Warrior 8.0 Field Operations Manual

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Warrior software version 8.0 Standard cased hole

Field Operations Manual

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Introduction

Warrior software Release 8.0 is a third-generation 64 / 32-bit Unicode program. The Warrior software is a mature logging environment that stresses ease of use, wide versatility, with a true multi-tasking environment. This software can also be used from a desktop to replay, recalculate and print logs from the raw data or imported data from other systems such as LAS or LIS data. The Warrior software runs on Windows Operating Systems (Currently Windows 7 32 bit or 64 bit or Windows 8 64 bit). Operators need to be familiar with Windows and logging.

The Warrior Tool Interface and Power Supply Panel is a new generation logging system. This system utilizes the USB Bus (Universal Serial Bus) along with DSP (Digital Signal Processor) technology providing the latest signal recovery technology available. This allows the PC to be upgraded independently as newer and faster PC's become available. Systems can be configured based on the services required at each site. The operator interface remains the same for each configuration, allowing the same look and feel for the operators.

The Warrior Well Logging System consists of a Tool Interface and Power Supply Panel, a computer, a printer and optional depth, line speed, line weight panel, and perforating power supply. The tool interface panel contains the necessary circuits to interface to most cased hole tools, both analog and digital. The depth encoder and line weight interfaces are built into the panel, as is the down hole tool power supply. All functions are digitally controlled from the software, with the power supply having a manual control mode. The panel incorporates data acquisition functions that interface to the host computer through the industry standard Universal Serial Bus (USB). A USB hub is also incorporated inside the panel allowing a single cable connection to the host computer. A second monitor may usually be attached to provide a Hoistman's or client's display. The system supports most thermal well log plotters and a selection of color printers.

An optional depth, line speed and line weight panel is available. This panel provides independent depth and tension measurements when powered from 12 VDC. It connects to the host computer through the USB and can be synchronized from the host depth or the host depth may be read from the depth panel.

The Probe Shooting Panel supplied by Scientific Data Systems can be set up with an option USBAUX board that allows computer control of the firing circuits so that firing is only allowed at a specified depth.

The Warrior logging system currently consists of the following components:
Computer – Laptop/Desktop – with monitor, keyboard, and mouse
Tool Interface and Power Supply (CP/PA/OP/SLAB)
Plotter (for hard copies)
Shooting Panel (optional)
Depth, Line Speed and Line Tension Panel (optional)
UPS (optional)

It is strongly suggested that the CPU and interface panel be run from an UPS with a capacity of approximately 1000 VA. Do not attempt to use an on-line type UPS with diesel generators unless the manufacturer specifically states that the product is suitable for this application. The switching type UPS seem to work well. Loss of data is guarded against by periodic update of the data base files, however, the use of a UPS allows the system to be shut down in an orderly manner and may also condition the line power to the system, thus eliminating problems due to a noisy power source.

This software uses the FreeImage open source image library. See http://freeimage.sourceforge.net *for details.*

FreeImage is used under the FreeImage Public License, version 1.0

Section

1

1 Warrior Software Installation

1.1 Distribution Media

The Warrior Data Acquisition Software version 8.0 (XXXXXX) or latest is distributed on one DVD. A USB drive is installed in the panel that contains the distribution software and required licenses for Warrior 8.0 Software. The software is also downloadable in the form of a single executable file from the web site http://www.warriorsystem.com/ under **DOWNLOADS.** This file should be saved to a temporary directory and then run to expand the software into an installation folder. It also starts the installation process.

It is a fact of life that every computer system will, sooner or later; suffer a failure, such as a disk crash, where there is the potential for loss of programs and/or data. This will generally happen at the most inconvenient time. The importance of keeping current backups cannot be overemphasized. It is vital that the time be taken to keep current backups of all essential programs and data.

All Warrior systems from Scientific Data Systems are shipped with some type of mass storage device, (usually a DVD-R/W drive) which can be used for backing up programs and data. The procedure for using CD drives varies with the software supplied. Become familiar with the specific software by reading the manual or select 'Help' after starting the program. It may be useful to purchase an off the self-CD program to standardize all systems.

All files copied from a CD to a hard drive are often written as read only. Some files used by the Warrior software will not function properly as read only. To change the attribute, use Windows Explorer select the copied files, right click on the files and select properties, uncheck the 'Read Only' Attribute and click the apply button.

The warrior system is usually configured for the selection of services to be run by a given client. This information is primarily contained in three files, Warrior.ini, Services.ini, and Tools.ini. The Warrior Backup utility can do a configuration backup or restore. Most of the user editable files are included in a Configurations Backup. A configuration restore can then be done on the computer or a new computer with Warrior software installed. In addition, the three primary files are automatically backed up every time the Warrior system is used and can be restored from Warrior Backup. See section 8 for a complete discussion of the Warrior Backup Utility.

1.2 New Installation of Warrior Software.

Before the installation of the Warrior software we recommend updating the Windows operating system through the Internet connection.

Restart the computer and turn OFF the Interface Panel Power supply.
Do NOT connect the Warrior Interface Panel to the computer via a USB cable before installing the Warrior 8.0 Software. This could cause problems in the later installation of hardware drivers.

The Warrior Data Acquisition Software DVDs are set up to be self-loading on most Windows Operating System computers. The Operating system must be any version of Windows 7 32-bit or 64 bit. After a fresh restart of the computer, open the CD tray, insert the Warrior Software DVD, and close the tray. The Windows Operating System will look for an autorun.inf file on the CD to start the loading procedure. The interactive menu shown in figure 1.2.2 should appear. Be sure that the CD player has stopped operating before assuming that the autorun file did not execute. There are several reasons that the autorun file may not execute. The two most like causes are the operating system may have autorun capability shut off or existing software on the computer may not allow software to run directly from the CD. Solutions for these problems will be discussed later.

FIG: 1.2.1 CD Start Detected

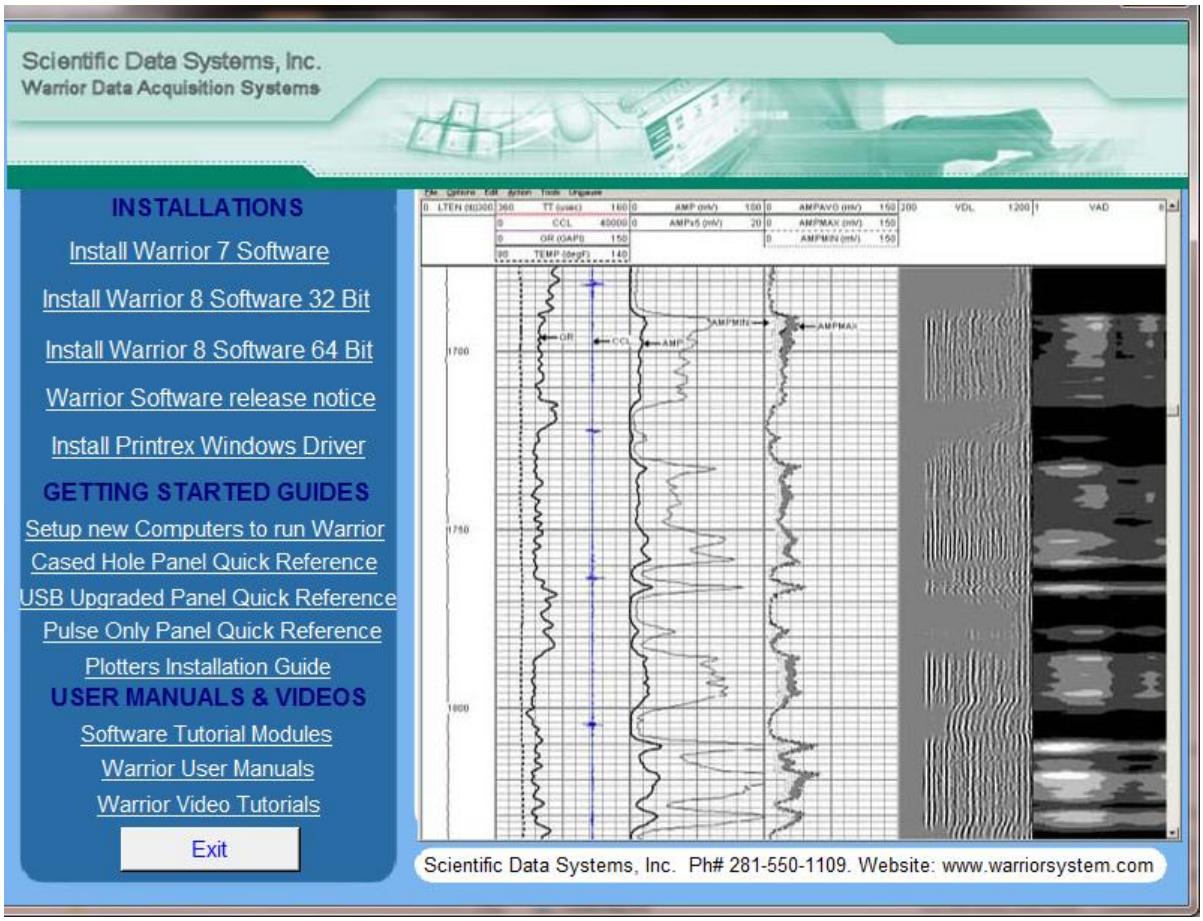


FIG: 1.2. 2 Interactive Menu

From the Interactive Menu, click on the Warrior 8 software installation that you wish to perform**.** The software will then do a preload to prepare for installation.

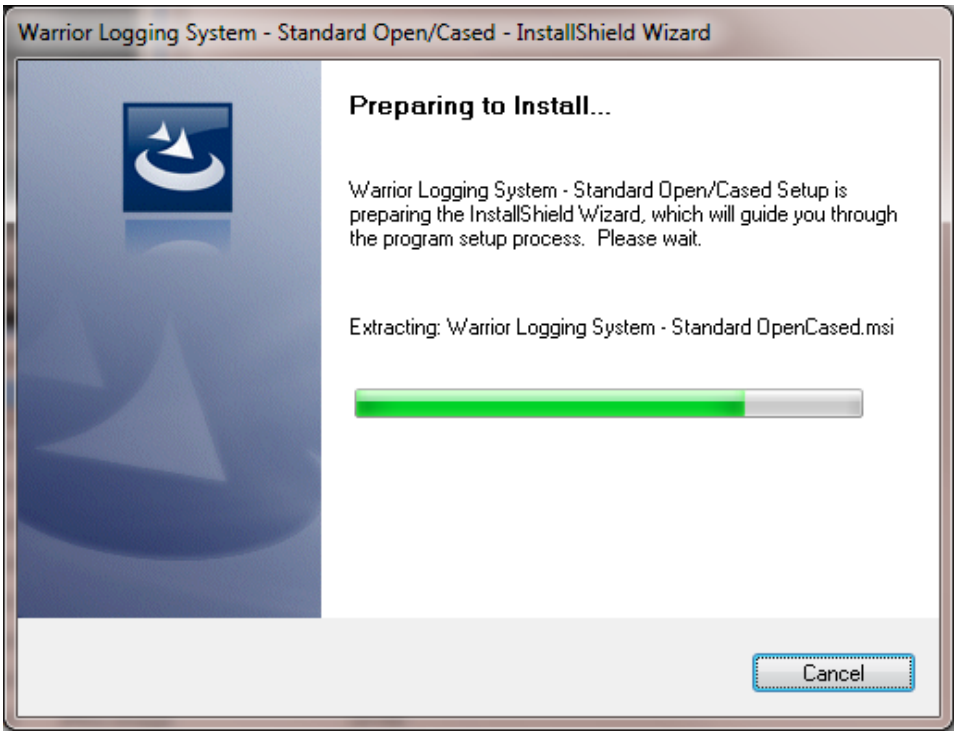


FIG: 1.2.3

The Install Shield Wizard will begin. Click on the **[Next]** button.

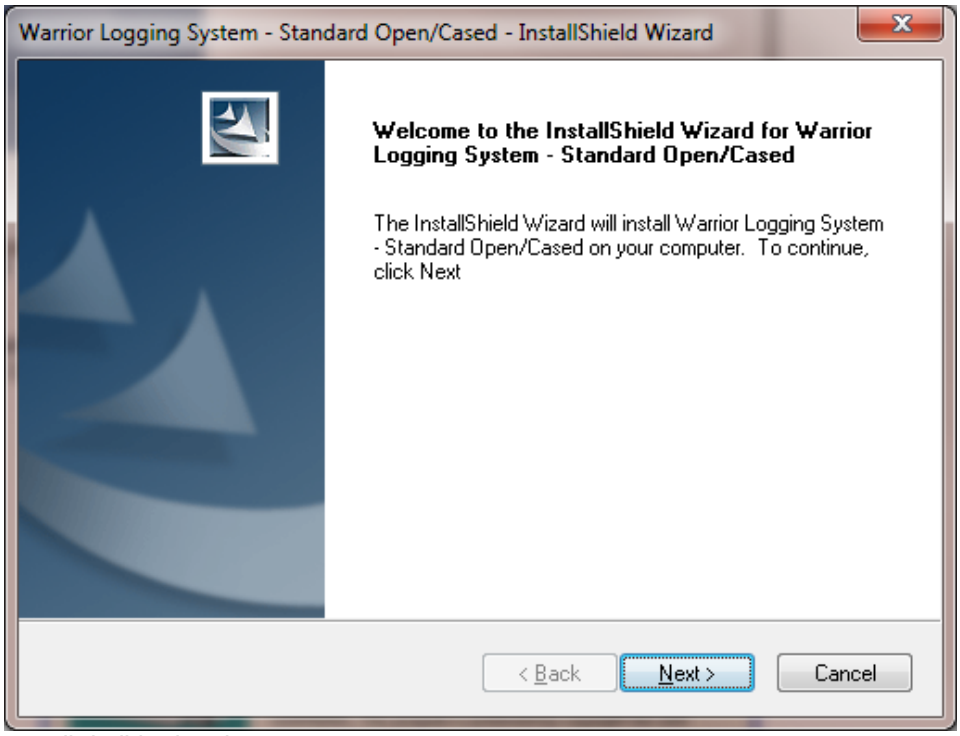


FIG: 1.2.4 InstallSheild Wizard

The folder for installing system files is then shown. The [Browse] button can be used to select an alternate folder in which to install the files. It is highly recommended that the default folder be used. Click the **[Next>]** button to continue.

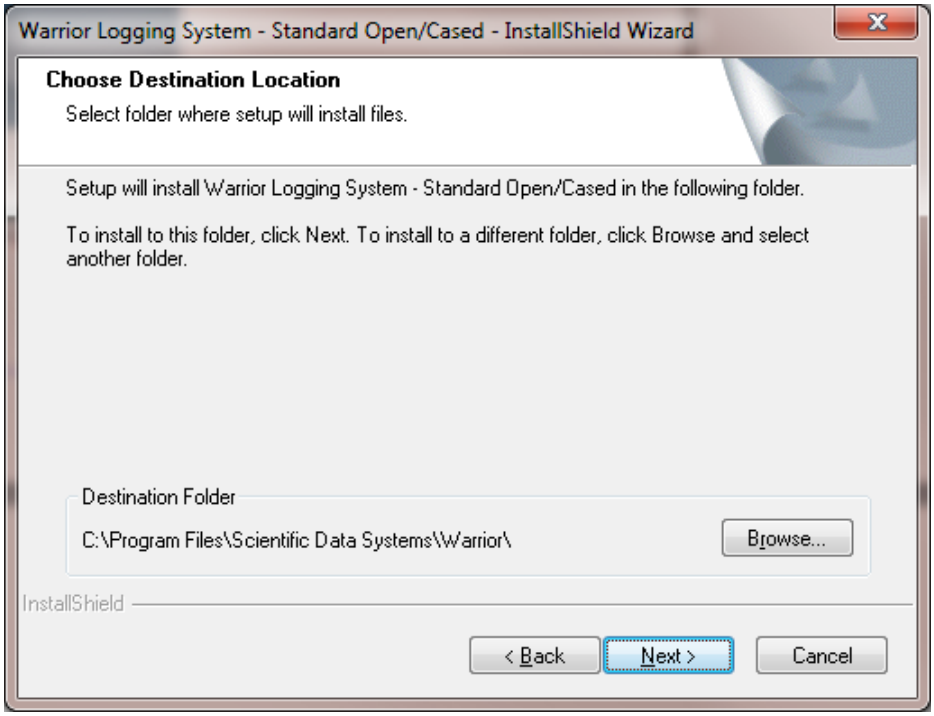


FIG: 1.2. 5 Program file folder destination

A summary will be shown of the installation options. Click the **[Next>]** Button to Begin installation.

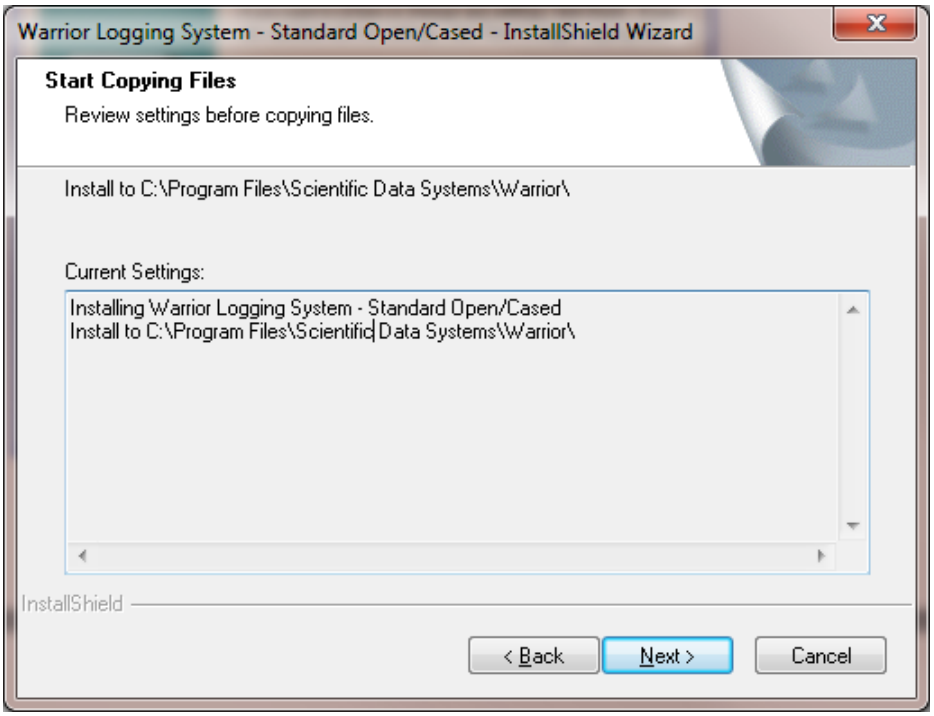


FIG: 1.2. 6 Setup ready to install

The Install Shield wizard will now begin the process of installing the Warrior Software onto the computer.

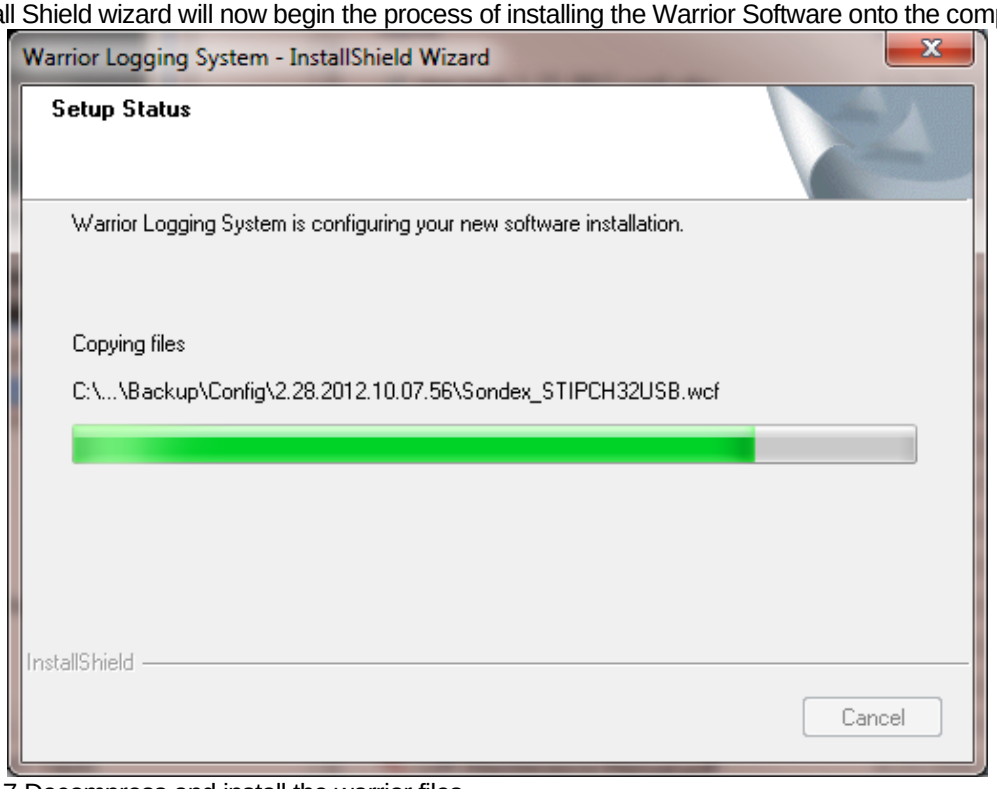


FIG: 1.2.7 Decompress and install the warrior files.

Allow the software to decompress, extract files, and create icons until it is finished.

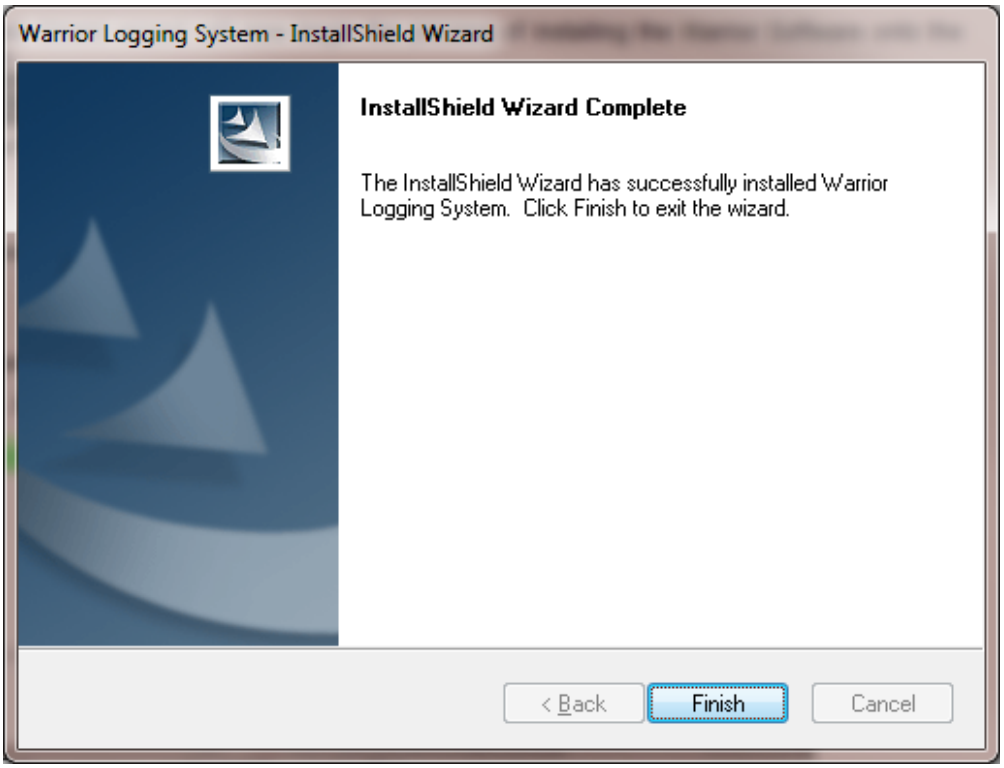


FIG: 1.2.8 Setup has finished

Click the **[Finish]** button.

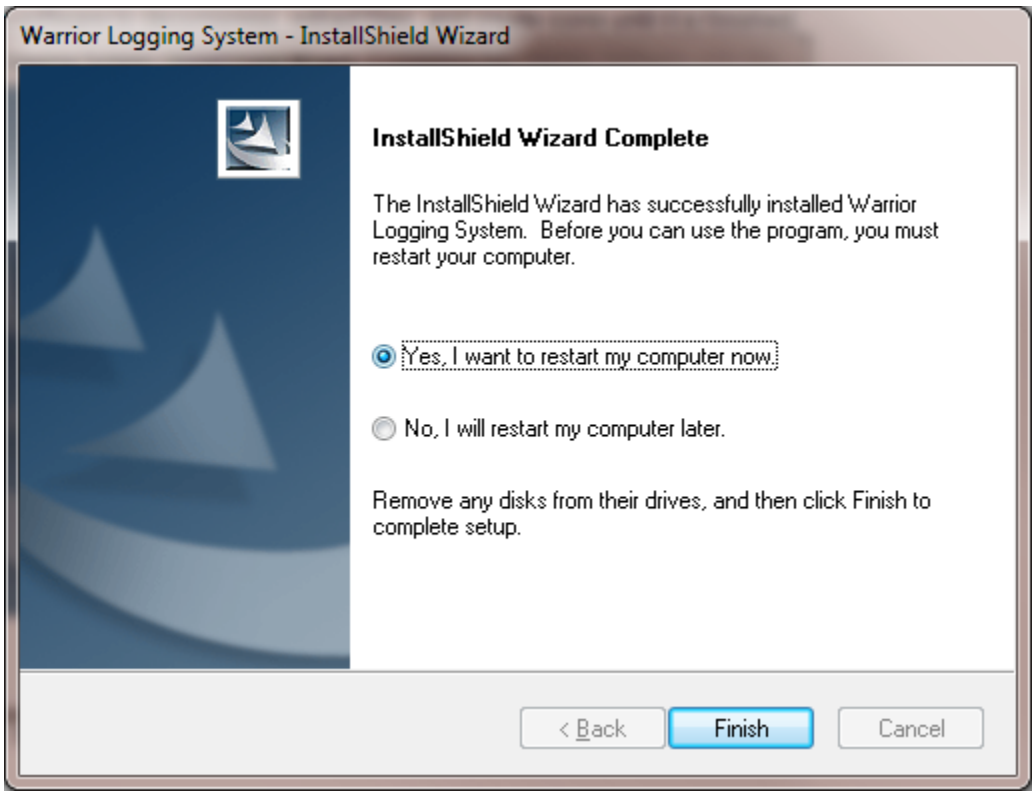


FIG: 1.2.9 Restart Computer

Allow the computer to reboot and finish the installation procedure
Remove any disk from their drives and click **[Finish]** to complete setup.

As the computer reboots, before windows starts, the final installation of the Warrior software will begin. There will be changes made to the configuration files that indicate what version of software has been installed. The Hardlock driver for the software key is installed. This may take some time, allow it to complete the Hardlock driver installation.

FIG: 1.2.10

As the SDS USB Devices Drivers are installed, you will be asked to accept the license agreement. Click **[Yes]** to continue.

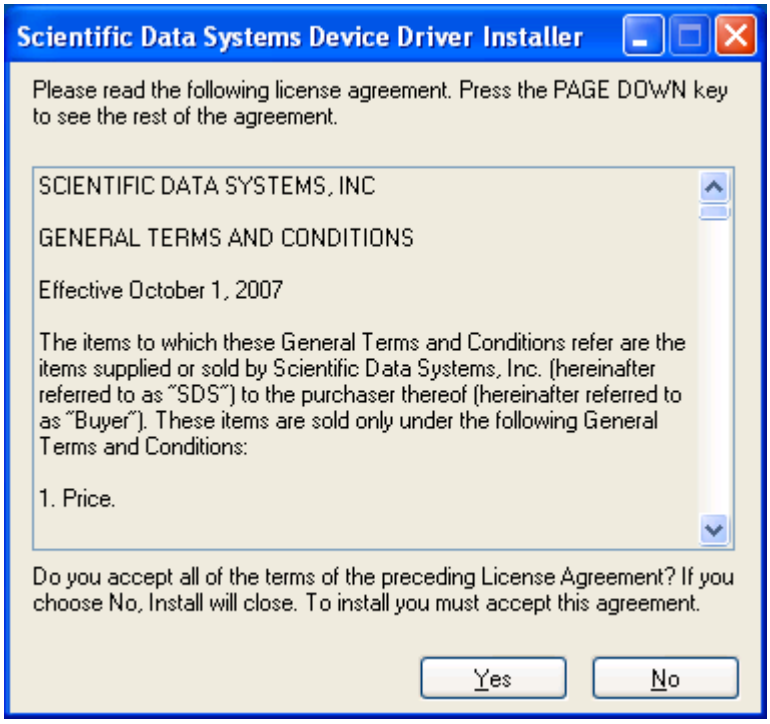


FIG: 1.2.11

The interface panel must be turned off and disconnected from the computer before the device's drivers are installed. Click the **[Next]** button to continue.

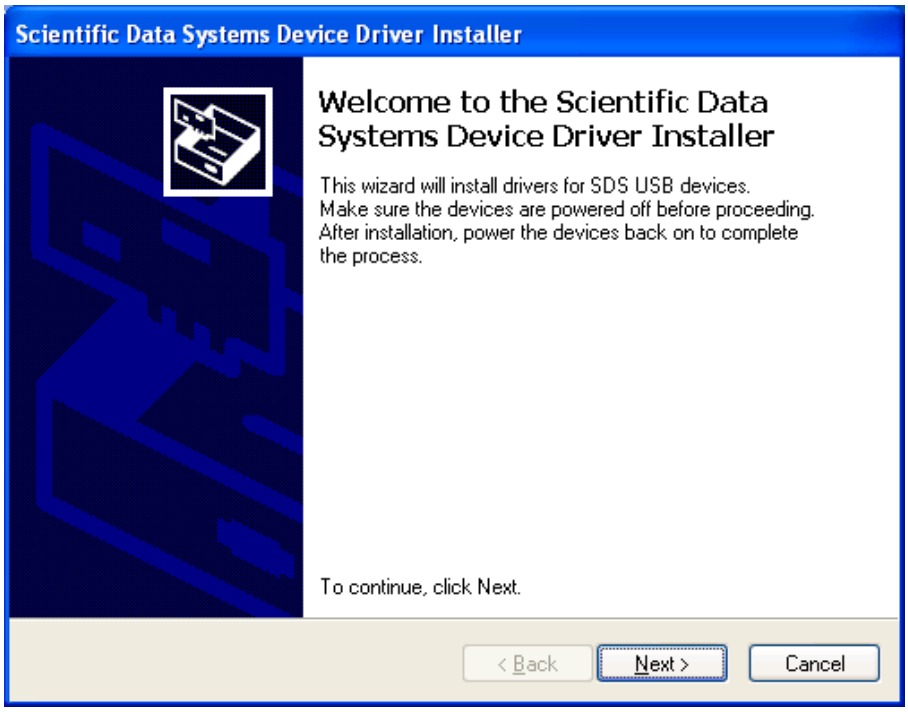


FIG: 1.2.12

You will get a window that shows that the devices drivers are installing. Wait for the device driver installation to be completed.

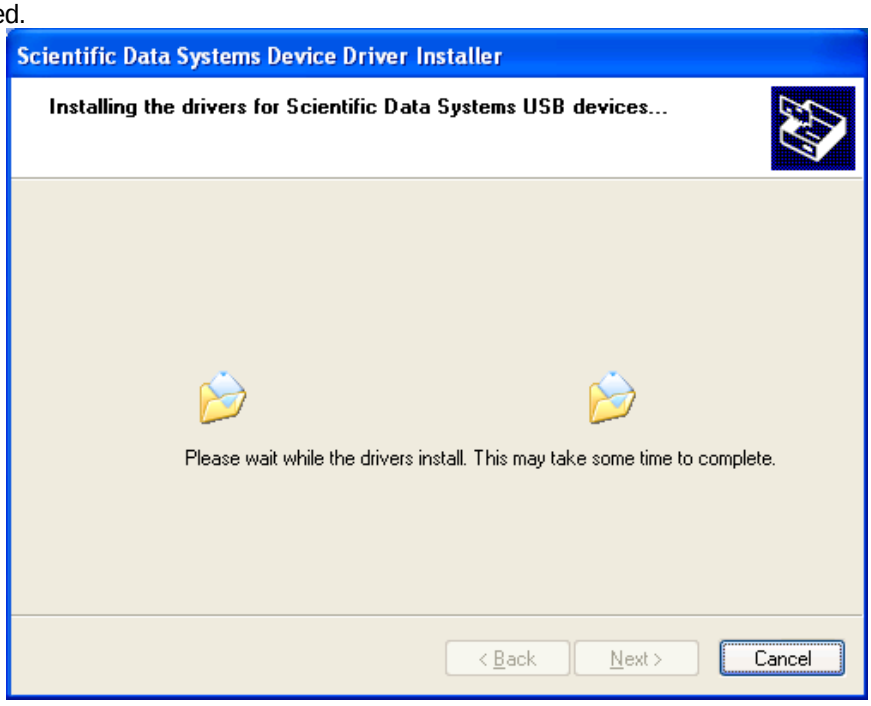


FIG: 1.2.13

When the devices drivers have finished installing, you will be show the confirmation window. Click the **[Finish]** button to proceed. You may notice a black window momentarily flash on the screen as the Warrior Event Logger is installed and started.

FIG: 1.2.14

You should now attach the USB cable from the computer to the Interface Panel and then turn on the panel. The drivers for the devices should load into Windows and be ready to use in a few minutes.

1.3 Warrior Software Upgrade or Perform new versions.

Upgrades are released from time to time to distribute new or improved components of the software.
Upgrades for Warrior Data Acquisition Software version 8.0 or latest is distributed on one DVD. Or the software is downloadable in the form of a single executable file from the web site http://www.warriorsystem.com/ under **DOWNLOADS.** This file should be copied to a temporary directory and run to expand itself. To install the Warrior software run the SETUP.EXE.

Restart the computer and turn OFF the Interface Panel Power supply.
Do NOT connect the Warrior Interface Panel to the computer via a USB cable before installing the Warrior 8.0 Software. This could cause problems in the later installation of hardware drivers.

To install the update from DVD, Place the new version of Warrior into the CD Drive. It should auto run. If not run CD Start from the DVD. When upgrading from an existing installation, the current Warrior system program files and configuration files are saved to a backup directory. If problems occur with the new installation, the previous installation can be restored entirely. Select Upgrade from Version X.x to Version Y.y, the program files will be updated, and existing configuration files will be then retained.

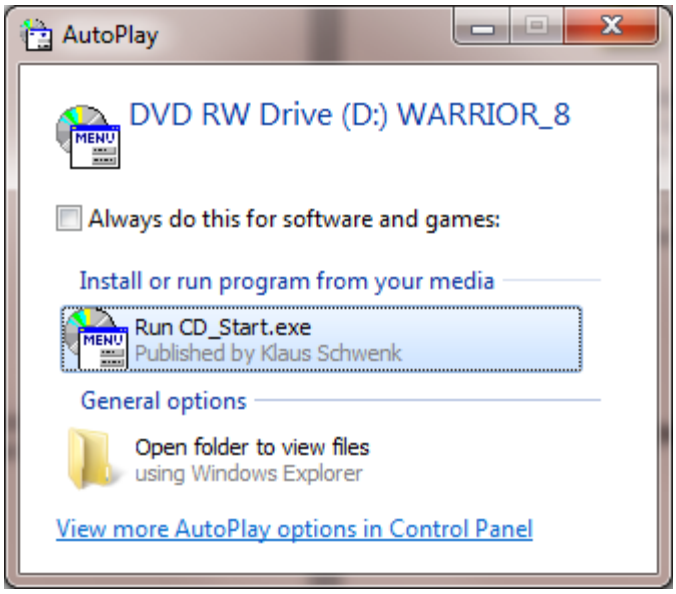


FIG: 1.3.1 CD_Start.exe found on DVD.

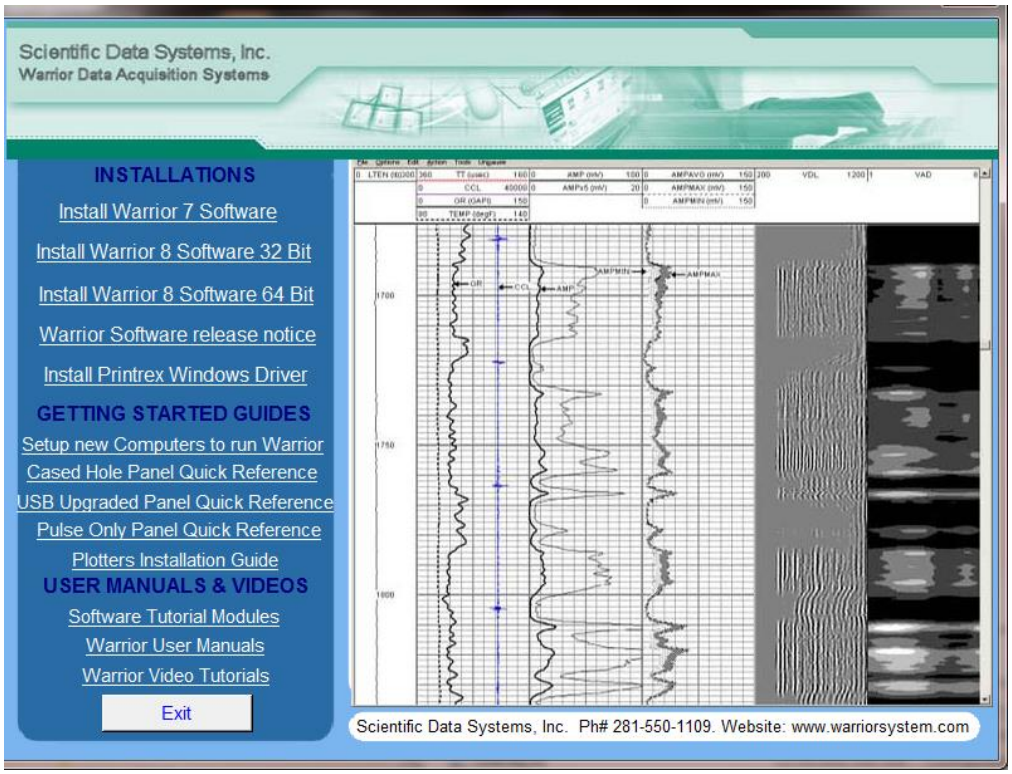


FIG: 1.3.2 Interactive Menu.

From the Interactive Menu, click on the Warrior 8 software installation that you wish to perform**.** The software will then do a preload to prepare for installation.

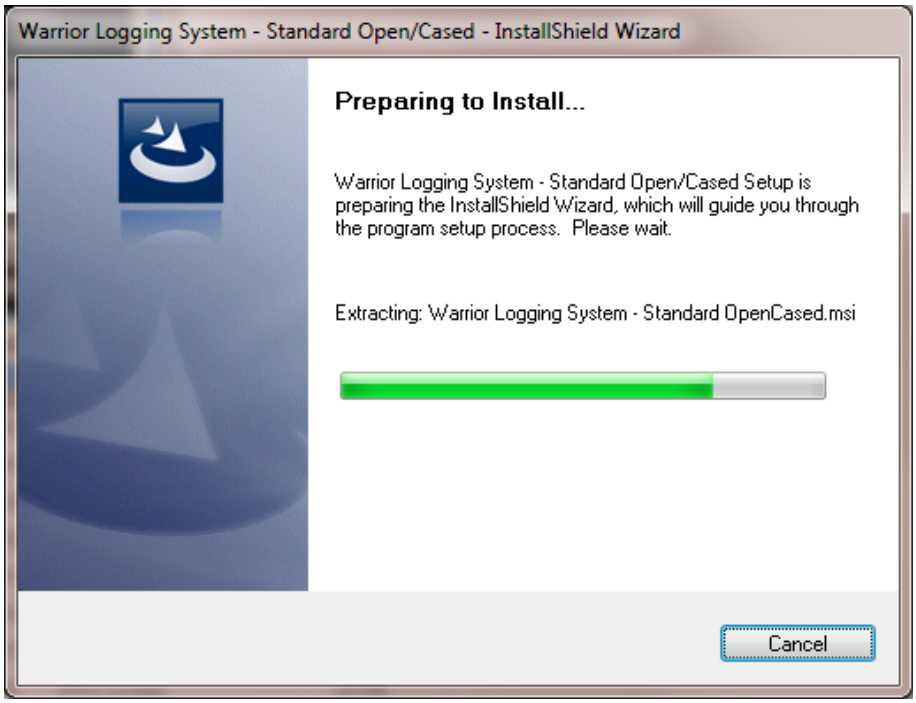


Fig. 1.3.3 Extracting preload files

You will be asked to do an upgrade or a completely new installation. Click the Upgrade button to retain current configuration setting and to upgrade program modules to new version. Click the Complete button to do a new installation, over writing any existing program configurations.

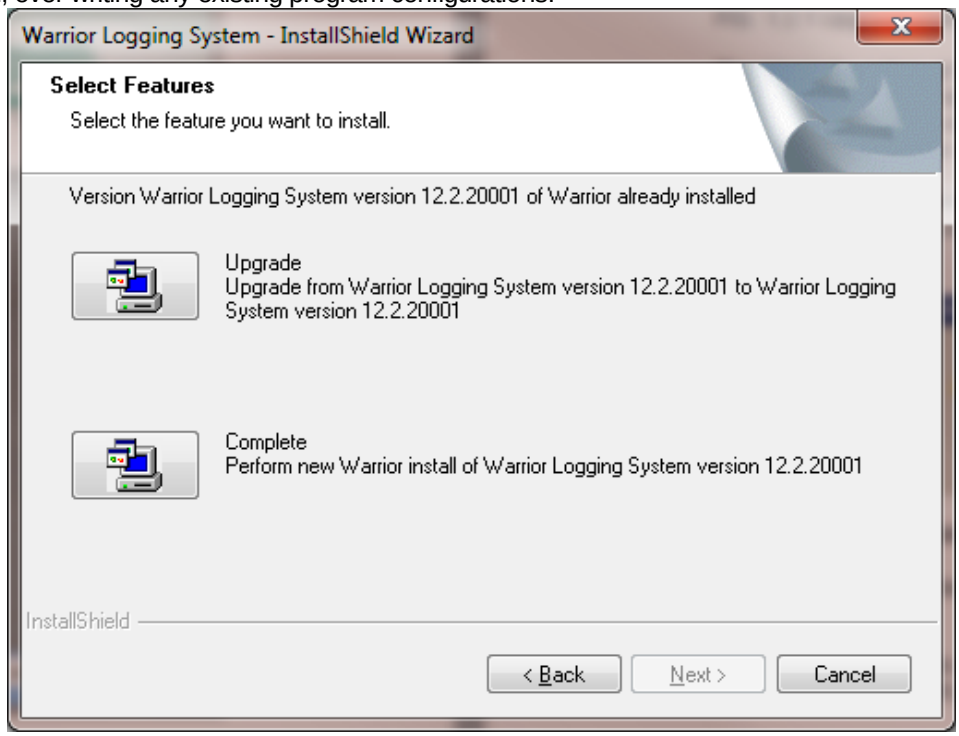


Fig. 1.3.4 Choose Upgrade to upgrade software and save current configuration settings.

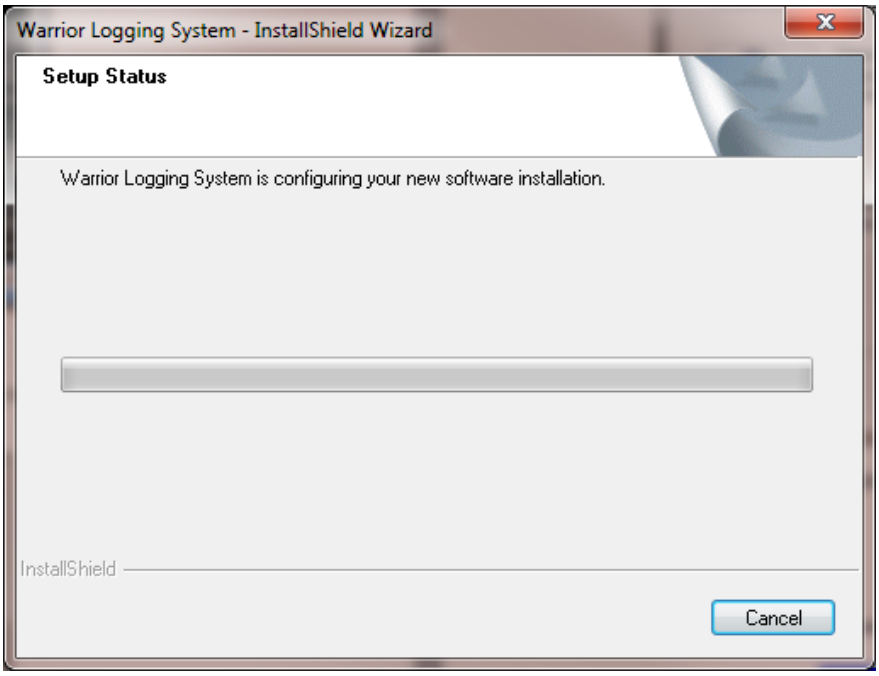


Fig. 1.3.5 The rest of the installation process is the same as an initial installation.

1.4 Warrior Shortcut Icon

Perhaps the easiest way to set up a short cut to a program group is using Windows Program Selection. Click on the Windows Start Button. Next, click on All Programs. Find the Warrior 8.0 program group and right click on that. Finally, select Send to -> Desktop (create shortcut)

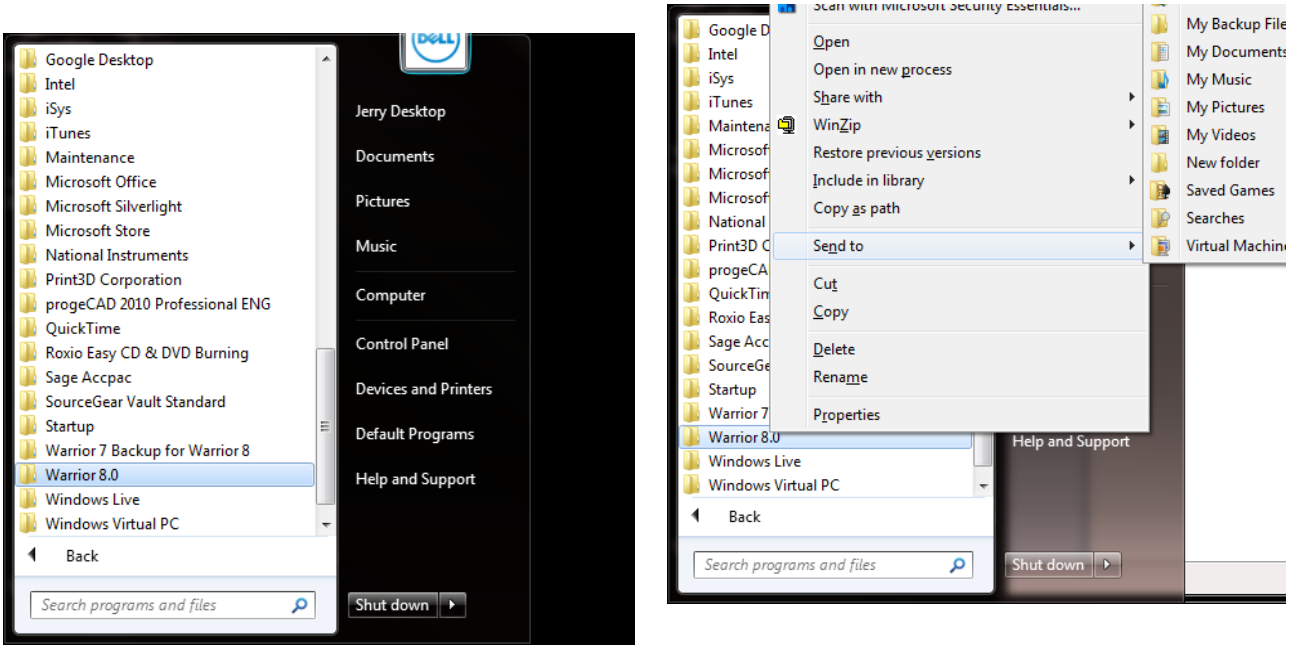


Fig. 1.4.1

It is recommended that the Warrior group programs be placed as a toolbar on the Windows toolbar. It is necessary to first have placed a shortcut to the Warrior program group on the desktop as done in the preceding paragraph. To add the Warrior toolbar, right click on a blank area of the Windows Toolbar. Select Toolbars >> then select New Toolbar . . .

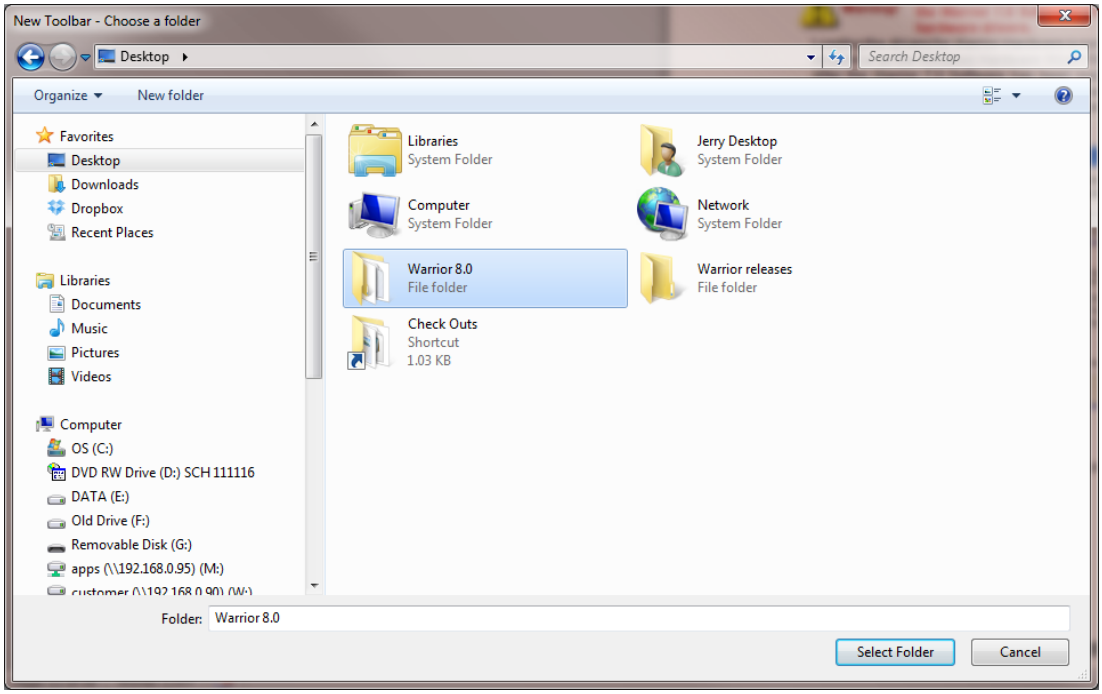


Fig. 1.4.2 Select Toolbar Folder

The window “New Toolbar – Chose a Folder” window will open. Click on Desktop to view the Desktop folders. Click on Warrior 8.0 folder then click the [Select Folder button]. You should now have a Warrior 8.0 toolbar for quick access to Warrior programs.

1.5 Key Software Authorization Setup

A Warrior USB key must be attached to a USB port on the computer or be contained in the interface panel attached to a USB port on the computer for the software to operate (unless the demonstration release has been installed). In addition, the Warrior 8 key codes for the key being used must be entered the Warrior Control Panel for the key to be recognized.

From the Warrior group box, select Control Panel.

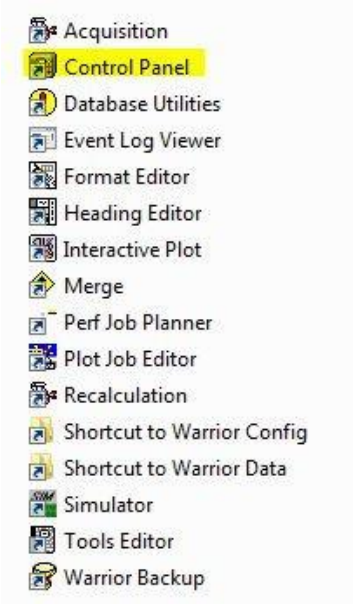


FIG: 1.5.1 Select Control Panel

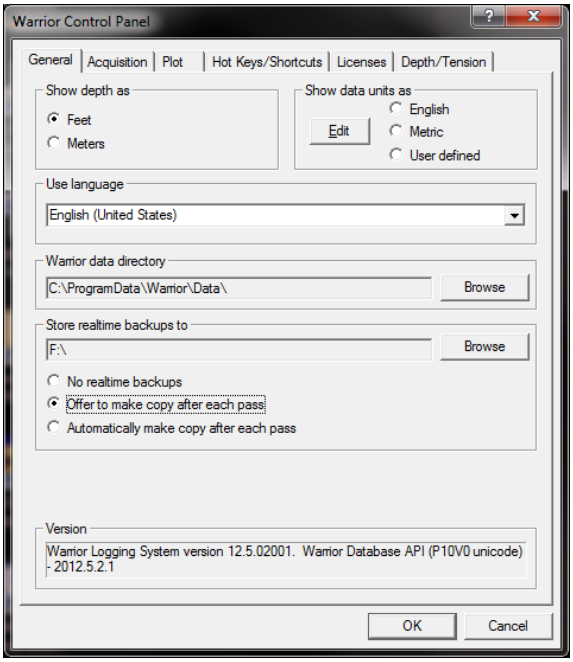


FIG: 1.5.2 Warrior Control Panel

Click on the Licenses tab.

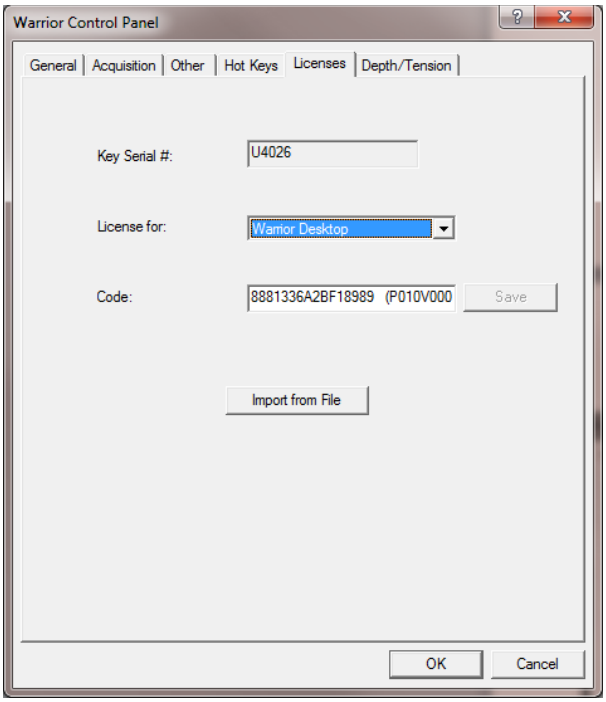


FIG: 1.5.3 Control Panel Licenses

Unlike the older Warrior software that required a single access code, Warrior 8.0 software requires multiple access codes for the different logging modules that get installed. Although the codes can be manually entered by typing the code for each individual license in the code box, the software can now import the codes by reading a text file and merging them into any existing codes. Click on the [Import from file] button to browse for the import file licenses.ini. With new systems, this file will be located on a USB drive installed in the Scientific Data Systems Interface panel.

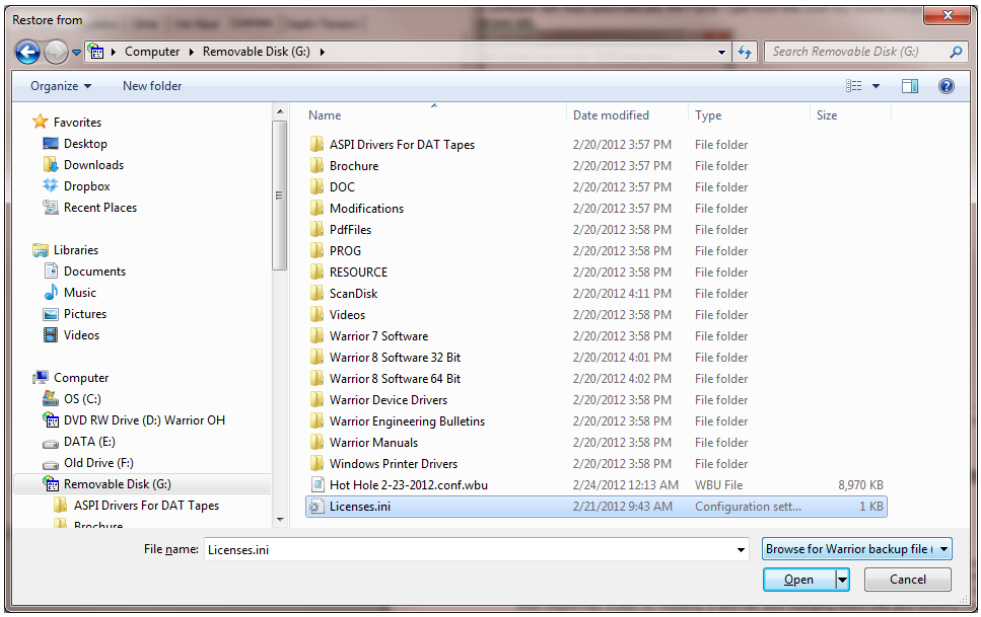


Fig. 1.5.4 Browse for Licenses.ini (normally located on USB drive in interface panel)

The Control Panel will indicate whether the codes were properly imported by showing Import: OK. You can now look at each of the different License in the License for: dropdown list. The software will show the code for the license type shown.

