

2016 Addendum Manual



The Intelligent Geological Software Solution

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Overview

Version 2016 Revisions

Added the ability to Import Perforated Interval Data

Added the ability to **Export Perforated Interval**

In the Well record we have added the ability to **Enter the Wells Surface Location Latitude and Longitude** in a formatted degrees minutes and seconds.

In the Well record we have added the ability to **Calculate** the **Wells Casing's Latitude and Longitude** from a measured depth if you have entered the Wells Surface Location in a formatted degrees minutes and seconds.

In the Well record we have added the ability to **Calculate** the **Wells Bottom Hole Location Latitude and Longitude** from a measured depth if you have entered the Wells Surface Location in a formatted degrees minutes and seconds.

We have added another layer to show the **Perforated Intervals** in Power*Log, Power*Curve and Power*Core.

Added a new Open Well Window in the Survey View Module.

Added the ability to designate the Township and Range numbers to the Plan and User defined views in the Survey View Module

Added the ability to define and display and calculate the distance from hard boundaries in the Plan and User defined views in the Survey View Module.

Ability to show the Power*Steer top and base of zones planes on the Survey View Modules User defined view.

Added the Power*Steer Module to our long list of products.

Added a Curve Fill Layer (Power*Steer Option on Single Curve) that allows you to create a visual effect with the Interpretive lithology coupled with the Power*Steer bedding dips and faults. This layer will allow you to automate the drafting on the Lithology along the Well Path in this track. If the Interpretive lithology has been drawn it will be reflected and directly correlated to the corresponding bedding dips and faults created in the Power*Steer application.

Wellsite Information Transfer Specification (WITS) for Digital Rig-Site Data is now available. Log on to the to the WITSML Server (with the correct permissions) and you can pole the server for all your curve and survey data along with any or all of the relevant data that has been entered into the Electronic Drilling Recorder (EDR). Imagine you can now get all this data into your database and displayed on all your logs without having to export from the server and then import into our application. Not quite real time as you have to set up a polling time but you can be as little as 1 minute behind the bit.

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File Menu – Import Menu - Perforations

This method will allow the user to import ASCII, space, comma or tab delimited file formats into our database. We cannot import EXCEL or any other type of spreadsheet format. If the data comes that way you must resave it in another format before attempting to import the data.

Importing Perforated Intervals Data

- 1. To access the Perforation Interval Data Import window, click on Import under File to activate the pop-out menu
 - and then select **Perforations** or **click** on the **P Import Perforations button** on the **Import Toolbar**. This will activate the open Percent Data file window as shown below.

Disconnect Access Registration		2 Open I	Perforation Interval File	×
New Ctrl+N Open Ctrl+O Close		Look in: BACKUP		•
Import +	AGS Data	Name	Date modif	fied ^
Export +	ASCI	16042501.exp	4/25/2016	11:34 AM
Backup	Core Data	core interval test.CSV	5/19/20163	3:17 PM
Print Log Ctrl+P	Core Photos	core point tests.CSV	5/19/2016	3:21 PM
Print to TIFF	Dip Meter	dean stark intervals.CSV	5/19/2016	1:46 PM
Print Morning Report	INI Settings File	X perforated intervals.txt	5/26/2016	12:35 PM
Print Well End Report	LAS Log / Well	<		>
Print Reports to Word® Print Setup	MDT Percent (%)	File name: perforated inter	vals.txt	Open
Exit	Perforations	Files of type: All Files (*.*)	-	Cancel
Survey Viewer Core Photo Profile Tool	Ranged Data Slide Rotate			

2. Select the file from the folder or drive with the corresponding navigational tools provided and either double click on the file name or click once and click on the **Open** button. This will activate the Set delimiter window as shown below.

N.B. The one o	n the left the delimiter is set correctly the	ne one on the right the delimiter is set incorrectly.	
	Set Delimiter	× Set Delimiter	
	Come Citil Come	C Suma G TAB C Suma	

Example		Example		
<column·break></column·break>	3650.00, <column-break>3875.00<column-break< th=""><th>\$ 3650.00, 3875.00</th><th></th><th></th></column-break<></column-break>	\$ 3650.00, 3875.00		
c		*		
	Finish		Finish	

3. Highlight the correct corresponding button beside Comma, TAB or Space delimiter (if shown correctly the Example should read <column-break> between the data columns. If you see this then click on the button to close this window and activate the Perforated Intervals Import window shown below.

	Perforation Int	terval Import	×
File			
Open File Click and Drag with the Left Mouse Data Column Column 1 Column 2	Open Mapping File	Save Mapping File to the corresponding field Field Top Depth Base Depth	Clear All Mapping
	Imp	sort	
Edit Data File	Reload Data File		
Perforations: From - To 3451.00, 3466.50 3501.00, 3522.00 3558.50, 3573.50 3650.00, 3875.00 4213.00, 4351.00 4894.50, 5085.00	Well UWI:100162706120W500	D	• •
			Exit

Overview of the window.

The **left hand side** of the **Perforated Intervals Import window** allows the user to view the different data columns represented in the file numbered in ascending order.

The **right hand side** of the **Perforated Intervals Import window** allows the user to see the data fields associated with the Perforated Intervals supplied by Power*Suite.

Open File Button allows the user to open another Perforated Intervals data file after the Import window has been opened.

Open Mapping File **Button** allows the user to utilize the mapping file saved from above to remap data columns in the Perforated Intervals file to database fields in the Perforated Intervals table in the database.

Save Mapping File **Button** allows the user to save the mapping between data columns in the Perforated Intervals file to database fields in the Perforated Intervals table in the database. Once the initial mapping has been done and saved, the user can utilize this mapping file so you do not have to repeat the clicking of dragging of data columns to database fields in the Perforated Intervals table again and again if you do not want to.

Clear All Mapping Button allows the user to undo all the mapping from data columns in the slide data file to database fields in the Perforated Intervals table that was done either by dragging or by utilizing the mapping file.

Edit Data File **Button** allows the user to open the file in Word pad to look at the file format and possibly make changes to the data file prior to importing the files data.

Reload Data File **Button** reloads the data into the sample portion of the file window.

Importing / Mapping of Perforated Intervals data.

A Perforated Intervals Layer should already have been added through the Log configuration builder so that the user has a Perforated Intervals type layer to import to. Otherwise it would be impossible to import any data.

- 1. On the left side of the window Click and drag the data column you wish to import to the corresponding table field on the right side and release it when the field becomes highlighted. If mapped the field **x** will turn green on the right and red on the left.
- N.B. The user can Right click on the Field to remove the mapping.
- Repeat the Clicking and Dragging of data columns to fields until all the columns that you want have been mapped.

	Perforation In	nterval Import	×
ile			
	Open Mapping File	Save Mapping File	Clear All Mapping
Data Column Column 1 Column 2		Field Top Depth Base Depth	Mapped Column Column 1 Column 2
	<u></u>	nport	
Edit Data File	Reload Data File	¢	>
Sample portion of file Perforations: From - To	Well UWI:100162706120W50	0	
3451.00, 3466.50 3501.00, 3522.00 3558.50, 3573.50 3650.00, 3875.00 4213.00, 4351.00 4894.50, 5085.00	weild wit forfoc / berzowol		Ŷ
¢			Exit

- 3. The user can save this mapping procedure at this time by **clicking** on the Save Mapping File **button** and giving this procedure a file name and folder to be used again at a later date when you would have to import this data again.
- 4. Click on the **button**. After the data has been imported you will be prompted with a system message.



5. Acknowledge the Import message. Click on the button and then click on the to exit or click on the the state button to close the Window.

How to Import Perforated Intervals with an Existing mapping file.

1. To access the Perforated Intervals Import window, click on **Import** under **File** to activate the pop-out menu and

then select **Perforations** or **click** on the **limbort Toolbar**. This will activate the Open Perforated Intervals file window as shown below.

2	Open Perforation I	nterval File	×
Look in: 🚺	BACKUP	· + € 💣 🖬 •	
Name	×.	Date modified	^
16042501.exp		4/25/2016 11:34 A	м
Core inte	erval test.CSV	5/19/2016 3:17 PM	
core poi	nt tests.CSV	5/19/2016 3:21 PM	
dean sta	irk intervals.CSV	5/19/2016 1:46 PM	1
X perforat	ed intervals.txt	5/26/2016 12:35 P	M 🗸
<			>
File name:	perforated intervals.txt	Оре	n
Files of type:	All Files (*.*)	+ Canc	el

2. Select the file from the folder or drive with the corresponding navigational tools provided and either double click on the file name or click once and click on the button. This will activate the Set delimiter window as shown below.

N.B. The one on the left the delimiter is set correctly the one on the right the delimiter is set incorrectly.

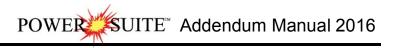
Set Delimiter	×	Set Delimiter	×
C Comma C TAB 👁 Space		C Comma C TAB C Space	
Example		Example	
<column-break>3650.00,<column-break>3875.00<column-break></column-break></column-break></column-break>		3650.00, 3875.00	
4		c	,
Finish		Finish	
prrect	Not Correct		

3. Highlight the correct corresponding is button beside Comma, TAB or Space delimiter (if shown correctly the Example should read <columnshreaks between the data columns. If you see this then click on the Finish

Example should read <column-break> between the data columns. If you see this then **click** on the **button** to close this window and activate the Perforated Intervals Import window shown below.

	Perforation I	nterval Import	
le			
Open File	Open Mapping File	Save Mapping File	Clear All Mapping
ick and Drag with the Left Mouse	button. Drag the columns of the data file ove	r to the corresponding field	
Data Column		Field	Mapped Column
Column 1		K Top Depth Base Depth	
	Ir	nport	
		<	
dit Data File	Reload Data File	1.	
ample portion of file			
ample portion or file erforations: From - To	Well UWI:100162706120W5	00	
451.00, 3466.50			
501.00, 3522.00 558.50, 3573.50 650.00, 3875.00			
213.00, 4351.00 894.50, 5085.00			
5			>
			Exit

4. In the upper portion of the window **click** on the Open Mapping File **button**. This will activate an open file window.



Look in: 🚺	BACKUP	• 🖶 📥 •	
Name	*	Date modified	Т
perfora	ted intervals.prf	5/26/2016 1:07 PM	P
٢			>
≮ File name:	perforated intervals.prf	Open	, ,

5. Select the mapping file with the *.prf saved from previous imports of similar Perforated Intervals files to your percent table by highlighting the file and clicking on the button or double clicking on the file name. Once the file has been opened it will refresh with the current mapping configuration as shown below.

N.B. The user can **Right click** on the **Field** to remove the mapping.

6. The user can map more data columns on the left side of the window **by Clicking and dragging** the **column** you wish to import to the **field** on the right side and release it when the layer becomes highlighted.

	Perforation I	nterval Import	
ile			
Open File	Open Mapping File	Save Mapping File	Clear All Mapping
Data Column		Field	Mapped Column
Column 1		🎇 Top Depth 🎇 Base Depth	Column 1 Column 2
	<u>_ in</u>	npoit	
Edit Data File R	eload Data File	<	_
	eloau D'ala File		
Sample portion of file Perforations: From - To	Well UWI:100162706120W5	00	
3451.00, 3466.50 3501.00, 3522.00 3558.50, 3573.50 3650.00, 3875.00 4213.00, 4351.00 4894.50, 5085.00			
3501.00, 3522.00 3558.50, 3573.50 3650.00, 3875.00			Σ

7. Click on the **button**. After the data has been imported you will be prompted with a system message.

Databa	ise Message	×
Impo	rted Successfully.	
	OK	

8. Acknowledge the Import message. Click on the button and then click on the to exit or click on the button to close the Window.



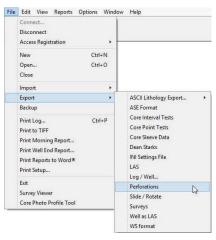
File Menu – Export Menu - Perforations

This utility exports your Perforation Intervals. This data can be exported into 3 file formats which can then be used by other applications.

Exporting Perforated Interval Data

To access the Export Perforated Interval Data window, click on Export under File to activate the pop-out menu and

then select **Perforations**. You can also select the Loop on the Export toolbar. This will activate the Specify file name window.



- 1. Click on the radio button next to the type of the file that you would like to create.
- 2. Click on the button. This will activate a Specify File Name window.

1	Specify Fi	le Name	×
Save in: 🚺	BACKUP	• 🖻 💣 💽	•
Name	*	Date modified	Т
	No items mate		
۲.			>
140			
File name:	perforated intervals.txt	Sa	ve

3. Type in a file name and select the drive and directory you wish the survey to be exported to. Then, **click** on the **Save button**. This will activate the System Information window asking you if you wish to proceed.

	d intervals.txt w E_2016\BACKUI		
you wish to		uncerory	

4. Click on the <u>Yes</u> button. This will create the file.

Edit Menu - Well

Lets you edit existing wells, and delete a well. The majority of this information is usually filled in at the start of a well, but should be updated with new information at the completion of a well.

The information associated with each well is entered into the Well window, along with the well's UWI (Unique Well Identifier). Note that each well and the information that it contains must be associated with a UWI (Unique Well Identifier) in order to distinguish it from the other wells residing within the Power*Log / Core & Curve database. However, the only way in which a well's information can then be displayed is by associating it with a log and then having that log open.

1. Click on Well, under the Edit menu selection, to activate the Well window.

	UWI 100143206323W500	Surf. Location: 14-32-63-23 W5M
it	Well Name Tutorial Well	Btm. Location: 8-32-63-23 W5M
Undo Move short Symbol	Operator: ABC Oil and Gas	Licensee: ABC Oil and Gas License # 124634
Redo Move short Symbol	Drilling Contractor: Drill Em Up	Pool: Big Field: Bigger
og	County.	Rig #: 23 Elevations
Vell	Province/State: Alberta	
rint Sections	Country: Canada	- Reference: Survey Ρε Ground / Collar: 21.1 KB: 24.9 Casing Flange: 21
og Configuration	- Surface Coordinates	Kb. (5.45) Casing Hange. (5.
rack Configuration	Latitude 53.612323	N/S: 1400.5 meters North of the South Boundary of Sec. 32-63-23 W5
ayer Configuration	Longitude 112.908911	E/W: 550.2 meters East of the West Boundary of Sec. 32-63-23 W5M
letafile Options	Intermediate Casing Point Coordinates	
elete Generic Groups	Latitude 53.612401	N/S: 1399.2 meters North of the South Boundary of Sec. 32-63-23 W5
ieneric Group Sorting	Longitude 112.909023	E/W: 550 meters East of the West Boundary of Sec. 32-63-23 W5M
ore / Sample Header 🕨	Bottom hole Coordinates	
og Layer Annotations	Latitude 53.615377	N/S: 603.5 meters North of the South Boundary of Sec. 32-63-23 W5M
	Longitude 113.103213	E/W: 1213.5 meters East of the West Boundary of Sec. 32-63-23 W5M
	UTM Surface Coordinates	
	Northing: 373718.96	Easting: 5942083.68
	Hole Direction: Horizontal 🔽 🗖 Faulted	C Deviated Hole ID: 100-302
	Depths	Date TimeWork Schedu
	Drillers T.D. Drillers T.D. Drillers T.D. Drillers T.D. Loggers T. (Tally) MD (Tally) TVD (Strap) MD (Strap) TVD MD	D. Loggers T.D. Spud: Jan 3, 2015 12:30 Curves
	3241 [2426.96 [3240 [2426.96 [3243	[2426.96] T.D.: Jan 22, 2015 23:00 Mud Types
	KB to Ground Cut Fill Plugback	Sidetrack Rig Release: Jan 31, 2015 08:00 Dir. Surveys
	5.3 1.5	Det Lik
		Well Status: Potential Red Sky
	Water Depth Reference: Water Depth	r I Abstract

Note: The well window has been filled in to give you an idea of how to complete the different fields.

