POWERSTEER

2018 Metric Tutorial

TRIVISION GEOSYSTEMS LTD.

The Intelligent Geological Software Solution

Suite 200, 638 – 11th Avenue S.W.

Calgary, Alberta T2R-0E2

Phone: (403) 777-9454

Website: www.powerlogger.com Email: info@powerlogger.com

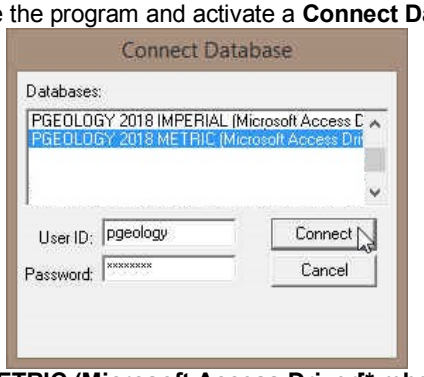
Contents

If you have followed through the Tutorials (Power*Log Metric Tutorial followed by the Power*Curve Metric Tutorial) we will now have to add the Type Well Curve data to the Tutorial Wells Data. If you have not done the Tutorials you will skip ahead to page 7 to import the Power*Curve Tutorial Well. Before we get started, we have to add the Type Well Curve to the previously done Power*Curve Tutorial Well.

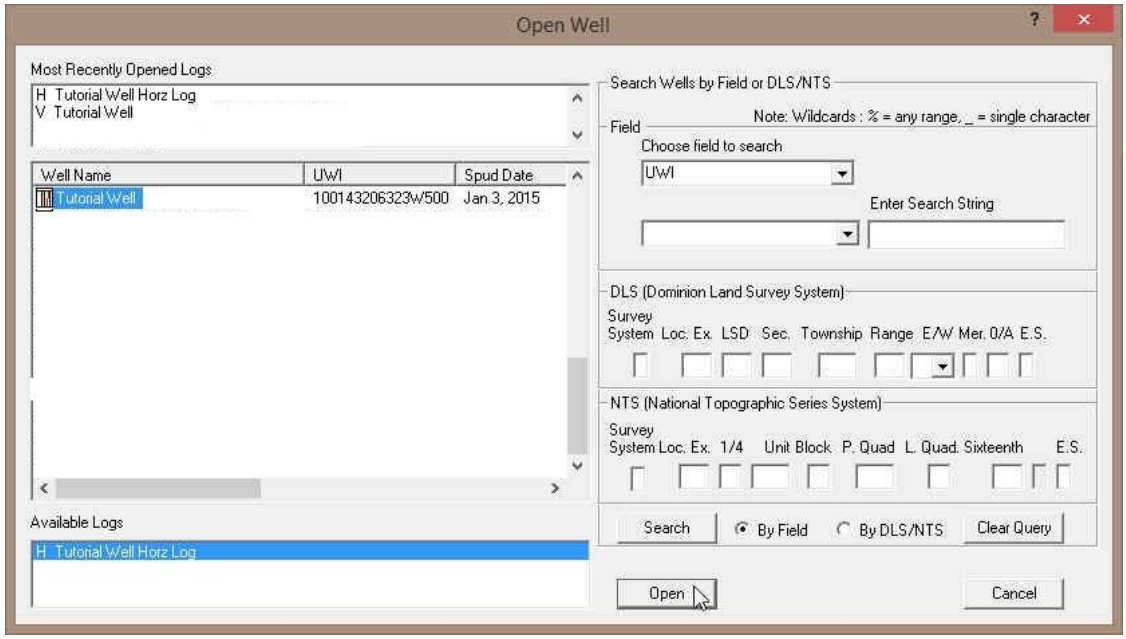
Adding the Type Well Curve

Congratulations on completing the tutorials. If that is the case then you will have to add the Type Well TVD Curve layer to this log and then import the Las file to get the Type Well GR Curve into your well data.

1.) **Double click** on the  **Icon**. Acknowledge the Security Information window by **clicking** on the OK **button**. This will initiate the program and activate a **Connect Database** window.

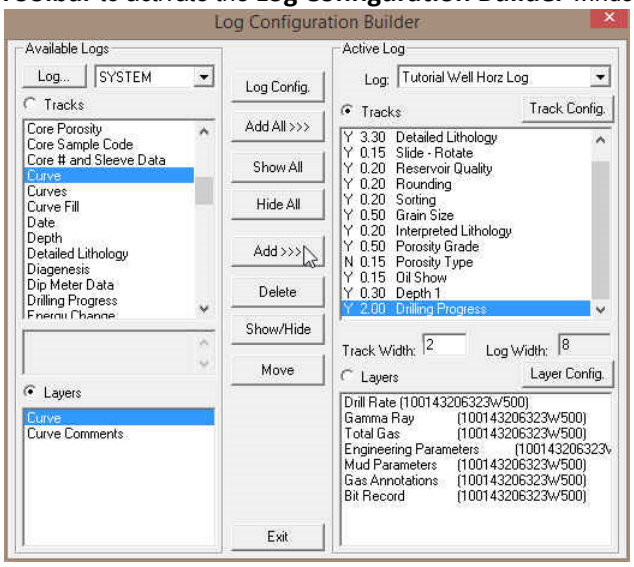


1.) Highlight the **PGEOLOGY 2018 METRIC (Microsoft Access Driver[*.mbd]))** database by **clicking** on it once.
2.) Move your mouse pointer to the **User ID** field and **click**. This will activate a flashing cursor in the **User ID** field. **Type** "**pgeology"** in the **User ID** field. **Press** the **Tab** key on the keyboard to move to the **Password** field.
3.) **Type** "**pgeology"** in the **Password** field and then **click** on the Connect **button**. The program will now load various dictionaries and then activate an **Open Log** window.



8.) **Select the Tutorial Well** from the List and then **click** on the Open **button**. This will open your Tutorial Well Horz Log.

9.) Under the **Options** menu, **click** on **Log Configuration Builder** or **click** on the **Log Configuration Builder button** on the **Toolbar** to activate the **Log Configuration Builder** window.

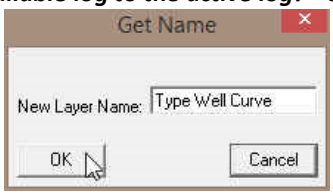


10.) On the **left side of the Log configuration builder** scroll down and highlight or **click** on the **Curve** track.

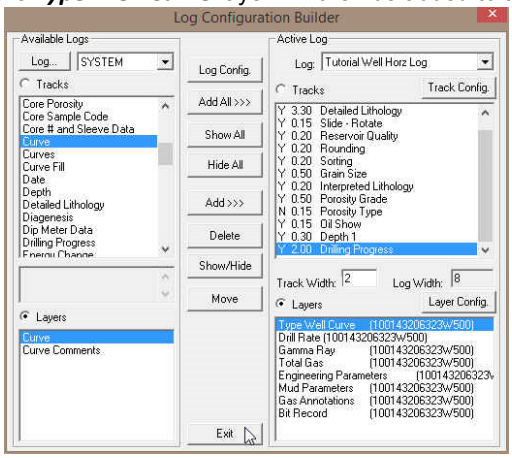
11.) **Click** on the **Curve** layer in the layers portion of the window on the lower left side of the builder to highlight it. In addition, notice the Layers Radio button on the left side is activated.

12.) On the **right** side (**Active Log**) of the **Log Configuration Builder** window, **click** on the **Drilling Progress** track to highlight it. This is the track we want to add the Type Well Curve layer to.

13.) **Click** on the Add >>> **button** and you will be prompted with the following system message, "***Do you want to ADD the selected (layer) from the available log to the active log?"*** **Click** on the Yes **button**.



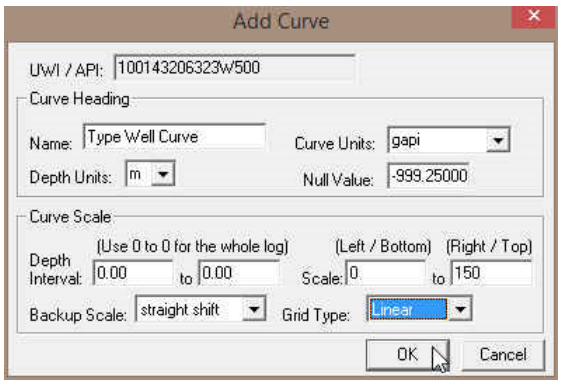
14.) This will activate a **Get Name** window with "***Type Well Curve***" as the name in the **New Layer Name** field. **Click** on the OK **button** and the ***Type Well Curve*** layer will then be added to the **Drilling Progress** track.



Note: The ***Type Well Curve*** has not yet been associated with the ***Type Well Curve*** layer. This will be done when the **Add Curve** window has been correctly filled in when you exit the Log Configuration Builder window.

15.) **Click** on the Exit **button** to return to the log and the log will be initialized with the new layer, which in turn will generate an **Add Curve** window.

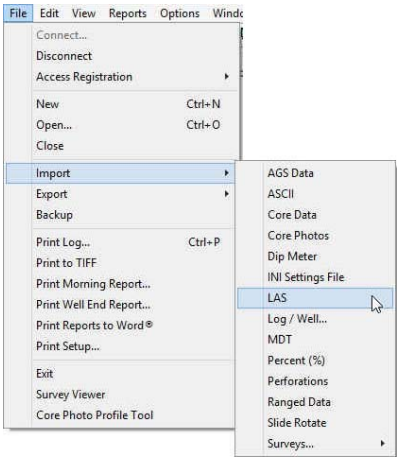
The Add Curve window…

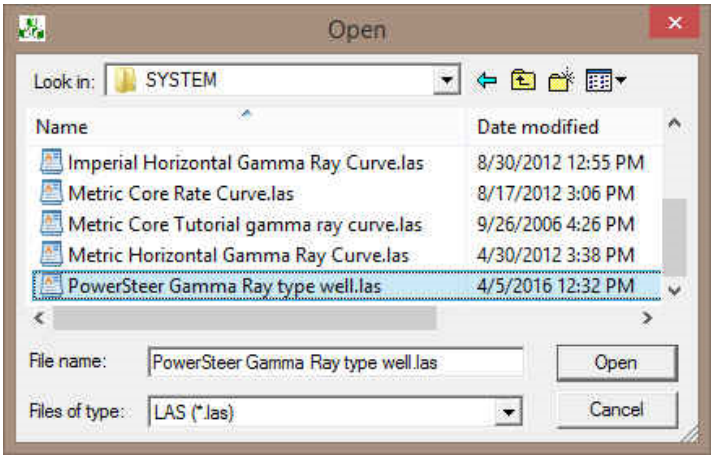


1.) **Type gapi** in the **Curve Units** field.
2.) Make sure **m** is in the **Depth Units** drop box field.
3.) Make sure the **Null Value** field is **-999.25**.
4.) Make sure the Depth **Interval** is **0** and **0** indicating the present curve scale is applicable to any depth on the log.
5.) Make sure the **Curve Scale** field values (**Left** / Bottom and **Right / Top**) to **0** and **150**
6.) Make sure the **Backup Scale** drop box field is **Straight Shift**.
7.) Make sure the **Grid type** drop box field is **Linear**.
8.) **Click** on the OK **button** to add the Type Well Curve layer to the Drilling Progress Track.

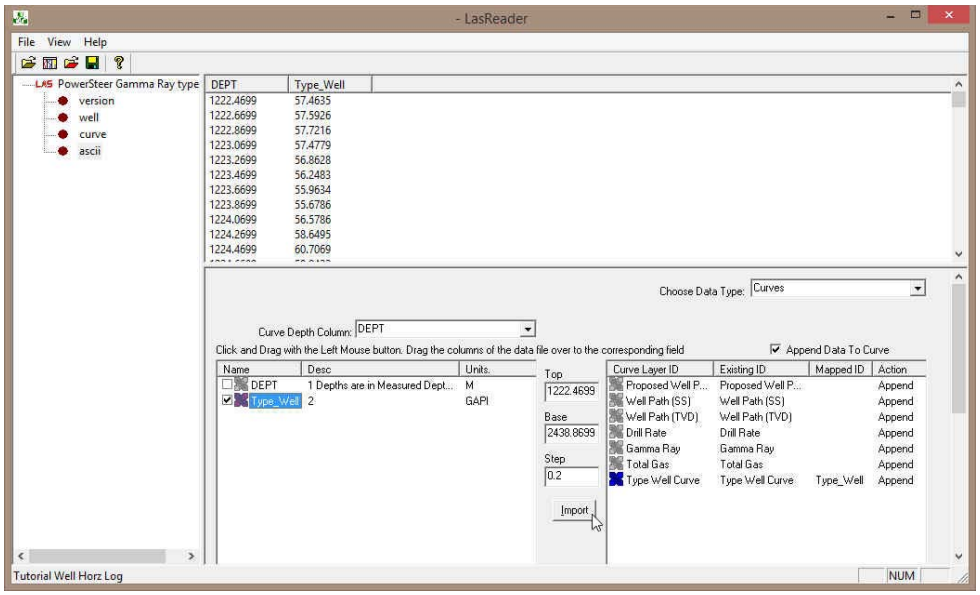
Importing the LAS Type Well Curve

1. **Click** on the **File** pull down menu selection and **click** on **Import** and then **click** on **LAS** from the pop out-menu or simply **click** on the **LAS button**, on the **Import Toolbar**, to activate the **LAS Reader** window.



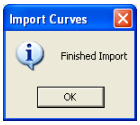


2. This will then activate the Open window which allows the user to select the LAS file you wish to import the data from**.** You can find the file in the PowerSuite_2018\System\PowerSteer Gamma Ray type well.las and highlight the file by **clicking** on it **once** and then **click** on the Open **button**. You will see the window shown below. It will default to the importing of Curve data.
3. On the lower left side of the window **Click and drag** the **Type Well curve** to the **Type Well Curve layer** on the lower right side and release it when the layer name becomes highlighted.



N.B. The user can **Right click** on the **Curve Layer ID** to remove the mapping or switch the action from append to replace. The Symbol color will either be purple for replace or blue for append.

4. **Click** on the Import **button**. You will then be prompted with a system message after the import has finished.

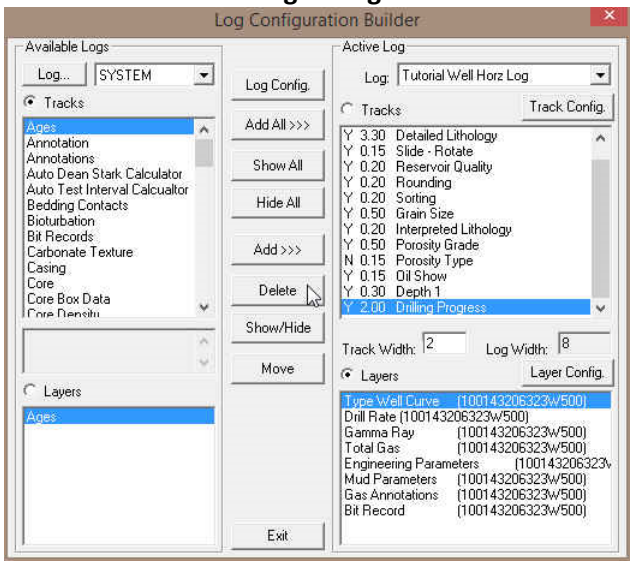


5. **Acknowledge** the Finished Import message. **Click** on the OK **button** and then **click** on the **button** to exit or **click** on the **File menu** and **select the Exit** option to close the LAS Reader Window.

Removing the Type Well Curve Layer from the Tutorial Well HZ log.

This does not delete the type well curve but removes it from the log display.

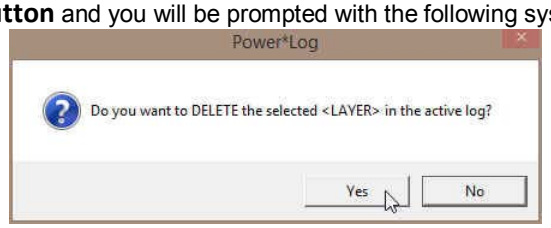
1.) Under the **Options** menu, **click** on **Log Configuration Builder** or **click** on the **Log Configuration Builder button** on the **Toolbar** to activate the **Log Configuration Builder** window.



2.) On the **right side of the Log configuration builder** scroll down and highlight or **click** on the **Drilling Progress** track.

3.) **Click** on the **Type Well Curve** layer in the layers portion of the window on the lower right side of the builder to highlight it. In addition, notice the Layers Radio button ◉ on the left side is activated.

4.) **Click** on the Delete **button** and you will be prompted with the following system message.