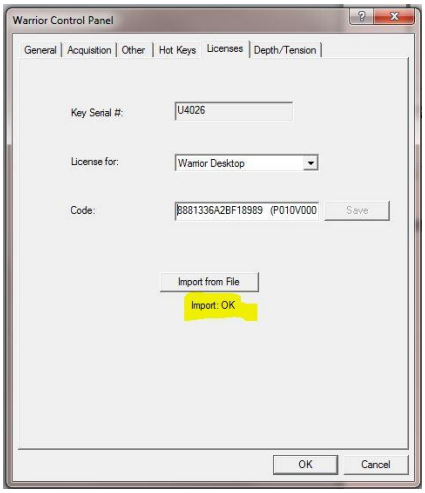


Fig. 1.5.5 Imported Licenses OK

1.6 Warrior USB Drivers Setup

USB Warrior Drivers are now loaded upon the reboot of Windows after the Warrior Software has be installed or updated. This if why it is important not to have the Interface panel connected to the computer at that time.

After the computer has finished rebooting, connect the USB cable from the computer to the interface panel and then turn the Interface panel on. The drivers for the Warrior devices should now self-install through Windows. It is recommended to go to the Windows Device Manager and check to be sure that all devices have been properly installed.

1.7 Device Manager

The device manager checks the connectivity between the Devices (Warrior Panel), USB Connection, and the computer. To get to the Windows Device Manager program in Windows 7, Click the Windows start / program button (icon) and then right click on the computer. From the list provided, select properties. You should be able to access the Device manager from this window.
Many Users place a shortcut to the Windows Device Manager on the computer desktop. To do this, first click on the Windows start / programs button, then click on Control Panel. In the upper right of the Control Panel Window, you can select to “view by:” category, large icons, or small icons. Select either the large icons or small icons. You should now be able to see the Device Manager Icon in the Window. Right click on the Device Manager Icon and select “Create Shortcut”. This will put the Device Manager shortcut and icon on the computer desktop.

Fig. 1.7.1 Device Manager Shortcut and Icon

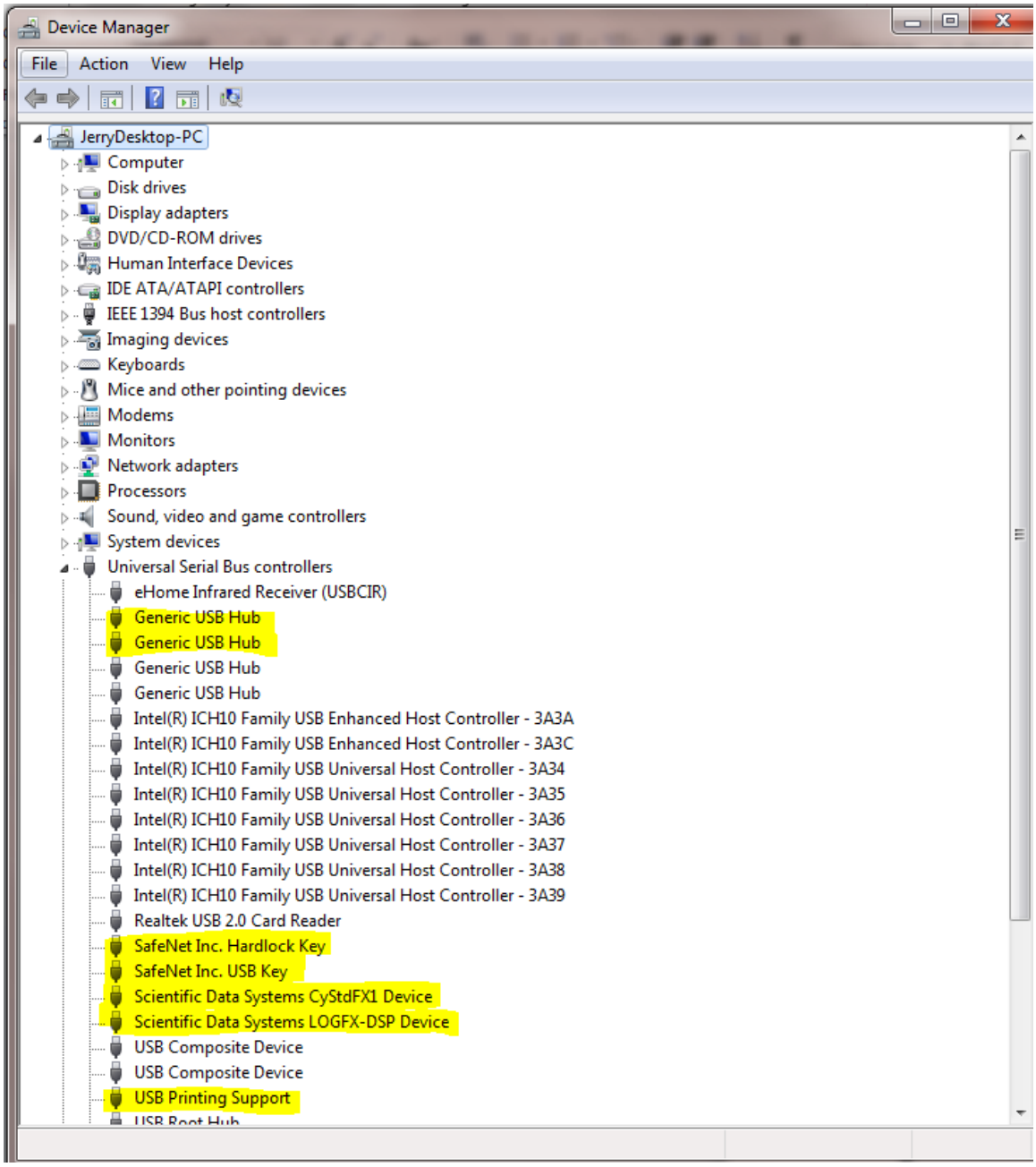


FIG: 1.7.2 Device Manager Path

The normal devices that are connected when attached to a standard interface panel include, but are not limited to:

2 Generic USB Hubs which are the USB Hub in the Panel
SafeNet Inc. Hardlock Key and SafeNet Inc. USB Key are the Warrior Software key
Scientific Data Systems CyStdFX1 is the USB44 Board
Scientific Data Systems LOGFX-DSP is the DSP Board

1.8 Creating Company Logo for Headings

For a logo to work correctly in the Warrior Standard headings, it should be twice as wide as it is high and be outlined with a heavy dark line. The actual dimensions used are not critical; it is the two to one relationship that is important so that the logo will appear in correct proportion when placed in the heading. If the logo is not outlined, it will cover the border area of the heading around the logo and make it look unusual.

Place a copy of your existing graphical image file that you wish to use as a logo into the Warrior\Config folder. The file can be a .BMP (bitmap image, .JPG (compressed picture file), .WMF (Window meta-file), .EMF (Enhanced meta-file), or .LGO (obsolete Warrior logo file). Open the Warrior Heading Editor program. Left click the mouse in the Logo area of the heading. You will get an Edit Logo window, as shown in figure 1.8.1. Click on [Change] to bring up the logo selection window, The Warrior\Config folder will be shown with all available logo selections. Select the logo that you wish to use and click on [Open]. This will be the logo that will be used in ALL files until it is changed again.

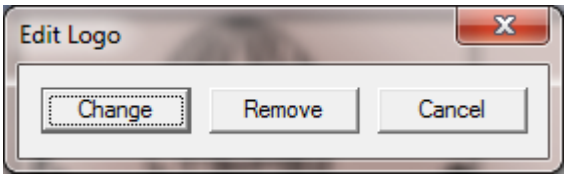


FIG: 1.8.1 Edit Logo

The following is an example how to create a company logo for use on headings and log banners. If you do not have any existing graphical image for a logo, such as a JPG, TIF, or BMP, you can use most drawing program such as Windows Paint to create your LOGO image. Open the graphics program and set the size of the image to be twice as wide as it is high.

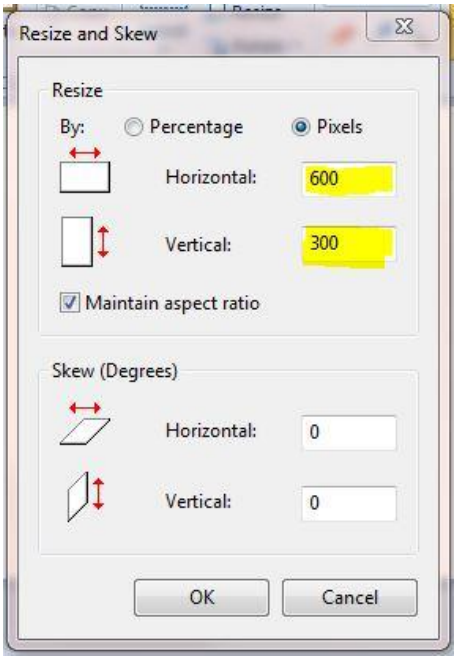


FIG: 1.8.2 Resize image in Windows paint

Once you have created your logo, save the file as a .JPG or .BMP to the Warrior\Config folder. You will then be able to change the logo in your heading as described above.

Section

2

2 Windows Set Up

The Warrior Well Data Acquisition System runs in the Microsoft Windows operating system. This gives the user many powerful tools and facilities not previously available in an inexpensive logging system. One of the principle advantages is that the system is multitasking, meaning that several programs (or tasks) may be running on one computer at the same time. Within the Warrior system, for example, several different log plots may be displayed independently on the screen and other logs may be directed to plotters. Headings may be prepared, and final log presentations set up, all while continuing to acquire data.

Another advantage of the Windows environment is the graphical user interface, which presents the functions available in the system in an easy to understand manner (well, fairly easy). While the simple interface makes the Warrior easy and fast to operate, the full power of the system can only be realized when an understanding of Microsoft Windows itself has been acquired. It is therefore strongly recommended that, after some initial experimentation with the system, the Windows User Guide is studied, and the Windows Tutorials run. Courses are also available on videotape, and other media, from many sources.

2.1 Windows Printer Setup

To be able to produce a hardcopy of your data from the Warrior software, a Windows printer must first be installed. The Warrior software includes the capability to print / plot to common plotters while logging but the software uses the Windows spooling to buffer the plotter output. Other plotters may be used to plot logs through Windows after data recording as stopped.

2.1.1 Windows 7 Printer Installation

To facilitate this operation a USB Port has been assign on the Interface Panel (rear Plate) and marked “Plotter”. It is recommended to use this USB port for your printer connection. With the printer turned off, plug in the USB cable or USB to Centronix Printer Adapter cable into the USB port. Make sure that the USB cable from the computer to the Interface Panel is properly connected. Turn the Printer On.

Windows will often install printer driver automatically. To see if Windows has installed the printer, click on the Windows start button and then click on the Device and Printers selection.

Fig. 2.1.1 Windows Start Button and Devices and Printers selection

Look in the Printers and Faxes section and see if the printer that you have connect has been automatically installed. If it hasn't been, then Windows drivers will have to be installed manually. At this point the manufacturer's drivers must be available. Drivers for black and white plotters normally supplied by Scientific Data Systems, such as Printrex and ISYS, are on the Warrior installation DVD.

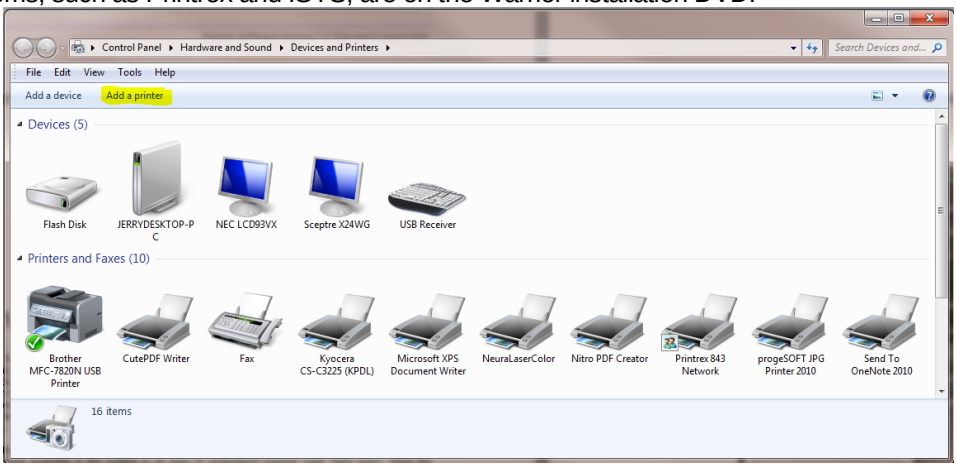


Fig. 2.1.2 Click on Add a printer

Place the CD /DVD or other media containing the device drivers in the computer so that they are available when required during the printer installation. Click on Add a Printer in the Windows Devices and Printers window.

Click on the Add a local printer selection

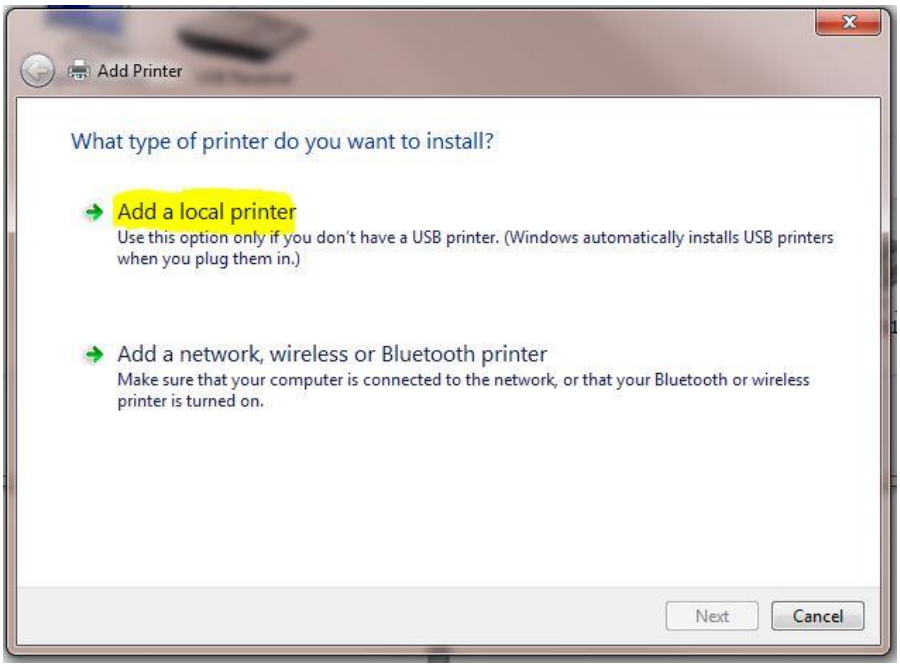


Fig. 2.1.3 Add a local printer

Click on the Use existing port selection, then drop down the scroll down printer port list to the right of the selection until you find USBxxx (Virtual printer port for USB). There may be several USB virtual printer ports, typically the highest numbered one is the last device that was plugged in to a USB Port. After selecting a USB port click the **[Next]** button.

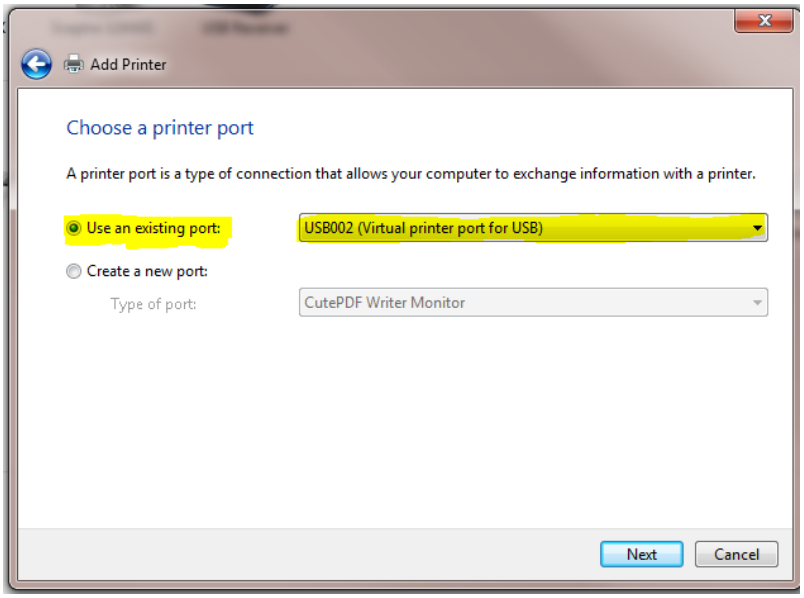


Fig. 2.1.4 Use Existing Port

The next step is to select the location of the printer driver to be installed.

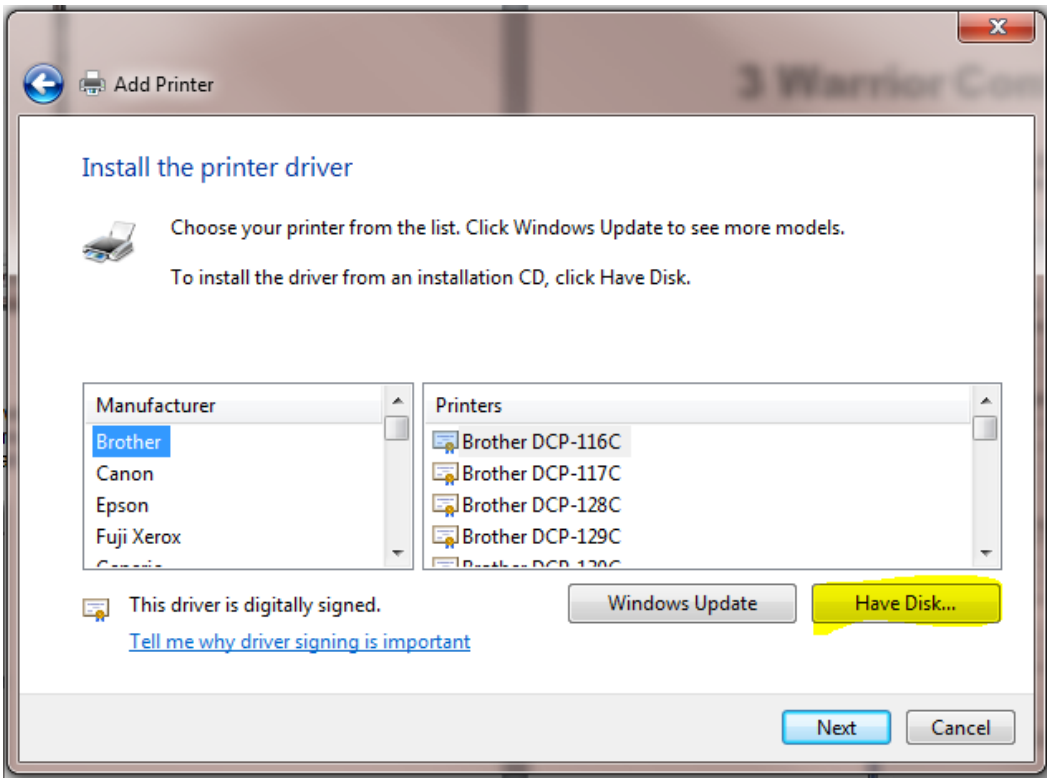


Fig. 2.1.5 Click [Have Disk]

The list on the left side of the window are printer manufacturers that Microsoft supports or that have previously been installed on the computer. Check the list to see if the manufacturer is in the list. If it is not in the list, click on [Have Disk …].

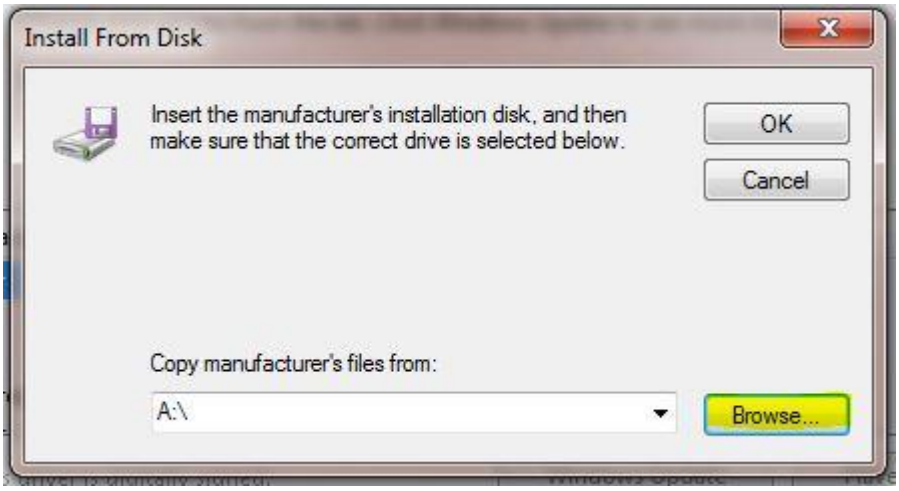


Fig. 2.1.6 Plotter Manufacturer Installation disk

Click on the [Browse …] button to locate the drivers for the printer. The Warrior Installation CD contains drivers for the plotters that Scientific Data Systems has supplied.

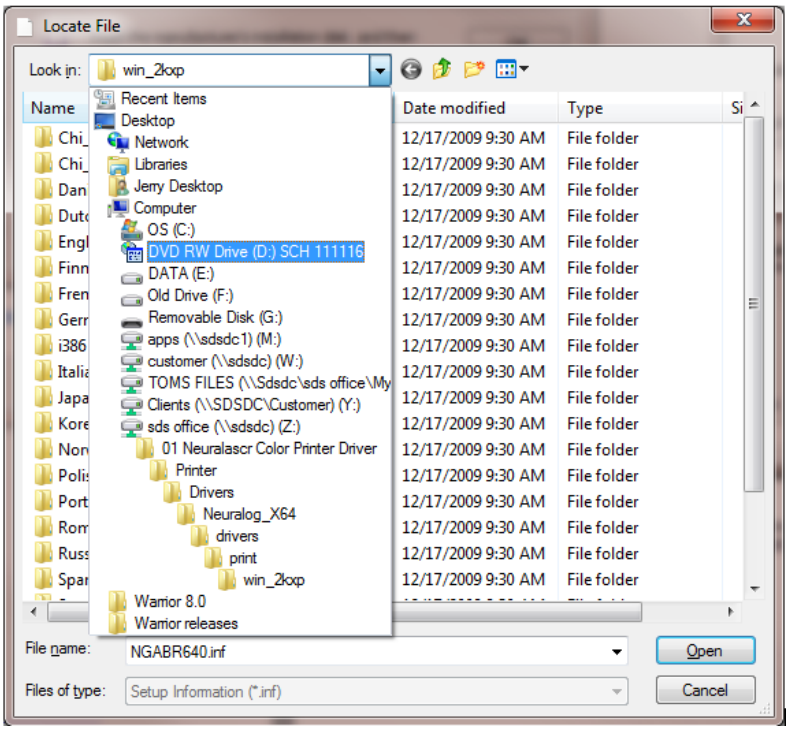


Fig. 2.1.7 Warrior CD

Click the Look in: drop down list in the Locate File window to find the Warrior Installation CD in the computer CD / DVD Drive and double click on it.

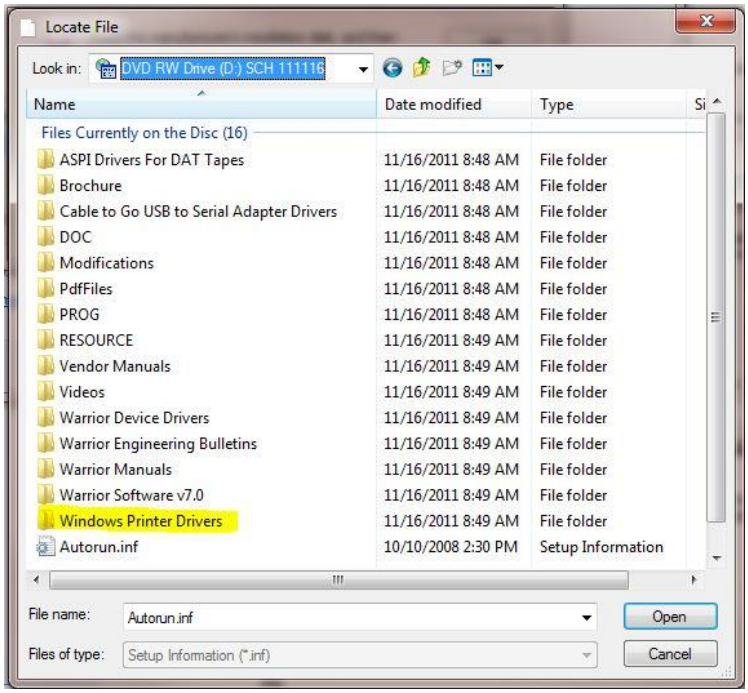


Fig. 2.1.8 Windows Printer Drivers on Warrior DVD

On the Warrior CD, locate the Windows Printer Drivers folder and double click on it.

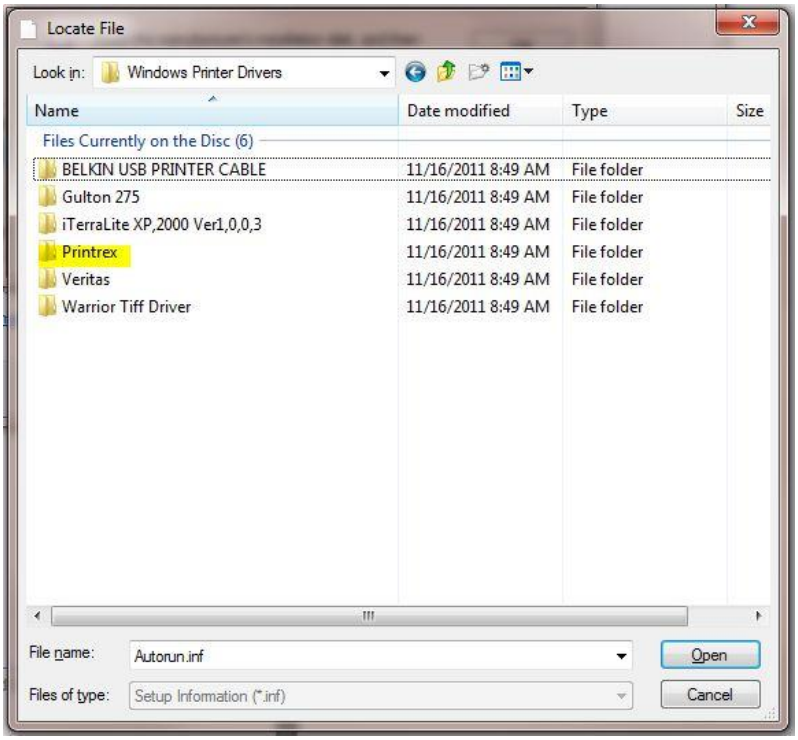


Fig. 2.1.9 Printrex Drivers Folder

Select the plotter manufacturer and double click on that folder.

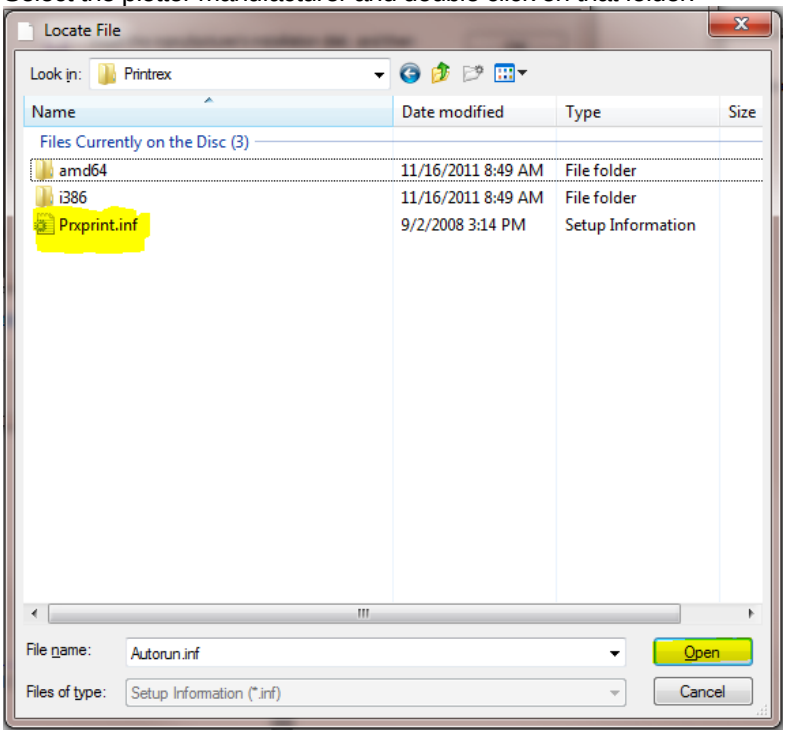


Fig 2.1.10 Windows Drivers information file

When the proper .inf, or setup information file has been located, click the file and then click on the [Open] Button.

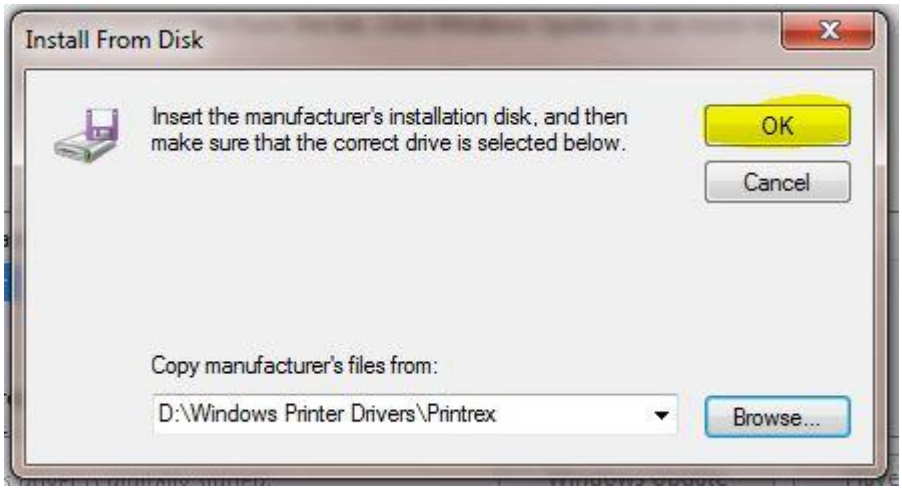


Fig 2.1.11 Opening Printrex Drivers

This should return you to the Install from Disk window with the folder with the manufacturers files selected. Click the [OK] button to continue.

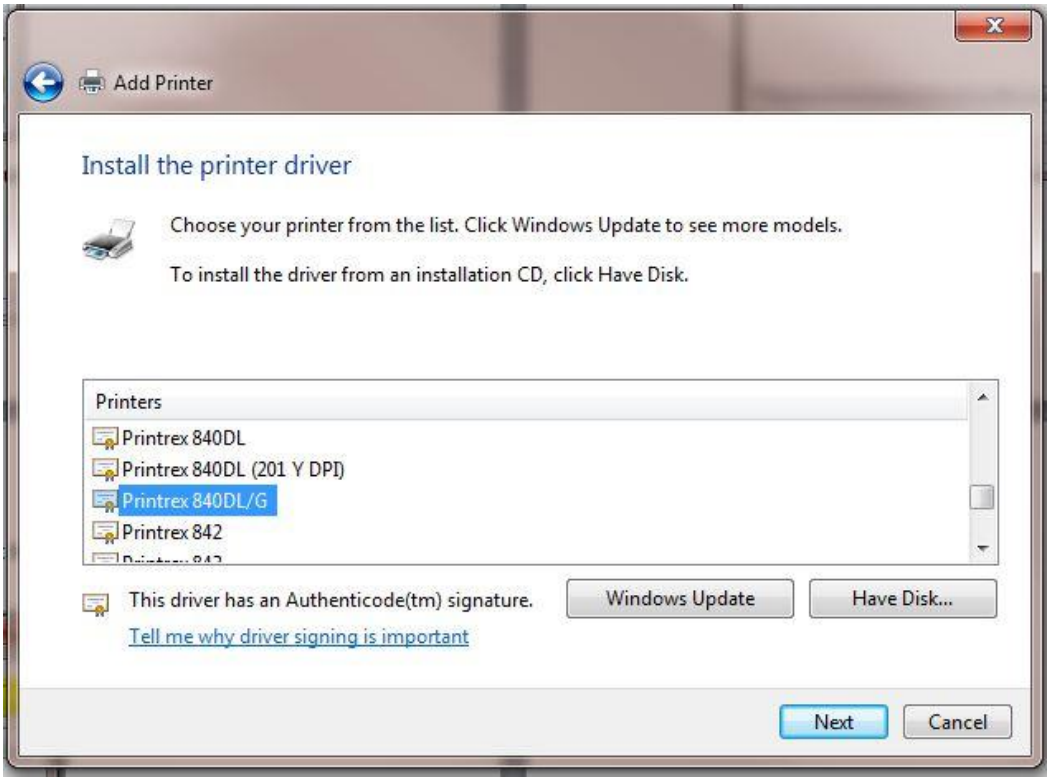


Fig. 2.1.12 Selecting printer

You should now have a drop down list of the manufacturer's printers. Scroll down the list to find the model of the printer that in being installed and click [Next].

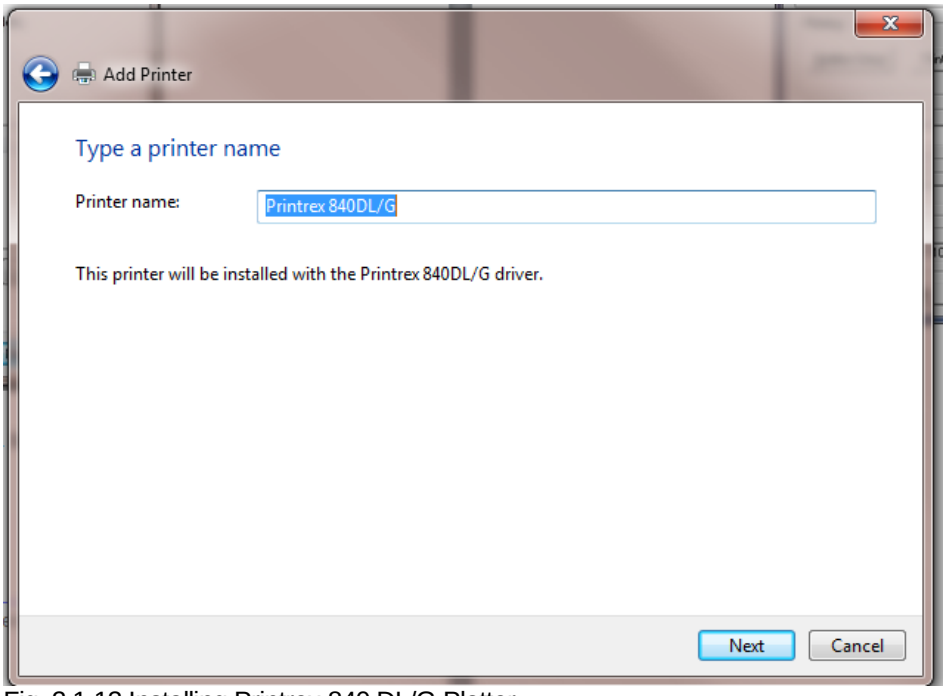


Fig. 2.1.13 Installing Printrex 840 DL/G Plotter

Either enter a new printer name or accept the printer name Windows has assigned by clicking the [Next] button.

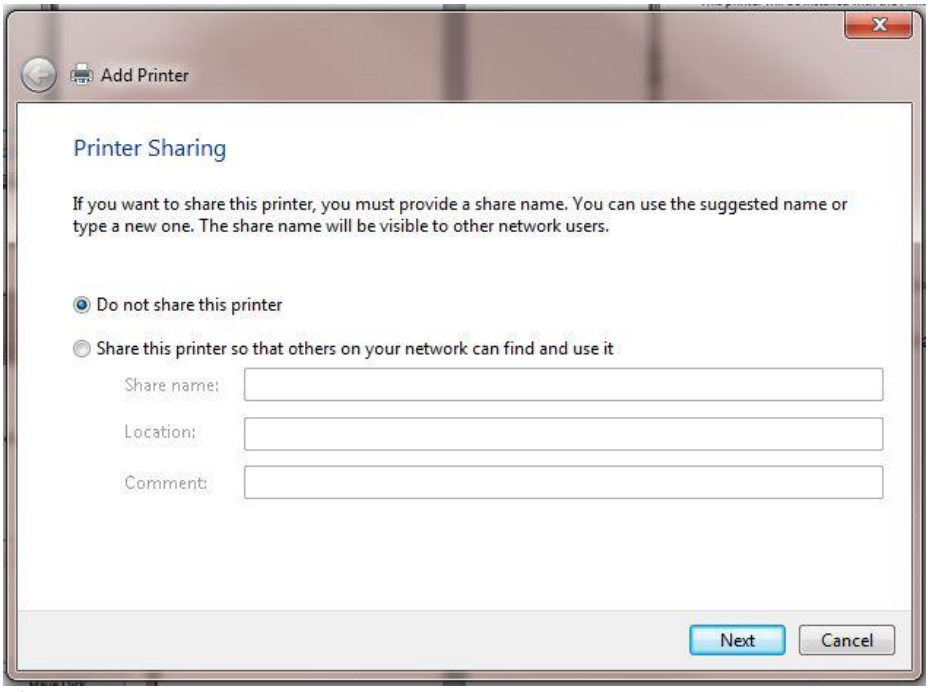


Fig. 2.1.14

Warrior will not print through a shared printer (Warrior does print through network printers) so select the Do not share this printer option and then click [Next].

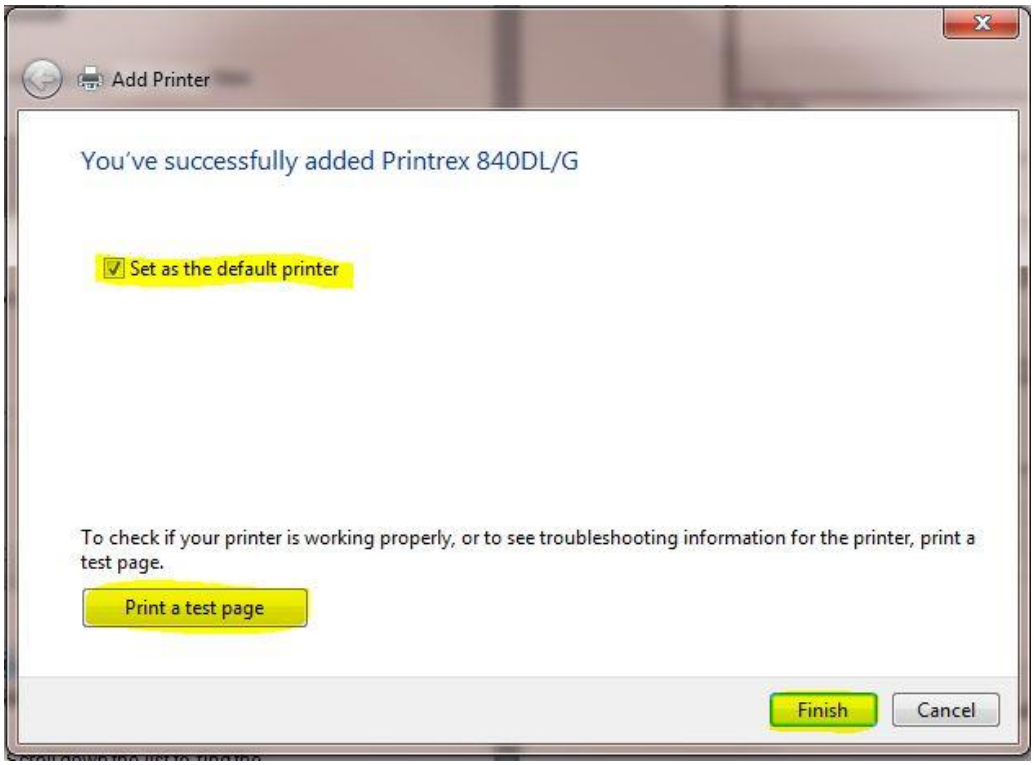


Fig. 2.1.15 Finish printer installation

If this is the only printer to be used on the computer, click the Set as the default printer check box.

2.2 Create Shortcut to Device Manager on Desktop

The Windows Device manager is a useful tool in determining device installation problems. It is suggested that a shortcut to the device manager be placed on the Windows desktop. To place the shortcut, click on the Windows Start button. Select All Programs. Select Accessories. Select and Open Windows Explorer. Navigate to C:\Windows\system32 and find devmgmt.msc. Right-click on the file, select Send to -> Desktop (create shortcut). Once the file is on the Windows Desktop, right click on the Icon and select Rename. Rename this shortcut to Device Manager.

FIG: 2.2.1 Device Manager Icon and renamed Icon

Double click on the Device Manager Icon to open the Device Manager. Scroll down the list to Universal Serial Bus Controllers and click the + sign beside it to expand and see what Universal Serial Bus Devices are installed.

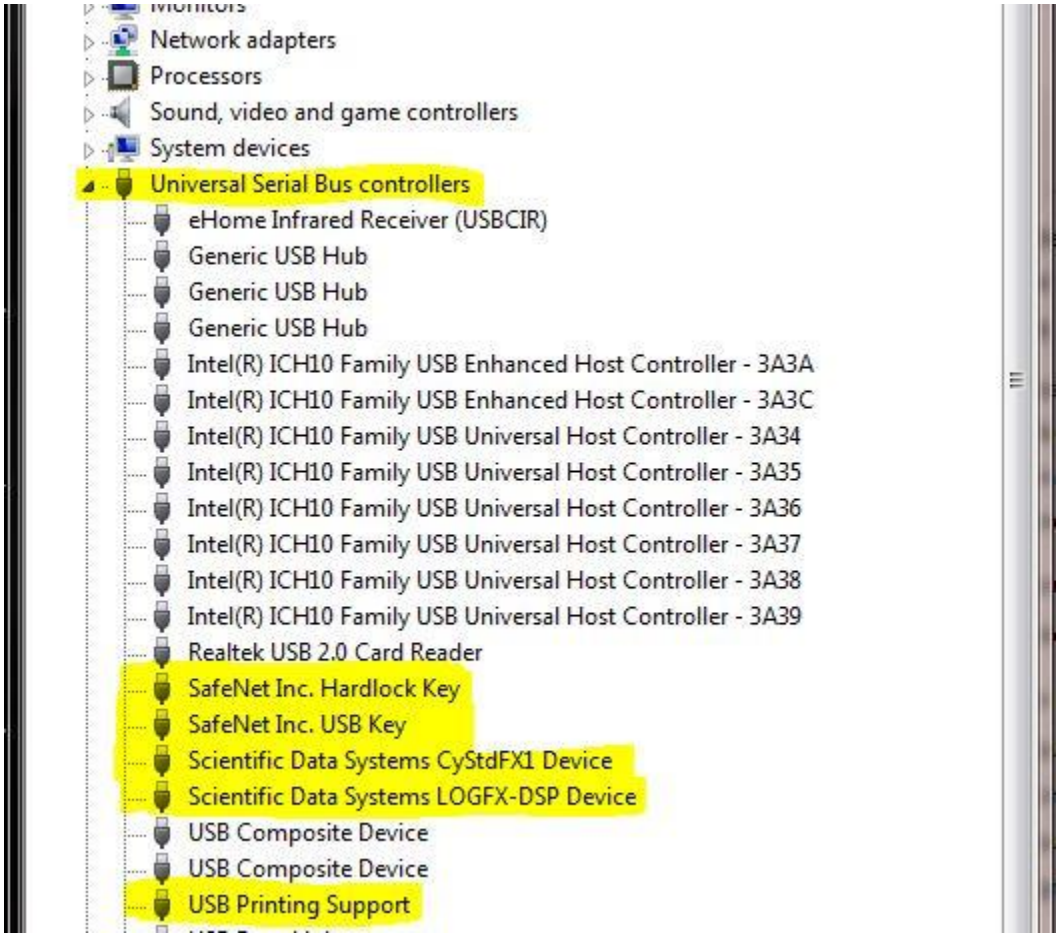


FIG: 2.2.2 Device Manager Path

Typical devices installed for Scientific Data Systems configurations include:

SafeNet Inc. Hardlock Key	Warrior software key
SafeNet Inc. USB Key	Warrior software key
Scientific Data Systems CyStdFX1	USB44 Board
Scientific Data Systems LOGFX-DSP	DSP

Other Devices that also may be seen depending upon the system and peripherals:

Scientific Data Systems CYSTD	Upgrade Panel UPUSBDAC
Scientific Data Systems CYSIM	Simulator Box
Scientific Data Systems CyShPnlFX1	Shooting Panel USBAUX
Scientific Data Systems CyAuxFX1	USBAUX
Scientific Data Systems CyPipFX1	Pulse Interface Panel

2.3 Scientific Data Systems Device Management

The Warrior software installs the Icon Scientific Data Systems Devices in the Windows Control Panel. The control panel should be viewed as Large Icons or Small Icons to be able to see the Scientific Data Systems Device Manager. Scientific Data Systems devices can be removed and reinstalled from this program. The properties window shows all Scientific Data System devices and whether the computer has installed drivers and if the devices are currently connected.

FIG: 2.3.1 Scientific Data Systems Device in the Windows Control Panel

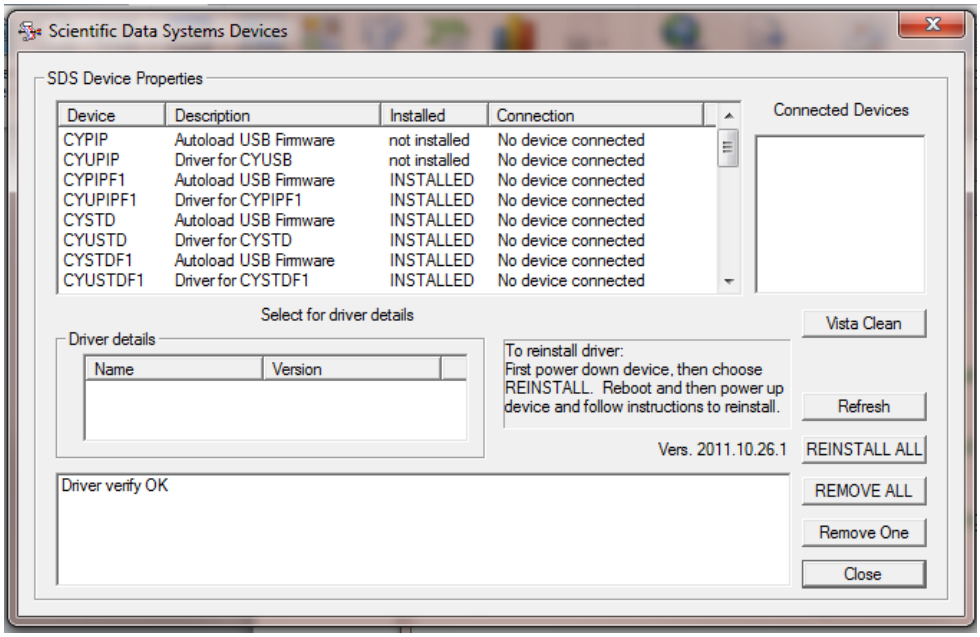


Fig. 2.3.2 Scientific Data Systems Devices

Section

3

3 Warrior Control Panel

The Control Panel sets certain global characteristics of the Warrior system. The Warrior Control Panel is started from its icon in the Warrior program group or via the Windows Program Menu. Warrior 8.0 now has several pages of information to set up system configurations. The pages of the Warrior Control Panel are General, Acquisition, Plot, Hot Keys, Licenses, and Depth/ Tension.

3.1 Control Panel - General

The General page sets many of the typical settings from the Warrior 7.0 control panel.

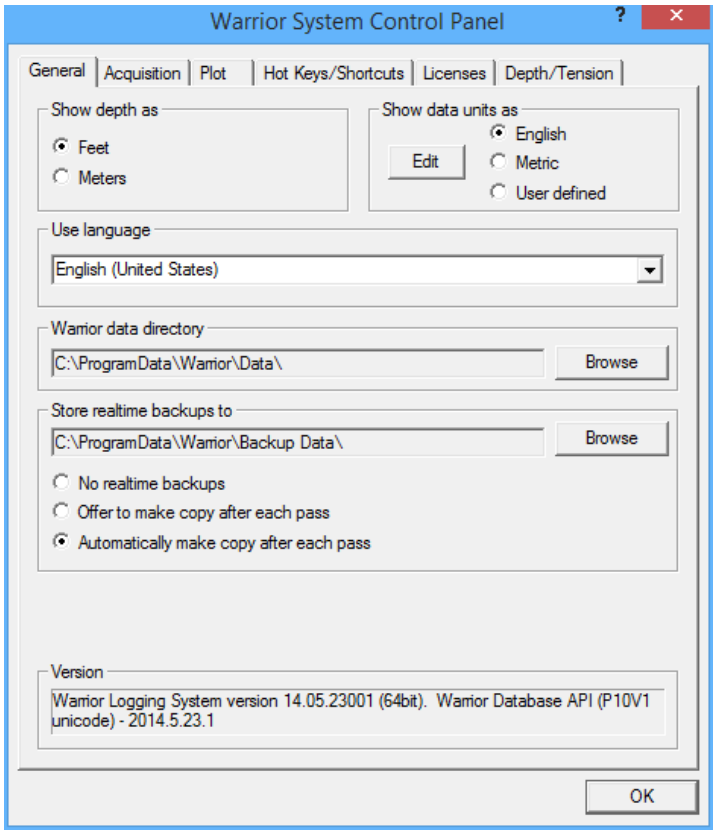


FIG: 3.0.1 Warrior Control Panel – General page

3.1.1 Show Depth as

The option buttons in the upper left set the default depth units for the system. The choices are Feet or Meters.

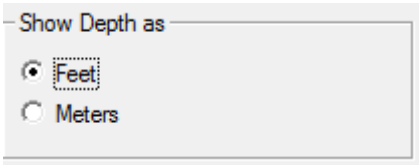
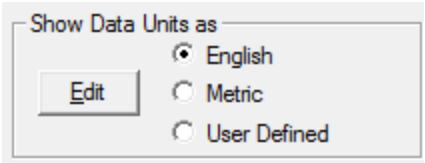


FIG: 3.1.1 Depth units

3.1.2 Show Data Units as

The “Show Data Units as” area allows the user to select one of three choices for the data units to be used.
FIG: 3.1.2 Depth units



By clicking on the [Edit] button, the user can select the actual units to be used for each of the 3 choices. Note that English units do not necessarily mean that they must be English units. This is merely a means to identify one of the three units’ choices and to use those units as the defaults during program operation.

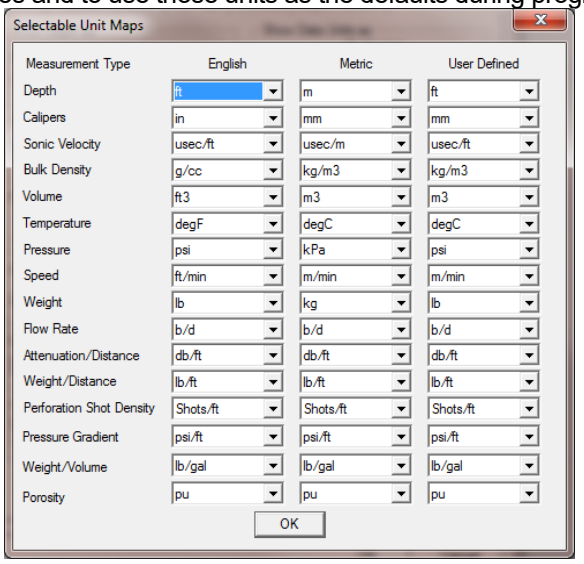


FIG: 3.1.3 Unit maps for the 3 data choices

3.1.3 Use Language

The drop down list allows the User to set the language of the user interface for the system. Several choices are expected to be available shortly.

FIG: 3.1.4 Languages

3.1.4 Warrior data directory

This item indicates the current Windows directory for the default storage of Warrior database files. To change the folder, click on the [Browse] button and navigate to an existing folder or click on [Make New Folder] to create a new folder for data storage.

It is highly recommended to use the default directory of "C:\ProgramData\Warrior\Data".

FIG: 3.1.5 Default Warrior data storage folder

3.1.5 Setting up Real Time Backup

If something should happen to corrupt the original database through a faulty merge or recalculation, copies of the original passes would still be available. While in acquisition, recording data, at the end of a log pass, the data from that pass is copied into the backup database. The User is given three options. The first is to make no backups. The next option is to give the User a prompt asking if they want to make a copy of that pass. The final option will automatically make the backup without the prompt. The User also has the option of using the [Browse] button to select the folder to be used for storing backup databases.

It is highly recommended that real time backup files be created.

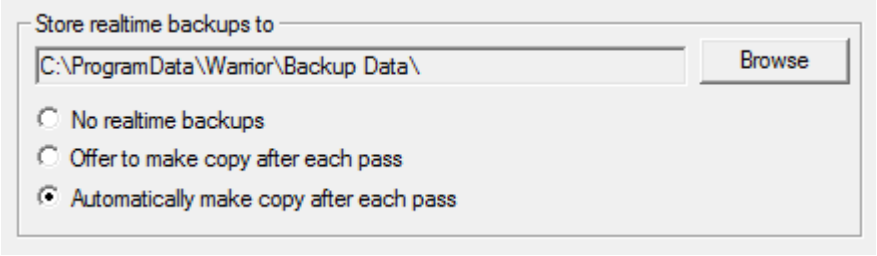


Fig. 3.1.6 Setting real time backup

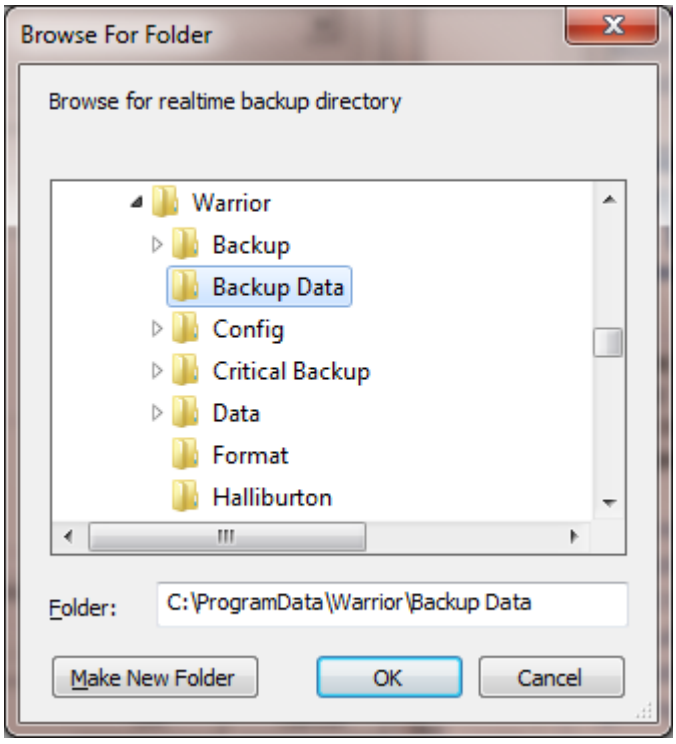


Fig. 3.1.7 Setting real time backup directory

3.1.6 Current Warrior Software Version

The currently installed Warrior Software version is shown on the bottom of the General page in the Warrior Control Panel.

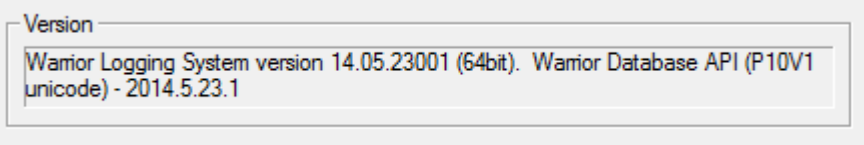


Fig. 3.1.8 Current Warrior Software version

3.2 Control Panel - Acquisition

The acquistion page of the Warrior control Panel sets up many of the general settings that are used while acquiring data.

