

POWER CURVE

Version 11 Metric Tutorial



TRIVISION

GEOSYSTEMS LTD.

The Intelligent Geological Software Solution

Suite 314, 602 – 11th Avenue S.W.

Calgary, Alberta T2R-1J8

Phone: (403) 777-9454 Fax: (403) 777-9455

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

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Introduction

Power*Curve™(Petrographical Office Wellsite Evaluation and Reporting) is a chip and core logging management program that utilizes single-entry data capturing to produce geological striplogs. The geological data is entered into the system through the use of intuitive data entry forms to ensure standardization of data. This data is stored in an RDBMS(Relational Database Management System) to allow data manipulation using SQL access tools.

Power*Curve™ software consists of four (4) main parts:

- 1.) A horizontal log editor module that allows you to change the striplogs to suit your needs and preferences.
- 2.) A data transfer module.
- 3.) Report printing modules.
- 4.) An on-line help system that is designed to familiarize you with the commands and functions available in **Power*Curve™** and lead you through many of the processes involved in creating welllogs.

A note about navigating through Power*Curve™ Reports:

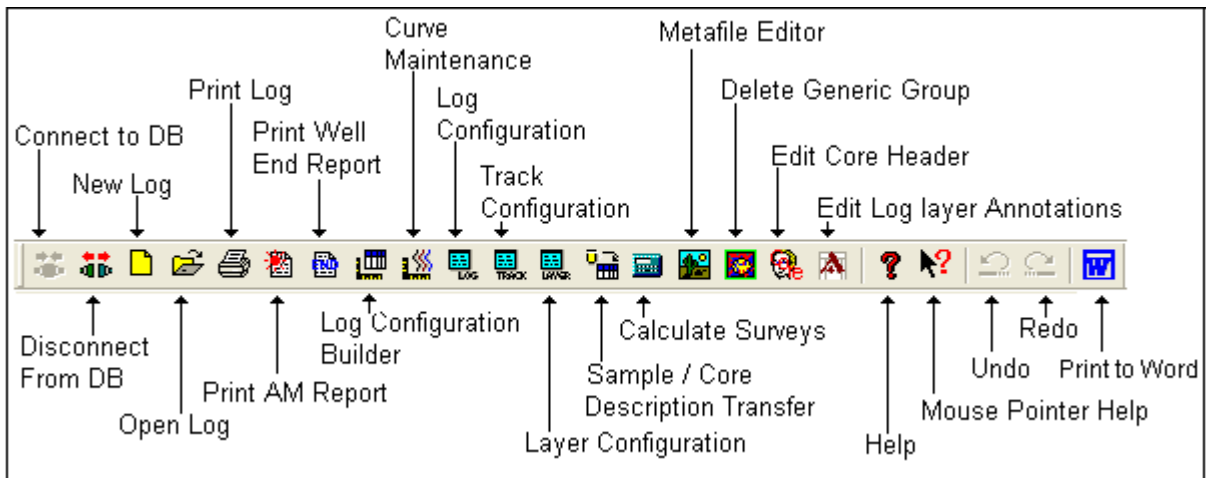
When you are entering information into data forms, you may move between boxes/fields by **pressing the Tab key** to go forward and **Shift +Tab keys** to move backwards. To exit forms that do not have an **Exit, OK, or Cancel** button, **press the Esc key** on the keyboard.

To access the On-line Help System in Power*Curve™:

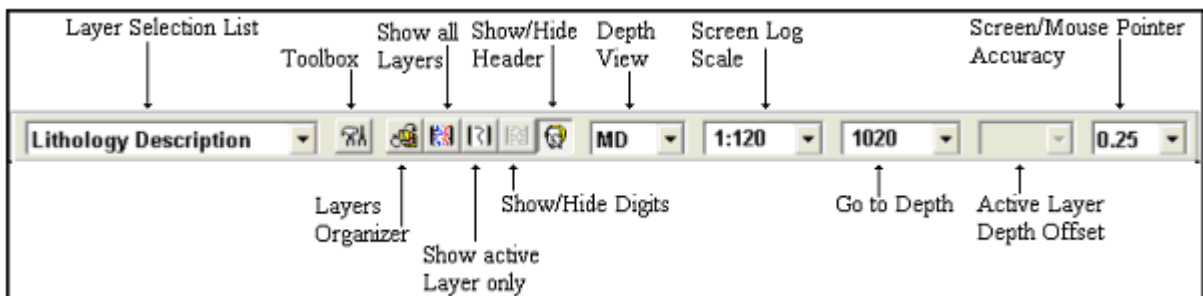
You can make use of the context sensitive help by **pressing the F1 key** when you are in a dialogue box. A pertinent help file will appear, opened to the topic relevant to the dialogue box you are in.

Below are some examples of common features within Power*Curve™:

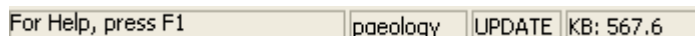
The Toolbar



The Selection Bar...



The Status Bar...

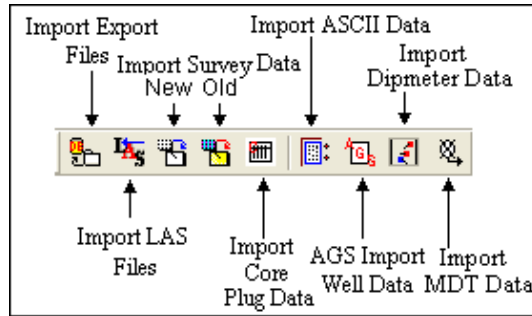


The **Status Bar** displays system status messages and any error message (associated with a field entry), in the far left corner. The KB elevation is displayed in the lower right corner of the **Status Bar**.

Import Toolbar

This toolbar is dock able and can be moved to different places on the screen.

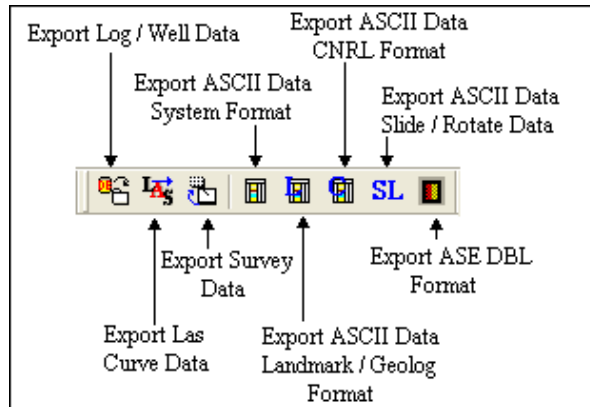
The Power*Log / Core & Curve™ Import Toolbar...



Export Toolbar

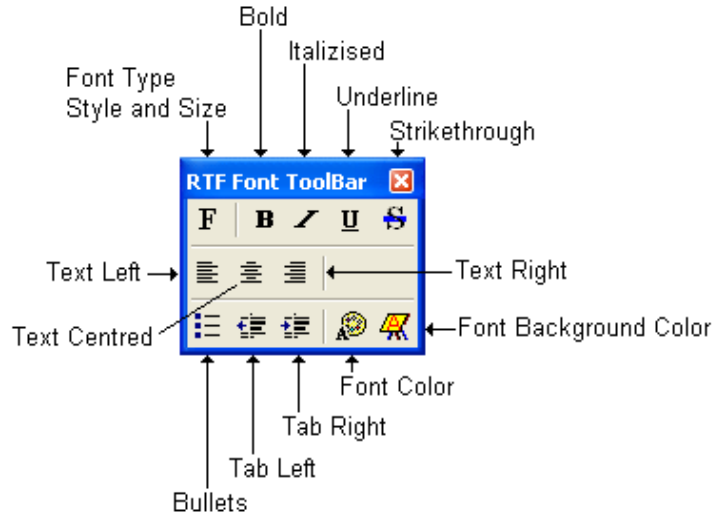
This toolbar is dock able and can be moved to different places on the screen.

The Power*Log / Core & Curve™ Export Toolbar...



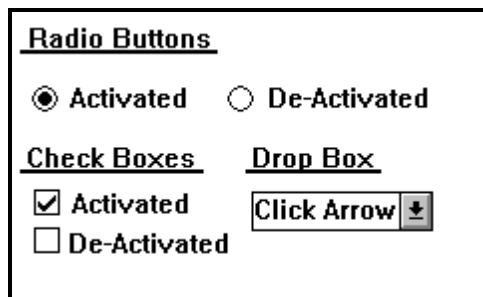
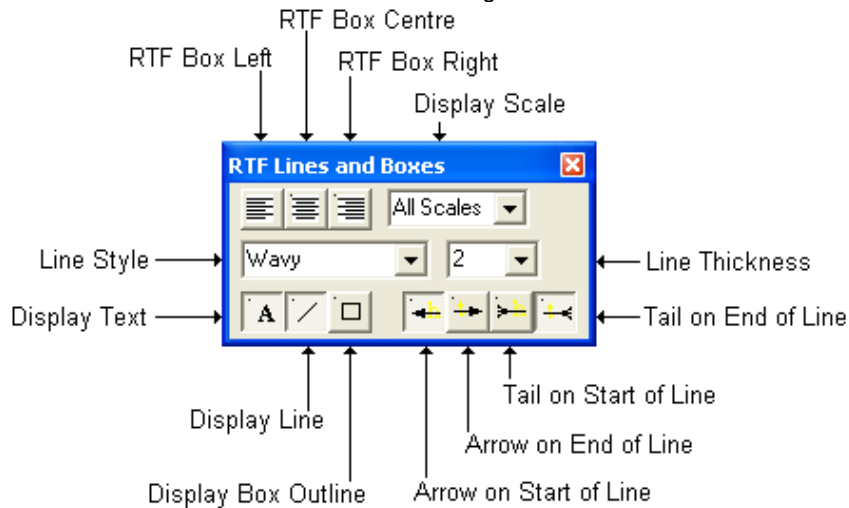
RTF Font Toolbar

Turns the RTF Font Toolbar on and off. This toolbar is dock able and can be moved to different places on the screen. This is used with the New RTF Annotations used on the Log.



RTF Line and Boxes Toolbar

Turns the RTF Line and Boxes Toolbar on and off. This toolbar is dock able and can be moved to different places on the screen. This is used with the New RTF Annotations used on the Log.



The On-line Help is divided into four(4) main categories:

Commands - Descriptions of each menu command within **Power*Log™**.

Toolbar - Shortcuts to common commands are explained.

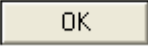
Database Table Operations - Commands/functions related to the Database Table are described.

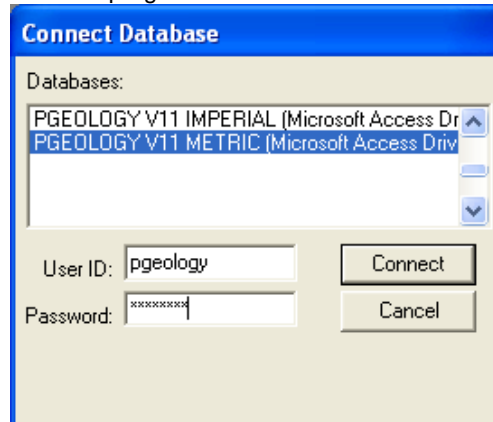
Quick Reference Guide - The portion of the **On-line Help System**, that quickly refers you to some of the more commonly performed tasks.


This tutorial will guide you through the process of creating and editing a new horizontal striplog (hereafter referred to simply as a log), with curves and interpreted lithology.

Connecting to the Database



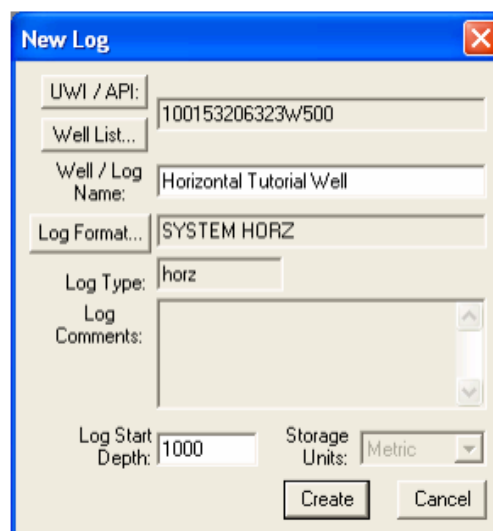
- 1.) **Double click** on the PowerCurve V11 **Icon**. Acknowledge the Security Information window by **clicking** on the  **button**. This will initiate the program and activate a **Connect Database** window.



- 2.) Highlight the **PGEOLGY V11 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  **button**. The program will now load various dictionaries and then activate an **Open Log** window.

Creating a new Well / Log

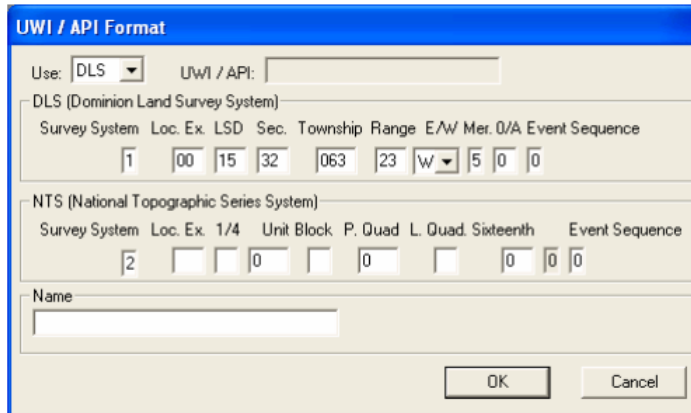
- 1.) The first step in creating a new log is to **click** on the  **New Log button** on the **Toolbar** or to **select New** under **File** on the **Selection Bar**. This will open the **New Log** window shown below.



- 2.) The **Well/Log Name** field is where you enter the name of the well (no more than 50 characters long). **Type** "Horizontal Tutorial Well" into the **Well / Log Name** field.

Note: In most cases, the user would click on the **Well List...** button first and then select the **Well** that was previously used for building the vertical portion of the striplog. The log name would then be automatically placed in the **Well/Log Name** field and when the horizontal log is created the log name will be appended with the letter **“H”** to indicate its status as a horizontal log. However, any and all information pertinent to the original vertical log/well would then be associated with the new horizontal log.

3.) Click on the **UWI** button to activate the **UWI Format** window.

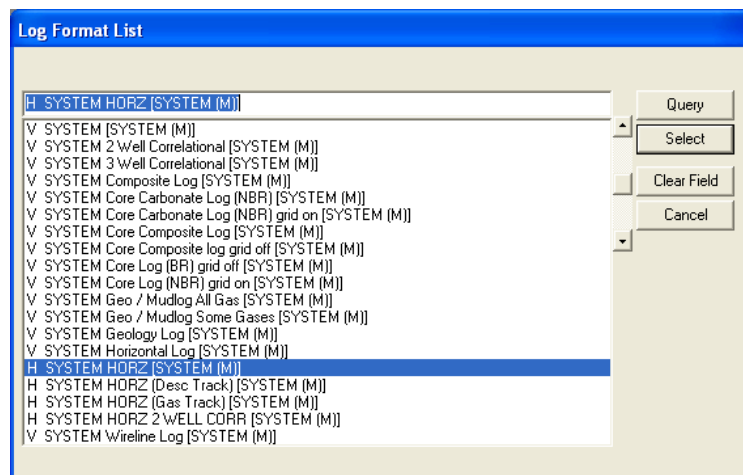


4.) You will be using the **DLS (Dominion Land Survey System)** format (for Alberta, Saskatchewan, Manitoba and some of BC). Enter the following information into the empty **DLS** fields and remember to **Tab** between fields.

Loc. Ex.: **00**(two zeros) LSD: **15** Sec.: **32** Township: **063** Range: **23**
 E/W: **W** Mer.: **5** O/A: **0** (zero) Event Sequence: **0** (zero)

5.) Click on the **OK** button when you have finished entering the **UWI**. An extended **UWI** is created by **Power*Curve™** from the many small fields that you just filled in.

6.) Click on the **Log Format...** button to activate the **Log Format List** window.



7.) Click on **“H SYSTEM HORZ [SYSTEM (M)]”** to highlight it and then click on the **Select** button. You may also **double click** on **“H SYSTEM HORZ [SYSTEM(M)].”**

Note: The **H** before the Log name represents a Horizontal Log Format and the **V** before the Log name represents a Vertical Log Format

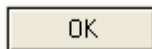
8.) Once you have been returned to the **New Log** window, **double click** in the **Log Start Depth** field. This will highlight the zero (**0**) and activate a flashing cursor. Type **1000** in the **Log Start Depth** field.

- 9.) Once the information is entered, click on the **Create** button.
- 10.) This will initiate a **New Log**. During this process, the curves associated with the selected log format will be added. You will now be prompted with the **Proposed Well Path (TVD) Add Curve** window.

The **Proposed Well Path (TVD) Curve** allows the user to draw the proposed well path as first drawn by the directional drilling company. Typically, you would only show the horizontal portion of the well path and/or the last few meters of the build section.

Note: The **Left / Bottom Scale** maps to the bottom on a horizontal curve and the **Right / Top Scale** maps to the top on a horizontal curve.

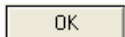
- 11.) Select “m” for meters in the **Curve Units** field. Then, enter a value of “500” into the **Left/Bottom Scale** field and a value of “494” into the **Right/Top Scale** field. Finally, select “Linear” in the **Grid Type** field and then click on the



button. The **Well Path Add Curve** window will then be displayed.

The **Well Path Curve** allows the user to draw the actual well path that the well takes when being drilled. The **Well Path Add Curve** window should have the exact same scale values as the **Proposed Well Path Add Curve** window.

- 12.) Select “m” for meters in the **Curve Units** field. Then, enter a value of “500” into the **Left/Bottom Scale** field and a value of “494” into the **Right/Top Scale** field. Finally, select “Linear” in the **Grid Type** field and then click on the






button. The **Detailed Lithology Scale [DETLITH1]** window will then be displayed

The **Detailed Lithology Scale [DETLITH]** window allows the user to draw **Lithology** in the **Detailed Lithology** track.

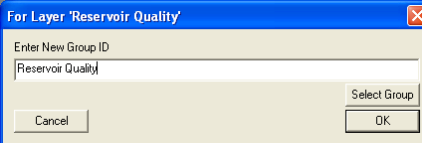
Note: The **Display Depths** associated with the **Detailed Lithology** layer in the **Detailed Lithology** track are determined by the values entered into either the **Major** or the **Minor** field in the **Layer Configuration** window for the **Detailed Lithology** layer.

13.) Enter a value of **"494"** into the **Top Scale** field and a value of **"500"** into the **Bottom Scale** field. Finally, select **Straight Shift** in the **Backup Scale** field.

14.) Click on the  **Save** button, and exit from the ensuing **Shortcut Options** window by clicking once on the  **Exit** button.

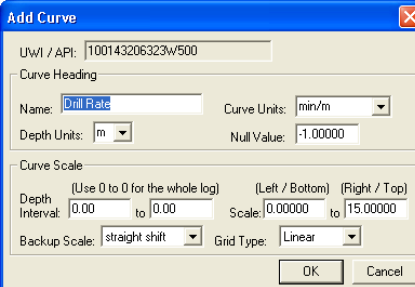
15.) You will now be prompted with the Curve Fill options window. We will delay this for now so click on the  **Cancel** button.


16.) You will now be prompted with an Add Generic Category layer window named Reservoir Quality. **Type Reservoir Quality** into the field as shown in the proceeding window.



17.) Click on the  **OK** button.

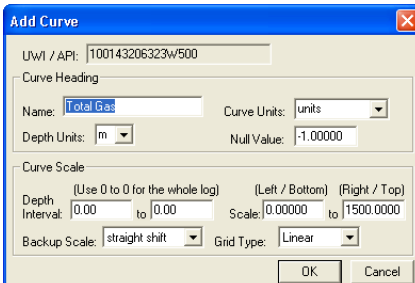
18.) You will now be prompted with an **ADD Curve window for Drill Rate**. Click on the  **OK** button.



19.) You will now be prompted with another **ADD Curve window for Gamma Ray**. Click on the  **OK** button.

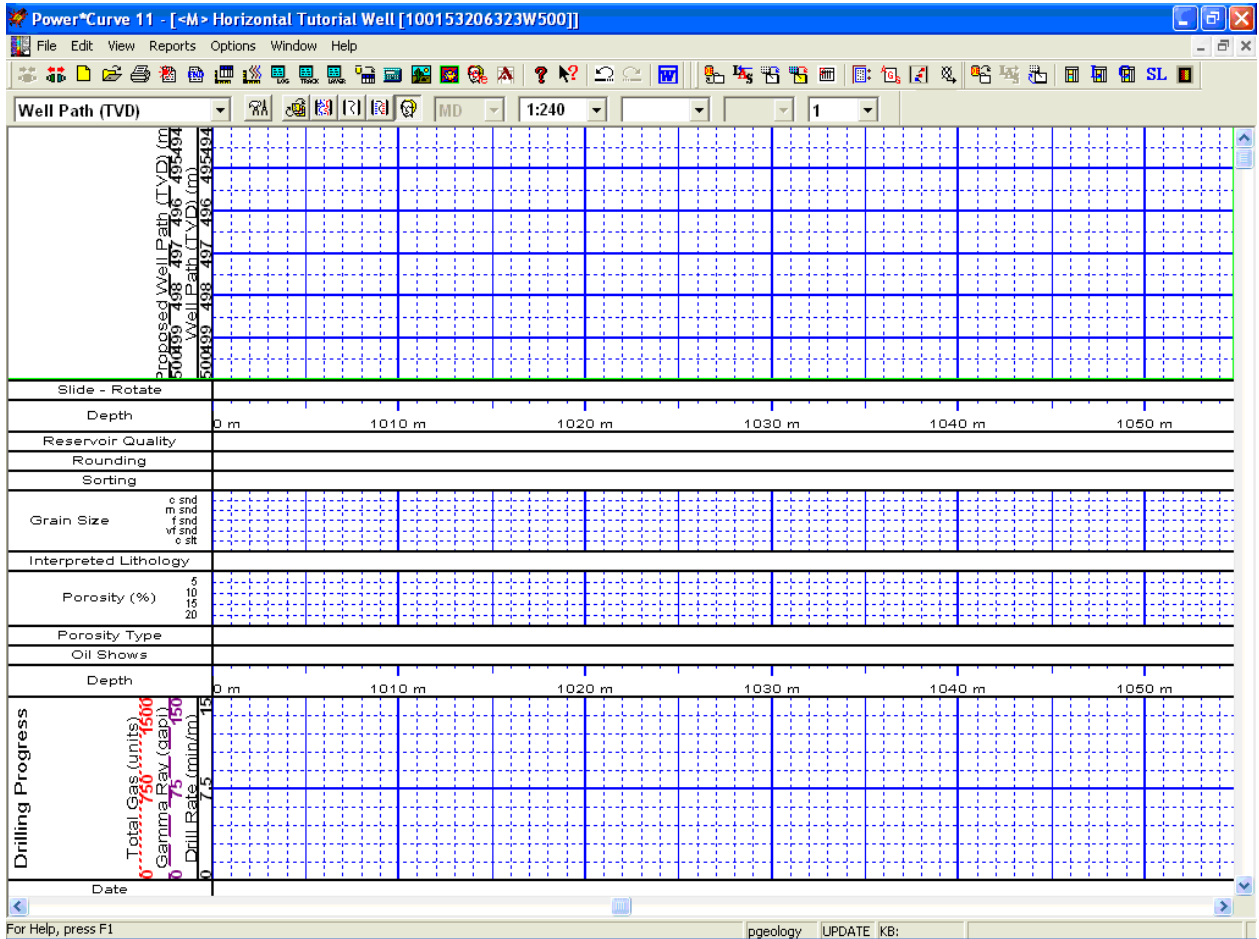


20.) This will activate the last Add Curve window for Total Gas. Click on the  **OK** button.



You have just added five curves to the database, that will be displayed as layers in the Drilling Progress track and the Detailed Lithology track on your new horizontal log.

**** When your log opens, it should look similar to the log displayed below. ****



1. You can now fill in your pertinent well information by selecting **Well** under **Edit** pull down menu on the **Selection Bar** to activate the **Well** window.

The screenshot shows the 'Well' window with the following data entered:

- UWI: 100153206323w/500
- Well Name: Horizontal Tutorial Well
- Operator: ABC Oil Resources Ltd.
- Drilling Contractor: Total Deepress 35
- Province/State: Alberta
- Country: Canada
- Location: 12-25-45-12 W4M
- Licensee: ABC Oil Resources Ltd.
- License #: 12424
- Pool: Lamba C Pool
- Field: Anywhere
- Reference: Ground
- KB: 24.9
- Ground / Collar: 21.1
- Casing Flange: 21.08
- Surface Coordinates: Latitude 0.12148, Longitude 10.0577
- Intermediate Casing Point Coordinates: Latitude 110.0577, Longitude 110.12148
- Bottom hole Coordinates: Latitude 0.12151, Longitude 10.0578
- UTM Surface Coordinates: Northing: 6349970.4, Easting: 470028.2
- Hole Direction: Horizontal
- Hole ID: Hole 1 plus 23
- Work Schedule: Spud: Feb 25, 2001 22:15; T.D.: Mar 7, 2001 06:15; Rig Release: Mar 10, 2001 12:00
- Water Depth: 12.5

2. Fill in the information you feel is necessary (the Figure above, has been filled in to give you an idea of how to complete the fields. Please **type in** the **KB elevation field** with "500". This is done so that when we add a formation top that a sub sea level (ssl) field will be filled in. Then **click** on the **Save** button to save any changes you have made to the well record.

Note: Some of the fields in the **Well** window have character restrictions or mandatory requirements. Consequently, if any of these restrictions have been violated or if any requirements have not been met, the offending field will be highlighted, the nature of the problem will be displayed on the **Status Bar** (lower left hand corner of the screen). Then you will be prompted with a system error message window. Remember to save your work, after the problem has been fixed.

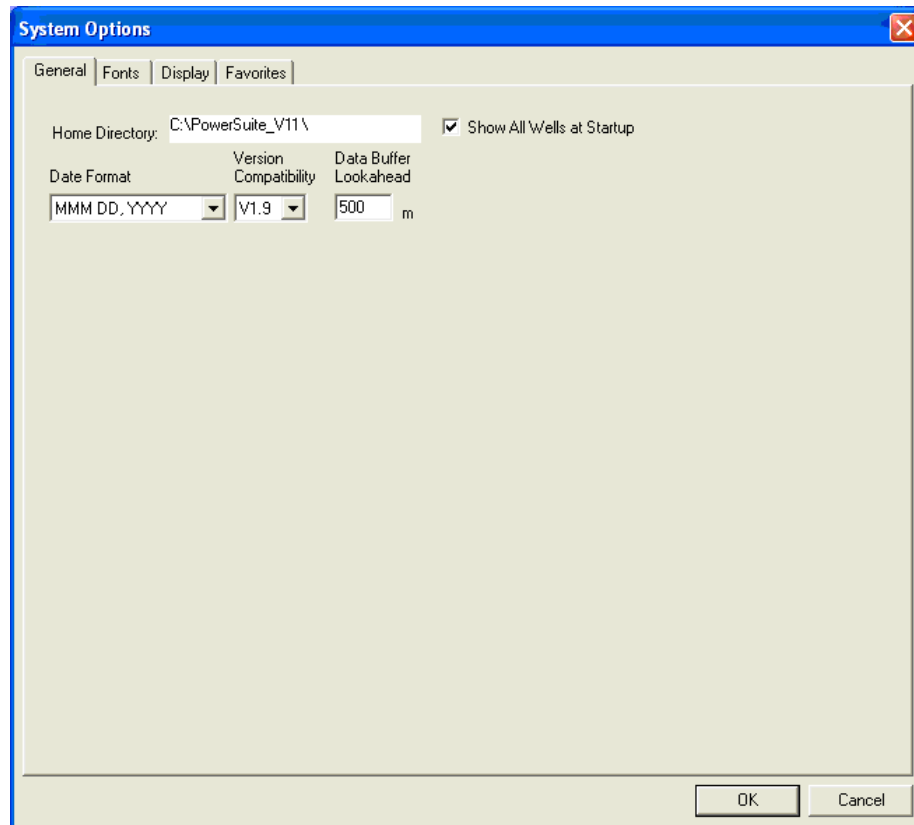
3. If the record has been successfully saved, **click** on the **Exit** button, when prompted with the **Shortcut Options** system window shown below:

The 'Shortcut Options' dialog box displays the following text and buttons:

- Record saved successfully. Choose one of the following shortcuts.
- Buttons: Start New Record, Move to Next Record, Exit, Cancel

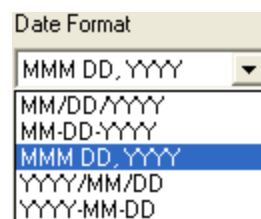
To activate the System Options window **click** on **System Options** under the **Options** menu selection.