- 2. Change or add to the different fields by typing in the fields. Certain fields have restrictions to what data they accept. If an error occurs while saving refer to the status bar for instructions.
- 3. Click on the save button or press ALT-S and the well data that you have just entered will be saved to the database.

<u>Note</u>: The Well Name field should be highlighted after you have clicked on the <u>save</u> button or press ALT-S, as an indication of a properly saved record. Some of the fields in the Edit 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 and the problem will be displayed on the Status Bar, at the lower left hand corner of your screen. Remember to save your work again, after the problem has been rectified.

4. If the record has been successfully saved, click on the *Lixi* button, when prompted with the Shortcut Options system window.

Surface Co-Ordinates Button:

The Surface Co-Ordinates button allows the user to input the Longitude and Latitude for the surface location in either pure degrees or degrees minutes and seconds. If you fill this window in we can then calculate the casing and bottom hole co-ordinates with only a depth field to be filled in.

- 1. Click on Well, under Edit, to activate the Well window and it will default to the active well.
- 2. Click on the surface co-ordinates button to display the Latitude and Longitude window.
- 3. Then, type in the wells surface co-ordinates in Degrees for Latitude and Longitude.
- 4. Or click on the Constraint check box to enter the wells surface co-ordinates in Degrees for Latitude and Longitude.

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Click on the	Longitude and Latitude	Longitude and Latitude
	Latitude Degree* Minute Second 0.12148 0 0	Latitude Degree* Minute Secon 5 24 34:345
	Longitude Degree* Minute Second 10.0577 0 0	Longitude Degree* Minute Second 119 43 54.546
	DMS Format	DMS Format OK

Casing and Bottom Hole Co-Ordinates Buttons:

The ** Casing and bottom Hole Co-Ordinates buttons allows the system to calculate these co-ordinates from a depth entry as long as the user input the Longitude and Latitude for the surface location in either pure degrees or degrees minutes and seconds.

- 1. Click on Well, under Edit, to activate the Well window and it will default to the active well.
- Click on the _____ beside the Casing or Bottom Hole co-ordinates 2. button to display the Enter Measured Depth window.
- Then, type in the measured depth of the wells casing or bottom hole. 3.
- Click on the CDMS Format check box to display the casing or bottom 4 hole co-ordinates in Degrees, Minutes and seconds for Latitude and Longitude.
- 0K button. Click on the 5

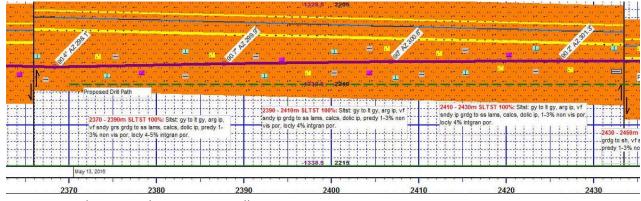
5.

Enter Measu	ired Depth 🔛
Depth: 0	ОК
E DMS	Cancel

nd

Curve Fill Layer (Power*Steer Option on Single Curve)

In Power*Suite, this layer type allows you to create a visual effect with the Interpretive lithology coupled with the Power*Steer bedding dips and faults. This layer will allow you to automate the drafting on the Lithology along the Well Path in this track. If the Interpretive lithology has been drawn it will be reflected and directly correlated to the corresponding bedding dips and faults created in the Power*Steer application. It has been designed to take the interpretive lithology drawn and fill in the Interpretation for the Horizontal (Power*Curve) application. An example is shown below.



How to Set the Power*Steer Curve Fill options

You will need the Well Path (TVD) curve available for the user to be able to fill in the options correctly. The easiest way to populate the Well Path (TVD) curve with digits would be by calculating the survey points and updating the well path curve with the digital data. Without actual survey data generating the well path curve this layer will not work correctlv.

Once the curve fill layer has been added to your log the user can now utilize the curve fill layer. To set the Curve Fill Options the user must first make the Curve Fill Layer active. To do so the user must click on a track containing the

Curve Fill layer and then selecting the given Curve Fill layer from the Layer Selection List field at the far <u>left</u> of the Selection Bar.

- 1. Double click anywhere within the Curve Fill or layer to activate the Curve Fill Options window.
- Click on the <u>Set Main Curve</u> button. This will activate a list of curves associated with this well.
- 3. Click on the Well Path curve name to use 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 (TVD) curve that has been generated by the survey data. You will now view

the curve name below the <u>Set Main Curve</u> button. Curve Options Portion of the Window. This information is pertaining to the Main Curve and its Curve attributes.

- 1. Click on the Pattern Type down arrow **■** and select the correct curve pattern for the main curve. The default is PtoP (Point to Point).
- 2. Click on the Grid Type down arrow riangler and select the correct curve grid type for the main curve. The default is Linear.

Fill Options Portion of the Window (1 Curve)

- Click on the Fill Modes 1 Curve down arrow
 In and select the Power*Steer from these options.
- 5. Click on the Save button in the Curve fill Options window. The window will close and the changes you have made will be reflected on the layer.

Perforated Intervals Layer

This layer allows the user to add perforated interval data to the database. These perforated intervals can be displayed in Power*Log, Power*Core, Power*Curve and Power*Steer. The user can define their own intervals either through click and drag method or typing in the intervals. The user can also import them.

Drawing Perforated Intervals in the Perforated Intervals Track / Layer.

1. Double click on the Perforated Intervals Track to activate the data entry window shown below.

Display Text	Text Options		
Display Fill	Vertical Alignment:	center	<u> </u>
Display Long	Horizontal Alignment:	center	•
C Opaque Text	Orientation:	V	•
Top Depth:	Base De Entry 🔽 Snap to	pth:	-1

- 2. Define the desired interval by **clicking and dragging** the mouse pointer within the Perforated Intervals track. The interval will be drawn accordingly.
- 3. The user can also type in the depths in the builder and then click on the save button.
- 4. **Double Click** within an existing rock type interval in the Perforated Intervals layer with the **Dbl Click Interval Entry** activated and the entire interval will be filled in with the attributes that have been entered into the Fills window.

Set Main Curve	Set Secondar	yCurve		
Vell Path (TVD)	Well Path (TVD	0)		
Curve Options			Example	
Pattern Type				
PtoP	Log Cycles 1	_		
1	Log Operes Tr			
Grid Type				
1				
Fill Options Fill Modes - 2 Curves	Fill Modes - 1 C			
And the second second second	Pill Modes - 1 C PowerSteer®	uive		
r-Well Path Options	Width: 0.8			
C TVD C SSL				
	Value: 0			
Fill Patterns				
Interpreted Lithology		•		
Foreground color	Background color	-		
black 🔄	black	•		
Solid Rock Fill				
		-	Save	Cancel
1		-		

Curve Fill Options

5. Click and drag the mouse on the track / layer close to an existing Fill (either above or below in the same column) with the Snap To Nearest activated and there will be no spaces between the fills. Remember you have to be within ¼" of the mouse pointer or screen accuracy from the previous symbol to have the snap to take effect.

Note: Measured Depths can be viewed within the mouse pointer display box 1224.80, situated to the right of the mouse pointer.

Also, while dragging the mouse, the user must start and stay within the confines of the track / layer they are working on. If you stray outside, the interval will start flickering and will not be drawn.

Modifying Fill Types

To modify the display on the track the user can right click on the fill and select one of these editing options. **Display Fill** – Displays the color of the fill interval.

Display Text - Displays the name Perforation or P.

Display Long- Displays **Perforation** within the fill interval. If unchecked, displays only **P** within the fill interval.

Opaque Text – Displays the white frame around the name of the fill interval for a better visibility.

Text Options - Allows the user to determine how they want the text to be aligned and oriented in the Perforated interval.

Fill Color – The Layer Configuration Display tab foreground Color will change the color from default black to any color you pick

Resizing Perforated Intervals

Mouse Pointer Method

 To resize an existing fills hold your Ctrl Key down on your keypad and move mouse pointer over the end part of the interval until it turns into a double arrow
 .

2. Click and drag to a new depth. Remember you cannot overwrite existing intervals.

Keypad Method

3

- 1. Click on the perforated Interval to be resized so that it goes into the builder.
- 2. Type in the new top OR base depth into the builder.
- 3. Click on the Save button

Deleting a single Perforated Interval

- 1. Double Click on the Perforated Interval Layer to activate the builder.
- 2. Right click on the interval you wish to delete and select delete from the pop out menu.
- Click on the Close button in the upper right hand corner of the builder. This will close down the Environment builder window.

Deleting multiple Perforated Intervals

- 1. Double Click on the Perforated Interval Layer to activate the builder.
- 2. Hold the SHIFT Key down and click and drag an area within the Perforated Interval Layer and then let go of the shift and mouse button to activate a System Message.

Confirm Multiple	Delete
Delete these Generic Fills?	
Yes	No

Click on the **button** and the corresponding Generic Category fills will be deleted.

4. Click on the Close button in the upper right hand corner of the builder. This will close down the Environment builder window.

Delete	
Fills	
Display Fill	
Display Text	
Display Long Form	
Opaque Text	
Vertical Align	×.
Horizontal Align	
Vertical Orientation	
Edit	
Edit Options	F
Add / Edit / Open Link	
Exit	

Note: Every type of layer in **Power*Log, Power*Core and Power*Curve** has a **Data Type** classification. The default settings for the **Perforated Intervals** are shown below. To access this window, click on the **Layer Configuration button** on the **Toolbar**, when the **Perforated Interval** layer is active.

POWER

SUITE[™] Addendum Manual 2016

Active Layer	Configuration [Perforations]	Activ	ve Layer Configuration [Perfor	rations]
Save Undo Name: Perforations	cales Data Group IDs Fornation and Age Display Dip Meter Definitions Data Type: Perforations	Layer - Display Settings Curve Definitions	s Layer Scales Data Group IDs Format	ion and Age Display Dip Meter Definitions
Display Layer Name or Curve Scale on Track Show Layer on Track Display Vertical Orientation (Layer Name) Display Backup scales Display Scale Change Line Indicator Display scales on non-active layers	Foreground Color: block Depth Offreet: Display Scale Placements Every Start at:	Genetic Category SYSTEM_PERFORATION MDT Run No	Graphics Visual Range (Energy)	Dip Meter Group Generic Symbols
Toisplay Full Logarthmic Scale Isplay Depth-Axis Grid Display Detta-Axis Grid Display Data-Axis Grid				1
	OK Cancel Help		Г	OK Cancel Help

Survey View Module

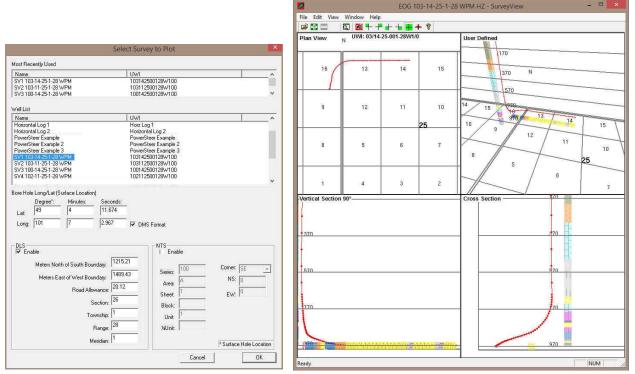
How to Open a set of Surveys for a well.

 This will activate the survey view window shown above. Click on the New Survey button on the toolbar or click on New Survey from the File menu selection to activate the Select Survey to Plot window.

Survey from the File menu	u selection to activate the Select Survey to Plot windo	SW.
Save Screen		
New Survey		1
Connect to Database		
Disconnect from Database	-rs	
Exit		
	Select Survey to Plot	×
Most Recently Us	sed	
Name	UWI	^
Tutorial Well ABC Oil Anywher	100143206323W500 ere 12-25 ABC 0/i 12-25	
bob	bob	~
Well List		
Name	UWI	
ABC Oil Anywher	ale 12-25 ABC Oil 12-25	
Core Log 3 Gas Log	Core Log 3 Gas Log	
Horizontal Log 1	Horz Log 1	
Horizontal Log 2 Tutorial Well	2 Horizontal Log 2 100143206323W500	
1		
	Lat (Surface Location)	
Degree		
Lat 0	lo lo	
Long: 0	0 DMS Format	
DLS I Enable	NTS I Enable	
Meters	s Notif of Sodin Boundary. I 100 Comer. SE	-
Mete	ers East of West Boundary: 10 NS: 📊	
	Road Allowance: 20.1200000 Area: 1 550 0	
	Road Allowance: 1 EW: 0 Section: 1 Data <	
	BIOCK, I	
	Township: 1 Unit: 1	
	Bange: 1 %Unit:	
	Meridian.	
	* Surface Hole Loc	ation
	Cancel 01	K D

- 2. Highlight the Well Name you wish to open by highlighting it with the mouse pointer.
- 3. If you have **hard boundaries** that you wish to stay away from, or you have **multiple wells** you wish to show on the survey plots you will have to **fill in the surface co-ordinates for the latitude and longitude**.
- 4. Then you will want to enable the check box and fill in the DLS coordinates or the NTS values as indicated in the window shown below. If your survey system does not fall into these survey systems then leave them unchecked and your well will be in the centre of a generic grid system as viewed in the Plan and user defined views.
- 5. Then **click** on the **DK button** to activate the survey view window with your surveys from this well.