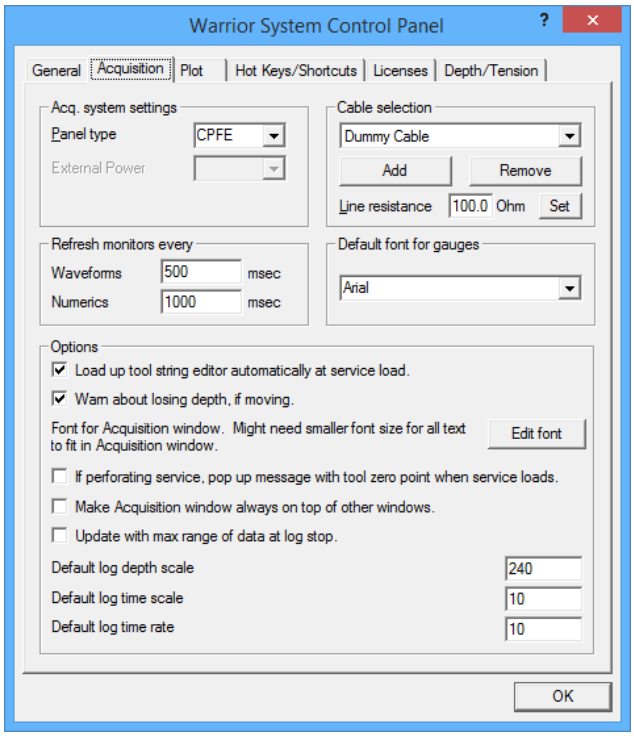


Fig. 3.2.1 Warrior Control Panel – Acquistion page

3.2.1 Acquisition system settings

The Panel Type is read from the Warrior Software key that is stored in the panel and reflects the hardware that is currently installed in the panel. This should be grayed out so that the User cannot inadvertently change the panel type. If different revisions of boards are installed in the panel, contact Scientific Data Systems for directions on how to change the panel type to reflect the board changes.

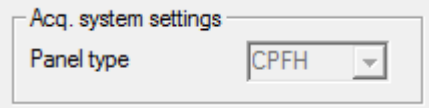


Fig. 3.2.2 Panel type setting

3.2.2 Refresh Monitor settings

The User has control over how often the Waveform windows and numeric windows such as monitoring outputs or sensors are refreshed. The default settings for refreshing windows is 1000 msec, or once per second. Be aware that while putting a lower value in for these settings will refresh the windows faster, that it will also put a lot of overhead computing power on the computer to do this and may slow down the response of the computer.

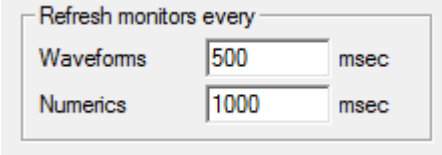


Fig. 3.2.3 Monitor Refresh settings.

3.2.3 Cable Selection Settings

The User can specify different cables to be used. This way each cable can have different settings for use as in a split drum unit or moving the computer among different units.

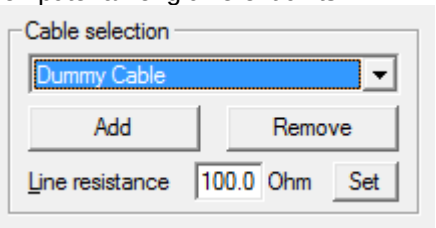


Fig. 3.2.4 Cable Selection settings.

New cables can be added to the drop down list of cable selections by clicking the [Add] button. An “Add new Cable Type” window will come up. The User can then type in any description to identify the new cable type. When the [OK] button is clicked, the new description will be added to the cable selection drop down list.

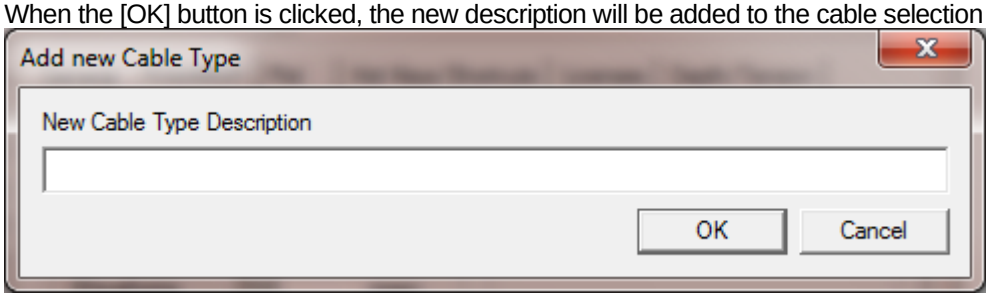


Fig. 3.2.5 Entering new cable description.

Existing cables may be removed from the drop down list by first selecting the cable to be removed and then clicking the [Remove] button. A confirmation window will come up to confirm removal of the selected cable. Each cable in the drop down list can have its own line resistance setting. To assign a line resistance to a line, select the line, enter the line resistance in ohms, and then click the [Set] button to assign that resistance to the cable selected. Line resistance is a User defined value. Most services will have HVOLTA as an output. HVOLTA is computed by taking the TCURR output (tool current) and multiplying by the Line resistance value and then subtracting this value from the TVOLT output (tool voltage) to give an apparent head voltage. Note that HVOLTA will not be accurate unless the tool voltage and tool current are properly calibrated, and the line resistance is the correct value for the line being used.
It is a given fact the the phisical characteristics of a cable can effect the shape of signals on the cable. By adding the SignalType control keyword to a service, different cables can each have different line filter settings for that service.The User would be allowed to select a cable type that would then set cetain filter setting for specific signal types. This is discussed further in Section 16

3.2.3 Default Font for Gauges

The dropdown list allows the User to select the Windows font that he would like to use for gauges in Acquisition.

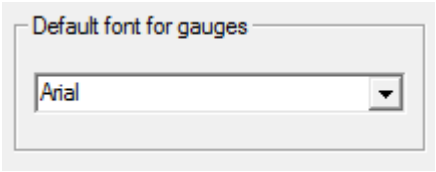


Fig. 3.2.6 Setting Font for Gauges

3.2.4 Other Acquisition Options

There are several other options that may be set from the acquisition that would affect how the Warrior software would work.

The first option is to show the tool string editor automatically when a service is selected. The tools to be included in the tool string are shown when the service is loaded into the software in the tool editor window. The tools chosen will affect what outputs are available, what the sensor offsets for each output are, what filtering is used on the outputs, and what the calibrations are used for an output.

It is highly recommended that this option be checked and the tool string editor used every time the service is started so that the User looks at the tools in the string.

If the “Warn about losing depth if moving” box is checked, the software will issue a warning if the depth is changing while a service would be loading. There is a short period of time while the software is loading that depth pulses to the panel would be missed. For the typical User in the field, this box should be checked.

The User may select the font that is used in the Acquisition window by clicking the [Edit font] button. This brings up a dialog window that allow the font, font style, and size to be selected. The selected font will then be used in the Acquistion window.

If a service has been made available for perforating in the Service Editor, then checking the “if perforating service . . “ box will have the service pop up a message with the zero point of the tool string when the service loads.

By checking the next box, the Acquisition window will always be on top even if other windows are moved over it. If the Depth window is selected to always be on top also, then it could cover the acquisition window if the depth window is moved over the acquistion window.

The update with max range of data check box changes the start and stop depth of a log pass from the encoder depths when the pass was started and stopped to the maximum output depths at the start and at the end of a log pass.

The default log depth scale is the number of feet of well log per foot of paper. The standard in the US is 240 ft of log per foot of paper or 100 foot per 5 inches.

The default log time scale is the number of seconds of log per inch of paper. The default setting of 10 will give 10 seconds of log for 1 inch of paper or 120 seconds of log per fool of paper.

The log time rate is the default for the number of data sample to be recorded to the database per second. The default rate of 10 works well in most instances.

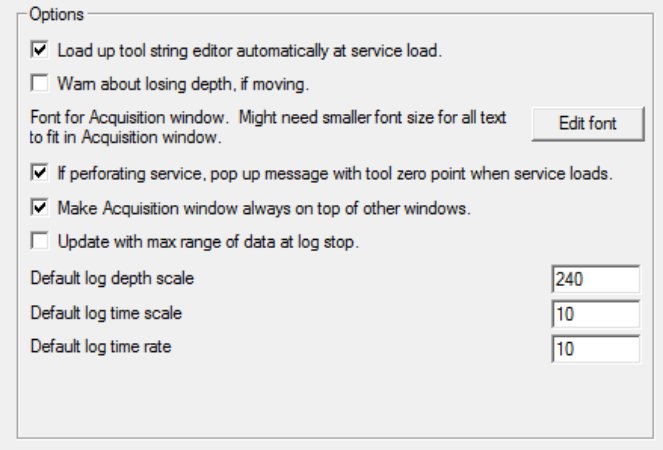


Fig. 3.2.7 Other option settings for Acquistion

3.3 Control Panel – Plot

The plot page of the Warrior Control Panel is used to setup plotters and allow the User to set up many of the parameters and functions used by Warrior software in the plotting of logs.

3.3.1 Plotting – Gridline Setup

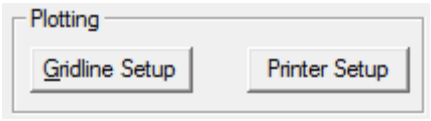


Fig. 3.3.1 Plotting Setup

The plotting of horizontal depth gridlines can be set up by adjusting the scale factors for the gridlines. If the vertical scale resolution on the plot is less than the maximum compression ratio, and the scale resolution is greater than the minimum compression ratio, than the gridline will be plotted. Separate gridline setups can be kept for English depth, Metric depth, and a time log.
In the setup shown in Fig. 3.3.2, the 50 foot depth line will be on the plot unless the scale is less than 12000 (.1”/100ft). The 10 foot depth line will plot when the scale is less than 2400 (.5”/100ft). The 2 foot depth line will only plot when the scale is less than 480 (2.5”/100ft). A 20 scale (60”/100ft) will not have two foot depth lines since they have a minimum range of 25, but it will have 1 foot depth lines since the 20 scale is less than the 1.0 foot maximum of 25.

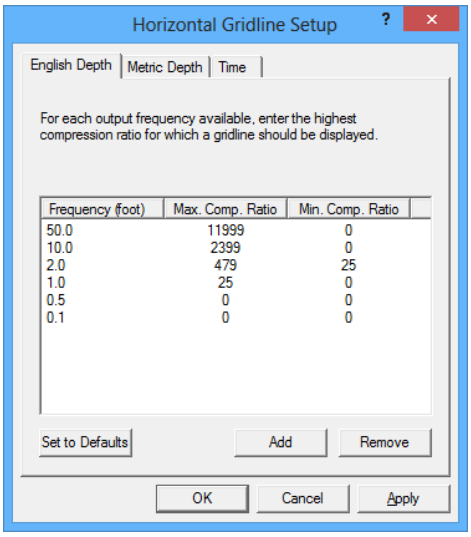


FIG: 3.3.2 Horizontal Gridline Setup

3.3.2 Plotting – Printer Setup

There are two different plotting modes that Warrior software can use to plot data. In the Direct Print mode, printer drivers contained in the Warrior Software allow real time printing while acquiring data and use only the Windows spooling function. In Windows mode, the Warrior software prints the data through the Windows installed printer drivers. **Windows mode should not be used for real time printing.**

For good quality color prints, or to print to a printer that is not in the list of supported Direct Print mode printers, select the option "Enable printing through Windows printer". If you have that option checked, then when you print from Warrior, you will see either (Direct) or (Windows) label for each printer in the list of printers to print to.

Direct to Printer

Printers supported for Direct printing by Warrior, also have Windows drivers, so when a Direct Printer is installed; the Windows driver must be installed as well for printer spooling. When selecting a printer name, as would be done during a printer selection in Windows programs, Warrior can use the port properties you set up for that printer through the standard Windows printer setup, so the port name doesn't have to be specified in two different places. When a Windows name is specified, then the Port Name doesn't need to be changed in Warrior, as it will use the same port that is set up through your standard Windows printer setup. When using Direct printing, settings, such as media type, plot speed, etc., are all controlled by Warrior software directly, not by the Windows printer driver.

Printers supported by Warrior Software for monochrome printing Direct:
Printrex 820 and 820 DL and the 840 DL/G or 843 DL/G and 920 (www.printrex.com)
ISys V8.5 or V8.5e (www.isys-group.com)

Printers supported by Warrior Software for color printing Direct:
Epson Stylus Color 900
Epson Stylus Color 1520
Epson Stylus Color 3000
Epson Stylus Color C60, C80, C82, C84
HP DesignJet 750C, 1050C
HP LaserJet 5L

In addition, PDF and image (TIFF) file can also be made directly.

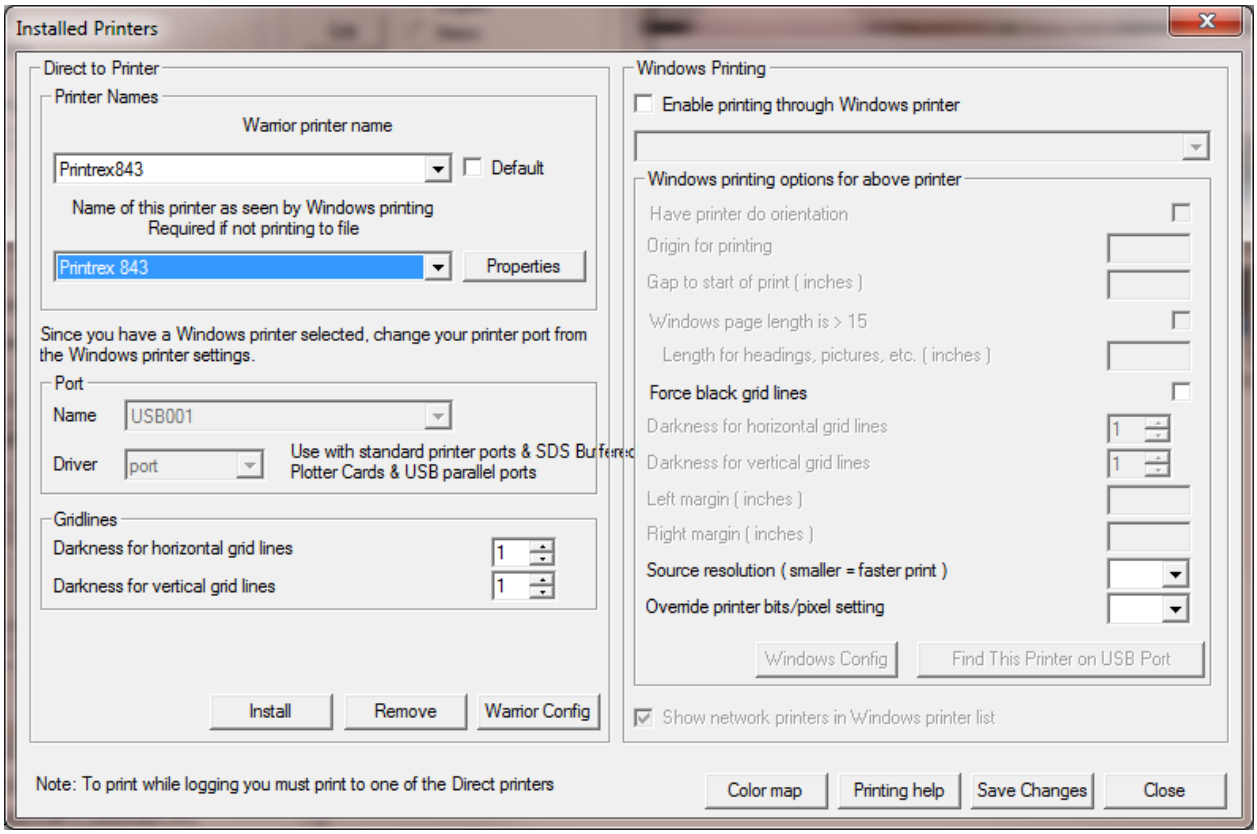


Fig. 3.3.3 Warrior Control panel Printer Setup

Printing through Windows Printing

While logging, it is possible to print to a Windows printer. However, printing hardcopy of your pass that you are currently logging is not possible do to Windows printing full pages at a time. SDS cannot guarantee that all printers will work properly for making prints from Warrior, therefore a list of tested printers that are able to make continuous prints, is available. The Windows printing options are settings that may change from one printer to the next. However, most of the settings are set by SDS, so they should not be changed. Some printers place a large gap at the start of a print, so a print gap is added during start of print, so the first fan fold can be skipped, and a distance can be added to get the <fold here> to come out in the right place.

When using Windows printing, settings, such as media type, plot speed, etc., are all controlled by the Windows printer driver.

3.3.3 Plotting – Installing a Direct Warrior Printer

From the Warrior Control Panel, click the Plot tab. From the plot sheet, click on the [Printer Setup] button. From the Installed Printers window, select the [**Install]** button at the bottom of the page for a list of printers supported by Warrior for direct printing while logging.

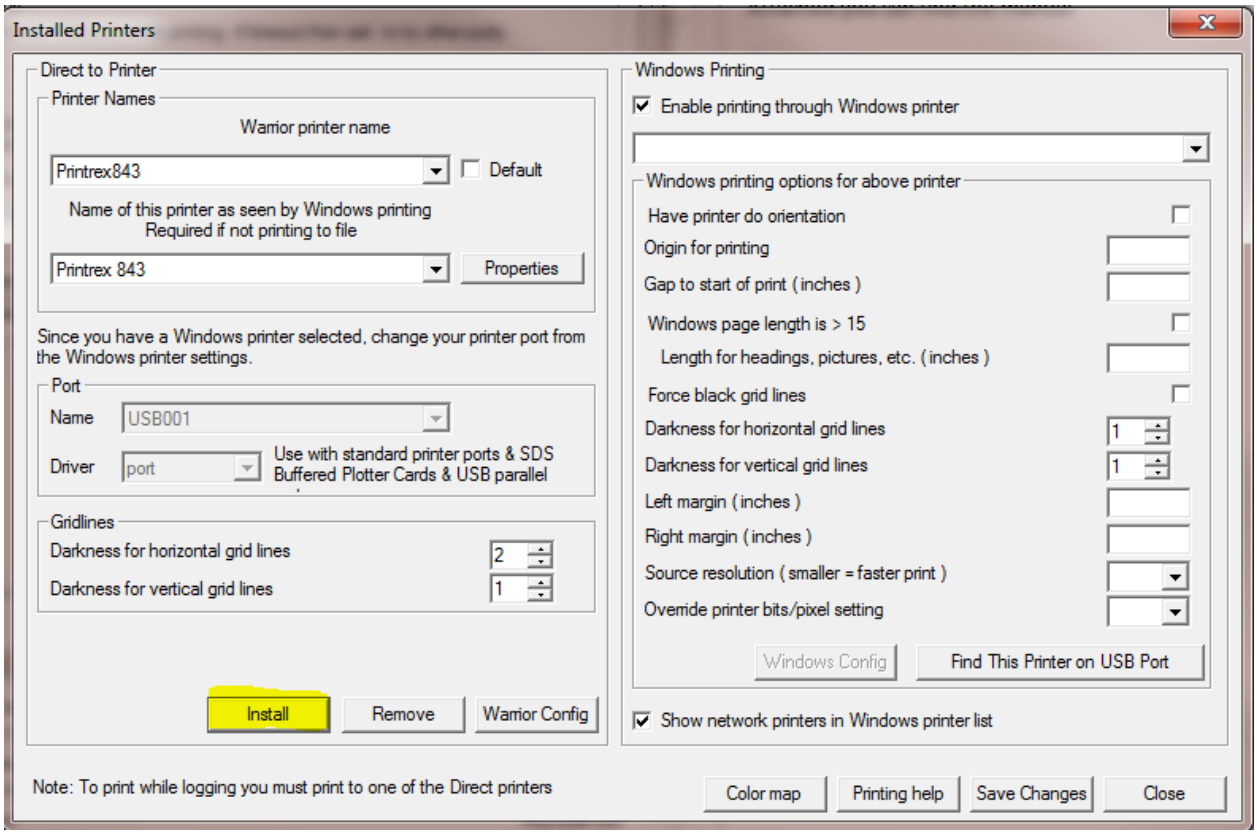


Fig. 3.3.4 Warrior Installed Printers Setup

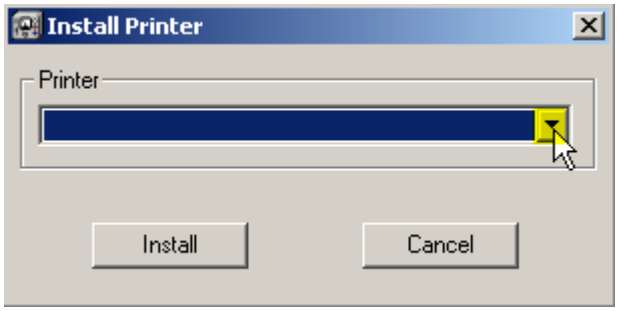


FIG: 3.3.5 Install Printer

Open the Drop- down list to view the list of printers. Note that there is a scroll bar to the side of the list to scroll up and down to view all the selectable printers.

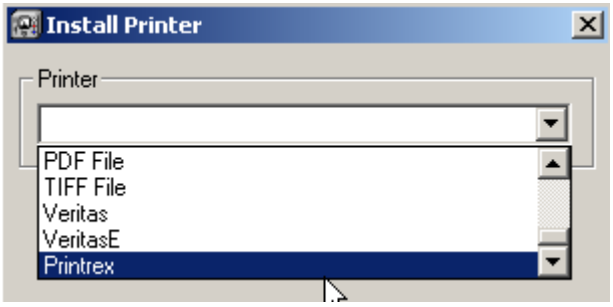


FIG: 3.3.6 Install Printer

In this example we will select Printrex for the Printrex 840 DL/G.

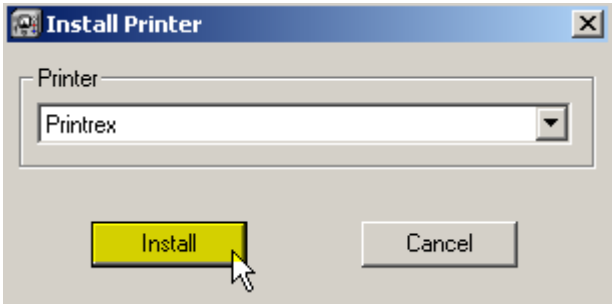


FIG: 3.3.7 Install Printer

Click the [Install] button to select the printer shown for installation.

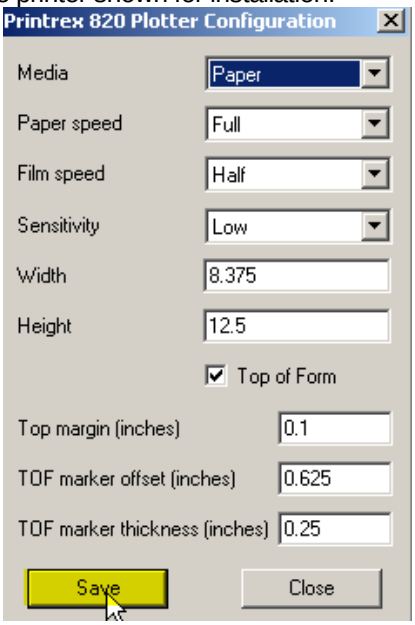


FIG: 3.3.8 Printrex 820/840 Plotter Configuration

The Plotter Configuration window for the plotter selected will now open. In this example, the Media can be paper or film. Depending upon the media selected, the plotter will run at either the paper speed or the film speed. The sensitivity setting controls the heat selection for the thermal paper or film that is installed. A low sensitivity will increase the heat setting. For fan fold printing, set the printer page height to twice the size of one fan fold page.

Some of the Windows printers may require a value to be entered for the “Gap to start of print”. Having a non-zero value will cause the printer to advance the paper that distance, so the first fan fold page may be blank in order to position the print head to the proper place.
Select [Save] to save the plotter configuration.
One physical plotter in a system can be installed under different names and each installation can then have different configuration settings and/or printer calibrations. To install multiple configurations for the same physical plotter, start the installation by clicking the [Install] on the lower portion of the screen. Find and select the plotter in the drop- down list. If that plotter name already exists in the list of installed plotters, you will be given the option of entering a new name. Click the [Rename] button to continue to the configuration window for that plotter name.

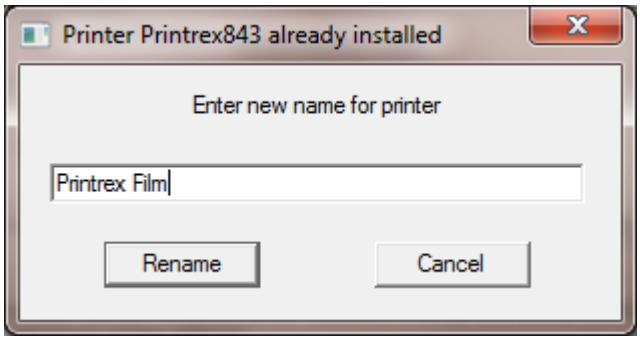


Fig. 3.3.9 Entering Second plotter name for existing plotter

Once the plotter has been selected and installed, the plotter used for windows spooling needs to be selected. This plotter must already have been installed in windows as discussed in section 2.1.

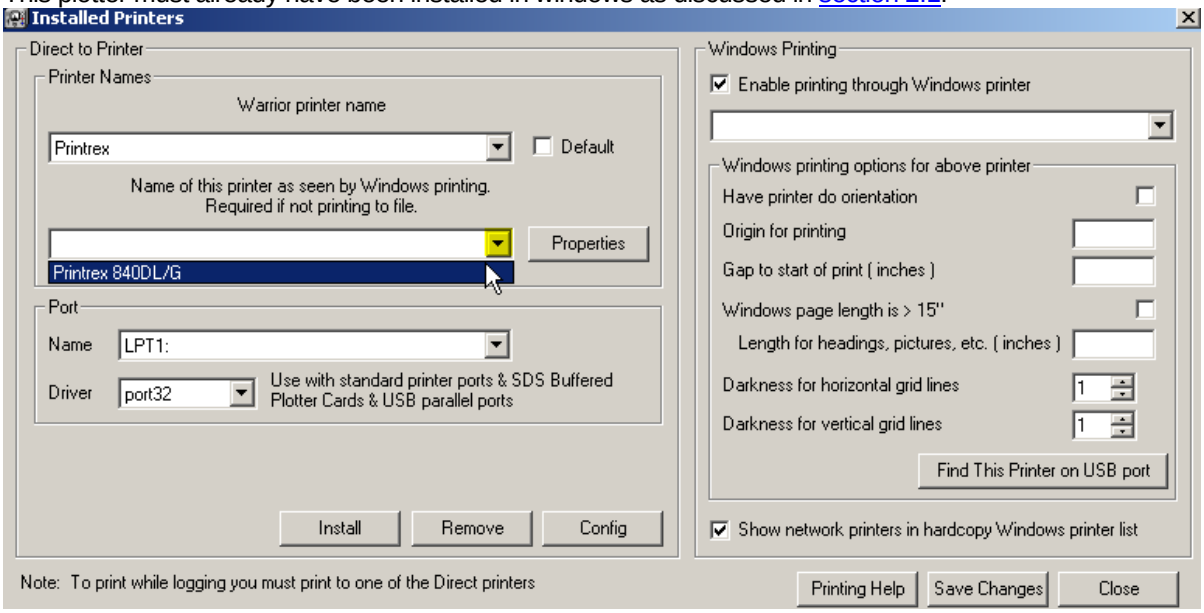


FIG: 3.3.10 Installed Printers

Select the Drop-down list for the Name of this printer as seen by Windows printers and select the Windows installed printer. If no plotter is selected, you will get the plotter may be off-line error message when you try to print from Warrior.

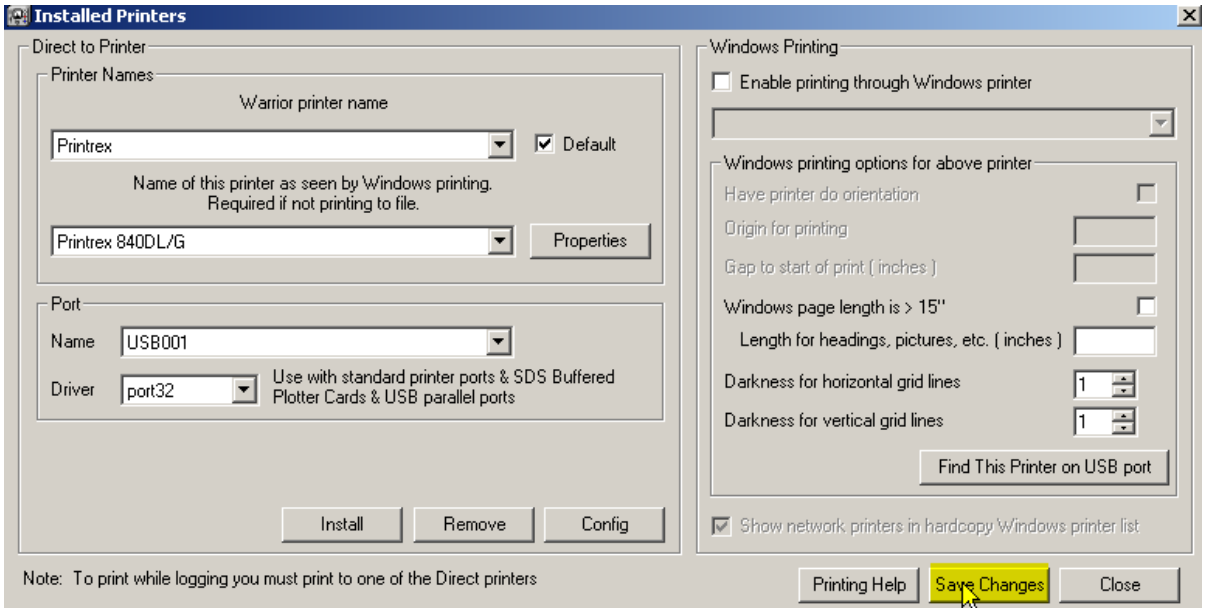


FIG: 3.3.11 Installed Printers

Select [Save Changes] to save the installed plotter and its configuration settings.

3.3.4 Printing to PDF

Warrior supports direct printing to PDF files through its own driver. Before creating a PDF output, determine what the customer intends to do with the file and configure the PDF configuration options accordingly. If it is intended only to view the PDF on the screen, then the driver should be set to Continuous Viewable Image and Color. If the customer intends to print the PDF, then it should be set to Continuous Printable Image and Color or Monochrome, depending on the printer being used. In addition, it may be important to set the page size to match the page size of the customer's printer; otherwise gaps between pages can appear. Furthermore, there is a tradeoff between file size and quality. The higher the dpi setting, the better the quality normally, but the file size is larger. Some experimentation may be required with the customer to produce optimal results. This is also true for the selected compression mode. For most situations, FLATE compression works well.

3.3.5 Printing to TIFF

Warrior also supports direct printing to TIFF files through its own driver. Again, determine what the file is intended for and configure the driver accordingly. Note that the driver supports TIFF single continuous pages of longer than 90 inches. However, many TIFF applications (including Warrior fax) do not support this, so before increasing the maximum page length make sure that the customer can read such files.

3.3.6 Windows Printing

Check “Enable printing through Windows printer.” When this box is checked, either a (Direct) or (Windows) label for each available printer is shown when printing from Warrior.
COLOR PRINTING NOTICE: You will always get better color prints printing through a Windows color printer. None of the direct color printers were designed for printing continuous log prints. Unless you require color printing while logging, we recommend you use one of the Windows printers and not use Direct printing to a color printer.
There are several settings that need to be set to achieve a quality print using Windows printers. By clicking on [Printing Help] you can read further about settings.

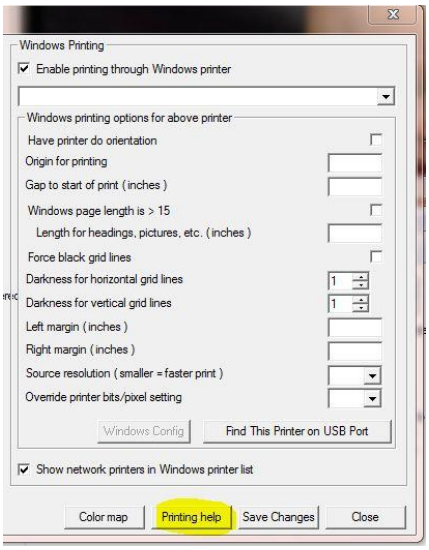


Fig. 3.3.12 Printing Help

If you click on the Supported Windows Printers, a list of printers will drop down. If you click on one of the listed printers, settings for Windows printing from Warrior will be shown. In addition, suggested settings for the Windows printer properties will be listed.

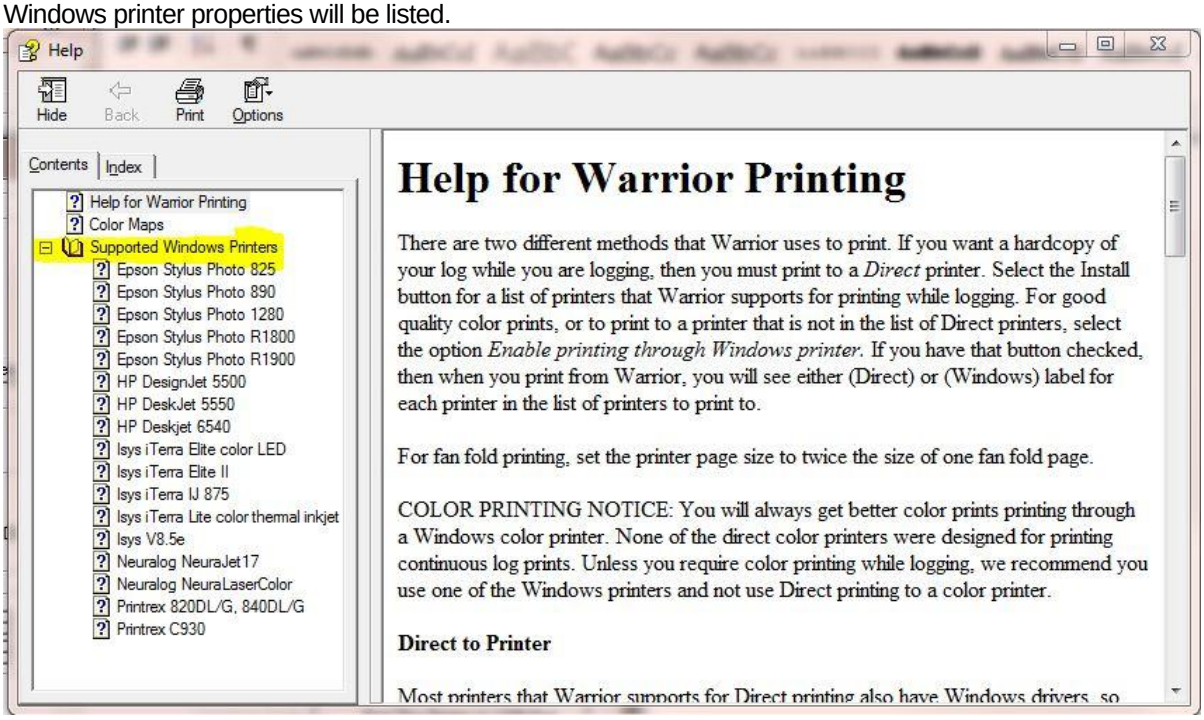


Fig. 3.3.13 Supported Windows Printers

Source Resolution: If it takes a long time to print to your Windows printer, try setting this to a lower value. The default is 1. A lower value may degrade the print quality, so test with your printer to find the optimal setting. You may be able to use a higher Windows printer resolution (600 or 720 dpi) and use a Source Resolution of 1/2 or 1/3 and still get a quality print.

3.3.7 Finding Printer

We recommend connect the Printer/Plotter in the same USB port but if you do not know which port to use, you can find the USB port where the printer is connected. This will work for printers that print only through Windows or for printers that use the Windows spooler for direct printing through Warrior.

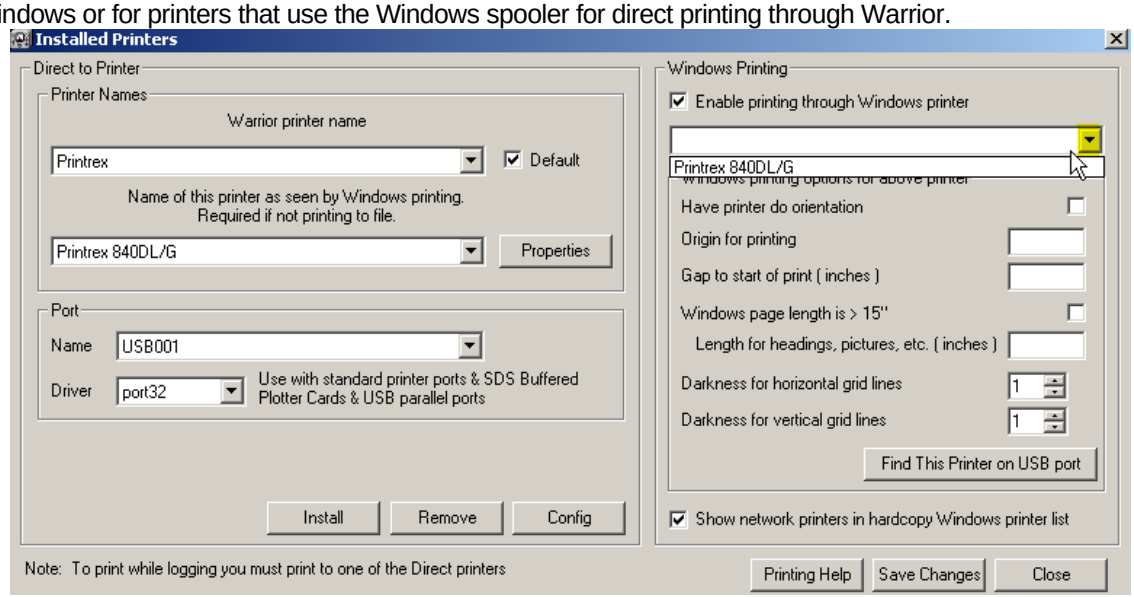


FIG: 3.3.14 Installed Printers

Select on the Drop-down the Printer that you wish to find what USB port it is attached to. In this case Printrex 840DL/G.

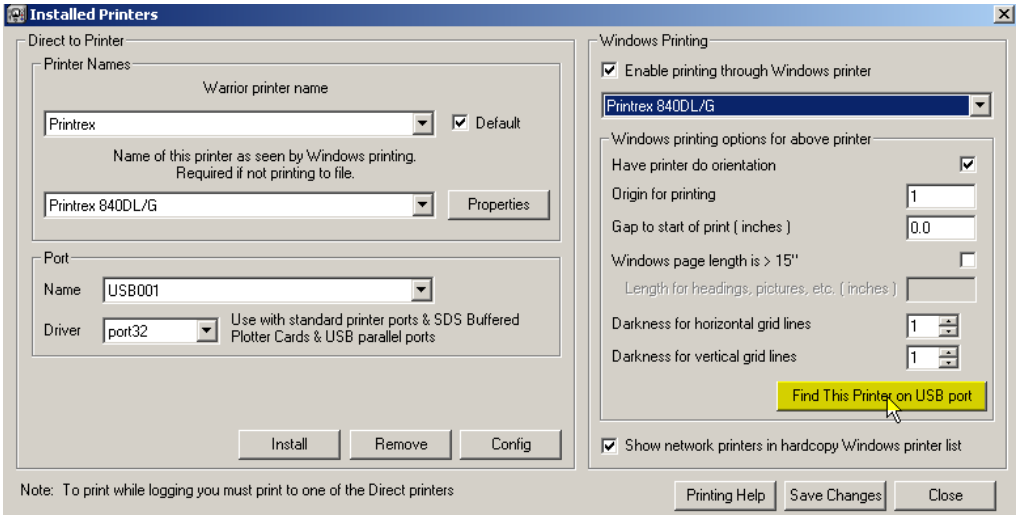


FIG: 3.3.15 Installed Printers

Click on the [Find this Printer on USB port] button. The find printer dialog box will come up. At time, it is important to disconnect any plotter that is not the plotter that you are trying to locate. A sample test page will be sent to the plotter and if the plotter is not the correct plotter being tested it may generate large amounts of wasted paper.

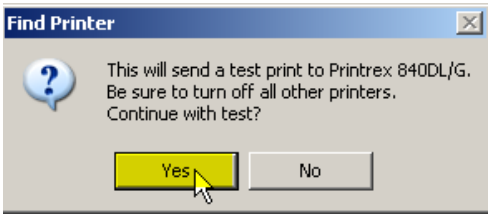


FIG: 3.3.16 Find Printer

Select [Yes] to start the test. Several USB ports may be tested before what the software thinks is the correct port is found.

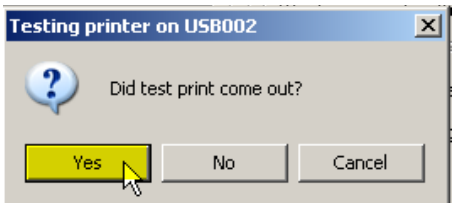


FIG: 3.3.17 Testing Printer

If the test print comes out, select [Yes]. The software will automatically set the Windows printer to the shown port. The confirmation that the printer is connected to USB002 is then shown. Select [OK] to continue.

FIG: 3.3.18 Printer Found

If you received the message shown in Fig. 3.3.7 and the test print did not come out and it did not come out after the rest of the USB ports have been tested, then it is possible that something may be wrong with that port. One common problem is that there may be prints in the print queue that are ahead of the test print. To check this, check the Windows Devices and Printers and check the status of the printer and make sure there is nothing pending.
Once the setup and configuration of the Windows printers has been completed, If Windows printers are not to be used, uncheck the Enable printing through Windows printer check box. On the left side, again select the Warrior printer name drop down list and select the default printer and the Window printer that it will use for Windows spooling. Check the Default check box to save it as the default printer when printing through Warrior.
Before leaving the Printer Setup, click the [Save Changes] button and then the [Close] button.

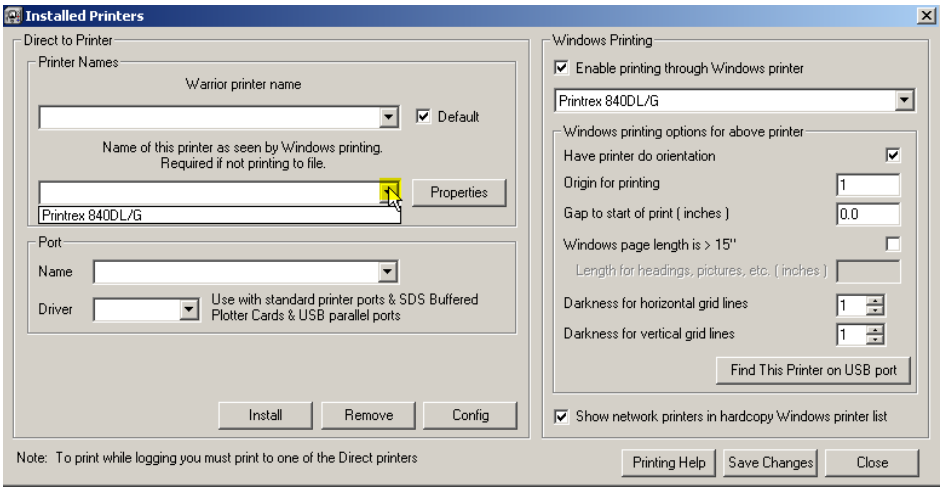


FIG: 3.3.19 Installed Printers

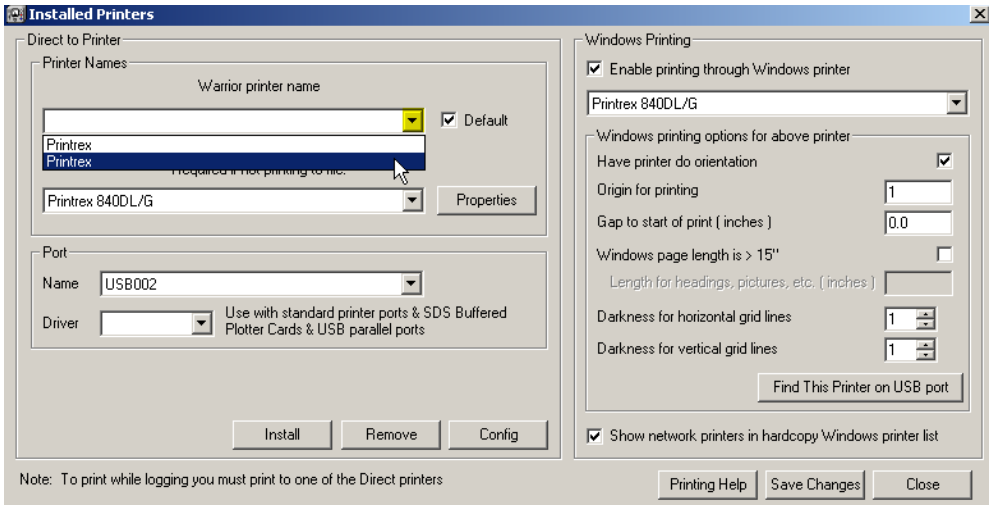


FIG: 3.3.20 Installed Printers

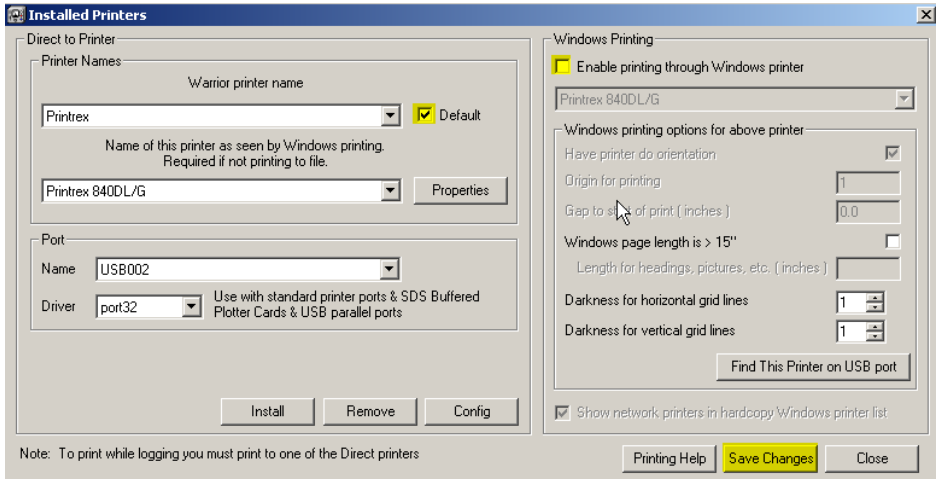


FIG: 3.3.21 Installed Printers

3.3.8 Plotting – Options

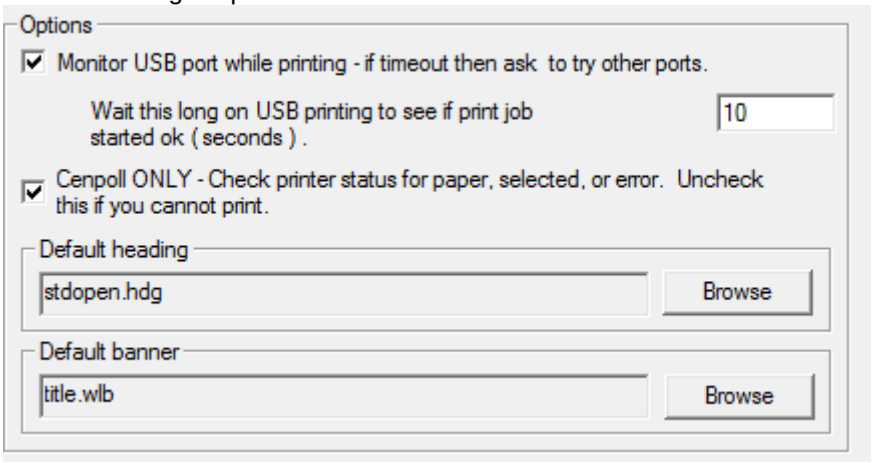


FIG: 3.3.22 Other plotting options

If the Monitor USB port while printing is checked, then if the software does not receive a response from the plotter within the time that is specified, a prompt to try other USB ports will be shown. **It is highly recommended that this box be checked.**
Some plotters that are connected to the computer via parallel port may require that the status of the plotter not be checked. This is only for specific plotters such as an older Gulton that are connected to a parallel port and not a USB port.
The default heading that is used in the Heading Editor may be selected by click the [Browse] button. All the headings in the C:\ProgramData\Warrior\Format\ folder will be shown. The User can select any heading and install it as the default by clicking the [OK] button. Similarly, the default log banner may be selected by its [Browse] button.

3.3.9 Plotting – Service Company

The text that is entered in this field will appear in LAS files as the Service Company Name.

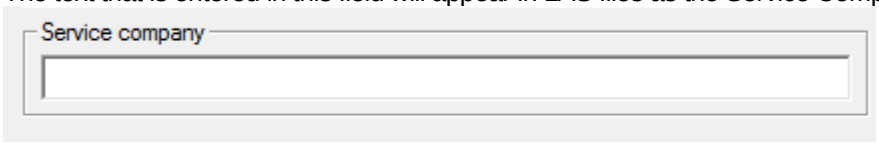


Fig. 3.3.23

3.4 Control Panel – Hot Keys / Shortcuts

This page allows the User to change the “Hot Keys” for certain Warrior functions such as using F9 to start an “Action – Record Up” from the Acquisition window. There is also an option to have the software create and place short cuts for the Warrior\Config\ folder and the current Warrior Data folder in the Favorites section of Windows Explorer.

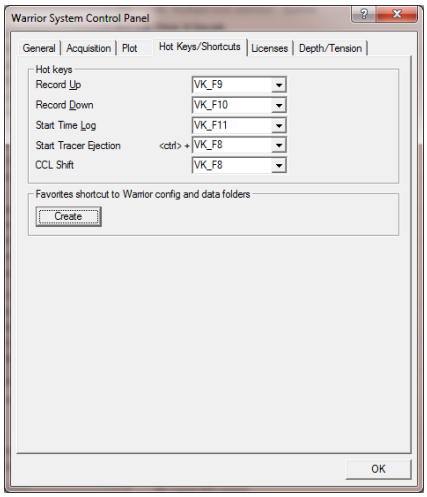


FIG: 3.4. Hot Key setup

3.5 Control Panel - Licenses

The first functionality of this section of the Warrior Control Panel is to show the key number of the Warrior Software key that is attached to the computer, either directly or through the USB hub in the interface panel. This is shown in the Key serial #: window as #Uxxxx, where the xxxx is the key. If no key is currently seen by the software, you will see “NOKEY” in the window.

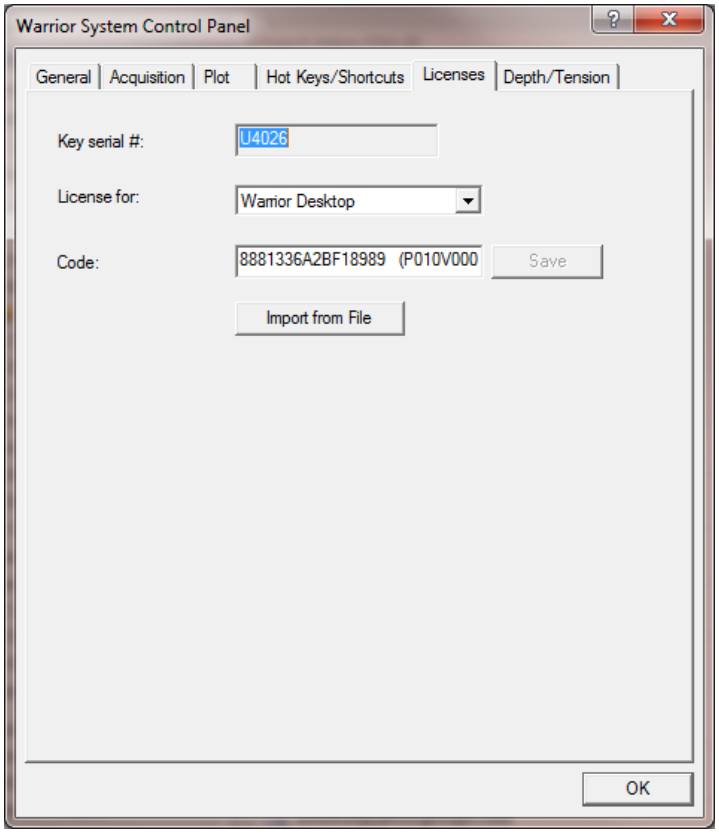


FIG: 3.5.1 Warrior Key License Codes

Unlike previous versions of Warrior Software that required a single license code, the Warrior 8 software has a different code for each of the software module types. In the “License for:” drop down list is the list of available Warrior Software licenses. When a license type has been selected, the “Code:” window will show the license code for the key serial # that is shown. If no license has been entered the code will be blank. The User has the option of hand entering the 16 digit hexadecimal code for a license and saving it, much like previous version of Warrior. Due to the number of codes that must be entered correctly for all the software permissions, the User can now import multiple codes for multiple software keys at the same time by clicking on the [Import from File] button and selecting the proper license file supplied by Scientific Data Systems.

3.6 Control Panel – Depth / Tension

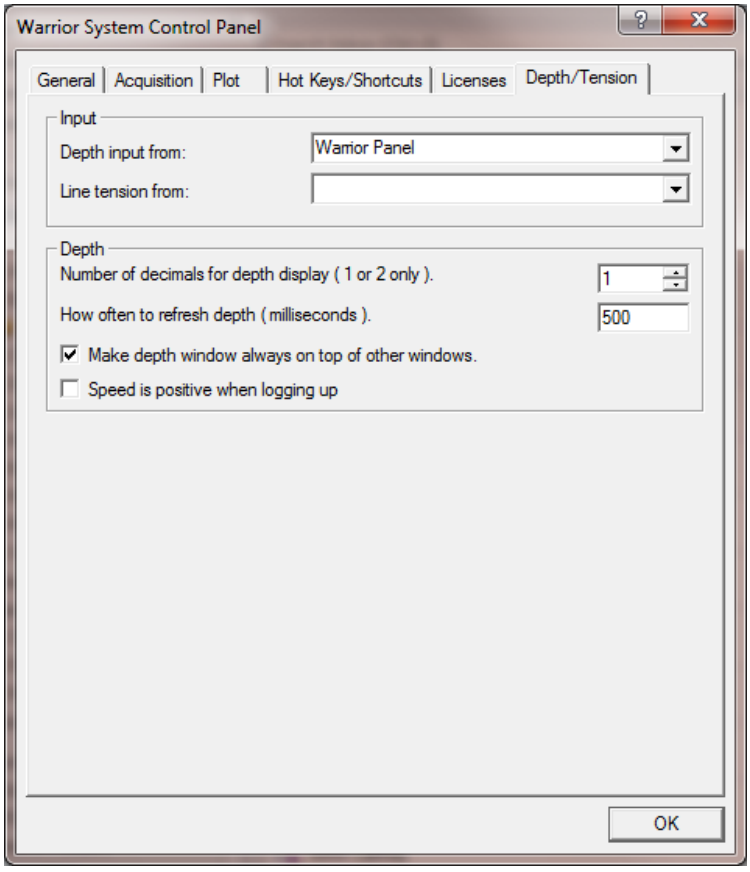


FIG: 3.6.1 Warrior Control Panel - Depth / Tension

The input section of the Depth / Tension page of the Warrior Control panel allows the User to specify the signal input used for both Depth and Tension. At the present time, depth can come from the Interface panel encoder input or from the ASEP Smart Monitor. Tension can come from the interface tension input, line load module input (AUX1 BNC), or the ASEP Smart Monitor.

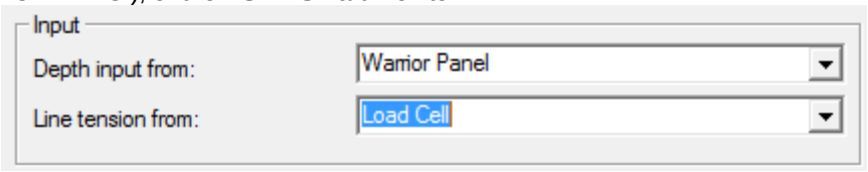


FIG: 3.6.2 Depth and Tension input selection

There are several other options for displaying the depth window. The depth may be displayed with 1 decimal point (0.0, normally used when depth is in feet), or with 2 decimal points (0.00, used when depth is in meters). The normal refresh rate of the depth window is 500 milliseconds. This can be changed by the User to be updated more or less often.
The “Make depth window always on top of other windows” check box will force the depth window to always be on top no matter what its position is.
The software normally shows speed as a negative value when logging up (depth decreasing). By checking the “Speed is positive when logging up” box, the value will be positive as depth decreases.