General Tab



Home Directory - This is the directory on your hard drive where **Power*Log**, **Power*Core** and **Power*Curve** is being executed. The user will not see any symbols on their log or print out any of our reports if you have the wrong home directory.

Show All Wells at Startup This check box when activated will populate the Open Log window with all the wells in the database. If it is unchecked it may help our corporate users and the time it take to retrieve thousands of wells from the database and to populate the Open Log window with that information. If this check box is deactivated and you wish to see all your wells then simply **click** on the **Clear Query** button in the Open Log window to see all their wells if this option is deactivated.



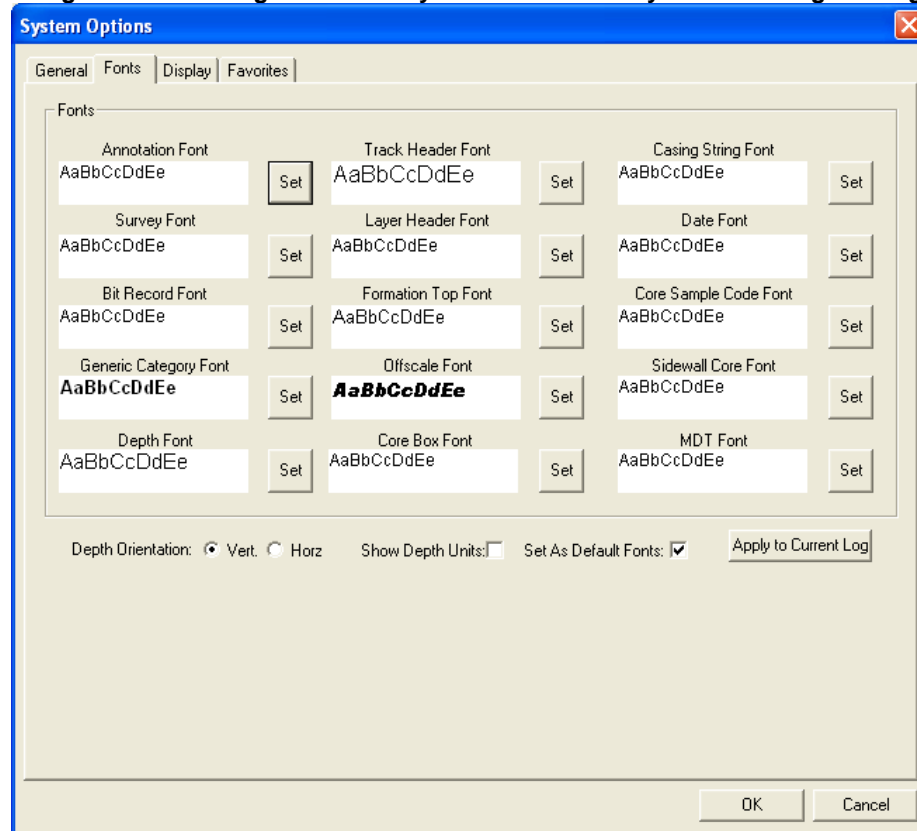
Date Format - From this drop box, you can select the date format. This selection determines how every date in **Power*Log / Core & Curve** will be entered and displayed. If you import a log with different date formats, **Power*Log / Core & Curve** will change the dates to comply with the format you've chosen here. The user can change this at any time and all the Date formats will be changed in the database.

Version Compatibility - Enables the user to achieve compatibility for Annotations in the older Versions of Power*Suite (V1.81 and before) and the Annotations in the newer Versions of Power*Suite (V1.9 and later).

Data Buffer Lookahead - The number placed in this field determines how far ahead and behind the current top depth will be stored in the computers buffer. The larger the look ahead number, the longer it takes for Power*Log / Core & Curve to refresh the screen when you exceed the look ahead value. However, until you meet or exceed the look ahead value, scrolling will be much faster, because the database is not yet being accessed.

Fonts Tab

This tab allows the user to set up most of the fonts used in Power*Log, Core and Curve. You can set it up to be used on the current log as well as using the fonts as your defaults when you are making new logs.



Annotation Font - Allows you to determine the default font style, type, color and size of your annotations on your log, Also this is the default when you use any of the Sample Description Transfer options.

Survey Font - Allows you to determine the font style, type, color and size of your survey data associated with the Survey Layer on your log.

Bit Record Font - Allows you to determine the font style, type, color and size of your bit record data associated with the Bit Record Layer on your log.

Generic Category Font - Allows you to determine the font style, type, color and size of your Long or Short Name display option in all the Generic Category Layers displayed on your log.

Depth Font - This allows you to determine the font style, type, color and size of the depth markers in the **Depth** track of the log.

Depth Orientation: Vert. Horz - These radio buttons allows the user to change the orientation of the Depth Font on the Layer. Beware you may have to change the Track Width to accommodate the Font size and orientation. Refer to the Log Configuration Builder to do this.

Show Depth Units This check box when activated will display the depth units with the depth on the Depth Layer. ie. 1000 ft or 1000 m vs. 1000

Track Header Font - Allows you to determine the font style, type, color and size of your Track Headers on your log. All track headers use the same font across the entire log.

Layer Header Font - Allows you to determine the font style, type, color and size of your Layer Headers on your log. All Layer headers use the same font across the entire log.

Formation Tops Font - Allows you to determine the font style, type, color and size of your Formation Tops data associated with the Formation Tops Long and Expanded Layers on your log.

Offscale Font - Allows you to determine the font style, type, color and size of your curve values displayed when the curve pegs off scale.

Core Box Font - Allows you to determine the font style, type, color and size of your Core Box data entered in the Core Box layer.

Casing String Font - Allows you to determine the font style, type, color and size of your Casing string data displayed on the Casing String layer. This data is entered through the Casing String Report.

Date Font - Allows you to determine the font style, type, color and size of your Date data entered in the Date layer.

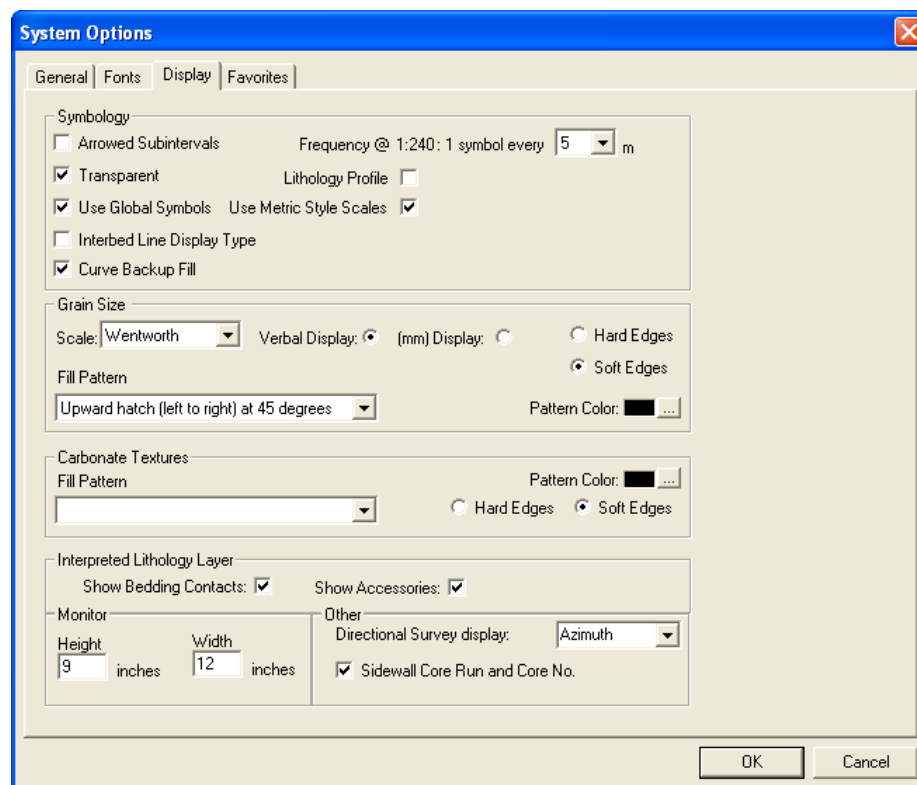
Core Sample Code Font - Allows you to determine the font style, type, color and size of your Core Plug data entered through the Core Plug Report. This font is displayed on the Core Sample Code layer.

Sidewall Core Font - Allows you to determine the font style, type, color and size of your Sidewall Run and Sample Number data entered through the Sidewall Core Report. This font is displayed on the Sidewall Core layer.

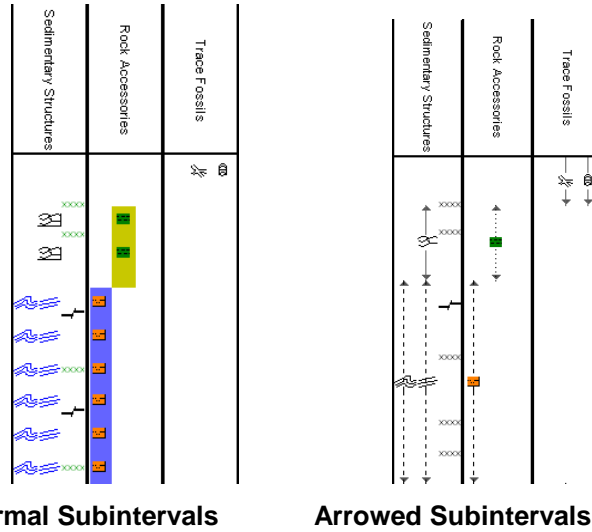
MDT Font - Allows you to determine the font style, type, color and size of your MDT Run and Test Number data entered through the MDT Report. This font is displayed on the MDT layer.

Set As Default Fonts This check box when activated will make the font setting in this window your defaults for any new log created regardless on the Fonts stored in the template.

Display Tab



Arrowed Subintervals - This check box when activated will indicate the top and bottom of your subintervals (portion of an interval) with an arrow rather than a set of symbols. An example is shown below.



Transparent - This check box when activated, this function makes the background of the accessory symbols transparent, so that the bed in the background shows through. If deactivated, a white background surrounds the accessory symbols in order to separate them more from the beds.

Use Global Symbols – With the ability to edit existing metafiles the user may have imported a well that has used metafiles or symbols that have been modified to look differently than the one existing within your system symbols. If you wish to use your symbol set instead of the revised imported ones you can select this check box to make that change.

Interbed Line Display Type - This check box when activated will display the interbed data with a line display splitting the two lithology types or when unchecked will display the lithology in an interbed fashion as displayed below.

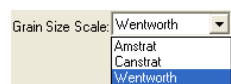
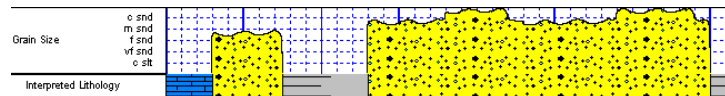


Curve Backup fill – This check box when activated will show a sideways hatching fill pattern when a curve goes off scale or in the backup mode. If unchecked there will be no hatching pattern when the curve goes off scale.

Frequency @ 1:240 – This drop box determines how often symbols are drawn on a **Lithology Layer**, with the scale of 1:240. For example: 1 symbol every 1 meter at 1:240, 2 symbols every 1 meter at 1:120, 1 symbol every 2 meters at 1:480, and so on. These frequencies are only in effect if you utilize the entire interval in **Oil Shows**, **Rounding**, **Sorting**, **Framework**, or designated an interval in **Sedimentary Structures**, **Traces Fossils** and **Rock Accessories**.

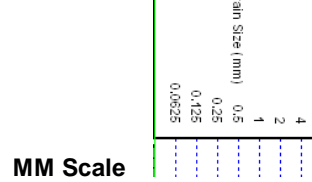
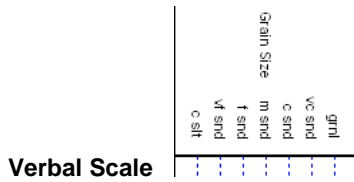
Lithology Profile - This check box when activated will fill in the Carbonate Texture and Grain Size layers with the interpretive lithology. It will draw the lithology to the maximum size filled in over the interval.

Note: The user may wish to turn off the track borders when this option is selected. You will see an example of this shown below.



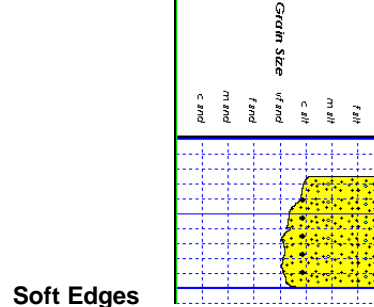
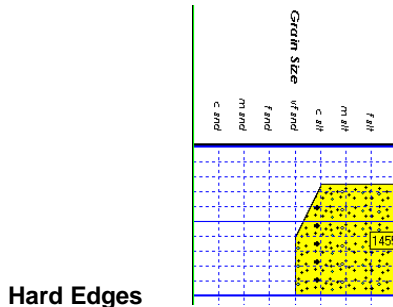
Grain Size Scale List box - You may choose between **Wentworth**, **Canstrat** or **Amstrat** scales, when using the **Grain Size Builder**. The Wentworth Grain size only allows full grain size while Canstrat / Amstrat allow half grain sizes when drafting in the Grain size and matrix layers.

Verbal Display: This radio button will display the **Grain Size Track header** with the equivalent verbal grain sizes such as C slt, VF snd, F snd, M snd, C snd etc.



(mm) Display: This radio button will display the **Grain Size Track header** with the equivalent numeric grain sizes (in mm) such as .0625, .125, .25, .5, 1, 2 etc. as shown above.

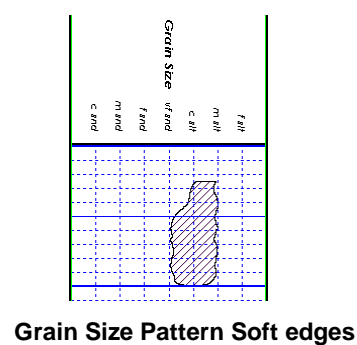
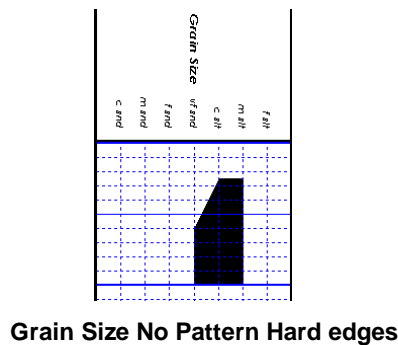
Hard Edges This radio button will display the grain size with strait edges and right angles between the grain sizes. The illustration below is shown with Lithology Profile activated.



Soft Edges This radio button will display the grain size with curved edges and rounded angles between the grain sizes.

Grain Size Fill Pattern Upward hatch (left to right) at 45 degrees This drop box allows the user to select a hatching pattern when using the Grain Size Layer with the Lithology Profile not activate.

Grain Size Pattern Color: This color selector allows the user to pick the line color (foreground) when the fill pattern option is used. The background color is found in the Layer configuration for the Grain Size.



Carbonate Texture Fill Pattern Upward hatch (left to right) at 45 degrees This drop box allows the user to select a hatching pattern when using the Carbonate Texture Layer with the Lithology Profile not activate.

Carbonate Texture Pattern Color: This color selector allows the user to pick the line color (foreground) when the fill pattern option is used. The background color is found in the Layer configuration for the Carbonate Texture Layer.

Carbonate Textures Hard Edges This radio button will display the grain size with strait edges and right angles between the Carbonate Textures. The illustration below is shown with Lithology Profile activated.

Carbonate Textures Soft Edges This radio button will display the grain size with curved edges and rounded angles between the Carbonate Textures.

Interpreted Lithology Layer - Show Bedding Contacts: -When this check box is activated the bedding contacts (lines) between the drawn lithology types in the Interpretive Lithology Layer will be shown.

Interpreted Lithology Layer - Show Accessories: When this check box is activated it will turn on the accessories in the Interpretive Lithology Layer.

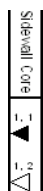
Monitor Height - This option allows you to scale your monitor for Power*Log / Core so you may correlate on-screen wells with hard copy logs that you may have. It is recommended that you take an opportunity to measure the vertical viewing area of your monitor in inches and then insert that value in the **Monitor Height** field. Be aware, however, that if you adjust the screen height knob on your monitor, this will affect the monitor height setting.

Monitor Width - This option allows you to scale your monitor for Power*Curve so you may correlate on-screen wells with hard copy logs that you may have. It is recommended that you take an opportunity to measure the horizontal viewing area of your monitor in inches and then insert that value in the **Monitor Width** field. Be aware, however, that if you adjust the screen width knob on your monitor, this will affect the monitor width setting.

Note: You must restart **Power*Log / Core & Curve** for the **Monitor Width / Height** changes to take effect.

Directional Survey display: Azimuth This drop box option will display your directional surveys on your log in either Quadrant format (N 62 ° W) or Azimuth format (AZ 298 °)

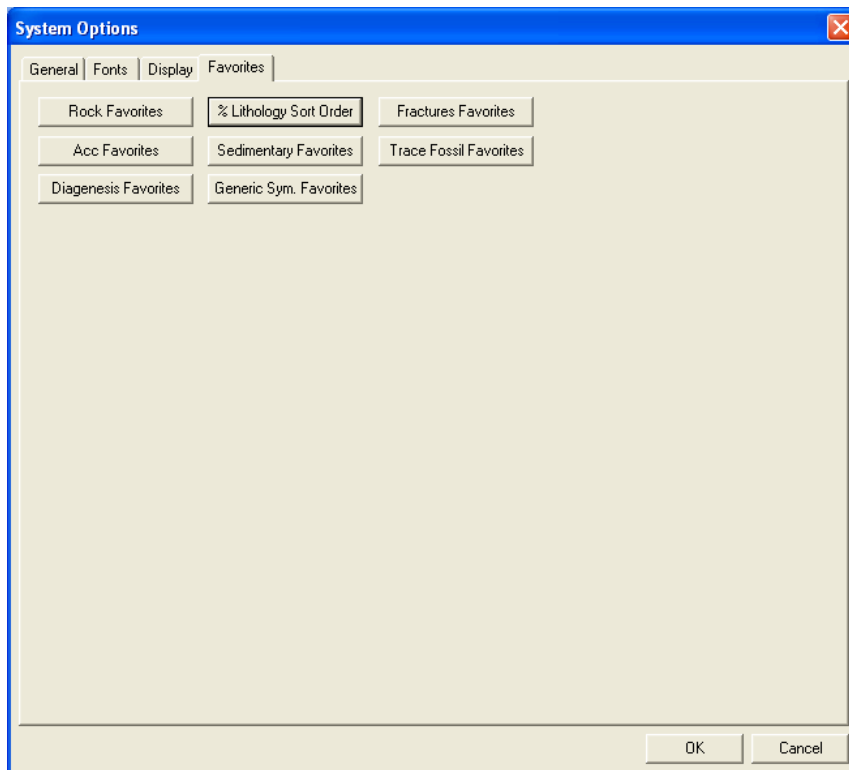
Azimuth
Quadrant



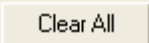
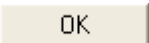
Sidewall Core Run and Core No. This check box when activated will display the Sidewall Core Run & Core numbers above the core triangle indicator on the Sidewall Core layer.

Favorites Tab

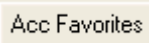

This tab allows the user to define their System favorites for all the data categories that support these choices. This tab dialogue also allows the user to access the % Lithology Sort order for the % Lithology Track.



1.) Click on the Rock Favorites button in the **System Options** window.

- 2.) Click on the  button in the Rock Type Favorites list window to prepare it for the selection of your Rock Favorites.
- 3.) Select the following **Rock Types** from the **Rock Type Favorites** list window:
- Ls ms [Limestone (mud supported)]**
 - Sh m gy [Shale medium gray]**
 - Ss [Sandstone]**
 - Dol [Dolomite]**
 - Plus any other 6 rock types you would use a lot.**
- 4.) Click on the  button to return to the **System Options** window.

Accessory Favorites - Allows the user to determine their thirty (30) favorite **Accessories** and then displays them in a pop-up menu generated by the activation of the **Accessory Builder** window in the **Interpretive Lithology** track.

- 1.) Click on the  button in the System Options window.
- 2.) Click on the  button in the **Accessory Favorites** list window to prepare it for the selection of your **Accessory Favorites**.
- 3.) Select the following **Accessories** from the **Thinbed**, **Components**, and **Cement** headings in the **Accessory Favorites** list window:

Note: You can navigate around these selections by typing in the first two characters of the accessory to get a lot closer to your selection.

Thinbed

cht dk pebbles [chert dark pebbles]
 sh gy stringers [shale gray stringers]
 sid nodules [siderite nodule]

Component


aren [arenaceous]
 calcs [calcareous]
 carb [carbonaceous]
 coal (carb) grs [coal (carbonaceous) grains]
 cht dk grs [chert (dark) grains]
 fld grs [feldspar grains]
 glau grs [glauconite grains]
 micmica [micromicaceous]
 pyric [pyritic]
 slty [silty]

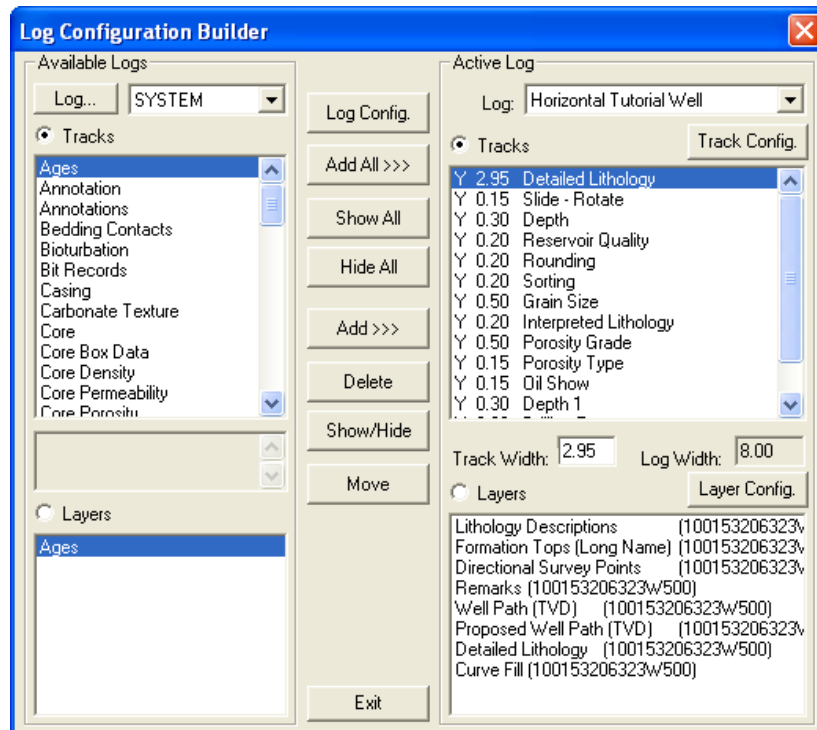
Cement

sid [siderite]
 sils [siliceous]
 Plus 15 other components that you would use a lot.

- 4.) Click on the  button to return to the System Options window.

The Log Configuration Builder Window

- This is the heart of the Log/Track/Layer configurations and controls the way your well's information is displayed on the log.
 - The well may have a lot of information stored in the database, but that information cannot be shown graphically on the log, until the necessary layers have been created to illustrate that information.
- 1.) Click on **Log Configuration Builder** under the **Options** menu on the **Selection Bar** or click on the **Log Configuration Builder**  button on the **Toolbar** to activate the **Log Configuration Builder** window.



Fundamentals of the Log Configuration Builder window

The left side of the Log Configuration Builder window: Available Logs

The **Available Logs** section or **left** side of the **Log Configuration Builder** window allows you to take any track or layer from **Available Logs** and add it to the log you are currently creating/building. On the **left** side of the window, below the **Tracks** radio button, is a list of the tracks available for adding to the **Active Log**.

The **Available Logs** section or left side of the window contains the track and layer configuration of the **SYSTEM [SYSTEM]** log, when the window first opens. You have the option of using any of the existing **Tracks** and their associated layers or any of the existing **Layers** that are associated with any of the system logs in the log database. The user can click on the **Log** button on the left side of the screen to activate a selection list of all log formats that are in your database. The list is comprised of two (2) names with the first name in the list being the system **Log Name** and the second name (in brackets), being the **UWI** of its primary well. **Double click** on the log format you wish to copy from.

Below the **Layers** radio button, on the **left** side of the window, is a list of the layers available in the track highlighted above. They will be added all at once, if you add their parent track. However, they can also be added on an individual basis, if you only want to add one(1) layer to an existing **Active Log** track.

The right side of the Log Configuration Builder window: Active Log


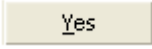
The **Active Log** section or **right** side of the window displays the track and layer configuration of the **Active Log** (the log you are currently creating), in the main **Power*Curve™** window. The name of the log is viewed in the **Log** field. In this case, it will be "Tutorial Well." Below the **Tracks** radio button, on the **right** side of the window, is a list of the tracks that are currently found within the **Active Log**. The track at the top of this list is drawn on the left side of the log, while the track on the bottom of the list is drawn on the far right of the log with all of the other tracks drawn in between, respectively. Below the **Layers** radio button, on the **right** side of the window, is a list of the layers that are associated with the track highlighted above.

The middle of the Log Configuration Builder window: Selection Buttons

The **selection** buttons, found in the middle column of the window, are for adding layers or tracks from the **Available Logs** to the **Active Log**, activating/deactivating the **Active Log's** tracks, deleting active log tracks or layers, and moving tracks or layers within the **Active Log** itself. Step-by-step instructions for accomplishing these tasks are provided on the following pages.

Working with the Log Configuration Builder window:**Deleting the Date track from the Horizontal Tutorial Log...**

- 1.) On the right side of the Log Configuration Builder Window scroll down in the Tracks list and **highlight** or **click** on the **Date track**.

- 2.) Click on the  button in the middle of the builder. This action will prompt you with a system message, "**Do you want to delete the selected track in your log?**" Click on the  button. The **Date track** has now been removed from the log.

Moving the Depth track...

- 1.) Click on the **Depth track** to highlight it on the right side of the Log Configuration Builder window.

Note: Make sure you have clicked on the **Depth track** and NOT the **Depth 1 track**.

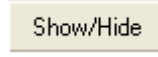
- 2.) Click on the  button and it will change to  button." Then, click on the **Detailed Lithology track**. The **Depth track** will then be placed above the **Detailed Lithology track**.

Resizing a track...



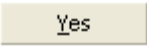
- 1.) On the right side of the Log Configuration Builder window and **highlight** or **click** on the **Detailed Lithology track**.
- 2.) **Double click** in the **Track Width** field and **type** in the value of **3.3** Then, press the **Tab** key and the Detailed Lithology Track with will change as well as the total width of the log itself will change to reflect the increase in the width of the **Detailed Lithology track**.

Note: For paper 8.5" wide, 8.00" is the widest that you want your log to be, especially if you are printing out the log in the **Landscape** paper orientation.

Turning off a track...

