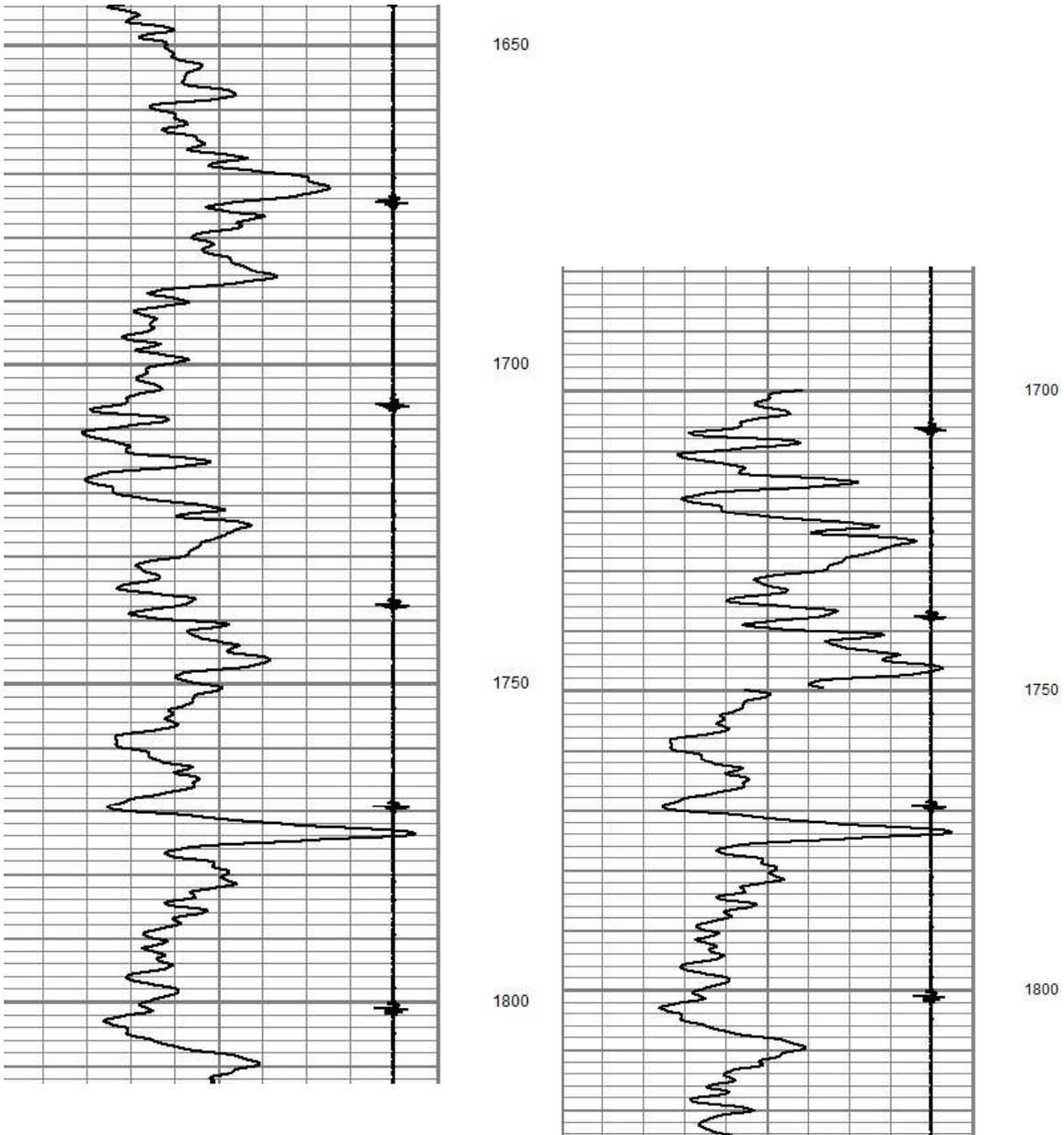


Fig. 7.27 Pass before and after zoned scale change

7.3.8 Interactive Plot – Edit – Gridline Setup

Edit -> Gridline Setup from Interactive Plot invokes the Gridline Setup editor to allow the User to control at what plot scaling the different horizontal (Depth / Time) grid lines appear. If the vertical scale resolution on the plot is less than the maximum compression ratio, and the scale resolution is greater than the minimum compression ratio, than the gridline will be plotted. Separate gridline setups can be kept for English depth, Metric depth, and a time log.