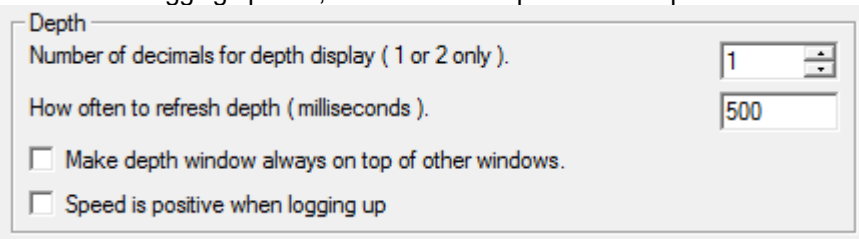


FIG: 3.6.3 Depth display options

Section

4

4 Acquisition

Acquisition is the main logging or data acquisition subset of the Warrior system. It acquires data from the hardware I/O devices, stores the raw data in the Warrior database and provides all the normal well logging functionality. When necessary, it also automatically starts other Warrior programs to perform additional functions in an integrated manner. In the Warrior System group, choose the Acquisition icon. (Double-click the icon,). Note SDS sets up the software to display a Warrior System group on the desktop. However, the program group is also available via the Start button.

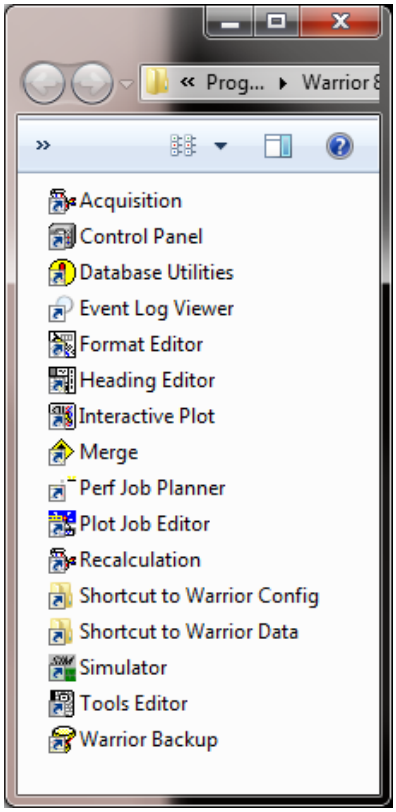


FIG: 4.1 Acquisition

Never switch off or disconnect a panel if Acquisition is running; always exit Acquisition first. Unpredictable results may occur if communication is lost with a panel during an Acquisition session.

Warrior is sensitive to USB devices being disconnected while it is running. USB devices can disconnect automatically when a computer goes into standby, so it is recommended that all standby/sleep/hibernate functions on the computer are disabled when using Warrior, not forgetting that closing the lid on laptop computers often puts them into standby as well.

4.1 Acquisition – Depth Control

When Acquisition is started, the Warrior Logging System Acquisition menu box will appear, along with the depth display. The Depth window displays the current depth and the line speed and has a **[Control]** button that causes the **Depth Control** window to be displayed.

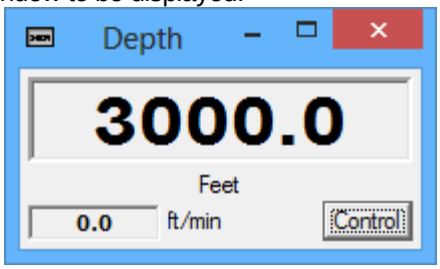


FIG: 4.2 Depth Display

Click on the **[Control]** button of the **Depth** window or hit Enter when the Depth window is active.
The **Depth Control** window appears as shown in Fig: 4.3. Enter the current depth in the **New Depth** field and click on **[Apply]** (or use the keyboard **Enter** key).

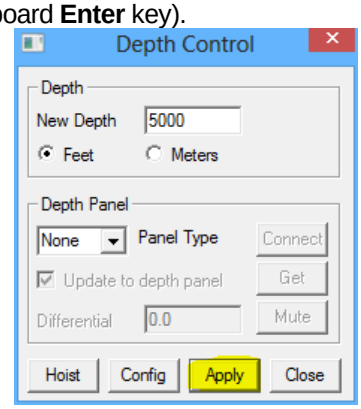


FIG: 4.3 Apply to Set Depth

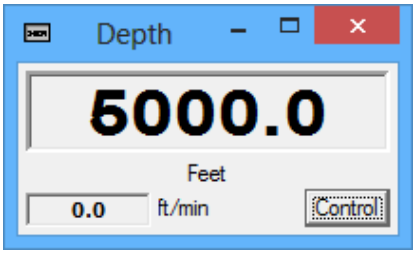


FIG: 4.4 Depth reset

The **Depth Panel** setting should normally be left at **None**; it is only used when there is a Scientific Data Systems stand-alone depth panel attached to the system. Refer to Depth Panel manual for settings. The Scientific Data Systems Depth, Tension, and Line Speed panel is connected via a **USB** port, select USB, if there is not panel available select **None** option.

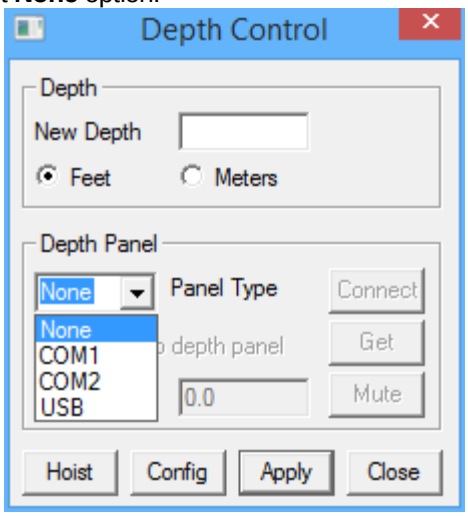


FIG: 4.5 Depth Panel Type

To configure the Depth Control, click on the **[Config]** button to access the Parameters and Alarms menu.

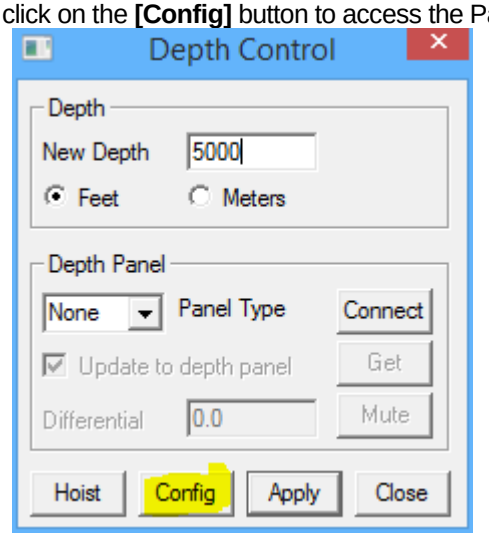


FIG: 4.6 Depth Control Configurations.

The depth control box may be displayed at any time by clicking the Control button of the depth display; however, the New Depth, Correction, Encoder Resolution and the Wheel Size parameters may not be changed while logging.
The Depth Configuration window enables configuration of the depth from an encoder input. The depth simulator that was available in previous versions of Warrior is no longer implemented since this was basically the same as a time drive log.
The measuring wheel correction, the encoder characteristics, nominal wheel size (distance per encoder revolution), encoder direction, and speed direction are entered from this dialog box.

Parameters for the Scientific Data Systems Depth, Tension, and Line Speed panel (if it installed) may also be entered or read by clicking the **[Get]** button.

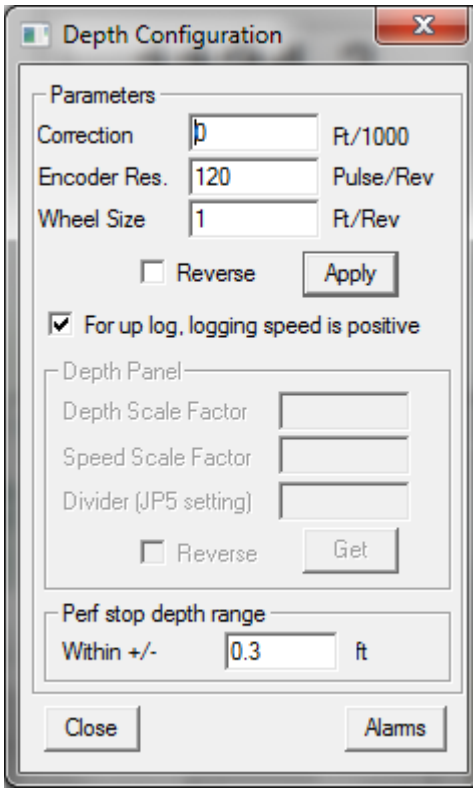


FIG: 4.7 Depth Configuration window

If the system has a Scientific Data Systems USBAUX device attached to the shooting panel, the tolerance range for enabling of firing the panel may be adjusted in the **Perf stop depth range**.
The **[Alarms**] button brings up the Warrior Alarms edit window. This allows the User to set the values, and tolerance for differential alarms, and to active the alarm by checking the On/Off box for that alarm. When the alarm is activated, the computer will normally beep through the speaker. By clicking on the three dots browse button to the right of the **Sound file name** for each alarm the User can elect to play back a .WAV file for the alarm warning. Under the **Differential Alarms** section are two depth alarms that have editable name fields. These can be used for alarms such as Packer, Seating Nipple, etc.

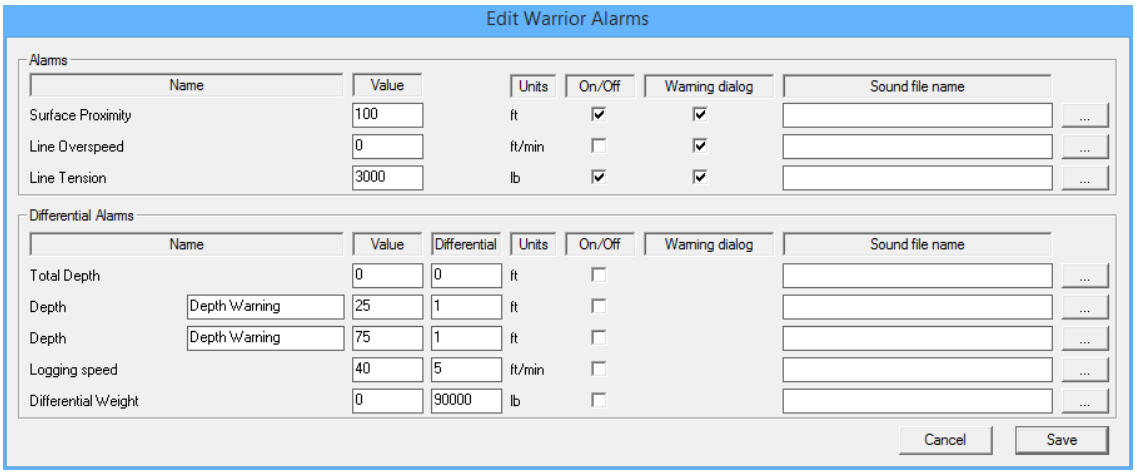


FIG: 4.8 Edit Warrior Alarms window

By clicking on the **[Hoist**] button in the **Depth Control** window, the Warrior System **Hoistman's Display** will come up. The Hoistman's Display contains depth and gauges for Depth, Line Tension, and Line Speed. The scales for each of the gauges may be individually scaled by right clicking on the gauge.

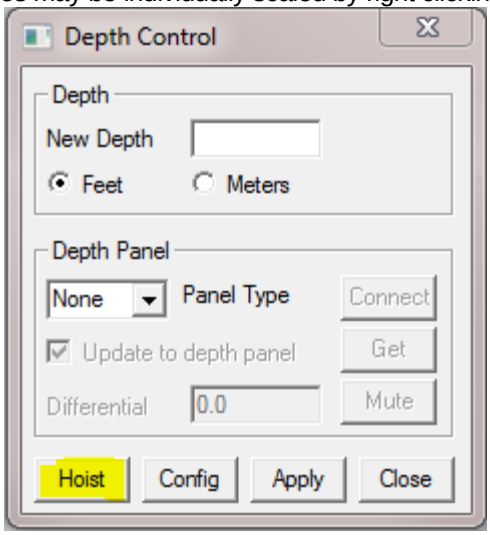


FIG: 4.9 Click [Hoist] for Hoistman's Display

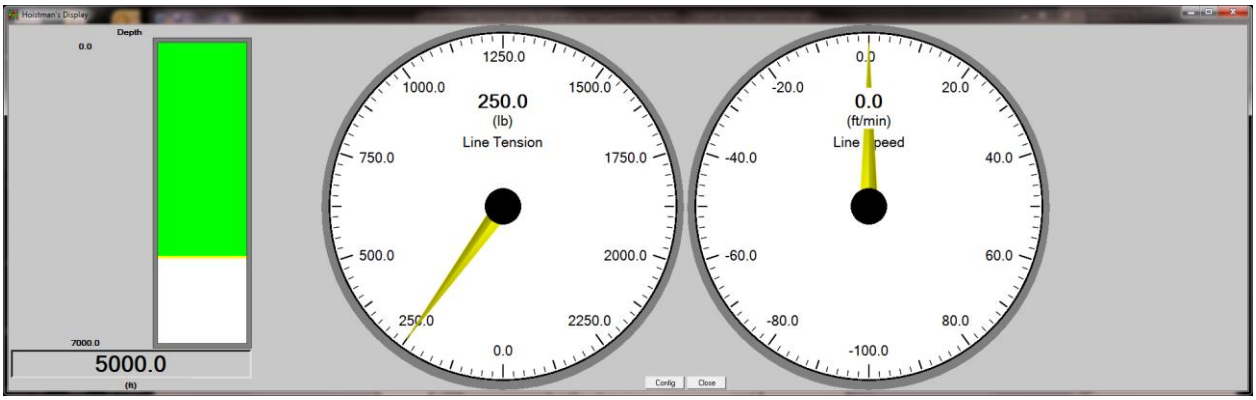


FIG: 4.10 Warrior System Hoistman's Display

4.2 Acquisition - File

The following options can be selected in File:
Select Dataset, Load variables, About, Exit, Close All.

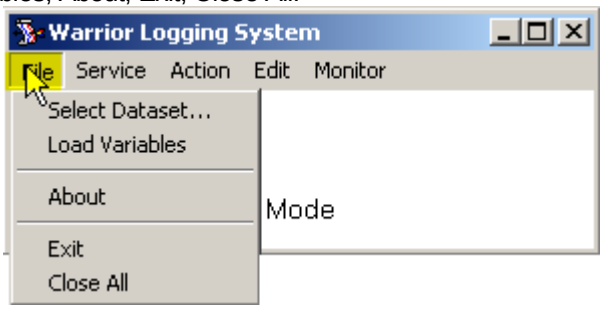


FIG: 4.11 Acquisition File Options.

4.2.1 Select Dataset

The Warrior well log database can (optionally) contain data from many wells, and within each well, data from many log passes. Each log pass is stored in a dataset. The dataset contains not only log data, but also other information about the logs, e.g. calibration and tool data.

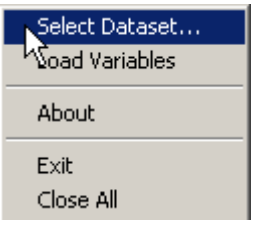


FIG: 4.12 Select Dataset.

The system requires a Windows compliant file name to be defined for the database file within which the data is to be stored. The structure of the Warrior log database allows datasets to be defined by field, well, run and pass. The user may optionally choose to insert in the various fields of the **Select Dataset** window, abbreviations of the actual field and well names. The run number and pass may also be entered, or they may be used to identify some other features of the dataset.
As an example, when running production logging, multiple passes are normally made, and can be difficult to identify later, if the dataset definition is left with the default entries. Another approach is to use the run field to identify the tool being run, e.g. field/well/temperature/pass1. The pass number will automatically increment every time a log is started.
If desired, modify the remaining fields to reflect the actual well and log information.
Click on OK or hit ENTER.

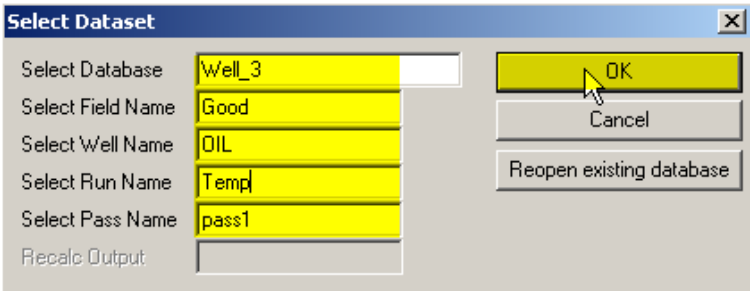


FIG: 4.13 Select Dataset

Enter a compliant file name in the Select Database field
If desired, modify the remaining fields to reflect the actual well and log information.
Click on **OK** or hit **ENTER**.

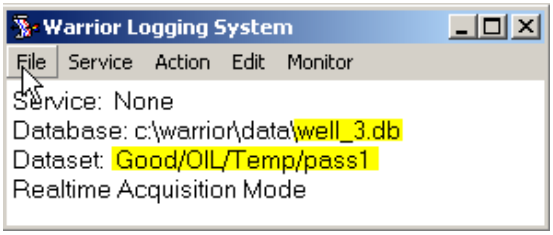


FIG: 4.14 Dataset Values

The file names may contain only the following characters:

Warning!

Numbers (0,1-9)
Letters (A-Z, a-z)
Blank (Theoretically you can have spaces)
ASCII characters greater than 127

Lengths of the file names are limited to 255 characters (260 for full paths).
Special characters are not allowed: $ % ' @ ~ ` ! ( ) ^ & + , ; = [ ]

The user may choose to store all data from a field in one file, or only the data from one log pass, or any intermediate level depending on the requirements. The usual procedure is to store all the data from one job in one file. In this way it is simple to back up the data to another directory before leaving the well site.
Data may be merged into a single log file, or split into several files using the Merge program, to be described elsewhere.

4.2.2 Load variables

This option allows you to load Zoned Variables from previous database passes. This is particularly useful when repeating runs but creating a new database. Load Variables from the other Dataset, enabling depth dependent parameters associated with the selected service to be zoned and values to be set.

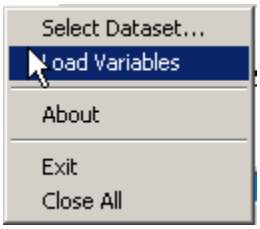


FIG: 4.15 Load Variables

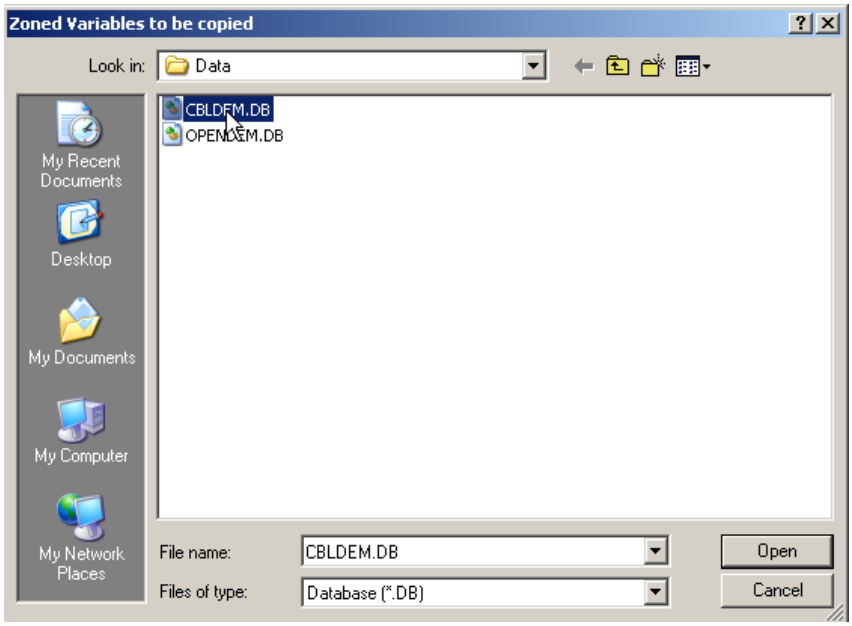


FIG: 4.16 Load Dataset Values

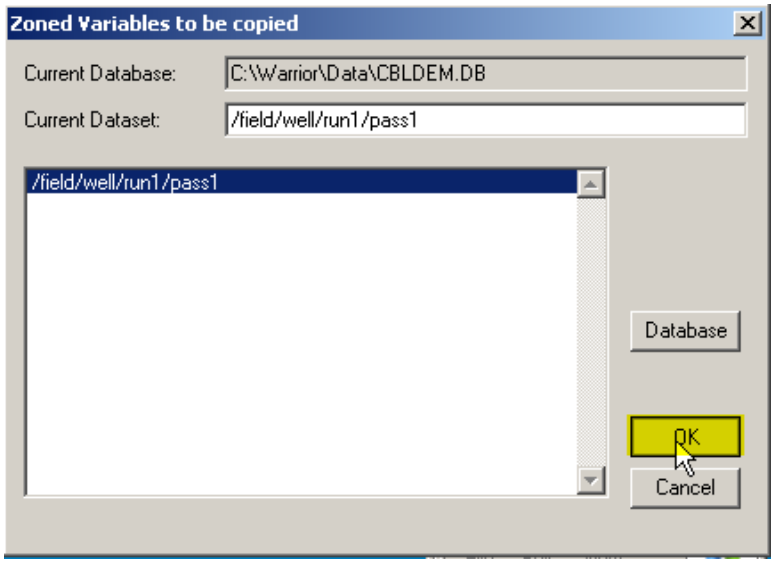


FIG: 4.17 Dataset Values run1/pass1

4.2.3 About

Shows the Software version installed in your computer

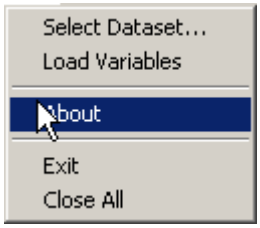


FIG: 4.18 Select About

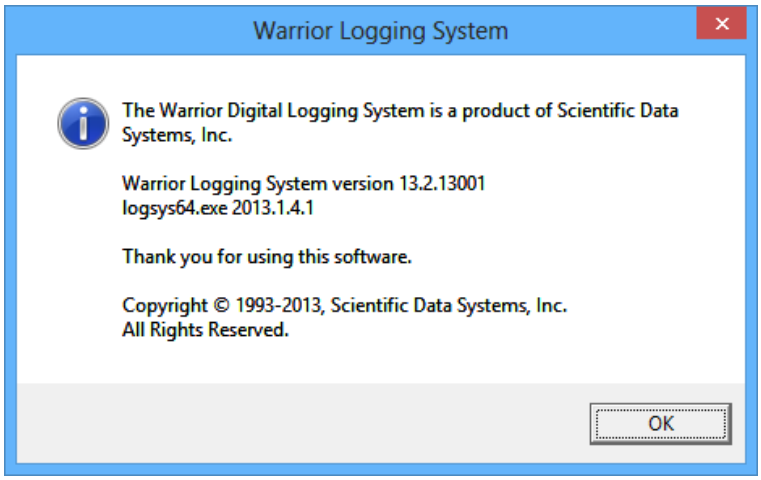


FIG: 4.19 Show the Version Warrior Software

4.2.4 Exit

Closes the program in the standard Windows manner. Exit the acquisition window.

4.2.5 Close All

Closes all windows that have been opened in a Warrior Acquisition session.

4.3 Acquisition - Service

In the Warrior acquisition window click on **Service** and select the desired service from the drop down box. The services can be customized using '**Edit Logging Service Details**', in Warrior Utilities.
None is typically the service that is loaded by default when the Acquisition module starts. Usually the None Service contains no tools (except the tool STD that is a standard "tool" that should be included in every service). It will display depth, and you can monitor line tension and speed.

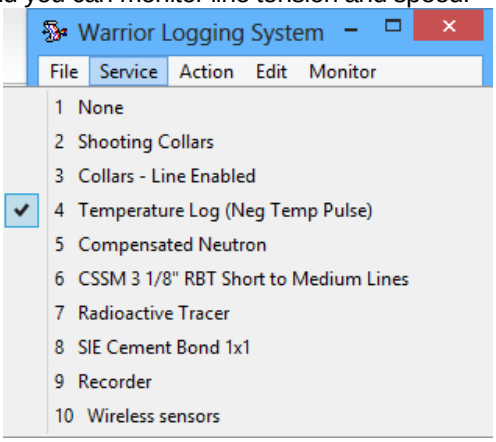


FIG: 4.3.1 Select Service

When any other service is selected by clicking on it, the tool string editor will appear. The importance of examining the tool string for the correct serial number and placement for each tool cannot be emphasized enough. Length, and sensor offsets will be calculated and calibrations for the selected tool serial numbers will be loaded. If the tool string is not correct than sensor offsets will not be correct. If the correct serial number is not selected, then the calibrations for the desired tool will not be used. The tool string editor will be discussed in further detail in the Acquisition -> Edit -> Tool String section

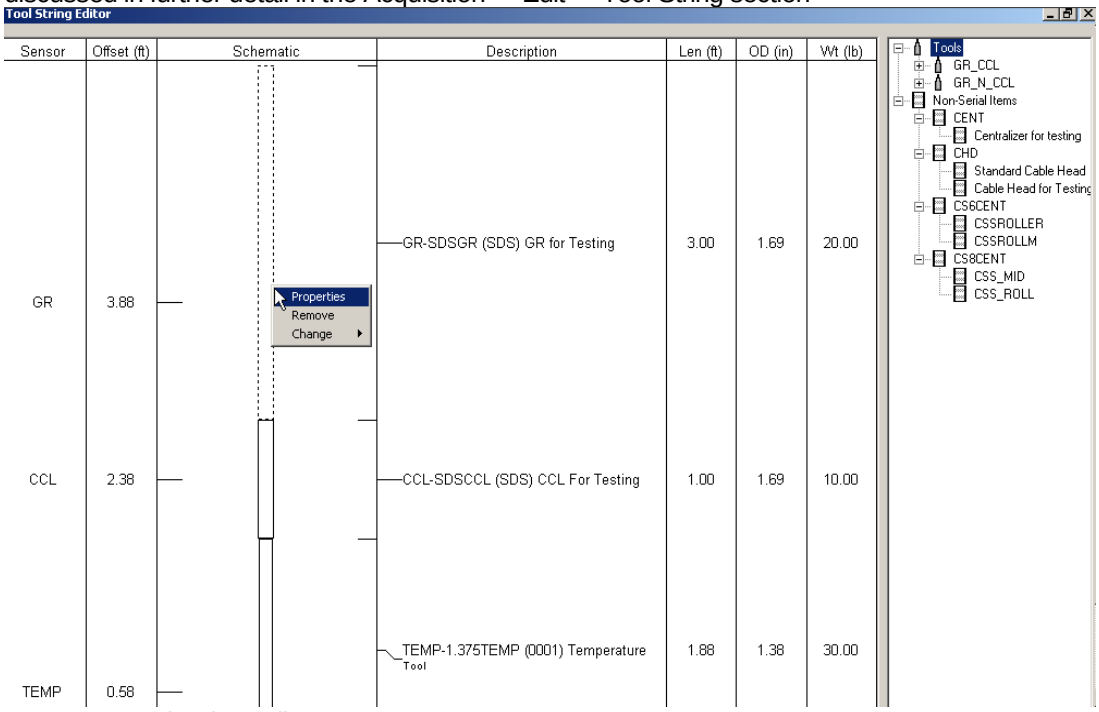


FIG: 4.3.2 Tool String Editor

After the service has been loaded, the selected service or service title will be listed on the service line in the acquisition window.

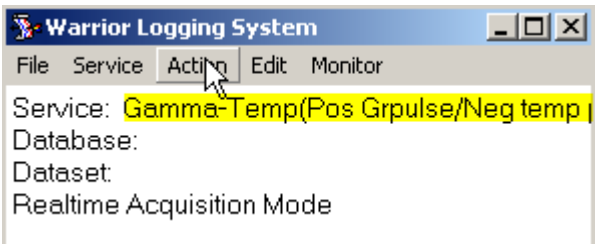


FIG: 4.3.2 Warrior Logging System

4.4 Acquisition - Action

FIG: 4.4.1 Acquisition – Action - Power Control

4.4.1 Power Control

Select Power Control from the **Action** menu. The Power Control window appears as shown below.
Select the **Enable** box.
Note: Tool voltage and tool current must be calibrated.

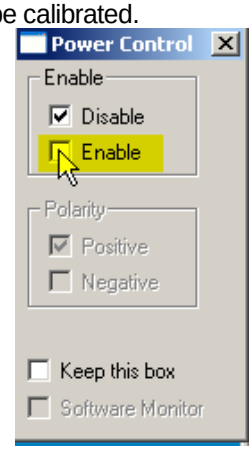


FIG: 4.4.2 Power Control

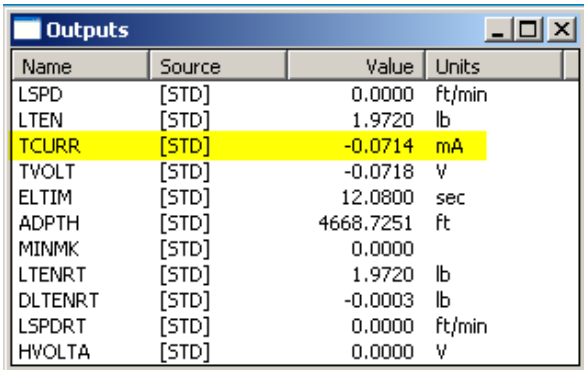


FIG: 4.4.3 TCURR Outputs

When the Tool Current (TCURR) is less of 10 mA for a Time period more than 10 seconds, the tool power supply relay is set to the power **disabled** position.
The Tool Current Open set point value (10mA) is set in wproperties.ini along with several other default values. These values can be controlled in each individual service by adding controls in the Service Editor.

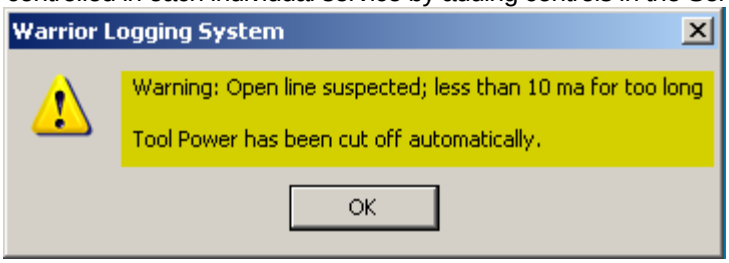


FIG: 4.4.4 Open Line Warning

The Service Editor allows the User to adjust many of these power control values in each specific service. This is done by adding a Control through a Control Key Word and a value.

NoMonitor= True to completely disable power monitoring)
External= True will allow monitoring (if TVOLT and/or TCURR are measured), but only pop-up message; no cutoff
SoftPowerControl=No. If Yes, then the power control slider bars will be enabled in the service

Numeric entries:
OverCurrent= Maximum allowable TCURR milliamps, 0 = disable over current monitoring.
OverVoltage= Maximum allowable TVOLT volts, 0 = disable over voltage monitoring.
OverDissipation= Maximum allowable TVOLT/TCURR watts, 0 = disable over dissipation monitoring.
ShortVoltage= Minimum TVOLT volts that must be reached before the ShortCurrent value exceeds it set limit.
ShortCurrent= Maximum TCURR milliamps for short-circuit detection before ShortVoltage is reached. 0 = disable short monitoring
OpenCurrent= Minimum TCURR milliamps, 0=disable OpenCurrent monitoring.
OpenTime= Maximum time interval for open-line detection, either 0 = disable OpenCurrent monitoring defaulted to 10 milliamp and 15 seconds.

Text entries:
ActionOnTrip= 'None' will cause the system to do nothing when a power "error" is detected. 'Cut off' will cause the system to disable power with no message. 'Warn' will provide the User with a message that there has been a power "error. 'Cut off and warn' will disable tool power and provide the User with a message why the power was disabled.

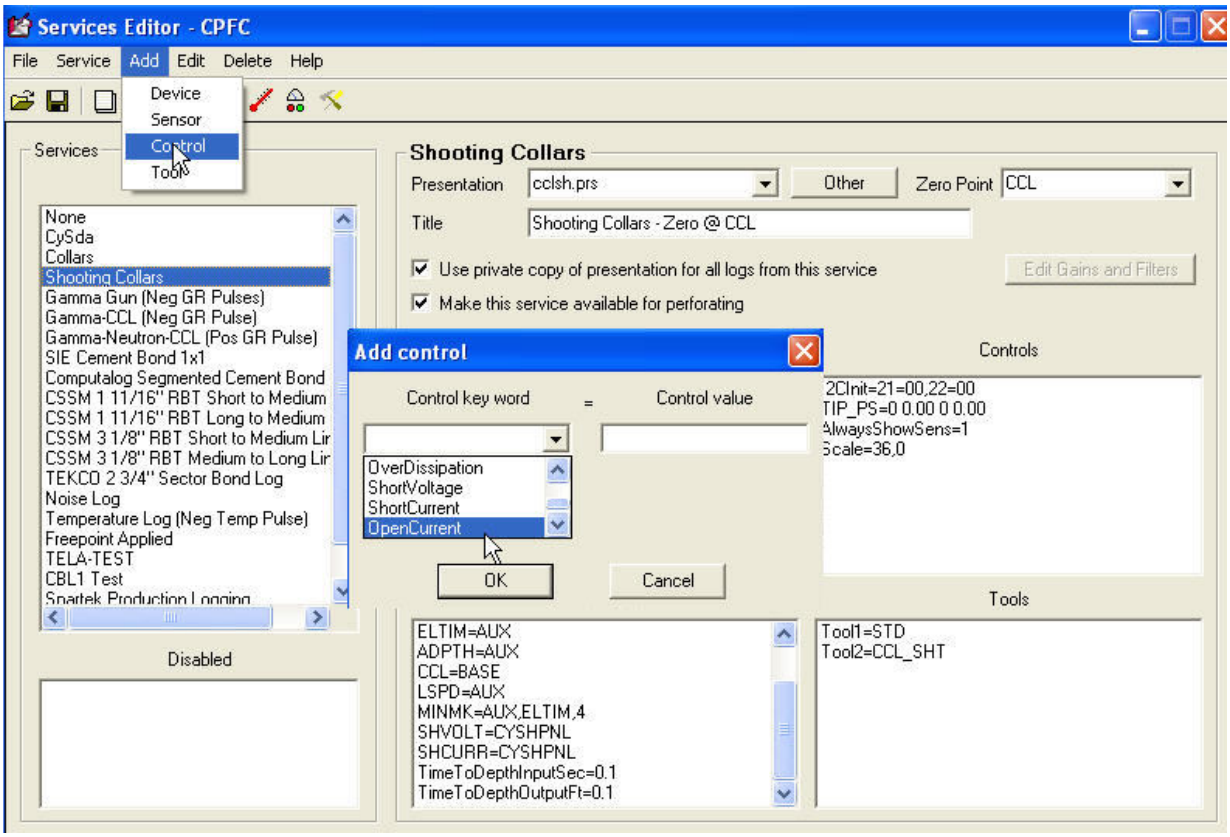


FIG: 4.4.5 Add Controls

FIG: 4.4.6 Power Control

When the Warrior system is invoked or the service is changed, the tool power supply relay is set to the power **disabled** position. Clicking the **Enable** button sets the relay to the enabled position and allows tool power to be applied to the wireline. Clicking **Disable** disconnects the power supply from the line and connects the line input to chassis ground.

The user may choose to have the Power Control box remain open whenever an action is taken by selecting **Keep this box**. Otherwise the box will close when any action is taken.
In order to Enable the software Power Control, go to Services Editor, select the service, ADD control, select SoftPowerControl , and Save .

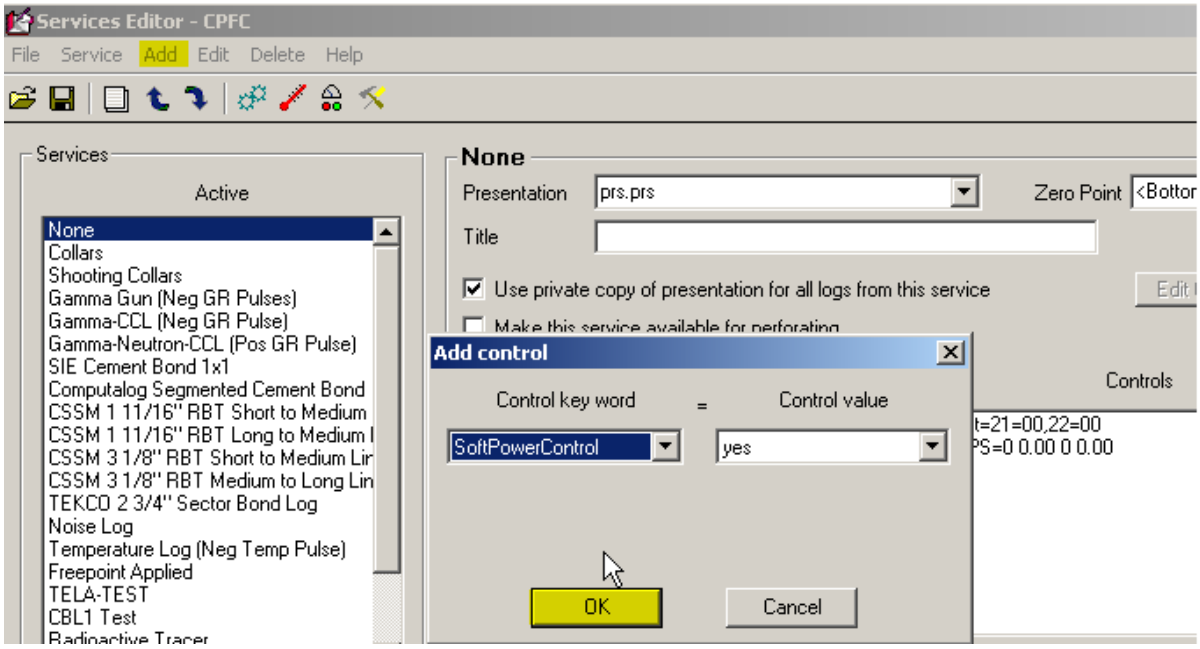


FIG: 4.4.7 Services Editor

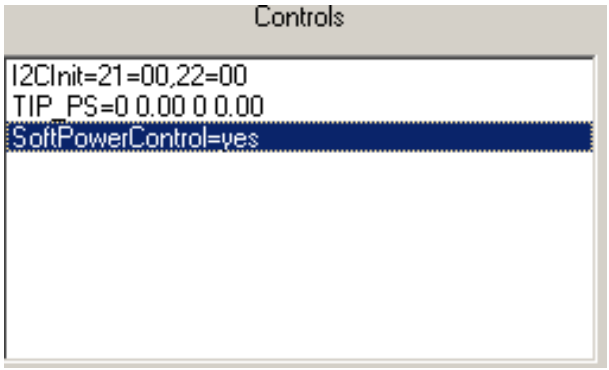


FIG: 4.4.8 Controls

The Acquisition software module monitors the output current and voltage, and the power dissipation within the tool power supply. It checks for over voltage, over current, excessive power dissipation and short circuit conditions. If any fault condition is detected the power supply will be disconnected from the line and a warning message displayed.

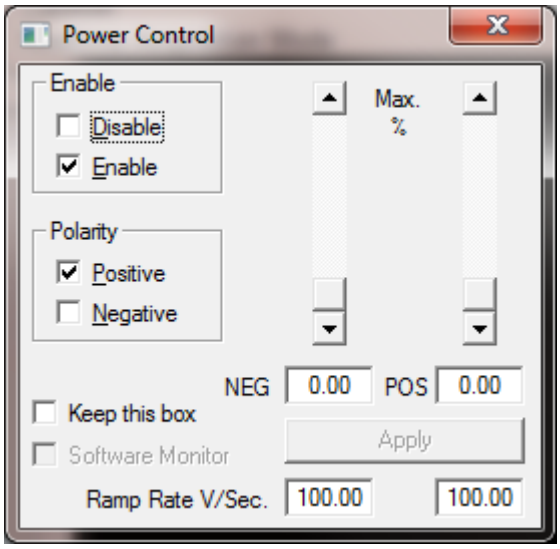


FIG: 4.4.9 Line Enable

The **Polarity** section of the window controls the polarity of the line voltage with respect to ground. Clicking the appropriate button, causing the polarity relay to switch, may change the polarity. In order to switch the polarity of the power supply from the Power Control window the Interface Panel Polarity Switch must be in the **Auto** position.
The line power can also be controlled from Power Control window. Entering a percentage of the line power into the relevant textbox and clicking on the **Apply** button can adjust the level.
You can also use the scroll bars as an alternative.
For a few tools, the line power needs to be ramped up gradually before reaching its maximum. You can enter a **Ramp Rate** in Volts per second in the textbox provided to protect these tools. The ramp rate must be a non-zero value for the soft power controls to function.

4.4.2 Caliper Control
This function is for Open Hole tools to Open and Close the Caliper.

4.4.3 Relay Control
The relay control is for opened Hole tools to switch the down tool from log mode to Calibration Mode or reference Mode.

4.4.4 Calibrate
Invokes calibration procedures for tools in the service.
Note that in order to record a post survey calibration a log pass must be generated after performing the calibration. In order to include the post survey calibration in the Plot Job this log pass must be selected when selecting the post survey calibration.

4.4.5 Verify
Invokes verification procedures for various tools in the service.
Note that in order to record post survey verification a log pass must be generated after performing the verification. In order to include the post survey verification in the Plot Job this log pass must be selected when selecting the post survey verification.

4.4.6 Plot Cal Report
Allow you to print out all the calibrations information for all the tools in the current string.
Print out the calibration report at the end of the Log.

4.4.7 Record Up

The plot may be paused by using the **Pause** button and terminated by reselecting **Unpause**. The plot may be paused at any time and the scroll bar, used to move back through the log to any zone of interest. When moving the scroll bar, the actual log depth, corresponding to the scroll bar position, is indicated in a box in the center of the log plot window. A popup window opens by right clicking on the plot, displaying all the curve's values (Log readings) at the mouse position.

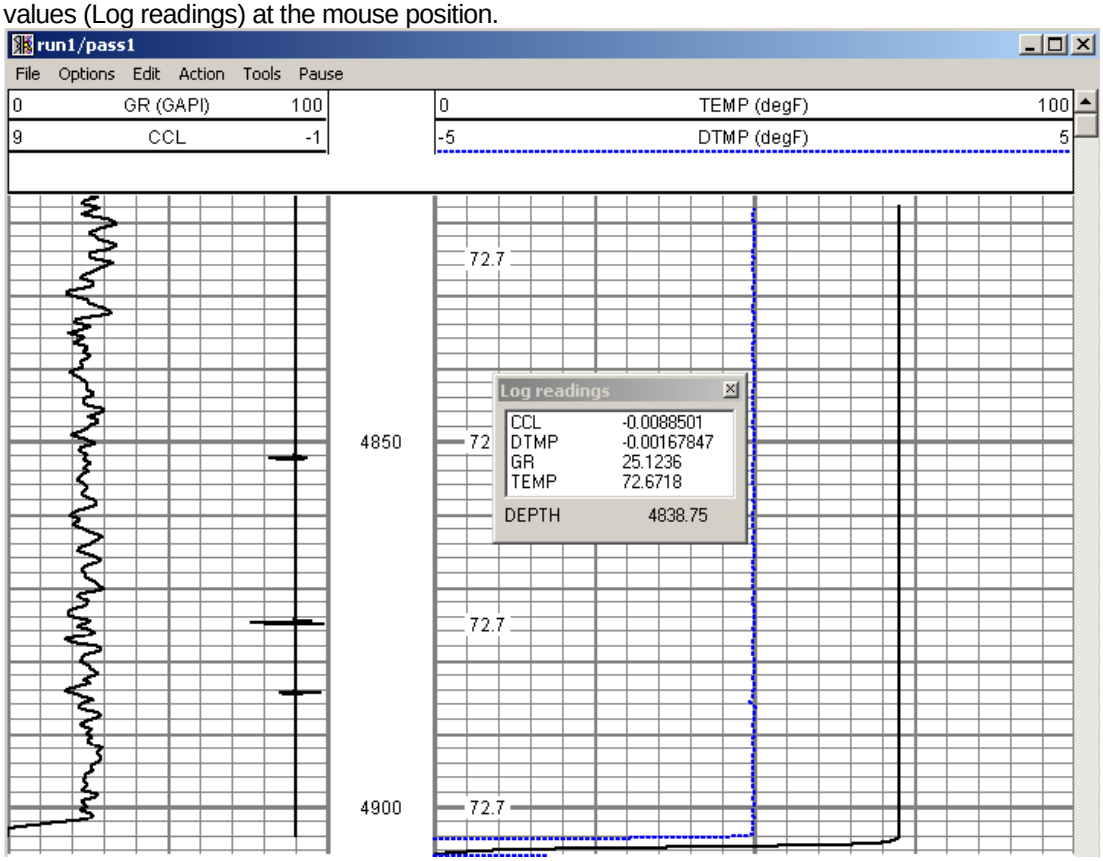


FIG: 4.4.10 Record Up GR/CCL/TEMP

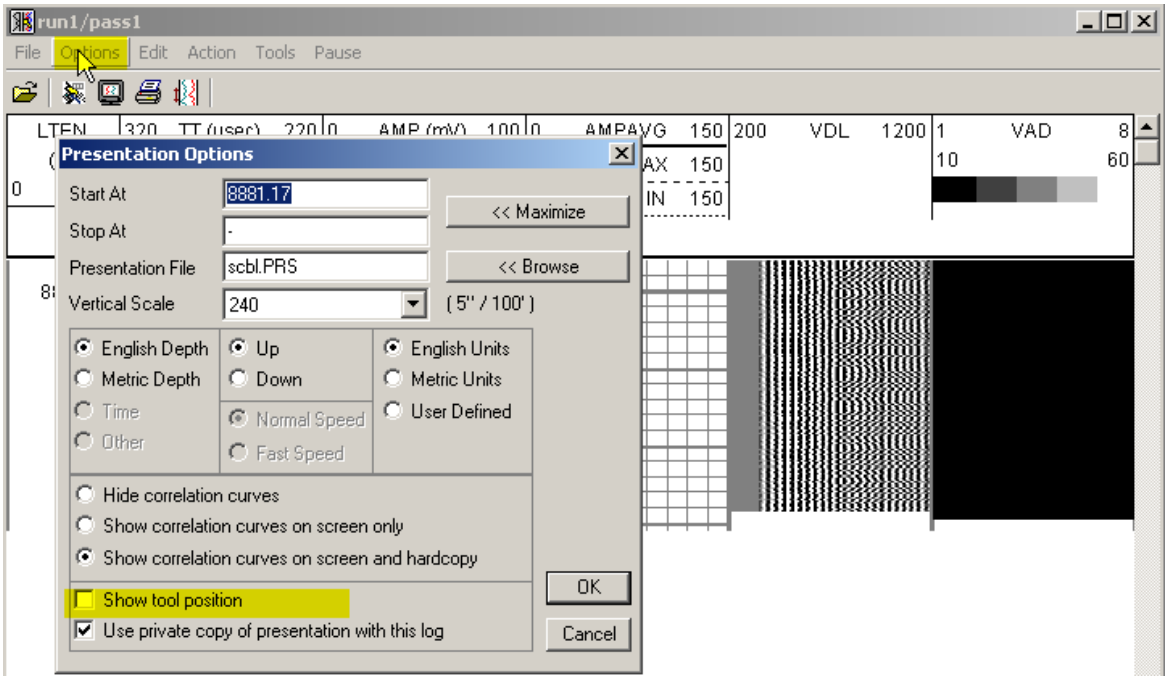


FIG: 4.4.11 Options

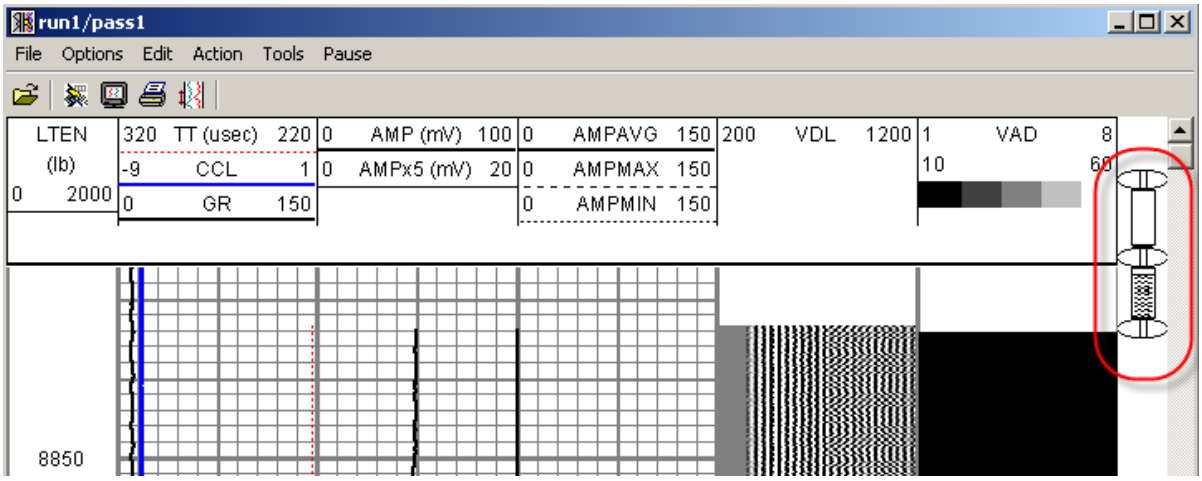


FIG: 4.4.12 Tool Position

This option show the tool position

FIG: 4.4.13 Tool Position ON/OFF

4.4.8 Record Down
Starts logging down.

4.4.9 Record on Time
Sets record on time reference mode. You will be prompted for the sampling rate in samples per second for fast sampling; or seconds per sample for slow sampling.

4.4.10 Replay
Replays data from current database.

4.4.11 Independent Replay
Replays data from any database.

4.4.12 Depth Shift
Makes a linear shift to the depth reference on a data file.
This feature is intended to provide a rapid tie-in capability by applying a linear depth shift to a dataset. Once a section of log has been made and is displayed on the screen, select **Depth Shift** from the Action menu. The window shown in Fig:4.4.15 below appears. Or **Apply Linear Depth Shift** function is also available from the **Utilities** program in the Warrior shortcut folder.

FIG: 4.4.14 Depth Shift

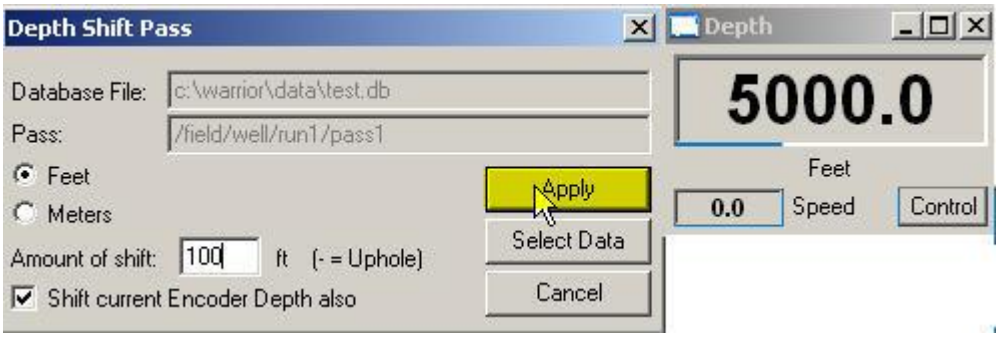


FIG: 4.4.15 Down Hole Depth Shift 100 ft.

The database and pass are defaulted to those of the last logged section. The **Feet** or **Meters** selection is defaulted to that set in the **Control Panel.**
Enter the required depth shift for the file and click **Apply**. Note that a positive number, entered here, **increases** the overall depth of the file. The screen plot of the file is now automatically redrawn, reflecting the applied depth shift

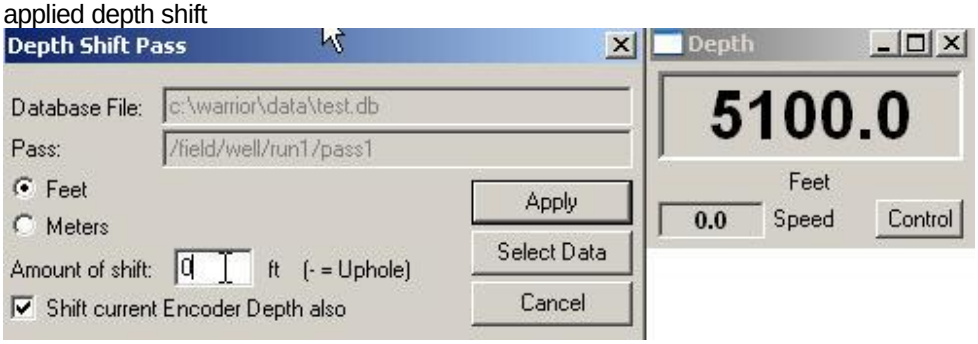


FIG: 4.4.16 Set Depth Shift 100 ft.

Add 100 Ft.

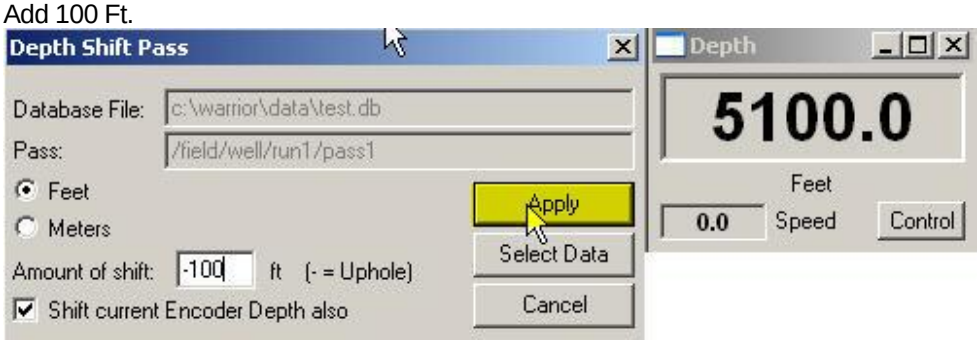


FIG: 4.4.17 Up Hole Depth Shift -100 ft

Subtract 100 Ft.

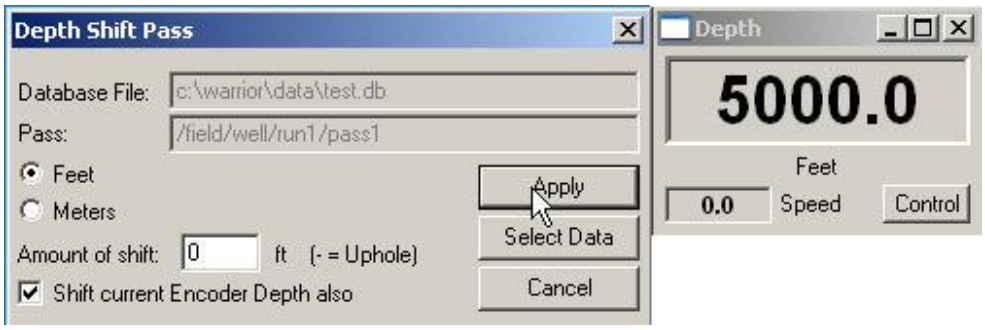


FIG: 4.4.18 Set Depth Shift -100 ft

The current encoder depth will be automatically updated when the **Shift current Encoder Depth also** box is selected. This is the default when the depth shift is run from Acquisition.
Note also that the shift may be made while logging; and that the encoder depth and log display will update accordingly. This facility may be used to apply a linear depth shift to log data, other than the current database. This can be achieved by using the **Select Data** button to bring up a file selection box. Ensure that the **Shift current Encoder Depth also** box is not selected, unless it is required to update the system depth.

4.4.13 Preview Up

Allows viewing of the log on screen (Interactive Plot) or hardcopy without permanently recording data to disk.

4.4.14 Preview Down

Allows viewing of the log on screen (Interactive Plot) or hardcopy without permanently recording data to disk.

4.4.15 Preview on Time

Allows viewing of the log on screen (Interactive Plot) or hardcopy without permanently recording data to disk.

Warning!

In Preview mode, data is being recorded in a special database called Preview. db. When the last program attached to Preview. dB is closed this database is automatically deleted.
There is no way to recover Preview. dB once it has deleted.