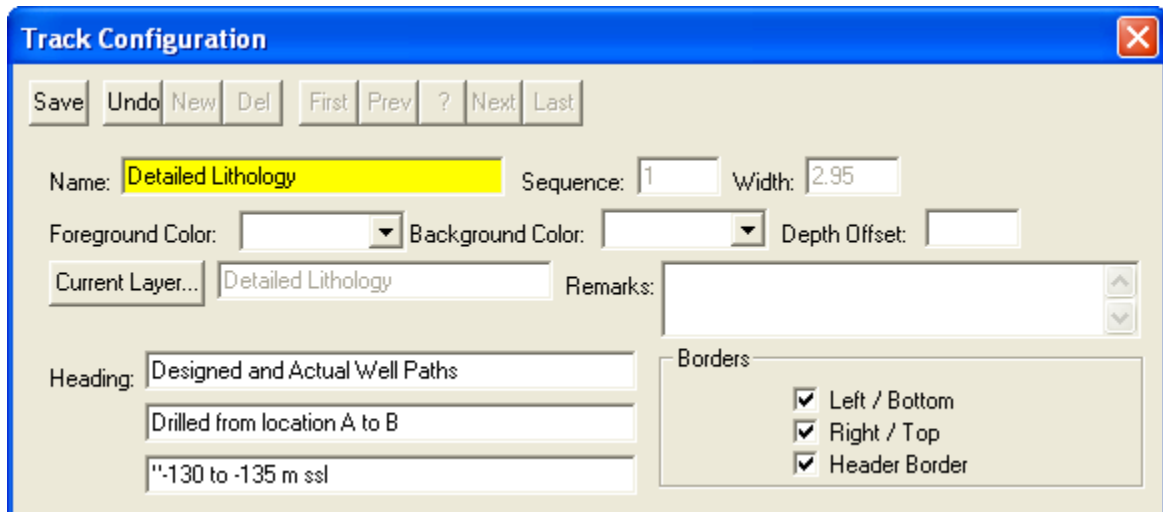
- 1.) Click on the **Porosity Type track** to highlight it on the right side of the Log Configuration Builder window.
- 2.) Click on the  button to turn the "Y"(yes), to the left of the track name, to "N"(no), indicating that the track will not be shown on the log, until it is reactivated.
- 3.) Alternatively, you can simply **double click** on the **Porosity Type track** to turn the "Y"(yes) to "N"(no).

Deleting the Remarks layer from the Detailed Lithology track...

- 1.) Click on the **Detailed Lithology track** to highlight it on the right side of the Log Configuration Builder window. Notice that the layers associated with this track are displayed below, in the Layers list box in the lower right portion of the window.
- 2.) Click on the **Remarks layer** to highlight it in the layers list box. Notice that the  radio button is automatically activated by highlighting a given layer.
- 3.) Click on the  button. This action will prompt you with a system message, "**Do you want to DELETE the selected [layer] in your log?**" Click on the  button. The **Remarks layer** has now been removed from the log.

- **Configuring the Detailed Lithology track...**


- 1.) Click on the **Detailed Lithology** track to highlight it.
- 2.) Click on the **Track Config.** button (to the right of Tracks portion of the window), to activate the **Track Configuration** window for Detailed Lithology

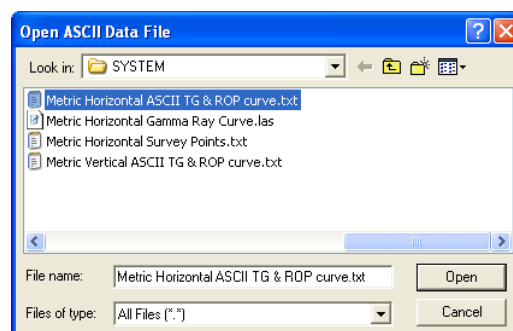


- 3.) The Track name is **Detailed Lithology**. To modify the Track Heading name type in "**Designed and Actual Well Paths**" in the first **Heading** field. In the second heading field, type in "**Drilled from location A to B.**" and in the third heading field type in "**-130 to -135 m ssl**". These modifications are shown in Figure above.
- 4.) Click on the **Save** button to save the changes.
- 5.) A system message will appear asking the User. "Record saved successfully. Do you wish to exit?" Click on the **Yes** button. This action will return you to the **Log Configuration Builder** window. When you exit from the **Log Configuration Builder** window, you will notice that the track headings have conformed to your changes.
- 6.) Click on the **Exit** button or depress the **Esc** key on the keyboard to exit from the **Log Configuration Builder** window and you will be returned to the main log window, where you will see the changes you have made to the new log.

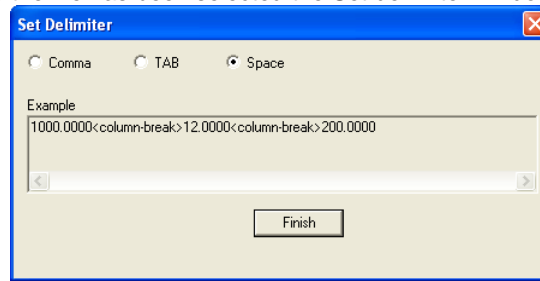
Importing ASCII File Data into the Drill Rate & Total Gas curve layers:

You will be able to do this import only if you have the LAS / ASCII Import Utility. If you do not you will have to input the curve data manually as instructed on pages 23 and 24.

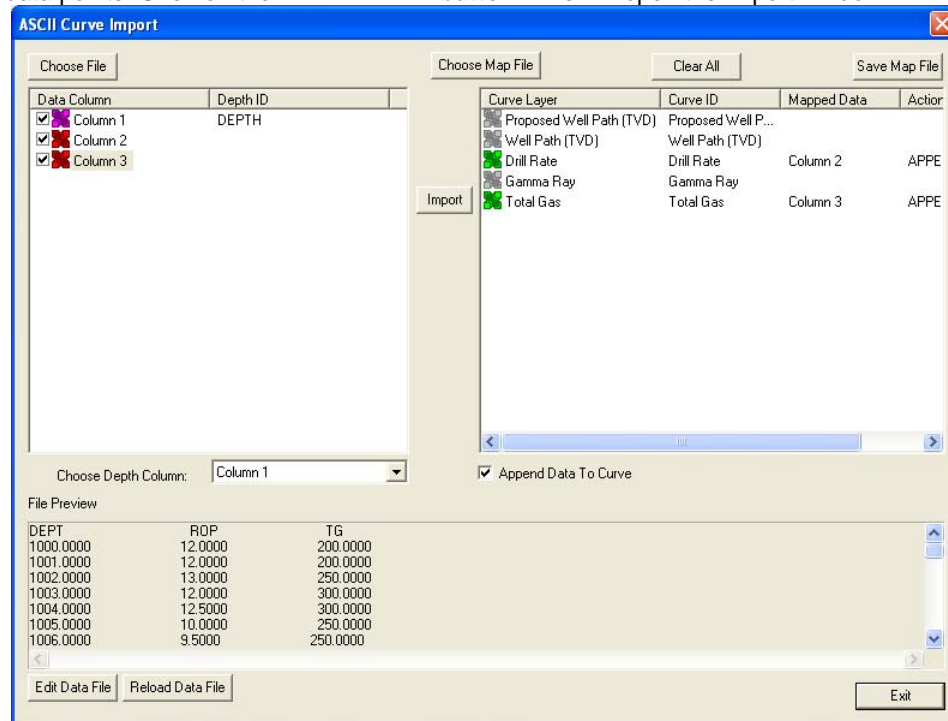
- 1.) Click on the **File** pull down menu, **select Import / Export** and then **select ASCII Import** from the pop out menu. OR the user can **select** the  icon from the Import Tool Bar. This will activate an Open ASCII Data File window.



- 2.) Navigate to the **C:\Powersuite_V11\System** folder and **select the Metric Horizontal ASCII TG & ROP curve.txt** file. Click on the Open button. Once the file has been selected the Set delimiter window will be activated.



- 3.) This file is a Space delimited file and the default on this window is space delimited. You will see <column break> between the data points. **Click on the Finish button.** This will open the Import window.



- 4.) The default on the Depth column is Column 1 which is indicated by the purple X. **In our case the depth is the first column so we do not have to change the depth column indicator.**
- 5.) **Click on the Column 2** on the left side and **drag it to the Drill Rate Curve layer** on the right side of the window. You will see Column 2 in the mapped Data field and an APPEND in the action field.
- 6.) **Click on the Column 3** on the left side and **drag it to the Total Gas Curve layer** on the right side of the window. You will see Column 3 in the mapped Data field and an APPEND in the action field.
- 7.) **Click on the Import button.** This will import the curve data and prompt you with a database message saying Imported successfully.

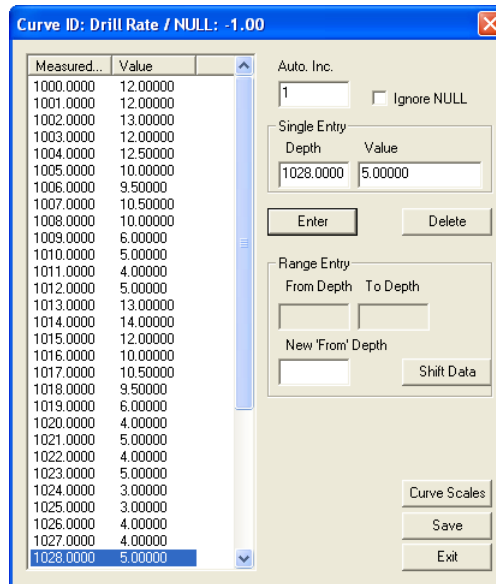


- 8.) **Click on the OK button** to close the window.
- 9.) **Click on the Exit button** to close the ASCII Import window.

Adding Drill Rate Curve Values Manually (If you do not have the Import Module or Files.)

If you have the LAS Import Module go to Changing Curve Scales on page 24.

- 1.) **Click** anywhere in the **Drilling Progress** track. Depending on your screen resolution you may have to scroll down to see the Drilling Progress track
- 2.) Use the drop down arrow in the **Layer Selection List** field (located at the upper left side of the **Selection bar**), to display a list of the layers in this track.
- 3.) **Click** on **Drill Rate** to make it the active layer and the **Layer Selection List** will close automatically after you have made your selection.
- 4.) **Double click** within the active **Drilling Progress** track to activate the Drill Rate Curve Editor.




- 5.) When the **Curve Editor** window opens, the cursor will be in the **Depth (m)** field. Type **1000** into the **Depth (m)** field and then **press** the **Tab** key on the keyboard to move the cursor to the **Value (min/m)** field.
- 6.) Type **12** into the **Value (min/m)** field and **press** the **Enter** key on the keyboard. The value will be entered into the list field and the **Depth (m)** field will automatically advance by the number specified in the **Auto Depth Increment** field, which is currently set at **one (1)**.

Note: You do not have to re-enter values if they are identical to the previous value. The previous value is already displayed in the **Value (min/m)** field, so you can just press the **Enter** key to insert the same value again.

- 7.) **Type** in the remaining **Values (min/m)** listed below and **pressing** the **Enter** key on the keyboard after each data entry. You will see the list get refreshed with the new values after every time you depress the enter key on the keypad.

1001	12.0	1011	4.0	1021	5.0	1031	4.0
1002	13.0	1012	5.0	1022	4.0	1032	4.0
1003	12.0	1013	13.0	1023	5.0	1033	5.0
1004	12.5	1014	14.0	1024	3.0	1034	5.0
1005	10.0	1015	12.0	1025	3.0	1035	3.0
1006	9.5	1016	10.0	1026	4.0	1036	3.0
1007	10.5	1017	10.5	1027	4.0	1037	3.0
1008	10.0	1018	9.5	1028	5.0	1038	2.0
1009	6.0	1019	6.0	1029	5.0	1039	3.0
1010	5.0	1020	4.0	1030	4.0	1040	4.0

- 8.) When you have finished adding values to the curve, **click** on the  **button**.

Note: If you forget to save the values before you exit from the **Curve Editor** window, you will be prompted by the following system message, "**Would you like to save the digits?**" Click on the **Yes** button to save the newly edited curve values.

9.) Click on the  button or Press the **Esc** key on the keyboard to exit from the Curve Editor.

• **Adding Total Gas Curve Values Manually (If you do not have the Import Module or Files.)**

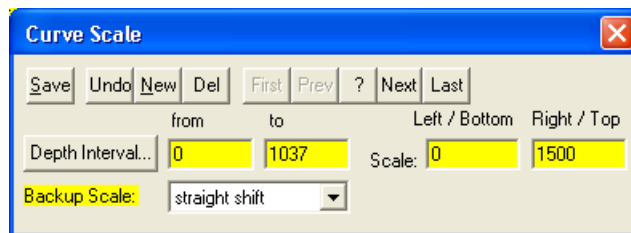
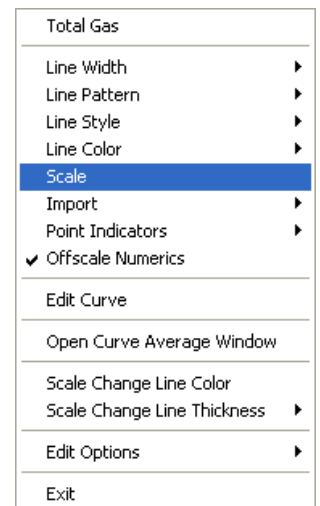
- 1.) Click anywhere in the **Drilling Progress** track. Depending on your screen resolution you may have to scroll down to see the Drilling Progress track
- 2.) Use the drop down arrow in the **Layer Selection List** field (located at the upper left side of the **Selection bar**), to display a list of the layers in this track.
- 3.) Click on **Total Gas** to make it the active layer and the **Layer Selection List** will close automatically after you have made your selection.
- 4.) Double Click on the **Total Gas** layer to bring up the **Curve Editor** window for the **Total gas** curve.
- 5.) Enter the values found below into the **Depth (m)** and **Value (units)** fields, respectively.

Note: After the first value has been entered into the **Depth (m)** field, the **Curve Editor** window automatically performs each subsequent increment, according to the value placed in the **Auto Depth Increment** field. Consequently, the only values you need to enter manually, after the first entry, are the **Value (units)** field values.

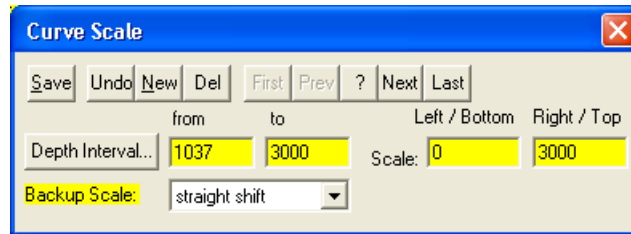
1001	200	1011	780	1021	1450	1031	1320
1002	250	1012	650	1022	1380	1032	1320
1003	300	1013	400	1023	1380	1033	1360
1004	300	1014	450	1024	1300	1034	1370
1005	250	1015	350	1025	1300	1035	1370
1006	250	1016	450	1026	1300	1036	1410
1007	350	1017	500	1027	1250	1037	1420
1008	350	1018	600	1028	1250	1038	1490
1009	680	1019	900	1029	1280	1039	1460
1010	700	1020	1200	1030	1280	1040	1490

Changing Curve Scales from Total Gas Layer Pop Up Menu

- 1.) Click anywhere in the **Drilling Rate** track. Depending on your screen resolution you may have to scroll down to see the Drilling Rate track
- 2.) Use the drop down arrow in the **Layer Selection List** field (located at the upper left side of the **Selection bar**), to display a list of the layers in this track.
- 3.) Click on **Total Gas** to make it the active layer and the **Layer Selection List** will close automatically after you have made your selection.
- 4.) **Right click** on the **Total Gas** layer. This will activate a Total Gas Pop-up menu.
- 5.) **Select Scale** from the menu. This will activate the Scale Window shown below. We will be changing scales in our case at **1037m**.



- 6.) **Type** in a different from Depth Interval changing the 0 to **1037** and then **click** on the **Save** button. This will activate a System message stating Record Saved Successfully.
- 7.) **Click** on the **Start New Record** button. This will clear the window.

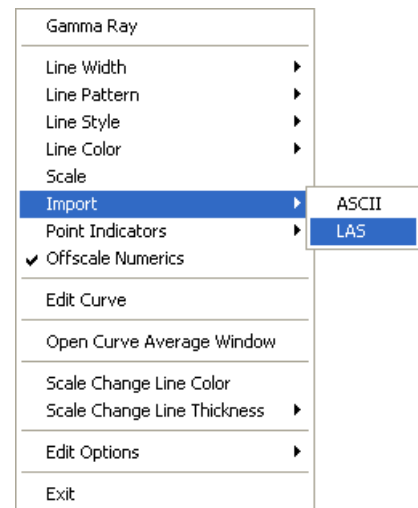


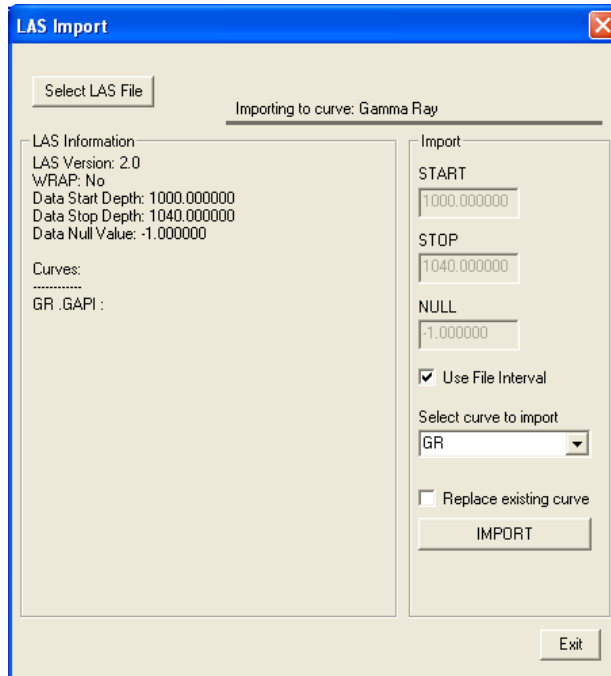
- 8.) **Type** in **1037** in the **from depth** interval field, **tab**, type **3000** in the **to depth** interval field, **tab**, type in **0** in the **left / bottom scale** field, type in **3000** in the **right / top scale** field, **select** **strait shift** from the **Backup Scale** drop box.
- 9.) **Click** on the **Save** button and then **click** on the **Exit** button from the ensuing Record Saved Successfully message box.

Importing an LAS Gamma Ray Curve data file...

There are two ways to import LAS Files. If you are importing only one curve it is easier to use the method described below. If you are importing more than one curve it would be best to utilize the LAS Import method found on the Import toolbar or under the File menu.

- 1.) **Click** on the **Drill Progress track** to make it active. You will notice a green trace around the outside of the track if done correctly.
- 2.) Use the drop down arrow in the **Layer Selection List** field (located on the left side of the **Selection bar**), to display the **Drilling Progress** track layer list.
- 3.) **Select** the **Gamma Ray** layer to make it the **active** layer and the **Layer Selection List** will close automatically after you have made your selection.
- 4.) **Right click** on the **Gamma Ray layer** to activate a popup menu.
- 5.) **Select Import** from the pop-up menu to activate a pop out menu and **select LAS**. This will activate the Las Import Window.





- 6.) Click on the **Select LAS File** button. This will activate the Open LAS File window and locate the “**Metric Horizontal Gamma Ray Curve.las**” in the **Powersuite_V11 / System** directory.
- 7.) After locating the Drive and Directory where the **Metric Horizontal Gamma Ray Curve.las** file is the user must select the file by **double clicking on the file name** or **clicking on it once** and clicking on the **Open** button. This will bring the file header into the LAS Import window.
- 8.) Click on the **Select Curve to Import** drop box and select the **GR** curve.
- 9.) Click on the **IMPORT** button. The curve will import and the window will disappear leaving the core rate curve on the layer.

• **Adding the Gamma Ray Curve Manually (If you do not have the LAS Import Module)**

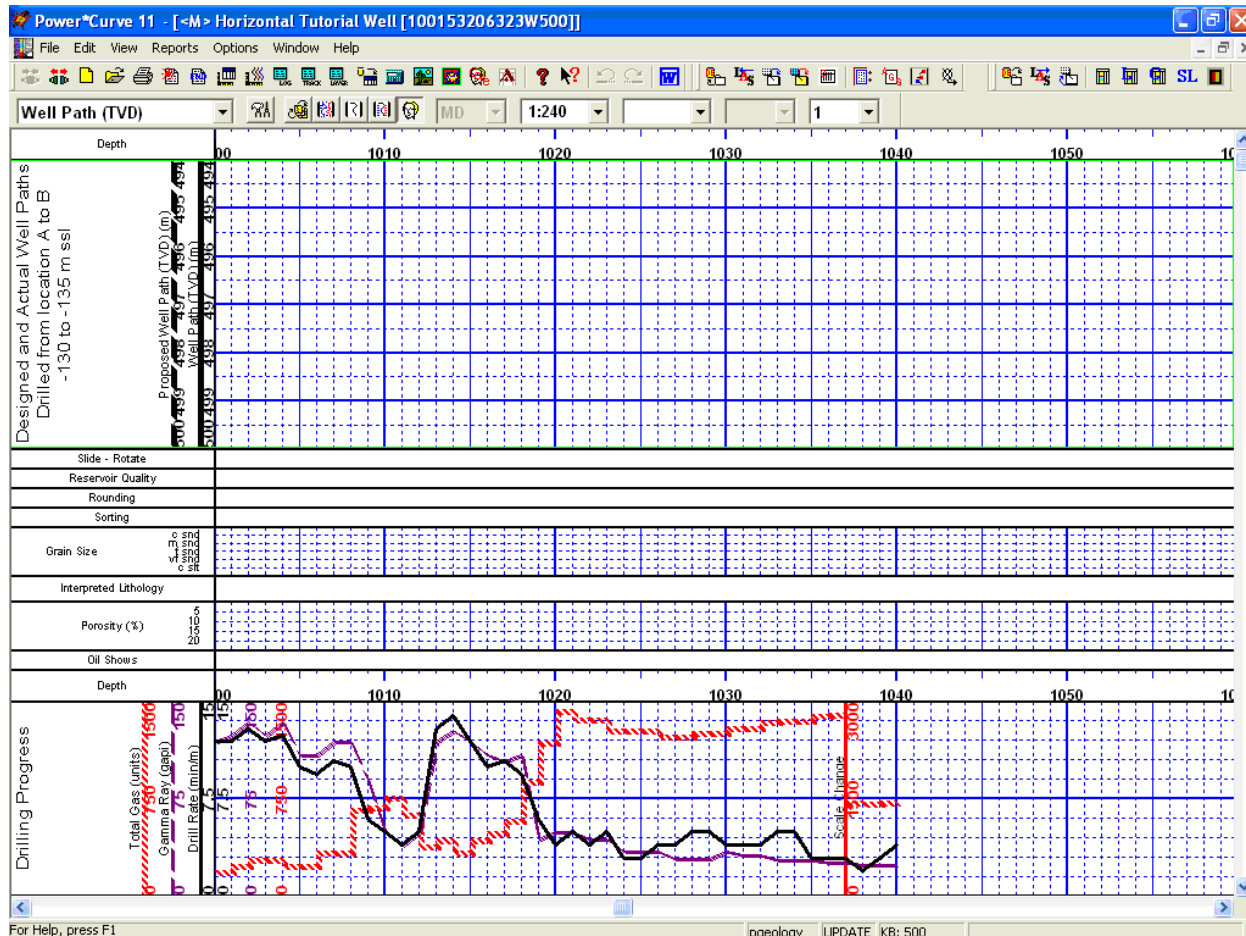
- 1.) Click on the **Drill Progress** track to make it active. You will notice a green trace around the outside of the track if done correctly.
- 2.) Use the drop down arrow in the **Layer Selection List** field (located on the left side of the **Selection bar**), to display the **Drilling Progress** track layer list.
- 3.) **Select the Gamma Ray** layer to make it the active layer and the **Layer Selection List** will close automatically after you have made your selection.
- 4.) Double Click on the **Gamma Ray** layer to bring up the **Curve Editor** window for the **Gamma Ray** curve.
- 5.) Enter the values found below and on the following page into the **Depth (m)** and **Value (gapi)** fields, respectively.

Note: After the first value has been entered into the **Depth (m)** field, the **Curve Editor** window automatically performs each subsequent increment, according to the value placed in the **Auto Depth Increment** field. Consequently, the only values you need to enter manually, after the first entry, are the **Value (gapi)** field values.

1000	120	1007	120	1014	129	1021	50
1001	125	1008	120	1015	120	1022	45
1002	135	1009	90	1016	110	1023	45
1003	125	1010	50	1017	105	1024	35
1004	135	1011	40	1018	110	1025	35
1005	110	1012	50	1019	45	1026	35
1006	110	1013	120	1020	50	1027	30

1028	30	1032	33	1036	27	1040	25
1029	30	1033	29	1037	27		
1030	35	1034	29	1038	25		
1031	33	1035	29	1039	25		

**** Your log should now look similar to the log shown below. ****



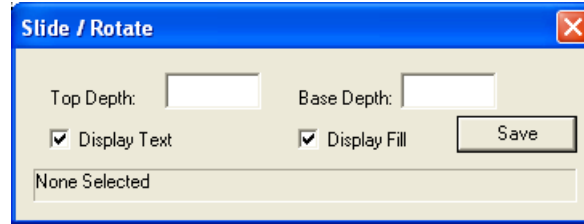
The Slide/Rotate Layer:


The **Slide/Rotate** layer provides a visual representation of the **Drill String Rotation** and **Orientation** throughout the progress of the well.

The **Rotate** function of the window is shown as disabled, because rotation is represented as a blank space on the layer. The only thing you can physically draw on this layer is a **Slide** or Orientation of the Drill string as done when you are directionally drilling, which is shown as a black bar with an S covering the distance of the slide or orientation of the drill string.


- **Drawing a Slide...**

- 1.) **Double click** on the **Slide/Rotate layer** to activate the **Slide/Rotate** window.




- 2.) On the **Slide/Rotate** track, position your mouse pointer at **1000m**, because this is where the **Slide** will begin.
- 3.) Hold down your **left** mouse button and drag the mouse pointer to **1014m**  because this is the position where you want the **Slide** to end.
- 4.) Release the mouse button and the **Slide** will be drawn from **1000m** to **1014m**.

- **Drawing another Slide...**

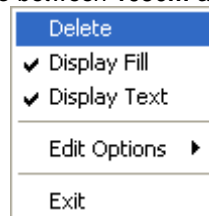
- 1.) Position your mouse pointer at **1017m** on the **Slide/Rotate** track.
- 2.) Hold down the left mouse button and drag the mouse pointer to **1031m**  on the **Slide/Rotate** track.
- 3.) Release the mouse button and the **Slide** will be drawn from **1017m** to **1031m**.

- **Drawing yet another Slide...**

- 1.) Position your mouse pointer at **1036m** on the **Slide/Rotate** track.
- 2.) Hold down the left mouse button and drag the mouse pointer to **1040m**  on the **Slide/Rotate** track.
- 3.) Release the mouse button and the **Slide** will be drawn from **1036m** to **1040m**.



- **Deleting a Slide...**

- 1.) **Right click** your mouse button on the **Slide** between **1036m** and **1040m**. This will activate the pop-out menu.




- 2.) **Click** on the **Delete** Selection and your slide drawn between 1036m and 1040m will be deleted.