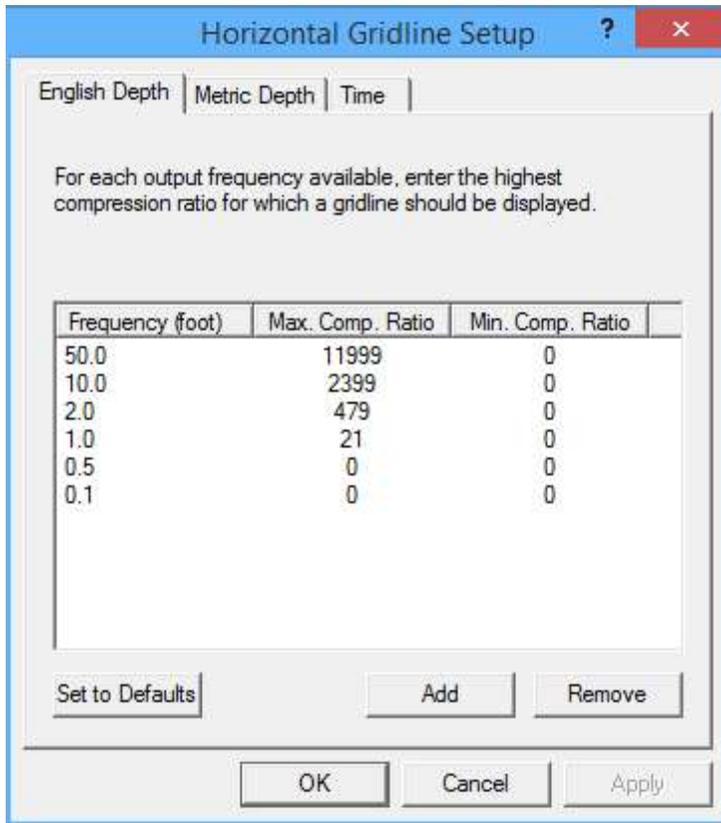


Fig. 7.28 Gridline Setup

7.3.8 Interactive Plot – Edit – Correlation Curves

Selecting correlation curves allows you to plot a curve(s) within a pass in a database into all other passes of the database. You will be given the option to select a curve or curves. Highlight the curve and select add. Once the curve has been added to the list of correlation curves, click on the selected Correlation curve. There are two radio buttons. The first one, "Always show in original track with original scales", will place the curve in the same track as the pass it originated in, with the scales as shown above it. This is the standard correlation mode. The second radio button "Only show when another curve by the same name is plotted, Show with the same name and scales as the named curve" will plot the selected curve only if it exists in the pass to be plotted, it will use the same scales and track as the current pass but will apply the color selected.