Note: The ***Type Well Curve*** **data will not be deleted** from the database. You are just deleting a layer that shows the Type Well Curve data from the Tutorial Well HZ log.

5.) **Click** on the Yes **button.**

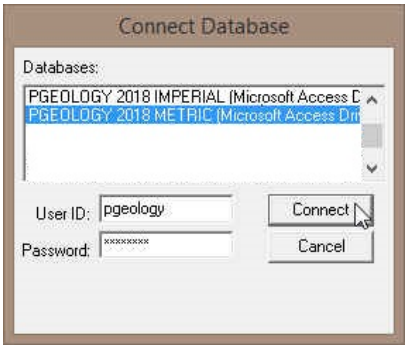
6.) **Click** on the Exit **button** to return to the log and the log will be initialized with this layer now deleted.

Power*Steer

Now we will start up the Power*Steer Portion of this Tutorial.

Connecting to the Database

1.) **Double click** on the **Power*Steer**  **Icon**. This will initiate the program and activate a **Connect Database** window.



4.) Highlight the **PGEOLOGY 2018 METRIC (Microsoft Access Driver[*.mbd]))** database by **clicking** on it once.

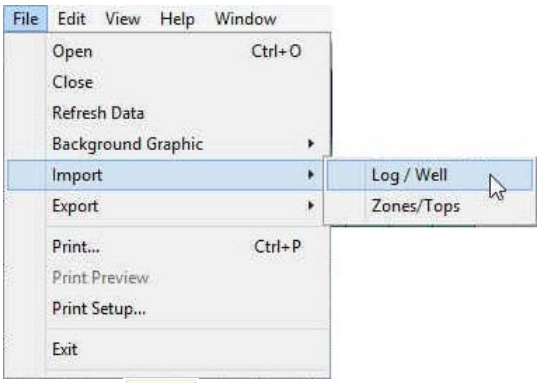
5.) Move your mouse pointer to the **User ID** field and **click**. This will activate a flashing cursor in the **User ID** field. **Type** "**pgeology"** in the **User ID** field. **Press** the **Tab** key on the keyboard to move to the **Password** field.

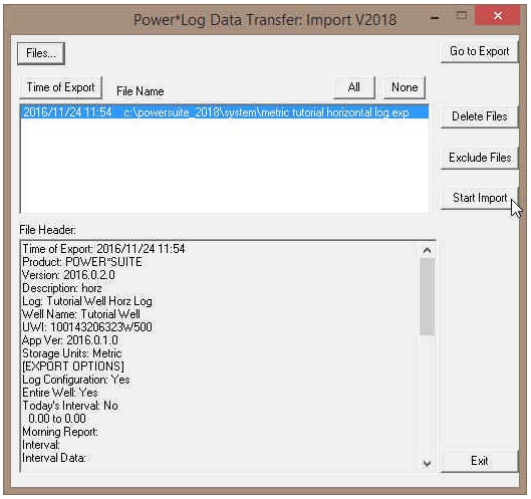
6.) **Type** "**pgeology"** in the **Password** field and then **click** on the Connect **button**. The program will now load various dictionaries and then activate a Well List window.

Import Log / Well Data.

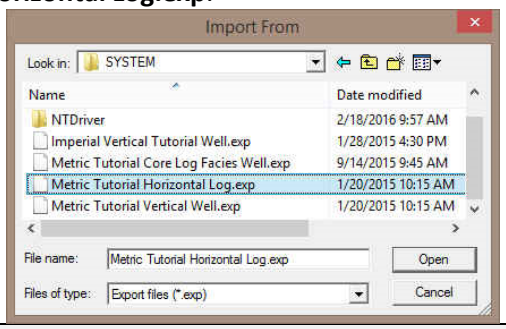
If you have followed all the tutorials you can skip ahead to page 10. If you have not done the Metric Power*Log Tutorial followed by the Metric Power*Curve Tutorial you will have no data available to you to do this Power*Steer tutorial. We will make this easy and have you import the Metric Tutorial Horizontal Well. This will have the majority of the data all the data you need. If you have followed along with the tutorials skip ahead to page .

1. **Select Import** under the **File menu** selection, and then **select Log/Well** from the sub-menu. This will activate the Import window.





2.) **Click** on the Files... **button.** This will activate the Import from window and now you will have to browse to find the folder **C:\POWERSUITE_2018\SYSTEM** and then the file name you want to import is **Metric Tutorial Horizontal Log.exp**.



Note that files available for importing will have an **.EXP** file extension. Any of the files that you select will then be added to the **File** list. Please make sure that the files you wish to import are highlighted (selected), in the list prior to importing.

3.) **Highlight the file name** and **click** on the Open **button.**

4.) The Import Log/Well window will now be displayed with the details of the file to be imported. **Select/highlight the file** to be imported.

5.) **Click** on the Start Import **button** to activate the following system message, "***Do you really want to IMPORT the highlighted files?***"

6.) **Click** on the Yes **button** to proceed with the import.

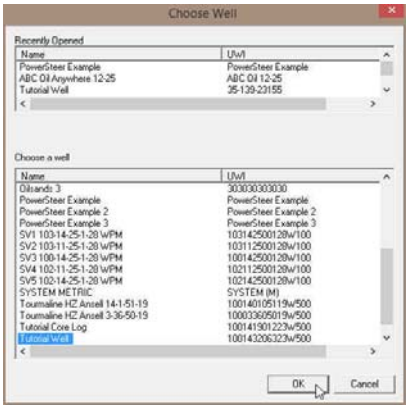
Note: If you click on the "***Yes***" button, and the file you are importing contains the information from an **Entire Well**, the following system message will be activated, "***About to IMPORT ENTIRE WELL data. All information associated with this well in the database will be OVERWRITTEN. Continue?***"

7.) **Click** on the Yes **button**.

8.) Upon completion of the import, the following system message will then be activated, "***Data has been imported successfully.***"

9.) **Click** on the OK **button** to confirm the successful import of the data.

10.) Close the Data Transfer window by **clicking** on the Exit **button** or by **clicking** on the icon located at the top right of the Data Transfer window.

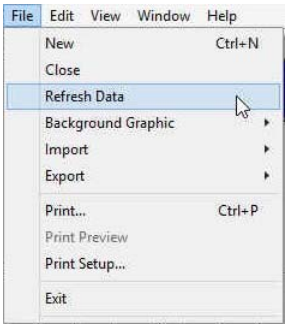


7.) **Double Click** on the **Tutorial Well or Highlight** the **Tutorial well** and then **click** on the 

button. Because this is the first time the Tutorial Well has been opened it will be a blank template starting at zero depths with no scales.

If you have not done the Power*Log and or Power*Curve tutorials this Well will not be in the list. Then we must import The Tutorial Well. **If you have done the tutorials then skip ahead to page 11 Set Well path**.

Refresh Data



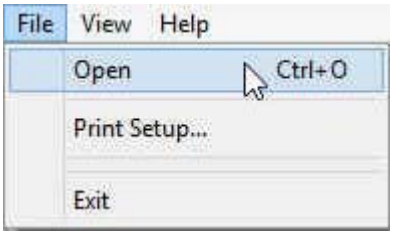
If the well was opened and you have imported a newer file the Power*Steer application must be refreshed to see the new data that has been imported. Because we did not have the well opened at this time you would not have to do this step. To refresh the data you would.

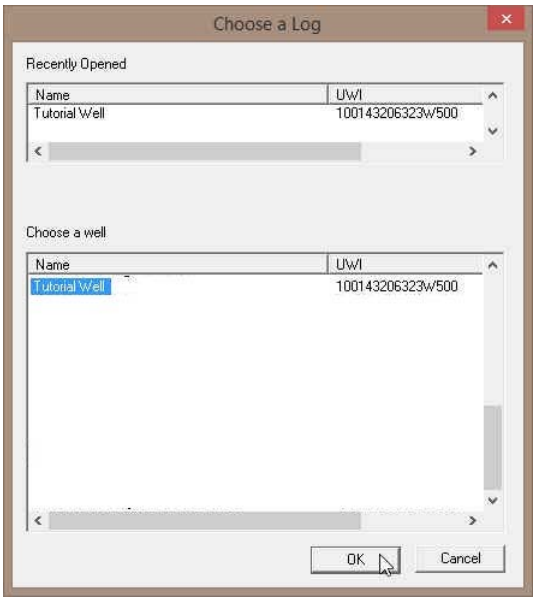
1.) **Click** on the **File Menu** to activate the drop down list and **Click** on the **Refresh Data** Selection to refresh the well's data you have open in Power*Steer.

Open Well

Now you have imported the Tutorial Well we now have to open the well.

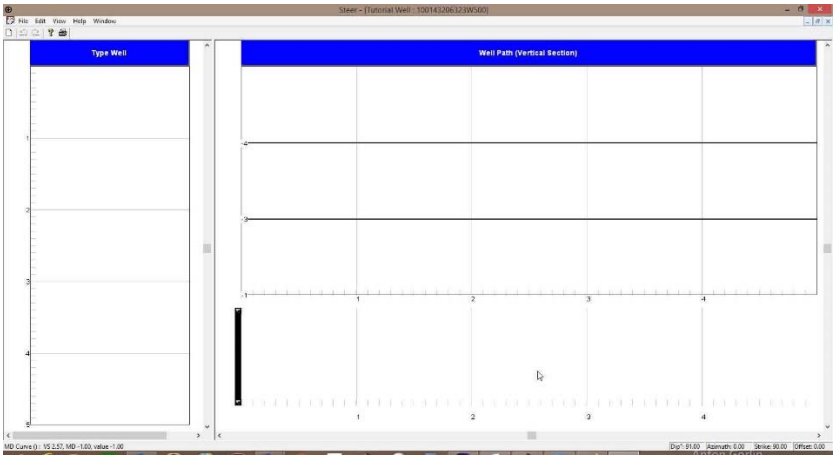
1.) **Click** on the **File Menu** to activate the drop down list **and click** on the **Open** Selection to activate the **Well List**.





2.) **Select** the **Tutorial Well** by **double clicking** on the **well name** or **highlighting once** and **click** on the OK **button.**

This will open the Power*Steer with 2 panes and no data shown with the depths defaulted to zero (0).

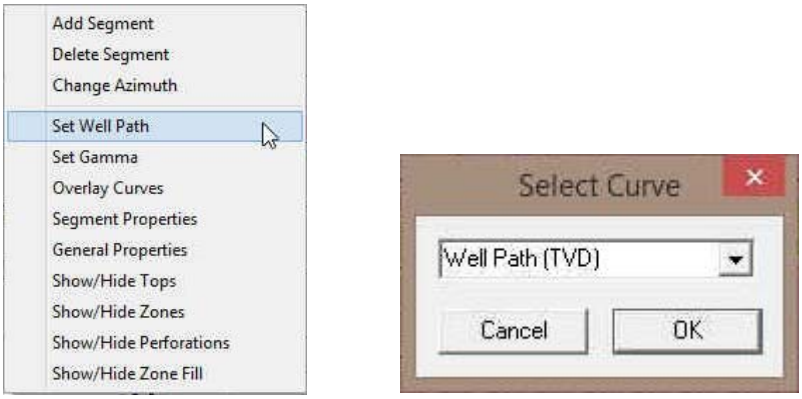


Power*Steer Well data needed from Power*Log / Power*Curve.

- A Well Path (TVD units) Curve has to be added and then calculated from the survey data.
- Survey data must also be up to date to display the information on the Power*Steer application.
- A measured depth Gamma Ray Curve must exist for the well being steered.
- A Type Well Gamma Ray Curve (TVD {True Vertical Depth} / RSD {Relative Stratagraphic Depth}) must exist for the well to be steered.
- Zone of interest must be known and identified on the Type well.
- Formation Tops may be added and also have to have the thickness calculated in order to show up in the list to be drawn in Power*Steer.

Set Well Path

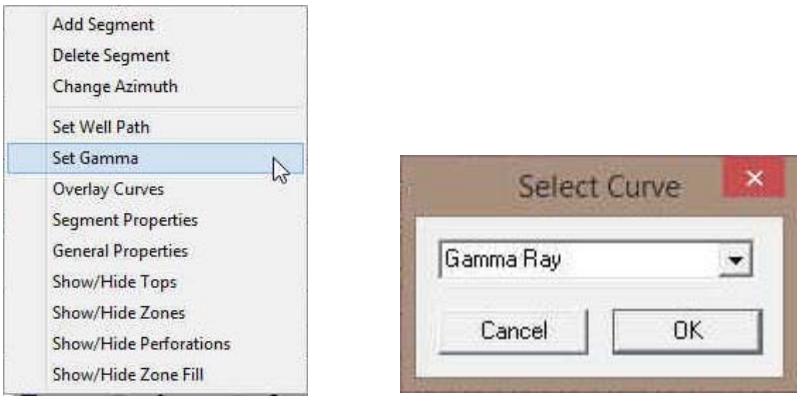
1. **Right click** on the **Well Path pane (right side)** to activate the pop out menu
2. **Select Set Well Path**. This will activate a Select Curve Window.



3. **Select** the steered **Well Path Curve** in TVD units from the drop down list by **clicking** on the **down arrow** and **selecting** it from your **curve list** for this well from your database.
4. **Click** on the OK **button**.

Set the Gamma Curve

1. **Right click** on the **Well Path pane (right side)** to activate the pop out menu
2. **Select Set Gamma**. This will activate a Select Curve Window.



3. **Select** the steered wells **Gamma Ray** curve in measured depth units from the drop down list by **clicking on the down arrow** and **selecting** it from your **curve list** for this well from your database.

Note: This Gamma Ray curve will be displayed on the lower portion of the well path and will either be displayed in MD or VS depth units depending on the view. This is the curve that you will be attempting to correlate to the Type Well Curve. It doesn't necessarily have to be the Gamma Curve but this tool is by far the most common tools to be run downhole while drilling.

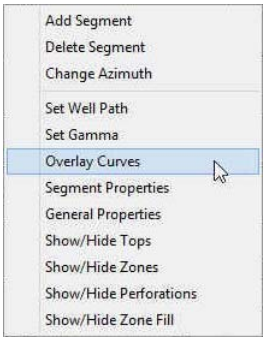
4. **Click** on the OK **button**.

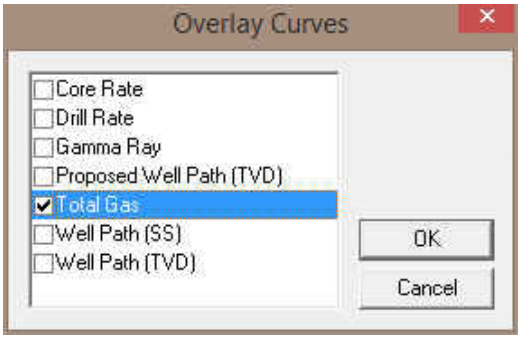
Set the Overlay Curves

If the user wishes to have more curves displayed on the Segment portion of the window the user can also display those curves in either MD or vertical section depth display. These are only for display purposes and will not be used to correlate to the Type Wells data.

1. **Right click** on the **Well Path pane (right side)** to activate the pop out menu

2. **Select Overlay Curves**. This will activate an Overlay Curves list.





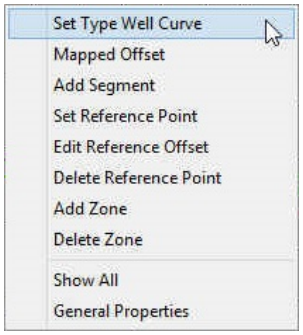
3. **Select** the **Total Gas curve** from the list and you may display other curves captured in your wells database. Display these curves data by activating the check box beside the curves.

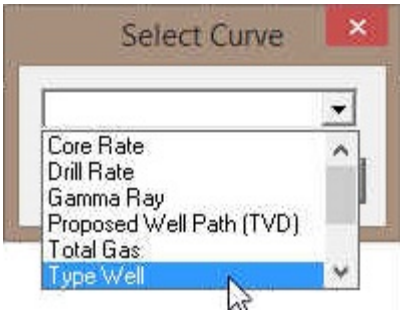
Note: These Overlay curves will be displayed on the lower portion of the well path and will either be displayed in MD or VS depth units depending on the view. These curves are for display purposes only.

4. **Click** on the OK **button**.

Set Type Well Curve

1. **Right click** on the **Type Well portion of the screen (left side)**
2. **Select Set Type Well Curve** from the pop out menu list. This will activate a Select Curve list.



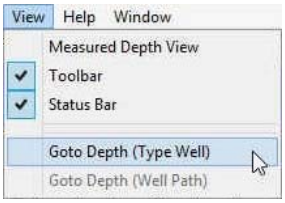


3. **Select** the **Type Well** Curve that you will be steering to**.** This is Type Well GR curve you imported into your steered well in Power*Curve.
4. **Click** on the OK **button**.