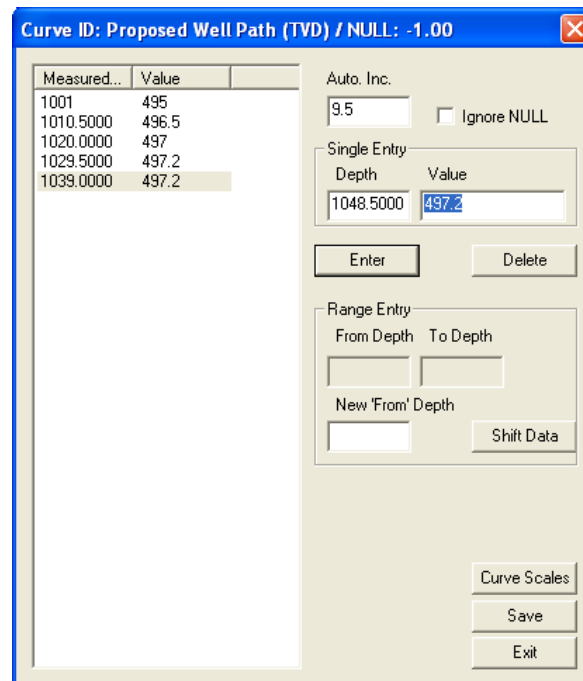
- **Resizing a Slide...**

- 1.) Hold down the **Ctrl** key on the **keyboard** and **position** the mouse pointer to the edge of the **Slide** you wish to resize (in this case the **Slide** residing between **1017m** and **1031m**) at 1031m. The mouse pointer will turn into a resize  cursor.
- 2.) While continuing to hold down the **Ctrl** key and the mouse button, **drag the mouse pointer** to the right to resize the **Slide** from **1017m - 1031m** to **1017m - 1033m**. Notice that the yellow increment box displays the two depth limits of the **Slide**, as you move the mouse pointer.
- 3.) **Release** the **left mouse button** (before the Ctrl key) and the new **Slide** interval will be drawn from **1017m** to **1033m**.
- 4.) **Press** the **Esc** key on the **keyboard** or **click** on the  in the builder to exit from the **Slide/Rotate** window.

Adding values to the Proposed Well Path Curve

The following steps will show you how to add values to the **Proposed Well Path** curve layer. In an actual Wellsite situation the User could import the Proposed well path curve if the ASCII file for the drilling program is available from the directional drillers. We will make up proposed well path in this case. Ie where the well was designed to be drilled.

- 1.) **Click** anywhere in the **Detailed Lithology** track. Notice that a **green** border highlights or surrounds the track. This is used to indicate that the track is ACTIVE.
- 2.) **Click** on the **down arrow on the right hand side of the Layer Selection List** to activate the list.
- 3.) **Click** on the **Proposed Well Path** from the Layer Selection List. This will make the Proposed Well Path curve layer the active.
- 4.) **Double click** within the active **Detailed Lithology** track to activate the Curve Editor for the Proposed Well Path Curve. Or the user can **click once** on the  **Data Editing Tool of Active Layer** button on the **Toolbar**.



Measured...	Value
1001	495
1010.5000	496.5
1020.0000	497
1029.5000	497.2
1039.0000	497.2

Auto. Inc. Ignore NULL

Single Entry

Depth	Value
<input type="text" value="1048.5000"/>	<input type="text" value="497.2"/>

Range Entry

From Depth	To Depth
<input type="text"/>	<input type="text"/>


New 'From' Depth

- 5.) **Double click** in the **Auto Depth Increment** field and **type** in a value of **9.5**. Then, **press** the **Tab** key on the keyboard once to move the cursor to the **Depth (m)** field.
- 6.) **Type 1001** into the **Depth (m)** field and then press the **Tab** key on the keyboard to move the cursor to the **Value (m)** field.

Note: The **Depth (m)** field in the **Curve Editor** window represents the **Measured Depth (MD)** in the **Detailed Lithology** track, while the **Value (m)** field represents the **True Vertical Depth (TVD)** in the **Detailed Lithology** track.

- 7.) **Type 495** into the **Value (m)** field and then press the **Enter** key on the keyboard. The depth value will automatically advance by 9.5 as specified in the Auto Depth Increment field.
- 8.) **Type** in the remaining **Value (m)** values listed below. After typing in a value the user must then press the **Enter** key on the keyboard to see his values getting added to the list.

1010.5m	496.5m
1020.0m	497.0m
1029.5m	497.2m
1039.0m	497.2m

- 9.) When you are finished adding values to the curve, **click** on the  **button**.

Note: If you forget to save the values before you exit from the **Curve Editor** window, you will be prompted by the following system message, "**Would you like to save the digits?**" Click on the button to save the newly edited curve values.

Click on the button or the user can press the **Esc** key on the keyboard to exit from the Curve Editor window and put you back into the main Power*Curve Window.

Importing Directional Surveys, Running Minimum Curvature Calculations and Updating the Well Path Curve

Before we can successfully import surveys, run the minimum survey calculations and update the well path curve at one time we have to fill in some necessary information in the Survey Report.

Getting the Directional Survey Window prepared to accept and correctly calculate the survey data to be imported.

- 1.) Click on the **Report** selection on the Menu bar and **select** the **Directional Survey** selection from the pull down menu. This will activate the Direction Survey Window. The steps below will fill in the necessary fields to run minimum curvature calculations, you can fill in the rest if you so desire.

Directional Survey

Save Undo New Del First Prev ? Next Last

Survey Points Master Survey Group Calculate TVD

Survey Group...

Service Company: Any directional Drilling Ltd.

Directional Driller: Joddy Rudd

MWD Hands: Alistor Symonds

Survey

Date: Jun 16, 2003 Type: magnetic Mode: MWD

Calculation Method: minimum curvature Dog Leg Severity Characteristic: 30 Target Azimuth: 120

User-defined TVD Calculation

Calculate Calculation Method: minimum curvature Calculate From: tie-in

Remarks:

Well was drilled a little off course from the originally planned well due to some hole conditions encountered during the drilling on the pilot hole. No problems with the drilling of the build section and the main drain up to this point in time.

Kick-off

*MD	*TVD	*Inclination °	*Azimuth °
*E/W	*N/S	*Section	*Dog Leg

Latitude: Longitude:

Surface Coordinates relative to boundary

N/S: E/W:

Tie-in

*MD	*TVD	*Inclination °	*Azimuth °
*E/W	*N/S	*Section	*Dog Leg

Latitude: 34 23 35 23" Longitude: 23 34 45 24"

Surface Coordinates relative to boundary

N/S: 220 meters North of the South boundary of Sec. 32-63-23 W5
E/W: 30 meters East of the West boundary of Sec. 32-63-23 W5M

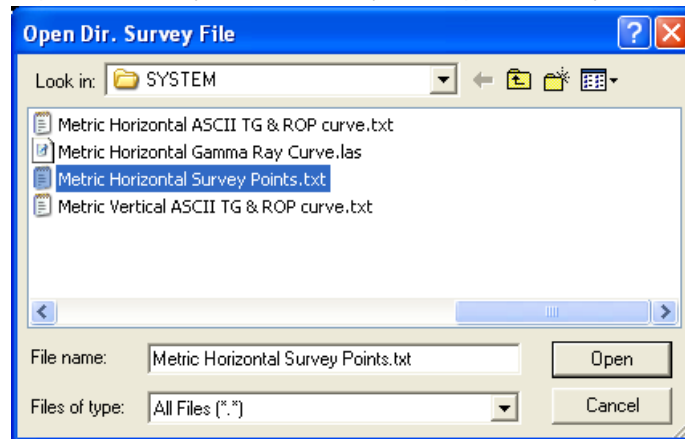
* Indicates fields that are required for Minimum Curvature and TVD calculations

- 2.) Select 30 from the **Dog Leg Severity Characteristic** Drop Box.
- 3.) Type in 120 in the **Target Azimuth** Field
- 4.) Type in 990 in the **Tie in MD** Field, tab, 494 in the **Tie in TVD** Field, tab, 80 in the **Inclination** field, tab, 120 in the **Azimuth** Field, tab, 770 in the **E/W** field, -32 in the **N/S** field, tab, 658 in the **Section** field, tab, and 3 in the **Dog Leg Severity** field.
- 5.) In the user defined portion of the window place a check in the box beside the calculate field, select **minimum curvature** from the calculation method drop box and **select tie in** from the **calculate from** drop box. Doing this will automate the calculation in survey points window.

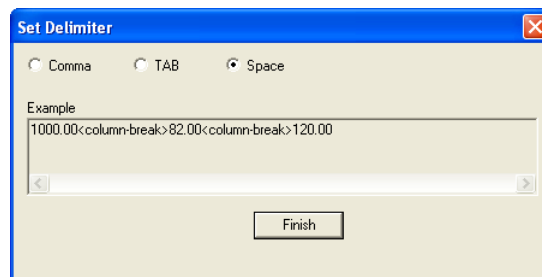
- 6.) Click on the **Save** button and then click on the **Exit** button from the ensuing Record Saved Successfully System Message. This will put you back into the main Power*Curve window.

Note: If you do not have the Las Import Module or you do not have Access to the necessary data file Metric Horizontal Survey Points.txt in the Powersuite_V11 / System directory skip to page 34 to do the manual entry method.

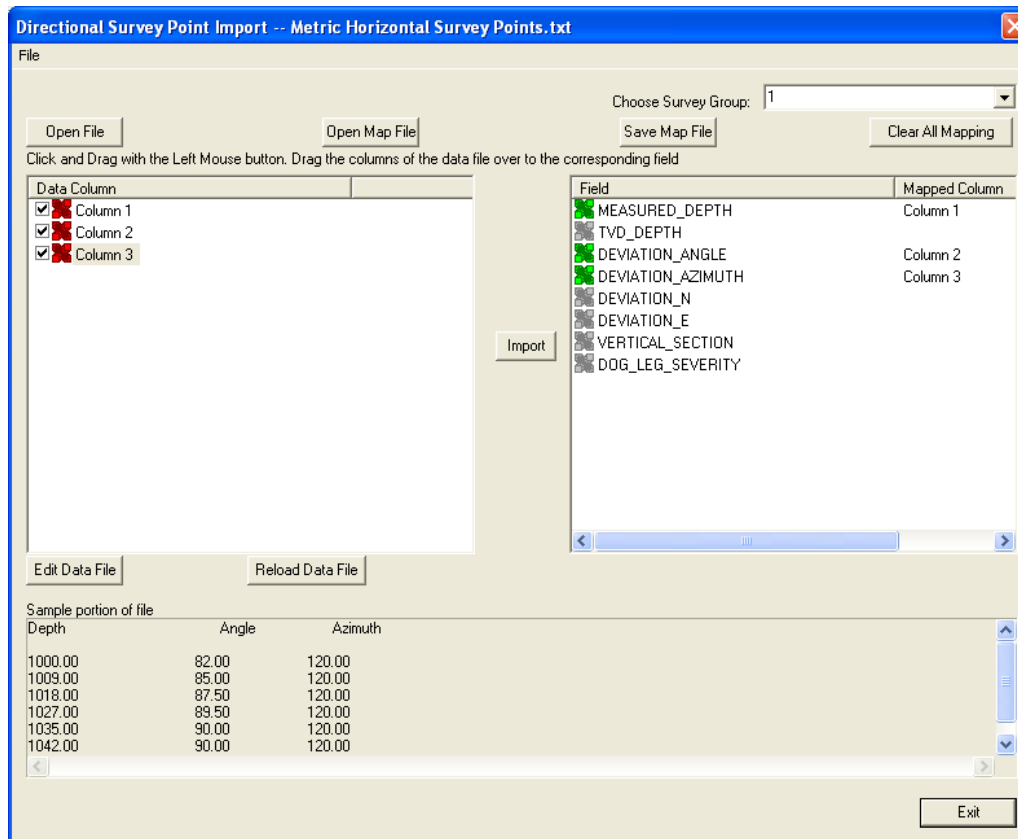
- 7.) Click on the **File** selection to activate the pull down menu and select **Import / Export** to activate the pop-out menu and **Select Import Surveys...** or you can click on the **Import Surveys** button on the Import toolbar to activate the Open Dir. Survey file window so you can pick the file you wish to Import.



- 8.) Select the “Metric Horizontal Survey Points.txt” located in the Powersuite_V11 / System directory. If chosen correctly it will look like the Open Dir. Survey File Window. Click on the **Open** button. This will activate the Set Delimiter window.



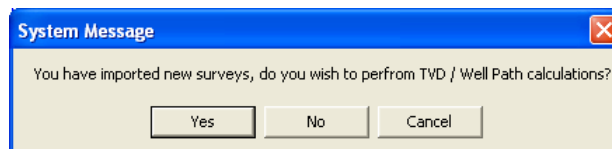
- 10.) This file is a Space delimited file and the default on this window is space delimited. You will see <column break> between the data points. Click on the **Finish** button. This will open the Import window.



- 11.) Click on the **Column 1** on the left side and **drag it to the Measured Depth** on the right side of the window. You will see Column 1 in the mapped Data field and an APPEND in the action field.
- 12.) Click on the **Column 2** on the left side and **drag it to the Deviation_Angle** on the right side of the window. You will see Column 2 in the mapped Data field and an APPEND in the action field.
- 13.) Click on the **Column 3** on the left side and **drag it to the Deviation_Azimuth** on the right side of the window. You will see Column 3 in the mapped Data field and an APPEND in the action field.
- 14.) Click on the **Import** Button. This will import the curve data and prompt you with a database message saying Imported successfully.



- 15.) Click on the **OK** button to close the window.
- 16.) Click on the **Exit** button to close the ASCII Import window.
- 17.) This will activate a System Message will be activated asking the user *"Do you wish to perform TVD / Well path Calculations?"*.



- 18.) Click on the **Yes** button. This will activate the TVD Calculations window.

- 19.) In the **Directional Survey** portion of this window the defaults should be set by the Directional survey report we filled in earlier. Make sure that the **Calculate Directional Survey** check box is checked, **Survey Group One (1)** is viewed, **Minimum Curvature** is selected in the Calculation Method drop box and **tie in** is selected from drop box
- 20.) In the Master Survey Group **select** the **Minimum Curvature** in the Calculation Method drop box and **tie in** is selected from drop box
- 21.) In the Well Path portion of the window **select** the **Calculate Well path** check box. **Click** on the **Well Path Curves...** button. This will activate a Curve List window.
- 22.) **Double Click** on the **Well Path (TVD)** curve or **Click once** on the **Well Path (TVD)** curve and **click** on the **Select** button. This will put you back into the TVD Calculations window and place the Well Path (TVD) curve name. **Type** in a Start Depth of **1000** in the Start Depth field and **select** the **Units** for the curve as **TVD**. Also **check** the **Point Indicators** check box.
- 23.) In the **Calculate TVD Attributes** portion of the window deselect the **check box**. We do not have any of these fields to be updated at this point in time.
- 24.) **Click** on the **Calculate Button**. This will activate a Progress Window followed by a System message "**Exit TVD Calculation Window?**". **Click** on the **Yes** button.

You should now see the directional survey points and well path plotted in the Detailed Lithology Track.

Adding Directional Survey Points Manually

If you have already imported the surveys skip ahead to page 36 dealing with **Adding an Oil / Water Contact curve layer to the log**.

There are two ways of getting the survey points into the program. The user can either enter them manually into the survey point window. Or you can get an ASCII or LAS file from the directional driller. We will show you the manual entry here.

Click on the **Report** selection on the Menu bar and **select** the **Directional Survey** selection from the pull down menu. This will activate the Direction Survey Window.

Adding a Directional Survey Point...

- 1.) Click on the **Survey Points** button. This will activate the Survey Points window.

- 2.) Click on the **New** button to prepare the **Directional Survey Point** window for the acceptance of a new record.
- 3.) Type in **1000** into the field beneath the **Measured Depth** button, **tab**, **82** in the **Drift Angle** field, **tab**, and **120** in the **Azimuth** field.

Note: The **Alignment** always defaults to the **right (top)** of the track that holds the directional survey points layer. However, if you select a **Blank Alignment** from the **Alignment** field drop box, your **Directional Survey Point(s)** will not be displayed on the **Detailed Lithology** track, but they will still be printed out in the **Well End Report** print window.

- 4.) Click on the **Save** button and then select **Start New Record** from the ensuing **Shortcut Options** window.

- **Adding another Directional Survey Point...**


- 1.) Type in **1009** into the field beneath the **Measured Depth** button, **tab**, **85** in the **Drift Angle** field, **tab**, and **120** in the **Azimuth** field.
- 2.) Click on the **Save** button and click on the **Start New Record** from the ensuing **Shortcut Options** window.
- 3.) Repeat steps 1 and 2 until you enter the last 1042 Survey point and then proceed with step 4

1018	87.5	120	1035	90	120
1027	89.5	120	1042	90	120

- 4.) Click on the **Calculate TVD** button to activate the TVD Calculations window.



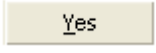
- 5.) In the **Directional Survey** portion of this window the defaults should be set by the Directional survey report we filled in earlier. Make sure that the **Calculate Directional Survey** check box is checked, **Survey Group One (1)** is viewed, **Minimum Curvature** is selected in the Calculation Method drop box and **tie in** is selected from drop box
- 6.) In the Master Survey Group **deselect** the **Calculate Master Survey Group** check box as we only have one set of survey points and we do not need to assemble a master survey group.
- 7.) In the Well Path portion of the window **select** the **Calculate Well path** check box. **Click** on the **Well Path Curves...** button. This will activate a Curve List window.
- 8.) **Double Click** on the **Well Path (TVD)** curve **or Click once** on the **Well Path (TVD)** curve and **click** on the **Select** button. This will put you back into the TVD Calculations window and place the Well Path (TVD) curve name. **Type** in a Start Depth of **1000** in the Start Depth field and **select** the **Units** for the curve as **TVD**.
- 9.) In the Calculate TVD Attributes portion of the window **deselect** the check box. We do not have any of these fields to be updated at this point in time.
- 10.) **Click** on the **Calculate** button. This will activate a Progress Window followed by a System message "**Exit TVD Calculation Window?**". **Click** on the **Yes** button.


When it is done your Directional Survey Point Window will be filled in with the calculation results shown.

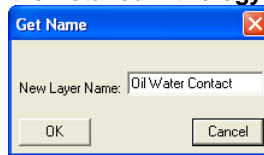
- 11.) Click on the  or Press your esc key to Exit this window. Your survey points and Well Path should now be seen on your log in the Detailed Lithology Track.

Adding an Oil / Water Contact Curve Layer to the log

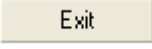
- 1.) Under the **Options** menu, click on **Log Configuration Builder** or click on the **Log Configuration Builder**  button on the **Toolbar** to activate the **Log Configuration Builder** window.

- 2.) On the left side scroll down in the tracks portion of the window and **highlight** the **Curves**.
- 3.) **Click** on the **Curve** layer in the layers portion of the window on the lower left side of the builder to highlight it. Also notice the  **Layers** radio button on the left hand side gets activated.
- 4.) On the **right** side (**Active Log**) of the **Log Configuration Builder** window, click on the **Detailed Lithology** track to highlight it. This is the track we want to add the Curve layer to.
- 5.) **Click** on the  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  button.

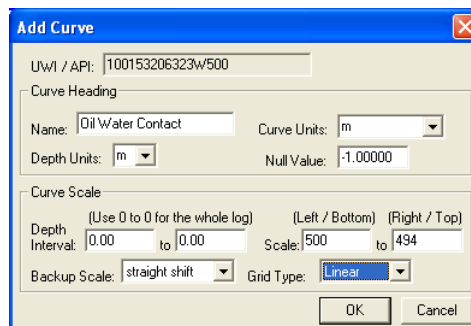
- This will activate a **Get Name** window with **“Curve”** as the name in the **New Layer Name** field. **Type** in the New Curve Name **“Oil Water Contact”** in the Get Name window and then **Click** on the  button and the **Oil Water Contact** layer will then be added to the **Detailed Lithology** track.




Note: The **Oil Water Contact** curve has not yet been associated with the layer yet. This will be done when the **Add Curve** window has been correctly filled in.

- Click** on the  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.

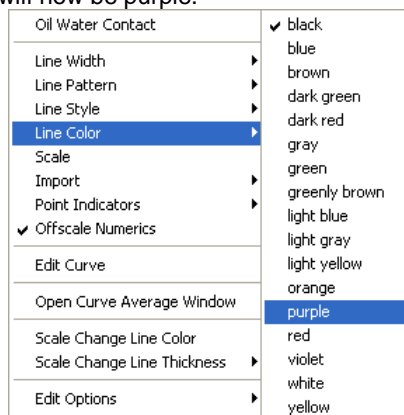
- The Add Curve window...**





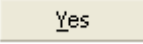
- Select m** from the **Curve Units** drop box field.
- Type** in **500** in the **Left / Bottom** field and **494** to the **Right / Top** field.
- Select Linear** from the **Grid Type** drop box.
- Click** on the  button to add the curve layer to the Detailed Lithology Track.

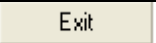
Changing the line color and adding two (2) data points to draw a line.

- Click** anywhere in the **Detailed Lithology** track. Notice that a **green** border highlights or surrounds the track. This is used to indicate that the track is **ACTIVE**.
- Click** on the **down arrow on the right hand side of the Layer Selection List** to activate the list.
- Click** on the **Oil Water Contact** selection from the Layer Selection List. This will make the Oil / Water Contact layer active.
- Right Click** on the **Oil Water Contact layer** to activate the pop-up menu and **select color** and then **select Purple** from the pop-out menu. Your curve will now be purple.

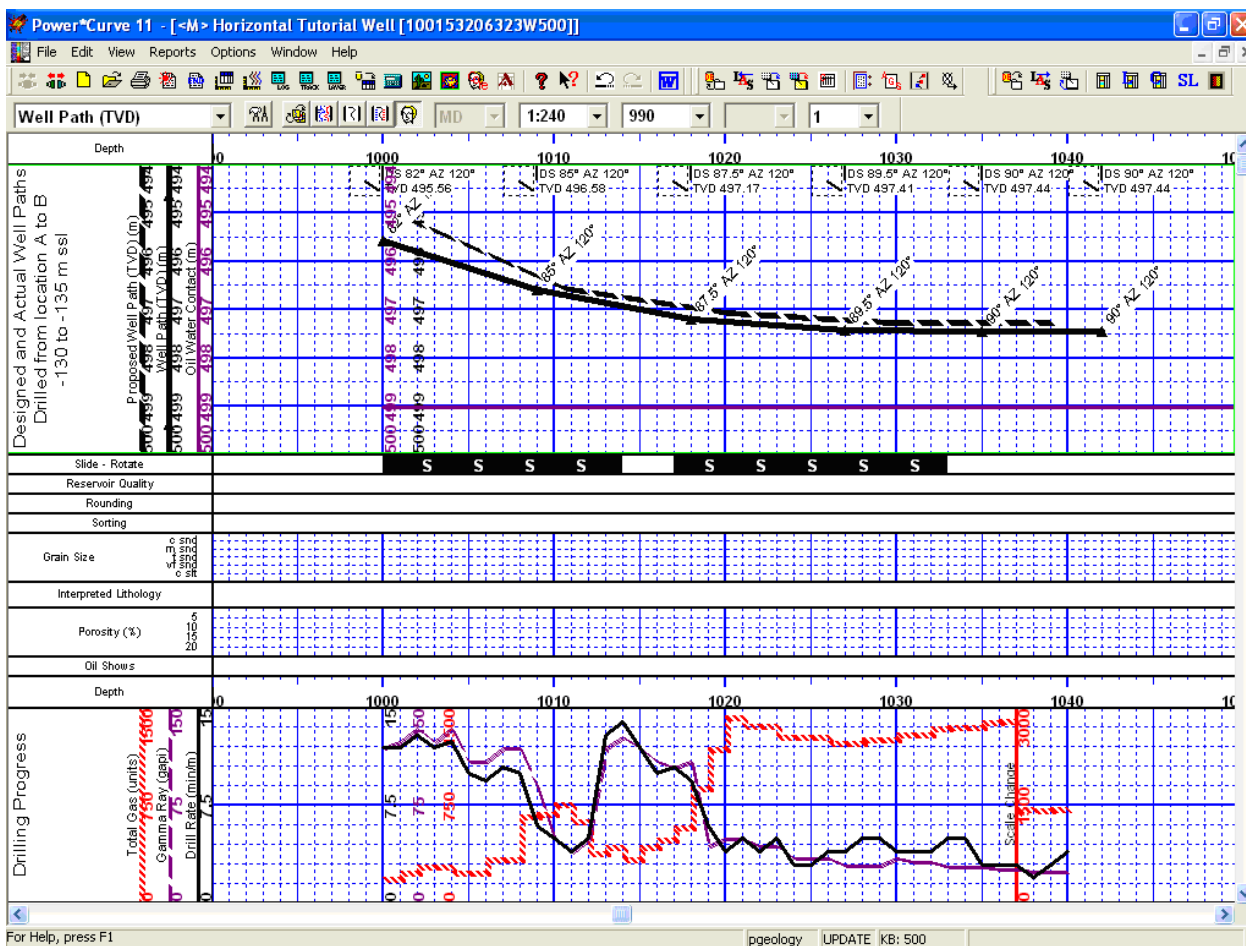


- 5.) Double click within the active **Detailed Lithology track** / with the **Oil / Water Contact layer active** to activate the Curve Editor for the Oil / Water Contact Curve. Or the user can click once on the  **Data Editing Tool of Active Layer button** on the **Toolbar**.
- 6.) Double click on the **Depth (m)** field and type **1000** into the **Depth (m)** field and then press the **Tab** key on the keyboard to move the cursor to the **Value (m)** field.
- 7.) Type **499** into the **Value (m)** field and then press the **Enter** key on the keyboard.
- 8.) Double click again on the **Depth (m)** field and type **2000** into the **Depth (m)** field and then press the **Tab** key on the keyboard to move the cursor to the **Value (m)** field.
- 9.) Type **499** into the **Value (m)** field and then press the **Enter** key on the keyboard.
- 10.) Click on the  **Save button**.

Note: If you forget to save the values before you exit from the **Curve Editor** window, you will be prompted by the following system message, **“Would you like to save the digits?”** Click on the  **button** to save the newly edited curve values.

- 11.) Click on the  **button** or the user can press the **Esc** key on the keyboard to exit from the Curve Editor window and put you back into the main Power*Curve Window.

**** Your log should now look similar to the log shown below. ****



Adding Sample Descriptions

- 1.) Click on the **Reports** selection on the **Power*Curve™ Menu Bar** to activate the pull down menu and then **Click** on **Sample Description** to open the **Sample Description** window.

- 2.) Type **1000** into the **Interval** (From) field and then depress the tab key.
- 3.) Type **1004** into the **Interval** (To) field and then depress the tab key.
- 4.) Type **Sh** into the **Rock Type** field and then depress the **tab key 4 times**. This will move the cursor to the Short description field.

Note: The rock types can be entered in a percentage format. This would generate a % description report as well as a % track or layer. For this exercise we will describe the samples interpretively.

- 5.) Type the following description into the **Short Description** field, exactly as it appears below:

m – dk gy, micmica, carb, occ tr glau grs, non calcs, fis. Tr Sid pels.

Note: The Long or Short Descriptions can be automatically transferred to the **Lithology Description** layer in the **Power*Curve™** window and the **Long Description** will be printed out in the **Sample Description Reports** from the **Print Well End Report** window.

- 6.) In the transfer options portion of the window **check mark** the **Automatic Description transfer**, **check mark** the **Transfer Depth Range**, and **check mark** the **Transfer Short Form** and select the lithtext1 group from the Transfer to Annotation Group drop box.
- 7.) Click on the **Save** button and then click on the **Start New Record** button from the ensuing **Shortcut Options** window.

Note: This will automatically transfer your samples descriptions to the Striplog.

- **Adding another Sample Description...**

- 1) Click on the **Auto Next** button to advance the description interval from depth to **1004m** and places the caret or highlight in the Interval to field.
- 2) Type **1008** into the **Interval (To)** field and then depress the tab key
- 3) Type **Ls** into the **Rock Type** field and then depress the **tab key 4 times**. This will move the cursor to the Short description field.
- 4) Type the following description into the **Short Description** field, exactly as it appears below:

lt gy brn, rexld mdst (crpxl), arg, dns, ns.

- 5) Click on the **Save** button and then click on the **Start New Record** button from the ensuing **Shortcut Options** window.