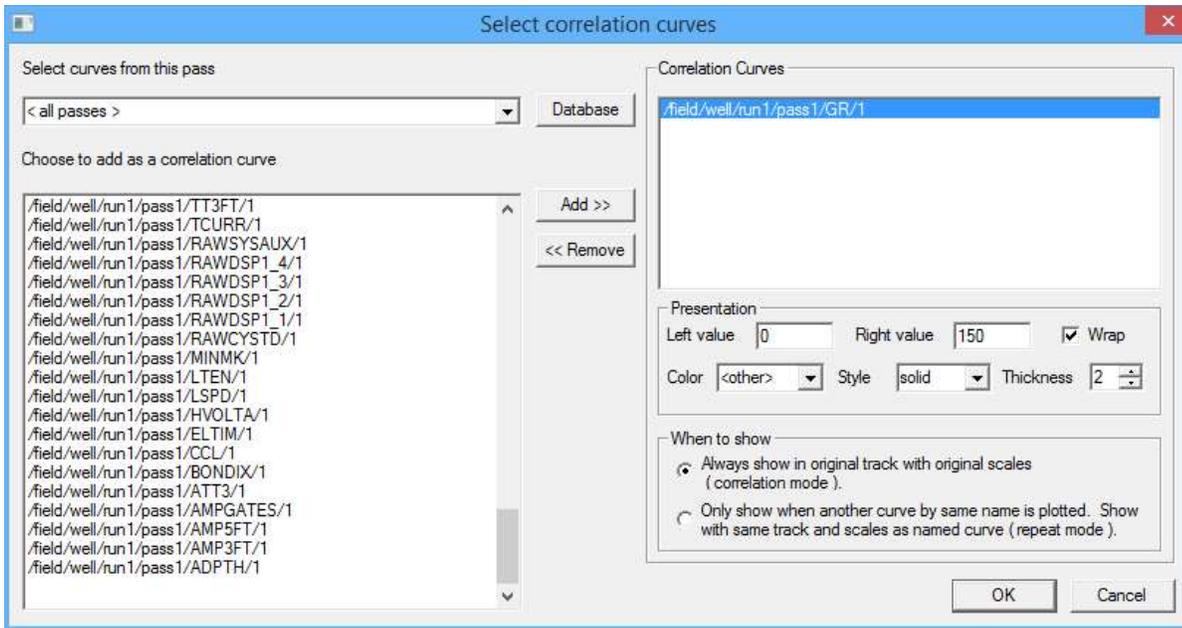


Fig. 7.29 Setup of correlation curves

If the displayed pas is depth shifted, the data in the pass will be shifted as usual but the correlation curve displayed will show the depth from its original pass and not be shifted.

There are now some additional options in Interactive plot. The default setting for correlation curves is to show the correlation curve, but do not plot the correlation curve in any hard copies (or PDF and TIFF). There are options to both display and print the correlation curves and to hide the correlation curves.

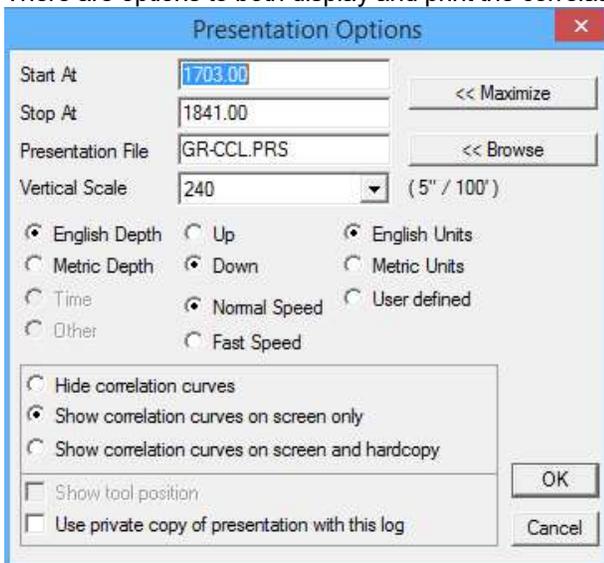


Fig. 7.30 New options for correlation curves

7.3.9 Interactive Plot – Action – Screen Plot

After a pass in a database has been selected, Action -> Screen Plot will display the pass on the screen. It may also be used to refresh the screen plot by selecting it twice. The first selection of Action -> Screen Plot will clear the

plot from the screen. The second selection will once again display the plot on the screen. Clicking on the Monitor Icon will have the same effect as Action -> Screen Plot.

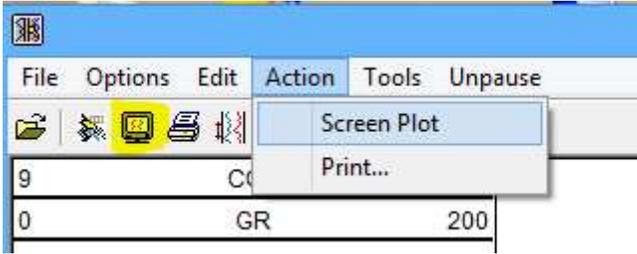


Fig. 7.31 Action -> Screen Plot and Screen Plot Icon

7.3.10 Interactive Plot – Action – Print

By clicking on the Plotter Icon or Selecting Action -> Print, the Start Plot Window will open. Printing may be started at any time, if it is direct printing (normal mode using Warrior Printer Drivers and not through Windows). Even though the screen may have acquired data for a considerable length of time, the plotter will start at the beginning of the plot and print the log until it has caught up. Any changes made to the presentation while plotting may have unexpected results on the hardcopy.