4.5 Acquisition - Edit

4.5.1 Edit - Tool String

The tool string editor will appear. The correct serial number and placement for each tool should be verified. Select save, depth offsets will be calculated and calibrations for the selected tool serial numbers will be loaded.
The Tool String Editor allows a tool string to be built from within the constraints of the selected service. Tools of the correct model may be selected by serial number and placed in the required physical position in the tool string. A tool string diagram is presented on the screen and may also be included in the hardcopy output by including in the plot job. Once the tool string has been assembled, the sensor offsets are automatically calculated using information stored in a tools database.
Note that a service will include one or more tools. The tools, which are included in a service, are defined in the services.ini file. Only those tools defined in the services.ini file may be entered the tool string with the tool String Editor.

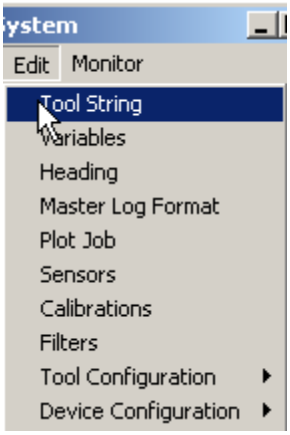


FIG: 4.5.1 Select Tool String

Select the required service and select **Tool String** from the **Edit** menu. The Tool String Editor will appear with the last saved tool string configuration.

4.5.1.1 Remove Tools in the string

To remove a tool from the string Mouse Right click on the tool section and select **Remove**.

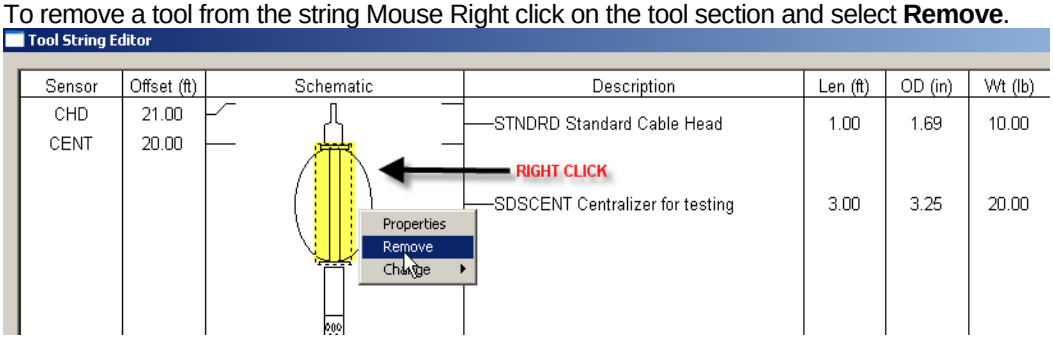


FIG: 4.5.2 Remove Tool

Other way is with Remove button and select the tool(s) to be removed using the >>> button(s) at the left of the tool string diagram. Note that, in the diagram below, the >>> buttons are now positioned at the center point of tools rather than at tool joints as in the above diagram.

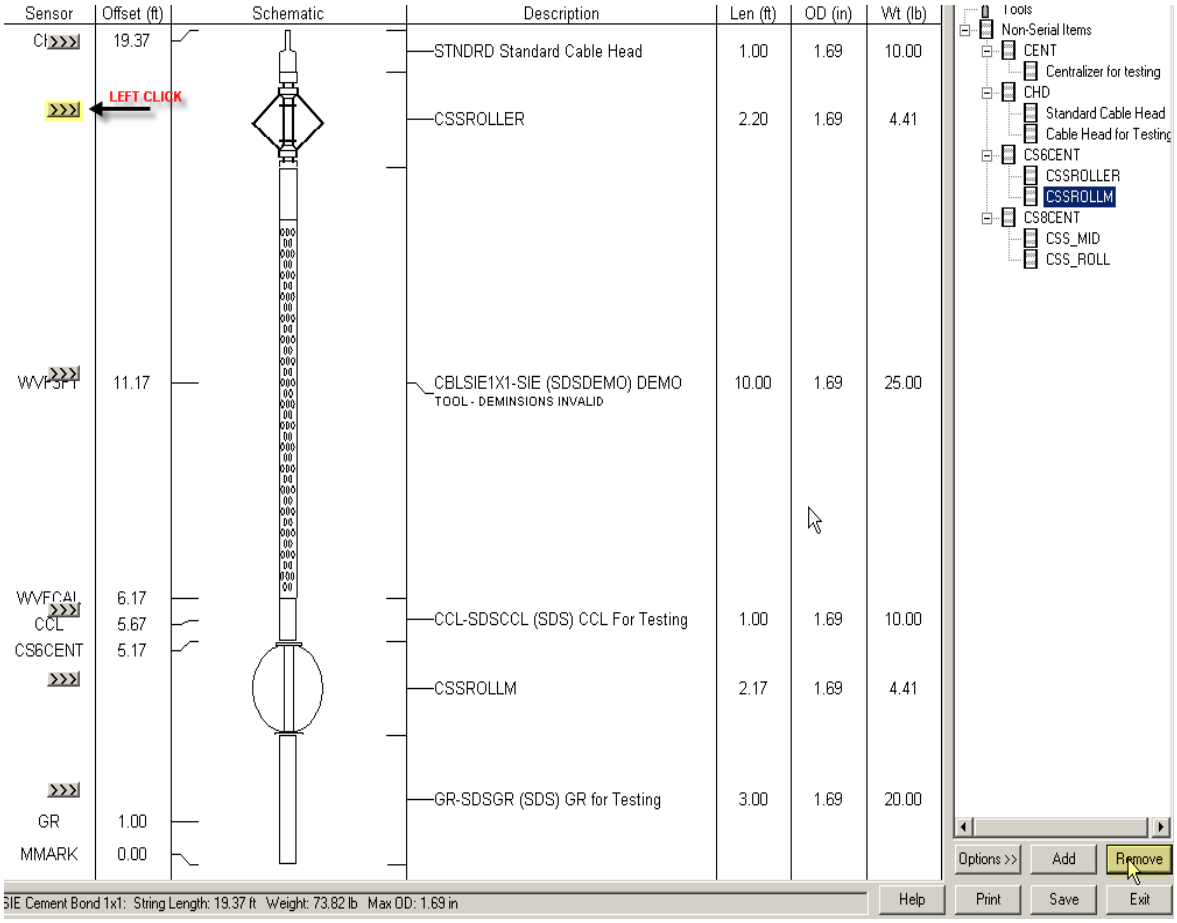


FIG: 4.5.3 Remove Tool

4.5.1.2 Add Tools in the string

To add tools to the string, click on the tool to be added and drag it into position in the tool string. A line on the drawing will indicate where the tool will be inserted. You can also click on any tool and drag to a new position in the string. To edit the properties of the tool, right click on the tool and select **Properties** to bring up the tool editor for that tool.

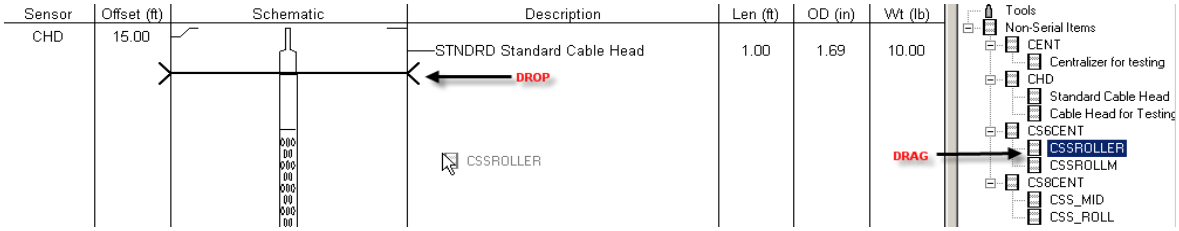


FIG: 4.5.4 Add Tool

The second option is to double click a selected tool. This will add the tool to the top or bottom of the string depending up Tool String Editor options. Another option to Add is select the too with the mouse Left click, then Mouse Left Click Over **Add** Button. Once a tool has been selected the point at which it is to be inserted in the tool string is defined using the **>>>** buttons which appear to the left of the tool diagram.

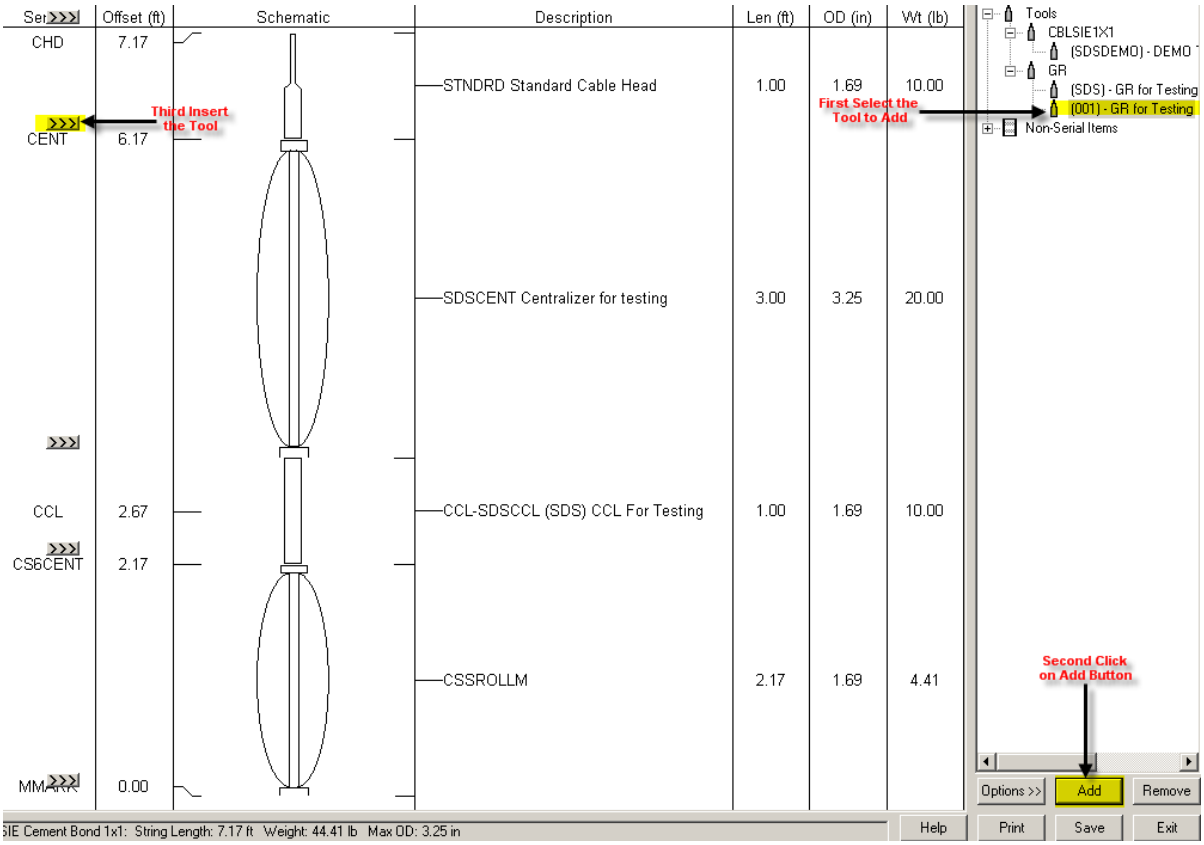


FIG: 4.5.5Add Tool

4.5.1.3 Change Tool

To change to another tool of the same type, right click on the tool and select **Change** to see a list of the serial numbers of available tools that can replace the one in the string.

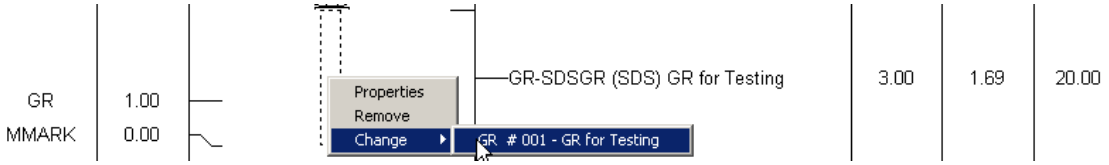


FIG: 4.5.6 Change Tool

4.5.1.4 Tool Properties

Mouse Right Click over the tool and select Properties. This will bring up the Tools Editor. The Tools Editor is used to create tools and to modify the physical properties of the tools used by the Warrior Software. This includes length, diameter, software modules used for logging, sensor offset, default filters, and software specific settings. The Tools editor will be discussed in further detail in the Utilities – Edit Logging Tool Details section of this manual.

When editing has been completed, the tool string information is saved using the **Save** button. At this point, the service will be reloaded as the current status; and other parameters of the tool string may have changed.

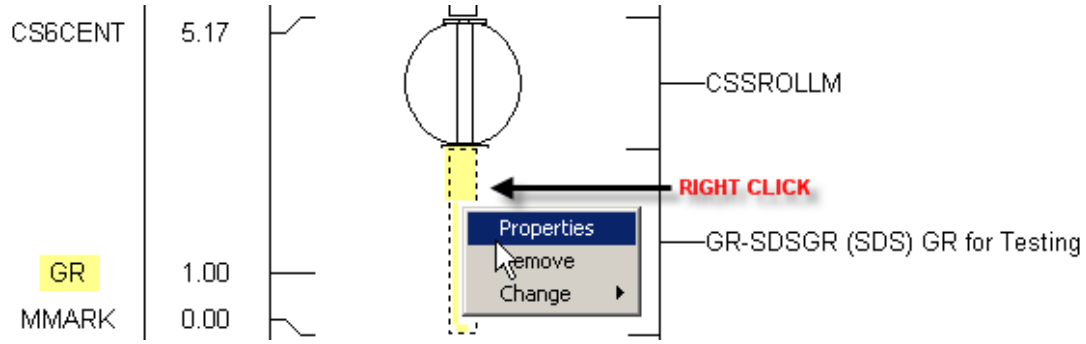


FIG: 4.5.7 Tool Properties

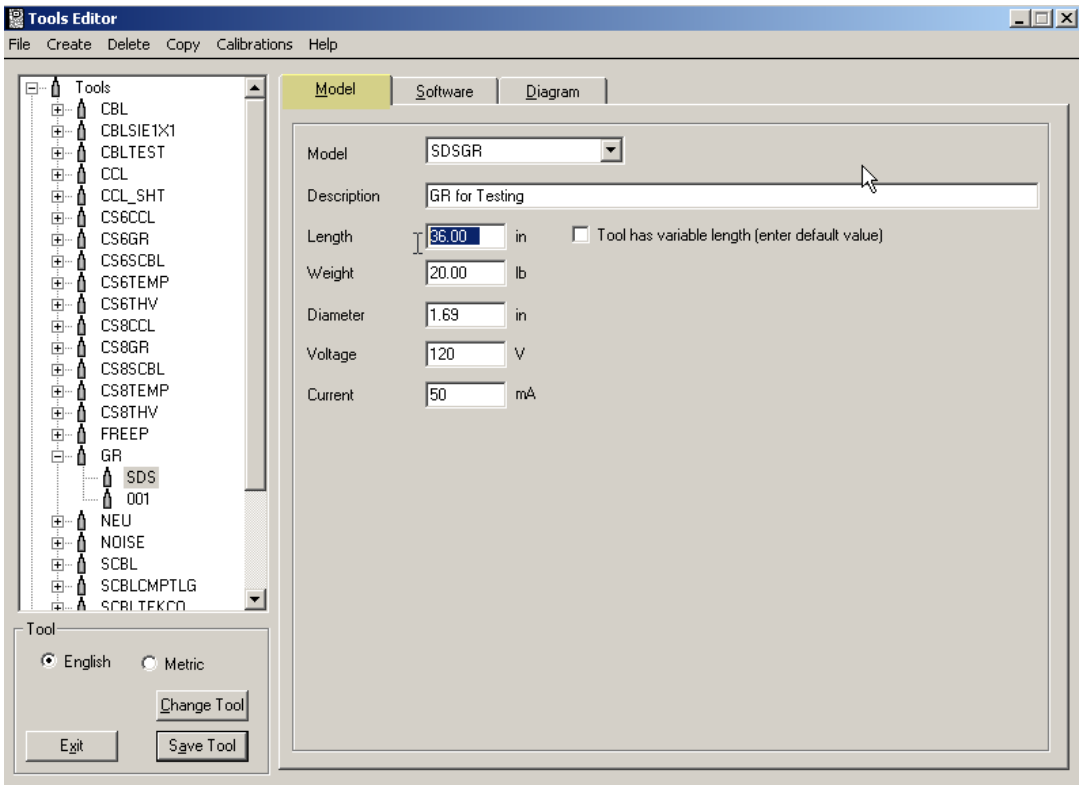


FIG: 4.5.8 Tool Model Properties

4.5.1.7 Variable Length Items

To change the length of a variable length item, right click on the item and select Length from the pulldown menu.

4.5.1.8 Options

When clicking on the Options button, a few options appear below the tool tree diagram.
These include the sensor offsets, where to break diagrams of long tools and the scale factor of the diagrams.

For long tools, select the **Break item** option and then enter a break length. You may have to toggle the Break item checkbox to update to a new break length. This will draw any tool that is longer than the break length with a break in the middle so you can fit more objects in a smaller area.

Choose a different **Scale Factor** to display the diagram at a greater resolution.
The **Show offsets** checkbox displays all the sensor names in the tool string and their offsets.

4.5.1.9 Print

Any tool diagram will print to fit on one page. When another scale factor than <auto> is selected, two print choices are available. You can print to fit on one page, or you can print to scale. If you print to scale, the image may span multiple pages.

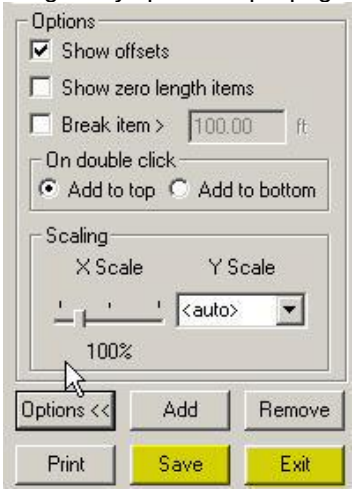


FIG: 4.5.9 SAVE and Exit

4.5.2 Edit – Variables

The **Variables** Editor is invoked from the Acquisition **Edit** menu or from Warrior shortcut folder, double-click the **Utilities** icon. The Utilities menu box will appear, Click on the **Edit Variables in a Dataset** button. It is used to enter and edit zoned Parameters for use by the logging system. When first invoked it appears like the window shown below in Fig. 4.5.32. Displays the Variable (parameter) editor window, enabling depth dependent parameters associated with the selected service to be zoned and values to be set.

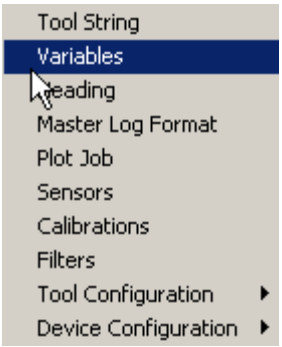


FIG: 4.5.10 Variables

A file selection dialog box appears. Select the required database, followed by the log pass (dataset). The Variable Editor is displayed with the variables that were active during the logging session.
In this case the well is shown as one zone from top to bottom. To define a new zone, press the **Zones** Button and a window will appear as shown below.

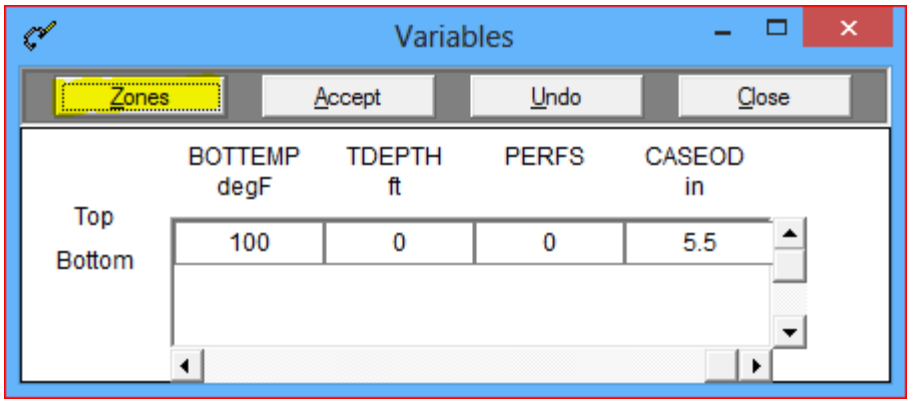


FIG: 4.5.11 Add Zones

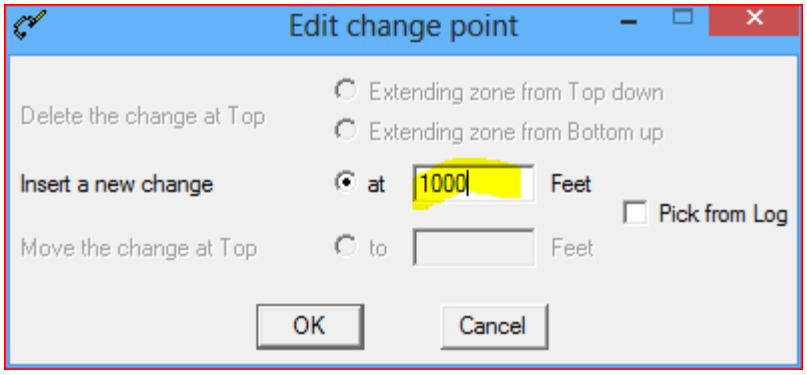


FIG: 4.5.12 Set a New Zone

Here boundaries may be inserted, and their positions changed, e.g. inserting a new change at 1000ft results in two zones, one from the top to 1000, and one from 1000 to the bottom.
Note: if the variable editor is started from the acquisition module when logging, then by selecting the **Pick from Log** checkbox, the depth of zone changes can be selected by clicking on the appropriate depth on the interactive plot.

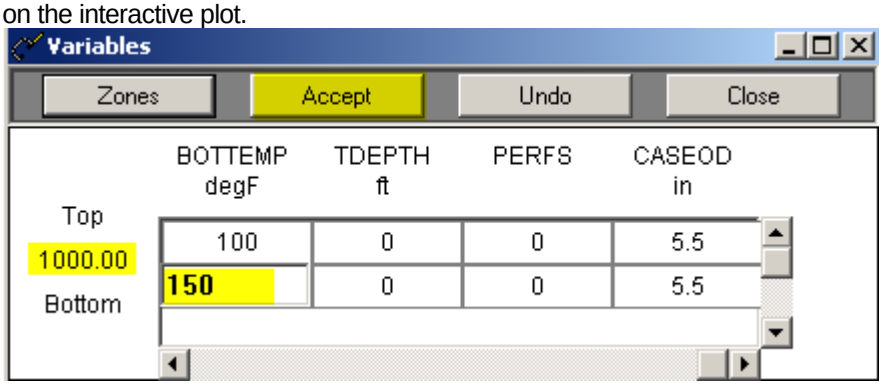


FIG: 4.5.13 Edit values and accept

To change the value of the variable in a zone, TAB to or click on the variable and enter the New value. When all entries have been made **Accept** the changes and **Close** the editor.

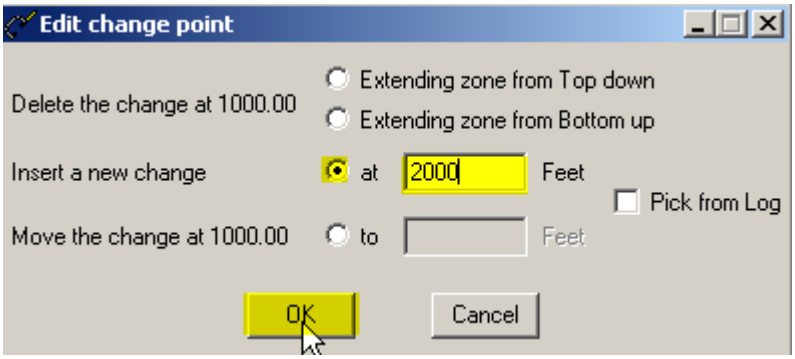


FIG: 4.5.14 Insert New Zone

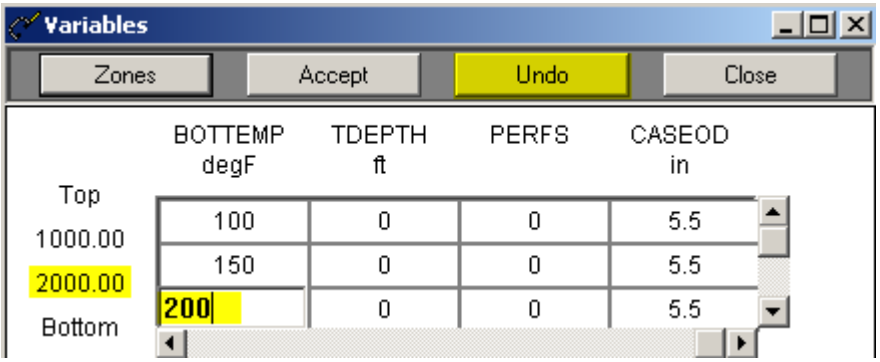


FIG: 4.5.15 Undo Zone

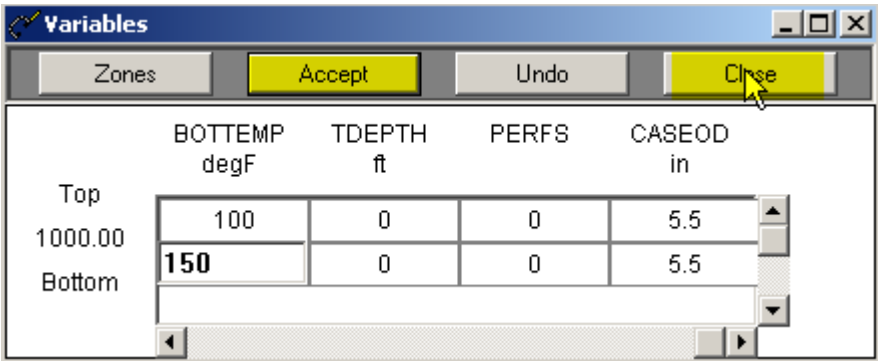


FIG: 4.5.16 Accept and Close

4.5.3 Edit - Heading

Edit – Headings invokes the Warrior Heading Editor. This will be discussed in detail in the Heading Editor Section

4.5.4 Edit – Master Log Format

Edit – Master Log Format invokes the Warrior Format Editor. This will be discussed in detail in Format Editor Section

4.5.5 Edit – Plot Job

Edit – Plot Job invokes the Warrior Plot Job Editor. This will be discussed in detail in the Plot Job Editor Section.

4.5.6 Edit - Sensors

Brings up the Edit Sensor window. Once a service has been selected, the Edit Sensors window may be displayed and information concerning the individual sensors, associated with the service, may be edited. This information normally consists of the hardware source of the sensor (Device and Channel number), the depth offset of the sensor from tool zero reference, and the sampling rate.

The information contained in Edit Sensors is derived from the current service and current tool string information. For example, sensor depth offsets are derived from the selected tool string and the information is contained in the tools database. The default sample rates and device channel assignments are derived from the services.ini file.

The default device and channel settings, and the default sample rates are contained in the services.ini file. The default depth offsets are derived from tool information contained in the tools.ini file.

Although the information in Edit Sensors is normally derived automatically from the information contained within the system, it may sometimes be necessary to modify or review a setting.

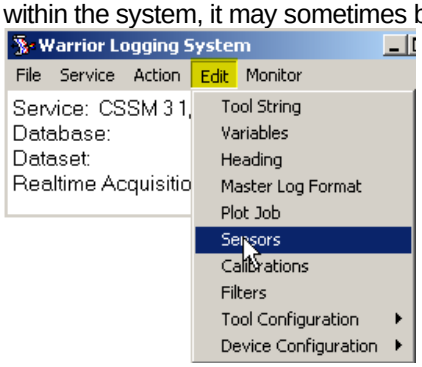


FIG: 4.5.17 Edit Sensors

Select **Sensors** from the **Edit** menu. The Edit Sensors window appears as shown below.

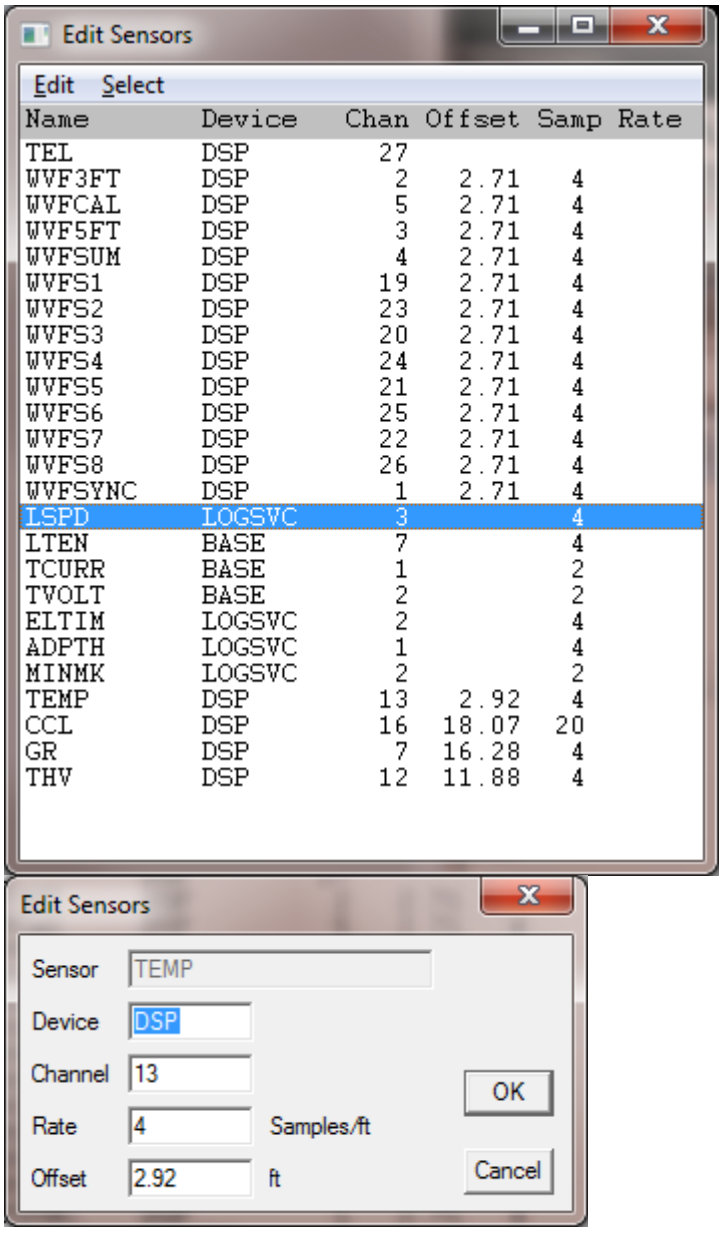


FIG: 4.5.18 Edit

Highlight one or more sensors and select **Edit** or double-click on a sensor item. The Edit Sensors dialog box will be displayed for editing as shown in Fig: 4.5.39. The acquisition device may be selected with the **Device** box. There are several acquisition devices supported within the Warrior system. Do not change this entry unless you know what you are doing. The channel of the device, from which the sensor is to be read, is selected by editing the **Channel** box. Do not change this entry unless you know what you are doing.
The number of samples per foot to be recorded is entered in the **Rate** box. The maximum sample rate for a sensor is generally limited to the maximum rate set for the acquisition device acquiring the data. This maximum rate is set in the services.ini file.
The physical depth offset of the sensor from tool zero is entered in the **Offset** box. Note that the value to be entered in Offset is the physical depth offset, as the system automatically compensates for any lags introduced by filtering.

The change made in Edit Sensors will remain in effect until the service is reloaded; when the sensor parameters are returned to their default values. Sensors should not be edited during logging. Note that sensor cannot be edited while logging.

4.5.7 Edit - Calibrations

Warrior allows editing of sensor calibrations. The Warrior system supports many types of calibrated tool response. The calibration parameters may be derived from manual entries, or from calibration procedures, performed by the system itself. Some calibration parameters can be edited from Edit/ Calibrations.

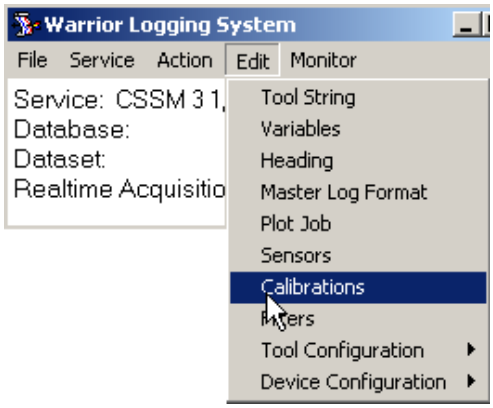


FIG: 4.5.19 Calibrations

Select **Calibrations** from the **Edit** menu and double-click on the sensor to be edited. Alternatively, click once and select and Edit/Edit Selections.

The tool type, serial number, calibration name and calibration type are displayed, but cannot be edited. The various calibration parameters can be edited and saved either permanently (with the **Perm** button) or temporarily (with the **Temp** button). See Fig: 4.5.20.

OLE_LinkFig4

Warrior stores calibrations internally in English units. When editing calibrations in this dialog, the reference values must always be entered in English units.

Changes made and saved temporarily stay in effect until the service is reloaded, so when the calibration parameters are returned to their normal permanent values. **Note that calibrations can be changed while logging.**

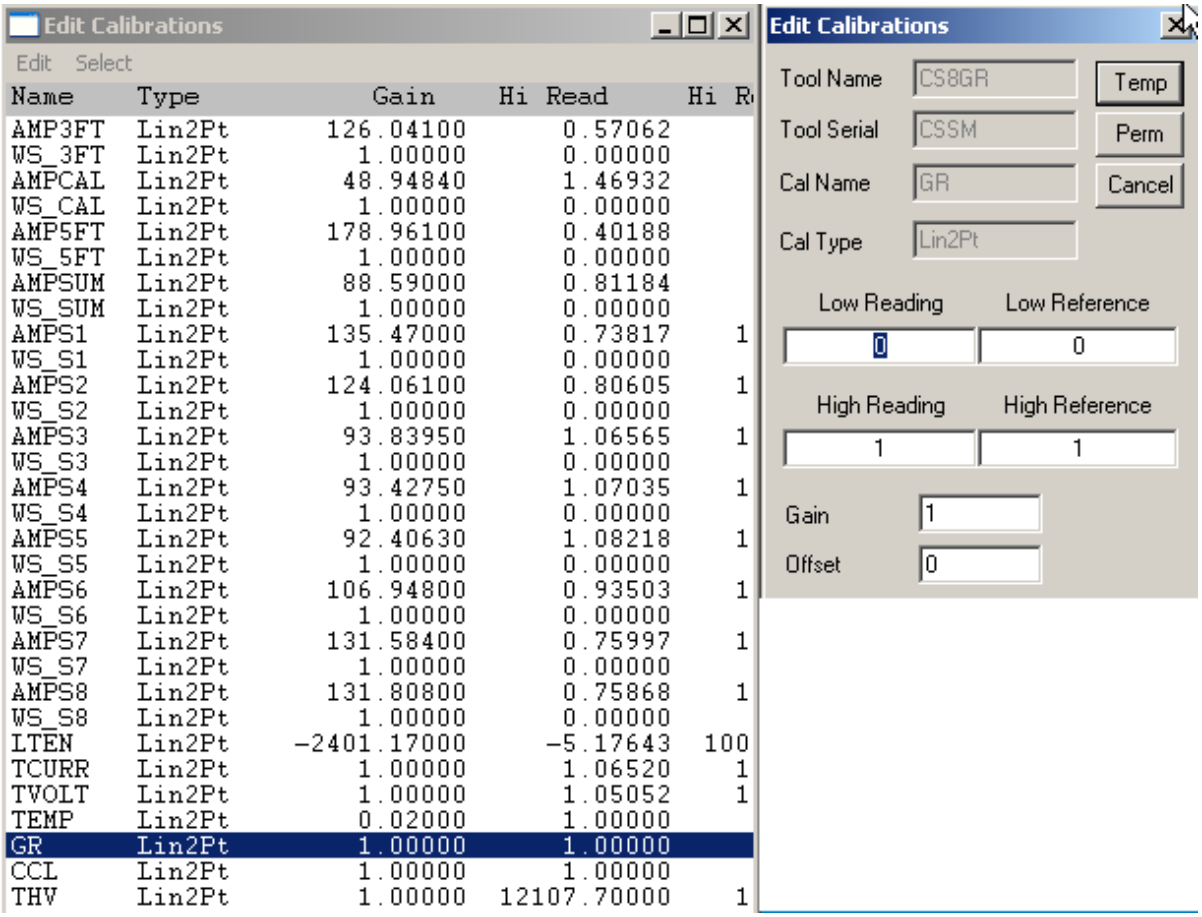


FIG: 4.5.20 Edit Calibrations

4.5.8 Edit - Filters

The **Filters** option displays filter settings and allows them to be edited. Four types of filter options are currently available in the Warrior system.

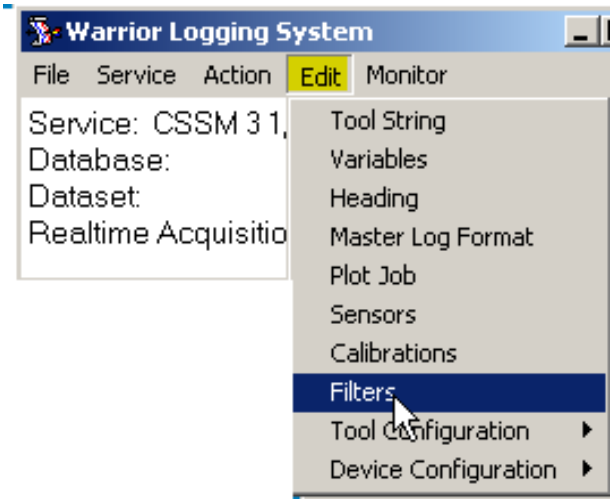


FIG: 4.5.21 Filters

These are:
SQUARE is a simple average of the sensor value over the filter interval selected.
GAUSSIAN is a weighted average, where the weights, applied to each sample over the interval, take the form of a Gaussian distribution. The filter interval is in feet, when recording in depth, and in seconds, when recording in time.
TRIANGLE is another weighted average that accentuates peaks like the Gaussian filter. The Triangle filter is more extreme than the Gaussian.
USER is a user-defined filter but is currently not implemented.
Select **Filters** from the **Edit** menu and double-click (or single-click and Edit/Edit Selections) on the sensor, whose filter is to be edited.

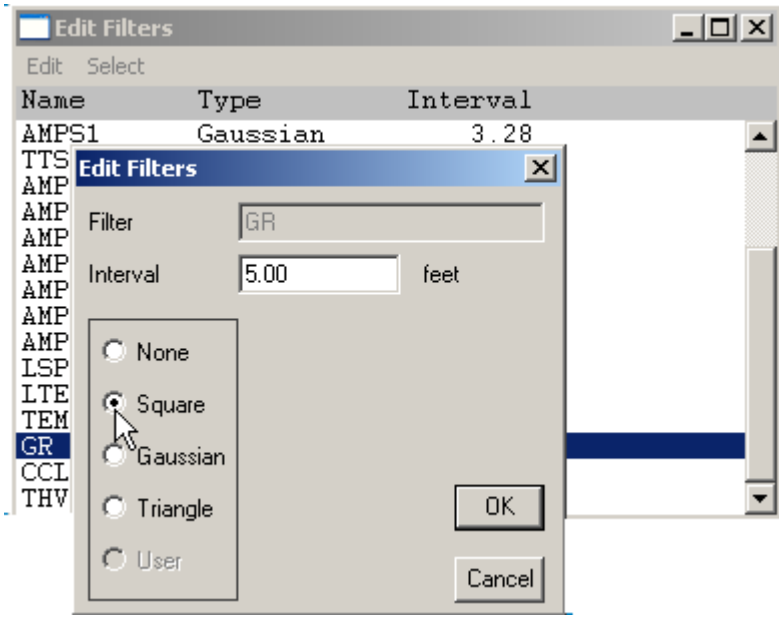


FIG: 4.5.22 Edit Filters

The tool type and current filter parameters are displayed for the sensor selected. Typing over the parameter, shown in the Interval box, may change the interval. The filter type can be changed by means of the radio buttons.
Note that changes, made here, stay in effect until the service is reloaded, so when the filter parameters are returned to their default values. Default filter settings are contained in the tools file as part of the tool model information. Filters cannot be edited while logging.

4.5.9 Edit - Tool Configuration

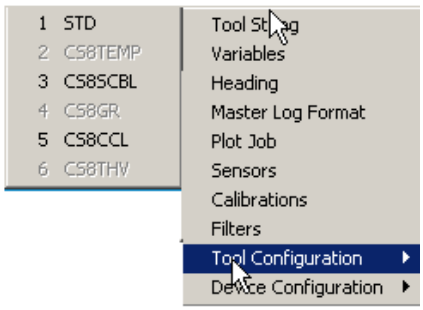


FIG: 4.5.23 Tool Configuration

4.5.9.1 STD Tool Configuration

The STD tool is normally in every service. The line resistance used to calculate HVOLTA (Head Voltage Apparent) can be edited from here.

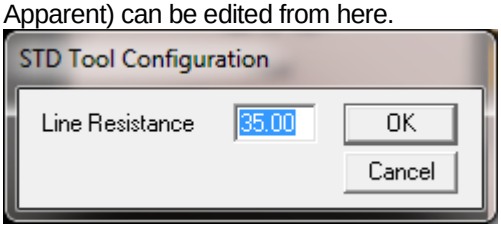


FIG: 4.5.24 Set Line Resistance

4.5.9.2 CCL Control

The CCL software produces 2 outputs:

CCL Casing Collar Locator
CCLRT Real Time Casing Collar Locator

The real time output bypasses the normal sampling queues so that changes can be seen immediately. The **CCL** software incorporates a facility to affect a shift of the CCL curve, as is sometimes required when running perforating services. The collar log may also be "filtered" in such a way as to remove noise from the baseline of the curve while still allowing collar signals above a certain threshold to be displayed.

When in Acquisition mode, and with a collar tool in the string, the **CCL Control** box may be displayed with **Edit/Tool Configuration/CCL**.

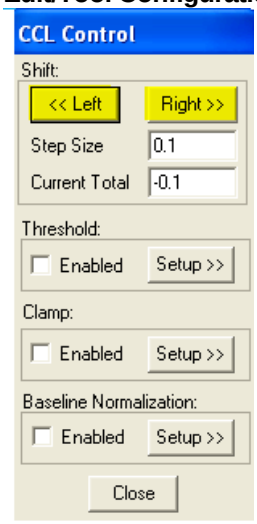


FIG: 4.5.25 CCL Control

Shift - CCL

Bring up the CCL Control box as described above.

Set the amount of shift required in the Step Size dialog. The value entered here should reflect the actual scale set for the log. For example, if the log is scaled at 1 volt per track and it is required to shift the curve 10 (small) divisions, enter a value of 0.1.

Clicking the Left or Right buttons produces the shift and the cumulative amount of shift applied appears in the Current Total box. Note that [<<Left] changes the CCL output by a negative value and [Right>>] changes the CCL by a positive value so that left and right only apply is the CCL plot is scaled with a negative value on the left and a positive value on the right.

Threshold - CCL

Invoke the CCL Control box and set the Threshold Enabled. Click on Setup and adjust the threshold settings as required.

The Positive and Negative Thresholds are set in the same units as the collar log output curve. Any collar curve signal smaller in amplitude than the threshold settings will be suppressed to a value of zero. Any signal greater than the threshold levels will be recorded as its true value.

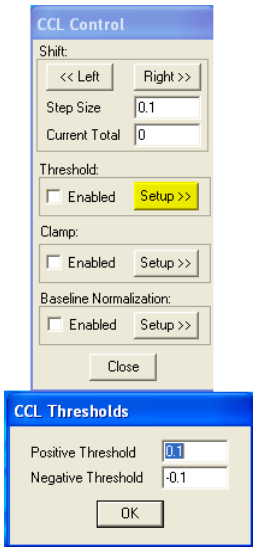


FIG: 4.5.26 CCL Thresholds

Clamp - CCL

The Positive and Negative Clamps cut the signal at the set point value. Any collar curve signal bigger in amplitude than the clamp settings will be set to clamp value.

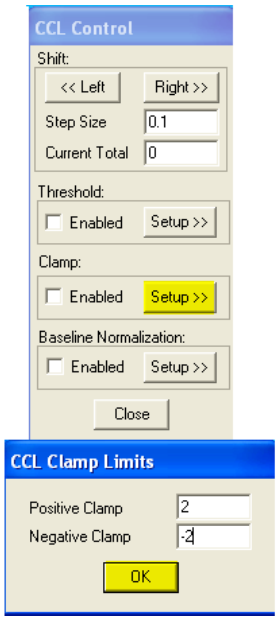


FIG: 4.5.27 CCL Clamp Limits

Baseline Normalization - CCL

Invoke the CCL Control box and set the Baseline Normalization Enabled. Click on Setup and adjust the cycle length (must be greater than 0) and the offset settings as required.
The system will attempt to correct a CCL baseline to a value of zero and then recheck it every cycle length.

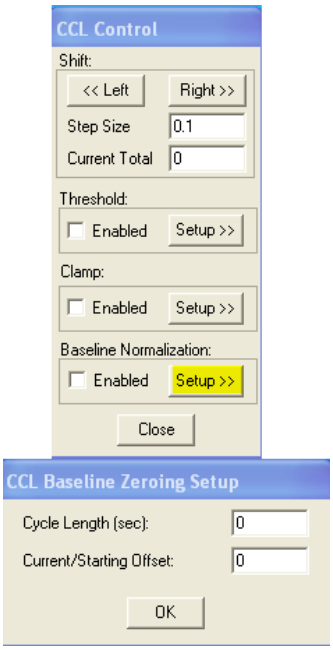


FIG: 4.5.28 CCL Baseline Zeroing Setup
Select **Setup**, and type in Cycle Length 2 left in Zero **Current/Starting Offset**.
Click over **OK**
Check on the Enable box, and Click on Setup, you find the new value in Current/Starting Offset

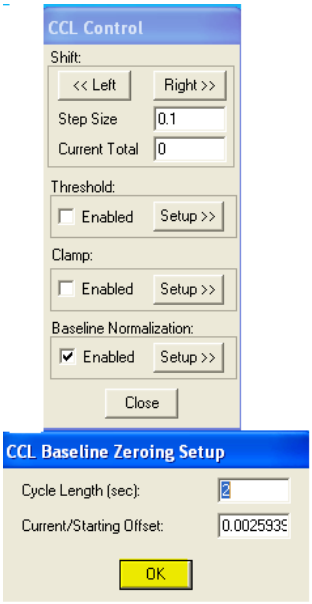


FIG: 4.5.29 CCL Baseline Zeroing Setup

4.5.10 Edit - Device Configuration

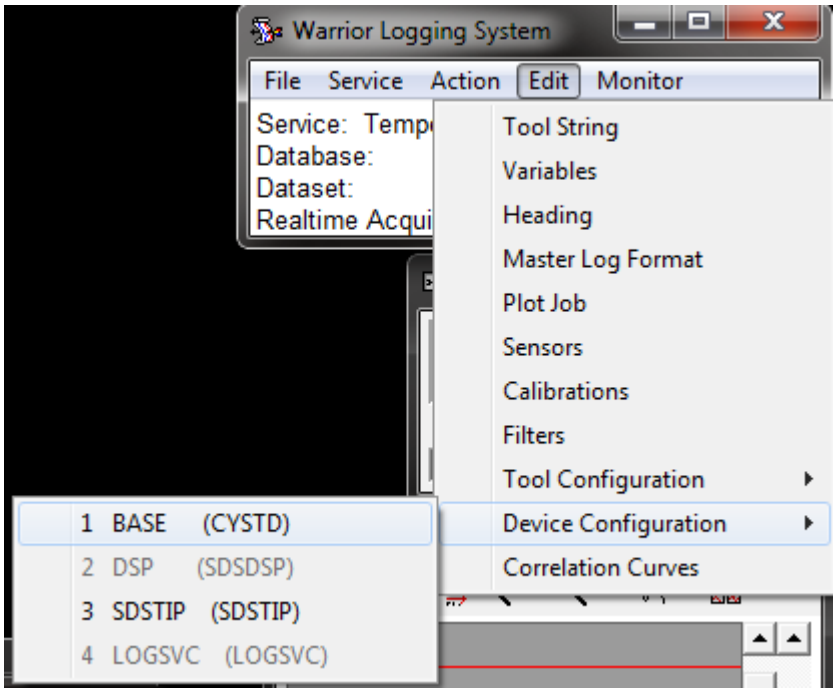


FIG: 4.5.30 Edit - Device Configuration

Base Configuration
Depending upon the panel type, the base device may be one of several different devices. The most common device is the CYSTD used in the standard interface panel. In most cases the card type will be read from the panel and need not be changed.

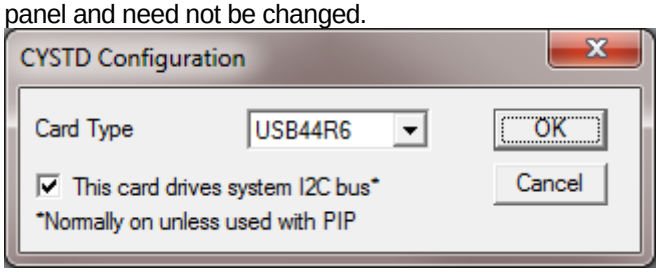


FIG: 4.5.31 CYSTD configuration

Warning! Do not change any settings here, unless you know what you are doing.

DSP Configuration
The current Scientific Data Systems Warrior Interface panel has no User controllable device settings.

SDSTIP and CBL1D Programmable Filters and Gain Controls
Most line signals, other than low frequency CCL signals, are filtered and amplified through the CBL1D board of the Scientific Data Systems, Inc. Tool Interface Panel. There is a single input to the CBL1D Board from the ANASW board, but it has three separate outputs, commonly referred to as Sync, Sonic, and AUX. Each

of these outputs has separate gain controls and programmable variable filter controls. Which sliders and filters are available are controlled by settings in the SDSTIP device in the service and saved in Services.ini? Each of the Sync, Sonic, and AUX output channels has a programmable attenuator that is controlled through the software by a slider bar in the panel controls. This is necessary to keep the signals from saturating during later stages of filtering and amplification. During normal operation, these are all that is necessary in a service to control the signal gains.

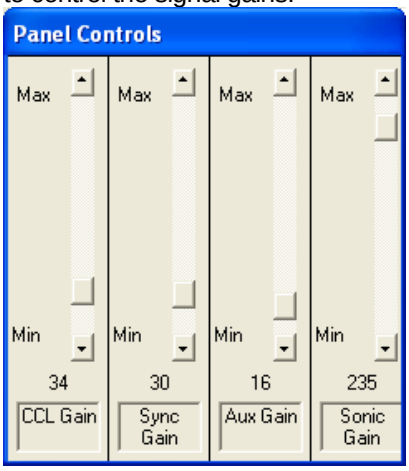


FIG: 4.5.32 Panel Controls

Each of the three channels also has a variable filter that can be set or adjusted. It is not normally necessary to adjust these filters once a service has initially been set up on a logging unit. Access for adjustment of these filters is obtained through the Acquisition Software by selecting Edit -> Device Configuration -> SDSTIP.

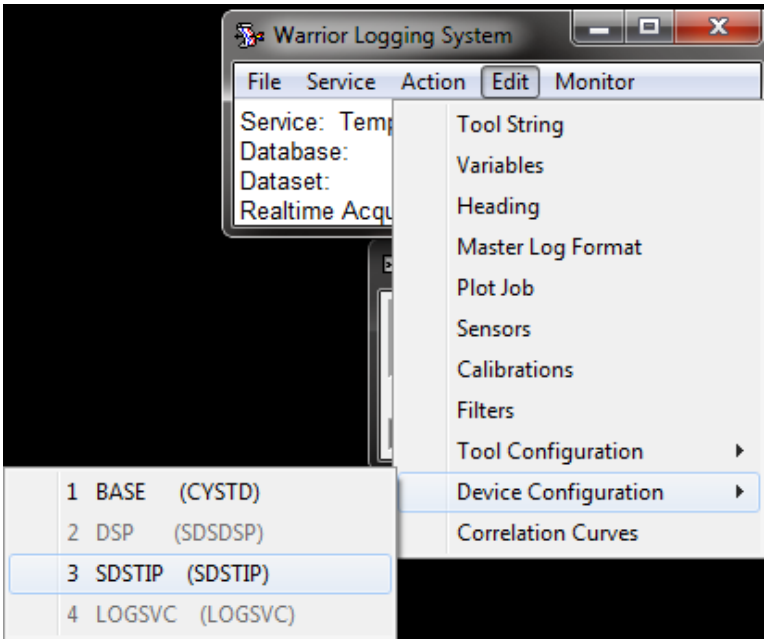


FIG: 4.5.33 Device Configuration

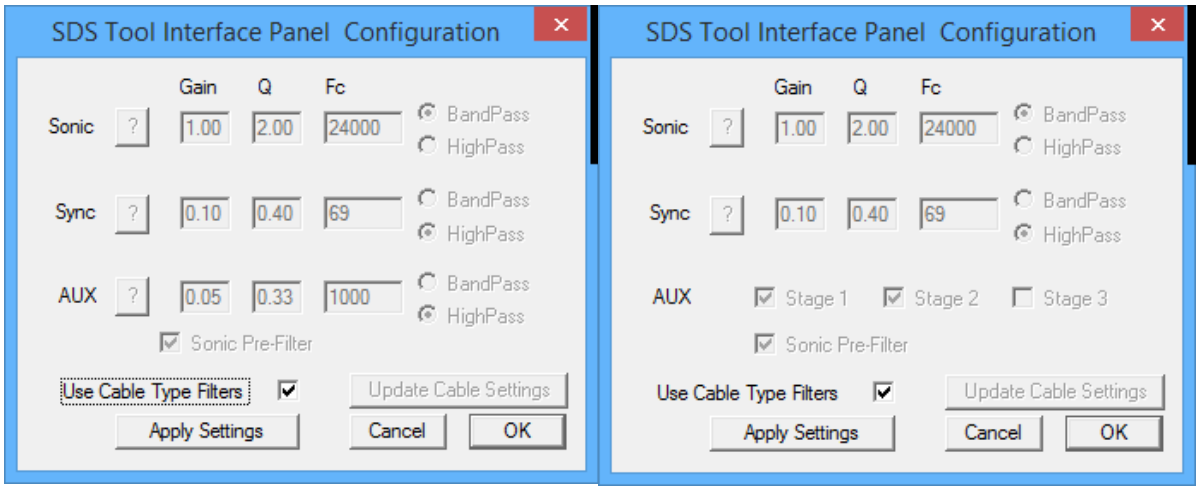


FIG: 4.5.34 SDSTIP for older CBL1D boards and for Revision 13 and newer

Each of the output channels has its own Gain, Q, Corner or Center Frequency, and whether it has a Band Pass or High Pass output. In addition to this, the Sonic channel has a pre-filter to keep the initial input attenuator from saturating. This pre-filter is turned off with a 0 value and is turned on with a value of 8. No other values will work. You will get no sonic signal with any value other than 0 or 8.
The Sonic and Aux channels will normally be set to filter a pulse signal, so they will usually have a High Pass filter with as low a corner frequency as possible. The gain for these channels should be set so that the slider bar gain control has a good setting for the service at near mid-range.
The Sonic channel will normally be looking at acoustic signals in the 20000 hertz range and should be selected as a Band Pass filter.
The Q of the filters is related to the how much frequency change is needed to attenuate the signal by 3DB. The larger the number, the less change from the Fc is needed to attenuate the signal.
The CBL1D Revision 13 and newer boards no longer have the programmable filter on the AUX channel. Instead, it has a set of 3 equalization filters in series. Any combination of the equalization's filters may be selected from none, to any one, to any combination of two, to all three filters.

The following Internet link gives simple explanations of filters and their characteristics. http://en.wikipedia.org/wiki/Electronic_filter#Multipole_types

The different hardware revisions of the CBL1D board require that the correct panel type be set in the Warrior Control Panel for the CBL1D board to respond to slider bar and filter settings. Revisions R1 through R4 will normally have a panel type that ends with the letter a (CPFA). As of this date, Revisions R5 and higher will have panel types that end with a B, C, D or E (CPFB – CPFE).

Warning!

If the service has a Signal type Control Keyword, the filter settings may change depending upon the Cable Selection in the Warrior control Panel. This is discussed in further detail Section 16 – Cable Types and Filter Settings.