Type Well Depth Manipulation

Go To Depth (Type Well)

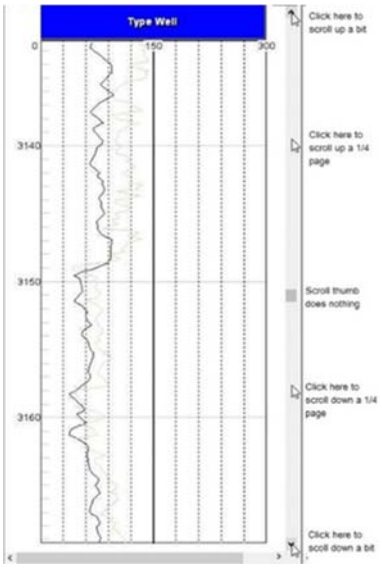
1. **Click** on the **Type Well** Portion of the window**.**
2. **Click** on the **View Menu** to activate the drop down list.
3. **Click** on **Go To Depth (Type Well)** selection to activate the Goto Window.



4. **Type** a **2395** in the Type Well Depth Field.
5. **Click** on the OK **button**. This will change the depth view from 0 to 2395 at the top of the type well.

Type Well Track Depth Scrolling

Once the Type Well curve has been added to this track the user has the ability to scroll up and down the curve depth display.



Mouse Pointer Controls

The user can **click** on the **up / down arrows** on the right side of the track pane to move up or down a bit or **click on the space between the thumb and arrows** to move up or down 1/4 page.

Mouse Roller Ball Control

Click on the **Type Well pane** and then **roll the roller ball away** from you to scroll up the view.

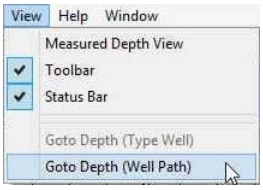
Click on the **Type Well pane** and then **roll the roller ball towards** you to scroll down the view.

Type Well Display Scale Manipulation

Click on the **Type Well pane**, **hold the CTRL Key down** on the keypad and then **roll the roller ball away** from you to decrease the scale so that you can see less data in the Type Well.

Click on the **Type Well pane**, **hold the CTRL Key down** on the keypad and then **roll the roller ball towards** you to increase the scale so that you can see more data in the Type Well.

Go To Depth (Well Path)

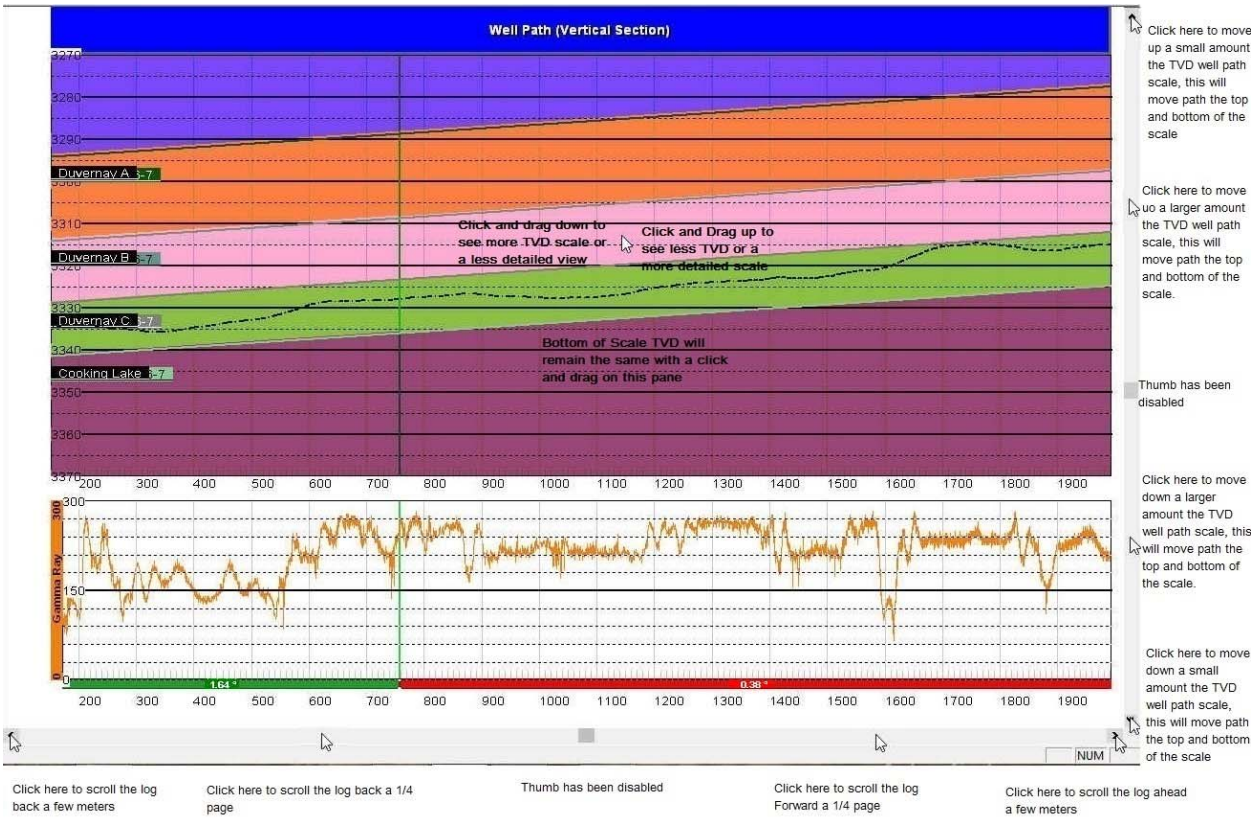


1. **Click** on the **Well Path** Portion of the window**.**
2. **Click** on the **View Menu** to activate the drop down list.
3. **Click** on **Go To Depth (Well Path)** selection to activate the Goto Window.
4. **Type** a **200** in the Well Path Depth Field.
5. **Click** on the OK **button**.

Well Path MD/VS Gamma Ray Depth Scale Display Manipulation

Click on the **Well Path pane**, **hold the CTRL Key down** on the keypad and then **roll the roller ball away** from you to decrease the scale so that you can see less data in the Well Path and MD / VS Gamma Ray.

Click on the **Well Path pane**, **hold the CTRL Key down** on the keypad and then **roll the roller ball towards** you to increase the scale so that you can see more data in the Well Path and MD / VS Gamma Ray.



Well Path TVD Scale manipulation

Mouse Pointer Controls

The user can **click** on the **up / down arrows** on the right side of the track pane to move up or down a bit or **click on the space between the thumb and arrows** to move up or down 1/4 page. This will move all the scales (both top and bottom scales simultaneously).

Mouse Roller Ball Control

Click on the **Well Path pane**, **hold the Shift Key down** on the keypad and then **roll the roller ball towards** you will move the TVD scale down (both top and bottom scales simultaneously).

Click on the **Well Path pane**, **hold the Shift Key down** on the keypad and then **roll the roller ball away from** you will move the TVD scale up (both top and bottom scales simultaneously).

Click and drag up on the Well Path portion of the pane to see a more detailed view or less TVD range. This action will not move the bottom TVD scale.

Click and drag down on the Well Path portion of the pane to see a less detailed view or more TVD range. This action will not move the bottom TVD scale.

Well Path MD/VS Gamma Ray Depth Manipulation

Once the Well Path TVD curve, Measured Depth Gamma Ray curve has been added to these track the user has the ability to scroll left and right to change the curve depth display.

Mouse Pointer Controls

The user can **click** on the **left / right arrows** on the bottom side of the track pane to move left or right a bit or **click on the space between the thumb and arrows** to go left or right 1/4 page.

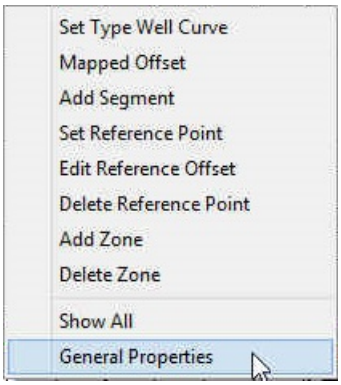
Mouse Roller Ball Control

Click on the **Well Path pane** and then **roll the roller ball away** from you to scroll left or back.

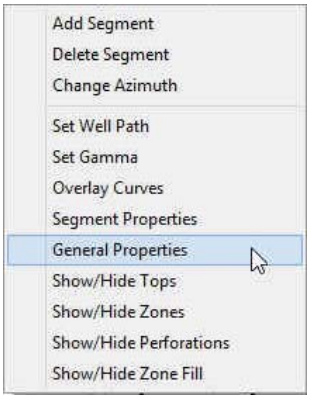
Click on the **Well Path pane** and then **roll the roller ball towards** you to scroll right or forward.

Curve Display and Grid Pattern Manipulation

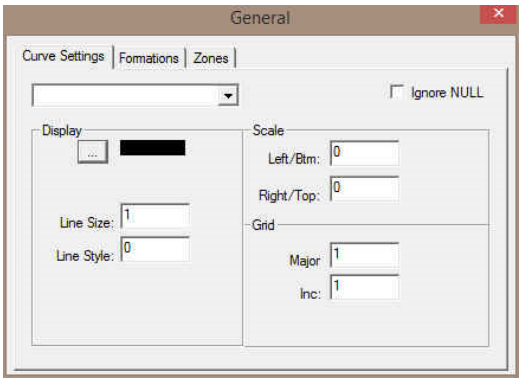
1. **Right Click anywhere** in either pane to activate the pop out menu.
2. **Select General Properties**. This will activate the General Properties window.



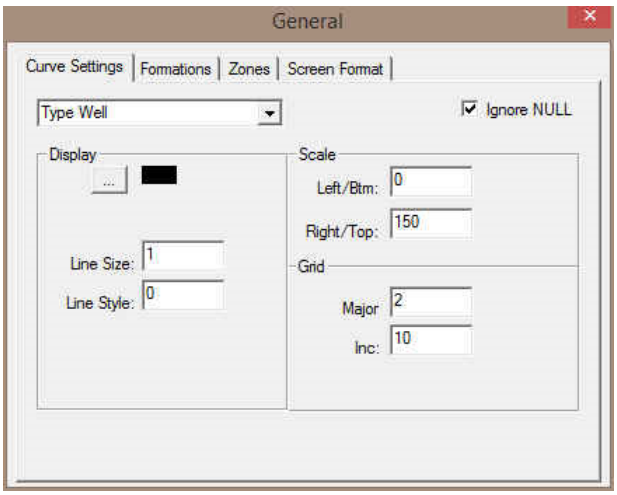
Right Click Type Well Pane



Right Click Well path Pane



3. The default Tab selection is the Curve Setting tab. So now **Click** on the **drop arrow** and **select** the **Type Well curve** to change the display for.



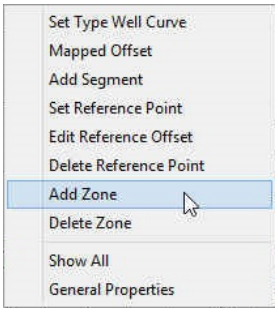
4. **Line Size portion of the window** will change the line thickness from 1 to 20 (pixels wide). You have to **type a number** in the **size field** and your input will be automatically displayed by the curve.
5. **Line Style portion of the window** will change the line style. You have to **type a number** in the **style field from 0 to 3** and your input will be automatically displayed by the curve. 0=Solid line, 1=Dashed Line, 2=Dotted Line, 3=Dash Dot Line

6. **Scale Portion of window** allows the user to change scales for the selected curve. Type a value in the appropriate fields to change the scales. The scales will change as you type.
7. **Grid Portion of window** allows the user to change the grid pattern for the selected curve. Type a value in the appropriate fields to change the grids. The grids will change as you type. Major Grids will indicate a value. The minor grids will divide the whole track and not the majors.
8. **Ignore NULL's check box** when activated will join curve values ignoring the null values. When deactivated the curve will only draw when there are two consecutive data points.
9. Repeat Steps 6-8 to change the appearance of the other curves presented in Power*Steer.
10. **Click** on the  in the upper right hand corner to **exit** this window.

Adding Zones

We will now add some Zones to the Type Well. They could be formation tops or other indicators that you wish to mark on your Type Well and will be transposed and manipulated by your segment movements in the Well Path pane.

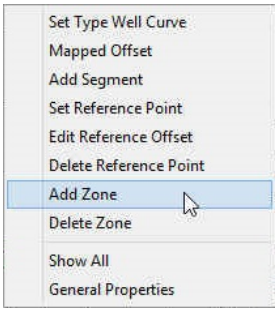
1. **Right Click** at **2405.5** on your **Type Well pane** to activate the pop out menu.
2. **Select Add Zone** from the pop out menu list. This will activate the Add Label window.



3. **Type** in a **Red Sky** in the field provided.
4. **Click** on the  **button**. This will close the window and add the Red Sky Zone Label to the Type Well pane.

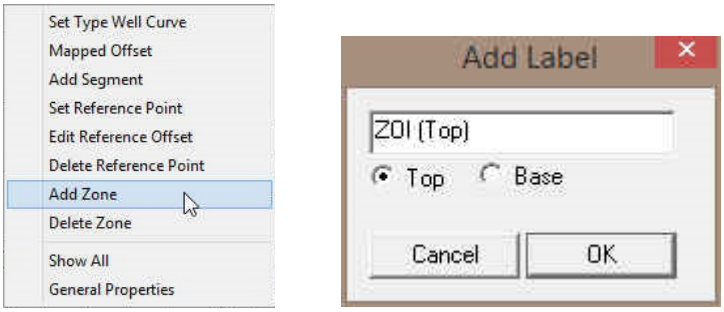
Note: The label will only be seen on the Well Path Pane after you have added a Reference Point

5. **Right Click** at **2409.8** on your **Type Well pane** to activate the pop out menu.
6. **Select Add Zone** from the pop out menu list. This will activate the Add Label window.



7. **Type** in a **Red Sky Main Sand** in the field provided.
8. **Click** on the  **button**. This will close the window and add the Red Sky Main Sand Zone Label to both the Type Well pane.

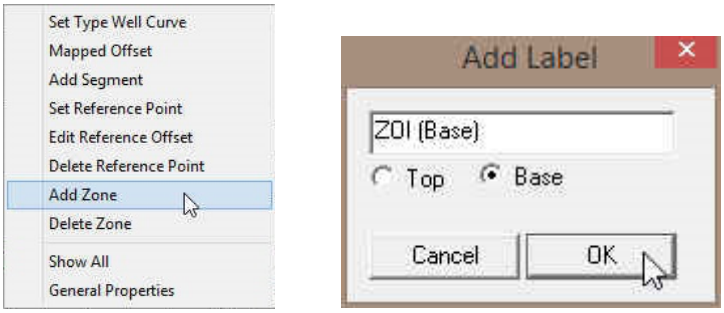
9. **Right Click** at the **2429** on your **Type Well pane** to activate the pop out menu.
10. **Select Add Zone** from the pop out menu list. This will activate the Add Label window.



11. **Type** in a **ZOI (Top)** {ZOI is an acronym for Zone of Interest} in the field provided.

> This is a **zone marker** that indicates that you are **inside the designated target** and you would like to calculate the percentage of the well's path that is inside the target boundaries then you must indicate whether this label is the **top or base of the Zone**. The user can only have one label designated at top and one zone label that is designated as base.

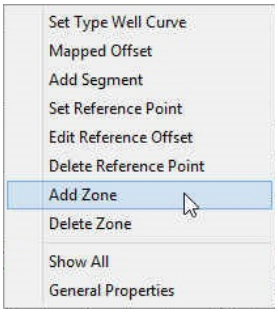
12. **This is the primary target label indicator** then you **must click** on the Top Base button.
13. **Click** on the OK **button**. This will close the window and add the ZOI (Top) label to the Type Well pane.
14. **Right Click** at the **2430.5** on your **Type Well pane** to activate the pop out menu.
15. **Select Add Zone** from the pop out menu list. This will activate the Add Label window.



16. **Type** in a **ZOI (Base)** {ZOI is an acronym for Zone of Interest} in the field provided.