Note: If you have made any typing errors the user can click on the Cancel button, then you can make any necessary corrections and then **Save** the record once again to replace the old record with the new one.

- **Adding another Sample Description**

- 1.) Click on the **Auto Next** button to advance the description interval from depth to **1008m** and places the caret or highlight in the Interval to field.
- 2.) Type **1012** into the **Interval (To)** field and then depress the tab key
- 3.) Type **Ss** into the **Rock Type** field and then depress the **tab key 4 times**. This will move the cursor to the Short description field.
- 4.) Type the following description into the **Short Description** field.

*m gy brn, m gred, modly w srt, rdd, qtz, com cht, occ glau & carb grs, sils cmt, fr - g
intgran por (14-20%), com - abnt brn o stng, bri yel flor, g stmg mky yel cut flor.*

- 5.) Click on the **Save** button and then click on the **Start New Record** button from the ensuing **Shortcut Options** window.

- **Copying a Sample Description...**


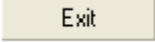
- 1.) While still in the **Sample Description** window, click on the **Interval...** button to bring up a list of the descriptions you have already entered.
- 2.) **Double click** on **1000 - 1004 Sh** and you will now see this description displayed in the **Sample Description** window.
- 3.) Highlight the text in the **Short Description** field by **clicking and dragging the mouse pointer over the text**.
- 4.) Once the text is highlighted, **hold down** the **Ctrl** key on the keyboard, press the letter "**C**" key on the keyboard, and then release the **Ctrl** key or the users can simply **right click** anywhere and then select the **Copy** function from the ensuing pop-up menu.
- 5.) Click on the **New** button to clear the **Sample Description** window.
- 6.) Type in a new from **depth of 1012m** and **press the tab key** to place the caret or highlight in the Interval to field.
- 7.) Type **1018** into the **Interval (To)** field and then depress the tab key
- 8.) Type **Sh** into the **Rock Type** field and then depress the **tab key 4 times**. This will move the cursor to the Short description field.
- 9.) In the **Short Description** field **hold down** the **Ctrl** key on the keyboard, press the letter "**V**" key on the keyboard, and then release the **Ctrl** key or the users can simply **right click** anywhere and then select the **Paste** function from the ensuing pop-up menu.
- 10.) Click on the **Save** button and then click on the **Start New Record** button from the ensuing **Shortcut Options** window.

- **Adding more Sample Descriptions...**

- 1.) Click on the **Auto Next** button to advance the description interval from depth to **1018m** and places the caret or highlight in the Interval to field.

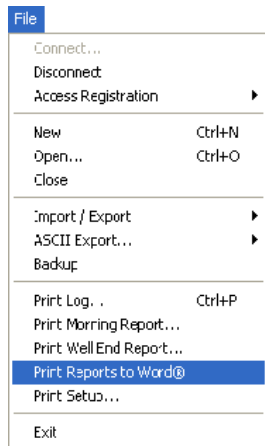
- 2.) . Type **1040** into the **Interval (To)** field and then depress the tab key
- 3.) **Type Ss** into the **Rock Type** field and then depress the **tab key 4 times**. This will move the cursor to the Short description field.
- 4.) **Type** the following description into the **Short Description** field, exactly as it appears below:


wh, lt gy, m - c gred, modly w srt, sbang - sbrdd, qtz, tr wthrd fld grs, tr dk cht pbls, sils cmt, g - ex intgran por (20-22%), abnt even brn o stng, flor aa.

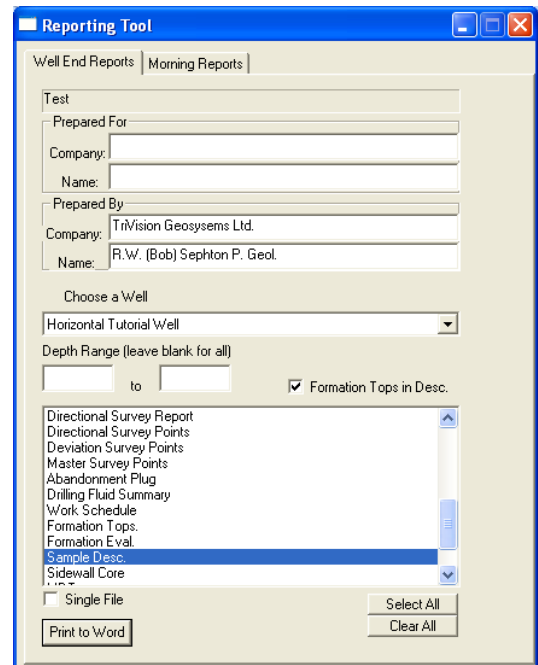
- 5.) **Click** on the  button and then **click** on the  button from the ensuing **Shortcut Options** window.

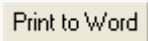
You will now view all your sample descriptions on the upper third of the Lithology Description Layer in your Detailed Lithology Track. We will move these descriptions around to fit so that the reader can see all the descriptions on the log at a later time. This will be done when we are finished with the Detailed Lithology Layer.

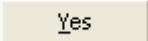
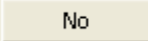
Printing out Sample Descriptions to Word. (Only if you have Word for Windows)




- 1.) **Click** on the  **Print Reports to Word** button on the **Toolbar** or **select Print Reports to Word Selection**, under the **File** menu, on the **Selection Bar** to activate the **Power*Log Report: Well End Report** window.
- 2.) The **Reporting Tool** print window will automatically default to the active **Well/Log Name**.: You will see **Horizontal Tutorial Well** in the **Choose a Well** field If it is not the defaulted well then go to the **Well list** drop box and select it from the List.



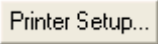

- 3.) Highlight **Sample Desc** in the **Reports** field by clicking on it once.
- 4.) Leave the **Depth Range** field blank to print all the descriptions.
- 5.) **Click** on the **Formation Tops in Desc** check box
- 6.) **Click** on the  button in the **Well End Report** window to printout the **Sample Descriptions**. This will activate you word program and you will get the Sample descriptions and Formation tops that were input through the Reports window.
- 7.) When you are finished, **press** the **Esc** key on the keyboard to exit from the **Well End Report** window and to

activate the following system message, "**Do you want to save the setup**" Clicking on the  button and the window selections you have just made will be remembered for the next time. Clicking on the  button will remember the default selections that were set for this window.



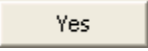
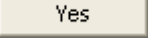
Printing out Sample Descriptions (If you do not have Word for Windows)

- 1.) **Click** on the  **Print Well End Report** button on the **Toolbar** or **select Print Well End Report**, under **File**, on the **Selection Bar** to activate the **Power*Log Report: Well End Report** window.
- 2.) The **Well End Report** print window will automatically default to the active **Well/Log Name** and its associated **UWI**: you will see **Tutorial Well (100143206323W500)** in the **Well List** field and it should be highlighted. If it is not

highlighted, move the mouse pointer to the **Well List** field and **click** on the desired **Well / Log Name** to highlight the **Well** you wish to print information from.

- 3.) Highlight **Sample Descriptions** in the **Reports** field by **clicking on it once**.
- 4.) **Select Printer** from the **Output** drop box field list.
- 5.) **Click** on the  button, in the upper right corner of the **Well End Report** window, to activate the **Print Setup** window. Notice that the currently selected printer is listed beneath the **Default printer** radio button (), at the top left of the **Print Setup** window. Use the **Printer** section of the **Print Setup** window to specify the use of a printer other than the default printer.

Note: Power*Log™ automatically defaults to a **Paper Orientation** of **Portrait** and a **Paper Size** of **8 5 x 11**, as specified in the **Orientation** and **Paper** sections, respectively, of the **Print Setup** window. Please do **NOT** change these default settings.

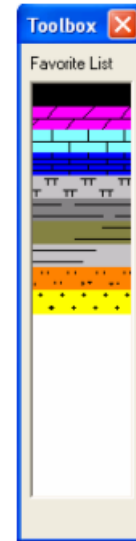
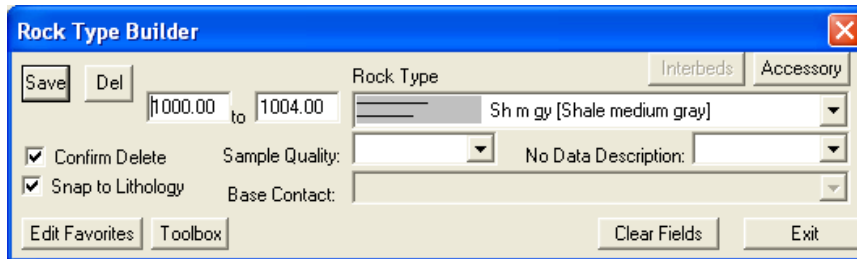
- 6.) Make sure that the **All** check box (), in the **Sample Description** section at the lower right of the **Well End Report** window, is activated.
- 8.) **Click** on the  button in the **Well End Report** window to printout the **Sample Descriptions**.
- 9.) When you are finished, **press** the **Esc** key on the keyboard to exit from the **Well End Report** window and to activate the following system message, "**Do you want to save the setup configuration?**" **Click** on the  button and all of the printer selection/settings information utilized in the **Well End Report** window will be saved to the database for any future **Well End Report** print jobs. Clicking on the  button will also return you to the main log window.

Drawing Interpreted Lithology

Note: To work on any layer in any track, simply **double click** on the track in which you wish to work to activate the "**builder**" window for that particular layer. Once the "**builder**" window for a given layer is active, you are then able to access the right click **pop-up** menu(s) associated with that "**builder**" window and may proceed to enter any necessary intervals and graphical descriptions for the given layer.

- **Drawing Rock Types...**

- 1.) **Double click** anywhere within the **Interpreted Lithology** track to activate the **Rock Type Builder** window and its **Toolbox**.



Note: The **Rock Types** are selected by the user in the **System Options** window (See **System Options** earlier in this tutorial).

- 2.) **Select** the Rock Type for **Shale (medium gray)** from the Toolbox and it will automatically be displayed in the **Rock Type** field within the **Rock Type Builder** window.
- 3.) **Define** the left side of the interval by **clicking and holding** the left mouse button at **1000m** on the **Interpreted Lithology** track.

- 4.) **Define** the right side of the interval by **dragging** the mouse pointer to **1004m**.
- 5.) Finally, **release the mouse button** and the interval will be drawn accordingly.

1000.00
1004.00

- **Drawing another Rock Type...**

- 1.) **Select** the Rock Type for **Limestone (mud supported)** from the Toolbox and it will automatically be displayed in the **Rock Type** field within the **Rock Type Builder** window.
- 2.) **Define** the left side of the interval by **clicking and holding** the left mouse button at **1004m** on the **Interpreted Lithology** track.

- 3.) **Define** the right side of the interval by **dragging** the mouse pointer to **1008m**.
- 4.) Finally, **release the mouse button** and the interval will be drawn accordingly.

1004.00
1008.00

Drawing another Rock Type...

- 1.) **Select** the Rock Type for **Sandstone** from the Toolbox and it will automatically be displayed in the **Rock Type** field within the **Rock Type Builder** window.
- 2.) **Define** the left side of the interval by **clicking and holding** the left mouse button at **1008m** on the **Interpreted Lithology** track.

- 3.) **Define** the right side of the interval by **dragging** the mouse pointer to **1030m**.
- 4.) Finally, **release the mouse button** and the interval will be drawn accordingly.

1008.00
1030.00

Inserting Rock Type within an interval...

****The following steps will require you to temporarily modify the Screen Accuracy from 1m to 0.5m. You can do this by selecting 0.5m from the Screen Accuracy field drop box found to the immediate left of the LAS button at the top right of the main Power*Curve™ screen.**

- 1.) **Select** the Rock Type for **Shale (medium gray)** from the Toolbox and it will automatically be displayed in the **Rock Type** field within the **Rock Type Builder** window.

- 2.) Define the left side of the interval by **clicking and holding** the **left** mouse button at **1012.5m** on the **Interpreted Lithology** track.


1012.50
1018.00

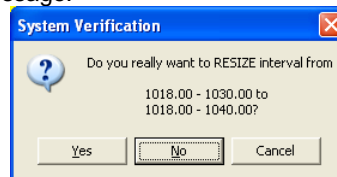
- 3.) Define the right side of the interval by **dragging** the mouse pointer to **1018m**.
- 4.) **Release the mouse button** and the user will be prompted with a system message **“Do you want to ADD an interbedded interval?”**

- 5.) Click on the **button** and the Shale bed will be inserted within the Sandstone Interval. If you had any accessories, grain size, sorting, rounding etc. Within this interval they would have been deleted.

Resizing an interval...

Note: The user can only resize either the top or the bottom of a particular bed at any one time. Accordingly, if you wish to resize both, you will have to repeat the steps.

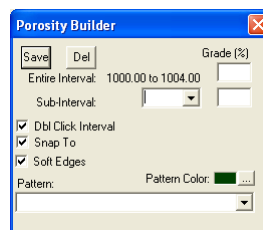
- 1.) **Press and hold** the **Ctrl** key on the keyboard **down**, while hovering over the right border of the Sandstone bed drawn earlier @ 1230m so that the mouse pointer turns into a resize  cursor.
- 2.) **Click and dragging** the **left** mouse button from **1030m** to **1040m** on the **Interpreted Lithology** track.
- 3.) **Release the mouse button** at **1040m**, followed by the release of the **Ctrl** key on the keyboard, and you will be prompted with the following system message.



- 4.) Click on the **button** to resize the **Sandstone** bed and then press the **Esc** key on the keyboard to exit from the **Rock Type Builder** window.

Drawing Porosity (%)

- 1.) **Double click** on the **Porosity (%)** track to activate the **Porosity Builder** window.



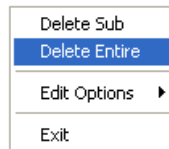
- 2.) Set the overall **Porosity** of the entire interval (**Ss** from **1008.0m** to **1012.5m**), by moving the mouse pointer to the left or right within the **Porosity (%)** track, until the mouse pointer displays a depth somewhere between the above interval **and a porosity reading of 18%** **1009.50 [18%]** which will be displayed in the yellow display box adjacent to the mouse pointer.
- 3.) Double click the mouse pointer and the desired **Porosity Grade** will be drawn accordingly.
- 4.) Set the overall **Porosity** of the entire interval (**Ss** from **1018.0m** to **1040m**), by moving the mouse pointer to the left or right within the **Porosity (%)** track, until the mouse pointer displays a depth somewhere between the above interval **and a porosity reading of 22%** **1030.00 [22%]** which will be displayed in the yellow display box adjacent to the mouse pointer.
- 5.) Double click the mouse pointer and the desired **Porosity Grade** will be drawn accordingly.

Drawing Porosity Grade sub-intervals...

To draw **Porosity (%)** sub-intervals, as illustrated on **Page 48**, simply **click and drag** the mouse pointer from a desired **Depth** and **Porosity (%)** to another **Depth** on the **Porosity Grade** track and the sub-interval will be drawn accordingly.

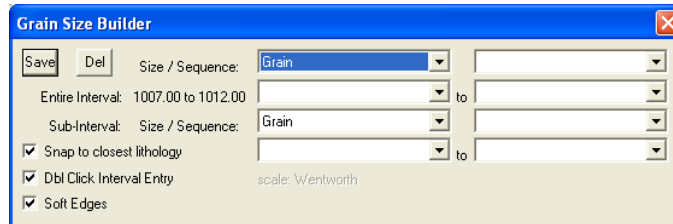
- **Deleting entire Porosity (%) intervals and sub-intervals...**

If you wish to delete an entire **Porosity (%)** interval or sub-interval, while the **Porosity Builder** window is open, **right click within** the interval or sub-interval slated for deletion to activate a pop-up menu, and then left **or** right click once on the appropriate selection.



Drawing Grain Sizes

- 1.) **Double click** on the **Grain Size** track to activate the **Grain Size Builder** window.



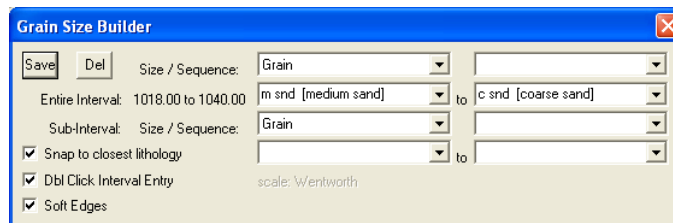
- 2.) Set the overall **Grain Size** of the entire interval (**Ss** from **1008.0m to 1012.5m**), by moving the mouse pointer to the left or right within the **Grain Size** track, until the mouse pointer displays a depth somewhere between the above interval and a **grain size of [m snd] 1010.00 [m snd]** which will be displayed in the yellow display box adjacent to the mouse pointer.
- 3.) Double click the mouse pointer and the desired **Grain Size** will be drawn in purple to represent an entire interval.

To define another entire interval with a grain size range the user has two methods described below.

- 1.) **Click and drag** the mouse pointer from **1018.0 [m snd]** to **1040 [c snd]** **1040.00 [c snd]** on the **Grain Size** track.

Note: Measured Depths and Grain Sizes, like **1008.0 [m]**, can be viewed within the mouse pointer display box, situated just to the right of the mouse pointer.

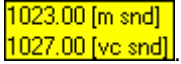
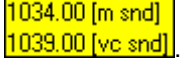
- 2.) **Release the mouse button** and the entire **Grain Size** interval will be drawn in purple to represent an entire interval.
OR
- 3.) The other method for drawing larger intervals of Grain Size is to click the mouse pointer within the interval. In our case **click the mouse** in the grain size track **between 1018 and 1040m**. You will notice the builder will show the entire interval for the bed.



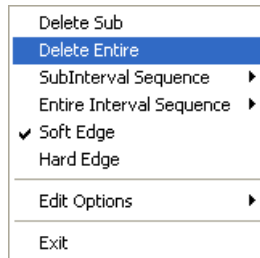
- 5.) **Click** on the top Grain size **from field drop box arrow** and select **m snd [medium sand]** from the resulting choice list.
- 6.) **Click** on the top Grain size **to field drop box arrow** and select **c snd [coarse sand]** from the resulting choice list.
- 7.) **Click** on the **Save** button and the entire interval will be drawn.

- **Drawing Grain Size sub-intervals...**

- 1.) To draw subinterval without snapping to the top of the bed (depending on the mouse pointer accuracy) the user must first **deselect** the **Snap to closest lithology** in the **Grain Size Builder**.

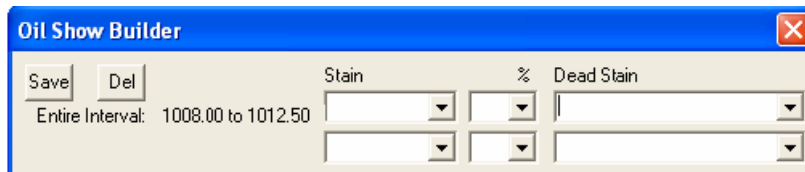
- 2.) Using the **left** mouse button, **click and drag** the mouse pointer from **1023.00 [m snd]** to **1027.00 [vc snd]**

 - 3.) **Release** the **mouse button** and the sub-interval will be drawn in green to represent a subinterval versus an entire interval which is drawn in purple.
 - 4.) Repeat **Steps 2** and **3** for **1034.00 [m snd]** to **1039.00 [vc snd]**

 - 5.) To exit from the **Grain Size Builder** window press the **Esc** key on the keyboard once.
- **Deleting entire Grain Size intervals and sub-intervals...**

If you wish to delete an entire **Grain Size** interval or sub-interval, while the **Grain Size Builder** window is open. Simply **right click** within the interval or sub-interval slated for deletion to activate a pop-up menu, and then left or right click once on the appropriate selection.

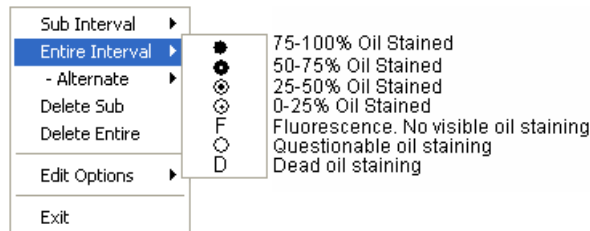


Drawing Oil Shows

- 1.) **Double click** on the **Oil Show** track to activate the **Oil Show Builder** window.



- 2.) **Right click** anywhere within the **1008m to 1012.5m** interval in the **Oil Show** track to activate the pop-up menu.



Note: The symbols utilized in the pop-up menu, represent a specific percentage (%) or amount of oil staining, as illustrated in the above diagram.

- 3.) **Select 50-75%** oil staining from the **Entire Interval** pop out menu and the entire bed will be populated with the **Oil Show** symbol (●).indicating **50-75%** oil staining.
- 4.) **Right click** anywhere within the **1018m to 1040m** interval in the **Oil Show** track to activate the pop-up menu.
- 5.) **Select 75-100%** oil staining from the **Entire Interval** pop out menu and the entire bed will be populated with the **Oil Show** symbol indicating **75-100%** oil staining.

Note: The Symbol frequency or the number of symbols on a 1:240 scale is determined in the System Options located under the Option pull down men on the Power*Curve Menu Bar

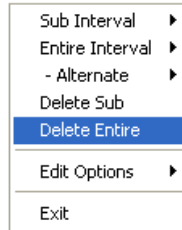
- **Drawing Oil Show sub-intervals...**

- 1.) **Right click** anywhere **Oil Show** Track to activate the pop-up menu.
- 2.) **Select 50-75%** oil staining from the **Sub Interval** pop-up menu.

- 3.) Click and drag from 1020-1022m 1020.00
1022.00, 1028-1030m 1028.00
1030.00, and 1032-35m 1032.00
1035.00 and three sub-intervals (in red) will be populated with the 75-100% oil staining symbol (●).

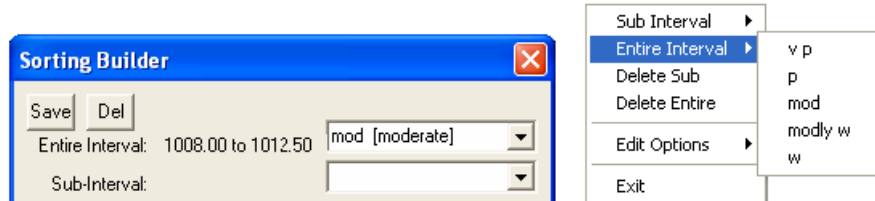
• **Deleting entire Oil Show intervals and sub-intervals...**

To delete an entire **Oil Show** interval or sub-interval, while the **Oil Show Builder** window is open, **right click** within the interval or sub-interval slated for deletion to activate the pop-up menu and then left or right click on the appropriate selection.



Drawing Sorting

- 1.) **Double click** on the **Sorting** track to activate the **Sorting Builder** window.



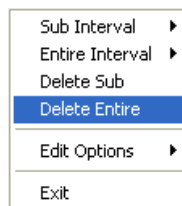
- 2.) **Right click** once anywhere within the **1008m to 1012.5m** interval the **Sorting Track** to activate the pop-up menu.
 3.) Select **mod** for the **Entire Interval** from the pop-up menu and the entire bed will be populated with the “**M**” symbol.
 4.) **Right click** once anywhere within the **1018m to 1040m** interval the **Sorting Track** to activate the pop-up menu.
 5.) Select **modly w** for the **Entire Interval** from the pop-up menu and the entire bed will be populated with the “**mW**” symbol.

• **Drawing a Sorting sub-interval...**

- 1.) **Right click** anywhere on the **Sorting** track to activate the pop-up menu.
 2.) **Select mod** from the Sub Interval pop-up menu.
 3.) **Click and drag** from 1026-1028m 1026.00
1028.00 and the specified sub-interval will be populated with the “**M**” symbol.

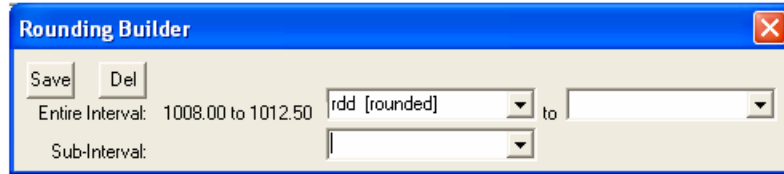
• **Deleting entire Sorting intervals and sub-intervals...**

To delete an entire **Sorting** interval or sub-interval, while the **Sorting Builder** window is open, **right click** within the interval or sub-interval slated for deletion to activate the pop-up menu and then left or right click once on the appropriate selection.

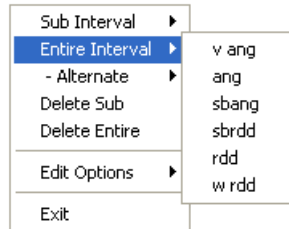


Drawing Rounding

- 1.) **Double click** on the **Rounding** track to activate the **Rounding Builder** window



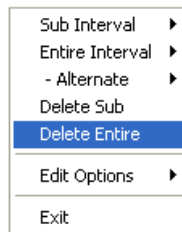
- 2.) **Right click** anywhere within the **1008m to 1012.5m** interval in the **Rounding Track** to activate the pop-up menu shown below



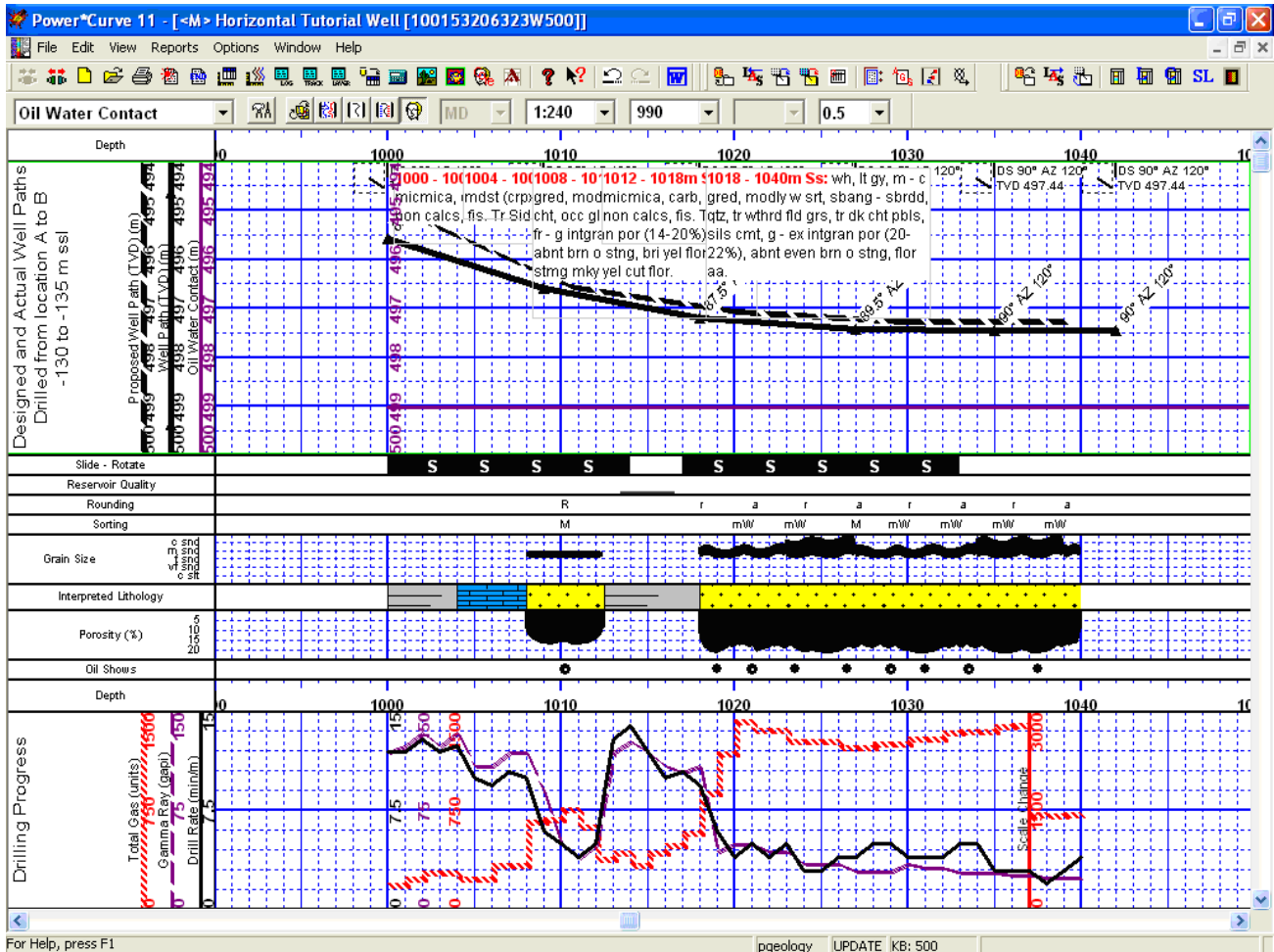
- 3.) **Select rdd** for the **Entire Interval** from the pop-up menu and the entire bed will be populated with the “R” symbol.
- 4.) **Right click** anywhere within the **1018m to 1040m** interval in the **Rounding Track** to activate the pop-up menu.
- 5.) **Select sbrdd** from the **Entire Interval pop-out menu** and the entire bed will be populated with the “r” symbol.
- 6.) **Right click** anywhere within the **1018m to 1040m** interval in the **Rounding Track** to activate the pop-up menu.
- 7.) **Select sbang** from the **- Alternate pop-out menu** and you will view alternating “a” and “r” symbols in this track.