DLS Example



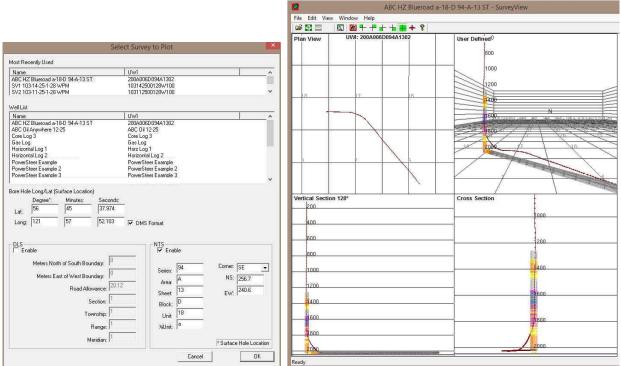
The surface hole Longitude and Latitude fields to not have to be filled in if this is the first well to plot in the survey view application. Any subsequent well data to be displayed the user must fill in the surface hole well co-ordinates for both Latitude and Longitude in degrees minutes and seconds and we will utilize these fields to get subsequent well data onto the plot. If you enable the check box beside the DLS your Plan view and User-defined view will have the DLS grid system marked. The DLS Survey breakdown would be as follows for this example location 09-26-001-28 W1M. Where the 09 is the Location, 26 is the Section, 001 is the township and 28 is the range and the 1 is the meridian

Meters North of South Boundary:	1215.21
Meters East of West Boundary:	1489.43
Road Allowance:	30.18
Section:	26
Township:	1
Range:	28
Meridian:	1

The Meters North of the South Boundary must be just that. If your survey plat gives you from the north boundary, then you have to subtract that number from 1,609.34 m to give you the meters North of South Boundary. The Meters East of the West Boundary must be just that. If your survey plat gives you from the east boundary, then you have to subtract that number from 1,609.34 m to give you the meters East of West Boundary. The Road Allowance field (these are dead areas in the DLS grid system) is traditionally the default value (20.12) but can in some places (30.18). The Township field (Values from 1 to 126) depends on the well location. It is necessary because we have to accommodate for correction lines if your well crosses those on the plan or user defined views. The Section field (Values 1-36) depends on the well location. It is necessary because we have to accommodate for road allowances if your well crosses those on the plan or user defined views.

6. Click on the button. If done correctly and you have sufficient surveys you should get the survey window filled in with the four (4) views of your well bore. You should see something similar to one of the Survey window shown above.

NTS Example



If you enable the check box beside the NTS your Plan view and User-defined view will have the NTS grid system marked.

Below is an example of the NTS survey system location. Remember we are dealing with the surface location. a-18-D / 94-A-13 whereas a is the ¼ Unit, 18 is the Unit, D is the block, 94 is the series, A is the Area and 13 is the sheet.

Series:	94	Corner:	SE 💌
Area:	A	NS:	256.7
Sheet:	13	- EW:	240.6
Block:	D	1	
Unit:	18		
¼Unit:	a		

Fill in the surface location fields from the surface location given to you in the survey plat. In this NTS system we can use any corner for the measurements on the surface location but you must pick one from the drop box Then fill in the Meters from the North / South Boundary. Then fill in the Meters from the East / West Boundary. If you are adding multiple wells then you must also fill the surface hole Longitude and Latitude fields to not have to be filled in if this is the first well to plot in the survey view application. Any subsequent well data to be displayed the user must fill in the surface hole well co-ordinates for both Latitude and Longitude in degrees minutes and seconds and we will utilize these fields to get subsequent well data onto the plot.

survey plat. In this NTS system we can use any corner for the measurements on the surface location but you must pick one from the drop box Then fill in the

Meters from the North / South Boundary. Then fill in the Meters from the East / West Boundary. If you are adding multiple wells then you must also fill the surface hole Longitude and Latitude fields to not have to be filled in if this is the first well to plot in the survey view application. Any subsequent well data to be displayed the user must fill in the surface hole well co-ordinates for both Latitude and Longitude in degrees minutes and seconds and we will utilize these fields to get subsequent well data onto the plot.

3. Click on the button. If done correctly and you have sufficient surveys you should get the survey window filled in with the four (4) views of your well bore. You should see something similar to one of the Survey window shown above.

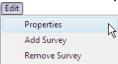
No Survey System

		124	Pow	erSteer Exan	nple 3 + SurveyView	
			ew Window Help			
	Select Survey to Plot	× 🛛 🚔 🗖 🗖	🖾 🖣 🕂 🕂 🛨 🖶 🕇			
Most Recently Used		Plan View	UWI: POWERSTEER EXAN	IPLE :	User Defined	1100
Name	UWI			1 1	·	1300
ABC HZ Blueroad a-18-D 94-A-13 ST	200A006D 094A1302					
PowerSteer Example 2	PowerSteer Example 2					1500
SV1 103-14-25-1-28 WPM	103142500128W100	~				1700
Well List						1940
Name	UWI	-			N	2100
ABC Oil Anywhere 12-25	ABC 0il 12-25					
Core Log 3	Core Log 3		1			2800
Gas Log	Gas Log					2700
Horizontal Log 1 Horizontal Log 2	Horz Log 1 Horizontal Log 2				TT	2909
Mancal Entice 102/14-2-28-24	102140202824W400				TXX	a100
PowerSteer Example	PowerSteer Example		A		TT T	2000
PowerSteer Example 2	PowerSteer Example 2				TT	XXX
PowerSteer Example 3 SV1 103-14-25-1-28 WPM	PowerSteer Example 3 103142500128W100	~		+ +		$\times \vee$
	103142500128W100				1 A X	
Bore Hole Long/Lat (Surface Location)						$\setminus \times \setminus$
Degree*: Minutes: Secor	nds:	and the second second			NX	
Lat 32 12 13.45		Vertical Section	ion 0.1°	500	Cross Section	
				700		1300
Long: 109 25 11.65	7 DMS Format			900	1	the fileses
				1		1500
				1100	-	1200
DLS Enable	NTS I Enable			1300	-	1700
1 Chable				1500		1900
Meters North of South Boundary:	Corner: [SE					
li l	Series:	<u> </u>		1700	-	2100
Meters East of West Boundary:	Area: A			1900	-	1
Road Allowance:		-		2100		2300
	Sheet: 1 EW: 0			1000		/
Section:	Block:			2300		2500
				2500	4	2700
Township:	Unit			2700	1	2100
Bange:	%Unit:					2900
5				2900	-	
Meridian:	* Surface Hole Loc	ation		3100		3100
				3300		1
	Cancel 01	Ready				3 3300
		Ready				NUM

If you do not enable the check boxes beside the DLS or NTS your Plan view and User-defined view will have a generic grid system marked and your well centre will be right in the middle of the plot.

3. Click on the button. If done correctly and you have sufficient surveys you should get the survey window filled in with the four (4) views of your well bore. You should see something similar to one of the Survey window shown above.

Edit Menu - Properties



🖻 🕂 🖃	🛛 🖾 🕂 🕂 🕂 🛨 🐐 😵
	<u> </u>

The Properties menu item allows the user to customize the look of the views. There is something to note here that if you make changes to one view they all change so beware.

1. Click on the Properties selection under the edit pull down menu or click on the Properties icon on the tool bar. Another way to activate this menu is to right click on the view and select the properties option from the pop out menu. This will activate the edit window for the survey view application as shown on the next page.

Overview of Properties Window

oint Display Size:	3	Grid Walls		- 14F -	E a	DLS Grid Rows North South
oint Display Size: 1 rognosis zimuth (Vertical Section urvey Text /ireframe ormation Tops	Plane)	Grid Labels N: N offset from borehol E+W-: 0	O	E: E	₩: ₩: ₩: ₩	Image: solution of the soluti
cale: rid Numbers	ব	N+S-: 100	-150	0	0	
Major.j	Scale offset from b E+W-: 10 V+S-: 10	orehole Increment 200	Lithology Column offset from borel E+W-: 40 N+S-: -90		E+W-: 100	Point Color Back Color
Hard Boundary Degree* Lat: 49 Long: 101	Minutes 7 8	16.674	1B Format DMS Format Show Boundaries	Line Size: 4 Color		Zone / Tops Vertical Scaling: 50 Opacity: 0.5 IV Display
					ок	Cancel Appl
Display Size: 3						ze of the survey poin

survey balls to a solid line view.

Prognosis The display **Prognosis** check box setting turns on/off the set of surveys that made up the original prognosis and displays that information. These surveys have to be entered into the Prognosis portion of the survey report in our main applications (Log, Curve and Core) and then calculated.

Azimuth (Vertical Section Plane) The display Azimuth check box allows the user to turn on/off the target azimuth of the well that has to be entered into the Survey Report window. Ultimately, the master survey group controls this display.

Survey Text The display Survey Text setting turns on/off survey indicators on the Plan view only and these indicators illustrate every 10th survey point in the Master survey group.

Wireframe The display Wireframe setting changes the survey point balls from a solid color to a wire frame symbol.

Formation Tops I The display Formation tops check box will turn on/off the ability to display the Formation tops entered into Power*Log / Curve or Core and will display the Log / Sample or Prognosed tops as indicated in the Formation tops window.

Scale: Very Scale check box will turn on/off the ability to display the scale

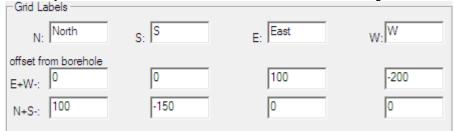
Grid Numbers IV The grid numbers check box will turn on/off the section numerical displays on the plan and user defined views.

Gnd Walls				
North	🔲 South	🔽 East	▼ West	Comers

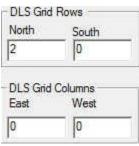
The **Grid Walls** enables the user to turn on/off the exterior walls of the grid system. These walls are displayed in three (3) of the views. These walls can be displayed in the User-defined, Target azimuth and Cross

section views. The walls increment is defined by the scale increment of the window.

Comers The corners check box turns on/off the corners connecting the grid walls. The ability to turn off the corners will mostly be used in the Vertical Section and Azimuth views if the target azimuth is tangential.



This **Grid Labels** enables the user to control the positioning and label verbiage in two (2) of the views. These labels are displayed in both the Plan view and the User-defined view but cannot be controlled independently. The labels (in this case are North, S, East and W) are displayed in the following example. The E+ / W- axis is left / right with a + value moving it to the right and a – value moving it to the left. The N+ / S- axis is up / down with a + value moving it up and a – value moving it down.



The DLS Grid Rows allows the user to identify where the grid should be drawn for the well path on the Plan View and User defined view to be drawn. We will identify the Section, Township and range numbers on the views as well. Correction lines and road allowances are also determined with the help of the of the surface co-ordinates. The grid rows are indicating how many sections are required to draw in all the directions. In the example here the well is being drilled due north and is covering the section we are starting in as well as 2 more sections to the north.

Line Sizes
Major: 3
Minor: 2

The **Line Sizes** enables the user to change the line thickness on the Plan and user-defined surface grid indications as well as the line thickness in the grid walls. Major lines encompass the exterior borders of a Section in the DLS system, a Unit in the NTS system and the exterior of a no survey system choice. All other lines on the views are minor lines.

- Scale	hole		The
Lithology Column offset from boreh	nole		
E+W-: .60	Column Size:	20	
N+S-: -90	Opacity (0-1):	0.5	

Scale enables the user to control where the depth scale is positioned and the increment for the depth scale. The depth Scale is displayed in all views but the Plan view. A positive (+) value in the **E+/W** -field moves the scales to the East with a negative (-) value moves the scale to the West. A positive (+) value in the **N+/S- field** moves the scales to the North with a negative (-) value moves the scale to the South. The Increment field allows the user to specify what the wall grid increment will be. The Scale: ✓ check box covered earlier will turn on/off the

scale.

The Lithology Offset enables the user to control where the Interpretive Lithology column (displayed in TVD & Vertical Section) is positioned. The Interpretive Lithology column is displayed in all views but the Plan view. A positive (+) value in the E+/W- field moves the Interpretive Lithology to the East with a negative (-) value moves the scale to the West. A positive (+) value in the N+/S- field moves the Interpretive Lithology to the North with a negative (-) value moves the scale to the South. The Colum size field changes the width of the Interpretive Lithology displayed in the views. The Opacity field changes the ability to see through the column to view other data. 0 is transparent and 1 would be solid.

-Log To	ps
E+W-:	10
N+S-:	10

The **Log Tops** enables the user to control where the Formation tops are positioned.. The Log Tops are displayed in all views. A positive (+) value in the **E+/W** -field moves the scales to the East with a negative (-) value moves the scale to the West. A positive (+) value in the **N+/S**-field moves the scales to the North with a negative (-) value moves the scale to the South. The Formation Tops is check box covered earlier will turn on/off the scale.

Point Color	Changes the color of the Survey Points / Line and target azimuth line display.
Back Color	Changes the background of the entire view.

Label Text Color

Changes the text color for the blocks, labels and Formation Tops.

Hard Boundary Portion of window.

	Degree*	Minutes	Seconds	HB Format	
Lat:	56	45	38.13	DMS Format	Line Size: 2
Long:	121	57	52.13	Show Boundaries	Color
and Day	-				
ard Bou -)/S(-):		n Borehole		HB Format	Line Size: 2

This portion of the window allow the user to enter any Hard boundaries that the well must stay away from. These boundaries can be displayed on both the Plan and User Defined views and the distance from them are calculated and displayed on these views.

HB Format

The **button** will change the data entry method from either a Latitude / Longitude in either in strait degrees **or** degrees, minutes and seconds. Or the other method is how many meters N/S and E/W from hole center.

The Show Boundaries check box will turn on/off the hard boundaries entered into the Hard Boundaries field and display them in the Plan and User Defined views.

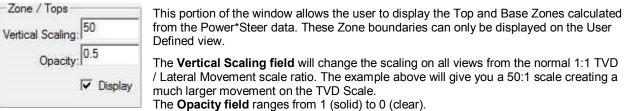
The DMS Format check box will toggle the data entry method for the hard boundaries from degrees to degrees minutes and seconds.

The Line Size: ^{|2} field in the Hard Boundaries portion of the window allows the user to change the thickness hard boundary line. This field can range from 1 pixel to 7 pixels wide.

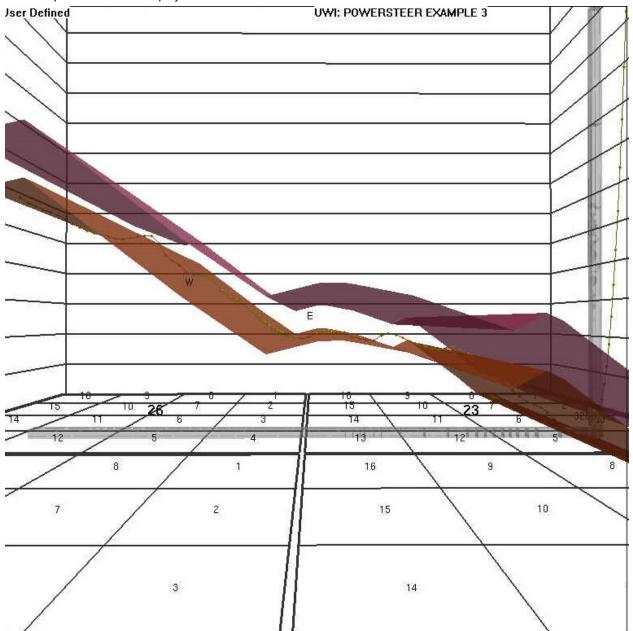
Color

Changes the color of the Hard boundary lines.

Zone / Tops Portion of window.