4.6 Acquisition - Monitor

Once a service has been selected, various data monitors are available to the operator as shown in Fig. 4.6.1 below.

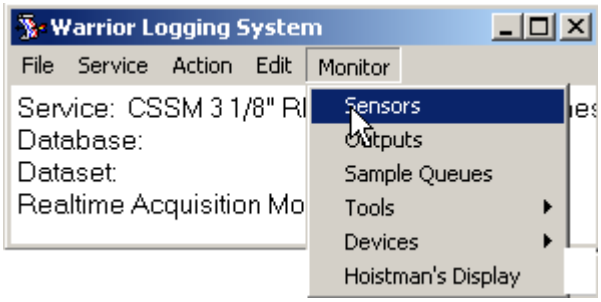
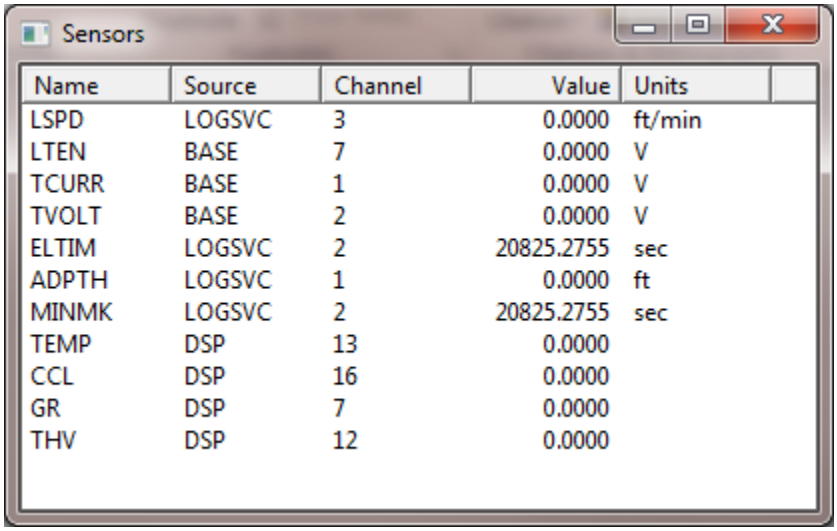


FIG: 4.6.1 Monitor Sensors

4.6.1 Monitor - Sensors

The sensors for the selected service are displayed along with the values of their current readings. The sensor monitor is used to monitor `raw' data. Select **Monitor Sensors** from the **Edit** menu. The Sensor Monitor will be displayed. The sensor monitor is updated at the refresh rate set in the Warrior Control Panel.

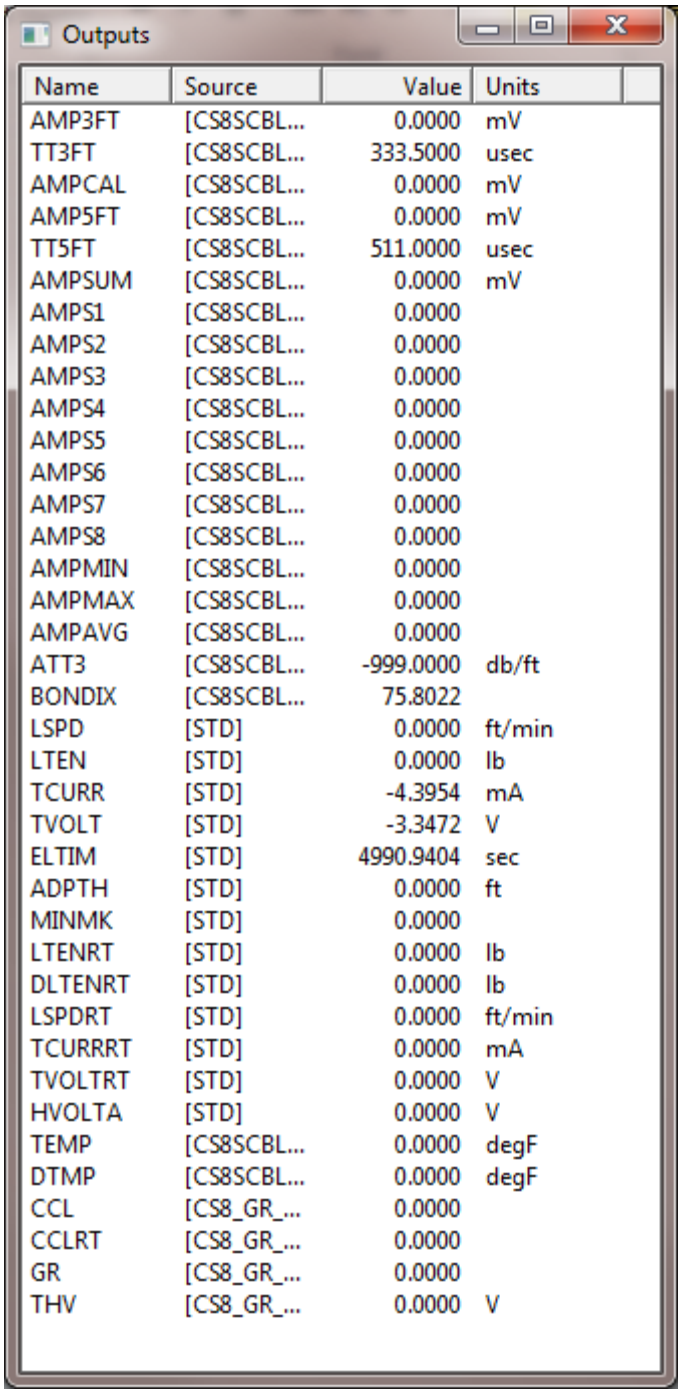


Name	Source	Channel	Value	Units
LSPD	LOGSVC	3	0.0000	ft/min
LTEN	BASE	7	0.0000	V
TCURR	BASE	1	0.0000	V
TVOLT	BASE	2	0.0000	V
ELTIM	LOGSVC	2	20825.2755	sec
ADPTH	LOGSVC	1	0.0000	ft
MINMK	LOGSVC	2	20825.2755	sec
TEMP	DSP	13	0.0000	
CCL	DSP	16	0.0000	
GR	DSP	7	0.0000	
THV	DSP	12	0.0000	

FIG: 4.6.2 Sensors

4.6.2 Monitor - Outputs

The outputs for the selected service are displayed along with the value of their current readings in engineering units. Select **Monitor /Outputs** from the menu. The Outputs monitor is displayed as shown in Fig: 4.6.3. When in a logging mode, e.g. Record Up, the readings are updated at each depth sample. When not in logging mode, the outputs are updated at the frequency set in the Control Panel.



Name	Source	Value	Units
AMP3FT	[CS8SCBL...	0.0000	mV
TT3FT	[CS8SCBL...	333.5000	usec
AMPCAL	[CS8SCBL...	0.0000	mV
AMP5FT	[CS8SCBL...	0.0000	mV
TT5FT	[CS8SCBL...	511.0000	usec
AMPSUM	[CS8SCBL...	0.0000	mV
AMPS1	[CS8SCBL...	0.0000	
AMPS2	[CS8SCBL...	0.0000	
AMPS3	[CS8SCBL...	0.0000	
AMPS4	[CS8SCBL...	0.0000	
AMPS5	[CS8SCBL...	0.0000	
AMPS6	[CS8SCBL...	0.0000	
AMPS7	[CS8SCBL...	0.0000	
AMPS8	[CS8SCBL...	0.0000	
AMPMIN	[CS8SCBL...	0.0000	
AMPMAX	[CS8SCBL...	0.0000	
AMPAVG	[CS8SCBL...	0.0000	
ATT3	[CS8SCBL...	-999.0000	db/ft
BONDIX	[CS8SCBL...	75.8022	
LSPD	[STD]	0.0000	ft/min
LTEN	[STD]	0.0000	lb
TCURR	[STD]	-4.3954	mA
TVOLT	[STD]	-3.3472	V
ELTIM	[STD]	4990.9404	sec
ADPTH	[STD]	0.0000	ft
MINMK	[STD]	0.0000	
LTENRT	[STD]	0.0000	lb
DLTENRT	[STD]	0.0000	lb
LSPDRT	[STD]	0.0000	ft/min
TCURRRT	[STD]	0.0000	mA
TVOLTRT	[STD]	0.0000	V
HVOLTA	[STD]	0.0000	V
TEMP	[CS8SCBL...	0.0000	degF
DTMP	[CS8SCBL...	0.0000	degF
CCL	[CS8_GR_...	0.0000	
CCLRT	[CS8_GR_...	0.0000	
GR	[CS8_GR_...	0.0000	
THV	[CS8_GR_...	0.0000	V

FIG: 4.6.3 Outputs

Monitor - Outputs - Gauges

Another function of monitor output is the ability to add a meter to a service. With the Monitor – Output window open, right click on any output in the list. You will be given a choice of 4 types of gauges to use. They are Angular Gauge, Histogram Gauge, Bar Gauge, and Numeric Gauge. The gauge will remain on the windows desktop until closed. However, the next time the service is reloaded the gauge will return to the windows

desktop. To permanently remove gauge from the service, Monitor – Outputs again, right click on the gauge that you want to remove from the service and choose the Delete Gauge option.

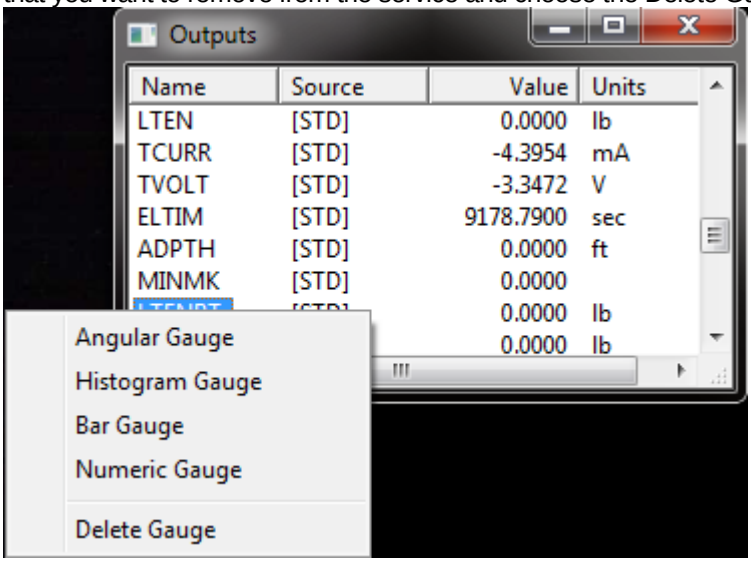


FIG: 4.6.4 Outputs – Adding / Deleting a gauge to a service.

The properties of the gauge can be modified by right clicking on the gauge.

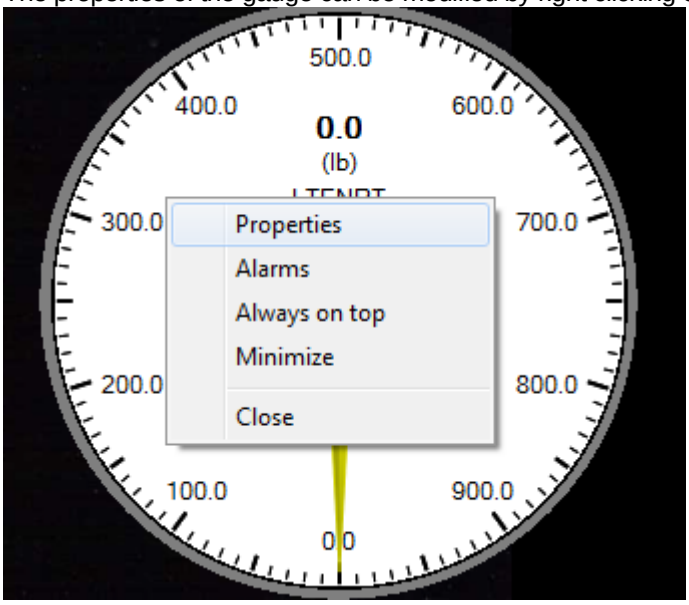


FIG: 4.6.5 Changing the properties of a gauge

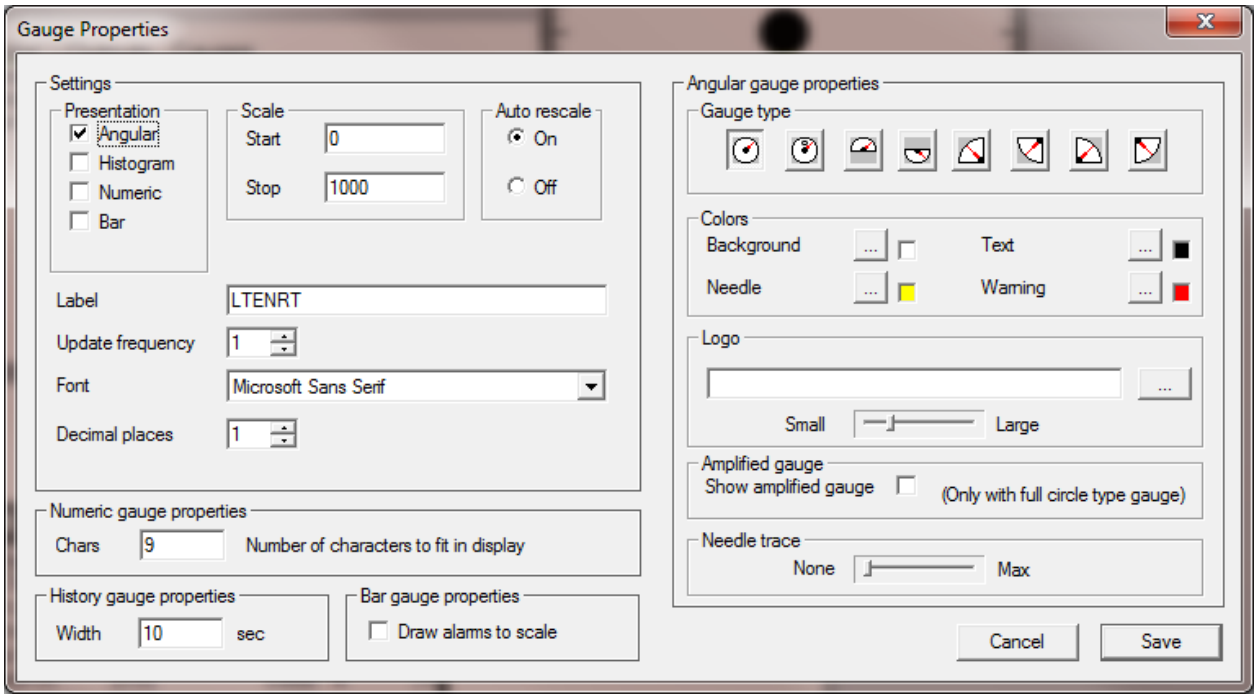


FIG: 4.6.6 Gauge properties

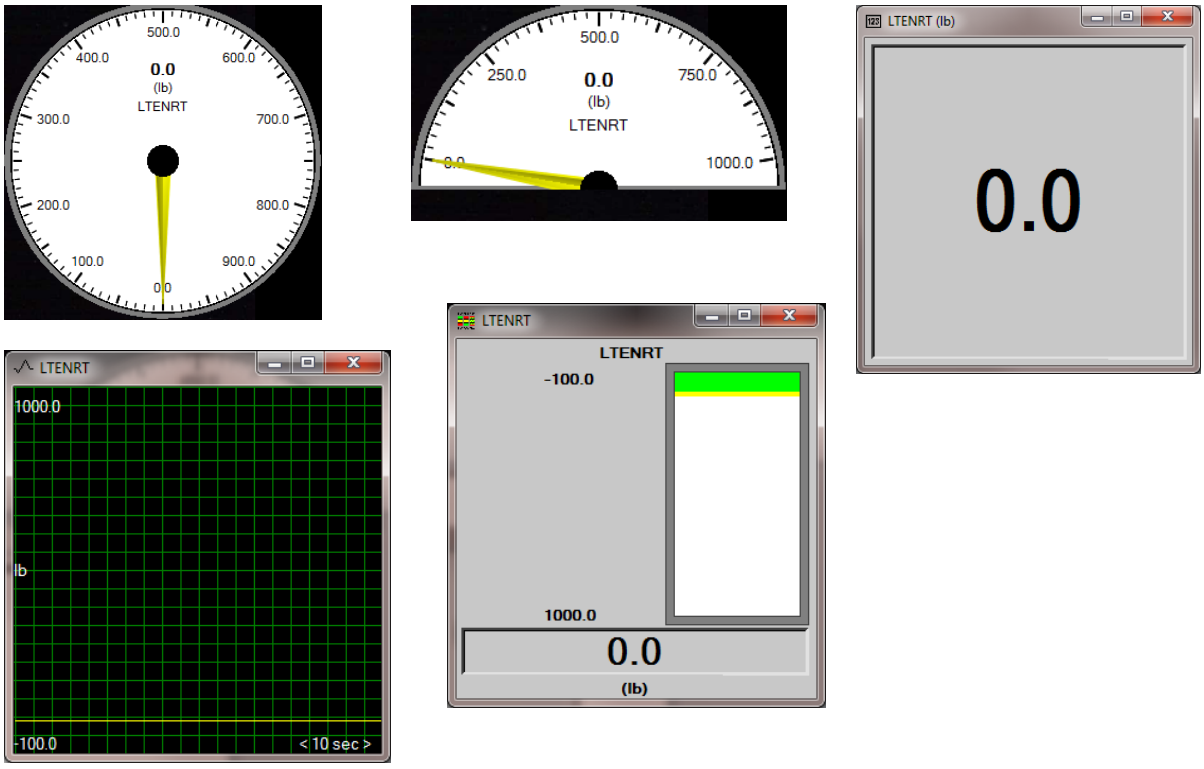


FIG: 4.6.7 Examples of various Gauge types available.

Monitor - Sample Queues
Monitors the status of the internal Warrior sample queues.

4.6.3 Monitor – Tools
Some tools may have special monitor windows, such as bond tools. The window will be used to monitor and setup measurement parameters for those tools.

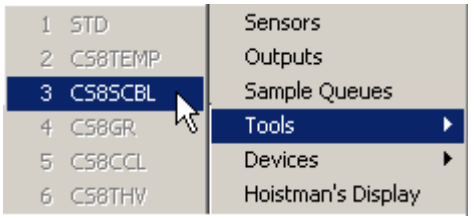


FIG: 4.6.8 Monitor Tools

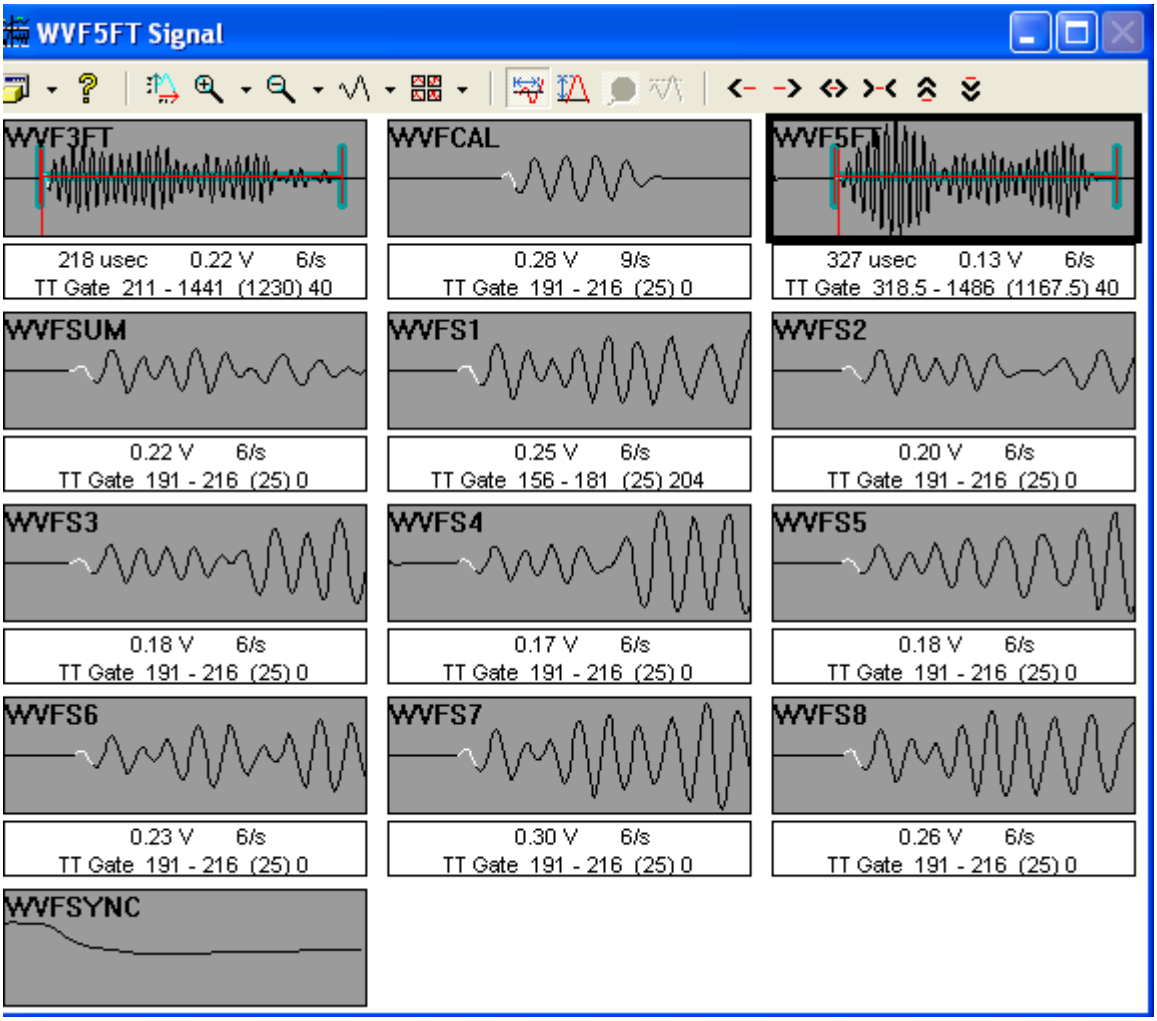


FIG: 4.6.9 Monitor CS8SCBL

4.6.4 Monitor - Devices

Displays the raw data readings of the selected device, channels, irrespective of whether channels are being used for the current service.

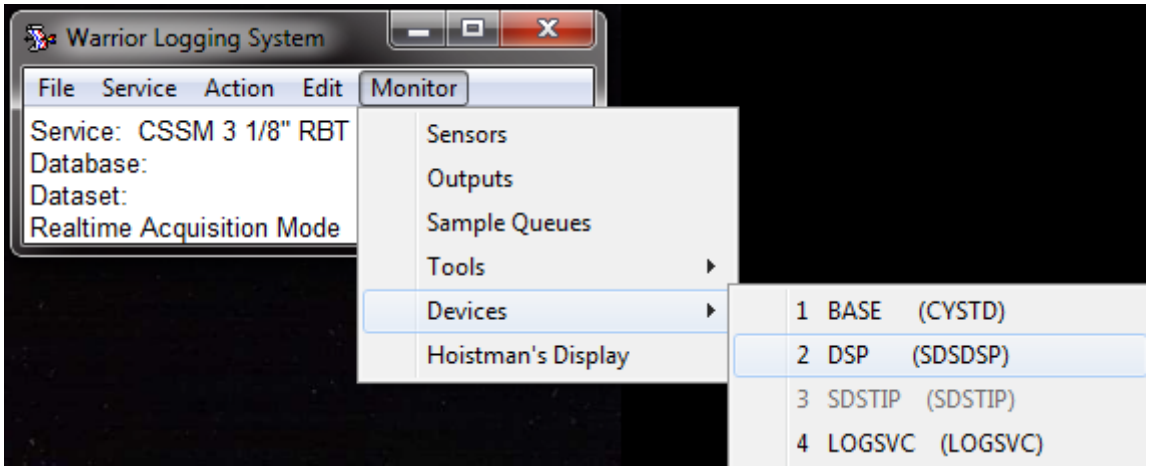
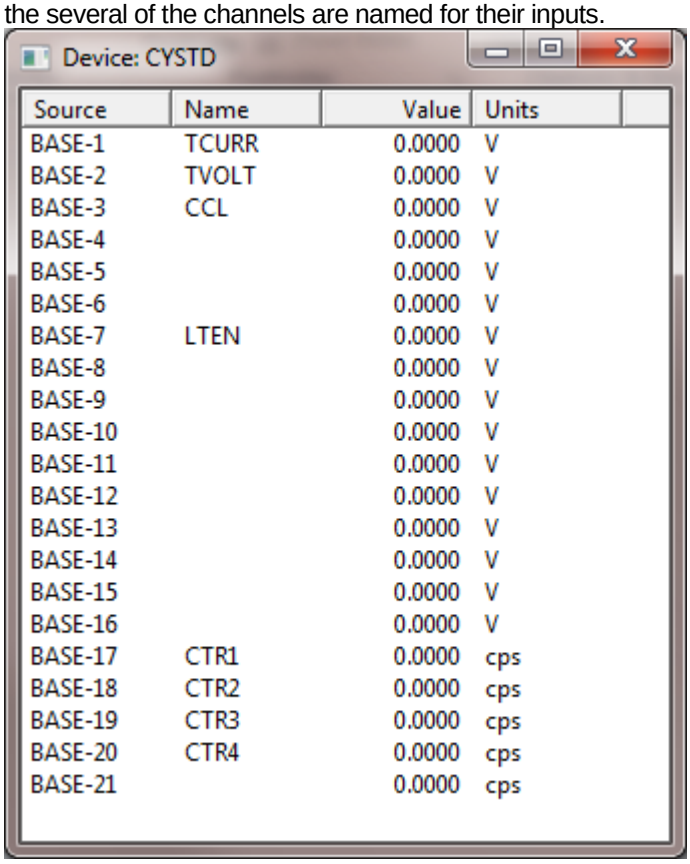


FIG: 4.6.10 Monitor Devices

Monitor – Devices - Base

If the base device is the CYSTD, the 16 possible analog inputs and 4 counter channels will be shown. Note the several of the channels are named for their inputs.



Source	Name	Value	Units
BASE-1	TCURR	0.0000	V
BASE-2	TVOLT	0.0000	V
BASE-3	CCL	0.0000	V
BASE-4		0.0000	V
BASE-5		0.0000	V
BASE-6		0.0000	V
BASE-7	LTEN	0.0000	V
BASE-8		0.0000	V
BASE-9		0.0000	V
BASE-10		0.0000	V
BASE-11		0.0000	V
BASE-12		0.0000	V
BASE-13		0.0000	V
BASE-14		0.0000	V
BASE-15		0.0000	V
BASE-16		0.0000	V
BASE-17	CTR1	0.0000	cps
BASE-18	CTR2	0.0000	cps
BASE-19	CTR3	0.0000	cps
BASE-20	CTR4	0.0000	cps
BASE-21		0.0000	cps

FIG: 4.6.11 Base (CYSTD) Values

Monitor – Devices – DSP
Depending upon the DSP script used in the service, the DSP monitor may show a variety of different things

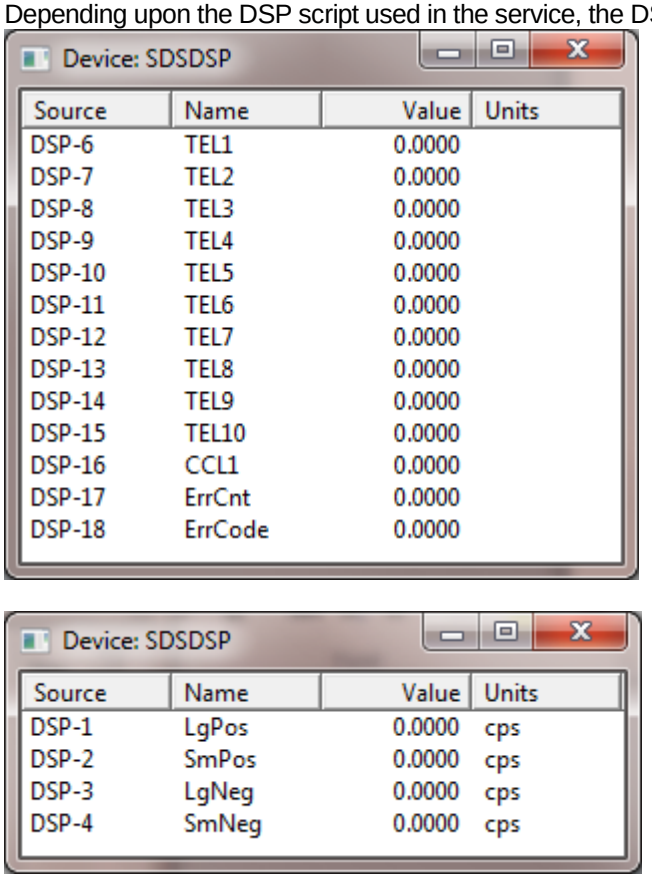


FIG: 4.6.12 Example DSP monitors.

Monitor – Devices – LOGSVC
The LOGSVC device is a software device used for processing depth and line speed.

4.6.5 Monitor – Hoistman's Display

The Hoistman's display can be loaded by clicking on Monitor / Hostman's Display or the **Hoist** button in the **Depth Control** window. Activating the popup menu can configure the view and scales. Do this by right clicking on the display and selecting the required menu option. Sound alerts for various conditions can also be configured here if a suitable sound card and speaker are available.
Note that in multi-monitor systems, the Hoistman's display can be positioned on a second monitor close to the winchman.

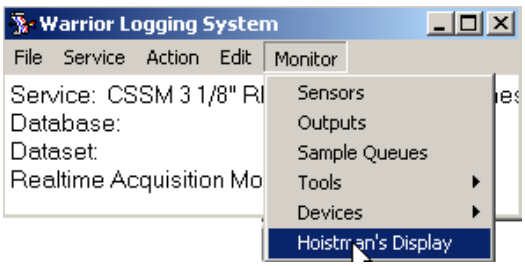


FIG: 4.6.13 Monitor Hoistman's Display

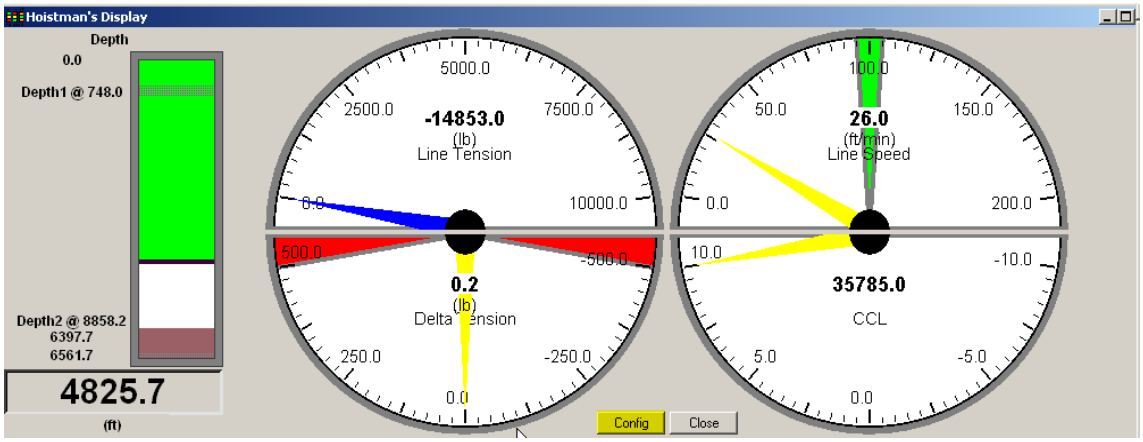


FIG: 4.6.14 Hoistman's Display

Click **Config**.

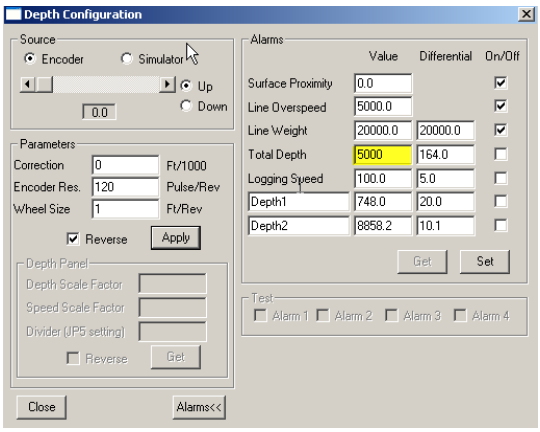


FIG: 4.6.15 Set up Depth Configuration

Right click over the gauge to select Gauge Properties

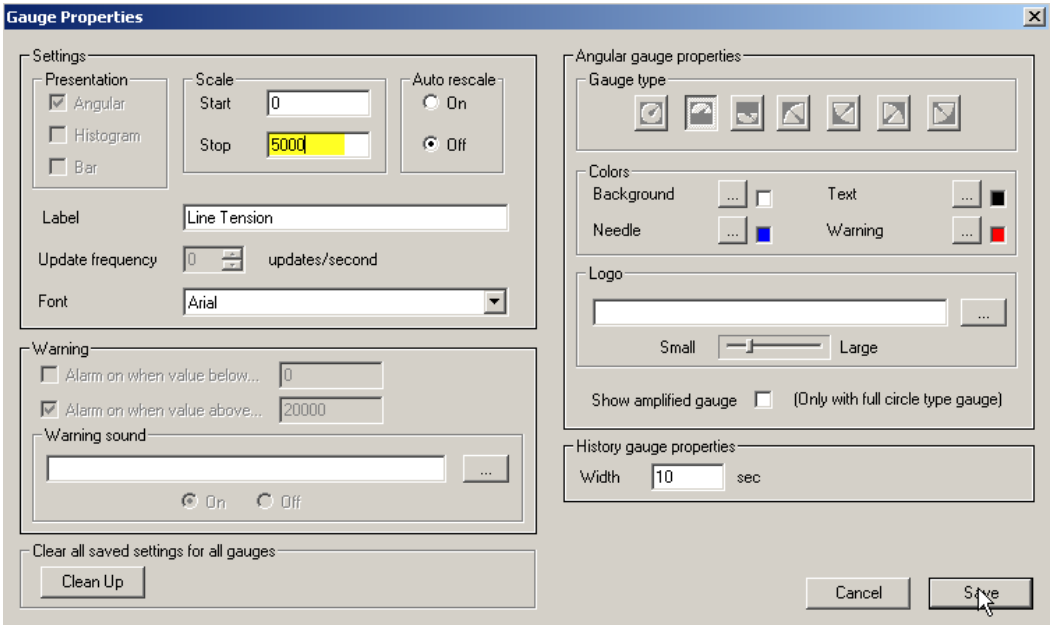


FIG: 4.6.16 Set Gauge Properties

Section

5

5 Heading Editor

The Heading Editor allows the log heading information to be added to a blank heading of pre-existing format. There are several different versions of default headings that can be produced using Warrior.
The Heading Editor may be started from several different locations including its icon in the Warrior program group, the Acquisition module under the Edit -> Heading, and Interactive Plot under Edit -> Log Heading.
.

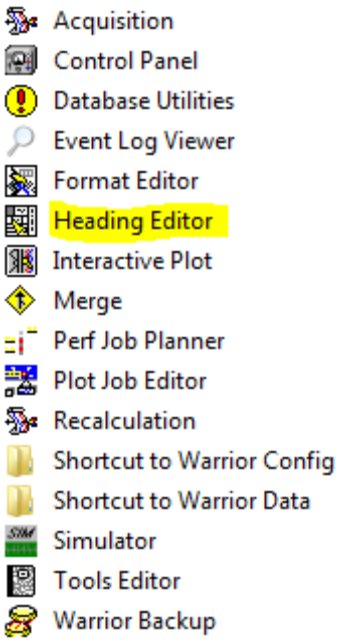


FIG: 5.1 Heading Editor in Warrior Program Group

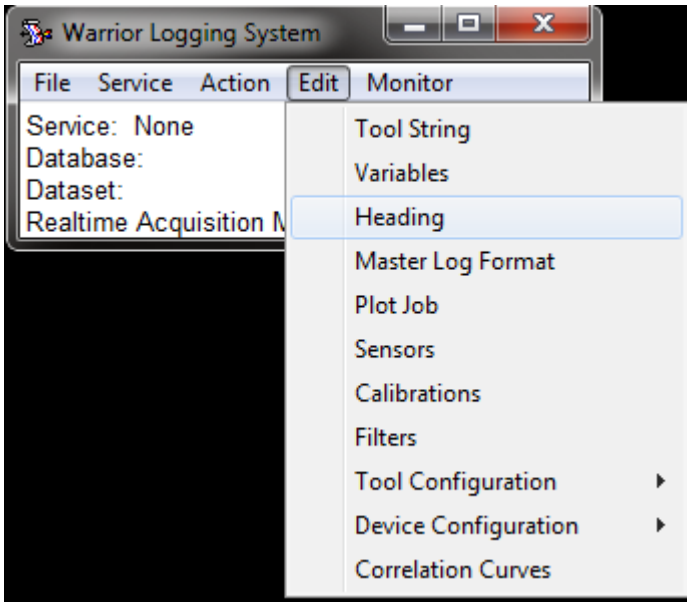


FIG: 5.2 Select Heading from Acquisition -> Edit

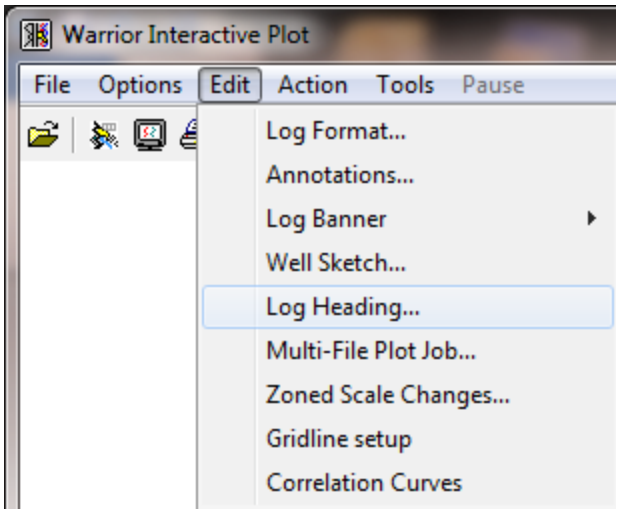


FIG: 5.3 Select Heading from Interactive Plot -> Edit

Headings are saved within and retrieved from Warrior databases. Headings generated during a logging operation, are normally saved in the same database as the log data for that job. When the Heading Editor is started, a blank heading appears. Headings can be filled out at any time during the job and saved. If the heading is only partially completed, it can be saved and reopened at later time and remaining information entered. It should then be saved again.

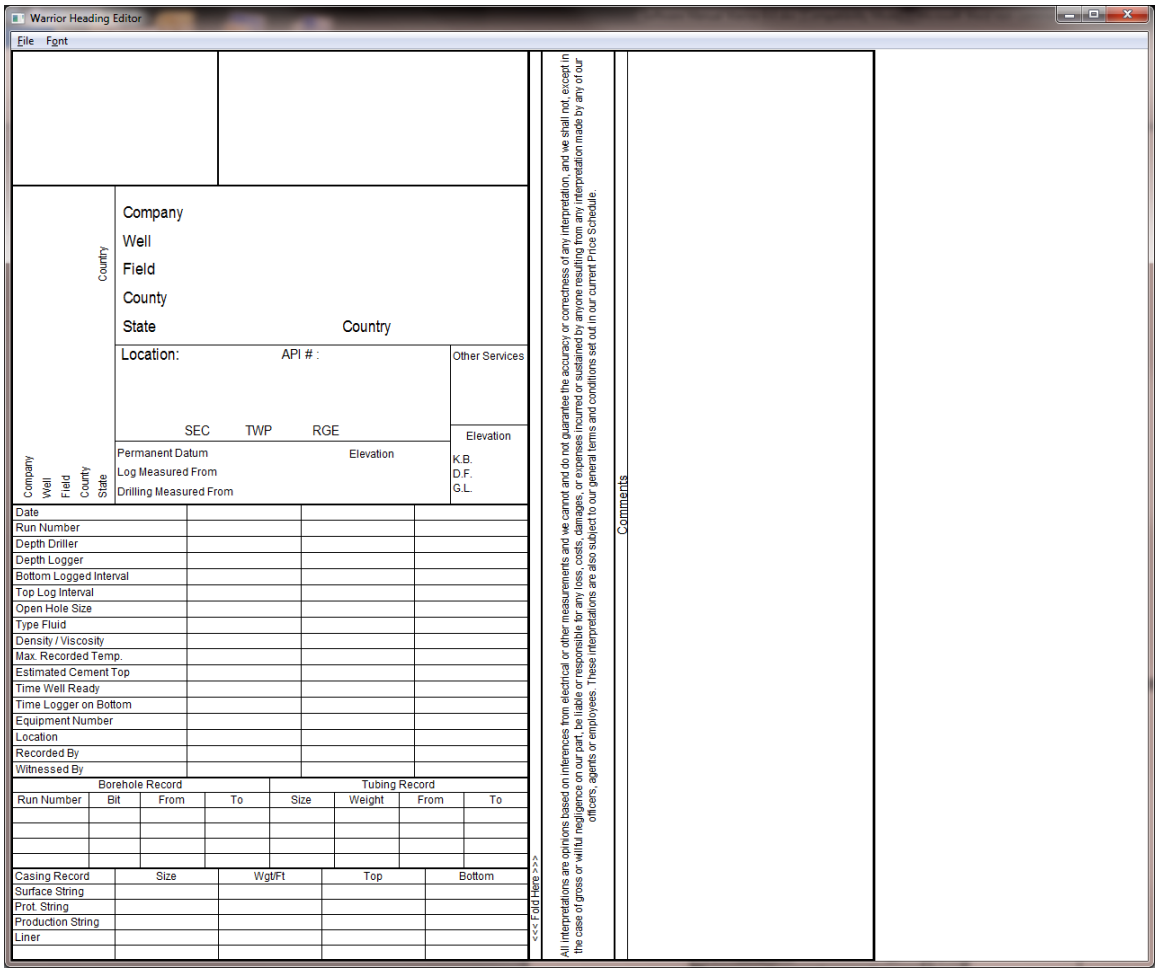


FIG: 5.4 Blank Heading (STDCased)

The default heading format is set from the Warrior Control panel – Plot page. In addition, the heading format may be changed for the current heading by clicking on File -> Select Format in the Heading Editor.

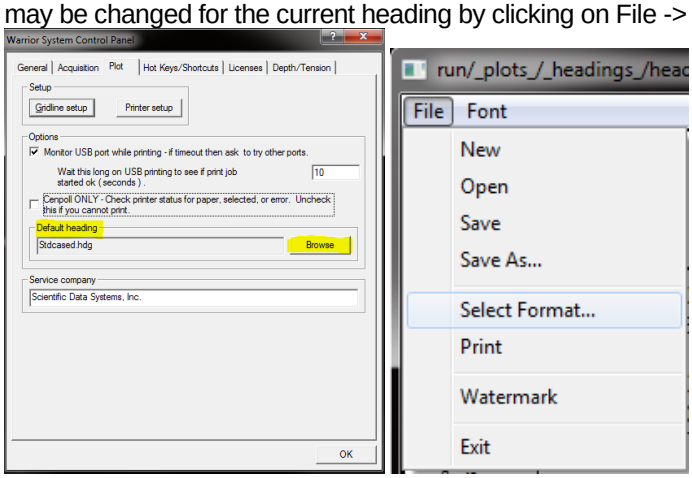


FIG: 5.5 Selecting heading format

From the Heading Editor **File** menu, either a new heading can be created, or a pre-existing heading may be selected for editing. In addition, the actual format of the header may be selected from the predefined formats in the system by using **Select Format....** Once a heading has been selected, fields may be chosen for editing by using the **TAB** key, or by pointing with the mouse to move around the heading. When a field has been selected, a dialog box appears, and the appropriate information may be entered.

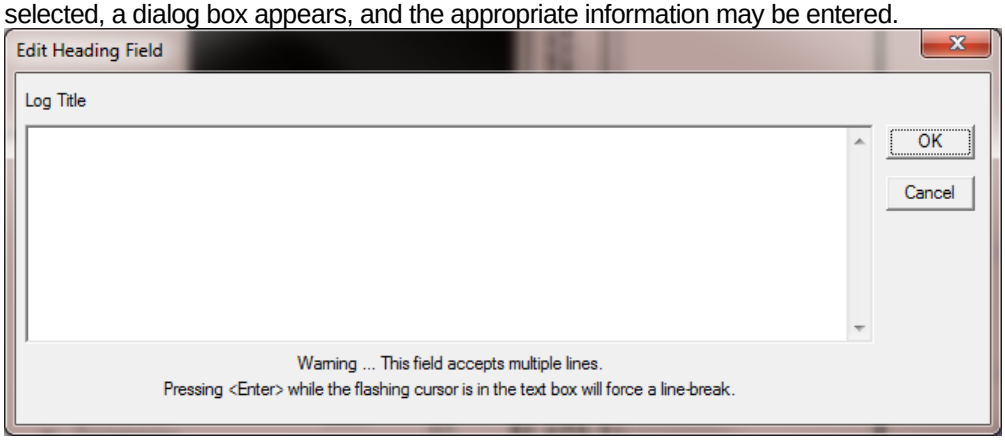


FIG: 5.6 Heading Data Field for the Log Title

Headings are saved within and retrieved from Warrior databases. Headings generated during a logging operation are normally saved alongside the log data for that job.
The description of the text to be typed in the field normally appears above the dialog entry, and the cursor is positioned for immediate text entry. When the text entry is complete, hit Enter to close the dialog window and move to the next field. Alternatively move to the OK button by using the TAB key or the mouse, and then hit Enter or click with the mouse. Then either hit the Enter key to open the next dialog window or click with the mouse to move to and open a new dialog window.

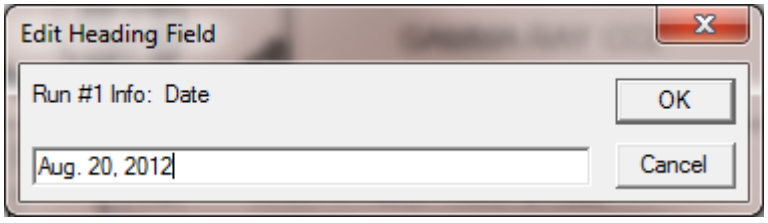


FIG: 5.7 Enter single line of information

Fields which have multiple lines are completed using a slightly different dialog box as shown in Fig. 5.8. Use the TAB key or the mouse to move to the text entry box and enter the required text. Pressing the Enter key while in the text field will add a new line of text.

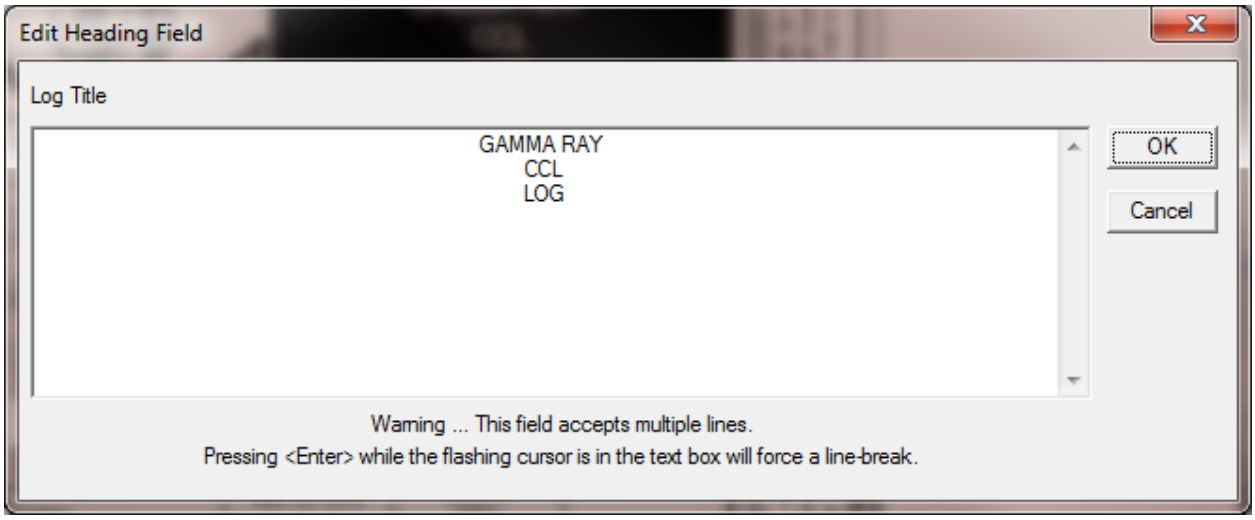


FIG: 5.8 Multiple line Entry – Click in field to Type Log Name

Warning! Do not hit Enter within the text entry box unless you wish to move to a new line within the current field, as for example, if multiple lines of text were to be entered in the Comments field.

When the text is complete use the TAB or mouse to move to the OK button and exit the dialog box as normal.

The User can Save the heading by clicking File -> Save. It may be necessary to select a database file to save the heading into. If so, be sure to select the database where you will be recording log passes.

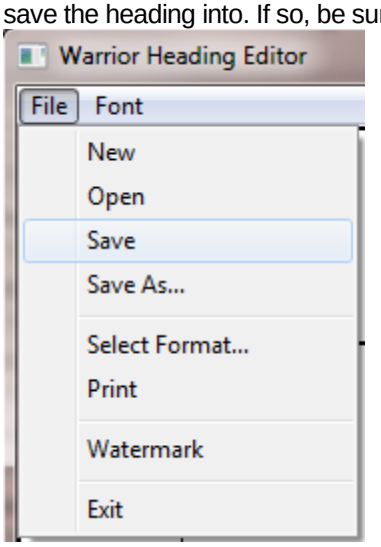


FIG: 5.9 Saving Heading

If no heading has been saved in the database, the software will use heading1 as the default heading name. Normally if you are only going to be plotting one log, the default need not be changed. The default name can be changed by backspacing out the “heading1” or highlighting the “heading1” and replacing it by typing.

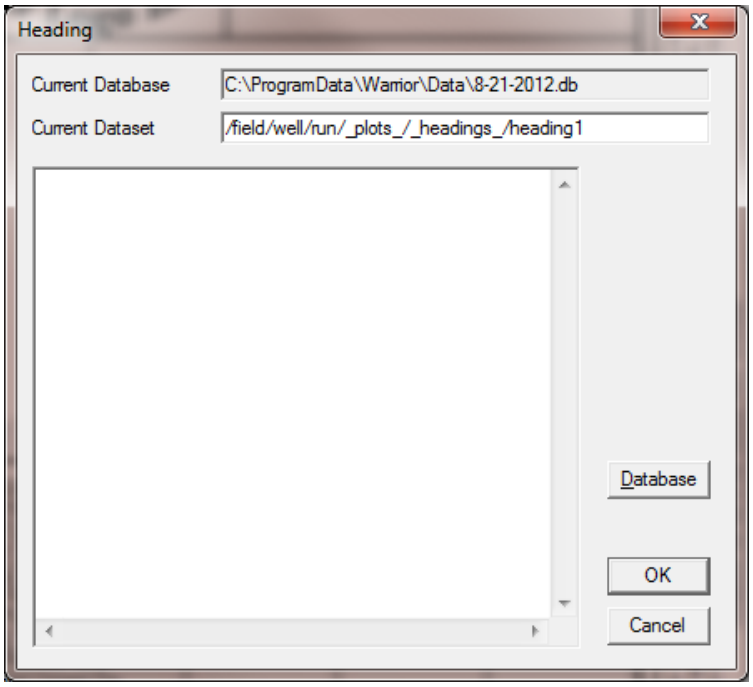


FIG: 5.10 Saving Heading – heading1 as default name

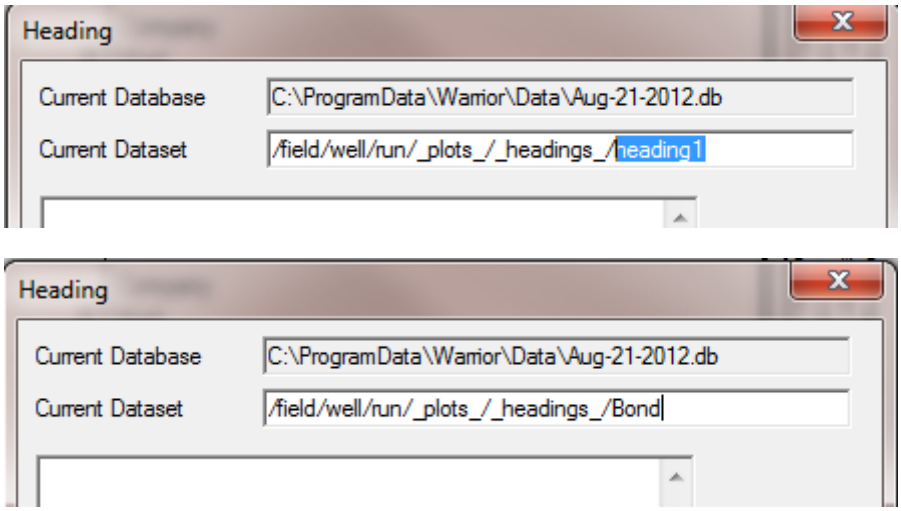


FIG: 5.11 Saving Heading – changing heading name

To save the modified heading under a different name use **Save As** from the **File** menu and enter a new name for the heading. The original heading will remain in the system under the original name.
.11 Type the new Heading name File

5.1 Heading Logo

The logo accepts formats *** .lgo, .*.wmf, *.emf, *.bmp, *.jpg**. The file must be in Warrior\Config.
In a Warrior standard heading, it should have the ratio 1 high by 2 wide to keep the proportionality with respect the original one.
To change or remove the Logo, just Mouse Left click on Logo Box.

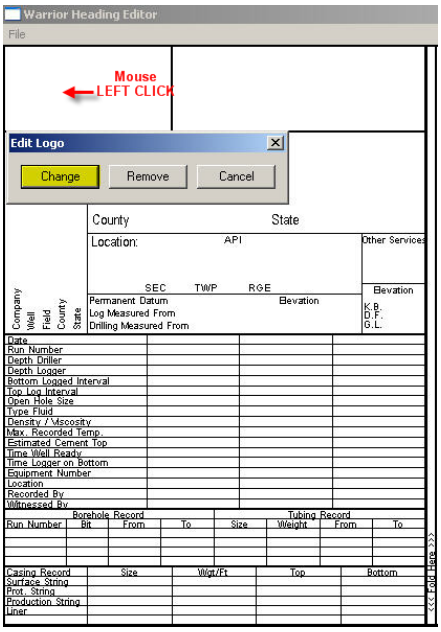


FIG: 5.12 Edit Logo

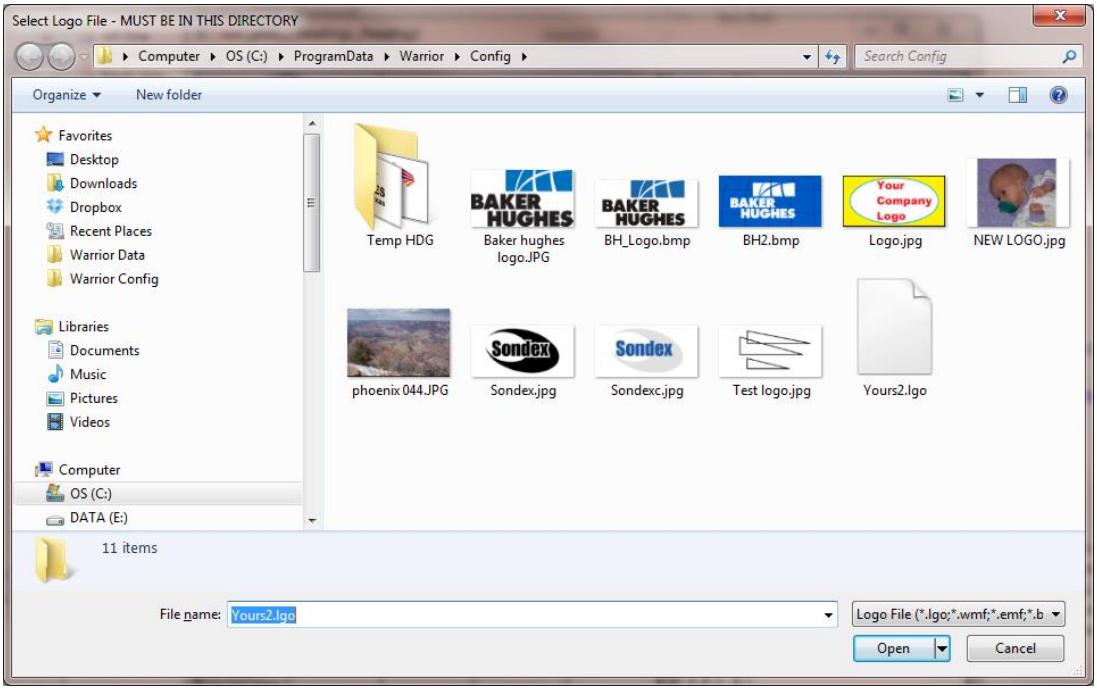


FIG: 5.13 Select the new Logo

5.2 Heading File Creation

Warrior creates headings by reading a text file that has a .hdg extension. The contents of these files can be viewed by using Windows Notepad. There are several different heading styles that are supplied with the

Warrior software (stdcased, stdopen, and greytest). The purpose of this document is to supply the information need for the user to write his own .hdg text files.