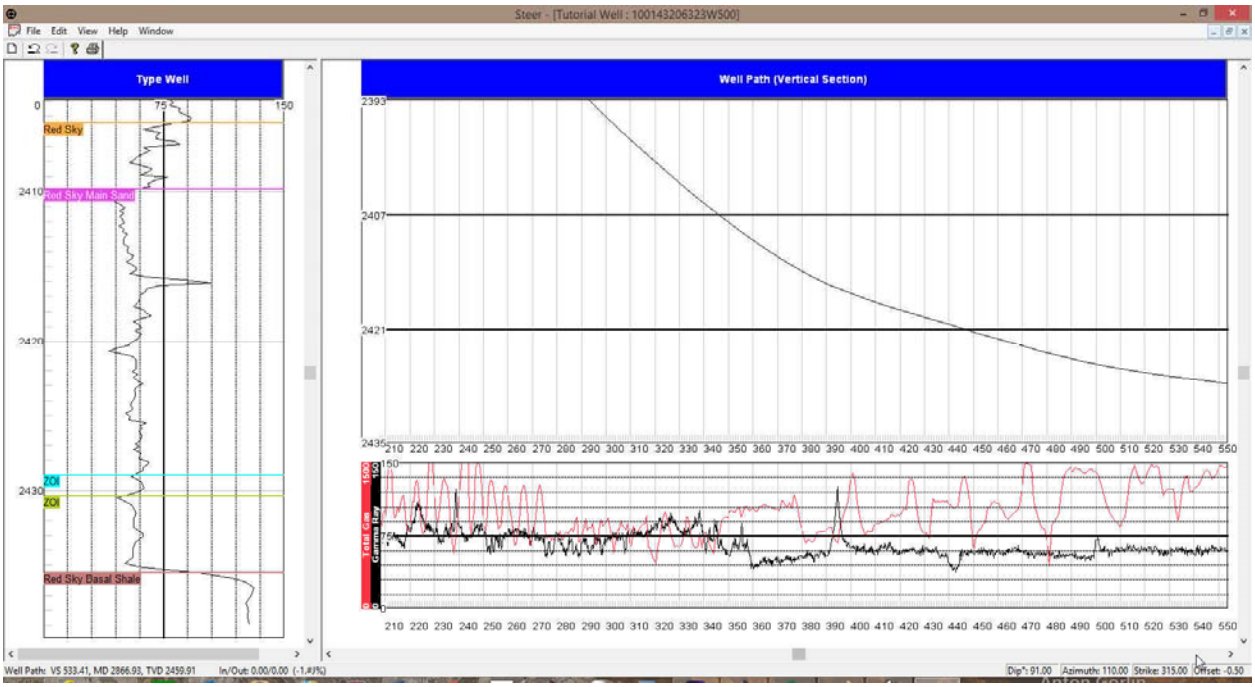
> This is a **zone marker** that indicates that you are **inside the designated target** and you would like to calculate the percentage of the well's path that is inside the target boundaries then you must indicate whether this label is the **top or base of the Zone**. The user can only have one label designated at top and one zone label that is designated as base.

17. **This is a primary target label indicator** then you **must click** on the Top Base **button**.
18. **Click** on the OK **button**. This will close the window and add the ZOI (Base) to the Type Well pane.
19. **Right Click** at **2435.5** on your **Type Well pane** to activate the pop out menu.
20. **Select Add Zone** from the pop out menu list. This will activate the Add Label window.



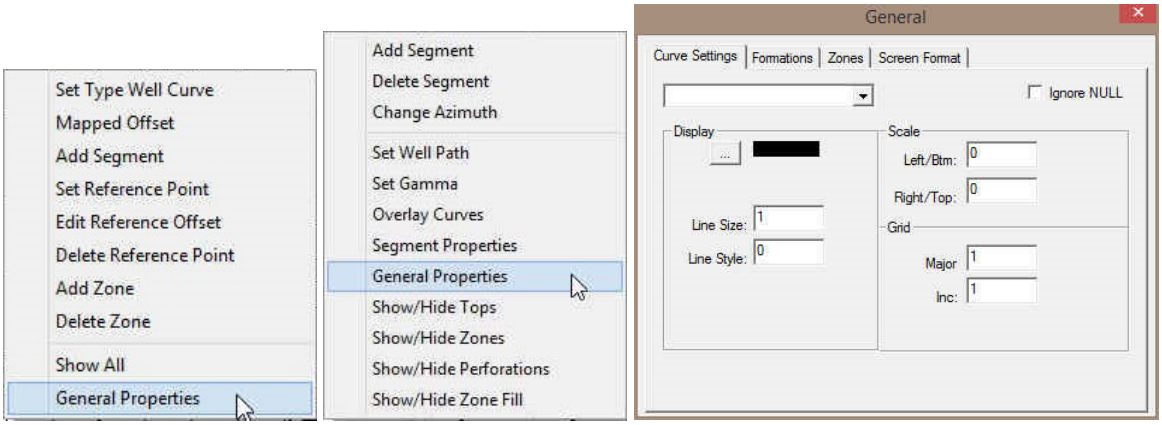
21. **Type** in a **Red Sky Basal Shale** in the field provided.
22. **Click** on the OK **button**. This will close the window and add the Red Sky Basal Shale Zone Label to the Type Well pane.

The zone labels will be added to the Well Path Pane after you put in a reference point and then add the first segment.



Zones Display Properties

1. **Right Click anywhere** in either pane to activate the pop out menu.

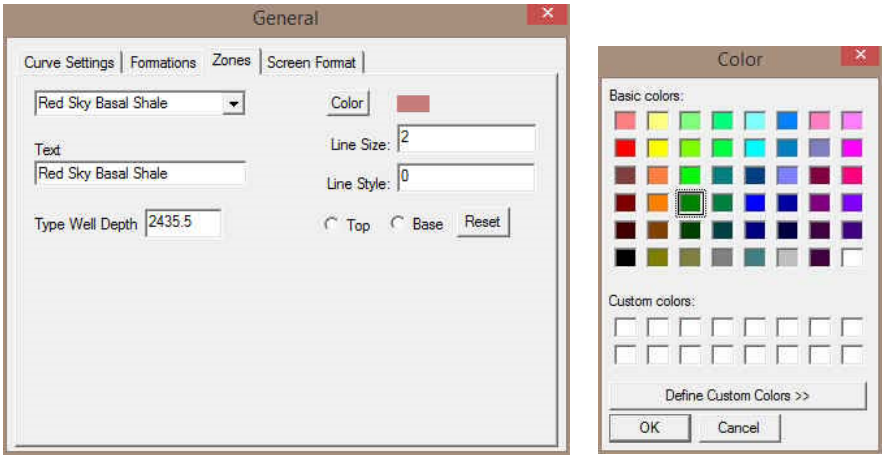


2. **Select General Properties**. This will activate the General Properties window.
3. **Click** on the **Zones Tab** to activate the Zones display properties.

Note: Zones will only appear in this list if they been entered in the **Type Well Portion** (left side) of the Geo*Steer application.

4. **Click** on the **drop arrow** and **select** the **zone** you wish to change the display for.

You can change the display name if you wish by typing in a new Zone name. These can be tops or any other indicators you wish to display in the Well Path Section of the Geo*Steer application.



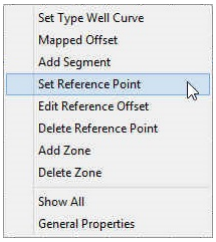
5. If you wish to change the **color of the Zone line** then you can **click** on the Color button to activate the Color pallet. **Select** a new **color** and then **click** on the OK **button.**
6. **Line Size portion of the window** will change the line thickness from 1 to 9 (pixels wide). You have to **type a number** in the **size field** and your input will be automatically displayed by the curve.
7. **Line Style portion of the window** will change the line style. You have to **type a number** in the **style field from 0 to 3** and your input will be automatically displayed by the curve. 0=Solid line, 1=Dashed Line, 2=Dotted Line, 3=Dash Dot Line.
8. If you choose to change the **Type Well depth** and or the Top Base Base or Top of zone then you must **click** on the Reset **button**
9. Repeat steps 4-8 for changes to other zone lines.
10. **Click** on the ✕ in the upper right hand corner to **exit** this window.

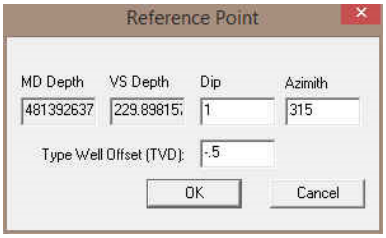
Set Reference Point

First thing you have to do is set up a reference point. You will need to know the general strike and dip of the formation you wish to steer this well for and the depth offset so that you can move the steered wells curve data up or down to match near the zone of interest. **This offset is critical for display purposes and should be correlated to the last Formation top encountered before the zone of interest to be drilled along is encountered.** This can be changed after the fact but will affect the segments that have been manipulated if done after the fact. The Strike and Dip will not be allowed to change. If you do want to change the strike and dip then you will have to delete the Reference point and that will delete all the segments that have been entered so you will be starting anew.

So it is quite important not to set up this reference point too soon as the segment manipulation is quite dependent on dip and if your well bore is less than 80 degrees inclination then you are manipulating bed thickness and not bedding dip, azimuth and or faulting.

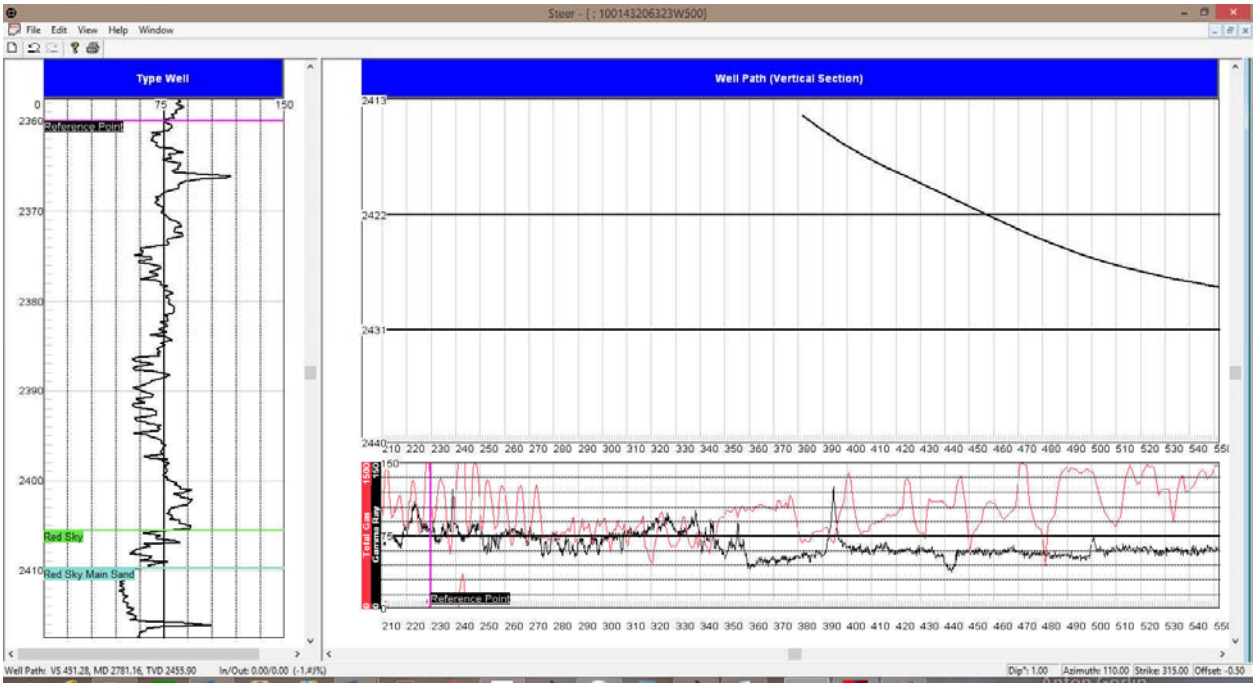
1. **Right Click** on the **Type Well Pane** at **2360** which is a little above the depth that we wish to start our correlations and **select Set Reference Point** from the pop out menu. This will activate the **Reference Point window**.





Note: The Reference Points Dip and Azimuth refers to the regional Strike and Dip in the area for your drilled zone of interest. The **Type Well Offset** moves your steered well up or down to match with the Type well. A negative number will move your steered well being drilled up and a positive number in this field will move your correlatable well down. This offset and steering should really be done when you are near your zone of interest.

2. In the Reference Point window the default Dip and Azimuth are **OK** for this tutorial. Normally the user will fill in the Regional strike and dip. The defaults are (1 degree) and strike azimuth (315 degrees) for our intended formation or zone you wish to steer.
3. **Tab key** to advance and highlight to the Type Well Offset field and **type -0.5** in the Type well offset.
4. **Click** on the OK **button**. Once the reference point has been set you will see a pink line in both the Type Well and your correlating well as shown above



Segments

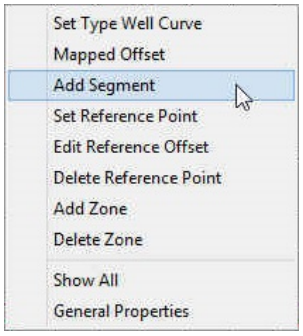
This is the nuts and bolts of the Power*Steer application and we should spend some time explaining what a segment does for you. A segment consists of various integral pieces of data that has Vertical Section depths from and to, Measured Depths from and to, True Vertical Depths from and to along with Dip angle, Azimuths and throws. All the Segment data is manipulated on the type well by shrinking and extending the **VS start** and **VS end** points, moving the entire segment to create a throw (indicated by a fault on the Well Path Pane) or changing the Segment Azimuth.

Segment Definition

A segment is a depth range on the Gamma Ray trace (either MD or VS depth range) that is then converted to TVD depth on the Trace Well. To select a segment you will have to **click** on the **segment marker** (arbitrary color) which is defined below the Vertical Section / Measured Depth Gamma Ray trace from the active well. Once the segment is clicked on you will see the Steered Well Gamma Ray curve (turns red) to make it active on the Type well and it will have a **VS start line** and **VS finish line** on both the Type Well and Well Path Panes. The Gamma Ray trace may go down or up or both depending on the well path over the segment interval. The segment trace on the Type well will appear red when going down and black when going up.

Add the first Segment

(First one is different than all the rest) The top of this segment cannot be refined with a change of dip or azimuth. It is just a starting point. The rest of the segments after the first can be redefined on both the VS Start and VS End or create some faulting.



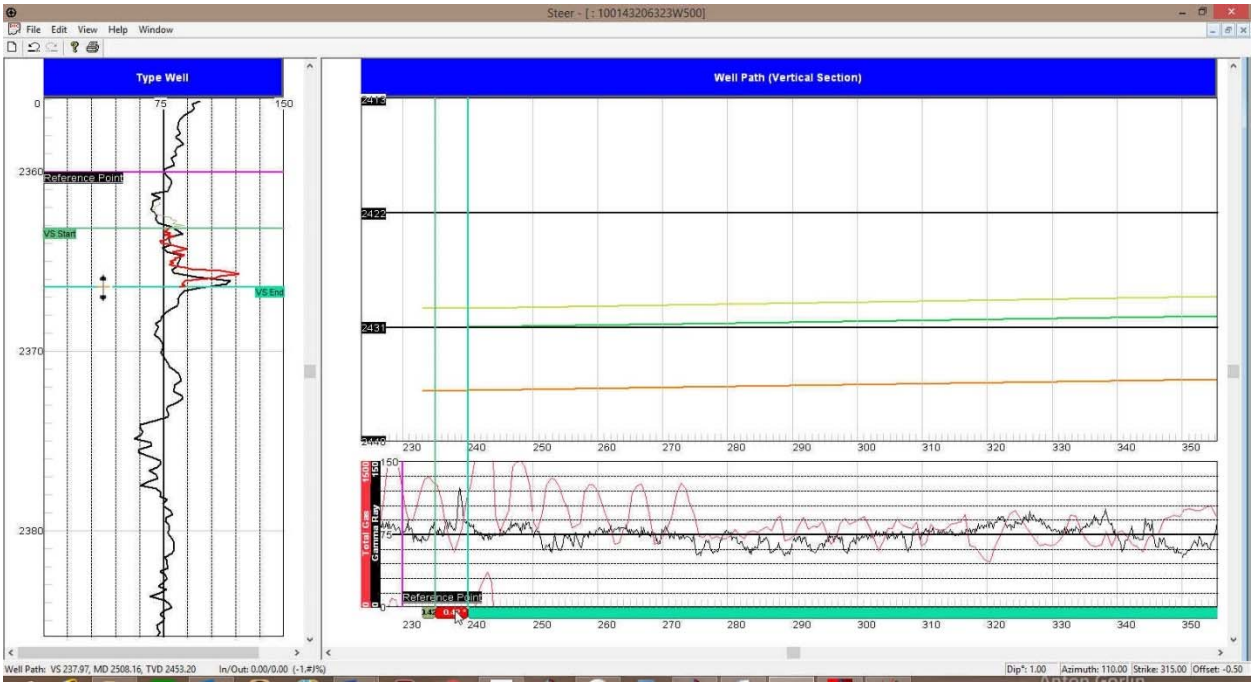
1. **Right Click** @ 2362 (somewhere near but deeper than your reference point) and **Select Add Segment** from the pop out menu.