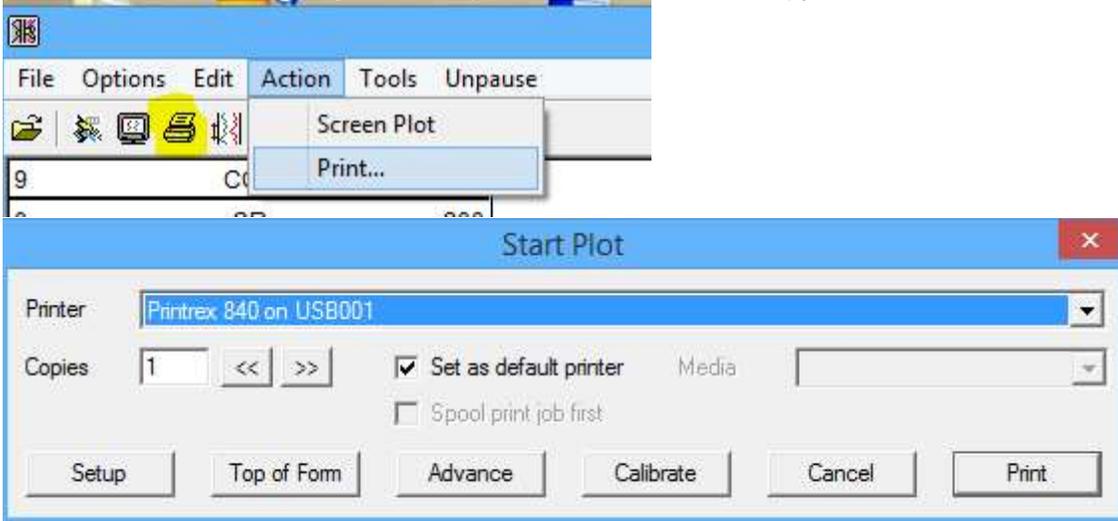


Fig. 7.32 Action-> Print and Print Icon

The User has the option of selecting which of the installed printers to send the hard copy to by clicking the dropdown installed printers list. There is a check box to set the currently selected printer as the default printer so that it will be shown when the Start Plot window is opened.



Fig. 7.33 Installed printer list

The User has the option to print multiple copies of the current plot by increasing the copy count. Most printers have some selectable settings that can be configured through the Warrior Software by selecting the [Setup] button. Due to the variety of plotters and settings, we will not cover the possible settings at this time. The [Top of Form] and [Advance] buttons will perform those functions when clicked. The [Calibrate] button allows the user to adjust the vertical scaling of the plot so the matte length meets required specifications (i.e. 5 inch of plot per 100 feet of well).

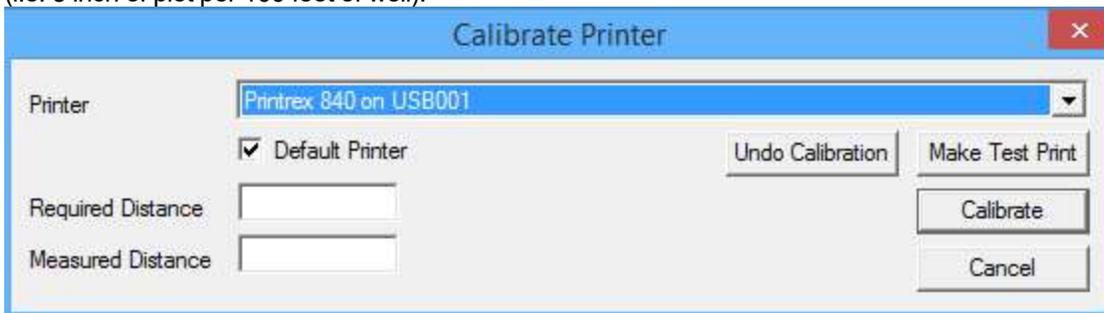


Fig. 7.34 Calibration of printer

For the "Required Distance", enter the distance that you want between two points on the plot. For the "Measured Distance" enter the distance that is measured between those two points. The further apart that the two points are the more accurately (relatively) you will be able to measure the distance. As an example, if you want a plot that is 5"/100 ft., you might choose to measure 300 ft. which would make your required distance 15 inches. Then if you measure it and it is 14 and 15/16 of an inch, your measured distance would be 14.9375. When the values have been entered, click the [Calibrate] button. The new calibration will then be shown. This value should be somewhat close to 1.00. If it considerably different, it may be necessary to remove printer scaling calibrations and start over by making a new plot. To remove plotter calibrations, click the [Undo Calibration] button. This will set the plotter calibration back to 1.00.