- **Deleting entire Rounding intervals and sub-intervals...**

If you wish to delete an entire **Rounding** interval or sub-interval, while the **Rounding Builder** window is open, **right click** within the interval or sub-interval slated for deletion to activate the pop-up menu and then left or right click once on the appropriate Delete selection.




**** Your log should now look similar to the Log shown on the next page. ****




Utilizing the Layers Organizer for a track


- 1.) Click on the **Detailed Lithology** track to make it active (highlighted in green).
- 2.) Click on the **View pull down menu** and **select Layers**

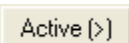
Organizer. You can also select the  button on the selection bar. This will activate the Layers Organizer window for the detailed Lithology Track.

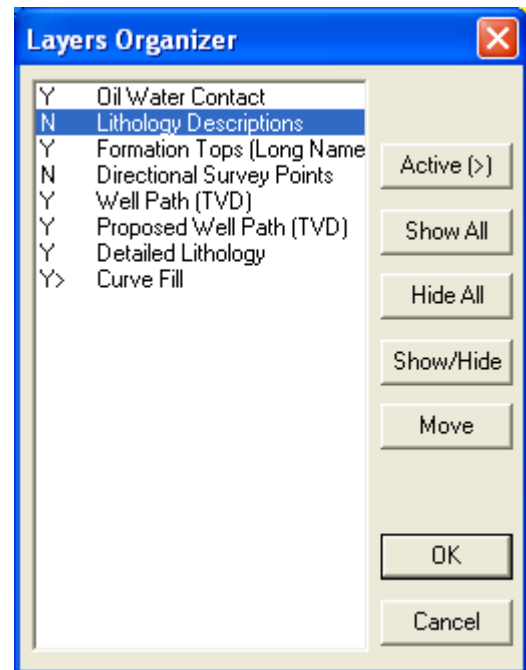
- 3.) Click on the **Directional Survey Points Layer** so that it is highlighted.

- 4.) Click on the  button. This will turn off the directional survey layer as they are redundant because we are utilizing the Survey points associated with the Well path curve. You will notice and N beside the layer name.

- 5.) Click on the **Lithology Description Layer** so that it is highlighted.

- 6.) Click on the  button. This will turn off the lithology description layer so that we can work with the curve fill layer. You will notice and N beside the layer name.

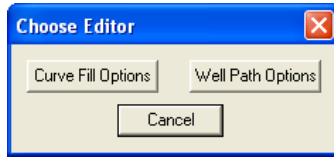
- 7.) Click on the Curve Fill Layer and then click on the  button. This will put a > symbol beside this layer. This indicates it is the active layer.



- Click on the **OK** button. This will close the window and turn off the Lithology Description and the Directional Survey Points layers and make the Curve fill layer active on the detailed lithology track.

Curve Fill Layer to Draw Lithology in the Detailed Lithology Track

- Double click anywhere within the **Detailed Lithology** track to activate the Choose Editor window shown below.



- Click on the **Curve Fill Options** button to activate the **Curve Fill Options** window shown below.

- Click on the **Set Main Curve** button. This will activate a list of curves associated with this well.
- Click on the **Well Path** so that it gets listed in the upper

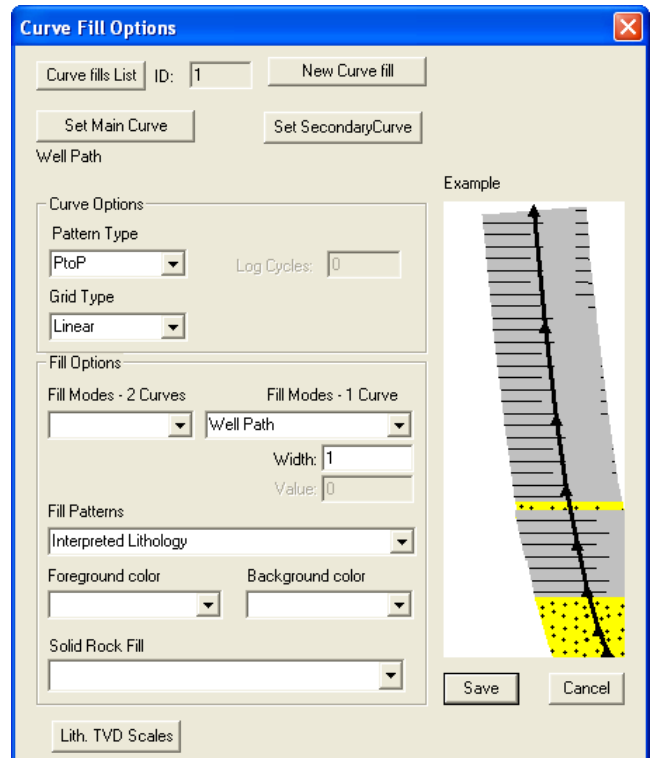
portion of the window and then click on the **Select** button or double click on the **Well Path**. You will now view the curve name below the Set Main Curve button.

Curve Options Portion of the Window. This information is pertaining to the Main Curve and its Curve attributes.

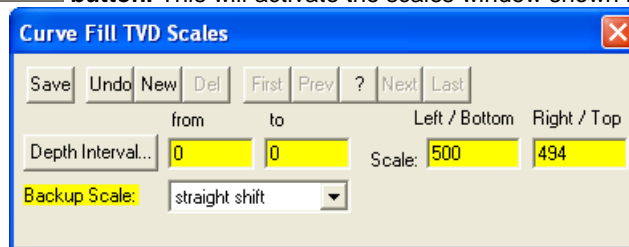
- Click on the **Pattern Type** down arrow and select **PtoP** (Point to Point).
- Click on the **Grid Type** down arrow and select the **Linear**.

Fill Options Portion of the Window (One Curve)

- Click on the **Fill Modes – 1 Curve** down arrow and select **Well Path**.
- Type **1** in the **Width** field. Example If (1) one is type into the width field then the fill will be ½” either side of the Well Path Curve.
- Click on the **Fill Patterns** down arrow and select the **Interpretive Lithology**.

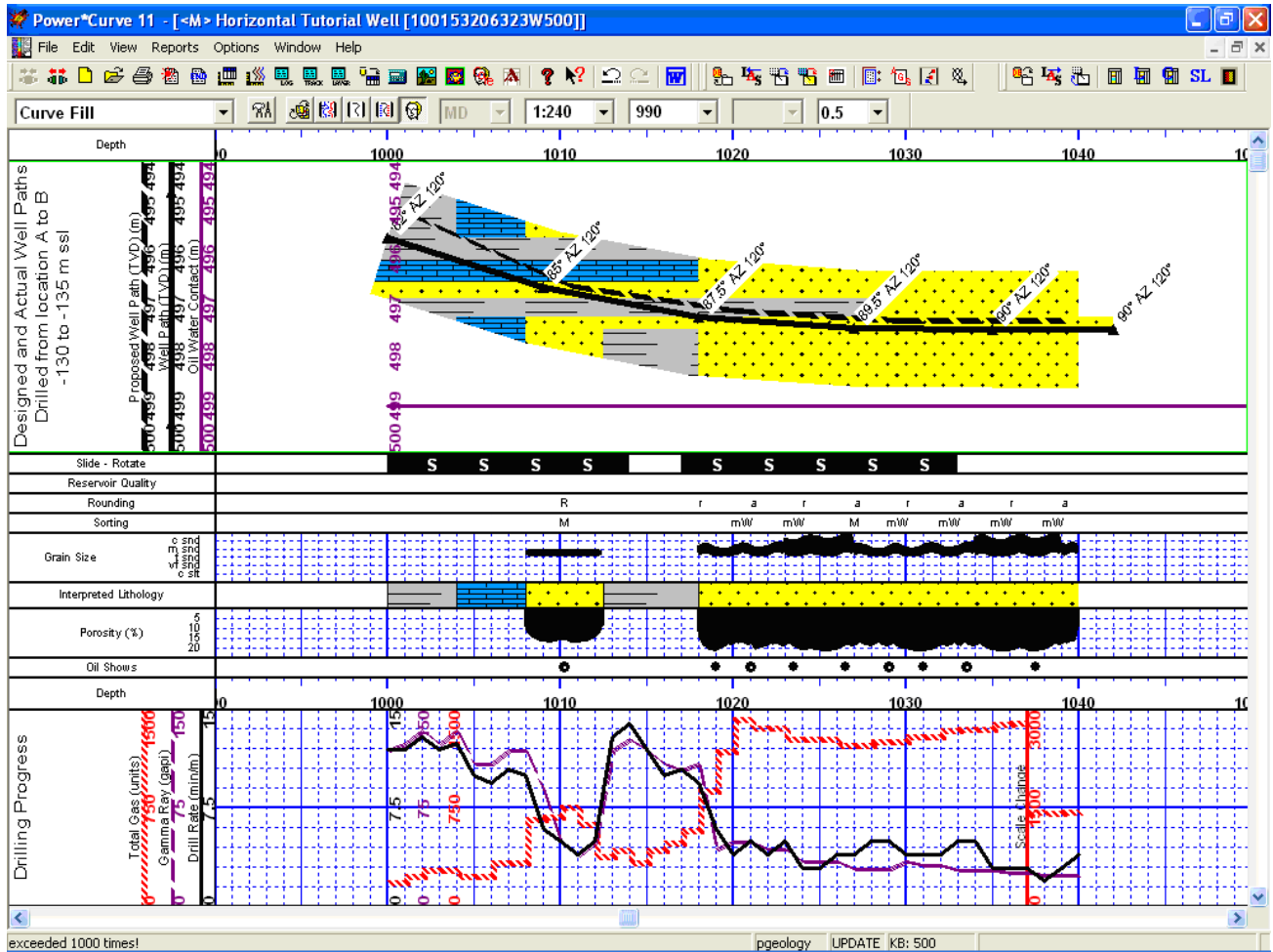


- Click on the **Lith. TVD Scales** button. This will activate the scales window shown below.



- Type **0** in the **from** and **to** Depth interval fields.
- Type in **500** in the **Left / Bottom** and **494** to the **Right / Top** fields.
- Select **Straight Shift** from the **Backup Scale** drop box.
- Click on the **Save** button to add the TVD Scales to the Curve fill layer in the Detailed Lithology Track. This will activate the Shortcut Options menu.
- Click on the **Exit** button to close this window.

**** Your log should now look similar to the Log shown below. ****

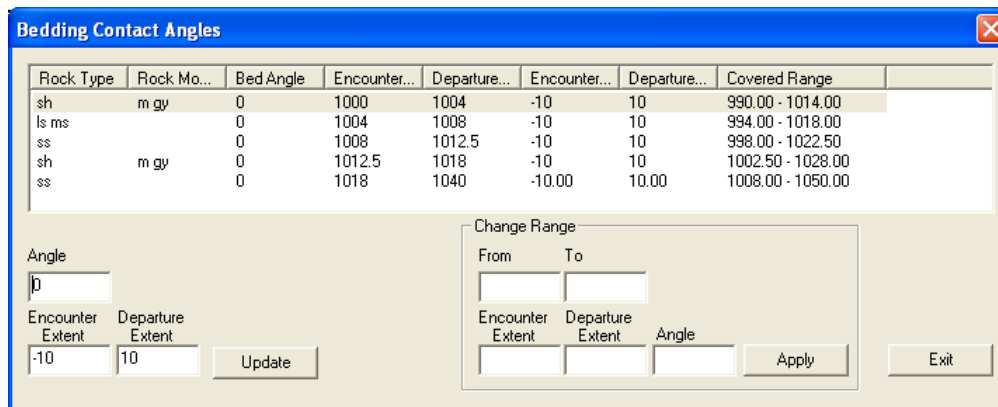


The Well Path Curve Fill Layer

- 1.) **Double click** anywhere within the Curve Fill Layer in the Detailed Lithology track to activate the Choose Editor window shown below.

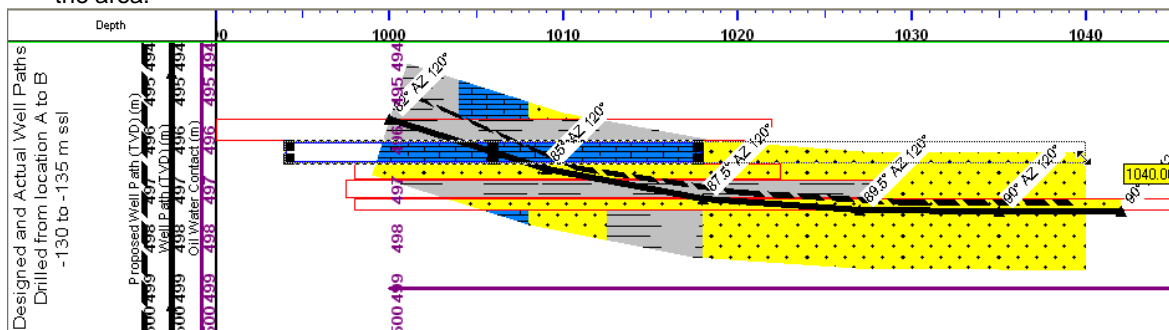


- 2.) **Click on the** Well Path Options **button to activate the Bedding Contact Angles window shown below.**



We will now modify the extents of the individual beds. To do so you can utilize the Mouse pointer or the keypad method of data entry. We will demonstrate both in this tutorial.

- 3.) **Click on the top sh mgy bed** and it will appear in the lower right hand info portion of the window. **Change the departure extent from 10 to 18** and then **click on the** Update **button.**
- 4.) **Click on the Ls Ms Bed (blue)** on the **curve fill layer** to activate the blue box around it. This will also activate it in the Bedding Contacts Angles window as well.
- 5.) **Hold the CTRL Key down and move mouse over the right edge of the bed (departure extent) and click and drag the** departure extend out to **1040m** as shown in the illustration below and **let the mouse button go.** This will revise the bed in the Bedding Contact Angles window and refresh on the screen with the LS Ms going to the end of the area.

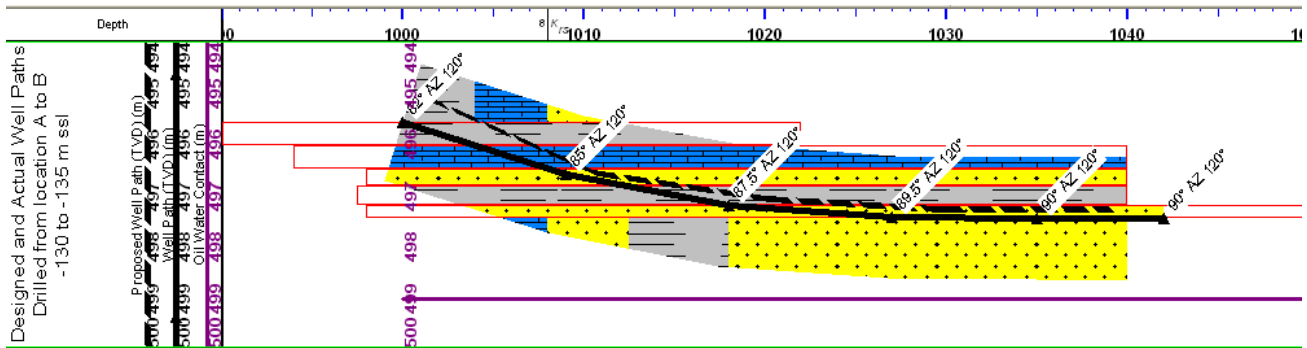


- 6.) **Click on the top ss bed** and it will appear in the lower right hand info portion of the window. **Change the departure extent from 10 to 27.5** and then **click on the** Update **button.**
- 7.) **Click on the bottom sh m gy bed** and it will appear in the lower right hand info portion of the window. **Change the Encounter extend from -10 to -15** and **Change the departure extent from 10 to 22** and then **click on the** Update **button**

- 8.) Click on the **bottom ss bed** and it will appear in the lower right hand info portion of the window. **Change the Encounter extend from -10 to -20** and then click on the **Update** button. If done correctly your Bedding Contacts window will look like the one below.

Rock Type	Rock Mo...	Bed Angle	Encounter...	Departure...	Encounter...	Departure...	Covered Range
sh	m gy	0	1000	1004	-10	18	990.00 - 1022.00
ls ms		0	1004	1008	-10	32	994.00 - 1040.00
ss		0	1008	1012.5	-10	27.5	998.00 - 1040.00
sh	m gy	0	1012.5	1018	-15	22	997.50 - 1040.00
ss		0	1018	1040	-20	10	998.00 - 1050.00

From	To	
<input type="text"/>	<input type="text"/>	
Encounter Extent	Departure Extent	Angle
<input type="text"/>	<input type="text"/>	<input type="text"/>

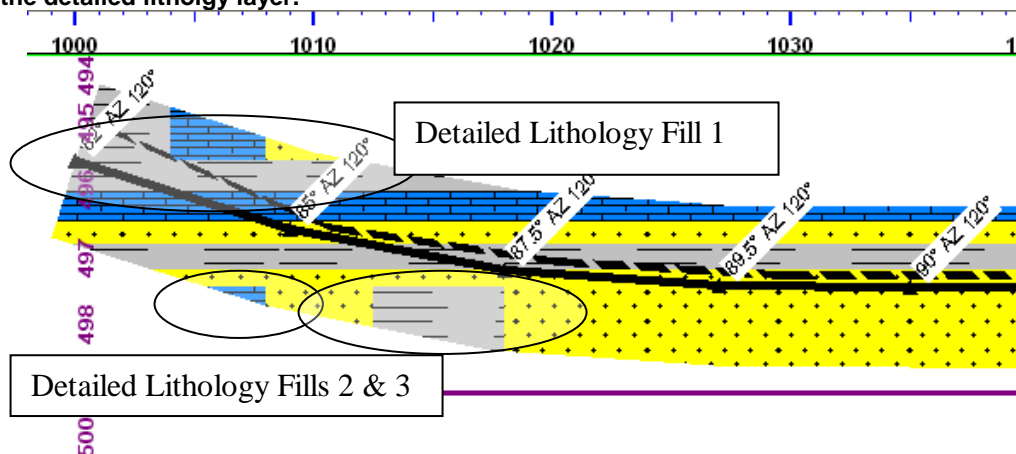


- 9.) Click on the **Exit** button to close this window.

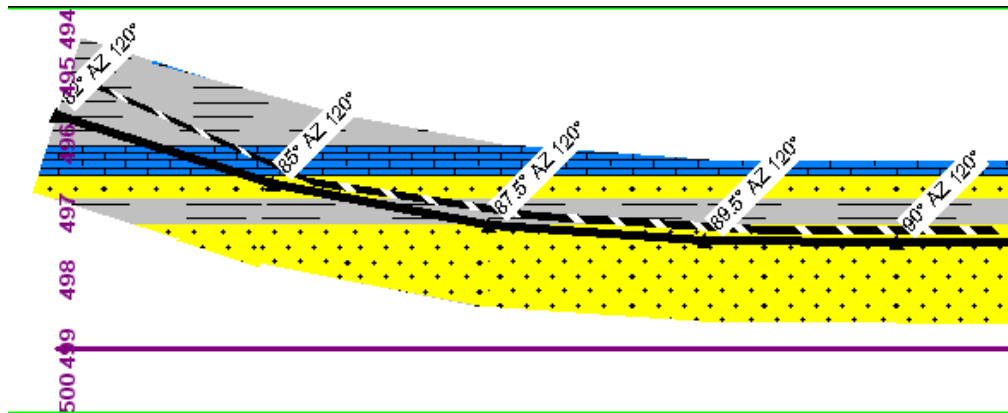
The Detailed Lithology Layer

In **Power*Curve™**, this layer allows you to create a visual representation of the **Interpreted Lithology** associated with your horizontal well path and gives you the ability to show **Lithology** above and below the well path curves or fill in areas where the Curve fill layer leaves a bit to be desired.

This is an illustration of the log before we fill in the erroneous lithology drawn by the curve fill layer. This is done with the detailed lithology layer.



This is an illustration of the log after we have drawn in some lithology with detailed lithology layer.



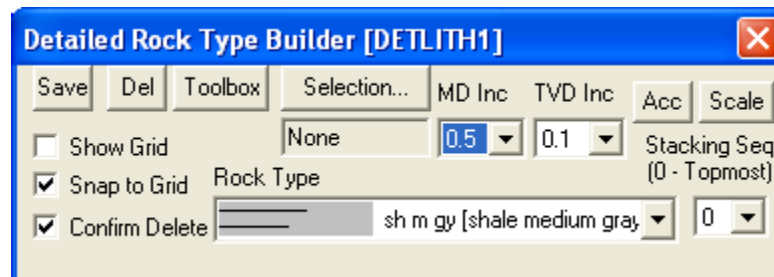
- **Drawing Detailed Lithology Fill1...**

- 1.) Make the **Detailed Lithology** layer active within the **Detailed Lithology** track by clicking on the Track and then selecting the **Detailed Lithology** layer from the **Layer Selection List** field.

Note: When this layer was first added to your log, you were prompted with a **Measured Depth** interval and a **Scale** for the top and bottom of the layer. This scale defines the upper and lower limits of your **Detailed Lithology** and should correspond to the top/right and bottom/left scales of your well path curves. The scale can be changed at any time and new scales may be added within the Detailed Lithology builder window.

When **Detailed Lithology** is your active or working layer, you will have the **True Vertical Depth (TVD)** increments visible on the left side of the layer. These are predetermined by the major/minor linear cycle settings set in the **Layer Configuration** window for this layer.

- 2.) **Double click** on the track to activate the **Detailed Rock Type Builder** window, the Toolbox, and a grid pattern (both the MD and TVD are defaulted to **1m** increments), in the **Detailed Lithology** layer.



- 3.) In our case we will need a little more accuracy in the TVD grid pattern and MD grid pattern. To change the grid pattern in the detailed lithology layer **click on the MD Inc drop box arrow** and **select 0.5** and then **click on the TVD Inc drop box arrow** and **select 0.1** from the subsequent list. This grid change will now be the default when you open this builder window the next time.
- 4.) Also turn off the **Show Grid** check box as shown in the builder above. With the grid off the detailed lithology layer is not as busy as the MD and TVD Inc are quite close together.

The Grid pattern is determined by the MD Inc and the TVD Inc drop boxes. This grid pattern is extremely helpful when the **snap to grid option** is activated. This makes the drawing of lithology a lot simpler when the user is attempting to join similar rock types together. The Show Grid option is a toggle for lack of better terms. It places the grid in front of the rock type, in back of the rock type and then it also turns the grid off entirely. As you click on this option you will notice the 3 different types of grid options.

Drawing Fill 1 in the Detailed Lithology layer...

- 1.) **Click** once on the **Sh m gy [Shale medium gray]** selection in the Rock Type Favorite toolbox to highlight it
- 2.) To define the top of the Shale bed move the mouse pointer to the detailed lithology layer so that you see in the yellow field that follows the mouse **1003.5 [494.7]**. To define the top **left click and drag** your mouse on the

Detailed Lithology layer until you see **1012.5 [495.6]** **1003.50 [494.7]** **1012.50 [495.6]** in the lower portion of the yellow field that follows the mouse pointer and then **release the left mouse button**. This will draw a line indicating the top of the Shale bed.

Note: If you do not like the position of the line the user can right click on the layer and you can select Restart from the resulting pop-out menu and the line will disappear so that you can proceed with step 2 again.



- 3.) Move the mouse pointer to the detailed lithology layer so that you see in the yellow field that follows the mouse **103.50 [495.6]**. To define the bottom of the Shale bed **left click and drag** your mouse on the Detailed Lithology layer until you see **1012.5 [495.6]** **1003.50 [495.6]** **1012.50 [495.6]** in the lower portion of the yellow field that follows the mouse pointer and then **release the left mouse button**. This will fill in the area between the two lines with Shale medium gray.

Drawing Fill 2 in the Detailed Lithology layer...

- 1.) **Click** once on the **Ss [Sandstone]** selection in the Rock Type Favorite toolbox to highlight it
- 2.) To define the top of the Shale bed move the mouse pointer to the detailed lithology layer so that you see in the yellow field that follows the mouse **1003.5 [494.7]**. To define the top **left click and drag** your mouse on the Detailed Lithology layer until you see **1005 [497.4]** **1005.00 [497.4]** **1008.50 [497.4]** in the lower portion of the yellow field that follows the mouse pointer and then **release the left mouse button**. This will draw a line indicating the top of the Sandstone bed.

Note: If you do not like the position of the line the user can right click on the layer and you can select Restart from the resulting pop-out menu and the line will disappear so that you can proceed with step 2 again.



- 3.) Move the mouse pointer to the detailed lithology layer so that you see in the yellow field that follows the mouse **1005 [497.4]**. To define the bottom of the Shale bed **left click and drag** your mouse on the Detailed Lithology layer until you see **1008.5 [497.8]** **1005.00 [497.4]** **1008.50 [497.8]** in the lower portion of the yellow field that follows the mouse pointer and then **release the left mouse button**. This will fill in the area between the two lines with Sandstone.


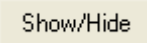

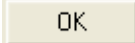
Drawing Fill 3 in the Detailed Lithology layer...

- 1.) **Click** once on the **Ss [Sandstone]** selection in the Rock Type Favorite toolbox to highlight it
- 2.) To define the top of the Shale bed move the mouse pointer to the detailed lithology layer so that you see in the yellow field that follows the mouse **1012 [497.4]**. To define the top **left click and drag** your mouse on the Detailed

Lithology layer until you see **1018 [497.4]** **1012.00 [497.4]** **1018.00 [497.4]** in the lower portion of the yellow field that follows the mouse pointer and then **release the left mouse button**. This will draw a line indicating the top of the Sandstone bed.

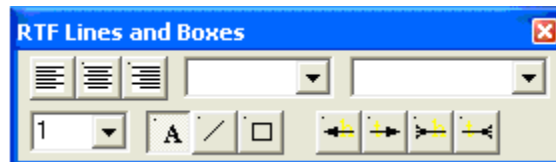
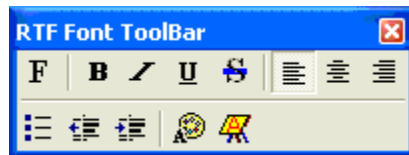
- 3.) Move the mouse pointer to the detailed lithology layer so that you see in the yellow field that follows the mouse **1012 [498]**. To define the bottom of the Shale bed **left click and drag** your mouse on the Detailed Lithology layer until you see **1018 [498.4]** **1012.00 [498]** **1018.00 [498.4]** in the lower portion of the yellow field that follows the mouse pointer and then **release the left mouse button**. This will fill in the area between the two lines with Sandstone.