The first segments Gamma Ray data will be displayed on your Type Well as a red curve and will be placed at the offset depth that was entered into your Set Reference Point. The display depths for the Gamma Ray curve on the Type Well pane have been recalculated from its Measured Depth / Vertical Section Depths to True Vertical Depth so the user can attempt to correlate to the type Well. The first segment will extend to the end depth of your current Survey data and will omit any Gamma Ray Curve data beyond that as it does not have any TVD depths associated to represent that data.

Note: You can only manipulate the bottom of this first segment (VS End).

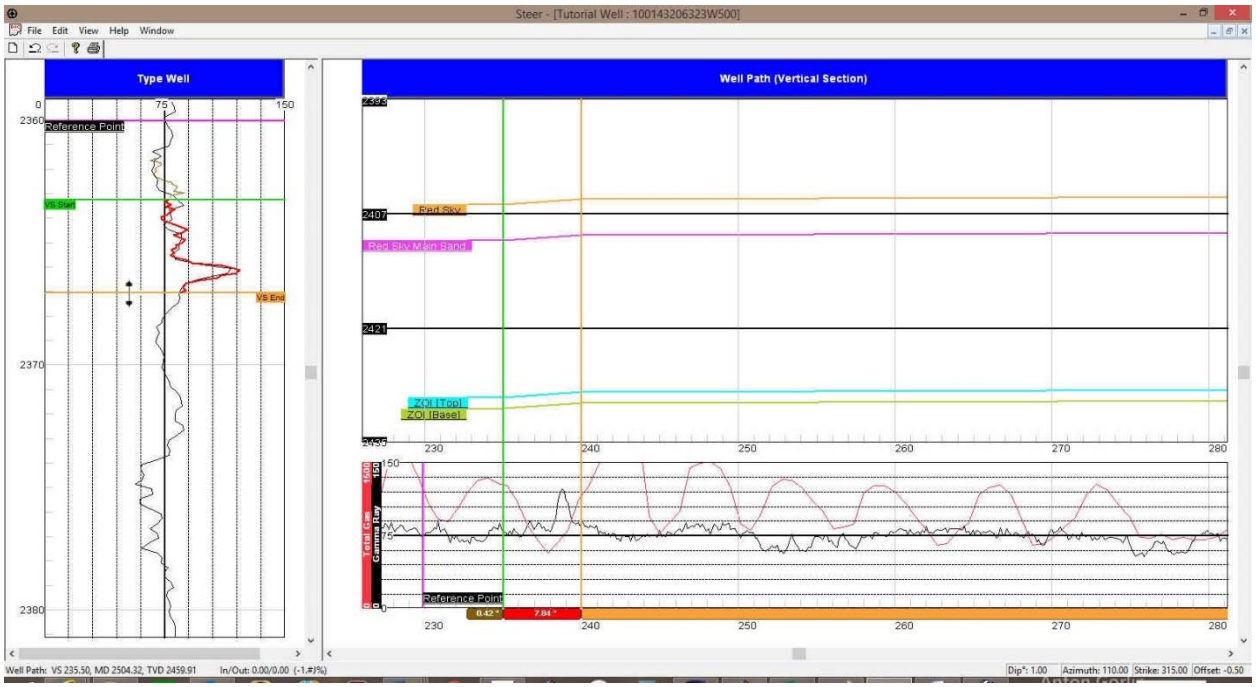
Adding more Segments.

1. **Right Click** @ **235 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
2. **Right Click** @ **240 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
3. **Click** on the **segment** just created from **235 to 240 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.



Changing the bedding angle of a Segment

1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
2. If you were to move the mouse pointer to hover over the VS End marker (blue line above and right) the cursor will turn into a ↕ as shown above.
3. **Click and drag** the **VS End down** to match the GR peak in the type well. This will change the bedding angle from 0.42 to approximately 7.33 degrees.

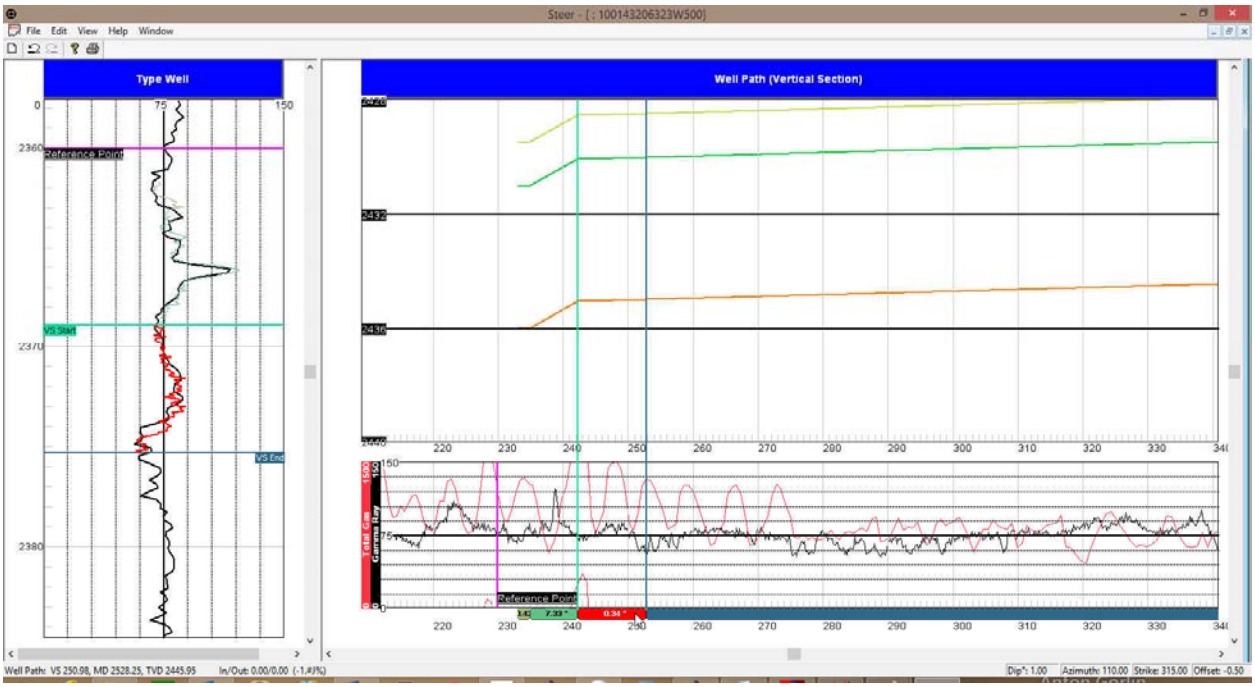


Extending the Segment

1. Then **hold the Shift key down** and **roll** the **scroll button** on your mouse **towards you** and **stop** when it gets to **2369**. This is where the GR Segment changes and does not perfectly match the Type well.
2. You can also **hold the Shift key down and Mouse over the end of the segment on the Well Path pane** and when it turns into an ↔ arrow **click and drag left or right** to shrink or extend the segment.
3. You will want to **double click** on the **Red Segment** from **235-242.6** and this will keep the segment visible on the Type Well after you initiate the next segment.

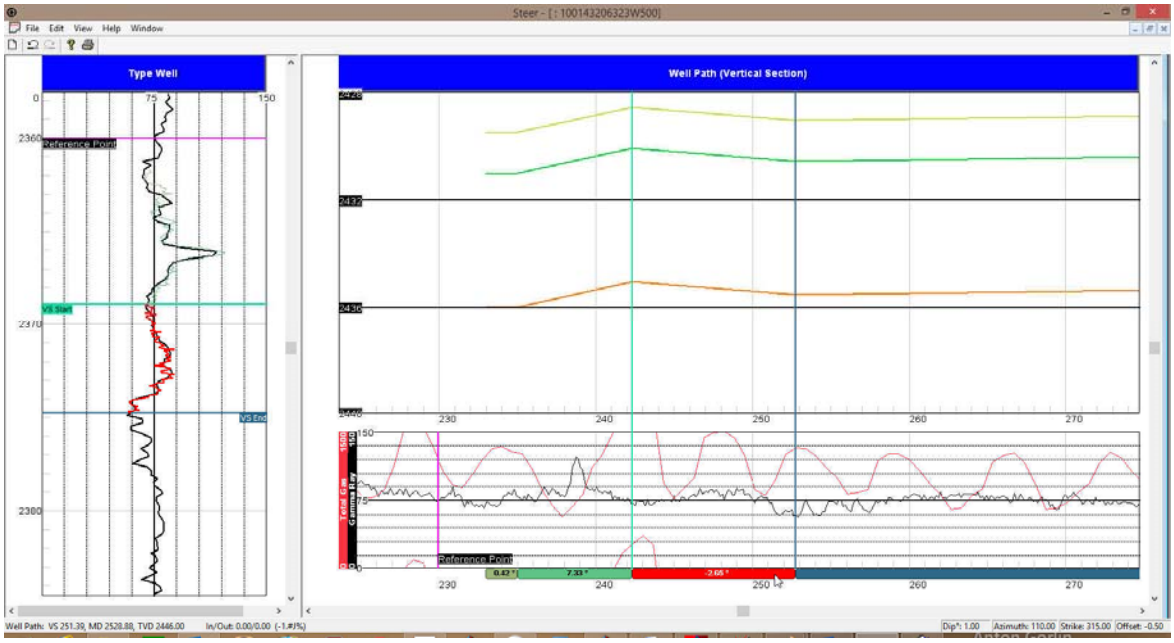
Adding another Segment

1. **Right Click @ 253 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
2. **Click** on the **segment** just created from **244.5 to 253 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.



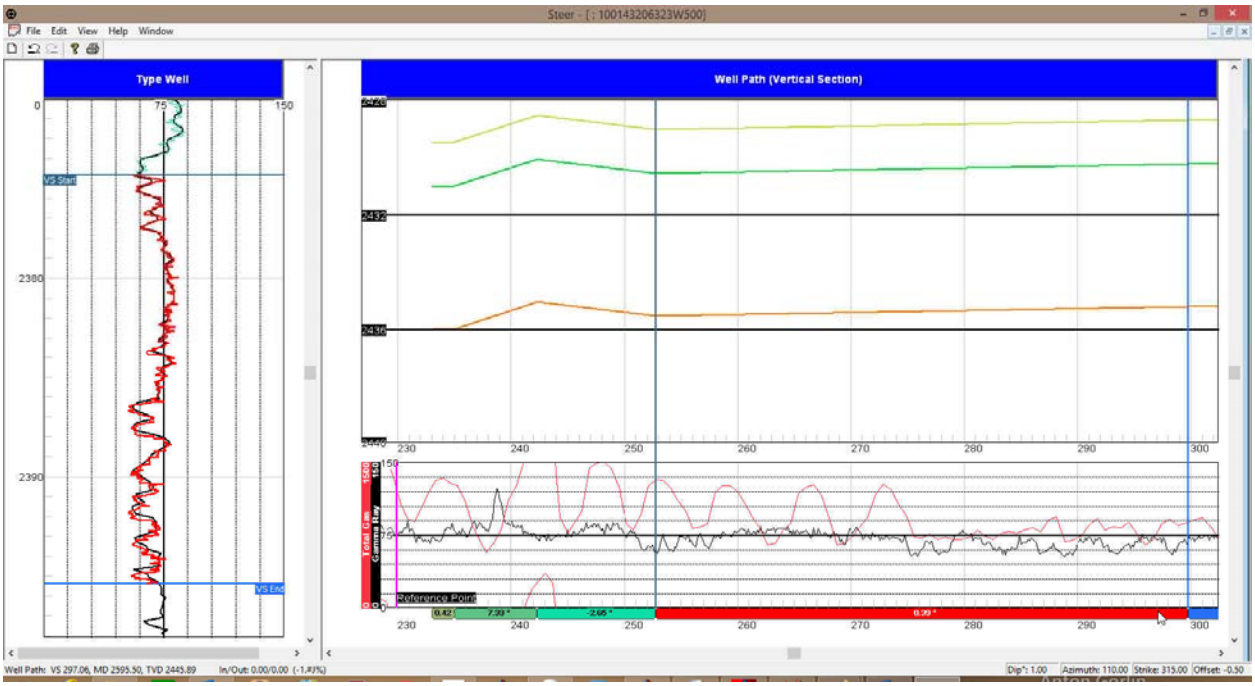
Changing the bedding angle of a Segment

4. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
5. If you were to move the mouse pointer to hover over the VS End marker (purple line above and right) the cursor will turn into a ↕ as shown above.
4. **Click and drag** the **VS End up** to match the GR peak in the type well. This will change the bedding angle from 0.34 to approximately -2.65 degrees.
5. You will want to **double click** on the **Red Segment** from **244.5-253** and this will keep the segment visible on the Type Well after you initiate the next segment.



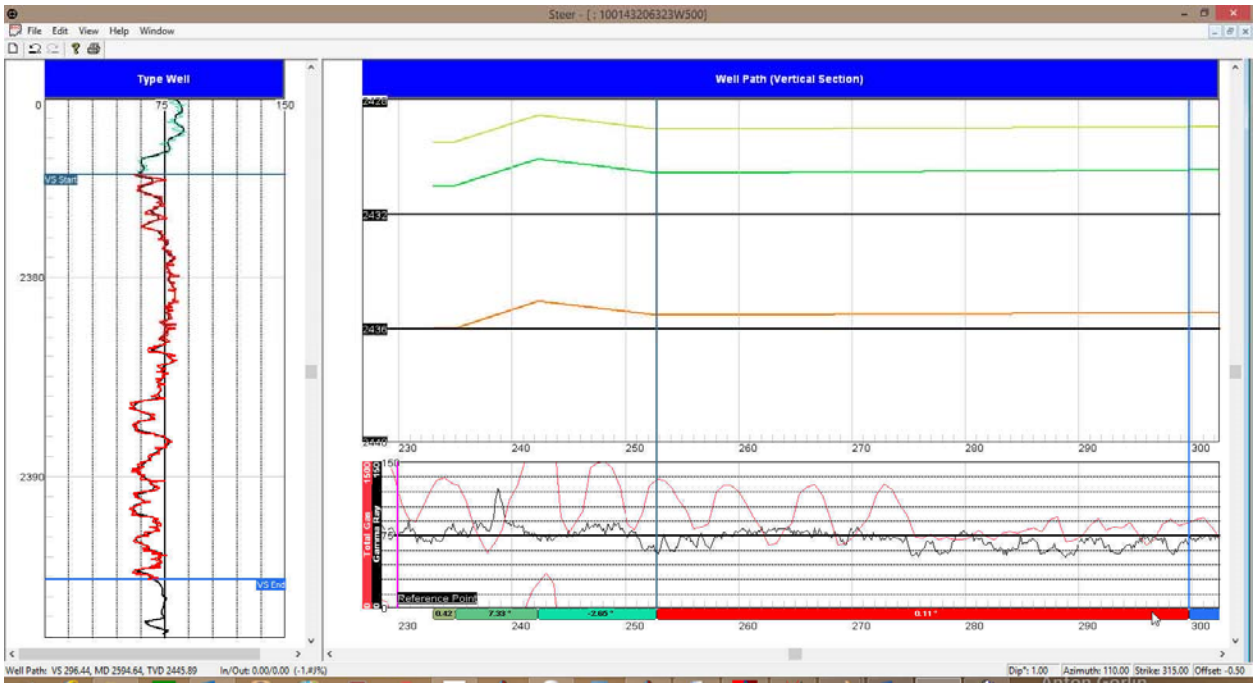
Adding another Segment

3. **Right Click @ 300 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
4. **Click** on the **segment** just created from **253 to 300 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.