An Example of the Zones displayed in the User Defined view shown below.



Surface Coordinates Tab (Properties Window)

Properties
Display Settings Surface Coordinates
Bore Hole Long/Lat (Surface Location) Degree°: Minutes: Seconds: Lat: 49 4 11.674 Long: 101 7 2.957
Coordinate System DLS Image: Enable Meters North of South Boundary: 1215.21 Meters East of West Boundary: 1489.43 Road Allowance: 30.18 Section: 26 Block: a Unit: 1 Weindian: 0
OK Cancel Apply

This portion of the window allows the user to add the Latitude (Lat:) /Longitude (Long:) for the surface hole which is necessary if this is an additional well to be plotted or correct the DLS or NTS portion of the window. These fields were entered when the survey plot was initially started.

The surface hole Longitude and Latitude fields to not have to be filled in if this is the first well to plot in the survey view application. Any subsequent well data to be displayed the user must fill in the surface hole well co-ordinates for both Latitude and Longitude in degrees minutes and seconds and we will utilize these fields to get subsequent well data onto the plot. If you enable the check box beside the DLS your Plan view and User-defined view will have the DLS grid system marked. The DLS Survey breakdown would be as follows for this example location 09-26-001-28 W1M. Where the 09 is the Location, 26 is the Section, 001 is the township and 28 is the range and the

1 is the meridian

Meters North of South Boundary	e 1215.21
Meters East of West Boundary	1489.43
Road Allowanc	e: 30.18
Sectio	n: 26
Townshi	ip: 1
Rang	je: 28
Meridia	in: 1

The Meters North of the South Boundary must be just that. If your survey plat gives you from the north boundary, then you have to subtract that number from 1,609.34 m to give you the meters North of South Boundary. The Meters East of the West Boundary must be just that. If your survey plat gives you from the east boundary, then you have to subtract that number from 1,609.34 m to give you the meters East of West Boundary. The Road Allowance field (these are dead areas in the DLS grid system) is traditionally the default value (20.12) but can in some places (30.18). The Township field (Values from 1 to 126) depends on the well location. It is necessary because we have to accommodate for correction lines if your well crosses those on the plan or user defined views. The Section field (Values 1-36) depends on the well location. It is necessary because we have to accommodate for correction lines if your well crosses those on the plan or user defined views.

7. Click on the button. If done correctly and you have sufficient surveys you should get the survey window filled in with the four (4) views of your well bore. You should see something similar to one of the Survey window shown above.

NTS Example

Properties	
Display Settings Surface Coordinates	
Bore Hole Long/Lat (Surface Location) Degree*: Minutes: Second Lat: 56 45 37.974 Long: 121 57 52.103	s: IF DMS Format
Coordinate System -DLS - Enable Meters North of South Boundary: Meters East of West Boundary: Road Allowance: 20.12 Section: Township: Range: Meridian: 0	NTS Image: Enable Series: 94 Comer. SE Area: A NS: 256.7 Sheet: 13 EW: 31 Block: d
	OK Cancel Apply

If you enable the check box beside the NTS your Plan view and User-defined view will have the NTS grid system marked.

Series:	94	Corner:	SE	1
Area:	A	NS:	256.7	
Sheet:	13	- EW:	240.6	
Block:	D	1		
Unit:	18	l.		
¼Unit:	a			

To the left is an example of the NTS survey system location. Remember we are dealing with the surface location.

a-18-D 94-A-13 whereas a is the ¼ Unit, 18 is the Unit, D is the block, 94 is the series, A is the Area and 13 is the sheet.

Fill in the surface location fields from the surface location given to you in the survey plat. In this NTS system we can use any corner for the measurements on the surface location but you must pick one from the drop box Then fill in the Meters from the North / South Boundary. Then fill in the Meters from the East / West Boundary. If you are adding multiple wells then you must also fill the surface hole Longitude and Latitude fields to not have to be filled in if this is the first well to plot in the survey view application. Any subsequent well data to be displayed the user must fill in the surface hole well co-ordinates for both Latitude and Longitude in degrees minutes and seconds and we will utilize

these fields to get subsequent well data onto the plot.

4. Click on the button. If done correctly and you have sufficient surveys you should get the survey window filled in with the four (4) views of your well bore. You should see something similar to one of the Survey window shown above.

Power*Steer Module Connecting to the Database

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

Databases	s:	
PGEOLO	GY 2016 IMPERIAL	(Microsoft Access D
PEEULO	an 2016 METHIL (N	dicrosoft Access Dri
		+ 0
User ID:	pgeology	Connect

1.) Highlight the PGEOLOGY 2016 METRIC (Microsoft Access Driver[*.mbd])) database by clicking on it once.

- 2.) Move your mouse pointer to the User ID field and click. This will activate a flashing cursor in the User ID field. Type "pgeology" in the User ID field. Press the Tab key on the keyboard to move to the Password field.
- 3.) **Type "pgeology"** in the **Password** field and then **click** on the **button**. The program will now load various dictionaries and then activate a Well List window.

Recently Opened Name	UWI	
PowerSteer Example	PowerSteer Example	
ABC Oil Anywhere 12-25	ABC OF 12-25	
Tutorial Well	35-139-23155	
<		>
hoose a well		
Nome	UWI	,
Oiltandt 3	303030303030	
PowerSteer Example PowerSteer Example 2	PowerSteer Example PowerSteer Example 2	
PowerSteer Example 2 PowerSteer Example 3	PowerSteer Example 2 PowerSteer Example 3	
SV1 103-14-25-1-28 WPM	103142500128W100	
SV2 103-11-25-1-28 WPM	103112500129W100	
5V3 100-14-25-1-28 WPM	100142500129w100	
SV4 102-11-25-1-28 WPM SV5 102-14-25-1-28 WPM	102112500129W100 102142500129W100	
SYSTEM METRIC	SYSTEM (M)	
Tournaine HZ Antell 14-1-51-19	100140105119w500	
Tournaline HZ Ansell 3-36-50-19	100033605019W500	
Tournaline HZ Ansell 3-36-50-19 Tutorial Core Log	100141901223w/500	- 12
Tournaline HZ Ansell 3-36-50-19		

4.) **Double Click on the Well** you want to open or **Highlight the Well** and then **click on the button**. If this is the first time the Well has been opened it will be a blank template starting at zero depths with no scales.

File Menu

The File pull down menu contains numerous selections described below.

Open Selection

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

			Choose	wen	
File	Edit View Help	Window	Recently Opened		
	Open	Ctrl+0	Name ABC 01/Anywhere 12-25 PowerSteer Example bob	ABC 0il 12-25 PowerSteer Example bob	Ê
	Close	13	<		>
	Refresh Data Background Graphic		Choose a well		
	Import Export	*	ABC Dil Anywhere 12-25 BIR 11-03 HZ 102 9-8-78-13 02 SIDE TRACK BIR 11-03 HZ 102 PCDUPES 9-8-78-13 BIR 11-3 HZ 102 PCDUPES 9-8-78-13 BIR 9-8 SIDE TRACK Bircholif HZ PCoupes 8-8-78-13W6	ABC 0il 12:25 10209-08-07813W602 102090807813W600 102090807813W600 102090807813W600 102090807813W603 100080807813W600	
	Print Print Preview Print Setup	Ctrl+P	BIRCHCLIFF HZ PCOUPES 9-8-78-13 bob Chevron Hz 102 KaybobS 6-26-61-20 Chevron HZ KaybobS 13-26-61-20 Chevron HZ KaybobS 16-27-61-20 PowerSteer Example Strategic Marlowe 2-9-121-23 SYSTEM METRIC	100090807813\/600 bob 102062606120\/500 100132606120\/500 100162706120\/500 PowerSteer Example 100020912123\/500 SYSTEM (M)	~
	Exit		\<	ОК	> Cancel

2. Select the well you wish to work with in Power*Steer by double clicking on the well name or highlighting

once and click on the OK button.

Note: The Recently Used list (located above the Well List) will remember the last 10 wells you worked on. Close Selection

1. Click on the File Menu to activate the drop down list and Click on the Close Selection to close the well you have open in Power*Steer.

Refresh Data Selection

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

This would be done if you have updated the data in Power*Log or Power*Curve and the well is already open in Power*Steer. Otherwise if you have just opened the well then there is no need to refresh the data.

Background Graphic Add Selection

The User has the ability to place a graphic (maybe a seismic representation in the background of the Power*Steer Well Path Pane

- 1. Click on the File Menu to activate the drop down list and Click on the Background Graphic Selection. This will activate a Pop out menu.
- 2. Click on the Add selection. You will be prompted with an Open Picture File window.

File	Edit View Help Window	-	Open Picture F	File	×		Set Backgro	und Image 🛛 👗
	Open Ctrl+O Close Refresh Data		Look in: 🔛 Desktop Name	▼ ← 🗈 (Date ^	of II → Type	TVD Top	3290	
1	Background Graphic	Add	Files	3/4/2013 2	File folder	TVD Base	2252	
	Import +	Remove	Power Steering for 102120606418W500.j		JPEG image	110 0000	3333	Cancel
	Export +		Power Steering for 102120606418W500	1/21/2016	JPEG image	VS From	-450	
	Print Ctrl+P Print Preview Print Setup		File name: Power Steering for 102120606418	W500.jpg	> Open	VS To	2100	
	Exit		Files of type: Picture Files (*.bmp;*.dib;.*emf;*.gif	;*ico;*jpg_★	Cancel			

- 3. Navigate the folder and file name and then **Click** on the **Deen button**. This will open a Set Background Image window.
- 4. **Type** in the appropriate True Vertical Depth (TVD) top and base depths along with the appropriate Vertical Section (VS) depths tabbing between fields.
- 5. Click on the button. You should see your graphic displayed at the appropriate depths.

Background Graphic Remove Selection

The User has the ability to remove a graphic once it has been added.

- 1. Click on the File Menu to activate the drop down list and Click on the Background Graphic Selection. This will activate a Pop out menu.
- 2. Click on the **Remove selection.** The graphic previously inserted will be removed.

Import Selection

- 1. Click on the File Menu to activate the drop down list and Click on the Import Selection. This will activate a pop out list.
- 2. Click on the Import Log / Well selection to import Power*Suite data exported from another user or time into Power*Steer. This will activate the Power*Log Data Transfer Import window.

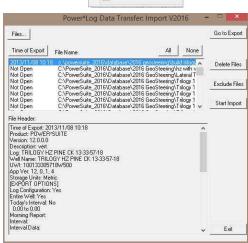


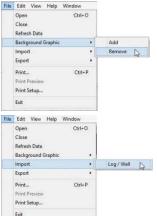
Click on the Files. button to browse through your drives/directories for the file(s) you wish to import. Note that files available for importing will have an .EXP file extension. Any of the files that you select will then be added to the File list. Please make sure that the files you wish to import are highlighted (selected), in the list prior to importing.

Note: The Exclude Files button will remove the selected/highlighted files

from the import list, but will not delete them. The **button**, on the other hand, will completely erase the selected/highlighted files from their directory. Once deleted, these files will no longer be recoverable.

- 2. Click on the ^{Start Import} button to activate the following system message, "*Do you really want to IMPORT the highlighted files?*"
- 3. Click on the <u>Yes</u> button to proceed with the import.





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

- Click on the <u>yes</u> button. Upon completion of the import, the following system message will then be activated, "Data has been imported successfully."
- 5. Click on the **button** to confirm the successful import of the data.

6. Once the data has been imported you must **select Refresh data** from the **File pull down menu.** Export Log / Well

Allows you to export log configurations, well information, system symbols and your Geology Expansion Dictionary. In this example we will show you how to export your Power*Steer data only.

- 1. Click on the File Menu to activate the drop down list and select Export. This will activate a pop out menu
- 2. Select Export Log / Well from the pop out menu. This will activate the Power*Log Data Transfer Export Window

When **Data Transfer Export** window opens from the main **Power*Log** / **Core, Curve and Steer™** it automatically defaults to the currently active Power*Steer log.

File	Edit View Help Wind	low		
	Open Close Refresh Data Background Graphic Import	Ctrl+0		
	Export	•	Log / Well	N
	Print Print Preview	Ctrl+P	Segments Surfaces	63
	Print Setup	100		
	Exit			

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Well Trilogy 102 H2 KaybobS 16: M Uwit: 102161706119W500 Password: Again: Entrie Well Today's Interval to 0 Morning Report Date to 0 Export Interval Interval Based Data: All None Record Based Data: All None 0 to 0 Core Frets Detaile Lithology Graphics Lithology Description Multiple Array Tests Detaile Lithology Description Multiple Array Export all Generic Categories NBF Symbology Core Plays Export all wells Side / Rotate Diftermation Export Symbolos Side / Rotate Difters Side / Rotate Sinder Rock Type (C) Survey Graphics	Log		Export File	C:\POWERSUITE_2016	Database\02
UWI: 102161706119W500 Log Configuration Entire Well Today's Interval Morning Report Date today's Interval Interval Based Data: Annotation Core Tests Detet Detet Detet Start Export Export all wells Start Export Export all wells Export all wells Side / Rock Type (C) Sniede Rock Type (C) Swied Rock Type (C)	Well Trilogy 102 HZ Kay	bobS 16-		<u>—</u> г	D alabase (02.
Log Configuration Entire Well Today's Interval Morning Report Date Export Interval Interval Based Data: All None Export Interval Interval Based Data: All None Core Photos Directional Survey Core Photos Core Photos Core Photos Core Frests Dean Stark Intervals Multippe Detailed Lithology Test More Files SideWall Cores Start Export Wireline Logging Work Schedule Lithology Description MDF Rymobology Core Box/Row Information Export all Generic Categories Sample / Core Description Stide / Rotate Side / Rotate Export Symbols Side / Rotate Side Rotate Side Rotate Sniede Rock Type (C) Survey Graphics	102161706119W5	00		Again: I	
Morning Report Date to Go to Impo Export Interval Interval Based Data: All None Record Based Data: All None 0 to 0 Annotation Curves Directional Survey Formation 0 to 0 Care Treats Multiple Array Detailed Linkology Detailed Linkology Bractica Wrieine Logging Work Schedule Linkology Description Start Export NBT Symbology Core Frees Export all wells Brange Data Sample Zora Sample Zora Export all wells Sample Zora Sample Zora Core Plugs Export Symbols Side / Rotate Directional Survey Formation Export all wells Brange Data Schedule Curve Fills Export Symbols Sample Zora Schedule Curve Fills Export Symbols Sample Zora Core Puges Sor/Row Information Export Geology Dictionary Sineder Rock Type (C) Survey Graphics					2
Morning Report Date to Export Interval Interval Based Data: All None Record Based Data: All 0 to Core Photos Directional Survey Core Tests Denotation Mud Type Dean Stark Intervals Multiple Array Detailed Lithology Test Lithology Description Curve Fills Start Export MDF Runs Export all Generic Categories Srider Rock Type (C) Stide / Rock Type (C) Survey Graphics	Today's Interval 0	to 0		· · · · · · · · · · · · · · · · · · ·	
Export Interval Interval Based Data: All None Record Based Data: All None 0 to 0 Annotation Curves Directional Survey Core Tests Dean Stark Intervals Muid Type Muid Type Muid Type Deals Lithology Test Muid Type Muid Type Detailed Lithology Graphics Wireline Logging Work Schedule Lithology Description Curve Fills Curve Fills Start Export Oil Staring Core Header Information Export all wells Range Data Core Description Export all wells Sample / Core Description Core Plags Stide / Rock Type (C) Survey Graphics Directeds	Morning Report Date		to		Go to Impo
Delete Core Photos Directional Survey Date Formation Date Muid Type Dens Task Intervals Multiple Array Delete Static Intervals Static Export Lithology Export all Generic Categories Signification Export all Generic Categories Distaining Export all wells Core Program Export all wells Sample / Core Description Export all wells Core Program Export all wells Sample / Core Description Export Symbols Sinider Rock Type (C) Sinider Rock Type (C) Linkets		Interval Based D	ata: All Nor	ne Record Based Data:	All None
State Explort NBR Symbology Genetic Fills Export all Genetic Categories Dil Statring Core Header Information Export all wells Bercent Lithology Interbeds Export Symbols Sample / Core Description Core Plugs Export Geology Dictionary Sinider Rock Type (C) Links	Delete	Core Tests Date Dean Stark Inter Detailed Litholog Graphics Lithology Lithology Descri	gy .	Formation Mud Type Multiple Array Test Wireline Logging Work Schedule Curve Fills	
Export all wells Percent Lithology Interbeds Export all wells Range Data Core Box/Row Information Export Symbols Sample / Core Description Core Plugs Export Geology Dictionary Sinider Rock Type (C) Links	6	NBR Symbology	,	Generic Fills	
Export all wells Range Data Core Box/Row Information Export Symbols Sample / Core Description Core Plugs Stide / Rotate Dip Meters Dip Meters Export Geology Dictionary Snieder Rock Type (C) Links	Export all Generic Categories				ition
Export Symbols Slide / Rotate Dip Meters Export Geology Dictionary Snieder Rock Type (C) Links Snieder Rock Type (G) Survey Graphics	Export all wells		2	Core Box/Row Infor	nation
Snieder Rock Type (G) Survey Graphics	Export Symbols		Jescription	Dip Meters	
	Export Geology Dictionary				
Backap All	Backup All	Constant fock 1	ypo (o)	PowerSteer Data	