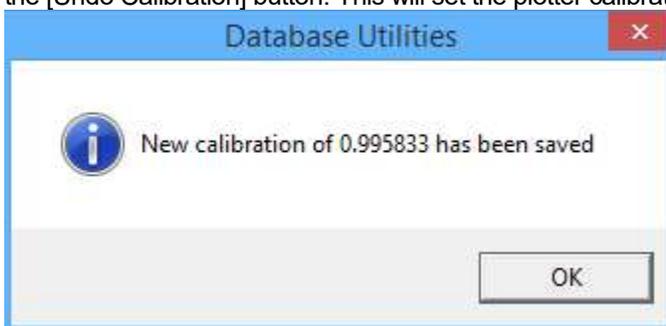


Fig. 7.35 New plotter calibration saved

7.3.11 Interactive Plot – Tools – Depth Shift a Curve

The Warrior Software has the ability to depth shift a single curve in a dataset while keeping all of the other curves at their current depths. It should be noted that while this feature does exist it should not be a general practice to need to do this. Tool offsets should be adjusted to insure that curves are on depth. Depth Shifts to a data item or curve can be done in Interactive Plot or Database Utilities.

The first step is to select the data or curve to shift. Click the [Select Data] button to bring up a list of data items in the database. Be aware that all data in the database will be shown, not just the data from the current pass that is displayed if you are in Interactive plot. Find and select the curve and click [OK]. Now enter the amount of shift with negative amounts shifting up hole. If the “Shift current Encoder Depth also” is checked, the encoder depth will also be moved by that amount when the [Apply] button is clicked. If you are in Interactive Plot, the screen will be refreshed with the curve shifted.

No records are maintained of which curves have been shifted or by what amount. It is a good idea to make a backup of the database before doing depth shifts in case of operator mistakes.