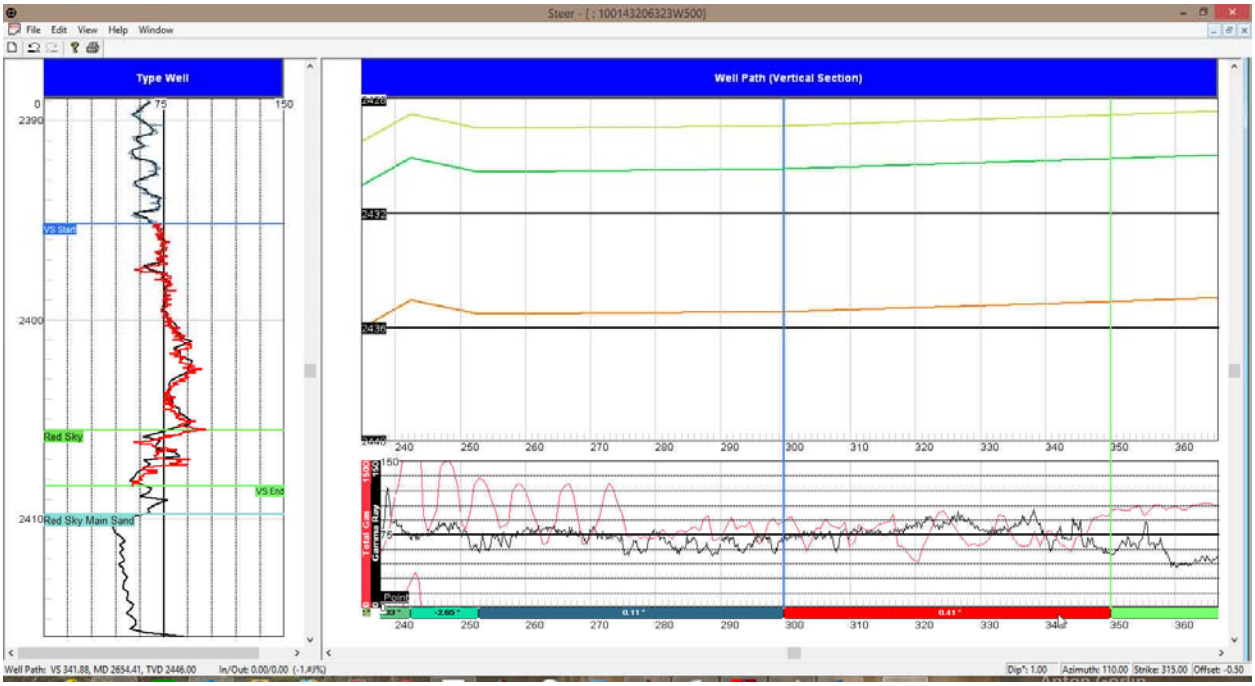
Changing the bedding angle of a Segment

6. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
7. If you were to move the mouse pointer to hover over the VS End marker (greed line above and right) the cursor will turn into a ↕ as shown above.
6. **Click and drag** the **VS End up** to match the GR peak in the type well. This will change the bedding angle from 0.39 to approximately 0.11 degrees.
7. You will want to **double click** on the **Red Segment** from **252-300** and this will keep the segment visible on the Type Well after you initiate the next segment.



Adding another Segment

1. **Scroll down** (deeper) on the **Type Well** pane and **scroll right** (deeper) on the **Well Path** pane.
2. **Right Click @ 350 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
3. **Click** on the **segment** just created from **300 to 350 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.

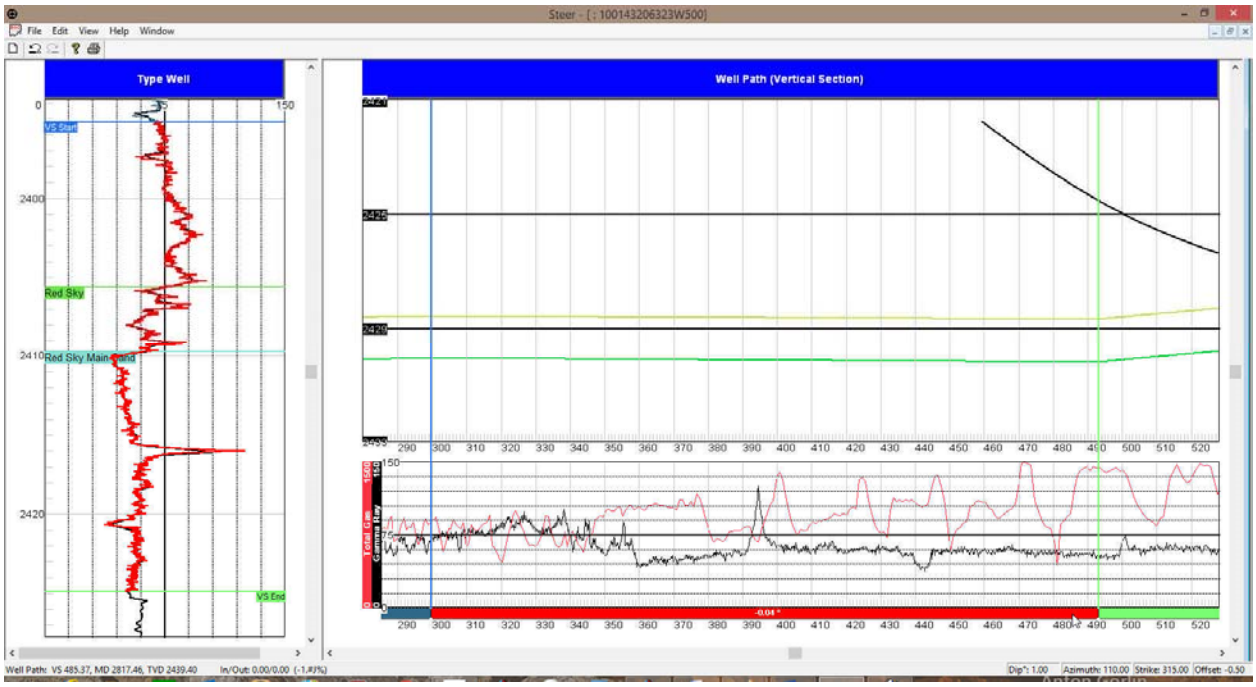


Changing the bedding angle of a Segment

4. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
5. If you were to move the mouse pointer to hover over the VS End marker (purple line above and right) the cursor will turn into a ↕ as shown above.
6. **Click and drag** the **VS End up** to match the GR peak in the type well. This will change the bedding angle from 0.41 to approximately -0.04 degrees.

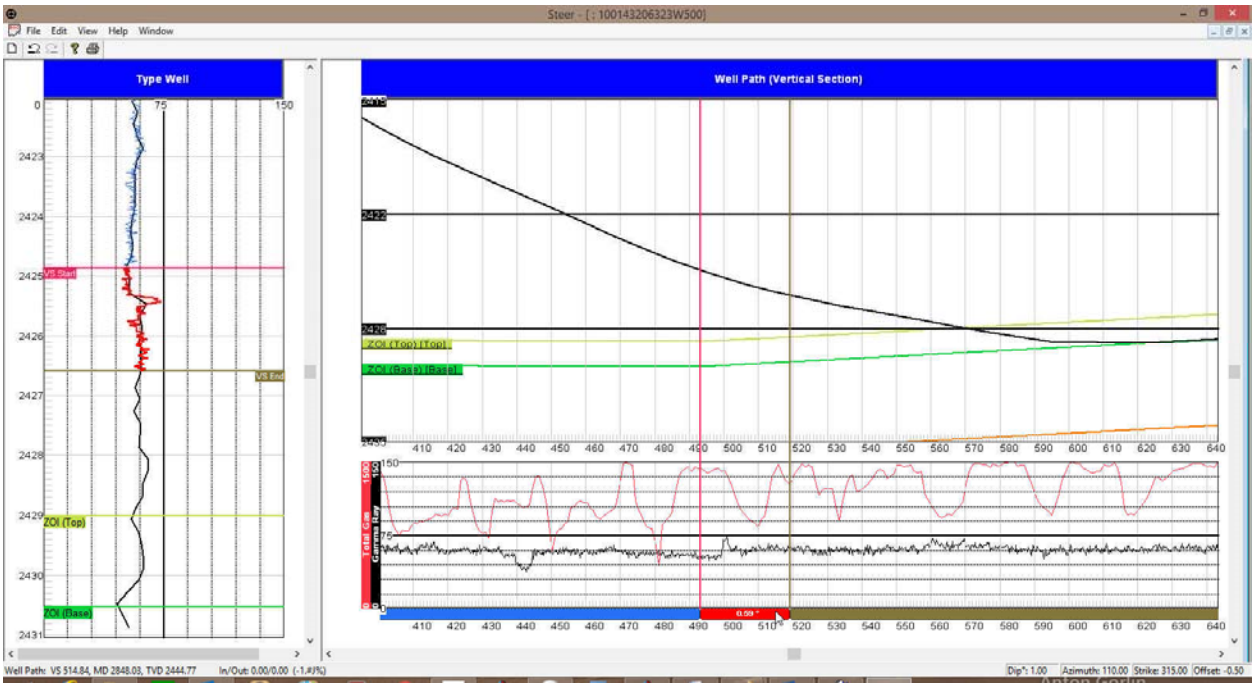
Extending the Segment

1. Then **hold the Shift key down** and **roll** the **scroll button** on your mouse **towards you** and **stop** when it gets to **2424.5**. This is where the GR Segment changes and gets a little off below this depth.
2. You can also **hold the Shift key down and Mouse over the end of the segment on the Well Path pane** and when it turns into an ↔ arrow **click and drag to the right** to extend the segment to 493 Vertical Section.
3. You will want to **double click** on the **Red Segment** from **300-493** and this will keep the segment visible on the Type Well after you initiate the next segment.



Adding another Segment

1. **Scroll down** (deeper) on the **Type Well** pane and **scroll right** (deeper) on the **Well Path** pane.
2. **Right Click @ 520 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
3. **Click** on the **segment** just created from **493 to 520 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.

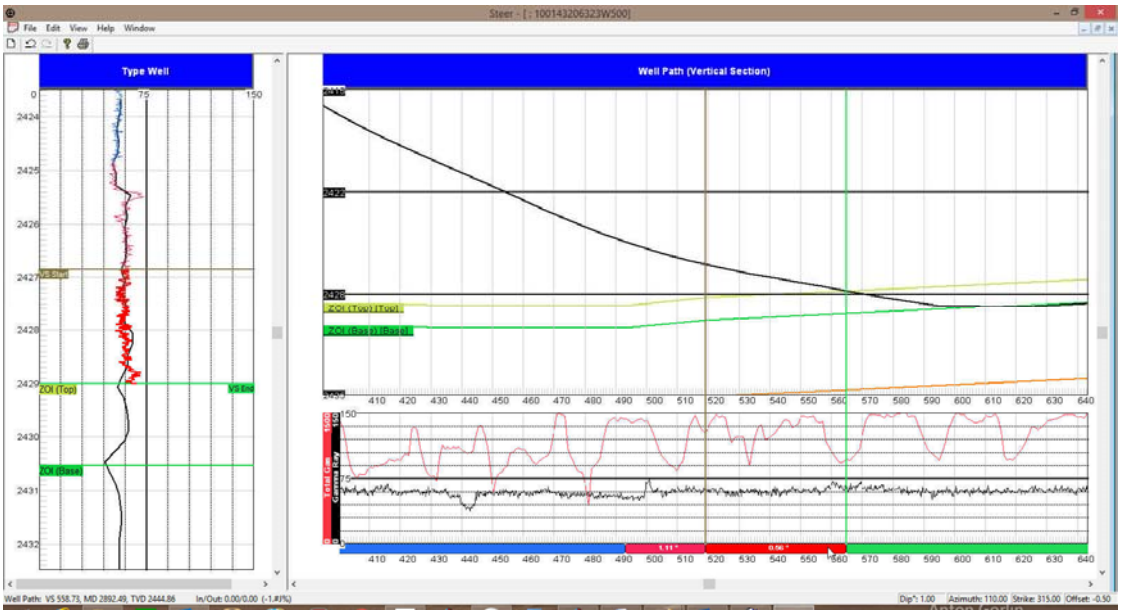


Changing the bedding angle of a Segment

4. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
5. If you were to move the mouse pointer to hover over the VS End marker (purple line above and right) the cursor will turn into a ↕ up/down arrow.
6. **Click and drag** the **VS End down** to match the GR peak in the type well. This will change the bedding angle from 0.59 to approximately 1.11 degrees.
7. You will want to **double click** on the **Red Segment** from **493 to 520 VS** and this will keep the segment visible on the Type Well after you initiate the next segment.

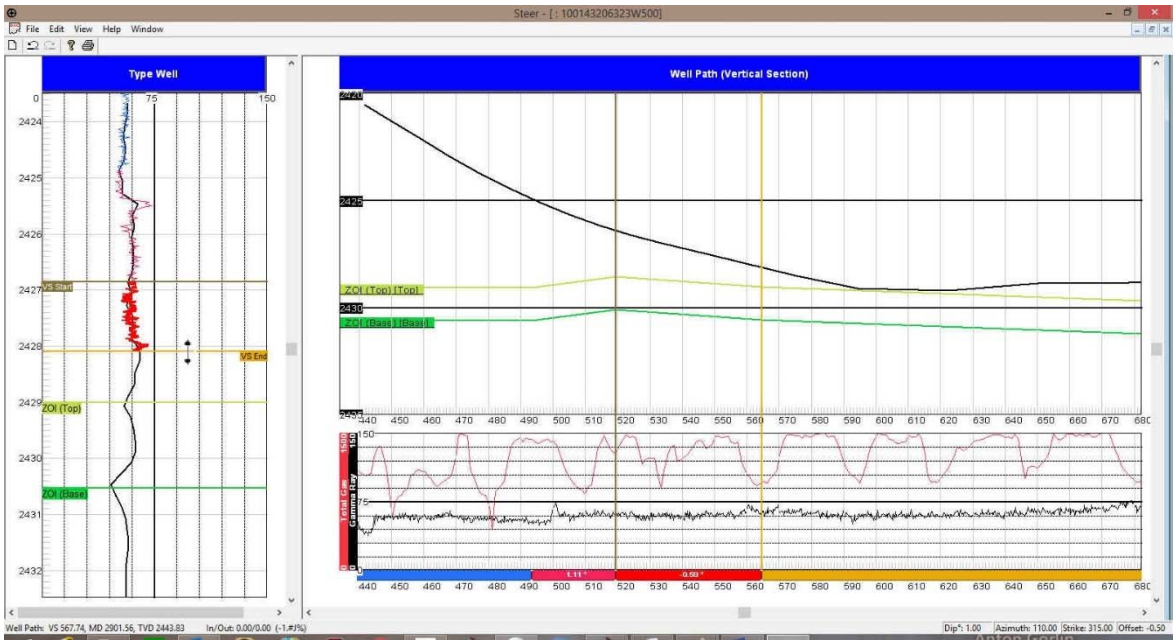
Adding another Segment

1. **Scroll down** (deeper) on the **Type Well** pane and **scroll right** (deeper) on the **Well Path** pane.
2. **Right Click @ 565 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
3. **Click** on the **segment** just created from **520 to 565 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.



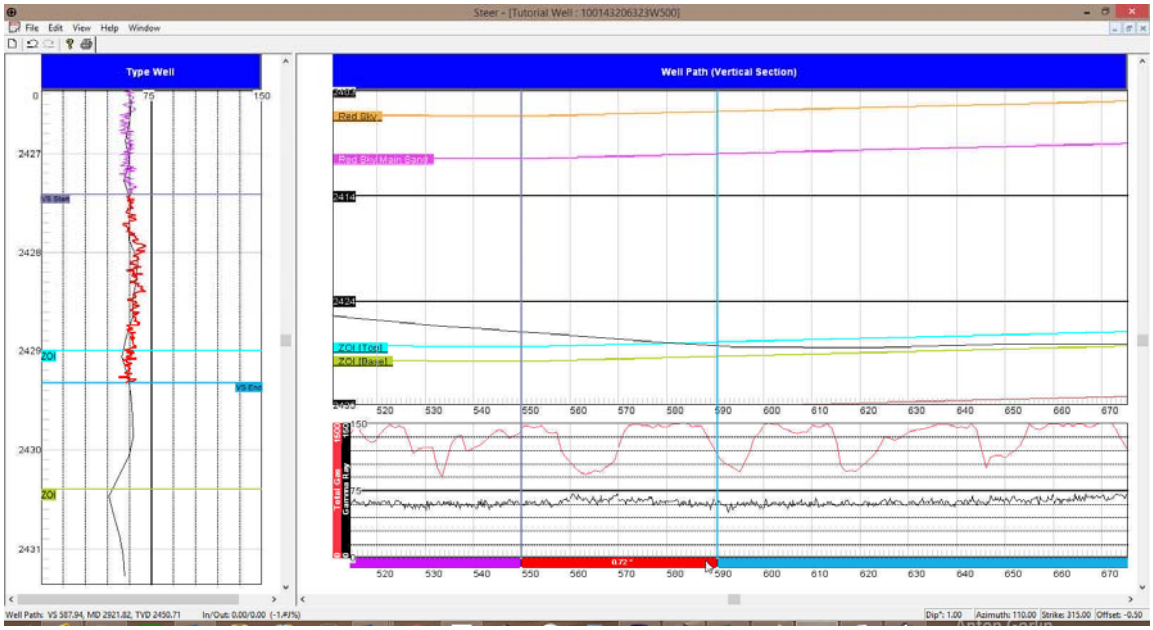
Changing the bedding angle of a Segment

4. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
5. If you were to move the mouse pointer to hover over the VS End marker (blue line above and right) the cursor will turn into a ↕ up/down arrow.
6. **Click and drag** the **VS End up** to match the GR peak in the type well. This will change the bedding angle from 0.04 to approximately -0.59 degrees.
8. You will want to **double click** on the **Red Segment** from **520 to 565 VS** and this will keep the segment visible on the Type Well after you initiate the next segment.