- 3. The Log Configuration check box 🗆 should not be activated (unchecked), as you are not exporting a log.
- 4. The Entire Well check box should also be activated (unchecked), as it is the default but in our case we will uncheck the Entire well as we are just exporting the Power*Steer data.
- 5. Because we are exporting only the Power*Steer data **click** on the **buttons** beside the Interval and Record Based Data. This will deselect all the Interval and record based data types.

Record Based Data:

- 6. In the Record based Data portion of the window and **click on or select** the **Power*Steer data selection** to highlight it.
- 7. Name the export file by clicking on the File Name... button and then select a destination and a filename. Do not type in a file extension other than .EXP. If you omit the extension, an .EXP file extension will be added, automatically, to your filename by Power* Steer™.
- 8. Click on the Start Export button.

This will backup your Power*Steer data that can be imported if things go awry or is overwritten by another export file.

Export Segment Data

This utility exports your Power*Steer Segment data into a *csv (comma separated values) file format which can then be utilized by other applications.

- 1. Click on the File Menu to activate the drop down list and select Export. This will activate a pop out menu
- 2. Select Segments from the pop out menu. This will activate a Segment Export File Name window.

۲	Segment Export File Name	×
Save in:	🖢 Desktop 💌 🖛 🔁	₫ 🖬
Name	Date	Туре
🗼 Files	3/4/2013 2	File folder
a bob.0	SV 2/11/2016	Microsoft
Log / Well		
Segments		
Surfaces Kd K		>
File name:	bob.CSV	Save
Save as typ	e: CSV Files (*.CSV)	Cancel
	Save in: Name Files Segments Surfaces	Save in: Desktop Save in: Desktop Name Date Sites Sites Suffaces Save in: Desktop Name Date Sites

3. Type in a file name and select the drive and directory you wish the survey to be exported to. Then, click on the save button. This will activate the Segment Export File Created window.

File C:\Users\Sephton\	Desktop\bob.CSV created
8 8 9 5	6 M36

4. Click on the **button** to exit Segment Export file window.

This will export the segment data only which can then be utilized by another 3rd party application. We cannot import this segment file data.

Export Surface or Zone Data

This utility exports your Power*Steer Surface data into a *csv (comma separated values) file format which can then be utilized by other applications.

- 1. Click on the File Menu to activate the drop down list and select Export. This will activate a pop out menu
- 2. Select Surfaces from the pop out menu. This will activate a Surface Export File Name window.

File	Edit View Help	Window	
	Open Close	Ctrl+O	
	Refresh Data		
	Background Graphic		
	Import	•	
	Export	*	Log / Well
	Print	Ctrl+P	Segments
	Print Preview		Surfaces
	Print Setup		
	Exit		



Choose a Zone Viking A	to export		
	Long.	Lat.	
Long/Lat	-108.0058669	51.1270327	
	Northings	Eastings	
C UTM	5668235.04	709501.95	

3. You will have to choose a zone of formation top to export from the drop list provided.

Choose a Zone to export		
Marker		
Viking A		
Viking B		

4. Decide on the X and Y coordinate system. We can export the data in either Longitude / Latitude or UTM Coordinates. **Click** on the **radial button** to determine which system to use.

	Long.	Lat.	
	108.0058669	51.1270327	
	Northings	Eastings	
CUTM	5668235.04	709501.95	

5. These surface co-ordinates are originally taken from the Well Record for the well. If the choice is Long / Lat and you have nothing in the well record for the Surface co-ordinates and you have the co-ordinates in

degrees minutes second format you will want to **click** on the **button** to activate the Longitude and Latitude DMS entry window.

Longitude Dearees	Minutes	Seconds
108	22	23.2545
Latitude Degrees	Minutes	Seconds
51	56	29.5462

- 6. Click on the Check box and type in the appropriate data. Click on the button to close the window and this action will fill in the Long / Lat portion of the window.
- 7. Determine whether you want the Z portion (depth) of the export file in subsea or true vertical depth values by checking the check box for Subsea.

1.00	COL
~	551
	000

8. Determine the depth increment of the file to be exported (along the Target Azimuth of the well) by **typing in a number in the increment field**. The default is 50 meters.

	Inc.: 1	
Export	button . This will activate t	he Specify Export File Name window.
	Export	Europet

9. Click on

⊕	Specify Ex	port File Name		×
🕞 🕞 🗝 🕇 🚺	► This PC ► Acer (C:) ► Long lat testing	~ ¢	Search Long lat testing	Q
Organize 🔹 Ne	w folder			0
This PC Desktop Documents Downloads Music Pictures Videos WDMy Book Acer (C:)	World Edition II (Public)	Name		Í
Removable Di	sk (F:)	<		>
File name:	Viking A ABC 32A1-12 ssl with long lat.XYZ			~
Save as type:	Export Surface (*.xyz.)			~
Hide Folders			Save 🔓 Cancel	

10. Type in a file name and select the drive and directory you wish the survey to be exported to. Then, click

й.	Export File	
C:\Long lat	testing\Viking A ABC 32A1-12 ssl with long	g lat.XYZ created.

11. Click on the **button** to exit **Export file** window.

This will export a single surface in the desired format so that it can then be utilized by another 3rd party application. We cannot import this Surface file data. Print

1. Click on the File Menu to activate the drop down list.

.....

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



Curve Settings | Formations Zones

Type Well Depth 3212.63

-

ZOI BASE

ZOI BASE

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

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

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

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

10. Type in the Interpreters name who created the interpretation in the Interpreter field.

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

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

Edit Menu

Redo

This selection allows the user to redo and undo of the last segment revisions. This can go on for as many undo's that have been made by the user. It is only applicable to the segment revision. If a user deletes other data they will have to enter that data again. The undo comments changes with each function performed to indicate what undo action will be performed.

- 1. Click on the File Menu to activate the drop down list and select Redo.
- 2. Perform this action as many times as is necessary.

Note: Commonly it will take a couple of redo's to get back to where you were.

Undo

This selection allows the user to undo the last segment revisions. This can go on for as many undo's that have been made by the user. It is only applicable to the segment revision. If a user deletes other data they will have to enter that data again. The undo comments changes with each function performed to indicate what undo action will be performed.

- 1. Click on the File Menu to activate the drop down list and select Undo.
- 2. Perform this action as many times as is necessary.

Note: Commonly it will take a couple of undo's to get back to where you were.

Calculate In / Out

Edit View Help Window Redo Update Segment Undo Delete Segment

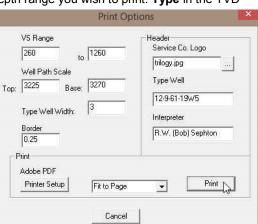
Calculate In / Out

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

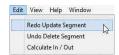
1.	Click on the Edit Menu to activate the drop down
list	and select Calculate In / Out .

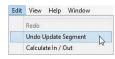
This will be printed in the output as well as displayed in

the Status bar when your mouse pointer is focused in the Well Path portion of the window.



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G Rase Reset

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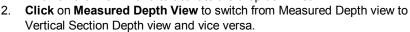
ERESUITE Addendum Manual 2016

Well Path: VS 231.10, MD 3281.99, TVD 3253.27 In/Out: 1397.23/607.62

View Menu

Measured Depth View

1. Click on the View Menu to activate the drop down list.



Note: Sometimes in the beginning before the well gets to a continuous positive Vertical Section Segments cannot be added because of the fact that the well is going back and forth on itself with respect to Vertical Section and can only be added in the Measured depth view.

Toolbar

- 1. Click on the View Menu to activate the drop down list.
- 2. Click Tool bar selection to turn on or off the toolbar.

The toolbar buttons will allow you to Open another well, Undo, Redo, access the about menu and activate the Print the Power*Steer Log.

Note: To activate the Help Menu depress the F1 key on your keypad

Status Bar

- 1. Click on the View Menu to activate the drop down list.
- 2. Click on Status Bar selection to turn on or off the Status Bar.

MD Curve (Gamma Ray): VS 662.82, MD 3734.98, value 133.16 Mouse pointer in MD Gamma Ray portion of window.

Well Path: VS 605.32, MD 3677.44, TVD 3259.00 In/Out: 183.12/713.30 Mouse pointer in Well Path portion of window.

RSD Curve (12-9-61-19W5 GR) : RSD (TVD) Depth 3214.02, MD Depth 4130.20, Value 140.91 Mouse pointer in Type Well portion of window.

Go To Depth (Type Well)

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

Go To Depth (Well Path)

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

Type Well Track Depth Scrolling

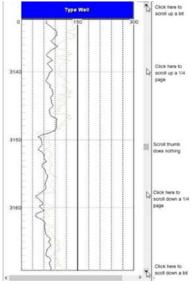
Once the Type Well curve has been added to this track the user has the ability to scroll up and down the curve depth display.





View	v Help
	Measured Depth View
1	Toolbar
-	Status Bar
	Goto Depth (Type Well)
	Goto Depth (Well Path)

Mouse Pointer Controls



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

Mouse Roller Ball Control

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

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

Type Well Depth Scale Display Manipulation

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

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

Type Well Pane Right Click Options

Set Type Well Curve

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

Set Type Well Curve	
Mapped Offset	
Add Segment	
Set Reference Point	Select Curve
Edit Reference Offset	
Delete Reference Point	
Add Zone	Gamma Ray
Delete Zone	Gamma Ray TVD for 16-12 Gamma Ray with null values
Show All	Total Gas
General Properties	Type Well GR TVD 6-12-61-2 Type Well GR TVD 6-7-61-15 💙

- Select the Type Well GR Curve you are steering to. This is Type Well GR curve you imported into your steered well in Power*Log or Power*Curve.
- 4. Click on the OK button.

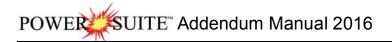
Mapped Offset

This allows the user to offset or shift the MD Gamma Ray Curve data that has been mapped onto the type well curve to the left with a negative number and to the right with a positive number.

- 1. Right click on the Type Well portion of the screen (left side)
- 2. Select Mapped Offset from the pop out menu list. This will activate the Mapped Curve Offset window.

Mapped Offset	Mapped Curve Offset		
Add Segment	12.00		
Set Reference Point			
Edit Reference Offset	50		
Delete Reference Point	1.00		
Add Zone			
Delete Zone	OK Cancel		
Show All	**		
General Properties			

3. Type in a value (+ moves right / - move left) in the field provided.



OK Click on the button.

Set Type Well Curve	
Mapped Offset	
Add Segment	N
Set Reference Point	L
Edit Reference Offset	
Delete Reference Poin	nt
Add Zone	
Delete Zone	
Show All	
General Properties	

Add Segment

Once the reference point has been set you will see a pink line in both the Type Well and your Steering well. You can now add segments. A segment is usually defined over an interval where the MD / VS Gamma curve can be correlated with the Type well curve and more than likely be a continuous downward or upward well path movement.

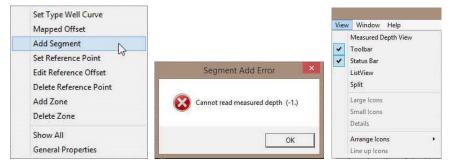
Add the first Segment

(First one is different than all the rest) The top of this segment cannot be moved. The rest of the segments after the first can be moved or resized.

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

Note: Once the first segment has been added you may not be allowed to add another segment due to the fact that you have a negative vertical section where you are adding the next segment.

 If you are experiencing the Segment Add Error message when you are adding another segment Click on the button in the message box.



- 3. Then switch your View from Vertical Section to Measured depth view by clicking on the View menu pull down and selecting Measured depth to switch from Vertical Section View to Measured Depth View. This will allow you to add another segment in either the Type Well or the Well Path panes.
- 4. You will more than likely have to scroll deeper on the Well Path section to see you Gamma Ray / Well Path data.

Set Reference Point

First thing you have to do is set up a reference point. You will need to know the Regional strike and dip of the formation you wish to steer this well for and maybe a depth offset so that you can move the steered wells curve data up or down to match near the zone of interest. This offset can be changed after the fact but the Regional Strike and Dip will not be allowed to change. If you do want to change the Regional strike and dip then you will have to delete the Reference point and that will delete all the segments that have been entered so you will be starting anew.

1. **Right Click** on the **Type Well Pane** a little above the depth that you wish to start your correlations and **select Set Reference Point** from the pop out menu list. This will activate the **Reference Point window**.