Turning on the Lithology Description Layer

- 1.) **Click** on the **Detailed Lithology** track to make it active (highlighted in green).
- 2.) **Click** on the **View pull down menu** and **select Layers Organizer**. You can also select the  button on the selection bar. This will activate the Layers Organizer window for the detailed Lithology Track.
- 3.) **Click** on the **Lithology Description Layer** so that it is highlighted.
- 4.) **Click** on the  **button**. This will turn on the lithology description layer so that we can work with this layer. You will notice and Y beside the layer name.
- 5.) Then **click** on the  **button**. This will put a > symbol beside this layer. This indicates it is the active layer.
- 6.) **Click** on the  **button**. This will close the window and turns on the Lithology Description and makes the Lithology Description the active layer on the detailed lithology track.

Moving a Lithology Description

- 1.) Make the **Lithology Descriptions** layer active within the **Detailed Lithology** track by clicking on the Track and then selecting the **Lithology Descriptions** layer from the **Layer Selection List** field.
- 2.) **Click** anywhere within an **Annotation** to activate the RTF Toolbars for the Lithology Descriptions Layer and it will highlight that description.




- 3.) Place the mouse pointer on the outline surrounding the selected **Sample Description** on the **Lithology Descriptions** layer and the mouse pointer will turn into a cross-hairs  cursor.
- 4.) **Click and drag** the mouse pointer to the Sample Description's new position and then release the mouse button, and the **Sample Description** will be redrawn at its new location.
- 5.) **Click** anywhere **outside** the description to **save** and close the RTF builders.
- 6.) **Repeat steps 2-5** to move all of the descriptions to where they best fit.

Refer to the Log Example on Page 58 for our suggestions.

• Resizing Sample Descriptions

- 1.) **Click** anywhere within an **Annotation** to activate the RTF Toolbars for the Lithology Descriptions Layer and it will highlight that description and an outline will appear around the **Sample Description**.

Note: You may only be able to activate the red dot associated with the uppermost **Sample Description**, because the **Sample Descriptions** created by you in the **Sample Description** window may overlap one another within the **Lithology Descriptions** layer.

- 2.) Place the mouse pointer overtop of the square boxes in the outline around the selected **Sample Description** on the **Lithology Descriptions** layer and the mouse pointer will turn into a resize  cursor.
- 3.) **Click and drag** the mouse pointer to the Sample Description's new size and then **release** the **mouse button**, and the **Sample Description** will be redrawn at its new size.
- 4.) Repeats steps 2-3 to change any of the sizes of the Sample Descriptions on your Log.
- 5.) **Click** anywhere **outside** the annotation to **save** and close the RTF builders.

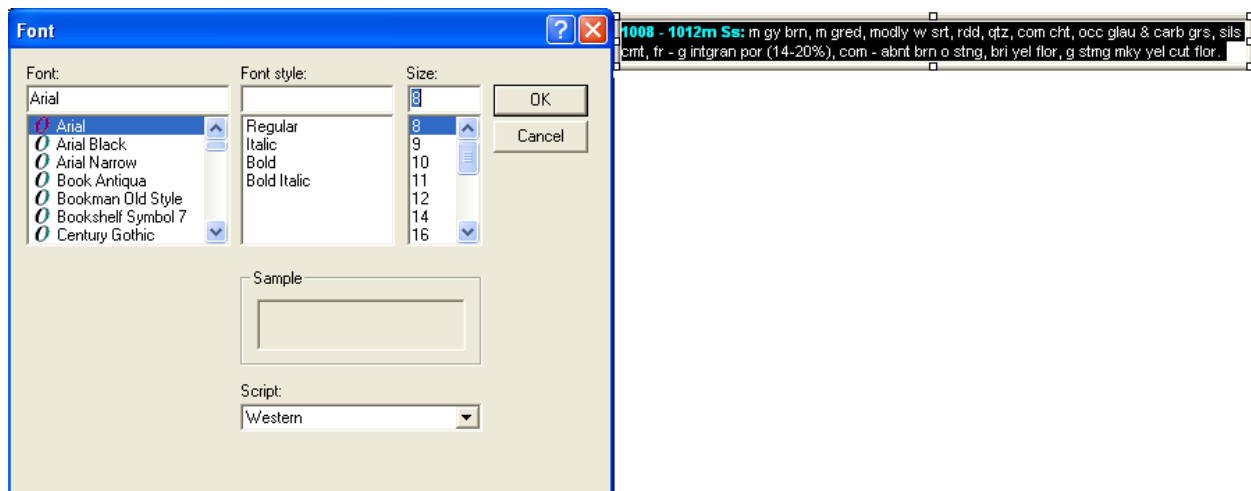
- **Editing a Sample Descriptions**

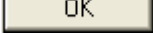
In this example, you will change the description of the **Shale** originally placed at **1018m** The description was 1012-1018m Sh : m – dk gy, micmica, carb, occ tr glau grs, non calcs, fis. Tr Sid pels.

- 1.) **Click** on the above sample description to activate RTF Toolbars and an outline will appear around the **Sample Description**.
- 2.) Click and drag over the description **from the rock type to the end and replace the shale description with aa**.
- 3.) **Click** anywhere **outside** the description to **save** and close the RTF builders

- **Resizing the font in a Sample Descriptions**

- 1.) **Click** on the **Ss** description from **1008 to 1012 m** to activate the RTF Toolbars for the Lithology Descriptions Layer and it will highlight that description
- 2.) **Highlight** the entire description by clicking and dragging the mouse pointer.
- 3.) **Click** on the **F** selection in the RTF Font builder. This will activate the Font builder.
- 4.) **Drop** the **Size** menu and **select 8** point font.

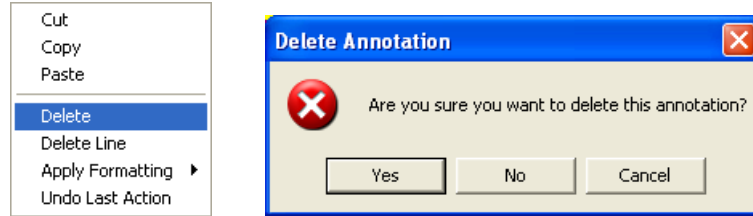


- 5.) **Click** on the  button in the **Font builder**, when you are finished.
- 6.) **Click** anywhere **outside** the description to **save** and close the RTF builders

Deleting a Sample Description

- 1.) **Click** anywhere within an **Annotation** to activate the RTF Toolbars for the Lithology Descriptions Layer and it will highlight that description and an outline will appear around the **Sample Description**.

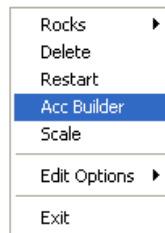
- 2.) **Right click** inside the annotation to activate the pop-up menu and then **click** on the **Delete selection**. This will activate a System message



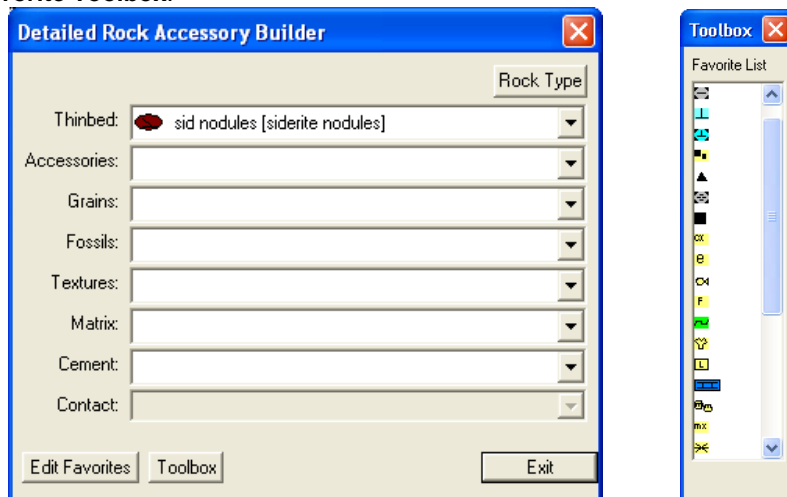
- 3.) **Click** on the  **button**. Your annotation will be deleted

Drawing Accessories:

- 1.) Make the **Detailed Lithology** layer active within the **Detailed Lithology** track by clicking on the Track and then selecting the **Detailed Lithology** layer from the **Layer Selection List** field.
- 2.) **Double click** anywhere within the **Detailed Lithology** track to activate the **Detailed Rock Type Builder** window and it favorites toolbox.
- 3.) **Right click** once anywhere within the **Detailed Lithology** track to activate the pop-up menu.



- 4.) **Select Acc Builder** from the pop-up menu to activate the **Detailed Rock Accessory Builder** window along with the **Accessory Favorite Toolbox**.



Note: The graphical images utilized in the Favorites Toolbox shown above represents the specific **Accessories** selected by the user in the **System Options** window (See **System Options** earlier in this tutorial).

...Adding a Thinbed...

- 1.) **Click** on the symbol for **Siderite Nodules** from the Toolbox and the Thinbed field in the Detailed Rock Accessory Builder window will be filled in with sid nodules [siderite nodules].
- 2.) **Click anywhere** within the existing Detailed Lithology layer to insert the desired symbol.
- 3.) Repeat Steps 1 to 2 for **dark chert pebbles**

Note: To delete an **Accessory symbol**, activate the **Detailed Rock Accessory Builder** window, **right click** on the upper left corner of the **Accessory** symbol you wish to delete, and then select **Delete** from the pop-up menu.

- **Adding a Cement...**

- 1.) **Click** on the symbol for **Siliceous Cement** from the Toolbox and the **Cement** field in the Detailed Rock Accessory Builder window will be filled in with sils [siliceous].
- 2.) **Click** anywhere within the existing Detailed Lithology layer to insert the desired Symbol.

- **Adding an Accessory...**

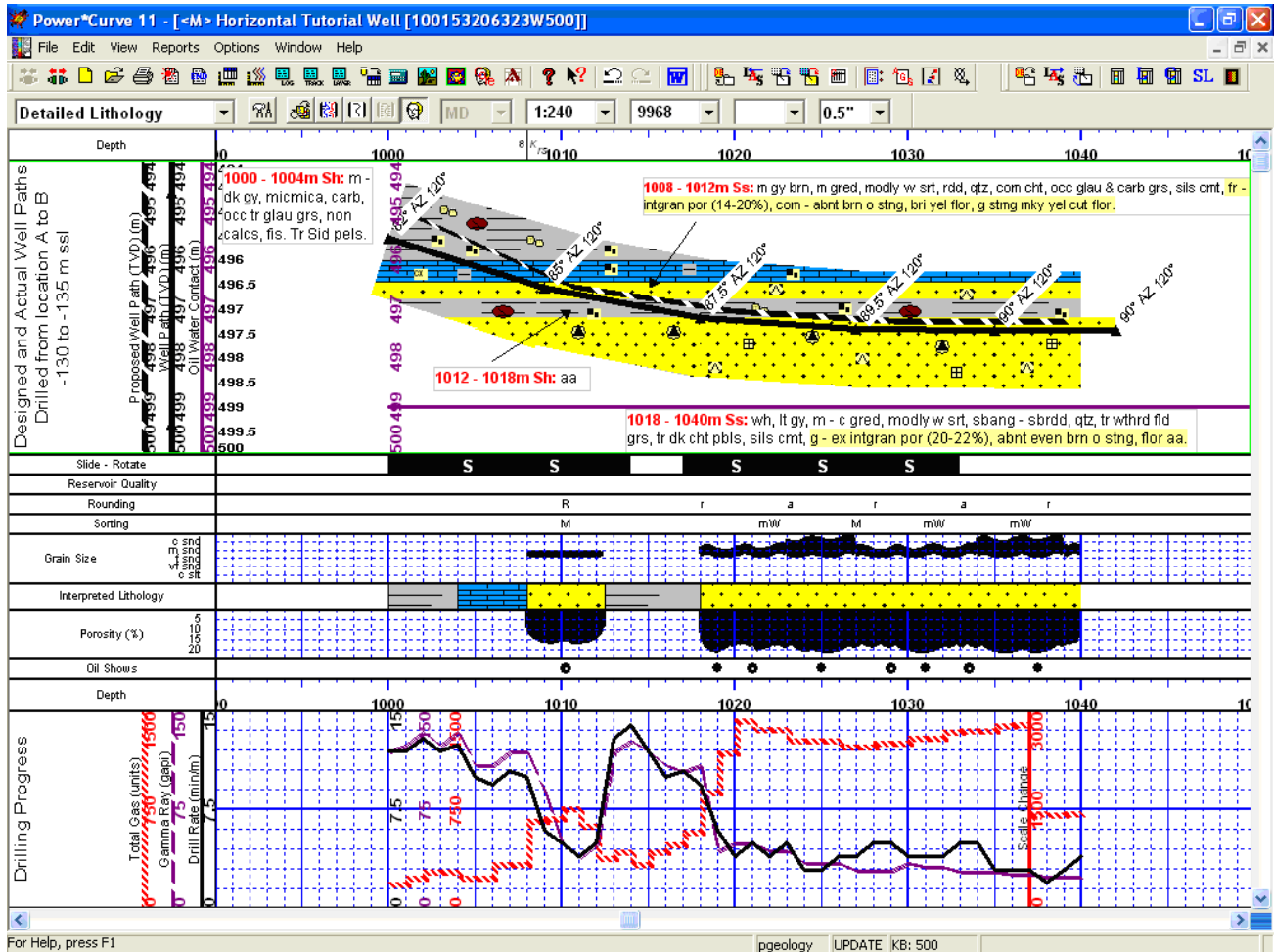
- 1.) **Click** on the symbol for **Carbonaceous** from the Toolbox and the **Accessories** field in the **Detailed Rock Accessory Builder** window will be filled in with **carb [carbonaceous]**.
- 2.) **Click** anywhere within the existing Detailed Lithology layer to insert the desired Symbol.

Note: When placing **Accessories** on the log, you may wish to increase the mouse accuracy from the default of **1** to **0.1**. This selection is located to the far left on the **Selection Toolbar**.

- **Adding more Accessories, Grains and Textures...**

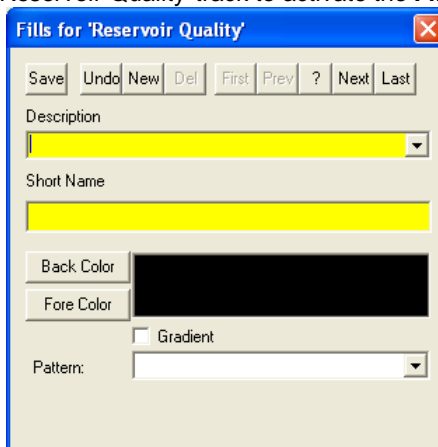
- 1.) **Right Click** on the **Detailed lithology layer** to activate the pop out menu.
- 2.) **Click** on the **Accessories** selection to activate the favorites list.
- 3.) **Click** on the symbol for **Micromicaceous** from the pop-out menu and the component field in the Detailed Rock Accessory Builder window will be filled in with micmica [micromicaceous].
- 4.) **Click** anywhere within the existing Detailed Lithology layer to insert the desired Symbol.
- 5.) Repeat **Steps 1** and **4** for the following grains and textures:
argillaceous chert grains feldspar grains cryptocrystalline glauconite grains

**** Your log should now look similar to the Log shown below.**



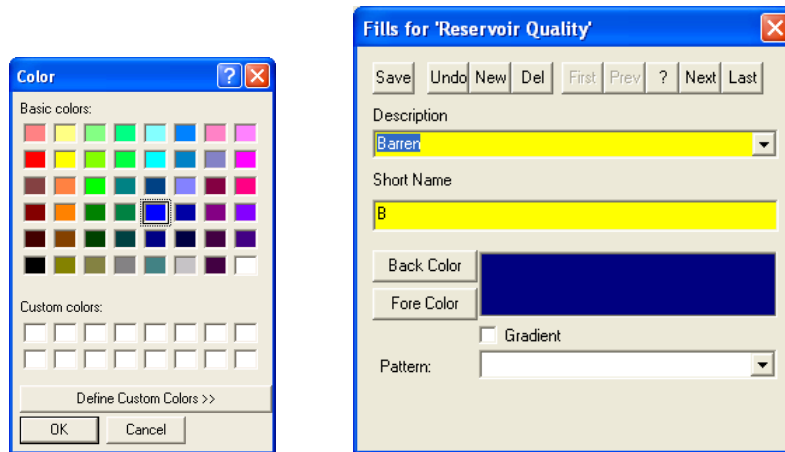
Adding Reservoir Qualities to the Reservoir Quality Track

- 1.) Double click anywhere within the Reservoir Quality track to activate the **Fills for Reservoir Quality** window.



- 2.) Type **Barren** into the Description field.
- 3.) Type **B** into the Short name field.

- 4.) Click on the **Back Color** button and select a blue color from the palette and then click on the **OK** button.



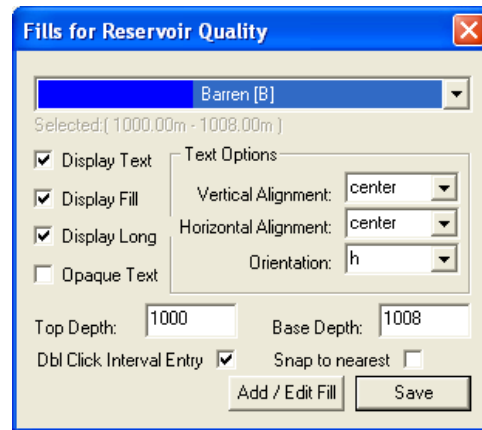
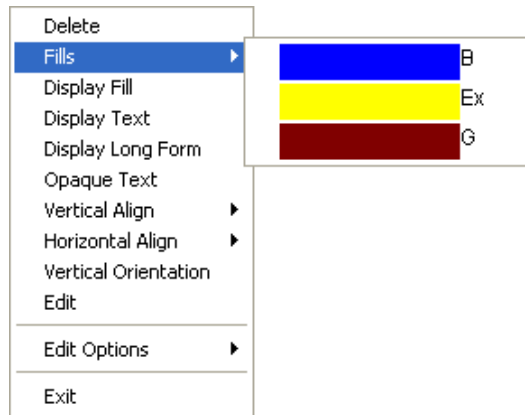
- 5.) Click on the **Save** button and then select **Start New Record** from the ensuing **Shortcut Options** window. This will clear the window and allow the user to enter a new record.



Adding more environments to the Environment fill category...


- 1.) Type **Good** into the Description field.
- 2.) Type **G** into the Short name field.
- 3.) Click on the **Back Color** button and select a maroon color from the palette and then click on the **OK** button.
- 4.) Click on the **Save** button and then select **Start New Record** from the ensuing **Shortcut Options** window. This will clear the window and allow the user to enter a new record.
- 5.) Type **Excellent** into the Description field.
- 6.) Type **Ex** into the Short name field.
- 7.) Click on the **Back Color** button and select a yellow color from the palette and then click on the **OK** button.
- 8.) Click on the **Save** button and then select **Exit** from the ensuing **Shortcut Options** window. This will close the window.

Drawing Reservoir Quality onto the Reservoir Quality Track...

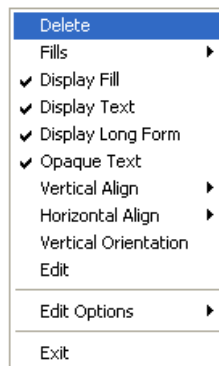
- 1.) Double click on the **Reservoir Quality** to activate the window.
- 2.) Right click in the **Reservoir Quality** track to activate the pop out window, select fills and click on the **B** selection. Or click on the builder drop box and select **Barren [B]**.




- 3.) Define the interval by **clicking and dragging** within the **Reservoir Quality** track from **1000 to 1008m**  . The Barren Reservoir Quality will be displayed in that interval.
- 4.) **Right Click** on the **fill just drawn** and **select** or **click** on the **Opaque Text** selection to turn off the background around the text.
- 5.) Define another interval with the same properties by **clicking and dragging** within the **Reservoir Quality** track from **1012.5 to 1018m**  . The Barren Reservoir Quality will be displayed in that interval.
- 6.) **Right click** on an empty area in the **Reservoir Quality** track to activate the pop out window, **select fills** and **click** on the **G selection**. Or **click** on the **builder drop box** and **select Good [G]**.
- 7.) Define an entire interval by **double clicking** within the Reservoir Quality track **between the depths of 1008 and 1012.5m**. The Good Reservoir Quality will be displayed in that interval. This is capturing the rock interval data entry and utilizing it to draw an entire interval.
- 8.) Define another entire interval by first selecting another Fill type. **Right click** on an empty area in the **Reservoir Quality** track to activate the pop out window, **select fills** and **click** on the **Ex selection**. Or **click** on the **builder drop box** and **select Excellent [Ex]**
- 9.) **Double click** within the Reservoir Quality track **between the depths of 1018 and 1040m**. The Excellent Reservoir Quality will be displayed in that interval.

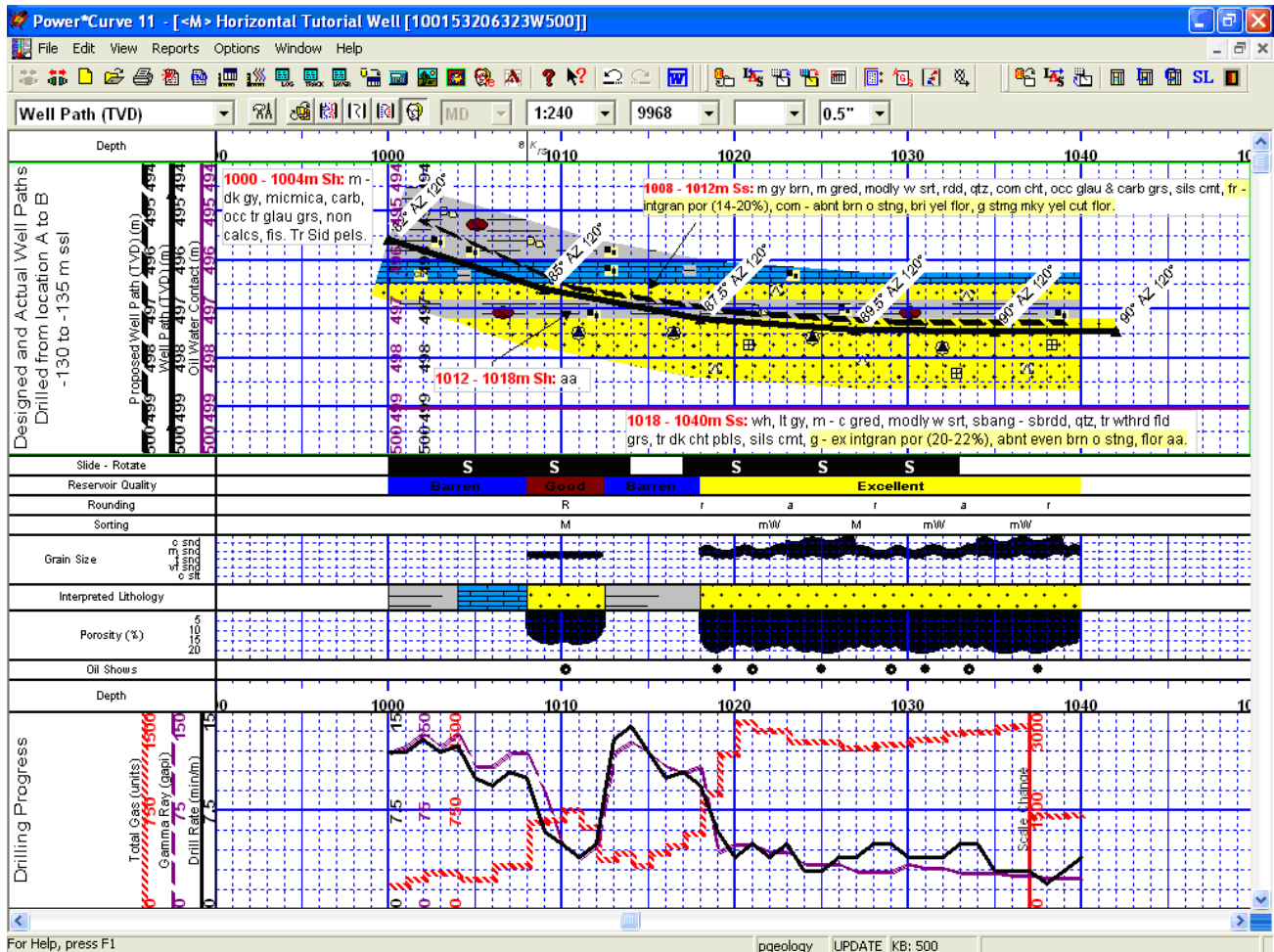
To **resize** an existing fill **hold your Ctrl Key down** on your keypad and **move mouse pointer over the end part of the interval until it turns into a resize cursor**  **and then click and drag** to a new depth. Remember you cannot overwrite existing intervals.

To **delete** an exiting interval **right click on the interval** and **select delete** from the pop out menu.



- 10.) **Click** on the  **close button** in the upper right hand corner of the builder. This will close down the Environment builder window.

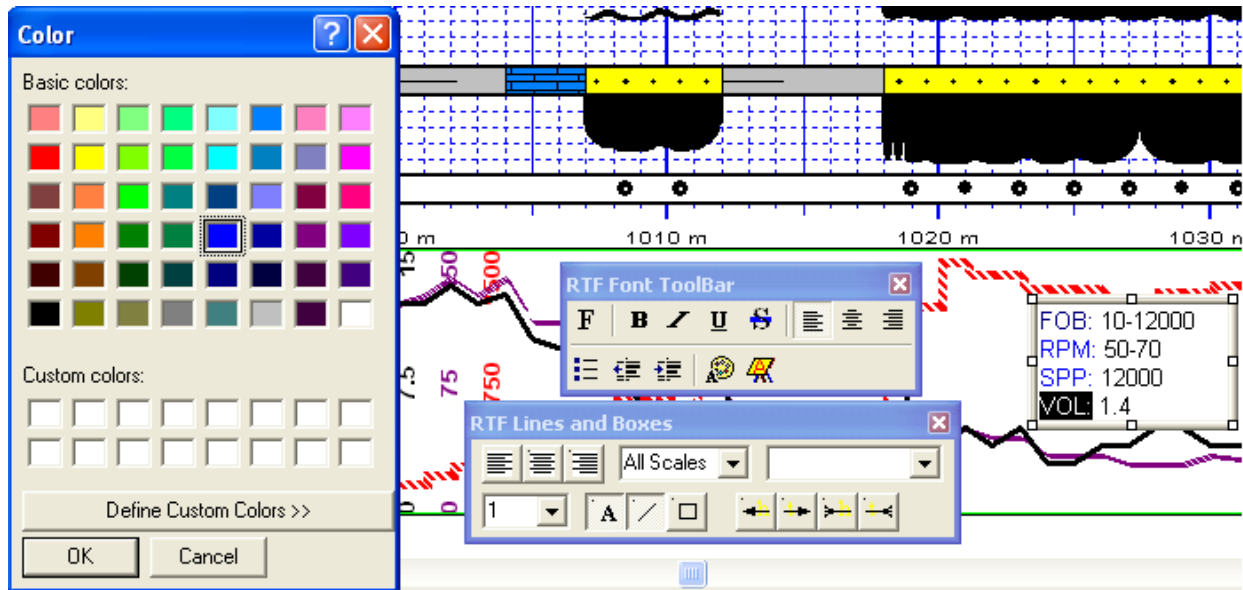
**** Your log should now look similar to the log shown below. ****


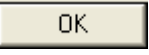


Adding an Annotation to the Drilling Progress Track

There are a number of annotations layers associated with this track. These are represented with Engineering Parameters, Mud Parameters and Gas Annotations. You could one annotation layer for all three types of annotations. We will deal with making an annotation in the Engineering Parameters layer.