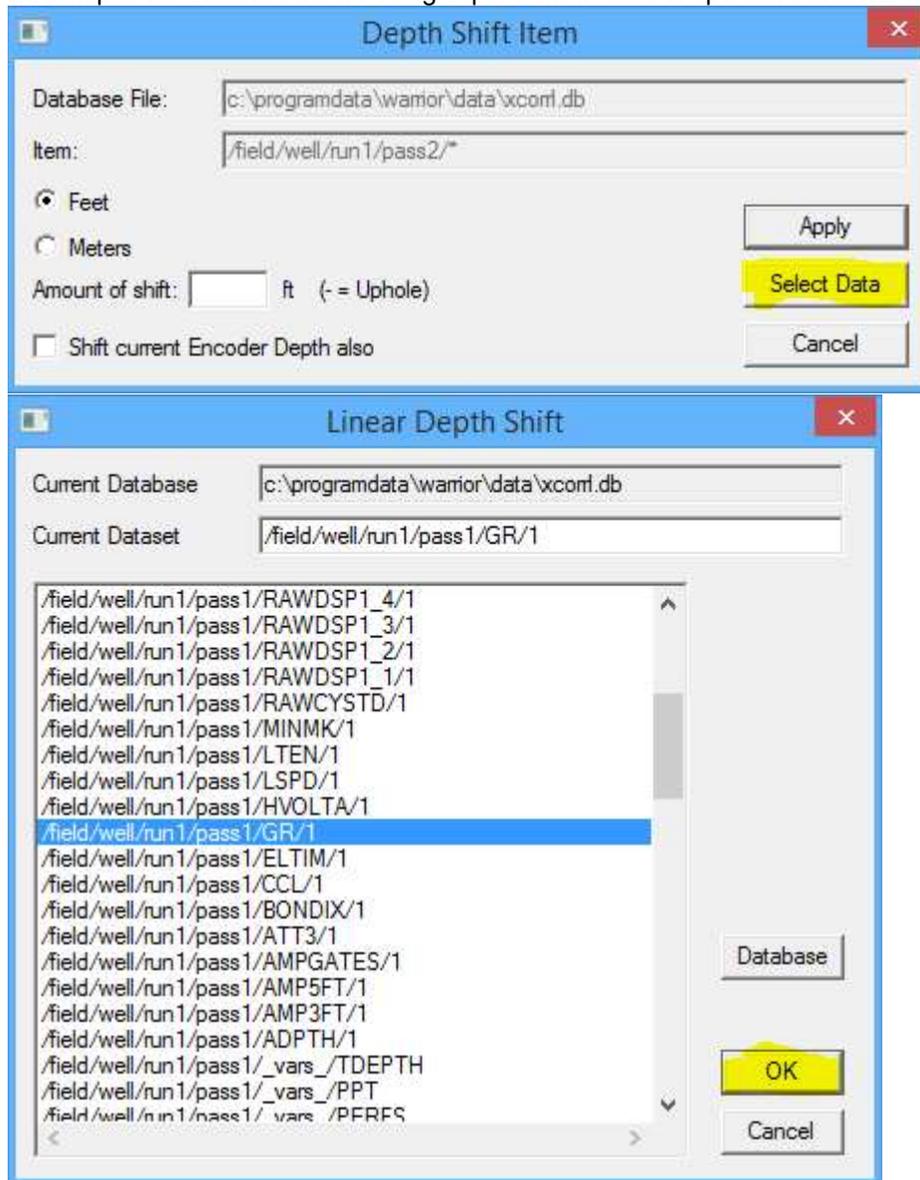


Fig. 7.36 Depth Shift a Curve

7.3.11 Interactive Plot – Tools – Depth Shift a Whole Pass

The Depth Shift Icon or Tools -> Depth Shift a Whole Pass can be used to depth shift a pass to put it on depth with other logs or passes. This can also be done from Database Utilities. If done from Interactive Plot, the current pass displayed will be selected as the pass to depth shift. If the check box “Shift current Encoder Depth also” is checked, the amount of shift will also be applied to the encoder. Enter the amount that you wish to shift the pass in feet or meters and click [Apply]. The Interactive plot will refresh the screen with the shifted pass and the encoder depth will be adjusted at that time.

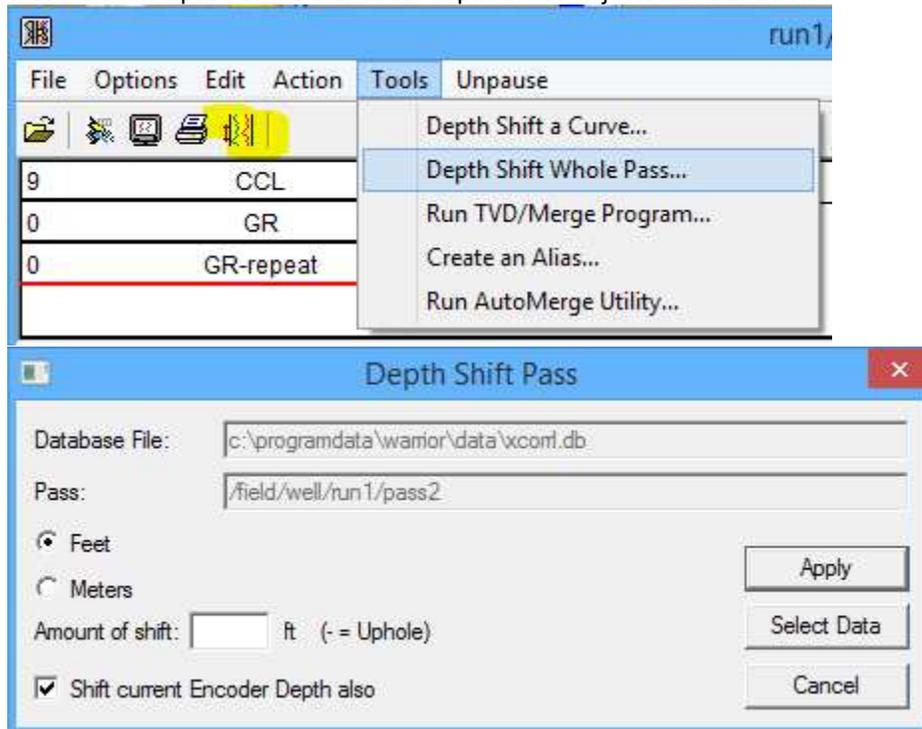


Fig. 7.37 Depth Shift a Whole Pass

7.3.12 Interactive Plot – Tools – Run TVD/Merge Program

Clicking on Tool -> Run TVD/Merge Program from Interactive Plot will open the Warrior Merge Program. [See section 11](#) for information on the use of the Warrior Merge program.