Set Type Well Curve Mapped Offset Add Segment	Reference Point
Set Reference Point	
Edit Reference Offset	MD Depth VS Depth Dip Azimith
Delete Reference Point	066152346 -451.68990 0.8 325
Add Zone	
Delete Zone	Type Well Offset (TVD): -42
Show All	0K Cancel
General Properties	

- In the Reference Point window the user will fill in the general bed dip degree and strike azimuth for your intended formation or zone you wish to steer. Tab to the Dip field or double click to highlight the Dip field, Type the dip for the bed in the dip field, depress the tab key to advance the highlight to the azimuth field.
- 3. **Type** in the **strike azimuth of the bed** in this field. **Depress** the **tab key** to advance the highlight to the Type Well Offset field.

4. **Type** in the **Type well offset**. This is not too critical as this can be changed after the fact. It just moves your correlatable well up or down to match with the Type well.

Note: A negative number will shove the Gamma Ray trace up and a positive number will shove your Gamma Ray trace well down.

5. Click on the ok button.

Edit Reference Offset

The Reference offset results in moving the traces from the VS / MD gamma segments shown on the Type Well up or down with respect to the Type Well Gamma Curve. A negative number (-5) will move the traces up 5 in the Type Well where a positive number (5) will move the traces down 5 in the Type Well.

1. Right Click on the Type Well Pane at the depth where your Reference Point is set (indicated by a Pink Line with Reference Point Text below it) and select Edit Reference Offset from the pop out menu list. This will activate the Reference Point window.

Set Type Well Curve		Referen	nce Point	×
Add Segment Set Reference Point		VC D. II	D:	Carco-state.
Edit Reference Offset	MD Depth	VS Depth	Dip	Azimith
Delete Reference Point	3161.71	-456.32	0.79999999	325
Add Zone Delete Zone	Type W	Type Well Offset (TVD): -11		
Show All General Properties			ок	Cancel

2. The user can then only change the Type Well Offset. **Type** in a new **Type Well Offset (TVD) in the field** provided and **click** on the **button**.

Note: If you need to change the Regional Bedding Dip and Azimuth then you will have to Delete the Reference Point and start again removing all your segment data.

Delete Reference Point

- 1. **Right Click** on the **Type Well Pane at the depth where your Reference Point is** set (indicated by a Pink Line with Reference Point Text below it).
- 2. Select Delete Reference Point from the resulting pop out menu. This will activate the Warning Message.



Note: If you need to change the Regional Bedding Dip and Azimuth then you will have to Delete the Reference Point and start again removing all your segment data.

Add Zone

This would be where you would add a Zone to your Type Well. They could be formation tops or other indicators that you wish to mark on your Type Well and will be transposed and manipulated by your segment movements in the Well Path pane.

- 1. Right Click at the depth you wish to add a Zone in your Type Well pane to activate the pop out menu.
- 2. Select Add Zone from the pop out menu list. This will activate the Add Label window.

Set Type Well Curve	Add Label
Mapped Offset	
Add Segment Set Reference Point Edit Reference Offset	Top of Window
Delete Reference Point	• Top C Base
Add Zone	
Delete Zone	1
Show All General Properties	Cancel OK

3. Type in a Zone / Label Name in the field provided.

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

- 4. If this is the primary target label indicator then you must activate a radio button indicating the top or base by clicking on the radio button. Top Base. If it is not the designated target zone label then skip on to
- step 5.5. If this is a zone marker that indicates that you are inside the designated target and you would like to calculate the percentage
- 6. Click on the ok button. This will close the window and add the zone label to both the Type Well and Well Path panes.

Mapped Offset

Add Segment

Delete Zone

General Properties

Set Type Well Curve Mapped Offset

Edit Reference Offset

Delete Reference Point

1

Add Segment Set Reference Point

Add Zone

Show All

Delete Zone

General Properties

Show All

Set Reference Point Edit Reference Offset

Delete Reference Point Add Zone

This will add the zone to both the Type Well and the Well Path Panes You may not see the zones on the Well Path Pane until you have some segments added.

Delete Zone

- 1. **Right Click** on the **Type Well Pane at the depth where the Zone Label** has been added.
- 2. **Select Delete Zone** from the pop out menu list. This will delete the Zone label from both the Type Well and the Well Path Panes.

Show All

This selection is more like a toggle to show all / hide all the segment traces that have been added and manipulated on the type well. The first time will show all and then the next time will hide all the segment data.

- 1. Right Click anywhere in the Type Well Pane
- 2. Select Show All from the pop out menu list.

Note: If you click on a segment in the lower portion of the Well path (under the Curve trace portion of the window (Indicated by a color bar) it will turn red to show that it is selected and then double click on the red bar and this will turn on the segment in the Type well Pane after selecting another segment and will be indicated by the default color.

General Properties

Curve Display Properties

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



Set Type Well Curve	Add Segment	General
Mapped Offset	Delete Segment	Curve Settings Formations Zones Screen Format
Add Segment	Change Azimuth	☐ Ignore NULL
Set Reference Point	Set Well Path	Display Scale
Edit Reference Offset	Set Gamma	Left/Btm: 0
Delete Reference Point	Overlay Curves Segment Properties	Line Size: T
Add Zone	General Properties	Line Style: 0 Major 1
Delete Zone	Show/Hide Tops	Inc: 1
Show All	Show/Hide Zones Show/Hide Perforations	
General Properties	Show/Hide Zone Fill	

Right Click Type Well Pane Right Click Well path Pane

1. Click on the drop arrow and select the curve you wish to change the display for.

Well Path (TVD)	▼ Ignore NUL
Display	Scale Left/Btm: 2435 Right/Top: 2408 -Grid Major 3 Inc: 1

- 2. Line Size portion of the window will change the line thickness from 1 to 20 (pixels wide). You have to type a number in the size field and your input will be automatically displayed by the curve.
- Line Style portion of the window will change the line style. You have to type a number in the style field from 0 to 3 and your input will be automatically displayed by the curve. 0=Solid line, 1=Dashed Line, 2=Dotted Line, 3=Dash Dot Line
- 4. **Scale Portion of window** allows the user to change scales for the selected curve. Type a value in the appropriate fields to change the scales. The scales will change as you type.
- 5. **Grid Portion of window** allows the user to change the grid pattern for the selected curve. Type a value in the appropriate fields to change the grids. The grids will change as you type. Major Grids will indicate a value. The minor grids will divide the whole track and not the majors.
- 6. **Ignore NULL's check box** when activated will join curve values ignoring the null values. When deactivated the curve will only draw when there are two consecutive data points.
- 7. Click on the **E** in the upper right hand corner to **exit** this window.

Formation Display Properties

- 1. Right Click anywhere in either pane to activate the pop out menu.
- 2. Select General Properties. This will activate the General Properties window.
- 3. Click on the Formations Tab to activate the Formation display properties.

Note: Formations will only appear in this list if they have a calculated thickness in the Formation Report window in Power*Log, Power*Core or Power*Curve.

General	Color 🎎
Curve Settings Formations Zones Screen Format	Basic colors:
ØAbequerqui ØRed Sky	
	Custom colors:
Red Sky	
	Define Custom Colors >>
	OK Cancel

- 4. Activate the check box beside the formation you wish to display in the Well Path portion of Geo*Steer.
- 5. If the formation is highlighted the user can also select a color from a color palette activated by the **button**. **Click** on a **color** and then **click** on the **OK button**.
- 6. Click on the in the upper right hand corner to exit this window.

Zones Display Properties

- 1. Right Click anywhere in either pane to activate the pop out menu.
- 2. Select General Properties. This will activate the General Properties window.
- 3. Click on the Zones Tab to activate the Zones display properties.

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

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

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

ZOI	-	Color	
Text		Line Size: 2	
ZOI	Ī	Line Style:	
Type Well Depth 2429	1		Reset

- 2. Line Size portion of the window will change the line thickness from 1 to 9 (pixels wide). You have to type a number in the size field and your input will be automatically displayed by the curve.
- Line Style portion of the window will change the line style. You have to type a number in the style field from 0 to 3 and your input will be automatically displayed by the curve. 0=Solid line, 1=Dashed Line, 2=Dotted Line, 3=Dash Dot Line
- 4. Click on the **I** in the upper right hand corner to **exit** this window.

Screen format Properties

- 1. Right Click anywhere in either pane to activate the pop out menu.
- 2. Select General Properties. This will activate the General Properties window.
- 3. Click on the Screen Format Tab to activate the Screen format display properties.

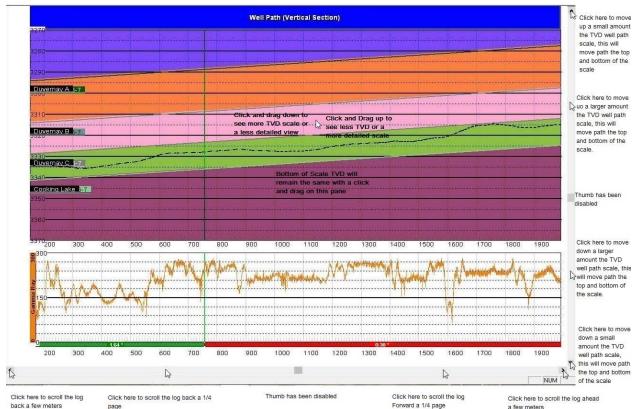


4. **Double Click** in the **Well Path Track** field and change the % from 70 to another percentage to change the Well Path Pane size.

General	×
Curve Settings Formations Zones Screen Format Well Path Track (% Screen)	ĺ

Well Path MD/VS Gamma Ray Depth Scale Display Manipulation

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



Well Path TVD Scale manipulation

Mouse Pointer Controls

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

Mouse Roller Ball Control

- 1. Click on the Well Path pane, hold the Shift Key down on the keypad and then roll the roller ball towards you will move the TVD scale down (both top and bottom scales simultaneously).
- 2. Click on the Well Path pane, hold the Shift Key down on the keypad and then roll the roller ball away from you will move the TVD scale up (both top and bottom scales simultaneously).
- 3. Click and drag up on the Well Path portion of the pane to see a more detailed view or less TVD range. This action will not move the bottom TVD scale.
- 4. **Click and drag down** on the Well Path portion of the pane to see a less detailed view or more TVD range. This action will not move the bottom TVD scale.

Well Path MD/VS Gamma Ray Depth Manipulation

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

Mouse Pointer Controls

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

Mouse Roller Ball Control

- 1. Click on the Well Path pane and then roll the roller ball away from you to scroll left or back.
- 2. Click on the Well Path pane and then roll the roller ball towards you to scroll right or forward.

Well Path Pane Right Click Options

Add Segment

Right Click on the **Well Path Pane at the depth** you wish to add a segment and **select Add Segment** from the resulting pop out menu. This will add a segment at that depth. Note: Segments can be added anywhere but you will want to add segments where the well path changes from up to down (< 90 / > 90) or where the segments start to vary from your Type well trace.

Delete Segment

In the Well Path Pane **click on the Segment** you wish to delete. Anywhere between the segment depths to change the color of the segment from it's default color to a red indicator to make it active.

Right Click anywhere between the Segment depths on the **Well Path Pane** and **select Delete Segment** from the resulting pop out menu. This will delete the segment.

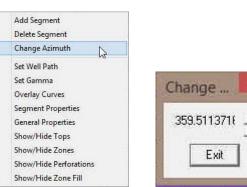
Change Azimuth

In the Well Path Pane **click on the Segment** you wish to change Azimuth or bed Strike. Anywhere between the segment depths to change the color of the segment from it's default color to a red indicator to make it active.

- 1. **Right Click** anywhere between the Segment depths on the **Well Path Pane to** activate the pop out menu.
- 2. Select Change Azimuth. This will activate the Change Azimuth window.







- 3. Click on the up or down arrows to change the segments strike azimuth. Once you have the corrected azimuth viewed.
- 4. Click on the Exit button.

Note: Changing the segment azimuth will affect the apparent dip and will result in a change of VS Start and VS End points. Once this new segment azimuth has been changed it will change the apparent dip for all segments added after this change.

Set Well Path

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

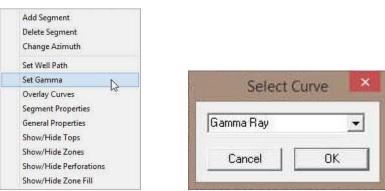


- 3. Select the steered Well Path Curve in TVD units from the drop down list by clicking on the down arrow and selecting it from your curve list for this well from your database.
- 4. Click on the OK button.

Note: This curve has to be added on the setup of Power*Log / Power*Curve when the well is started. If this has not been done then you will not see this curve available to you. The Well Path (TVD) curve can be imported into Power*Log / Power*Curve from an LAS or ASCII file or can be calculated with the survey data.

Set Gamma

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



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

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

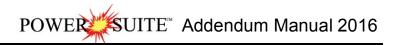
4. Click on the OK button.

Note: This curve has to be added on the setup of Power*Log / Power*Curve when the well is started. If this has not been done then you will not see this curve available to you. The Gamma Ray curve can be imported into Power*Log / Power*Curve from an LAS or ASCII file.

Overlay Curves

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

- 1. Right click on the Well Path pane (right side) to activate the pop out menu
- 2. Select Overlay Curves. This will activate an Overlay Curves list.



Add Segment Delete Segment Change Azimuth	Overlay Curves	×
Set Well Path Set Gamma	Gamma Ray	
Overlay Curves	Gamma Ray TVD for 16-12	
General Properties	✓ Total Gas	
Show/Hide Tops Show/Hide Zones	□ Type Well GR TVD 6-12-61-20 □ Type Well GR TVD 6-7-61-19 □ Well Path (SS)	OK
Show/Hide Perforations Show/Hide Zone Fill		ancel

3. **Select** as many of the other curves captured in your wells database. Display these curves data by activating the check box beside the curves.

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

4. Click on the OK button.

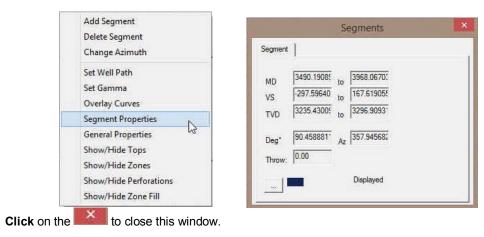
Note: These curves have to be added on the setup of Power*Log / Power*Curve when the well is started. If this has not been done then you will not see these curves available to you.

Segment Properties

This selection allows the user to view the segment properties on each induvial segment. They include Measured Depths from and to, Vertical Section Depths from and to, True Vertical Depths from and to, segment dip and azimuth, segment throw, segment default color and display option on the Type Well Pane.

In the Well Path Pane **click on the Segment** you wish to view the properties of. Anywhere between the segment depths to change the color of the segment from it's default color to a red indicator to make it active.

- 1. Right Click anywhere between the Segment depths on the Well Path Pane to activate the pop out menu.
 - 2. Select Segment Properties. This will activate the Segments window.



Note: This is the information that is exported when you Export Segments. You may wish to keep this window open to compare the strike and dips of the segments. Also if you see the throw field has a value (other than 0.00) displayed and you have not placed a fault on purpose then you do have an issue. The throw is carried forward from segment to segment. So you will have to find the first segment that changed from 0.00 throw to a throw value and attempt to make the throw back to 0.00 by moving the segment up or down on the Type Well pane.