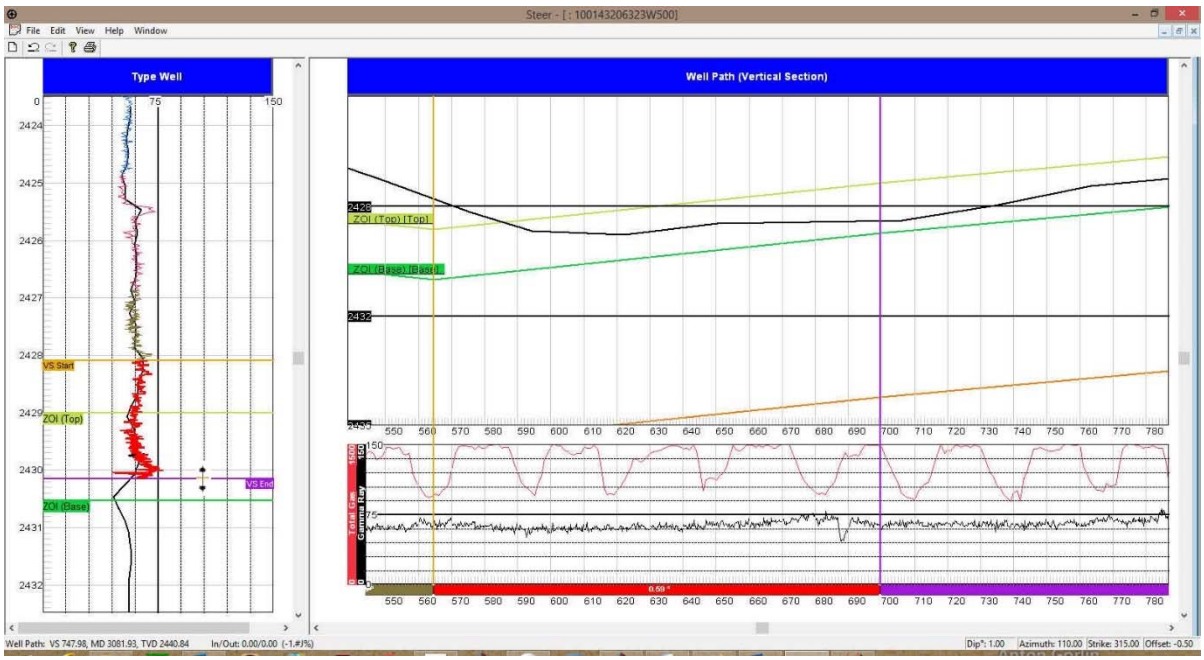
Adding another Segment

1. **Scroll down** (deeper) on the **Type Well** pane and **scroll right** (deeper) on the **Well Path** pane.
2. **Right Click @ 700 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
3. **Click** on the **segment** just created from **565 to 700 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.



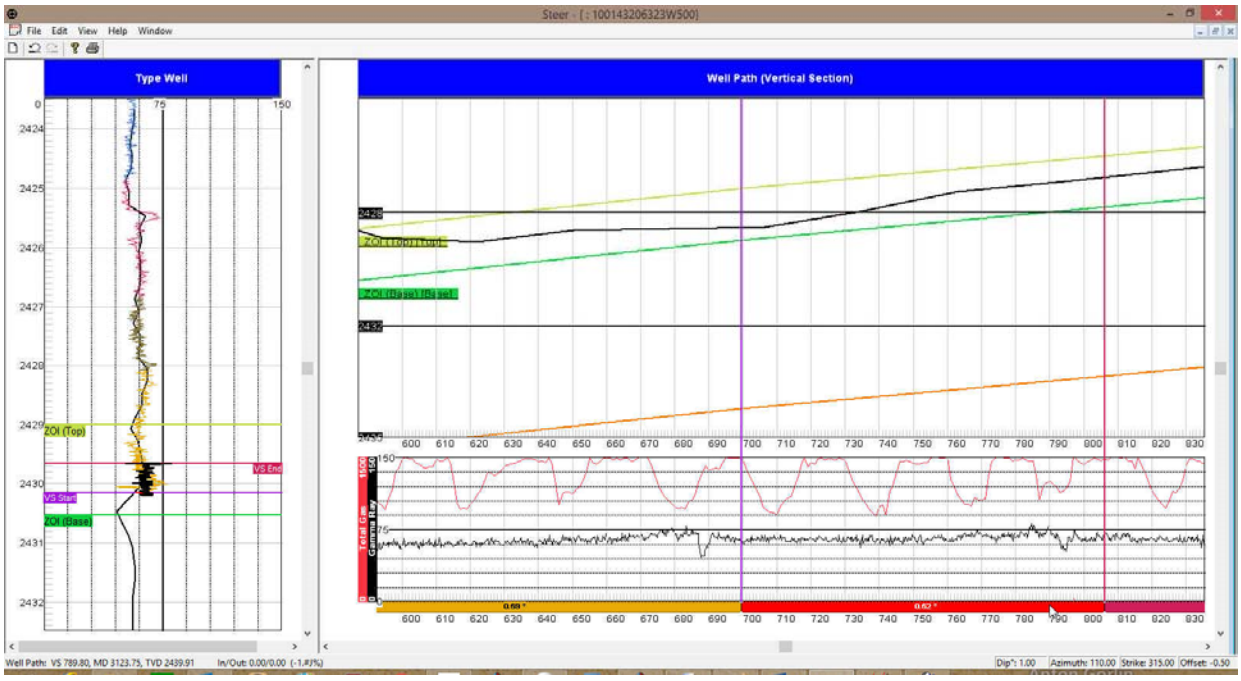
Changing the bedding angle of a Segment

1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
2. If you were to move the mouse pointer to hover over the VS End marker (blue line above and right) the cursor will turn into a ↕ up/down arrow.
3. **Click and drag** the **VS End up** to match the GR peak in the type well. This will change the bedding angle from 0.55 to approximately 0.59 degrees.
4. You will want to **double click** on the **Red Segment** from **565 to 700 VS** and this will keep the segment visible on the Type Well after you initiate the next segment.



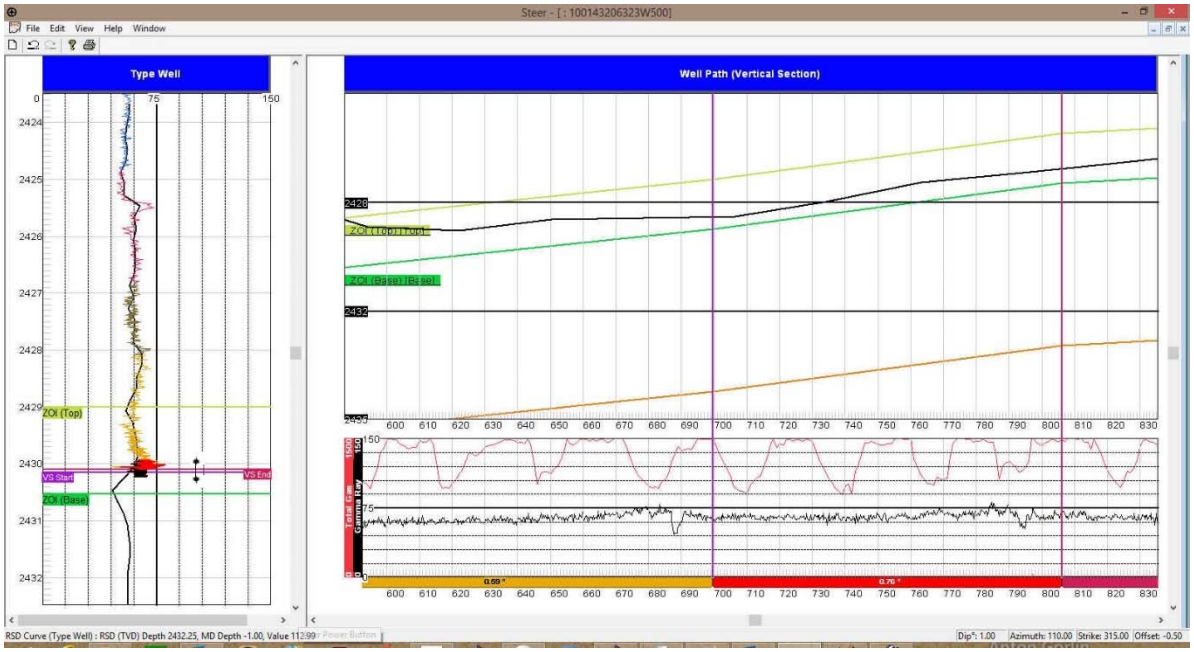
Adding another Segment

1. **Scroll down** (deeper) on the **Type Well** pane and **scroll right** (deeper) on the **Well Path** pane.
2. You will now want to **expand the Type Well Scale** by Clicking on this pane and **holding** the **CTRL Key down** and **rolling the roller ball on your mouse away from you** to increase the scale.
3. **Right Click @ 806 VS** on the **Well Path / Gamma Ray Pane** and **Select Add Segment** from the pop out menu.
4. **Click** on the **segment** just created from **700 to 806 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.



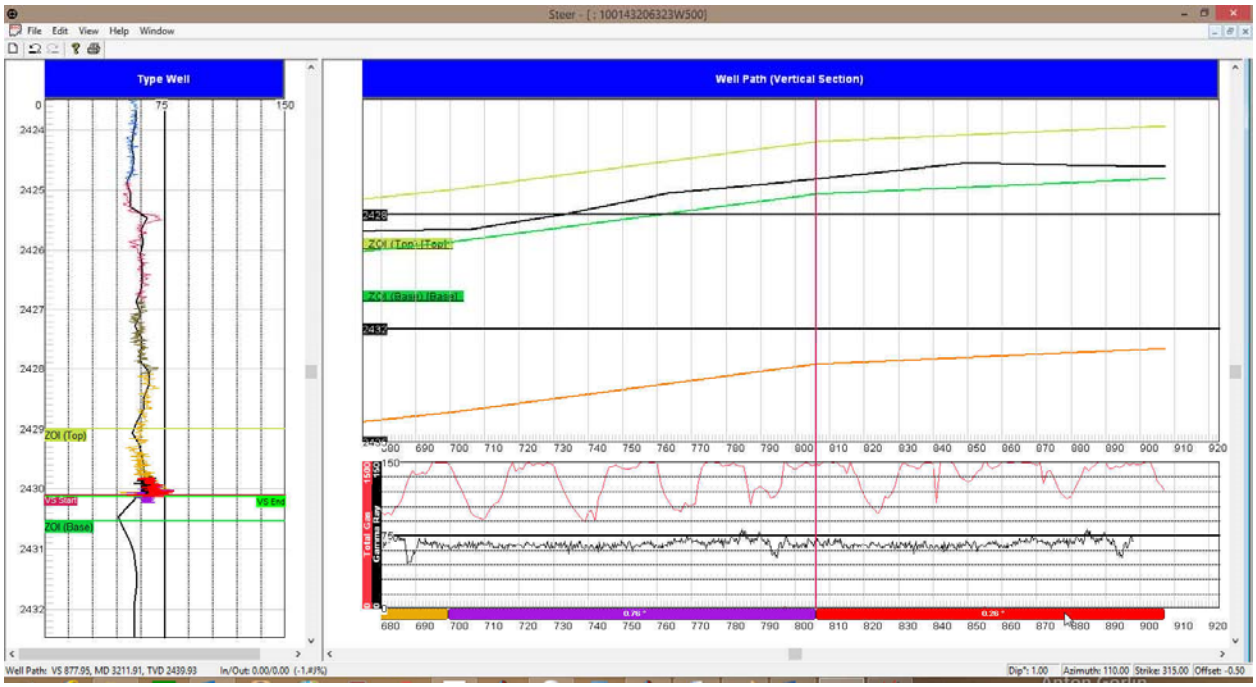
Changing the bedding angle of a Segment

1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown on previous page) to highlight the segment on the Type Well.
2. If you were to move the mouse pointer to hover over the VS End marker (blue line above and right) the cursor will turn into a ↕ up/down arrow.
3. **Click and drag** the **VS End up** to match the GR peak in the type well. This will change the bedding angle from 0.52 to approximately 0.76 degrees.
4. You will want to **double click** on the **Red Segment** from **700 to 806 VS** and this will keep the segment visible on the Type Well after you initiate the next segment.



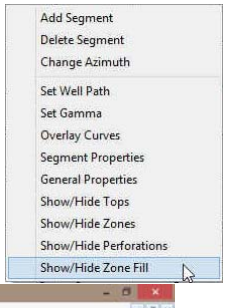
The Last Segment

1. **Scroll right** (deeper) on the **Well Path** pane.
2. **Click** on the **segment** from **806 to 907 VS** to highlight the Gamma Ray section (Red (Well bore heading down) / Black (Well Bore heading up) and you will see VS Start and VS end indicators.
3. As far As I can tell they are lined up over each other so you are now done with the Power*Steer portion of the tutorial.

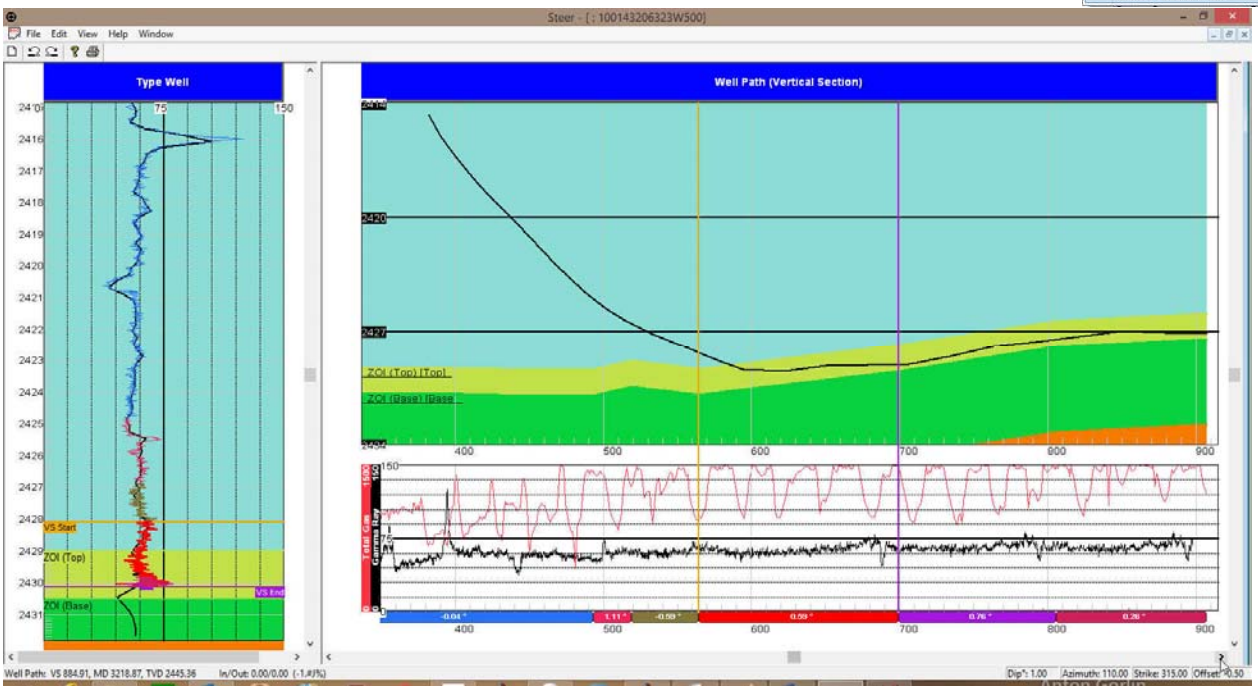


Zone Fills

The zone fills option adds some color to the final product.



1. Right Click on the Well Path / GR Panes to activate the pop out menu.
2. Select Show/Hide Zone Fill. This will turn on the Zone fill color scheme shown below.