7.3.13 Interactive Plot – Tools – Create an Alias

Creating an alias allows the User to display data in a presentation from a different pass in the same database. It does not create a copy of the original data but simply shows the data as being in the pass while it actually exists elsewhere.

Use the [Browse] button to select the pass that contains the original data. That data item will then be displayed in both the existing data item name and the New Name fields. The New Name field must now be edited to show the pass and curve name that you wish to present. This normally will consist of changing the pass number and often changing the curve mnemonic since two curves of the same name cannot exist in a given pass. Verification of the creation of the alias will be shown at the bottom of the window. Note that when the alias is created that it will need to be in the presentation to be displayed and if it is in the presentation the screen may need to be refreshed before it is displayed.

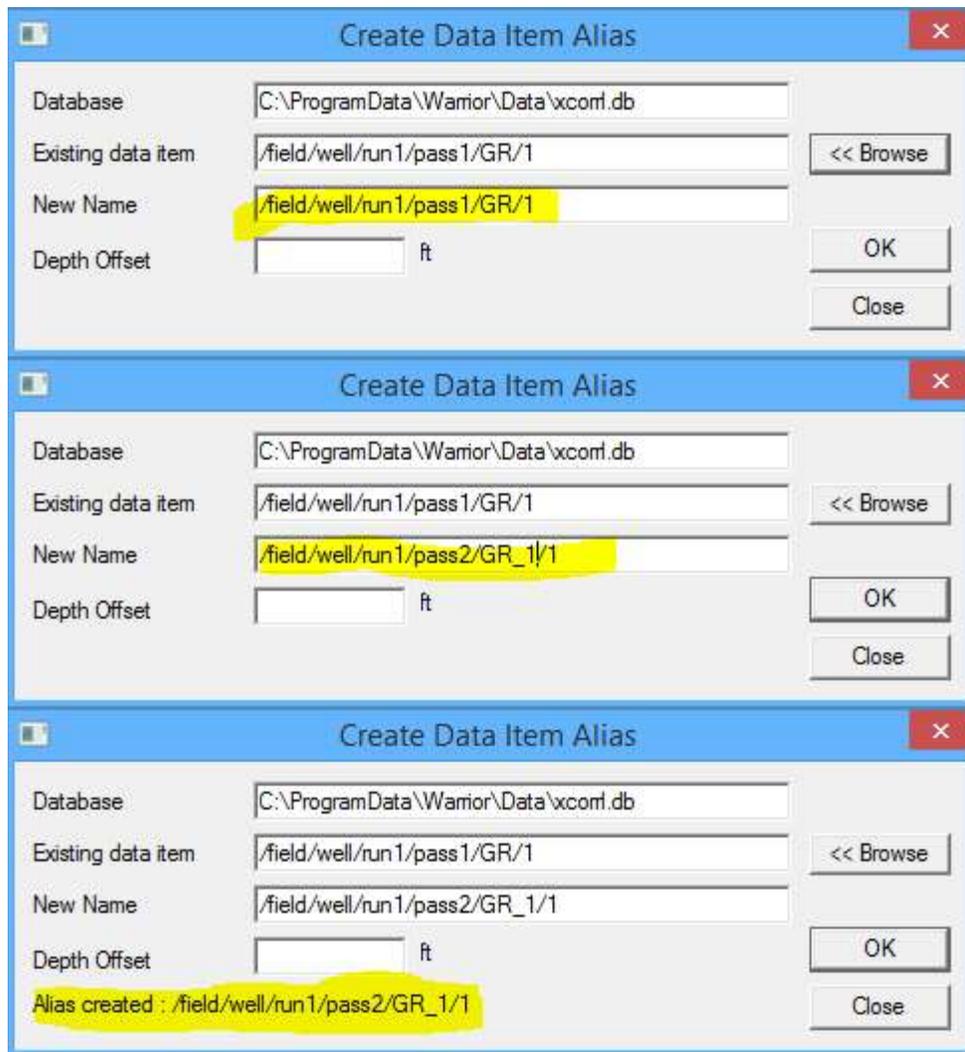


Fig. 7.38 Creating an Alias of GR from Pass1 as GR_1 in pass2

7.3.14 Interactive Plot – Tools – Run AutoMerge Utility