General Properties

3.

Curve Display Properties

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

Set Type Well Curve	Add Segment Delete Segment	General Curve Settings Formations Zones Screen Format
Mapped Offset	Change Azimuth	
Add Segment		Ignore NULL
Set Reference Point	Set Well Path Set Gamma	DisplayScale
Edit Reference Offset	Overlay Curves	Left/Btm: 0
Delete Reference Point	Segment Properties	Right/Top: 0
Add Zone	General Properties	
Delete Zone	Show/Hide Tops	Line Style: 0 Major 1
Show All	Show/Hide Zones Show/Hide Perforations	inc. 1
General Properties	Show/Hide Zone Fill	

Right Click Type Well Pane Right Click Well Path Pane

3. Click on the drop arrow and select the curve you wish to change the display for.

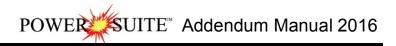
Well Path (TVD)	-	Ignore NULL
Line Style: 3	Right/Top: 3	1370 1270 10

- 4. Line Size portion of the window will change the line thickness from 1 to 20 (pixels wide). You have to type a number in the size field and your input will be automatically displayed by the curve.
- Line Style portion of the window will change the line style. You have to type a number in the style field from 0 to 3 and your input will be automatically displayed by the curve. 0=Solid line, 1=Dashed Line, 2=Dotted Line, 3=Dash Dot Line
- 6. **Scale Portion of window** allows the user to change scales for the selected curve. Type a value in the appropriate fields to change the scales. The scales will change as you type.
- 7. **Grid Portion of window** allows the user to change the grid pattern for the selected curve. Type a value in the appropriate fields to change the grids. The grids will change as you type. Major Grids will indicate a value. The minor grids will divide the whole track and not the majors.
- 8. **Ignore NULL's check box** when activated will join curve values ignoring the null values. When deactivated the curve will only draw when there are two consecutive data points.
- 9. Click on the in the upper right hand corner to exit this window.

Formation Display Properties

- 1. Right Click anywhere in either pane to activate the pop out menu.
- 2. Select General Properties. This will activate the General Properties window.
- 3. Click on the Formations Tab to activate the Formation display properties.

Note: Formations will only appear in this list if they have a calculated thickness in the Formation Report window.



	Set Type Well Curve Mapped Offset Add Segment Set Reference Point Edit Reference Offset Delete Reference Point Add Zone	Set Well Set Gam Overlay Segmen	egment Azimuth Path Ima
	Delete Zone Show All General Properties	Show/H Show/H Show/H	lide Tops lide Zones lide Perforations lide Zone Fill
Curve Settings Forma	General tions Zones Screen Format	×	Color X

- 4. Activate the check box beside the formation you wish to display in the Well Path portion of Geo*Steer.
- 5. If the formation is highlighted the user can also select a color from a color palette activated by the **button**. **Click** on a **color** and then **click** on the **OK button**.
- 6. Click on the in the upper right hand corner to exit this window.

Zones Display Properties

- 1. Right Click anywhere in either pane to activate the pop out menu.
- 2. Select General Properties. This will activate the General Properties window.
- 3. Click on the Zones Tab to activate the Zones display properties.

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

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

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

	Seneral 🔤
Zurve Settings Formations Zones	Screen Format
Text ZOI	Line Size: 2
Type Well Depth 2429	

- 5. Line Size portion of the window will change the line thickness from 1 to 9 (pixels wide). You have to type a number in the size field and your input will be automatically displayed by the curve.
- Line Style portion of the window will change the line style. You have to type a number in the style field from 0 to 3 and your input will be automatically displayed by the curve.
 0=Solid line, 1=Dashed Line, 2=Dotted Line, 3=Dash Dot Line
- 7. Click on the in the upper right hand corner to exit this window.

Show / Hide Formation Top Names

This selection is a toggle to either Show or Hide the Formation Top Names displayed on the Well Path pane.

- 1. **Right click** on the **Well Path pane (right side)** to activate the pop out menu.
- 2. **Select Show / Hide Tops** from the pop out menu list. This will toggle between Showing and Hiding the Formation Top Names in the Well Path pane

Show / Hide Zone Names

This selection is a toggle to either Show or Hide the Zone Names displayed on the Well Path pane.

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

2. **Select Show / Hide Zones** from the pop out menu list. This will toggle between Showing and Hiding the Zone Names in the Well Path pane.

Add Segment
Delete Segment
Change Azimuth
Set Well Path
Set Gamma
Overlay Curves
Segment Properties
General Properties
Show/Hide Tops
Show/Hide Zones
Show/Hide Zones
Show/Hide Zone Fill

Show/Hide Tops Show/Hide Zones Show/Hide Perforations Show/Hide Zone Fill

Add Segment

Delete Segment

Change Azimuth

Set Well Path

Set Gamma

Overlay Curves

Segment Properties

General Properties

Show / Hide Perforations

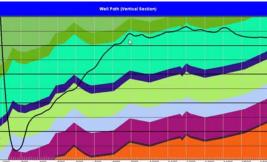
This selection is a toggle to either Show or Hide the Perforated Intervals entered into Power*Suite displayed along the Well Path curve in the Well Path pane.

Note: The perforated intervals must be either imported or created in Power*Log, Core or Curve.

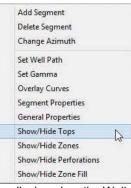
- 1. Right click on the Well Path pane (right side) to activate the pop out menu.
 - Select Show / Hide Perforations from the pop out menu list. This will toggle between Showing and Hiding the Perforated Intervals along the Well Path curve in the Well Path pane.



Perforated Intervals Shown



Perforated Intervals Hidden



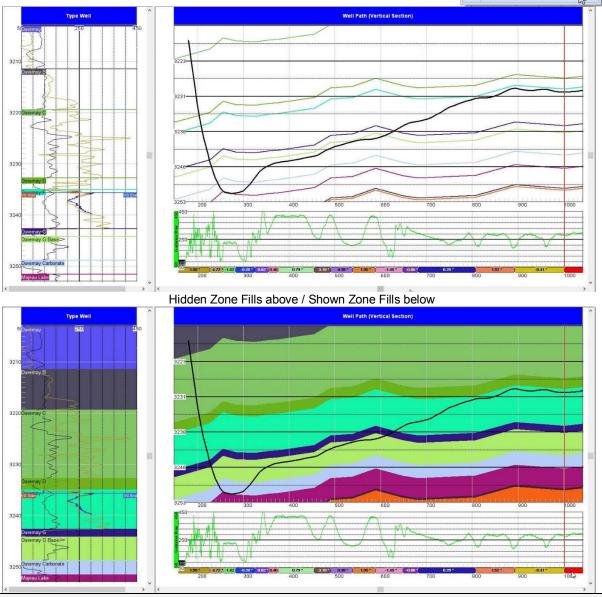


Show / Hide Zone Fill

This selection is a toggle to either Show or Hide the Zone Fills displayed on both the Well Path and Type Well Panes. The Zone fill will fill in the area between the Zone Marker and the next Zone Marker.

- 1. Right click on the Well Path pane (right side) to activate the pop out menu.
- 2. Select Show / Hide Zone Fill from the pop out menu list. This will toggle between Showing and Hiding the Zone Fills on both the Well Path and Type Well Panes.

Add Segment Delete Segment Change Azimuth Set Well Path Set Gamma Overlay Curves Segment Properties General Properties Show/Hide Tops Show/Hide Zones Show/Hide Zones



The Colors of the fill are determined by the Zone Markers Colors found in the Right Click General properties selection located in the Zones Tab

Segments

This is the nuts and bolts of the Power*Steer application and we should spend some time explaining what a segment does for you. Before we can add a segment we must add a Reference point to tie the Segment data to the Type well.

A segment consists of various integral pieces of data that has Vertical Section depths from and to, Measured Depths from and to, True Vertical Depths from and to along with Dip angle, Azimuths and throws. All the Segment data is manipulated on the type well by shrinking and extending the VS start and VS end points, moving the entire segment to create a throw (indicated by a fault on the Well Path Pane) or changing the Segment Azimuth. So we will start with setting a Reference Point.

Before any of this is done you will have to add the Type Well Gamma Ray Curve (TVD units), the steered well Gamma Ray curve (MD units) and the Well Path curve (TVD Units).

Set Reference Point

First thing you have to do is set up a reference point. You will need to know the general strike and dip of the formation you wish to steer this well for and maybe a depth offset so that you can move the steered wells curve data up or down to match near the zone of interest. This offset can be changed after the fact but the Strike and Dip will not be allowed to change. If you do want to change the strike and dip then you will have to delete the Reference point and that will delete all the segments that have been entered so you will be starting anew.

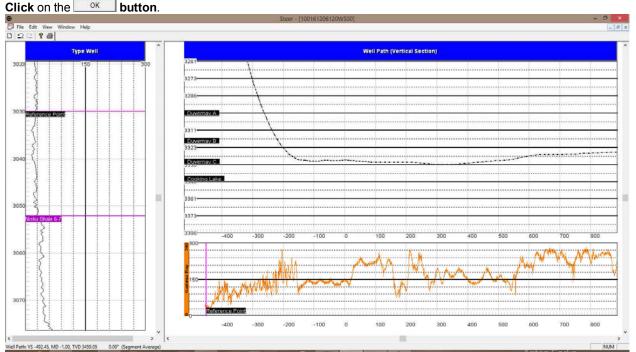
Right Click on the **Type Well Pane** a little above the depth that you wish to start your correlations and **select Set Reference Point** from the pop out menu. This will activate the **Reference Point window**.

Set Type Well Curve Mapped Offset	Reference Point			t ×
Add Segment	1.1111.111 - 171			
Set Reference Point	MD Depth	VS Depth	Dip	Azimith
Edit Reference Offset	066152346	-451.68990	0.8	325
Delete Reference Point	1	1	1	1
Add Zone	Type Wel	Offset (TVD):	-42	
Delete Zone	10000000		-	1
Show All		0	ОК	Cancel
General Properties				

In the Reference Point window the user will fill in the general bed dip degree and strike azimuth for your intended formation or zone you wish to steer.

Tab to the Dip field or double click to highlight the Dip field, Type the dip for the bed in the dip field, depress the tab key to advance the highlight to the azimuth field, type in the strike azimuth of the bed in this field, depress the tab key to advance the highlight to the Type Well Offset field and type in the Type well offset.

Type Well Offset field is not too critical as this can be changed after the fact. It just moves your correlatable well up or down to match with the Type well. A negative number will shove your steered well being drilled up and a positive number will shove your correlatable well down.



Once the reference point has been set you will see a pink line in both the Type Well and your correlating well as shown above. You can also see a zone marker (Nisku Shale 6-7) in the illustration above. We will deal with the zone markers later on in the manual.

Add the first Segment

(First one is different than all the rest) The top of this segment cannot be moved. It is just a starting point. The rest of the segments after the first can be moved or resized.

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

The first segment will be displayed on your Type Well as a red curve and will be placed at the offset depth that was entered into your Set Reference Point. The display depths on the Type Well pane have been recalculated into True Vertical Depth units so the user can attempt to correlate to the type Well. The first segment will extend to the end depth of your current data in your Gamma Curve.

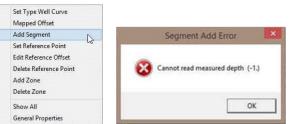
Note: You can only manipulate the bottom of this first segment (VS End).

Adding a second Segment.

1. **Right Click** somewhere near (but deeper than) than the Start of your first segment and **Select Add Segment** from the pop out menu. This can be done on either the Well Path pane or the Type Well pane

The second segment will be displayed on your Type Well as a red curve and will also be placed at the offset depth that was entered into your Set Reference Point. The display depths on the Type Well pane have been recalculated into True Vertical Depth units so the user can attempt to correlate the second segment to the type Well. The second segment will extend to the end depth of your current data in your Gamma Curve.

Note: This second segment may not be allowed due to the fact that you have a negative vertical section where you are adding the next segment.



If you are experiencing this Error message when you are adding another segment.

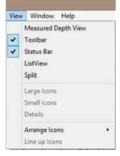
- 1. Click on the ok button in the Segment Add Error window.
- Then switch your View from Vertical Section to Measured depth by clicking on the View menu pull down and selecting Measured depth to switch the view. This will allow you to add another segment in either the Type well or the Well Path panes.

You will more than likely have to scroll deeper on the Well Path section to see you Gamma Ray / Well Path data.

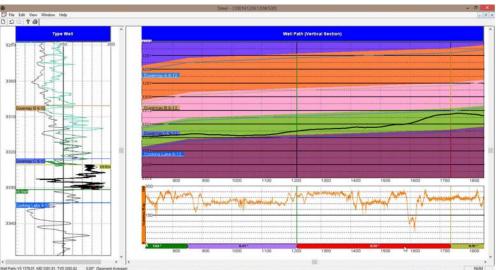
Defining a Segment

A segment is a depth range on the Gamma Ray trace (either MD or VS depth range) that is then converted to TVD depth on the Trace Well. You have to **click** on the **segment marker** which is shown below the Steered well Gamma ray curve (turns red) to make it active on the

Type well. Once it is active on the Type Well the segment will have a VS start line and VS finish line. The Gamma ray trace may go down or up or both depending on the well path over the segment interval. The segment trace on the Type well will appear red when going down and black when going up.



Set Type Well Curve	
Mapped Offset	
Add Segment	N
Set Reference Point	hs
Edit Reference Offset	
Delete Reference Point	
Add Zone	
Delete Zone	
Show All	
General Properties	



Changing the bedding angle of a Segment

- 1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown above) to highlight the segment on the Type Well.
- 2. If you were to move the mouse pointer to hover over the VS End marker (blue line above and right) or hover over the VS Start marker (mauve

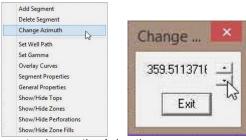
line above and right) the cursor will turn into a \downarrow

3. **Click and drag** the segment down (extend it) or drag it up (shrink it) to match the Type Well Gamma Curve. This result will be angle change for the Zone Markers and or Formation Tops if they are displayed on the Well Path.

Changing the Strike Azimuth of a Segment.

Changing the Strike Azimuth will change the apparent dip of the segment.

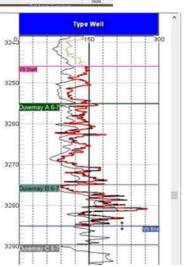
- 1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
- 2. Right Click between the Segment Markers on the Well Path pane and select Change Azimuth from the resulting pop out menu. This will activate the Change Azimuth Window.



- 3. Click on the up down arrows to change the Azimuth.
- 4. Click on the **Exit** button.

Segment Data Visibility on the Type Well

If you would like to keep the Gamma Ray segment data on the Type well once you click on or create another segment. To view this data you would **double click** on the **Segment portion under the Gamma Ray Curve**. Vice versa it you want to **turn it off** you would then **double click** on the **segment again**.