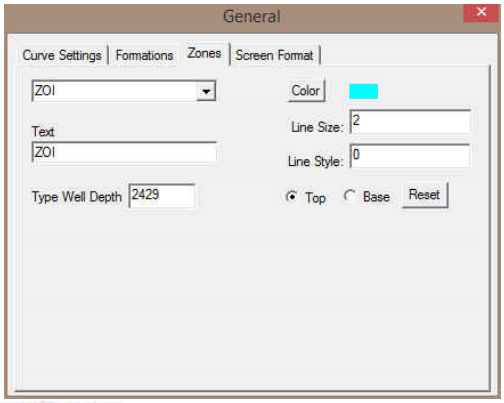


Calculate In / Out

This menu selection works with the zones that were added and where the zones were indicated as the top and base. When those are defined the user can select this Edit menu selection and it will calculate the amount of well path that is in the zone and the amount of well path that is out of the zone. This calculation is started when the well path first encounters the top of your zone of interest.

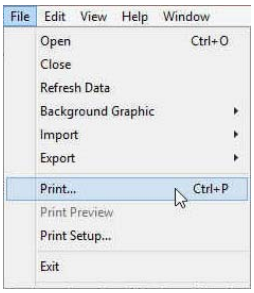
1. **Click** on the **File Menu** to activate the drop down list and **select Calculate In / Out**.

This will be printed in the output as well as displayed in the Status bar when your mouse pointer is focused in the Well Path portion of the window.



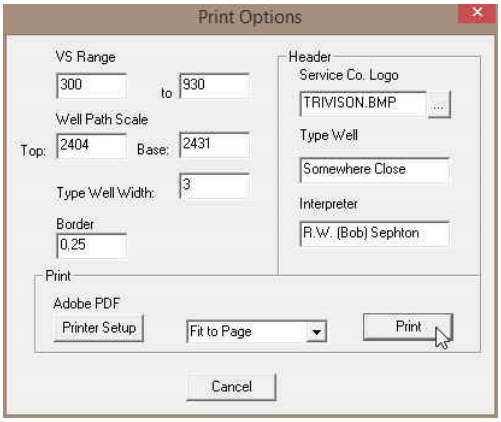
Print

1. **Click** on the **File Menu** to activate the drop down list.
2. **Click** on **Print selection** or **click** on the **Print button** on the Toolbar to activate the **Print Options** window shown below.
3. VS / MD Range portion of the window indicates the Vertical Section depth range or Measured Depth Range you wish to print. **Type** in the **depth range** in the **fields provided**.



(Your Power*Steer application may be in Measured Depth [MD Range] units.)

4. Well Path Scale portion of the window indicates the TVD depth range you wish to print. **Type** in the TVD **depth range** in the **fields provided**.
5. Type Well Width field is how wide you want to print this portion of the Power*Steer window. **Type** in a **width** in Inches in the field.



The depth scale interval and scale of the Type well will be determined by what is viewed on your screen and the paper size an orientation.

6. Border field is how much border you wish to have around the top, bottom, and left edges of your print. **Type** in a **border width** in inches in the field.
7. Print field drop box is the VS Depth Scale of your print. **Click** on the **drop box** and **select** from the **List or** the user can also **Type** a VS **depth scale** in the **field**.
8. **Click** on the Service Company logo **button** to search your computer for a logo to put in your header.
9. **Type** in the **Type Well Name / Location** is the Type Well field. Depress the tab key on your keypad to advance the cursor to the Interpreter field.
10. **Type** in the **Interpreters name** who created the interpretation in the Interpreter field.

Printer Setup **button** allows the user to setup the printer for the Power*Steer output

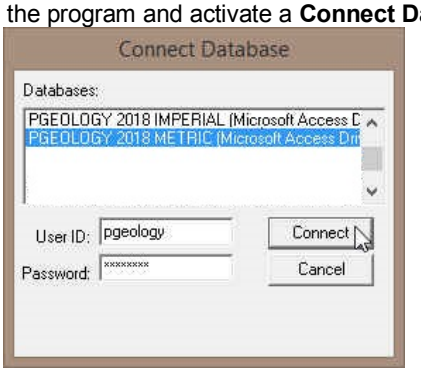
11. When you are ready to print your Power*Steer log, **click** on the Print **button**.

Power*Curve / Power*Steer display

This is another way to display the lithology in the Power*Curve module in the detailed lithology track of our default logs. The normal curve fill would be the well path but we will now show you a Power*Steer curve fill layer.

Connecting to the Database

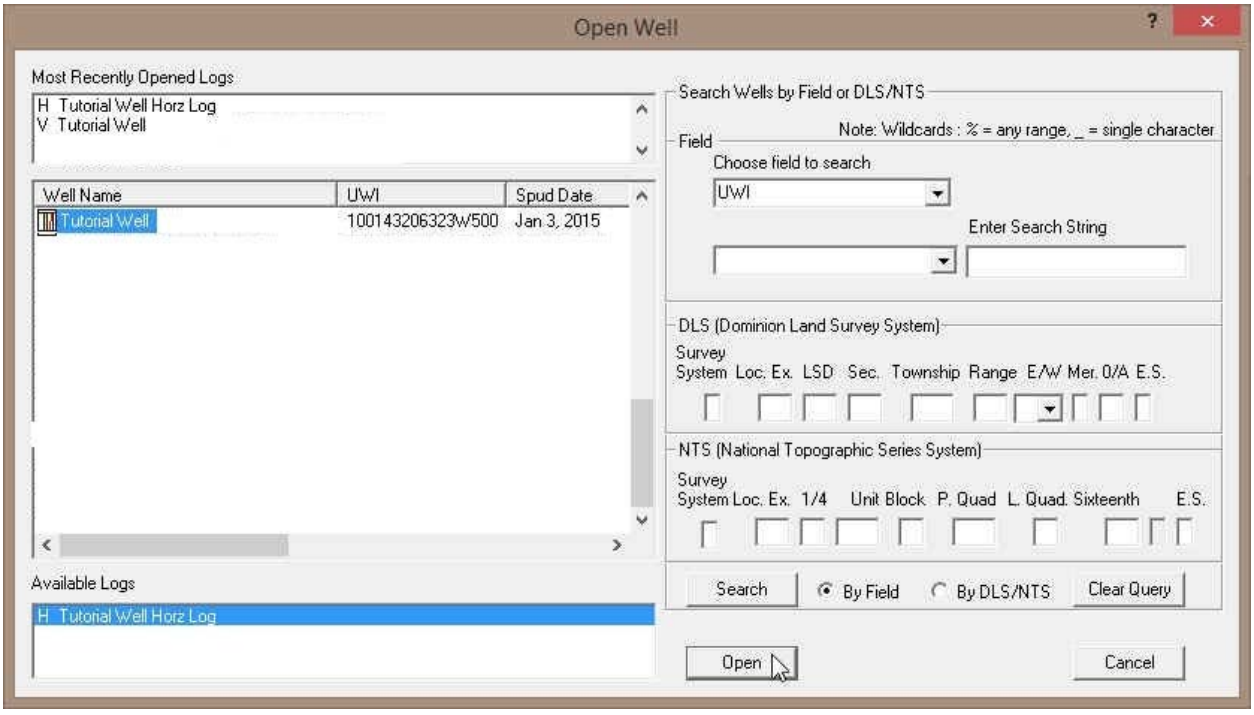
1.) **Double click** on the PowerCurve 2018 **Icon**. Acknowledge the Security Information window by **clicking** on the OK **button**. This will initiate the program and activate a **Connect Database** window.



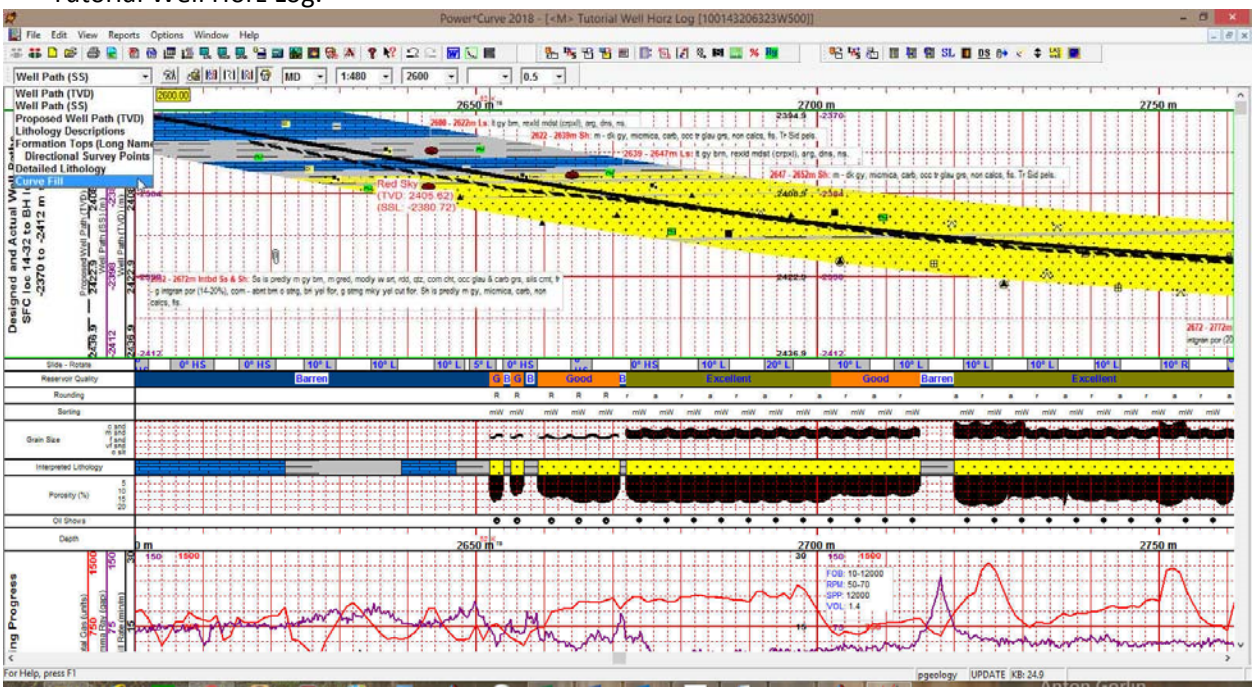
2.) Highlight the **PGEOLOGY 2018 METRIC (Microsoft Access Driver[*.mbd]))** database by **clicking** on it once.

3.) Move your mouse pointer to the **User ID** field and **click**. This will activate a flashing cursor in the **User ID** field. **Type** "**pgeology"** in the **User ID** field. **Press** the **Tab** key on the keyboard to move to the **Password** field.

4.) **Type** "**pgeology"** in the **Password** field and then **click** on the Connect **button**. The program will now load various dictionaries and then activate an **Open Log** window.



5.) **Select the Tutorial Well** from the List and then **click** on the Open **button**. This will open your Tutorial Well Horz Log.

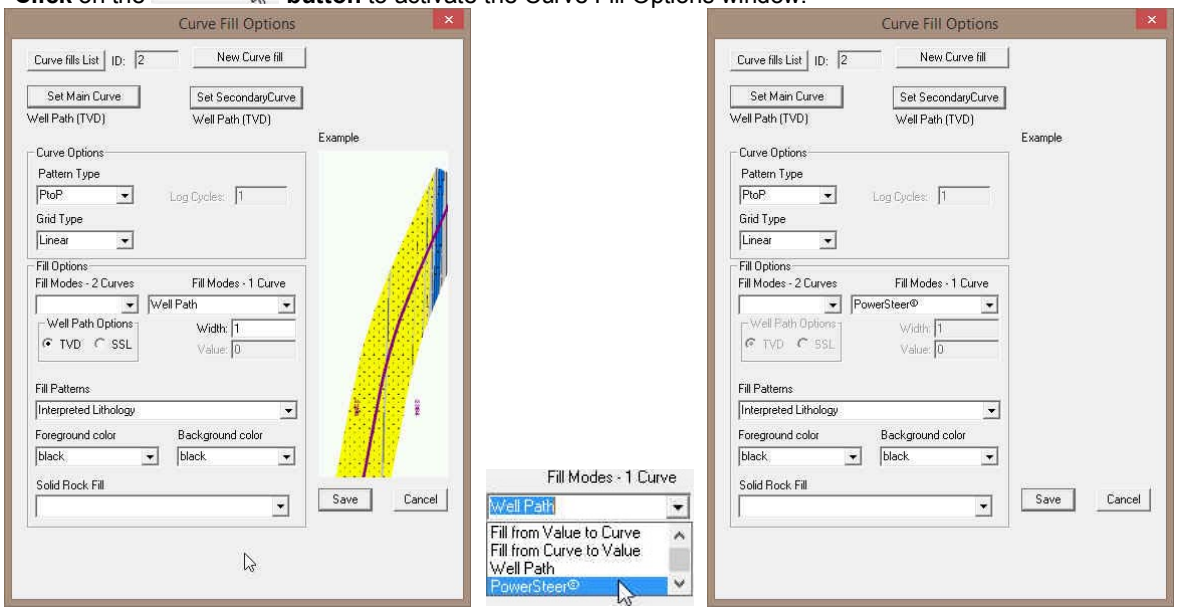


6.) **Click** on the **Detailed lithology track once** to highlight the track in green.

7.) **Click** on the **layer Selection list** and **click** on or **select the Curve fill layer.** This will make active the Curve fill layer.

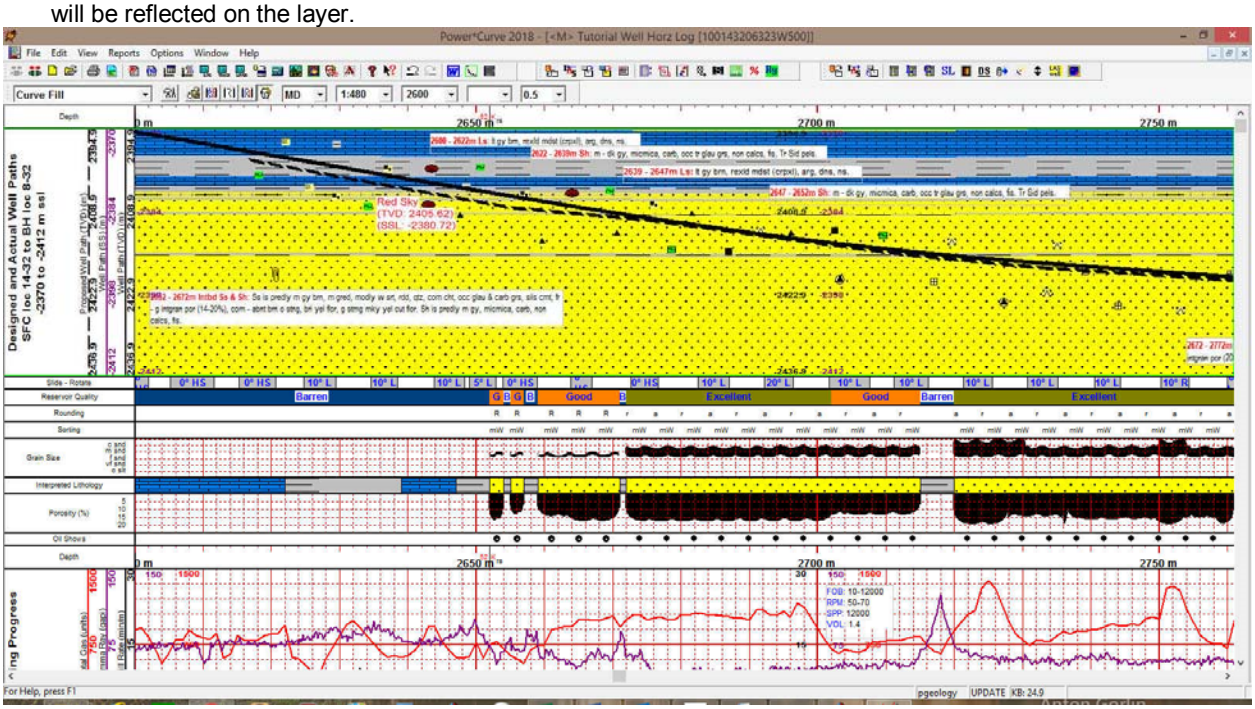
8.) **Double click** anywhere within the **Curve Fill layer** to activate the Curve Fill Options window. This will activate the Choose Curve Editor shown below.

9.) **Click** on the Curve Fill Options **button** to activate the Curve Fill Options window.



10.) **Click** on the Fill Modes – 1 Curve **drop box** and **Select Power*Steer**.

11.) **Click** on the Save **button** in the Curve fill Options window. The window will close and the changes you have made will be reflected on the layer.



This concludes your Power*Steer Tutorial.