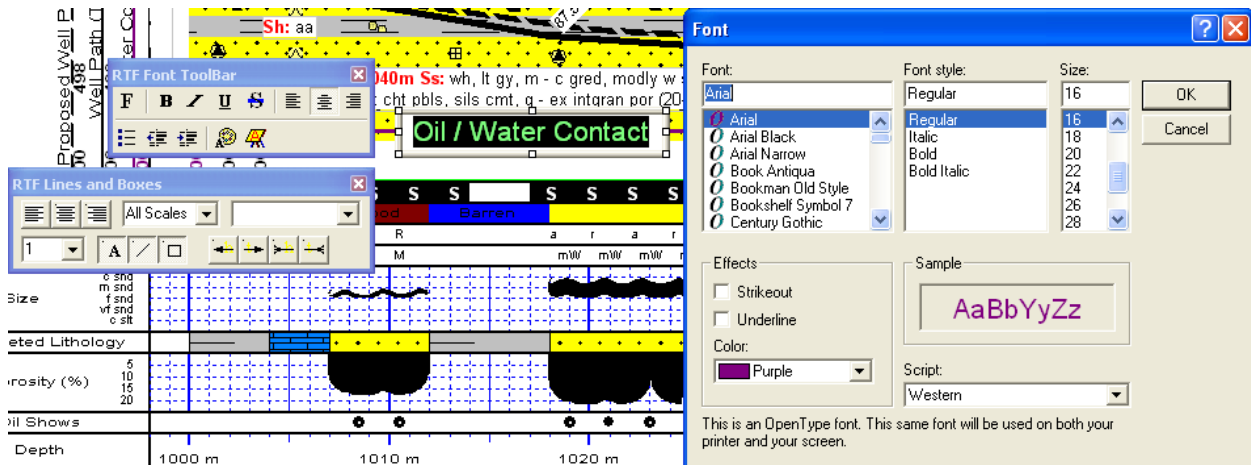
- 1.) Click on the **Drilling Progress** track to make it active (highlighted in **green**).
- 2.) Select **Engineering Parameters**, as your active layer, from the **Layer Selection List** field.
- 3.) Define the area on the layer where the **Annotation** will appear by:
 - a) placing the mouse pointer at the desired depth;
 - b) **clicking and dragging** the **left** mouse button from the upper left corner to the lower right corner of the desired area to form a rectangular shape
 - c) releasing the **left** mouse button. This will activate the RTF Toolbars.







- 4.) **Type** the following into the text field in the annotation layer:
 - FOB: 10-12000**
 - RPM: 50-70**
 - SPP: 12000**
 - VOL: 1.4**
- 5.) To change the Font Color **Highlight the Text** you want to change by **dragging the Mouse over the text** to highlight the letters.
- 6.) **Click** on the  button in the RFT Font toolbar. This will activate the color palette.
- 7.) **Click** on the **new color** and then **click** on the  button. This will close the Color Palette and make your changes.
- 8.) **Click anywhere outside the text box** to save your annotation and close the Toolbars.
- 9.) The user would probably want a Grid Pattern on this Track for printing purposes. Select a Curve layer (Gamma Ray, Drill Rate or Total Gas) from the layer selection list on the Selection Bar.


Adding an Annotation to the Detailed Lithology Track

- 1.) **Click** on the **Detailed Lithology** track to make it active (highlighted in green).
- 2.) **Select Lithology Description**, as your active layer, from the **Layer Selection List** field.
- 3.) Define the area on the layer where the **Annotation** will appear by:
 - a) placing the mouse pointer at the desired depth;
 - b) **clicking and dragging** the **left** mouse button from the upper left corner to the lower right corner of the desired area to form a rectangular shape
 - c) releasing the **left** mouse button. This will activate the RTF Toolbars.
- 4.) **Type** in **Oil / Water Contact** into the text field.



- 6.) To change the Font Color **Highlight the Text you want to change by dragging the Mouse over the text** to highlight the letters.
- 7.) Click on the  button in the RTF Font toolbar. This will activate the Font Builder.
- 8.) Select 16 from the Font Size Drop box.
- 9.) Select Purple from the Color Drop box
- 10.) Click on the  button. This will close the Font Builder and make your changes.
- 11.) Click on the  icon in the RTF Lines and Boxes toolbar to draw a box around your annotation.
- 12.) Click anywhere outside the text box to save your annotation and close the Toolbars.
- 13.) Press the **Esc** key on the keyboard or Click on the  close button in the upper right hand corner of the builder to exit from the **Annotation Builder** window.
- 14.) The user would probably want a Grid Pattern on this Track. Select a Curve layer (Proposed Well path, Well Path, or Oil / Water Contact) from the layer selection list on the Selection Bar.

Adding a Formation Top

- 1.) Click on the **Reports** selection on the **Power*Curve™ Menu Bar** to activate the pull down menu and then Click on **Formation** to open the **Formation** window shown on the next page.
- 2.) Click on the  button to clear the window and get the window ready to accept another record.
- 3.) Click in the **Formation Short Name** field to activate a flashing caret and **type** in **rs**. Press the Tab Key. This will advance the user to the Formation Long Name field. The rs will be drawn in the Formation Tops (Short Name) layer which is associated with the Measured Depth Tracks.
- 4.) **Type** in the **Red Sky** in the Formation Long name field. Red Sky will be drawn in the Formation Tops (Long Name) layer which is associated with the Detailed Lithology Track.

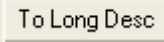
- 5.) **Select Mesozoic** from the **Era** drop down box.
- 6.) **Select Lower** from the **Series** drop down box.
- 7.) **Select K (Cretaceous)** from the **Period** drop down box. The K will be drawn in the Formation Tops (Short Name) layer which is associated with the Measured Depth Tracks.
- 8.) **Select Santorian** from the **Stage** drop down box.
- 9.) **Select Center** from the **Alignment** drop down box. Red Sky will be drawn in the center of the Formation Tops (Long Name) layer which is associated with the Detailed Lithology Track along with its Subsea and TVD values

Note: The subsea values are calculated from the K.B. elevations entered into the Well window which can be edited. The Well window can be found by clicking on Edit on the Power*Curve men bar and select Well from the resulting pull down menu.


- 10.) **Select Conformable** from the **Boundary Type** drop down box.

- 11.) **Select**  from the Display portion of the Window.

- 12.) Type **1008** into the **Sample Top MD** field. You will notice that the TVD Sample top field will be calculated for you. Then depress the tab key four times. This will place the flashing caret in the Evaluation field.

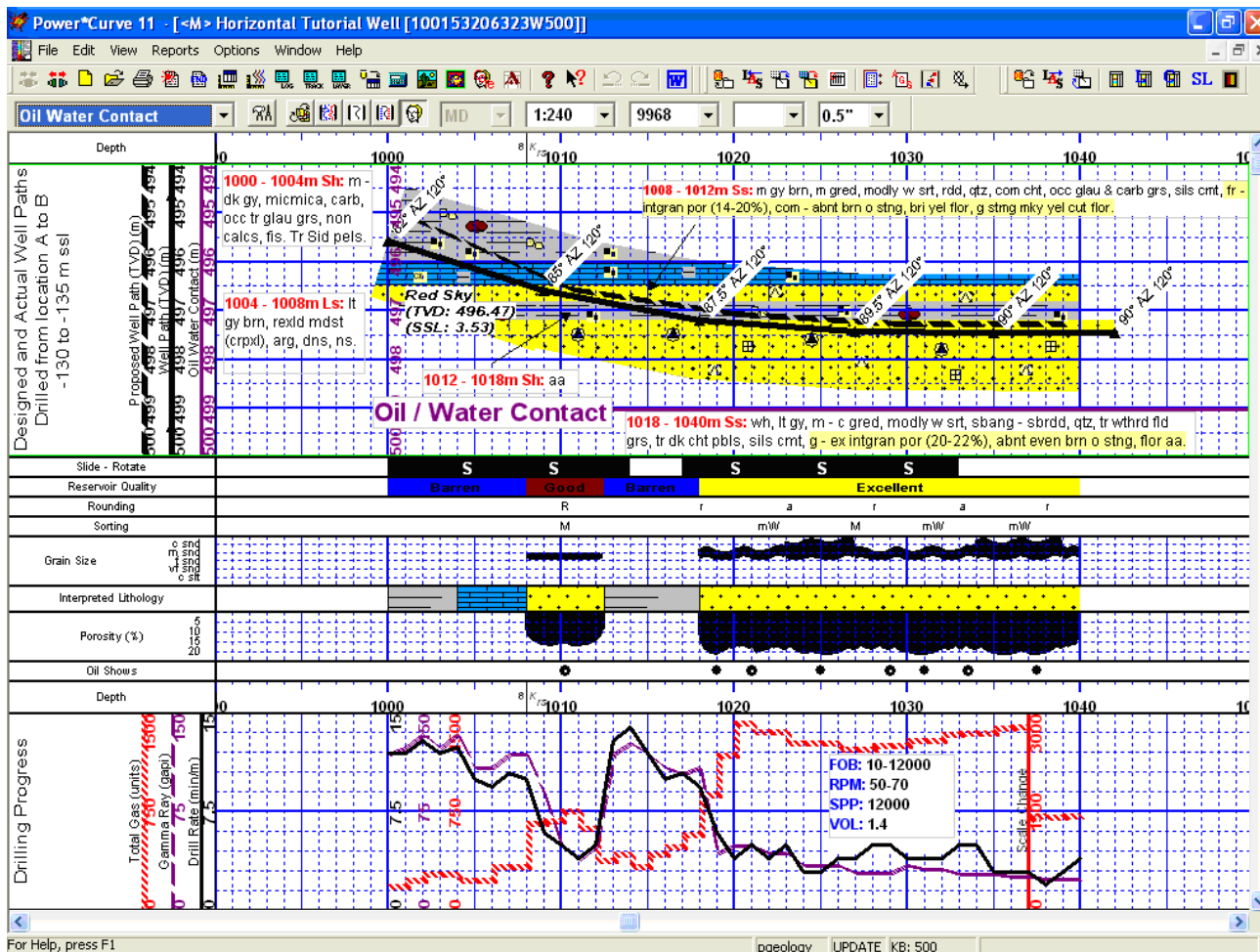
- 13.) The user can then **type** in the Evaluation short form or the user can go to the **Annotations** or **Samples** button and search the samples to copy and paste the relevant description. Once done **click** on the  button to expand the description. Then depress the tab key. This will advance the flashing caret to the Conclusion field.

- 14.) **Type the Conclusion** into the Conclusion field. **Click** on the  button to expand the description.

- 14.) **Click** on the  button and then select **Exit** from the ensuing **Shortcut Options** window. You will notice the both the Short Name and Long Name formation tops layers filled in with the appropriate Red Sky tops information.

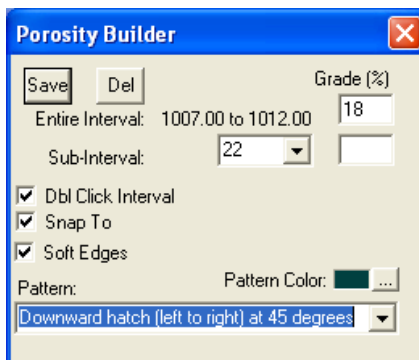
- 15.) You can now move the top long name to a neutral location out of the way of other data by **Holding the CTRL Key down** and **clicking and dragging** the formation top long name to a neutral position on the log **and releasing the mouse button**. The long name should snap to the new position as shown on the log on the next page.


**** Your log should now look similar to log shown below. ****




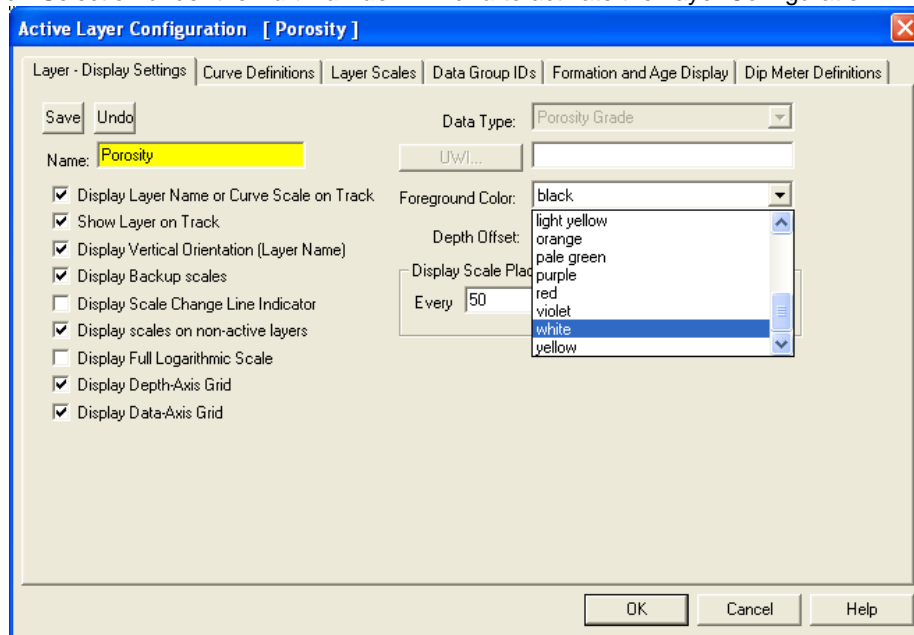
Changing the Display for the Porosity Grade Layer.



1. **Double Click** on the **Porosity Grade Layer** to activate the porosity builder.

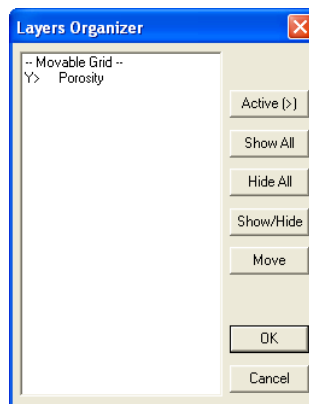


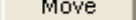
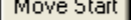
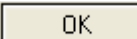
2. **Select the Downward Hatch (left to right) at 45 degrees** from the **Pattern** drop box.
3. **Click** on the **Save** button. Then exit the builder by pressing the **Esc Key** on your keypad or **click** on the  button in the builder.

4. With the porosity Grade Layer still active **Click** on the  **button** on the **tool bar** or **click** on the **Layer Configuration** Selection under the **Edit Pull down menu** to activate the Layer Configuration window.



5. **Select white** from the **Foreground Color drop box** and then **click** on the  **button**
6. With the Porosity Grade layer still active **click** on the  **button** on the selection bar or **click** on the **Layers Organizer** Selection under the **View Pull down menu**. This will activate the layers organizer for the Porosity Grade track.

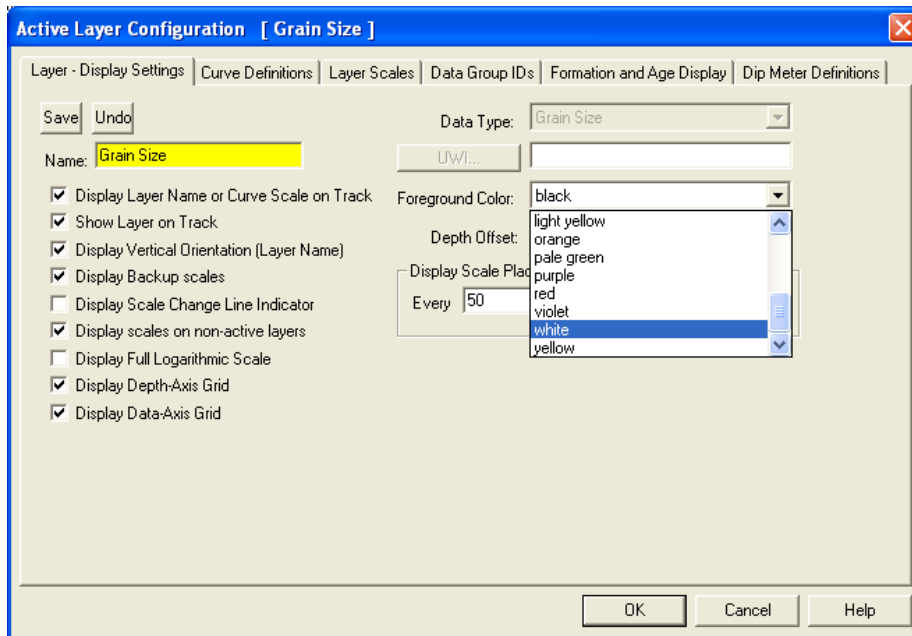



7. **Click** on the **Movable Grid layer**, then **click** on the  **button** which will turn into a  **button** and then **click** on the **Porosity layer** to move the grid above the hatching pattern on the log. Finally **click** on the  **button**.

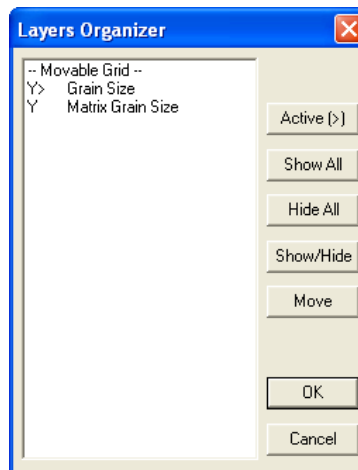
You should now have a black hatching pattern with a white foreground and the Grid showing through as seen on the log on page 68.

Changing the Display for the Grain Size Layer.

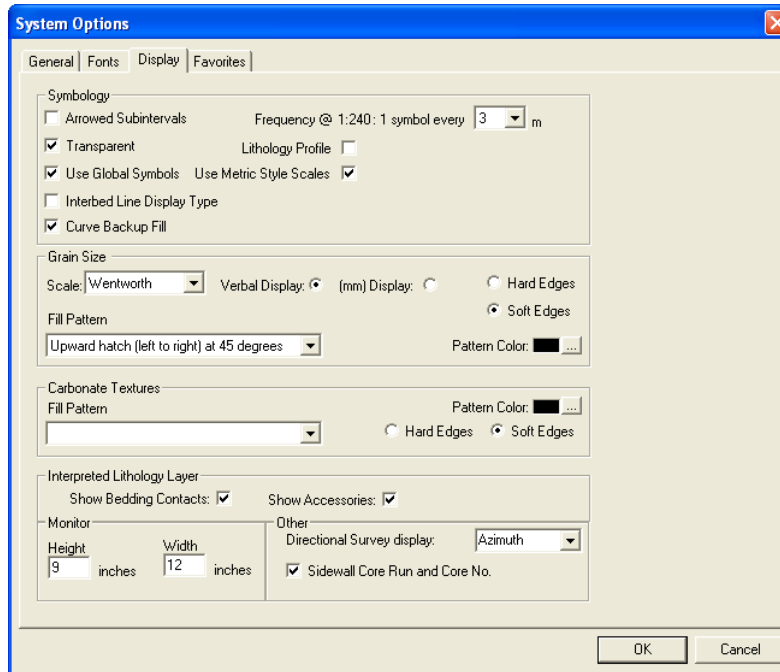
1. **Click** on the **Grain Size Layer** to make the Grain size layer active.
2. With the Grain Size Layer active **Click** on the  **button** on the tool bar or **click** on the **Layer Configuration** Selection under the **Edit Pull down menu** to activate the Layer Configuration window.




3. Select **white** from the **Foreground Color** drop box and then click on the **Save** button
4. With the Grain Size layer still active Click on the  button on the selection bar or click on the **Layers Organizer** Selection under the **View** Pull down menu. This will activate the layers organizer for the Porosity Grade track.



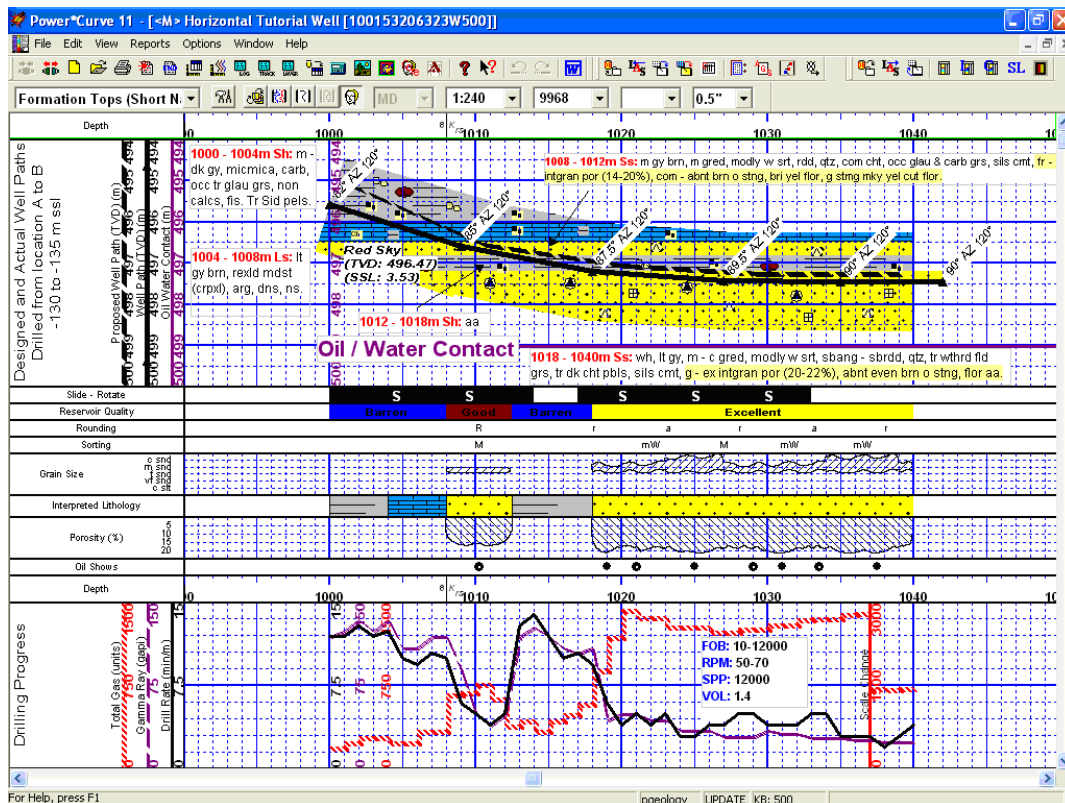
5. Click on the **Movable Grid** layer, then click on the **Move** button which will turn into a **Move Start** button and then click on the **Grain Size** layer to move the grid above the hatching pattern on the log. Finally Click on the **OK** button.
6. Click on **Option** pull down menu and select **System options**. This will activate the System Options window.
7. Click on the **Display** tab to make it active.




8. Select the **Upward Hatch (left to right) at 45 degrees** from the **Fill Pattern** drop box for grain Size.
9. Click on the  button. This will close the System Options window.

You should now have a black hatching pattern with a white foreground and the Grid showing through as seen on the log on page 68.

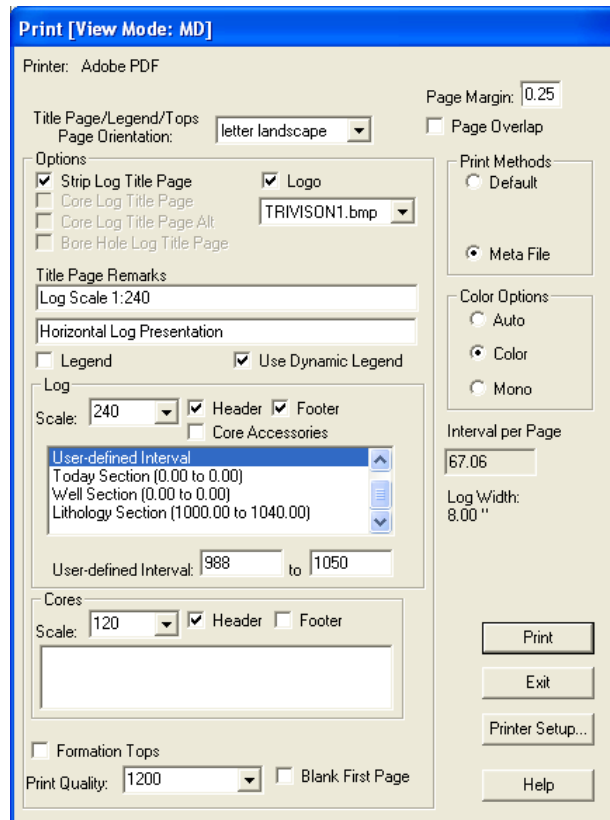
**** Your log should now look similar to the log shown below. ****



How to Print the Log

- 1.) Under the **File** menu, click on **Print Log** or click on the  **Print** button on the **Toolbar** to activate the **Print Log** window.

Note: The Title bar and all depths associated with the Print Log window are defaulted to the Depth View that Power*Core are in at the time of the activation of the Print Log window.



- 2.) Select the **letter landscape** paper orientation from the **Page Orientation** drop box field and the **Title Page**, **Legend**, and **Formation Tops** will automatically conform to the selected orientation.

Note: The letter or legal landscape or portrait settings selected from within the **Print Log** window will **NOT** override the paper orientation settings selected in the printer's **Properties** window. Therefore, you must also modify the paper orientation settings in your printer's **Properties** window to letter or legal landscape.

- 4.) Activate the **Use Dynamic Legend** check box () , if you wish to have the legend reflect only the symbols printed on the log or core portions of the printed intervals defined in the log and core portions of the print log window. Leave the Dynamic Legend unchecked if you wish to print out the entire list of symbols.

In the Log portion of the Print Log window

- 5.) Select **1:240** from the scale drop box for the log to be printed out at.
- 6.) Click to activate the **Header and Footer** check boxes () to print the track headers on the log.
- 7.) Click on **User Defined Section** and **type** in **988 to 1050** in the appropriate fields to highlight it in the printing options selection box.

Note: The log itself must be displayed in whatever depth view you wish to print before you activate the print log window. To change the log to the desired format refer to depth view under the view pull down menu.

Page Margin The page margin field is available, primarily, when you are printing to Adobe Acrobat writer. When a numerical value in inches is typed into this field it will initiate a top and left margin for the templates (Title Page, Legend and Formation Tops) as well as a left margin for the main log.

Page Overlap Activate the **Page Overlap** check box () if you are printing on single sheets. This will force the printer to include an additional 1/4 inch of the log at the top and bottom of each page, so that you can cut-and-paste pages manually, if you so desire.

Print Methods...

Default Activating the **Default** radio button () forces Power*Log / Curve / Core to use a **raster or bitmap graphic printing method**. This printing method is generally used with Laser printers but not exclusively so.

Meta File Activating the **Meta File** radio button () forces Power*Log / Curve / Core to use the **meta file technology printing method**. This printing method was developed for the newer models of printers on the market today as well as using the Adobe Acrobat Distiller or pdf printing technology.

Color Options...

Auto Activating the Auto radio button () forces Power*Log / Curve / Core to use the settings from the printer driver to printout the log.


Color Activating the Color radio button () forces Power*Log / Curve / Core to override the printer driver settings and consequently Power*Log / Curve / Core assumes that you are using a color printer.

Mono Activating the Mono radio button () forces Power*Log / Curve / Core to override the printer driver settings and consequently Power*Log / Curve / Core assumes that you are using a monochrome (black and white) printer.

Interval per page field indicates how many meters of log will fit on a page of selected paper size and orientation selected in the setup as well as what log scale you are printing at. This will help indicate to the user how many pages will be required by the print job.

8.) Click on the  button to activate the **Print Setup** window and confirm that the correct printer settings are in effect.

Note: If you are printing out logs in color, you must activate the **Diffusion** or **Error Diffusion** option normally found under **Graphics** in the **Properties** window for most printers.

9.) When you are ready to print your log, click on the  button.

Note: If you do exit from the **Print Log** window, you will be asked if you wish to save the print settings. If you click on **Yes**, the program will remember every setting that you made to the **Print Log** window and then will default to those settings the next time you enter the **Print Log** window.

This concludes the Power*Curve™ Tutorial. If you need help with specific functions or operations, please use the Table of Contents in the Power*Suite™ User Manual to find the desired topic or use the Search function built into the Power*Curve™ On-line Help System.