Creating a fault

- 1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
- Move Mouse pointer between the VS End marker (blue line right) and the VS
 Start marker (mauve line) it will turn into a
- 3. **Click and drag** the segment down or drag it up to match the Type Well Gamma Curve. This will result with a thrust or normal fault block for the Zone Markers and or Formation Tops if they are displayed on the Well Path.

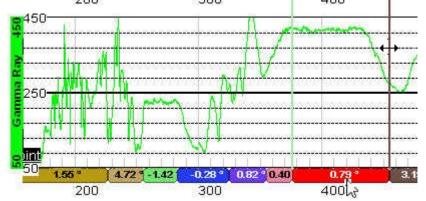
Extending or Decreasing the (MD / VS) size of a Segment

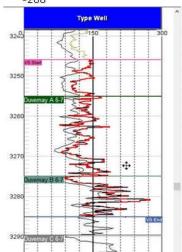
As more data comes or you wish to extend or decrease the size of an existing segment. On the Type Well Pane

- 1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown above) to highlight the segment on the Type Well.
- 2. Click once on the Interval between the VS Start and VS End on the Type Well.
- 3. Hold the Shift Key down on the keypad and then roll the roller ball on your mouse away from you to decrease the size of the Segment. You will notice the VS End going up on the Type Well Pane and to the left on the Well Path pane. Or Hold the Shift Key down on the keypad and then roll the roller ball on your mouse towards you to increase the size of the Segment. You will notice the VS End going down on the Type Well Pane and to the right on the Well Path pane.

On the Well Path Pane

- 1. **Click once** on the **Segment Marker** below the Gamma Ray curve (shown below) to highlight the segment on the Type Well.
- 2. You can mouse over (Hover) on the Well path Pane over a **Segment end line** and it will turn into a and then you can **click and drag left or right** to increase or decrease the size of the segment.





Power*WITS Module

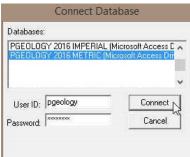
The Wits Module allows the user to get the data hub, that is populated from the Electronic Drilling Recorder (EDR) in virtually real time. It allows you do download any and all curve data, survey data, and some of the well record data. The data populates the database and the user merely refreshes their log periodically.

Connecting to the Database



1.) Double click on the Power*WITS Database window.

Icon. This will initiate the program and activate a Connect



- 2.) Highlight the **PGEOLOGY 2016 METRIC (Microsoft Access Driver[*.mbd]))** database by **clicking** on it once.
- 3.) Move your mouse pointer to the User ID field and click. This will activate a flashing cursor in the User ID field. Type "pgeology" in the User ID field. Press the Tab key on the keyboard to move to the Password field.
- 4.) **Type "pgeology"** in the **Password** field and then **click** on the **Connect button**. This will activate the Power*WITS window below.

		PowerWIT	5	-	a ×
Messages					
Server <mark>Inub:pason.c</mark> Userid: Password Connect		Select Well			
Check the Data to Updat	Update Interval (min) e 5	Max Log/Curve Fetched	Max Survey Fetched	Data Lag Depth	
Coad Selection Save	Selection		Start		> Exit

Overview of Window

Server	hub.pason.com	
Userid:	mark.foster	
Password	******	

Connect

These fields allow the user to type in the Network Sever name. The user will also have to fill in their User Id and password in the appropriate fields given to you by the Network Server administrator.

This button will activate the connection to the server once you have identified the server and typed in both the User ID and the Password field.

The Select Well portion of the window shows the wells that you have been given

to you by a Network Server administrator or Pason representative.

> Update Interval (min) a 5 tl

> > field.

Max Log/Curve Fetched 3468.6

> Max Survey Fetched 3453

> > Data Lag Depth 30

This field allows the user to determine how often the Power*WITS application will go and look for new data from the Server. If this is a Pason Server the data is updated to the server every 5 minutes so that would be the minimum time you would type in this

permissions to view and access data from. These permissions in this case are granted

This field notifies you of the last depth that curve data was retrieved from the server. If you are starting fresh you may want to type in the depth where you want to retrieve curve data from the server in this field.

This field notifies you of the last depth that Survey data was retrieved from the server. If you are starting fresh you will want to type in the depth of Zero "0" where you will want to retrieve all the survey data from the server.

This field allows the user to reset the Max Log/Curve Fetched back a few meters. The number you type in here will all depend on the depth of your hole or the positioning of the LWD tools in your bottom hole string. The bit depth when retrieved from the server will have some data but the Mud Gas Data / LWD data will be lagged. This field will compensate for those depths so you have all the data.

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÷	ellbore-uid:ca 1483331400 wb1 uidWell:ca 1483331400
Baland .	
	rig-uidWell:ca_1483331400 uid:ca_1483331400_rig1295978579 uidWellbore:ca_1483331400_wb
1	trajectory-uid:ca_1483331400_traj2 uidWell:ca_1483331400 uidWellbore:ca_1483331400_wb1
-	trajectory-uid:ca_1483331400_traj3 uidWell:ca_1483331400 uidWellbore:ca_1483331400_wb1
E-	Iog-uidWeltca_1483331400 uidWellbore.ca_1483331400_wb1 uid:ca_1483331400_wb1_log_1
	ADBKP AutoDriller Brake Pos: uid:lci-adbkp
	- ADDP AutoDriller Diff Press; uid:lci-addp
	ADDRM- AutoDriller Drum Ticks: uid:lci-addrm
	- ADDRT- AutoDriller Diff Pressure Response Tunin: uid:lci-addrt
	ADEP- Actual Depth: uid:lci-adep
	ADRRT AutoDriller ROP Response Tuning: uid:lci-adrrt
	ADRSP AutoDriller Off Bottom ROP Limit: uid:lci-adrsp
	ADS- AutoDriller Status: uid:lci-ads
	ADSE-Autodriller Sensitivity: uid:lci-adse
	ADT AutoDriller Torque: uid:lci-adt
	ADTPD AutoDriller Ticks Per Depth: uid:lci-adtpd
	- ADTRT-AutoDriller Torgue Response Tuning: uid:lci-adtrt

🖂 🔽 GAM Gamma: uid:lci-gam	~
🖳 🗖 GAMB Gamma at Bit: uid:loi-gamb	
🖳 🗖 GAMFR Gamma Fresh: uid:Ici-gamfr	
- 🗖 GAST1 GA Status 1: uid:lci-gast1	
🗖 PEST PV Estimate: uid:loi-pest	
PESTE PV Estimate Error: uid:loi-peste	
PFS PVT Fill Strokes: uid:lci-pfs	
🔲 PMGL PVT Monitor Mud Gain/Loss: uid:lci-pmgl	
🔲 GV3 MWD General Variable 3: uid:lci-gv3	
🗖 GV4 MWD General Variable 4: uid:lci-gv4	
🔲 HDIAM Hole Diameter: uid:lci-hdiam	
🔤 🗖 TGAS Pason Gas Percent Unlagged: uid:lci-tgas	
🗖 TIME Time Logged: uid:lci-time	
TOP- Time Of Penetration: uid:lci-top	
- TOR- Rotary Torque: uid:lci-tor	~

This portion of the Selection window allows the user to select different data types from the server. In this case we will be retrieving some well bore data including basic Striplog header information, survey data from trag3 in this case, and curve data from log-uid selection. The curves being retrieved are not being shown in the illustration to the left. The Survey data group will have a name made up from the server. Our default group name is 1 so you will have to modify the Master group to handle the import of surveys from the server.

This portion of the Selection window allows the user to select different curves to download from the server. In this case we will be retrieving 3 sets of curve data from the Server. The curves being retrieved are Gam, PGAS and TOP. N.B. The curves being imported will have these curve names and must then be associated with a curve layer and will also have to have some scales associated with the curves for them to be displayed correctly.

Save Selection

This button will use the save the selections of curve and well bore, that you have picked for data to download and will be saved with a file name that you provide.. This button will load the saved selection of curve and well bore selections that were saved from the Save Selection button.

Load Selection Start

This button will start the download process with the particulars that you have entered into the various fields.

Stop This button will stop the process and will only be seen after you start the download process.

Connecting to the Server

- 1.) Click in the Server name field and type in the sever name and website (in our case it is a Pason EDR) and the server location is "hub.pason.com". Tab to the Userid field.
- 2.) Type in your User ID in the Userid field. Tab to the Password field.
- 3.) **Type** in your **password** in the password field.

4.) Click on the Connect button.

Note: You will need some special permissions to access the datahub. Drilling Bit Access (bit) Drilling/Service Rig Data Access (edr) Live Data (live_data) And **the be all end all you need permissions** to the **WITSML Server** With these permissions you will be able to see the well names you have been given permissions to get data from.

5.) Click on the Well Name in the Select Well portion of the Window. This will activate the Well in the lower portion of the window.

2				Pow	erWITS			· 🗆
lessages								
			Sel	ect Well				
Server	hub.pason.com	2				Y HZ TOWN a-D41-F/94-B		
	mark.foster					Y HZ TOWN A-E041-F/094		
Userid:						r HZ TOWN a F13 F/94 B r HZ TOWN a G13 F/94 B		
Password	1					Z Town b-14-F/94-B-16	-10	
	Connect					Z Town b-76-L/94-B-16		
		1. I.A. 1. I.A. 1. I.A.			scarpa	M. C. Friday	D.I.I. D.II	
		Jpdate Interval (i	minj Ma	k Log/Curve F	etched	Max Survey Fetched	Data Lag Depth	
NEW YORK					1	L	100	
NO ASSESSOR	Data to Update	5 Z TOWN a-F134	F/94-B-16 AF	4493.6 1#: 202/a-034	I-F/094-B-	4471.21	20	
NO ASSESSOR	0.001 - 0.000 - 0.000 - 0.000 - 0.000		F/94-B-16 AF		-F/094-B-		20	
NO ASSESSOR	0.001 - 0.000 - 0.000 - 0.000 - 0.000		F/94-B-16 AF		-F/094-B-		20	

R

6.) Click on the k to expand the well and activate the check mark in the appropriate box as indicated in the graphic below.

	Update Interval (min)	Max Log/Curve Fetched	Max Survey Fetched	Data Lag Depth
Check the Data to Update	5	4493.6	4471.21	20
	HZ TOWN a-F13-F/94-B	-16 API#. 202/a-034-F/094-B	-16/00	
43				

7.) Click on the k to expand the wellbore-uid and activate the check mark in the appropriate box as indicated in the graphic below.

	Jpdate Interval (min)	Max Log/Curve Fetched	Max Survey Fetched	Data Lag Depth
heck the Data to Update	5	4493.6	4471.21	20

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- 8.) Click on the kill to expand the rig—uid (this will import some of the Well data but you may not want to keep this activated as it will overwrite the data you have put in the well record), trajectory—uid (this will import the survey data) and the log—uid (this will import the curve data) and activate the check marks in the appropriate box as indicated in the graphic below.

	Update Interval (min)	Max Log/Curve Fetched	Max Survey Fetched	Data Lag Depth
Check the Data to Update	5	4493.6	4471.21	20
Read International Property of Property of the		-16 API#: 202/a-034-F/094-B	-16/00	
	a_1489904050_wb1 uid			
		a_1489904050_rig114625180		
	the second s	ij10 uidWell:ca_1489904050 u /ellbore:ca_1489904050_wb1		
	sil.ca_1403304030 uluw	relibore.ca_1405504050_9001	uld.ca_1405504050_WD1_1	

- 取
- 9.) Click on the kinet to expand the log-uid and activate the check marks in the appropriate box as indicated in the graphic below for the curve data you wish to download. The Max Log / Curve Fetched field indicates the deepest data retrieved for your curve data to date. The Max Survey Data Fetch field indicates the deepest survey data fetched to date.

	Update Interval (min)	Max Log/Curve Fetched	Max Survey Fetched	Data Lag Depth	
Check the Data to Update	5	4493.6	4471.21	20	
- 🗖 SNDE	EP Sensor Depth: uid:lo	i-sndep			^
- 🗖 SPM1	IPump 1 strokes/min: u	uid:lei-spm1			
- 🗖 SPM2	2 Pump 2 strokes/min: u	aid:lei-spm2			
- 🗹 SPP	Standpipe Pressure: uid	tlei-spp			
- 🗖 SSSI-	Surface Stick Slip Inde	x: uid:loi-sssi			
- 🗖 T1ST	- Trip Tank 1 Refill State	us: uid:lei-t1st			
- 🗖 TANK	(SPVT Mud Tanks Inc	luded: uid:lci-tanks			
	Tank 1 Capacity: uid:lo	si-to_1			
- TC_2	Tank 2 Capacity: uid:lo	si-tc_2			
- TC_3	- Tank 3 Capacity: uid:lo	si-tc_3			
- 🗖 TC_4	- Tank 4 Capacity: uid:lo	si-tc_4			
- 🗖 TC_5	Tank 5 Capacity: uid:lo	si-tc_5			
- 🗖 TF T	ool Face: uid:lci-tf				
- TFIL-	- Total Fill Strokes: uid:lci	i-tfil			
- 🔽 TGAS	6 Pason Gas Percent U	nlagged: uid:lci-tgas			-
	Time Logged: uid:lci-tir	ne			
TOP-	- Time Of Penetration: ui	d:lci-top			
TOR-	- Rotary Torque: uid:lci-to	DL DL			~
the second se	and the part of the state of the				

10.) Click in the Update interval (min) field and type in a time interval you want the updating to happen in Minutes.

- 11.) Click in the Data Lagged depth field and type in the depth delay or the lag you want to repeat when importing data. This is typically for gas as there is a lag from the time drilled to the time it is recorded on the surface. Otherwise you will be getting nothing but zeros for your gas.
- 12.) **Click** on the **Start button.** This will initiate the download of data. The curves downloaded will be in the database but will not be reflected on your log until you map the downloaded curve data to the appropriate layer. See **Curve Maintenance section** in the manual.

	Save Selection	n	
13.) If you want to save the selected curve and well data click on the Save WITS Setting File window.		button.	This will initiate a

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👌 🛛 Save Wit	Settings File
Save in: 🔒 3rd Well	· · · · · · · · · · · · · · · · · · ·
Name	Date modified T
pason.wst	5/12/2016 3:33 PM V
K	>
File name: pason selections	Save
Save as type: WIT Settings files (*.wst) Cancel

- Save button. 14.) **Type** in a **file name** and **click** on the
- 15.) If you happen to close the Power*WITS application and you want to start up again when you get to the curve

Load Selection button to designate which curve data you are selection portion of the window you can click on the button to de wanting to download. This will activate the Open WITS Setting File window.

Look in:	3rd Well	💌 🗕 🖻 🖝 💽
Name		Date modified
pason s	elections.wst	10/13/2016 12:25
٢		
≮ File name:	pason selections.wst	Ope

16.) Highlight y

Exit 17.) Click on the

button to close the Power*WITS application.