The AutoMerge Utility allows the User to merge data items of the same name from multiple passes within a database into a new pass and automatically gives each of the data items a new name. This is very useful when several passes have been run over the same interval and you wish to see all of the passes on one plot. The new output pass will automatically be named `././merge1`, but this may be edited. The User may use the [`<<Browse`] button to select a presentation to use on the pass that is created.

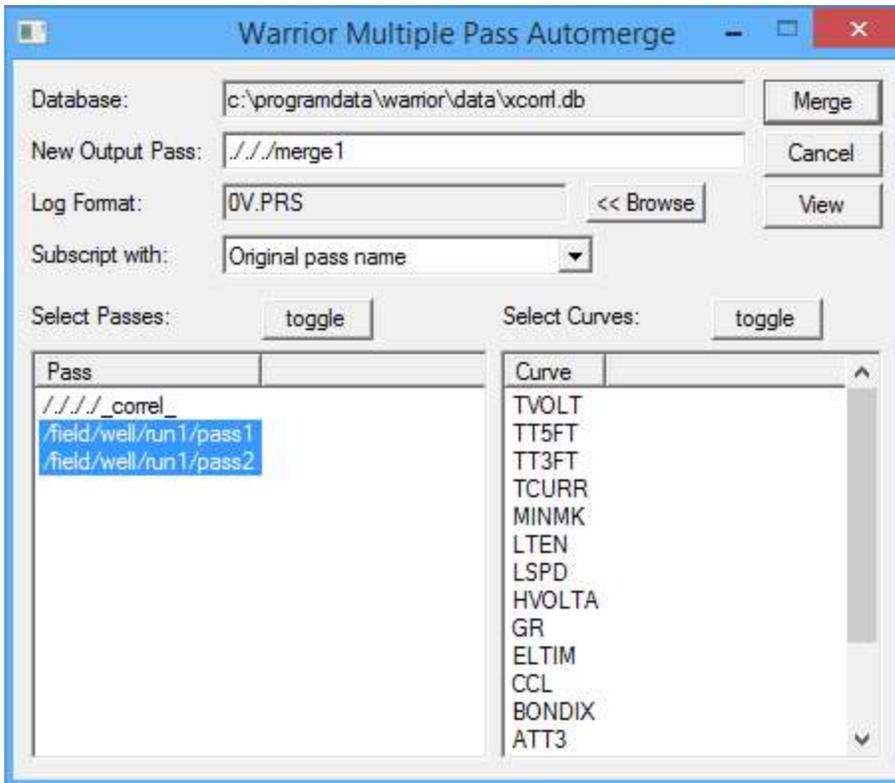


Fig. 7.39 AutoMerge Utility

There are a variety of naming methods that may be used for the curve names. A list of some choices and the resulting name for a GR from pass2 are:

Original pass name	GRpass2
Original pass number	GR2
Run number and first pass letter	GR2p
Run number and pas number	GRr1p2

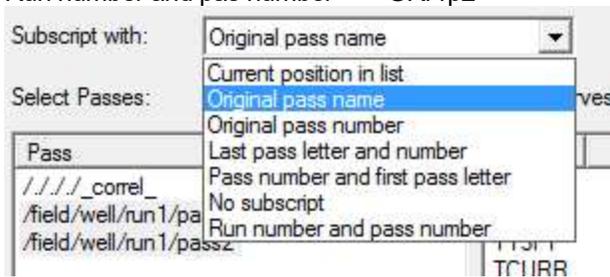


Fig. 7.40 Curve rename options in automerger utility

7.3.14 Interactive Plot – Pause / Unpause

The Pause selection is used to keep the display from scrolling so that data may be examined, annotations added to the pass, etc. If the pass has been paused, the selection will change to Unpause and can be used to allow the display to once again scroll.