The first two lines of the file define the physical size of the heading in inches as plotted. The width of the heading is the length of the plot from the plotter. The height is the width of the heading, with 8.25 being the standard API log width.

Width 10
Height 8.25

You must define panels to make the separate sections of the heading. Pictures, text, text edit fields, and panels may then be placed in the panels. Two pairs of x,y coordinates define the location of a panel as a percentage (0 to 100) of the current panel. The contents of the panel are enclosed in curly brackets.

Panel x1, y1, x2, y2
{
Panel Contents
}

The Border statement defines the thickness of the panel edge. The larger the integer N, the thicker the border will become.

Border N

The Font statement defines the font size of any text that is printed within a panel. The larger the integer N, the larger the font size.

Font N

Both the Font and the Border statement control the effects of the panel that they are in and all panels that are included in that panel, unless the included panel contains Font or Border statements, which are then used for that panel and any panels that it might include.

A picture may be placed within a panel. The location of the picture is defined by two sets of x and y coordinates as a percentage of the current panel. The name of the picture must be declared under the heading section of Warrior.ini.

Picture x1, y1, x2, y2 {NAME}

Text may be placed within a panel. The location of the text is defined by two sets of x and y coordinates as a percentage of the current panel. Previous font statements determine the size of the text. The orientation of the text is determined by a four-letter code - OTHV. The O is the orientation of the text, the T is the type of text, the H is the horizontal centering, and the V is the vertical centering. Text strings that are larger than the area specified may have unpredictable results. They might be truncated or extend outside of the defined area. Multiple line text will automatically wrap at a word boundary if the text exceeds the area length.

O H - Horizontal Text
V - Vertical Text
T S - Single line of Text
M - Multiple line of text
H L - Left justify for horizontal text, Bottom justify for vertical text
C – Center Text horizontally
V T - Top justify for horizontal text, Left justify for vertical text
C – Center Text vertically

TextOTHV x1, y1, x2, y2 "TEXT"

An editable field may be placed within a panel. The location of the field is defined by two sets of x and y coordinates as a percentage of the current panel. Previous font statements determine the size of the text. The orientation of the text is determined by the same four-letter code - OTHV that is used with text. A hint name for the field is enclosed within curly brackets. A hint line is then added (normally at the end of the file) that will give a hint text to the user when he clicks on the field.

EditOTHV 0,0,100,100 {Hint Name}
hint "Hint Text" {Hint Name}

The following examples are the only commands that are in *.HDG and *.WLB files for headings and well log banners.

Width 10
Height 8.25
Panel x1, y1, x2, y2 {Panel Contents}
Border N
Font N
FontfaceN “style”
Picture x1, y1, x2, y2 {NAME}
TextOTHV x1, y1, x2, y2 "TEXT"
EditOTHV 0,0,100,100 {Hint Name}
hint "Hint Text" {Hint Name}
Comments

5.3 Headings LOG Banners File Creations

In addition to heading files (*.HDG), well log banners (*.WLB) use the same form of text file but when printed, the orientation is rotated 90 degrees. Thus, a heading has a height of 8.25 inches and a banner has a width of 8.25 inches.
Pipe Tally Tables (*.WRF) also use a similar format with some variance. The mode of entering user information is quite different.
Comments may be placed anywhere in the file. Comments normally have // as the first two printable characters on a line.

5.4 Pipe Tally Tables

Pipe Tally Tables have a few additional commands and the mode that Edit text commands gets their data is different. The edit text fields are pre-defined rather than defined by the Hint Command and are filled from editing the heading information of the pipe tally table, editing the grading of the settings, and from processing the log. The predefined fields are as follows:

{CONAME} – Company Name from Edit – Heading Information
{WELLNAME} – Well Name from Edit – Heading Information
{FLDNAME} – Field Name from Edit – Heading Information
{COUNTY} – County from Edit – Heading Information
{STATE} – State from Edit – Heading Information
{DATE} – Date from Edit – Heading Information
{COMMENT} – Comments from Edit – Heading Information
{RANGE1} through {RANGE6} – Maximum of six grading ranges from editing Settings - Grading
{SYMBOL1} through {SYMBOL6} – Maximum of six grading ranges from editing Settings – Grading
{GRADECNT1} through {GRADECNT6} – Count of the number of joints of that grading acquired from Scan Minimum Wall Log
{RWBC_LVAL} – Bar Chart Left Value from RWBC_LEFT of Warrior.ini
{RWVC_RVAL} – Bar Chart Right Value from RWBC_RIGHT of Warrior.ini

{RWUNIT} – Units of curve from Scan Minimum Wall Log
{NO***X***} – Number of Joint X from Scan Minimum Wall Log
{DEP***X***} – Top Depth of Joint X from Scan Minimum Wall Log
{LEN***X***} – Length of Joint X from Scan Minimum Wall Log
{RW***X***} – Remaining Wall of Joint X from Scan Minimum Wall Log
{PLX***X***} – Percentage Loss of Joint X from Scan Minimum Wall Log
{PLF***X***} – Percentage Left of Joint X (100-PLX***X***)
{RWBC***X***} – Remaining Wall Bar Code of Joint X for Bar Charts
{GR***X***} – Grade Symbol of Joint X from Range and Symbols above and scan
There are three addition command that are used to create *.WRF pipe tally tables.

They are as follows:

Recount N
This line must be in the first 512 characters of the WRF file (normally place just after the Width and Height commands). It is a count of the number of joints to be shown on each sheet as the file is printed.

barchart x1,y1,x2,y2 {RWCBZ}
Charts bar code for Joint ***Z*** on RWBC_left to RWBC_right Scale

The Bar graphic default can be changed from by editing the Wproperties file.
Open Wproperties with notepad and search for [Heading] if the line BarChartCode is not present add it an select a grayscale for the output.

[Heading]
BarChartCode=

0	white
1	light gray
2	gray (default)
3	dark gray
4	black

editHSCCB 0,0,100,100 {GR*Z*}
Prints Grade symbol for Joint ***Z*** horizontal centered both vertically and horizontally on a colored background.
The color of the background is defined in Warrior.ini [Heading] section.
BkColorMap=grade1,{color1},grade2,{color2}, etc.
Where grade {x} is the symbol for a grade and color {x} is R, G, B set

Section

6

6 Format Editor

The Format Editor allows the creation and editing of the log presentation or format files. The output of the format editor are files of the type *.prs which are subsequently used to control all aspects of plotting acquired data. The Format Editor may be started in three different ways: From its icon in the Warrior program group, from the **Edit** menu of the Acquisition or Recalculation modules, or from the **Action** menu of Interactive Plot. In addition, double-clicking in the scales area of the Interactive Plot window will also start the Format Editor. When started from the Warrior program group the Format Editor window will open with no presentation available for edit. Any presentation that is opened from there will be opened in Master Format mode so that any changes that are made will be permanent. If started from the Acquisition or Recalculation the Master copy of the presentation as declared in the current logging service will be opened. For Interactive Plot modules, the log format currently being used will be presented.

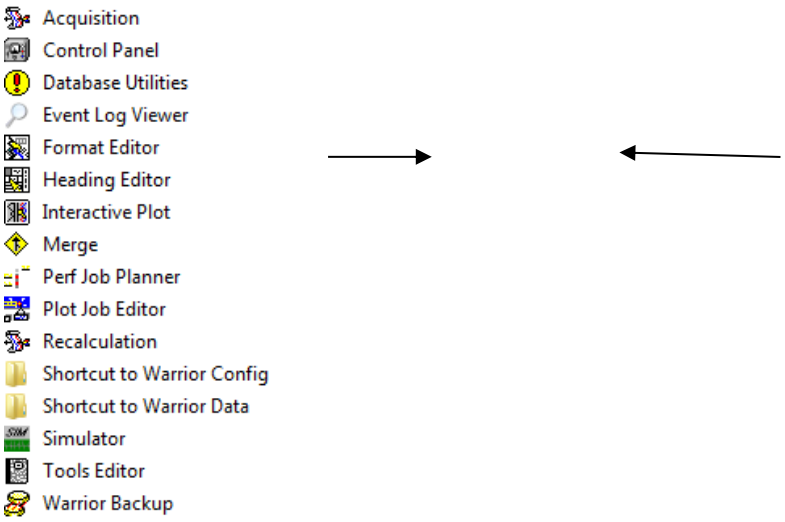


FIG: 6.1 Select Format Editor from Warrior program group

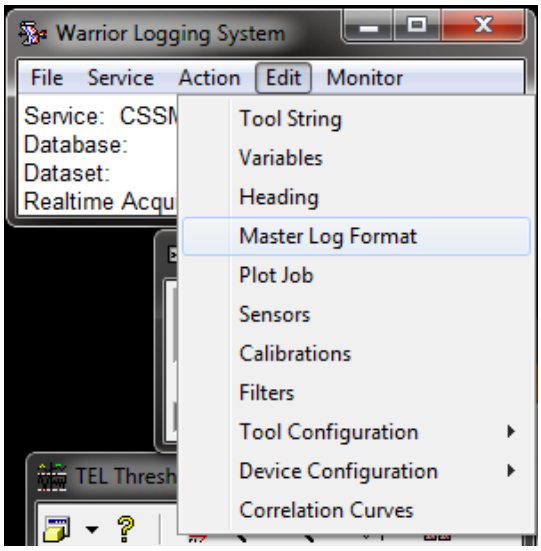


FIG: 6.2 Select Format Editor from the Acquisition window

When the Format Editor is opened from the Acquisition or Recalculation window, the format specified in the current service in the services.ini file is opened in the Master Format mode. Any changes that are made will be permanent to that Master Format. If a private copy of a presentation using that format has been saved to a database, no changes will be made to the private copy.

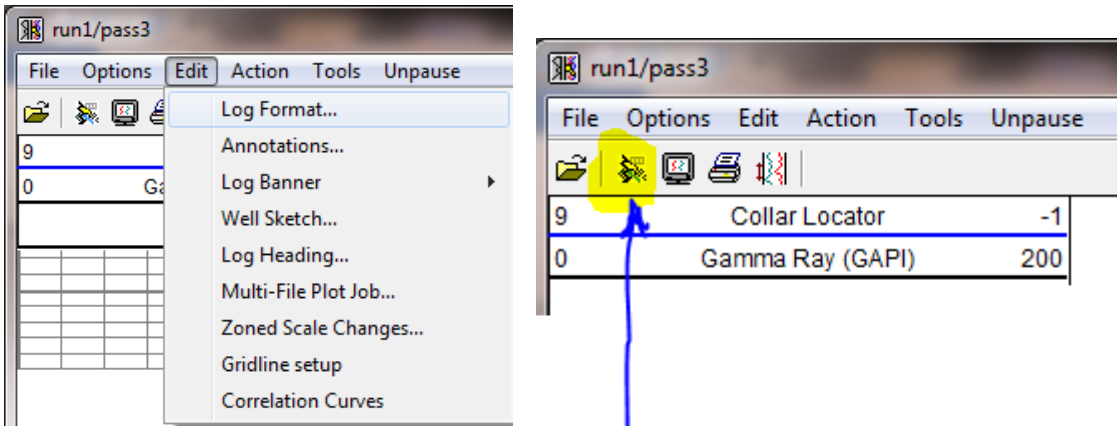


FIG: 6.3 Select Format Editor from the Interactive Plot window

The Format Editor can be opened from three different places in the Interactive Plot window. If you click Edit -> Log Format…, Click on the second icon on the Presentation Plot screen, or double click on the log scales, the Format Editor will open to the current presentation format.

When the Format Editor is invoked from Interactive Plot, changing the log format and saving it causes the active screen plots to be re-plotted with the new format. Note that many screen plots may be overlaid on each other at any one time. If a large number a plot are present, a noticeable delay will occur while all are re-plotted.

Before going any further we should discuss the difference between a Private Copy of a presentation and a Master Copy of a presentation. The Master Copy of a presentation is a file kept in the Warrior\Format folder. When a log pass is started from Acquistion, normally a copy of this file is placed into the Warrior database. This becomes the private copy that will be edited any time the format editor is opened from the interactive plot. Whether the private copy is used in a service or not is controlled by the service. In the Service Editor, there is a box “Use private copy of a presentation for all logs from this service”. If this box is checked then the

private copy will be placed in the database. Otherwise, the will be no private copy and the master copy will be used at all times. It is recommended that the “Use private copy of presentation for all logs from this service” box be checked in all services.

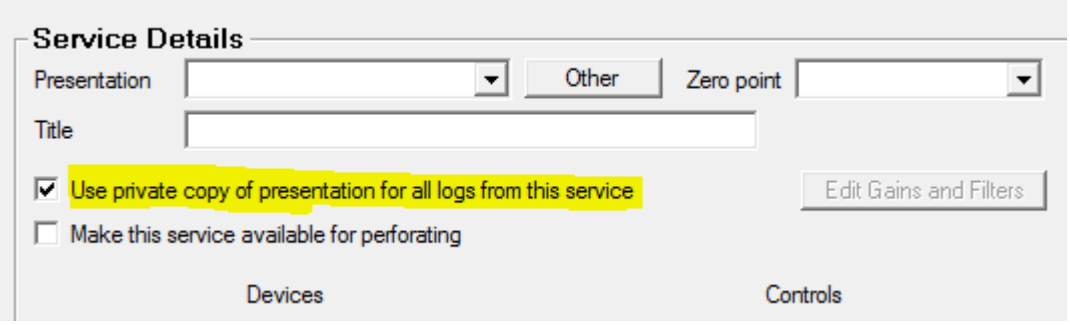


FIG: 6.4 Selecting Private copy of presentation in the Service Editor

When Format Editor is opened from the Warrior Program group, no presentation is shown. To edit a presentation, you must first select a presentation and open it. To do this, click on the [Open] button. Or build a presentation from the beginning, including the grid layout.

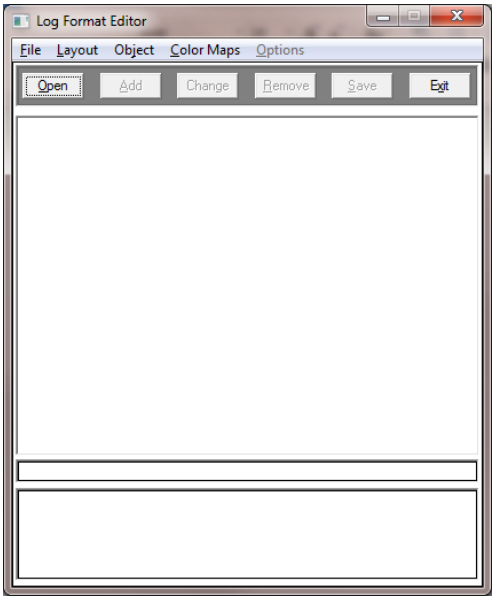


FIG: 6.5 Open Format

This will display a file selection window showing all the presentation files, currently available, within the system. The operator can select the presentation file to be edited. Note that all presentation files are to be found in the \warrior\format directory and have a prs extension.

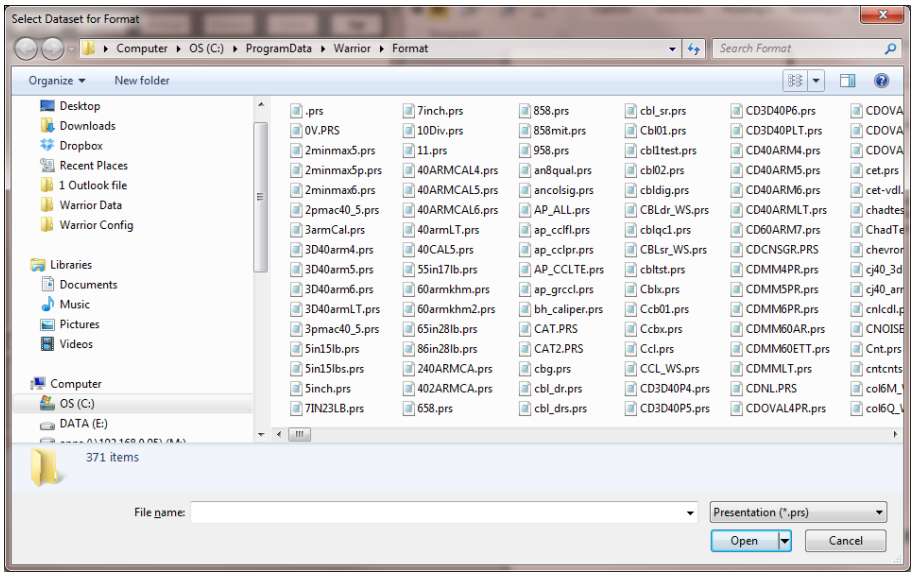


FIG: 6.6 Select Presentation Format to be Edited

From the Acquisition or Recalculation modules select Edit -> Master Log Format. The log format specified in the currently selected service will be presented. Note that when the master presentation is edited, if a private copy of the presentation has been created in the dataset, changes will not be made to the private copy.

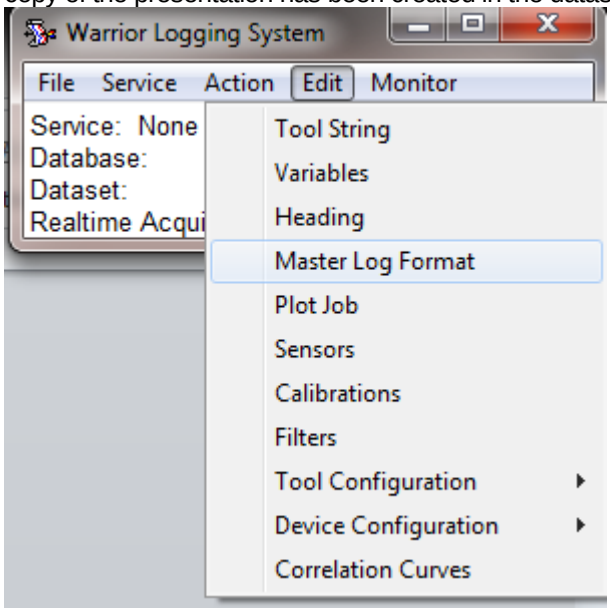


FIG: 6.7 Select Master Log Format

6.1 Editing a Log Format

The Format Editor provides the User a means to graphical display data. Any data or variables in a pass, either recorded or imported from external data, can be displayed using one of a few different layout presentations, or the User can create his own layouts. Fig. 6.8 below shows a sample presentation for a radial bond log.

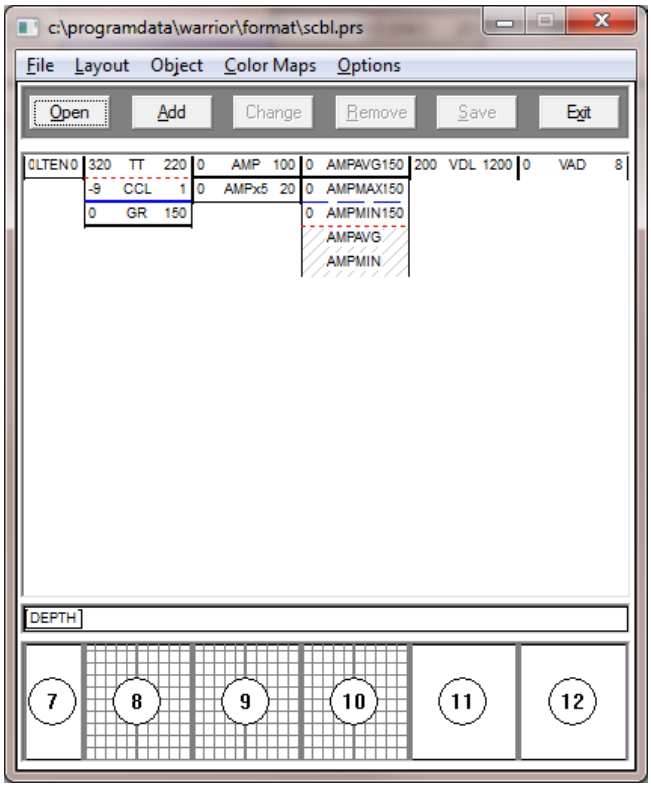


FIG: 6.8 Example presentation

6.1.1 Editing a Data Item

To edit the plotting parameters of an existing curve, click on the curve shown and then click the [Change] button. Optionally, if you double click the curve it will also open the Define Data Item dialog window for curve editing.

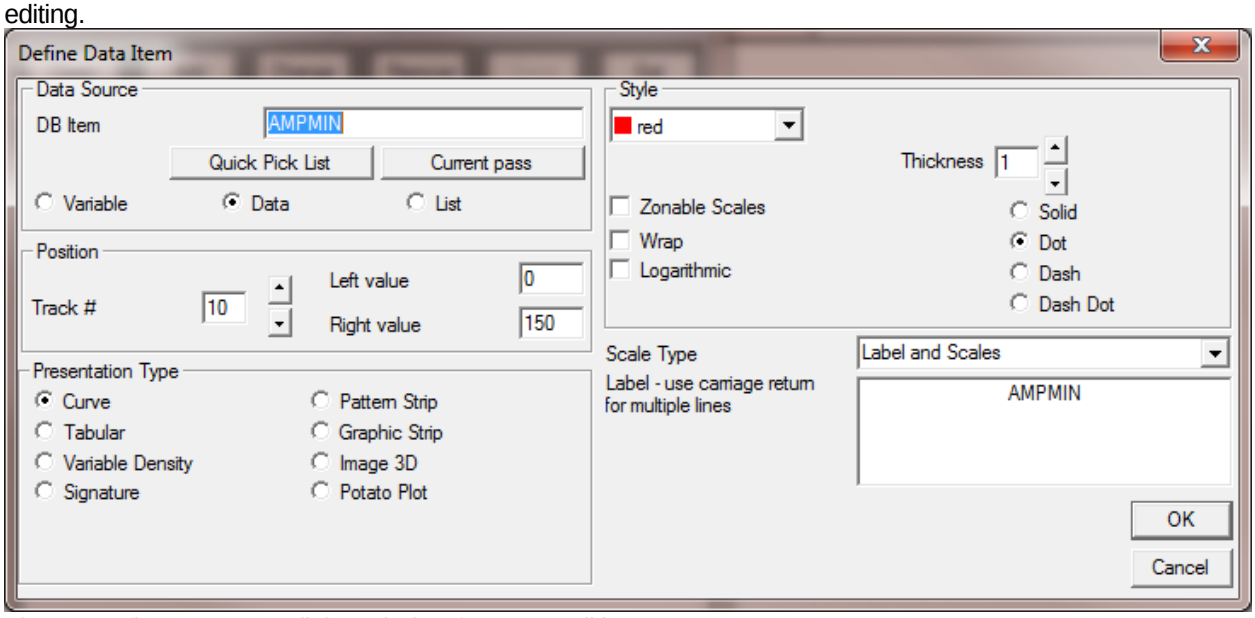


Fig. 6.9 Define Data Item dialog window for curve editing.

The DB Item should be a valid Warrior Data Mnumonic or Warrior Variable but the software does not check to see if the entered DB Item is valid. If the DB Item does not exist in the current pass, the software sets up the DB Item named to be plotted but no curves or curve label are shown in the plot.

If the Format Editor is invoked from a Presentation Plot there will be a [Current Pass] button under the DB Item entry box. Clicking on the [Current Pass] button will show a list of all of the plottable items in the current pass. The [Quick Pick List] provides a list of commonly used DB items, but is by no means a complete list of possible DB items.

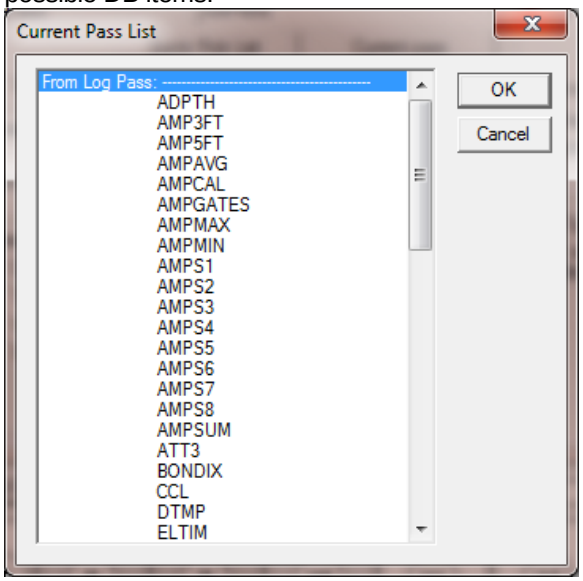


Fig. 6.10 Partial list of Data Items from a log pass

There are three basic types of DB items that can be plotted. The most common is a data item that is usally an output. Any of the log variables may be plotted as a variable. The list type would be an array of curves or the same type such as caliper arms or sector amplitudes.

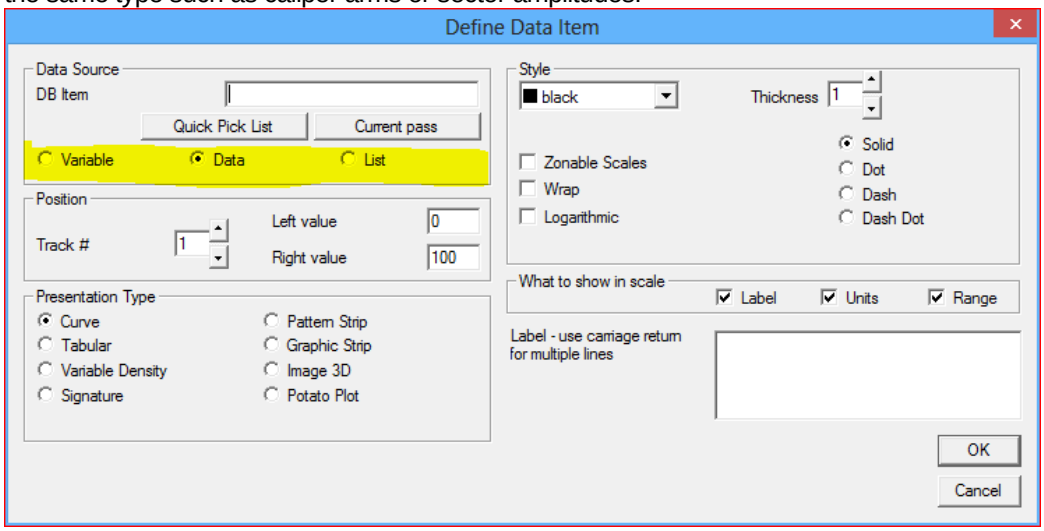


Fig. 6.11 DB Item Types

The curve may be put into any track that is defined in the current grid layout as shown at the bottom of the window. Note that the track numbers do not necessarily conform to any API standard. The track number can be changed by typing in the track# window or by using the scroll bar buttons next to the window. The presentation may use any of the predefined layouts or the User may edit or build his own layouts, as will be discussed later.

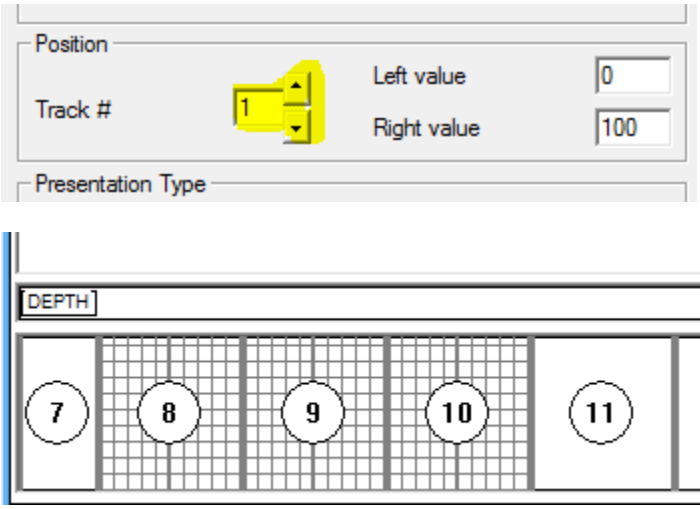


Fig. 6.12 Assigning curves to a track

The presentation type to be plotted will depend upon the data that has been selected. Most data and variables will be plotted using a curve or a Tabular list of the data. Waveform data will normally be presented using a Variable Density or Signature.
Pattern strips represent the values using a color pattern. Certain items such as Well Objects are plotted as a graphic strip. Caliper arrays can be plotted as a 3D image. Caliper cross sections and other items would be plotted as potato plots.

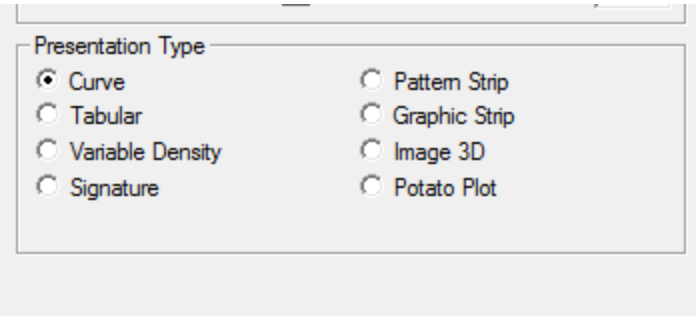


Fig. 6.13 Presentation types

6.1.1.1 Plotting Data Item as a curve
When a data item or variable is plotted as a curve, there are several other options besides the track and the scale values. These options include the color of the line, the thickness, and the dash pattern.
The curve may also be plotted logarithmically between the scale values (Note that curves are plotted regardless of the grid layout that is in that track).
The Wrap option allows a curve to re-enter the track from the opposite side if it has exceeded the scale value.
Zonable scales allows the user to set the scales to different values through different depth intervals on the log pass. The values and depths are entered through the “Edit -> Zoned Scale Changes …” option in Interactive Plot.

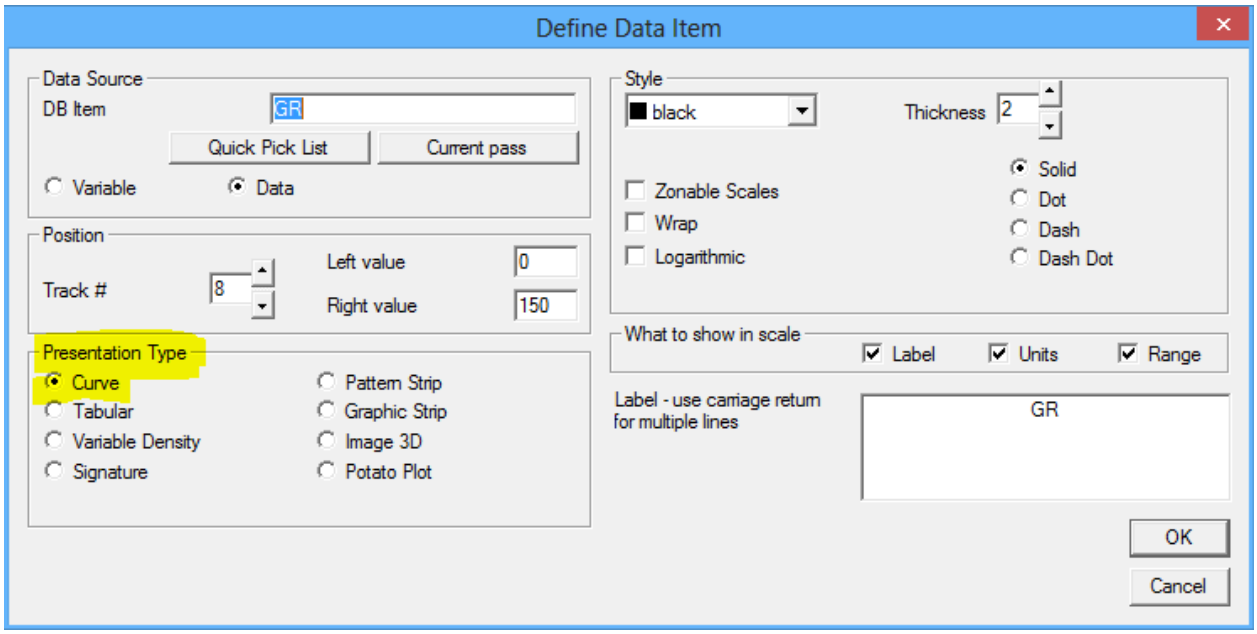


Fig. 6.14 Curve Style Options

6.1.1.2 Plotting Data Item as a Tabular Value

Scalar database items and variables may also be plotted as tabular data. The track is selected from the Grid Layout as before, but in this case the scales are not used. The color chosen will be the color that the tabular text is printed. The tabular data can be plotted in the left, middle, or right position of the selected track. The number of decimal places to be shown can be selected. If the data is plotted by interval, the interval between samples shown on the log can be selected. If the data is plotted by data, the delta change of the data can be selected, with the data being displayed whenever the amount of change has been reached. As with plotting a curve, the label may be changed from the Warrior mnemonic and whether the label and units are shown on the scale inserts can be selected. The Range, like the scales, is not used in this instance.

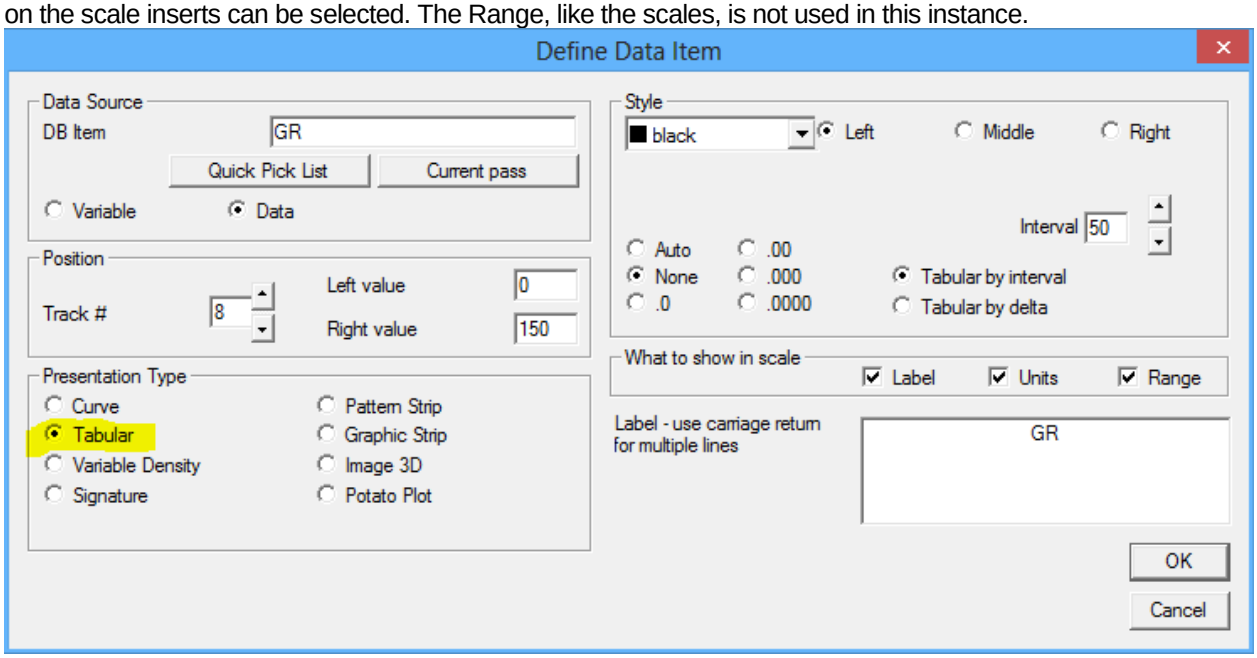


Fig. 6.15 Tabular Listing Style Options

6.1.1.3 Plotting Waveform Data Item as a Variable Density

Database items that are digitized waveforms can be plotted as either a Variable Density or as a Signature. The track is selected from the grid layout in the normal manner. The left and right scales are the sample times in microseconds. If scale values are selected that are out of the digitized range of the data item, then the maximum digitized value is used.

When waveforms are plotted as a variable density, normally the Percentage of the waveform windows maximum size is used. The Percentage of Black level and White Level set the levels to change to the last shades of the color map. As an example, if the color map had black, white, and three shades of gray between them, and the percentages were both set to 40%, then when the signal height gets greater than 40% or 1.0 volts positive the signal will be black, between 40% and 20% the first shade of gray, between 20% and -20% the second shade of gray, between -20% and -40% the third shade of gray, and at greater than -40%, or 1 volt negative signal, will be white. The percentages should be kept approximately equal if a small number of different shades are in the color map to keep the baseline in the middle shade. Note that by lowering the percentages, this in effect increases the contrast of the signal, making very small signals visible.

Constructed waveforms made from array of data, such as sector maps made from the individual sector amplitude data, may also be plotted as a variable density. In this case, if Specific Values is chosen, then the calibrated output value of the data is used to set the upper and lower limits. If we use limits of 10MV and 60MV and a map with black and white and three grays, then when a sector amplitude is less than 10MV, that section of the map will be black. When a sector amplitude is between 10 and 23.3, the first shade of gray will be shown. When a sector amplitude is between 23.3 and 36.6, the second shade of gray will be shown. When a sector amplitude is between 36.6 and 60, the third shade of gray will be shown. And when a sector amplitude is greater than 60MV, that section of the map will be white.

In addition to the options for labeling the scale insert as before, the User has the option to show the mapping in the insert or not.

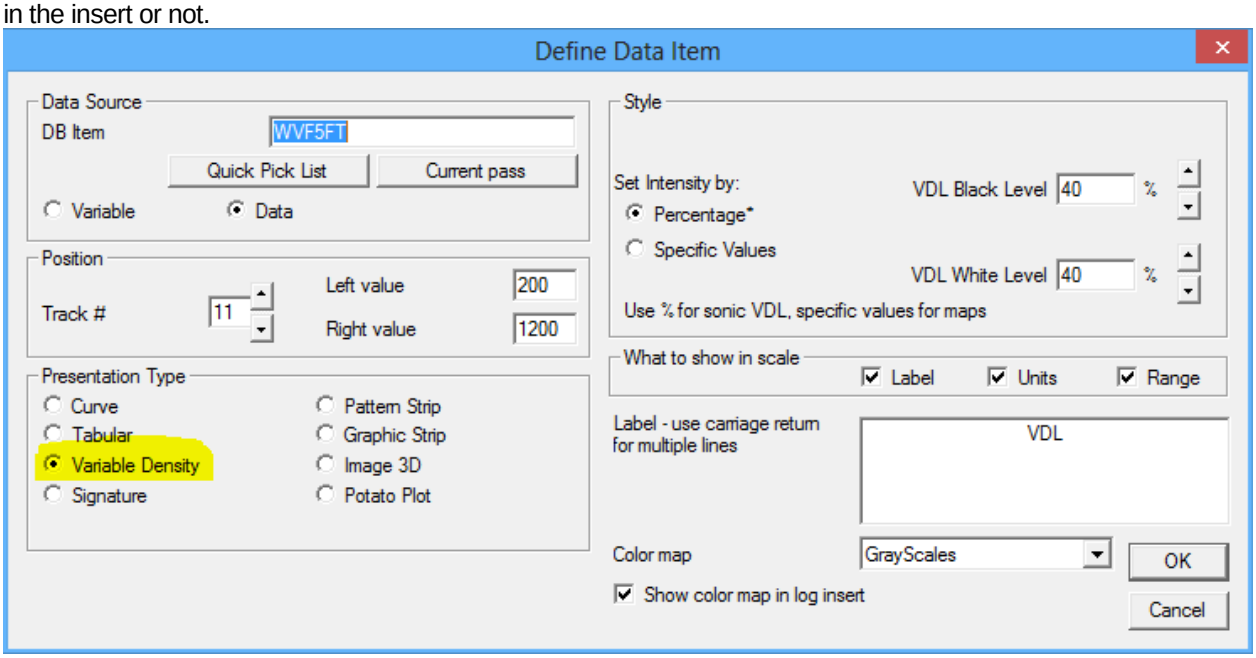


Fig. 6.16 Waveform Variable Density Style Options

6.1.1.4 Plotting Waveform Data Item as a Signature

Waveform data can also be plotted as a signature. The scales are the time in microseconds of the waveform capture as with a variable density and are limited by the actual time of the capture.

The User has the options of scaling the relative height of the waveform in the presentation and the interval of how often the curve is plotted. The interval is in the units of the log, feet or meters. The positive portion or the negative portion of the waveform can be selected for shading. The waveforms can also be presented using a logarithmic gain and / or with waveform maximum readings all normalized to the same value. The position of the waveform in the track can be shifted by entering a Vertical Skew value in the depth units.

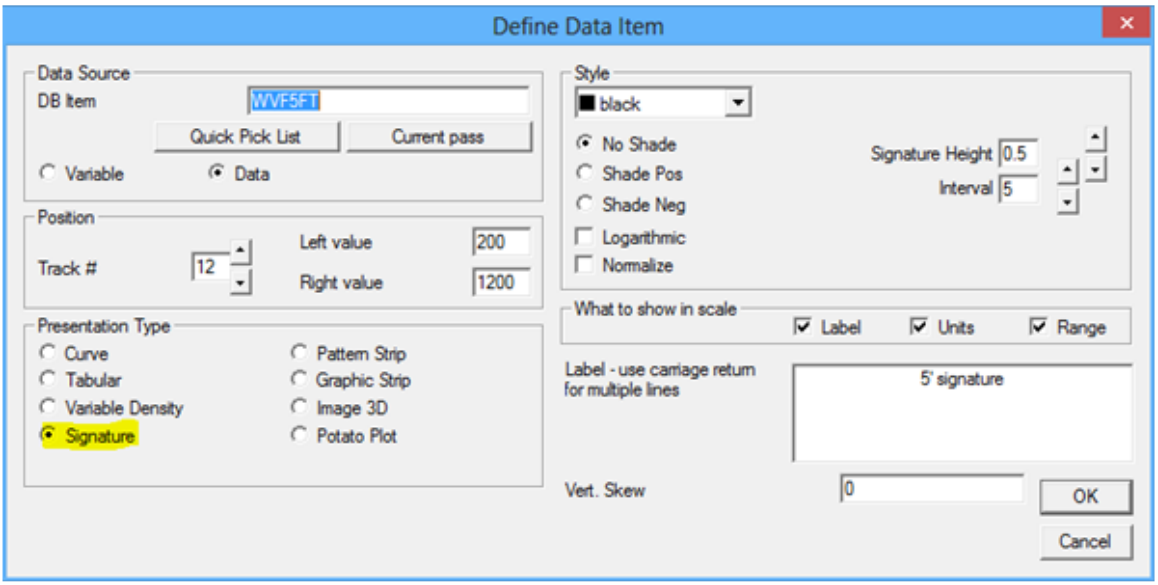


Fig. 6.17 Waveform Signature Style Options

6.1.1.5 Plotting Data Item as a Pattern Strip

Data item may also be plotted as a pattern strip. Rather than plotting a curve, the data is shown as a band, or strip that changes shades or colors to indicate relative value across the whole width of the track that it is plotted in. The left and right values are the maximum extents of the color map used for shading. The last colors of the color map are used if the scale values are exceeded. An example of a bond amplitude curve used to indicate good bonding or poor bonding is shown in the figure below.

It is possible for the shading to be composed of one of the 25 different shading patterns that Warrior Software uses for the shading of logs. However, at the present time this requires hand editing of the color map in the Warrior.INI file. If this should be needed, contact Scientific Data Systems for further instructions.

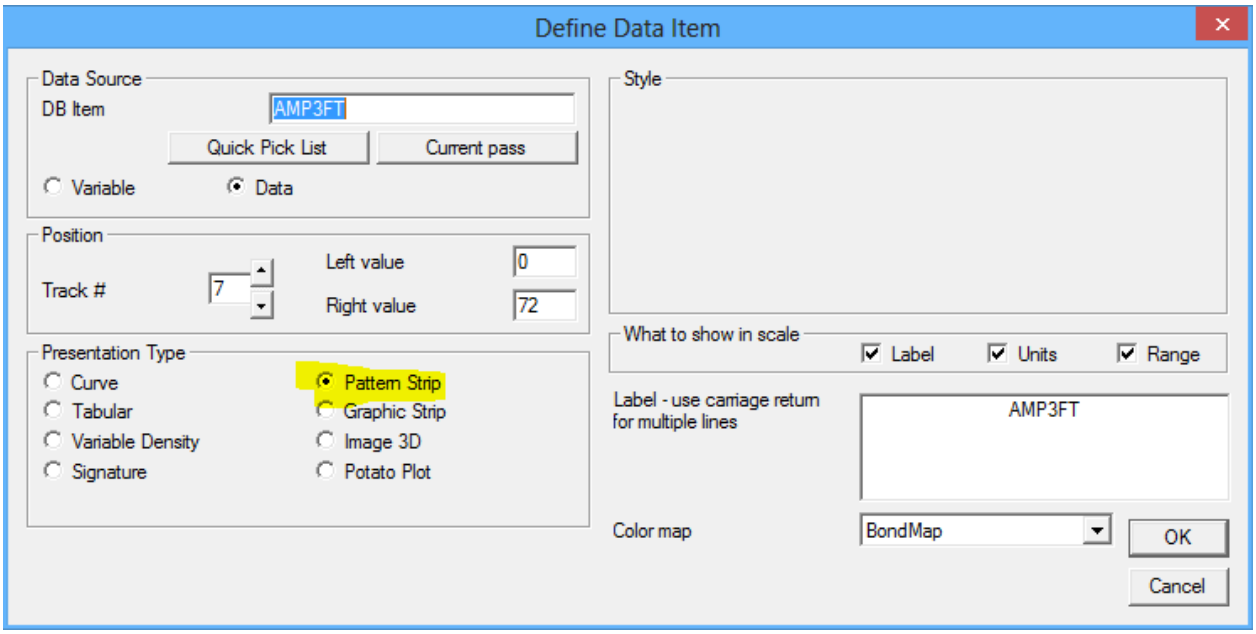


Fig. 6.18 Plotting Pattern Strip

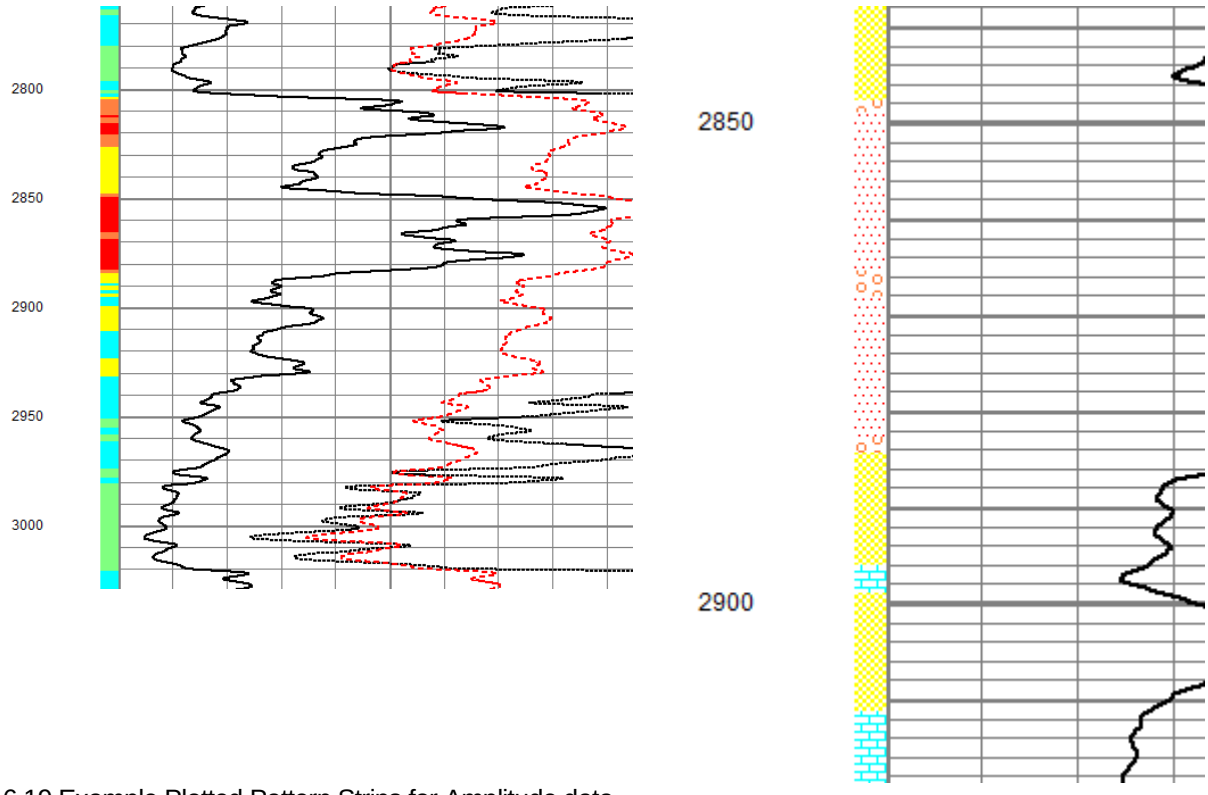


Fig. 6.19 Example Plotted Pattern Strips for Amplitude data

6.1.1.6 Plotting a Graphic Strip

Graphic strips are used to plot well objects created by the Well Object Editor. These are normally created by using Edit -> Well Sketch. The allows the User to create a Well Sketch containing perforations, plug, packers,

tubing, etc. and placing them in any defined track in the grid layout. The DB Item selected to be plotted is WELLOBJ.

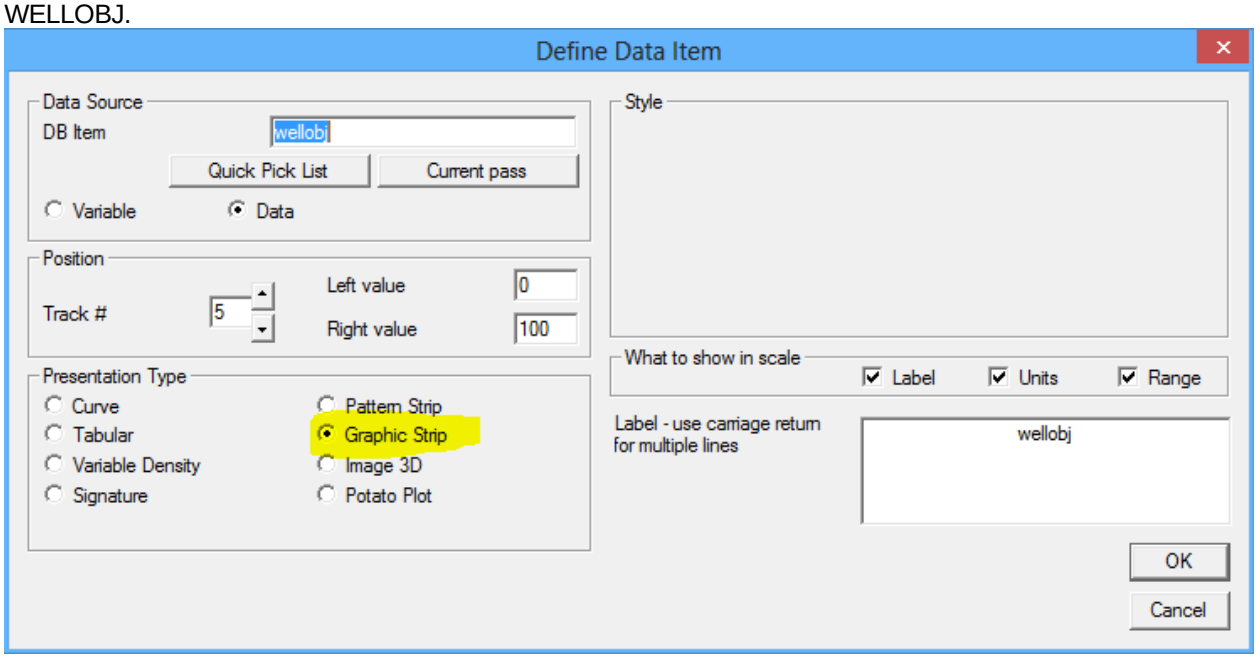


Fig. 6.20 Plotting a Graphic Strip

6.1.1.7 Plotting a Image 3D

A graphical 3-dimensional image can be plotted in the specified track. This is usually a representation of something like the casing taken from the readings of a multi-fingered caliper log. The software allows you to represent any array data as a 3D presentation, there is a Non-Caliper checkbox that should be checked if the array is not caliper data. The left and right scale values are not used in this instance, the scale values shown are taken from the image properties. Click on the [Image Properties] button to open the image properties dialog.

By clicking on the [Edit Variables] button, the Casing O.D. and Casing I.D. will be updated. These variables are what set the shown left and right scale values of the presentation.

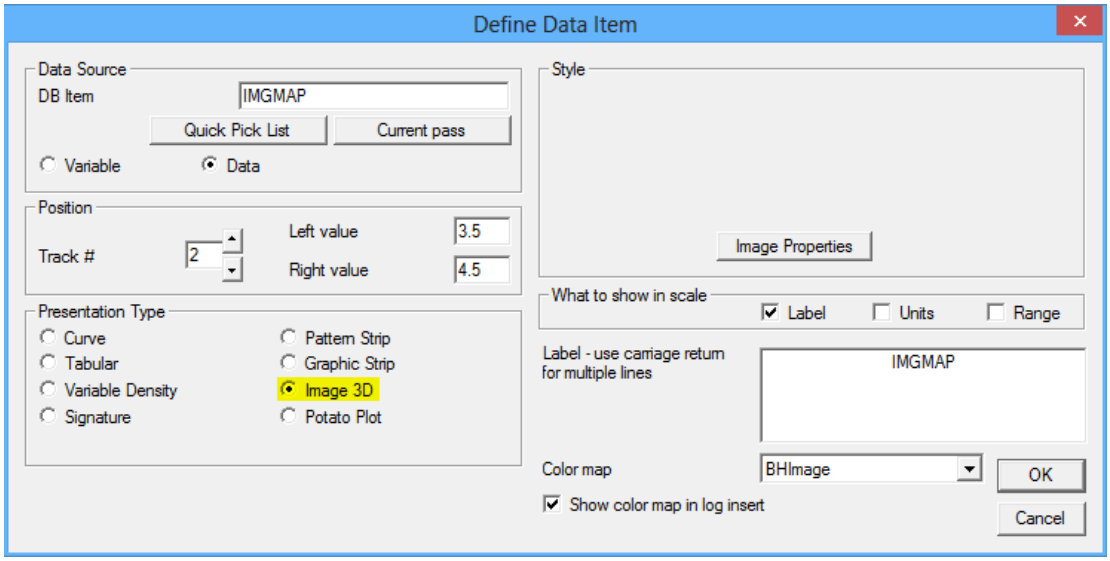


Fig. 6.21 Plotting a 3D Image

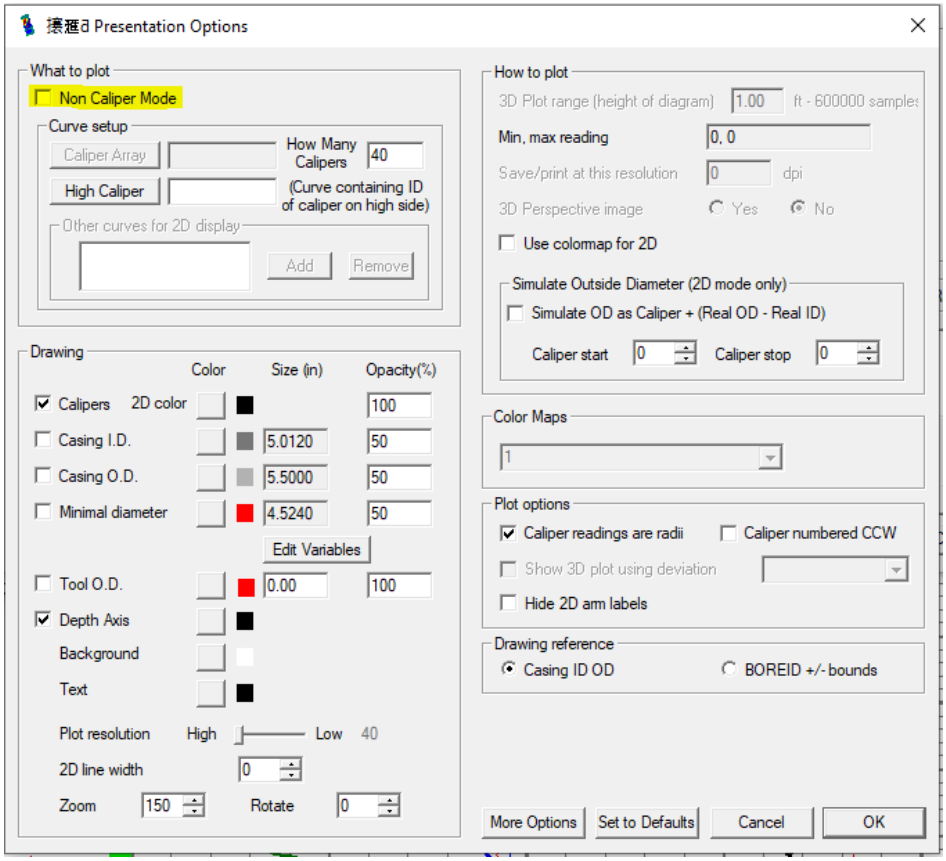


Fig. 6.22 Plotting a 3D Image – Image Properties

6.1.1.8 Plotting a Potato Plot

A potato plot is used to plot a graphical image such as a cross-section diagram from a multi-fingered caliper or a dip meter histogram. As with a 3-D image the image is placed in the appropriate track, but the scales have no relevance.

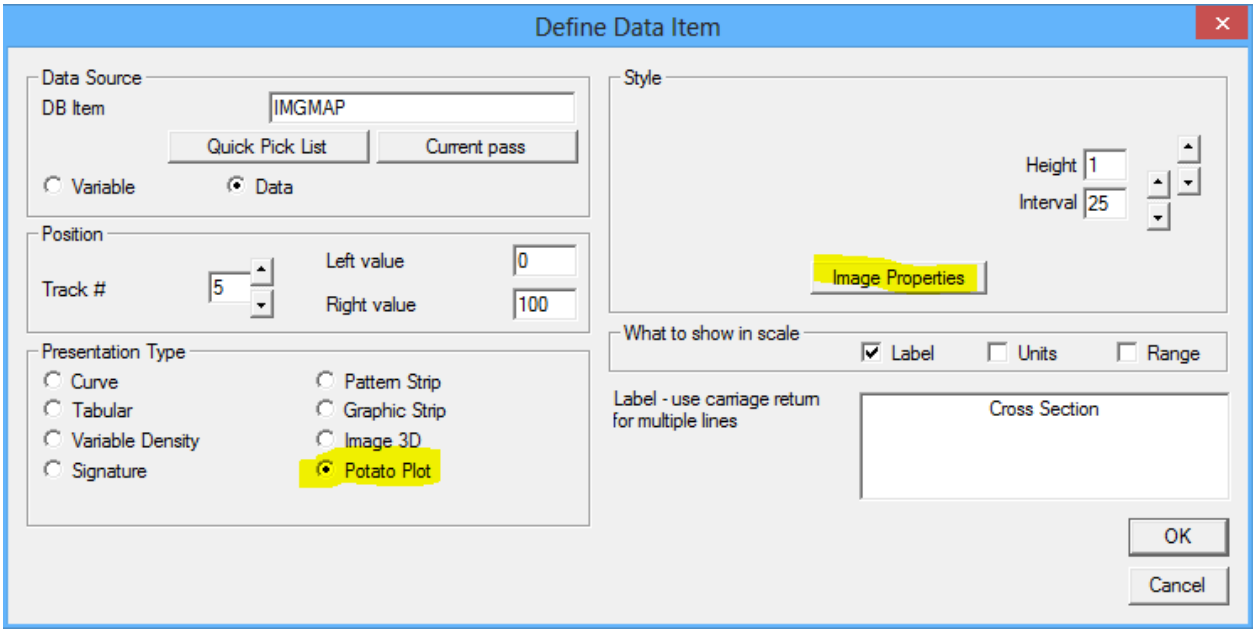


Fig. 6.23 Plotting a Potato Plot

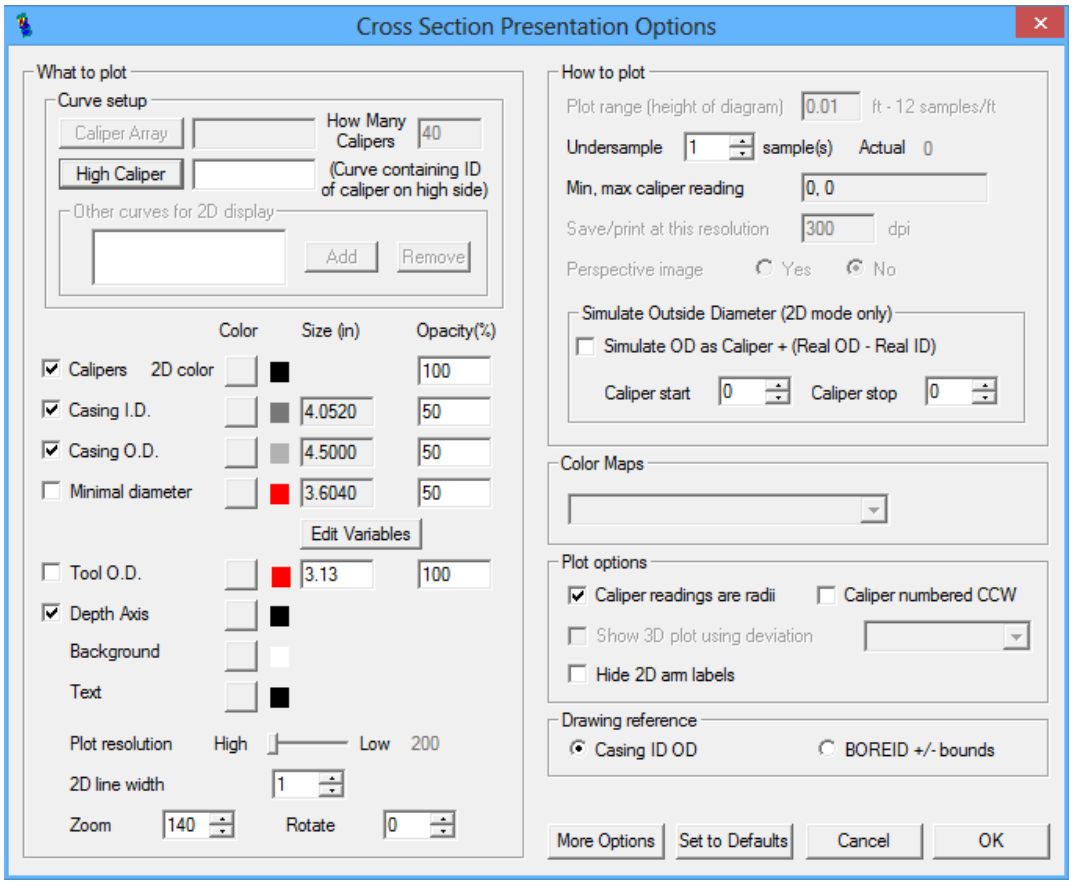


Fig. 6.24 Potato Plot Presentation options

6.1.1.9 Plotting a List Item

By selecting the List data type, the user may plot a list of curve that are sequentially numbered and have the same prefix (caliper arms – R0, R1, . . . and Sector Amplitudes – AMPS1, AMPS2, … as examples) as a single presentation entry.

The track # needs to be a valid grid track as before. The scales values should be selected as if a single curve were to be plotted in the track.

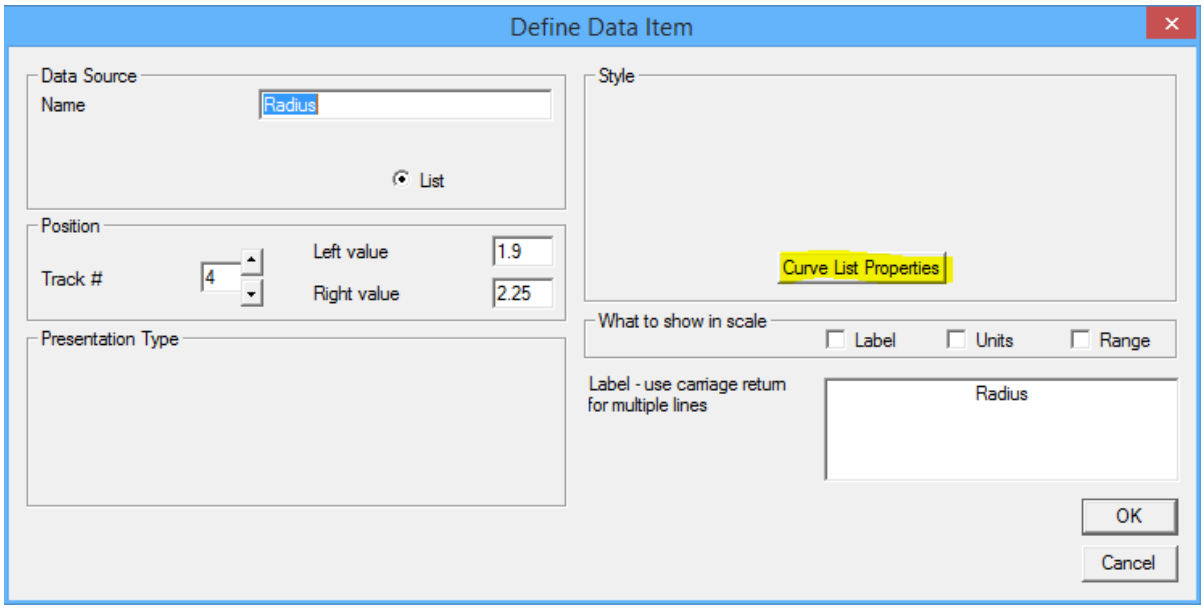


Fig. 6.25 Plot a List of Curves

When you click on the [Curve List Properties] button the Curve List Editor dialog window will come up.

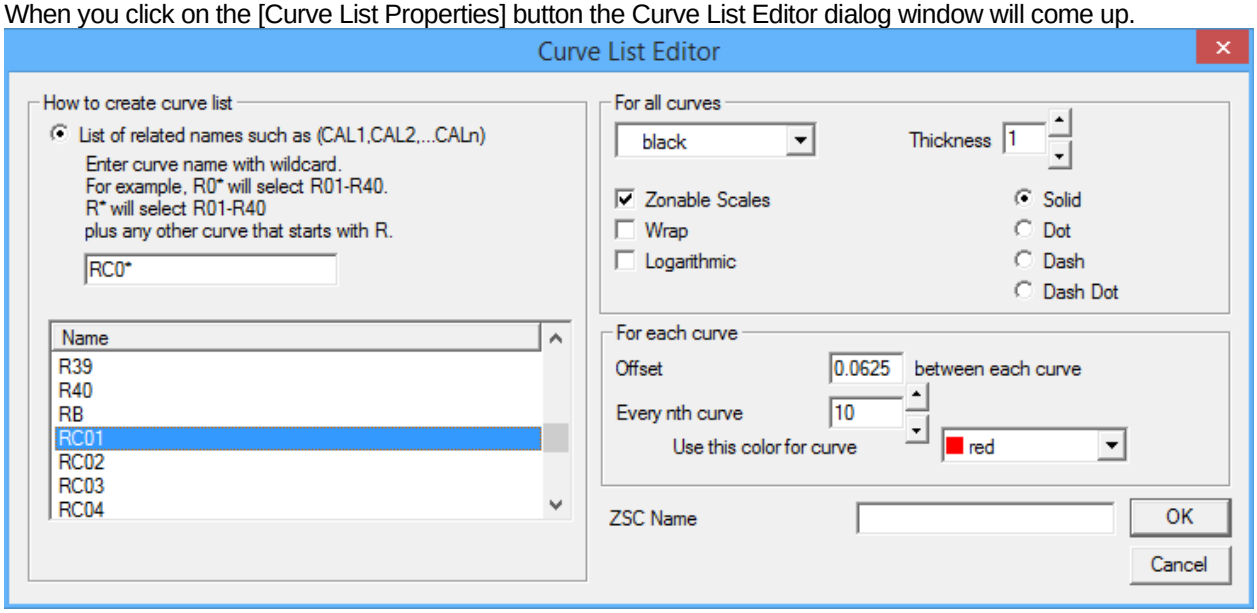


Fig. 6.26 Plot a List of Curves Properties

By clicking on a curve name or mnuemonic, the list of related curve names will be shown with the * appended as a wild card character(s). The style for thickness, dash pattern, color, and other selections are chosen as normal with the expection that the selected style (exceot for color) applies to all of the curves. Every nth curve may be selected to have a differnet color other than the base color selected in the style.
The offset between each curve can be entered to separate the curves in the presentation. The offset has several effects. As an example, let us say that the original left and right scale values are 0.0 and 10.0, and we use and offset of 1.0. Each time an additional curve is picked up the presentation changes by the amount of the offset. When the first curve is added, the overall track scaling changes to 0.0 to 11.0, with the first curve plotted from 0.0 to 10.0, while the second curve is moved or by the the offset of 1.0 and then plotted from 1.0 to 10.0 making the total track width of 11. When the second curve is picked up, the effective grid scale changes to 0.0 to 12.0 to accomadate the additional 1.0 offset of that curve. This continues untill all of the curves that are chosen are picked up by the presentation. Although each curve is plotted to the left and right

scal values specified, the overall scales of the grid itself are the scale width plus the number of curves minus one times the curve offset.

6.2 Format Editor - Grid Layout

The grids or mattes that are used in the Warrior Software are extremely flexible. 20 different styles of tracks may be placed anywhere on the page. The layout is not a fixed width so that when the plot is printed it will fit on whatever width paper is used in the plotter from narrow 1 track plotters up to 17" or wider plotters.
To choose a different layout, click on "Layout" and the available list of grid layouts will drop down. Click on any of the layouts available, and that layout will then be shown at the bottom of the Format Editor window. When the new layout is chosen, the track numbers as shown in the format editor may change significantly. This may cause many of the data items plotted as curves to lose their assigned tracks. It is a good idea to check at least one curve as this will show where all the curves would be plotted.

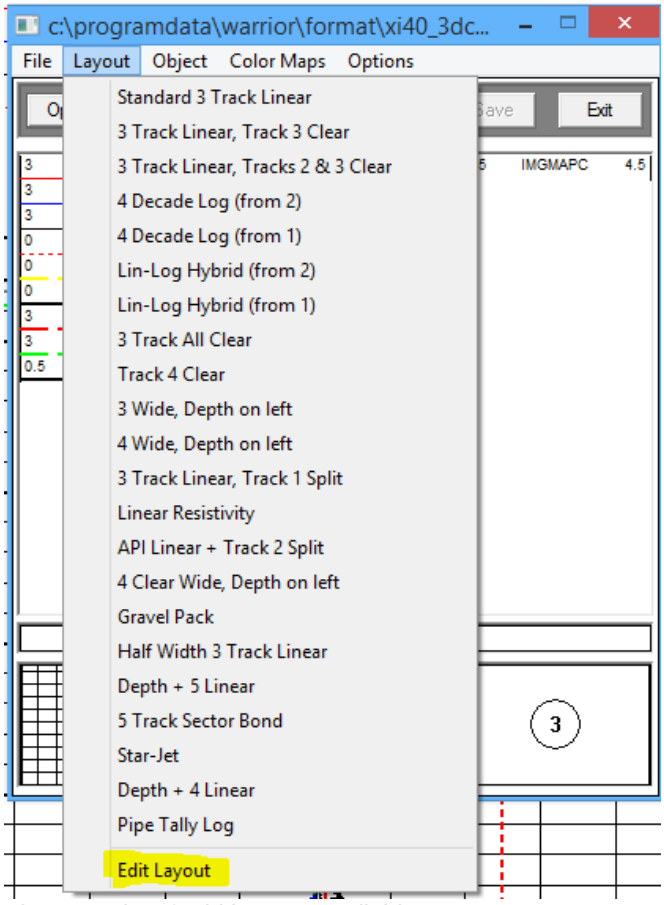


Fig. 6.27 List of grid layouts available

6.2.1 Format Editor - Grid Layout Editor

Even with the supplied list of grid layouts, it would be impossible to have a list long enough to accommodate all the possibilities of layouts the might be desired. To this end, the User can create and save his own grid layouts. At the bottom of the layouts list is the Edit Layout option. Click on Edit Layout to bring up the Layout Grid Editor.
There are two modes that the Layout Grid Editor can be entered. The first is a custom mode that allows the grid layout in the existing presentation to be edited. This mode is entered by as soon as the Format Editor is

opened clicking on “Layout -> Edit Layout”. The second mode allows you to edit the Master Layouts list that shows all the available layouts. This allow the User to Rename layouts, delete layouts, change the order of the list by moving the layouts, and to copy an existing layout and giving the copy a name thereby creating a new layout.

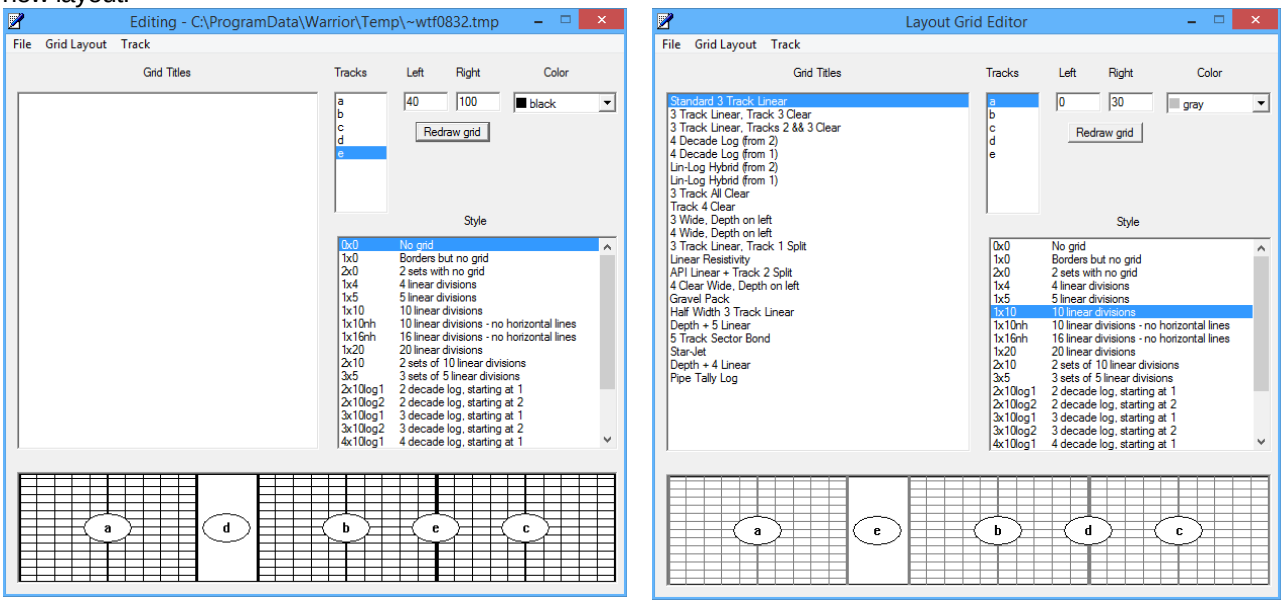


Fig. 6.28 Layout Grid Editor

6.2.1.1 Layout Grid Editor - Editing tracks

The width of the layout goes from 0 on the left to 100 on the right. When the log is plotted, the presentation will cover the width of the plotter regardless of the plotter width. Each track can be specified to be any width and be placed in any position on the page. When the track is highlighted in the Tracks column any of the existing grid styles may be applied to that track.

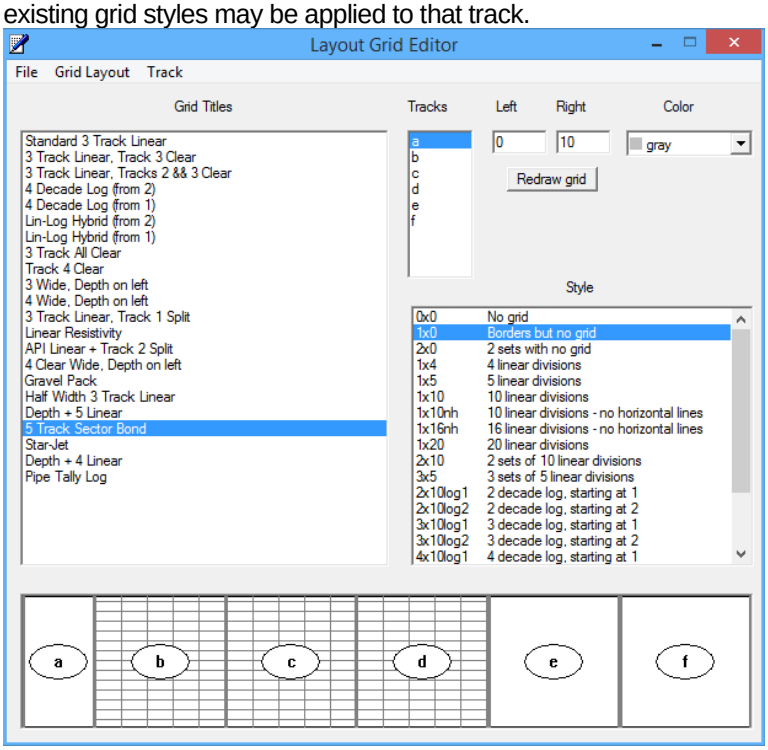


Fig. 6.29 Editing an existing layout

Tracks may be added or removed from the layout by clicking on Track -> Add (or -> Delete). By clicking on the [Redraw grid] button, the grid track changes that have been made.

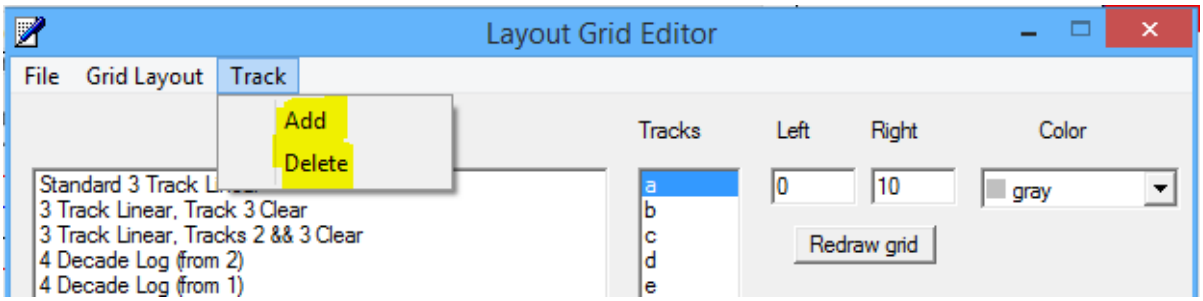


Fig. 6.30 Adding or Deleting Tracks

6.2.1.2 Layout Grid Editor - Editing List of Layouts

By clicking on Grid Layout, the User can edit the list of displayed grid layouts.

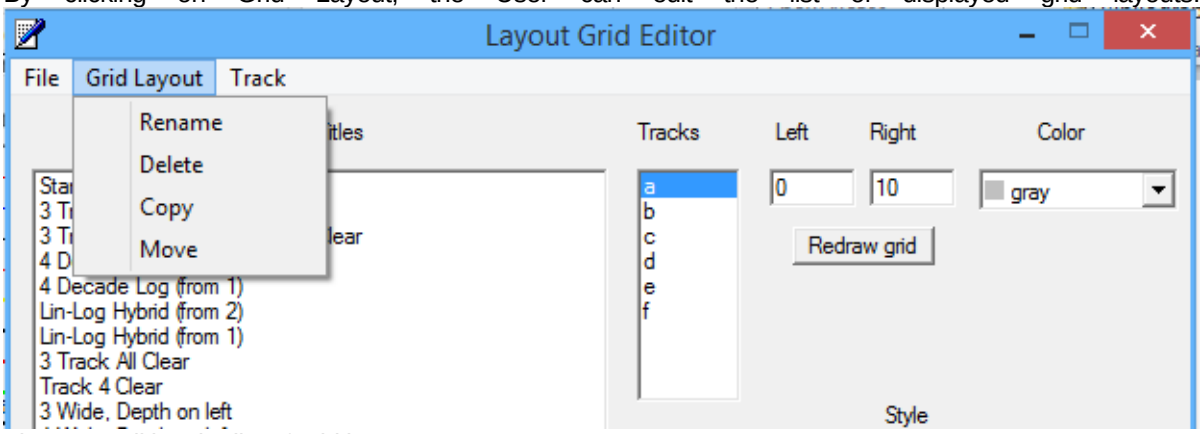


Fig. 6.31 Editing the list of grid layouts

By clicking on “Rename”, the current name of the grid selected will be shown. By typing the new name of the grid in the box and selecting [OK] the grid will be renamed.

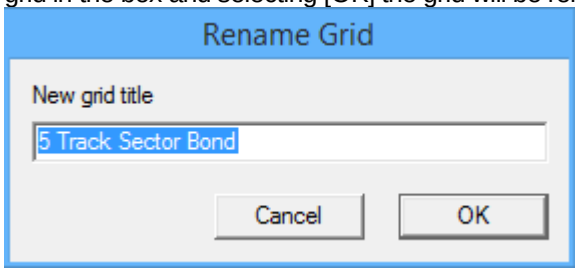


Fig. 6.32 Renaming a grid layout

If “Delete” is selected, a verification window will open to confirm the deletion and to prevent accidental deletions. If [Yes] is clicked, the selected layout will be deleted from the list.

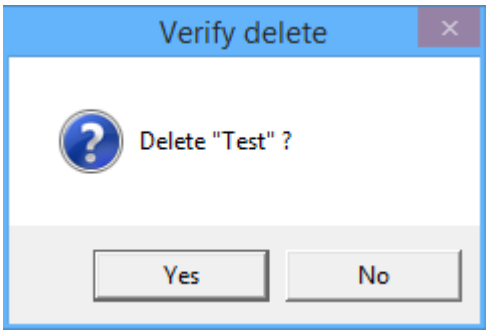


Fig 6.33 Deleting a Grid Layout

If “Copy” is selected, a window will open that the User can type a name for the new layout that will be generated when the existing layout selected is copied. This new layout will then appear at the end of the current list of layouts.

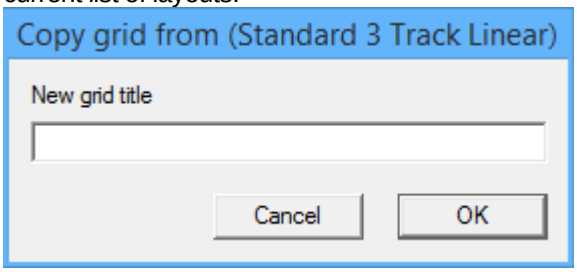


Fig. 6.34 Enter new title for copy of existing layout

If “Move” is selected, the User will be allowed to move the selected layout to any position in the list of layouts. The “Move Grid Layout to” window will open. By selecting a position in the list, the currently selected layout will be moved to that position and all layouts from that position will be moved down.

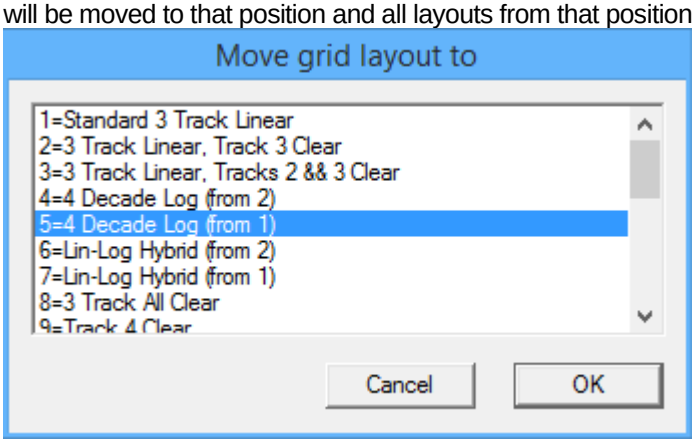


Fig. 6.35 Moving a Layout in the list of Layouts

6.3 Format Editor – Object

By selecting “Object” from the Format Editor the User has several options. The first is “Add Data”. This is the same as clicking the [Add] button and allows the User to add information to the presentation. If an item has been selected, the “Change Current Selection” and “Remove Current Selection” choices have the same effect as the [Change] and [Remove] buttons.

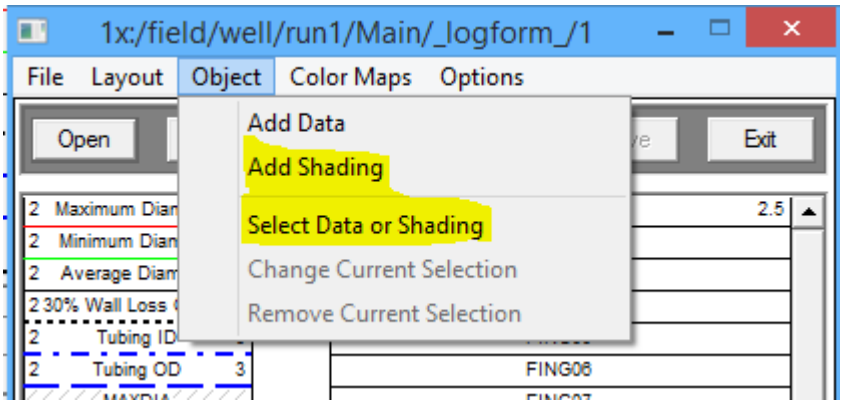


Fig. 6.36 Object Selection of Format Editor

The “Select Data or Shading” Selection allows the User to select any item that has been added to the presentation showing the DB Item type and the Warrior mnemonic. If it is shading, the left and right boundaries will be shown. Once selected the item may be changed or removed.

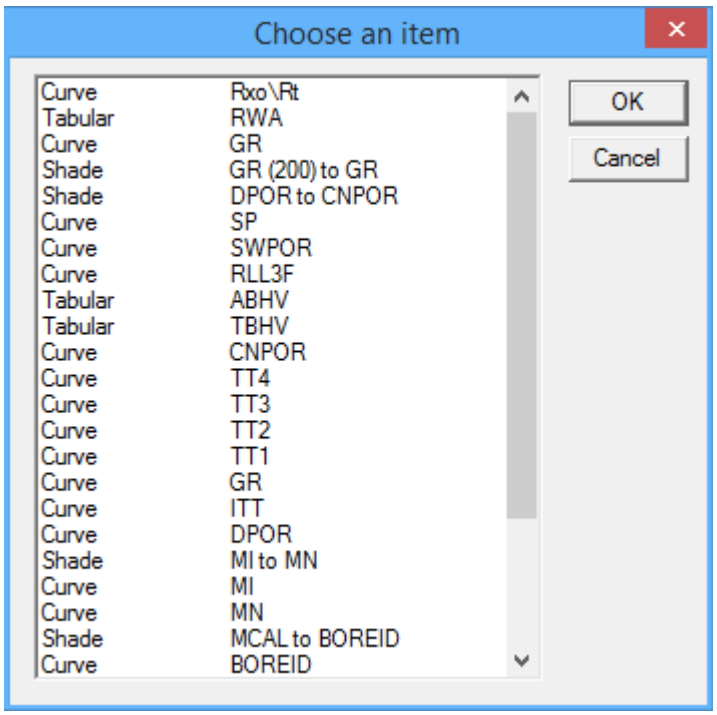


Fig. 6.37 Selecting Data or Shading

6.3.1 Format Editor – Object – Add Shading

Shading may be added to a Warrior Format presentation by selecting “Object -> Add Shading”. The left and right boundaries may be any plotted curve or a constant value of a curve to set the position in the track where the curve is plotted.

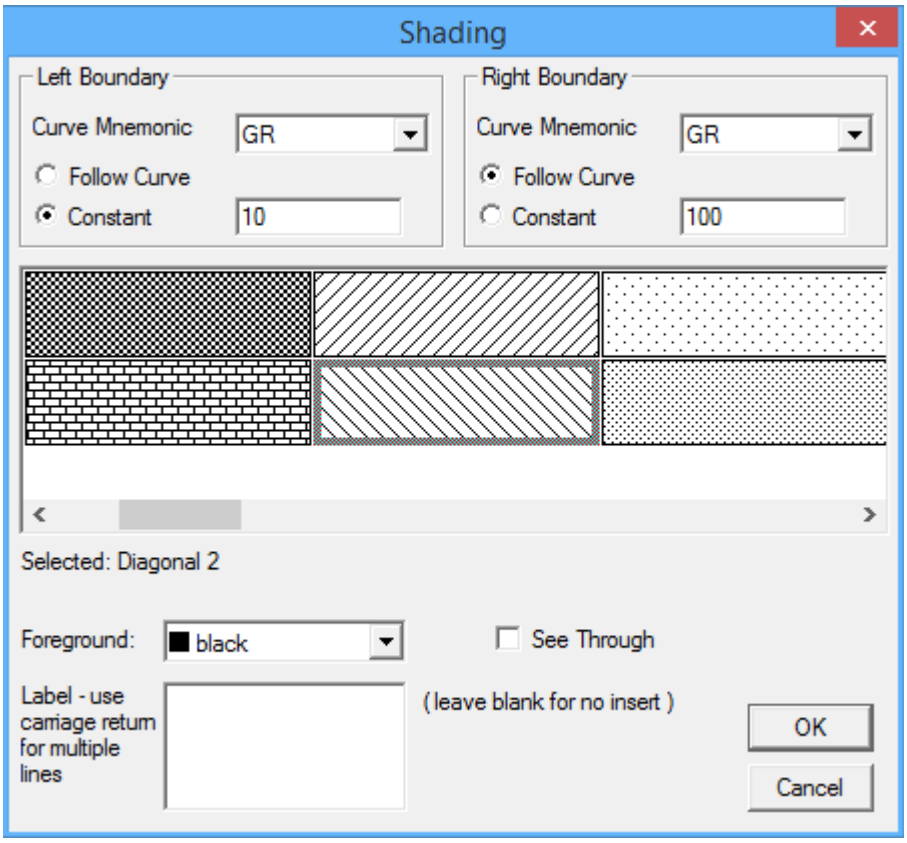


Fig. 6.38 Adding Shading

In the example shown in Fig. 6.38, the left boundary is set to a constant of 10 in the GR track, so if the GR scales were 0 to 100 then the shading would occur from 1 division in the GR track on the left to the GR curve on the right.

Warning! Be aware that it is the position of the curve in the track that is being shaded, not the value of the database item. The use of wrapped curves may cause unexpected results when shading. As an example, if you have a GR from 0 to 100 as a curve and you wish to shade from a GR constant value of 100 to the curve, you will get no shading since the GR has to wrap to get to the greater than 100 value. To shade something like an off scale Gamma Ray, a second instance of the GR data item should be added (the user may want to use different lettering to identify the curve, such as Gr or gr) to the plot with the appropriate off scale left and right values with no wrap and then shade that curve from a constant that is the left boundary to the curve as the right boundary.

There are 25 different styles of shading that can be used. Note that there is a horizontal scroll bar to provide access to all the different patterns available. The color of the shading can be selected by clicking on the drop down list labeled as “Foreground:” If “See Through” is not checked, then the shading will cover all the presentation behind it. If “See Through” is checked, then grid lines and curves will show through behind the shading pattern. A label may be used to identify the shading in the format editor. Not that the label does not show on the plot itself unless it is selected in the Options, as discussed shortly.

6.4 Format Editor – Color Maps

Color maps are used to present variable density, 3D Images, and some pattern strips in Warrior. Each printing device and the screen can have its own presentation for a color map. If no presentation is available for the

device, the software interprets the screen presentation and uses it for the device. The User can create and/or edit his own color maps by clicking on “Color Maps -> Edit” from the Format Editor.

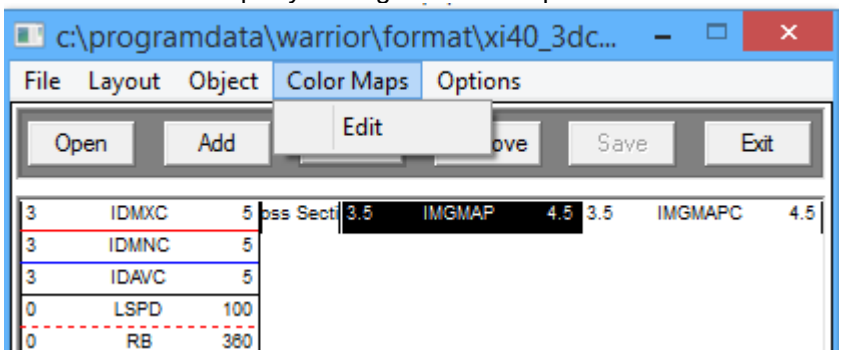


Fig. 6.39 Edit Color Maps

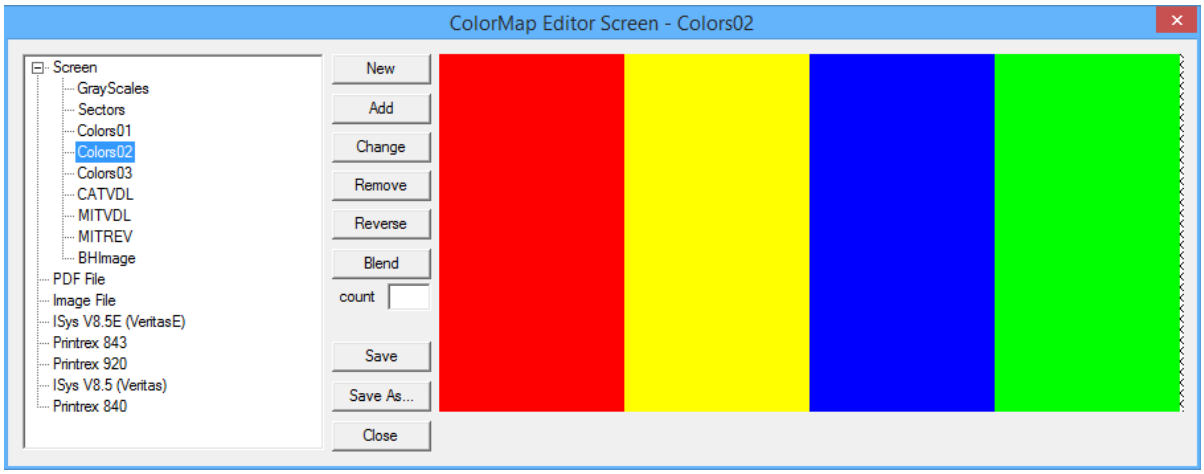


Fig. 6.40 Color Map Editor

6.4.1 Format Editor – Color Maps – Creating and Editing

To create a new color map, first click on the device or screen that you want to create the color map for. Then click the [New] button to ensure a new map. Now click the [Add] button to bring up the Windows color palette. You can select any color and /or adjust the settings for the color. When you click [OK], that color will be added to your color map. You can continue adding colors, with each additional color placed to the right of the existing ones.

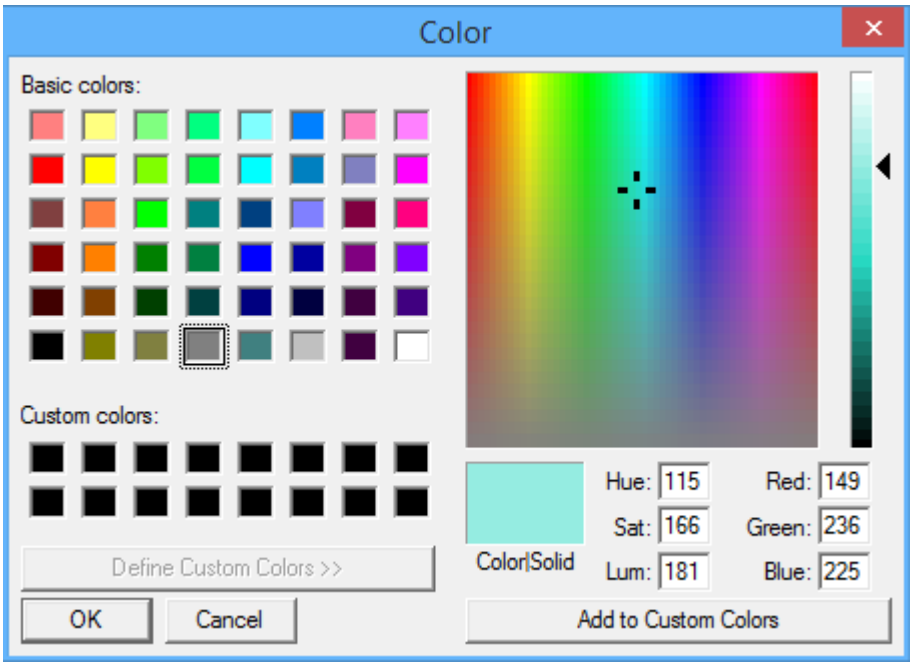


Fig. 6.41 Windows color palette

At any time, on new or existing color maps, if you click on a color and click [Change], that color can be edited again to replace the existing color.
Similarly, by clicking on a color and clicking the [Remove] button, that color can be removed from the color map. Care should be taken when doing this as the [Remove] button will give the option to remove the color map if no color has been selected for removal.
The [Reverse] button allows the User to reverse the order of the colors shown in the color map.
The [Blend] button can function in two different ways. If the “count” box has a number in it, then clicking on [Blend] will cause that many new shades blended between the existing colors to be inserted between every pair of colors. If no count is in the box, the colors will be blended to a maximum of 256 different shades of colors.
Clicking the [Save] button will save any changes made to existing color maps (same as . The [Save As …] button will allow the User to save the color map with a new name that will then appear in the colormaps list.
[Close] will close the color map editor reminding the User of any unsaved changes.

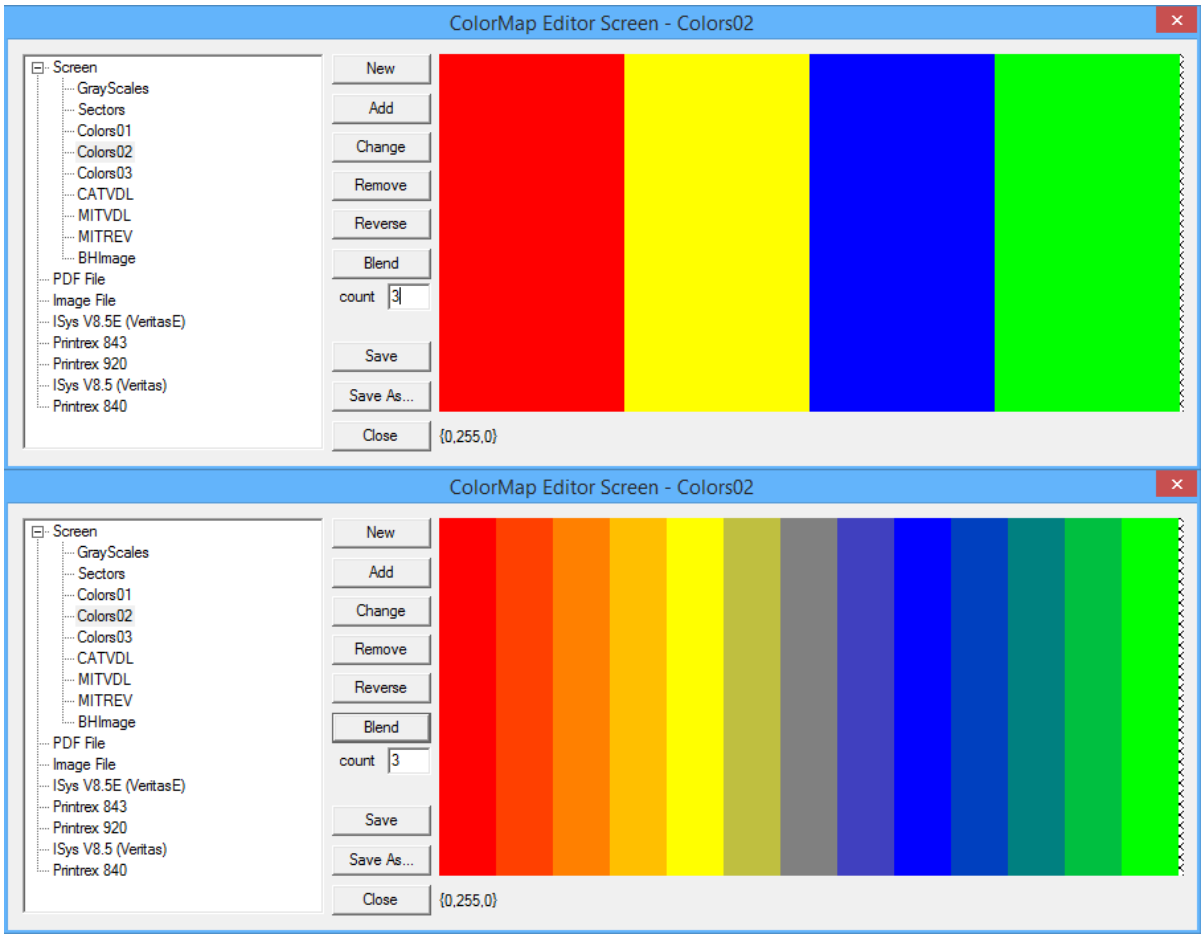


Fig. 6.42 Blending colors in color map

6.4.2 Restoring Color Maps from other systems

The Warrior 8 software now allow for the transferring of color maps between systems. On the system that has the color maps that you wish to use, go to Warrior Backup and do a backup to a file. Transfer the file to the system that you want to put the color maps on, and then run Warrior Backup on it.

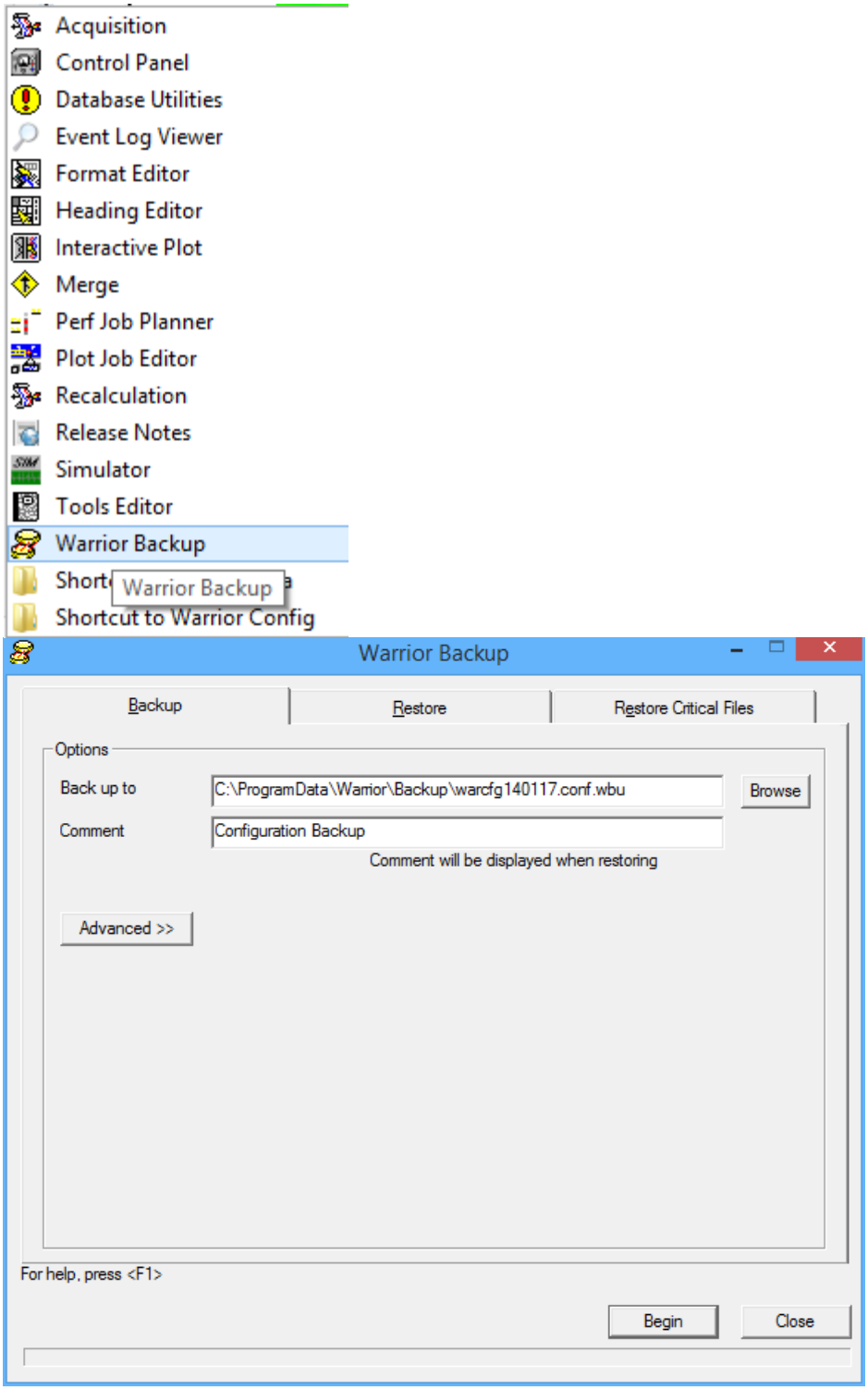
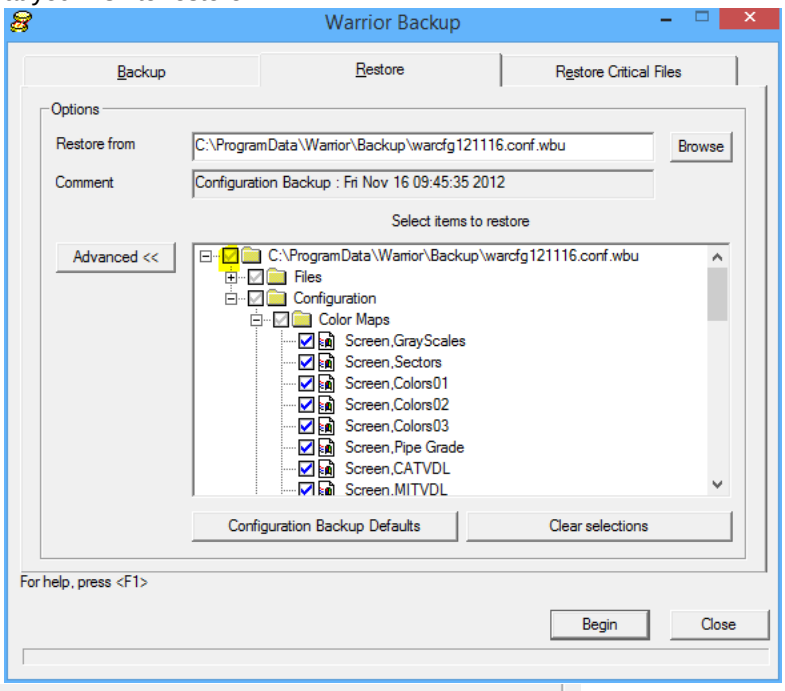


Fig. 6.43 Using Warrior Backup to backup files from a system

Go to the Restore page and use the [Browse] button to select the file. Click the [Advanced >>] button to see a list of the files in the backup file. Uncheck the uppermost check box to un-select all files in the backup. This prevents doing a complete restore from the first system. Click on the [+] beside configuration. Click on the [+]

beside Color Maps. You should now see the list of color maps from the first system. Check the box beside each color map that you wish to restore.



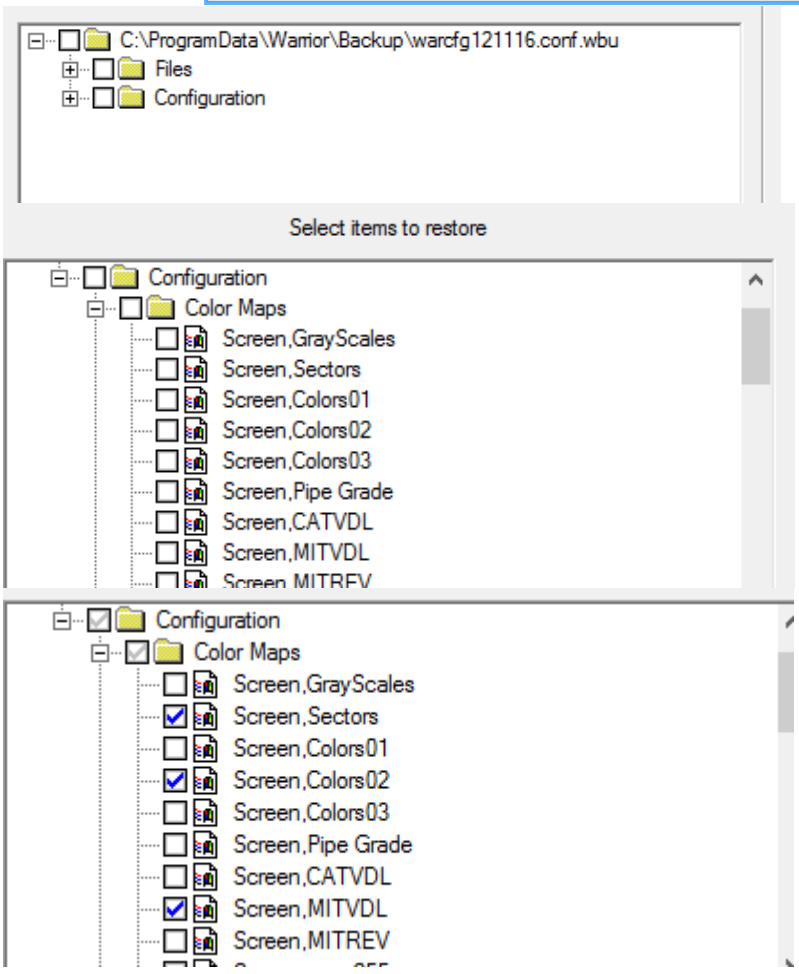


Fig. 6.44 Restoring Color Maps

6.5 Format Editor – Options

The options that are available in the Format Editor are to show a tool image on the side of the presentation during logging passes. To show the shading labels in interactive plot and on prints, like what is shown in the format editor. Bore Hole Image presentations can be attached to a presentation format so that when the presentation is called up the borehole image presentation also come up provided valid data values are available.

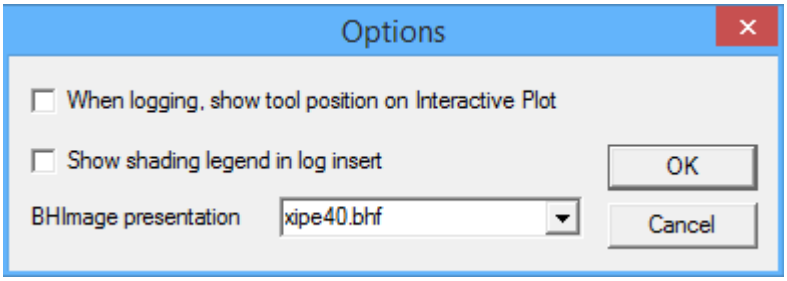


Fig. 6. 45 Format Editor Options

Section

7

7 Interactive Plot

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

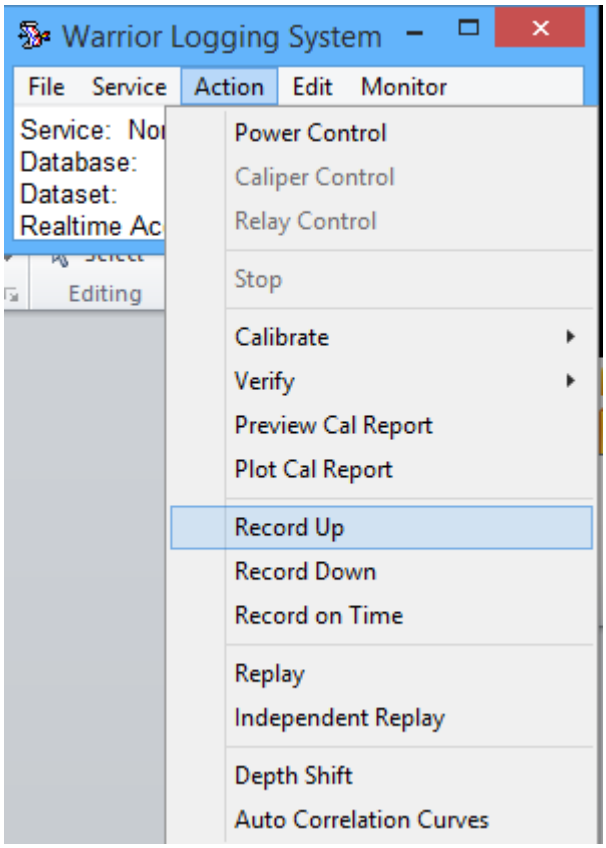


Fig. 7.1 Starting Interactive Plot from acquisition

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

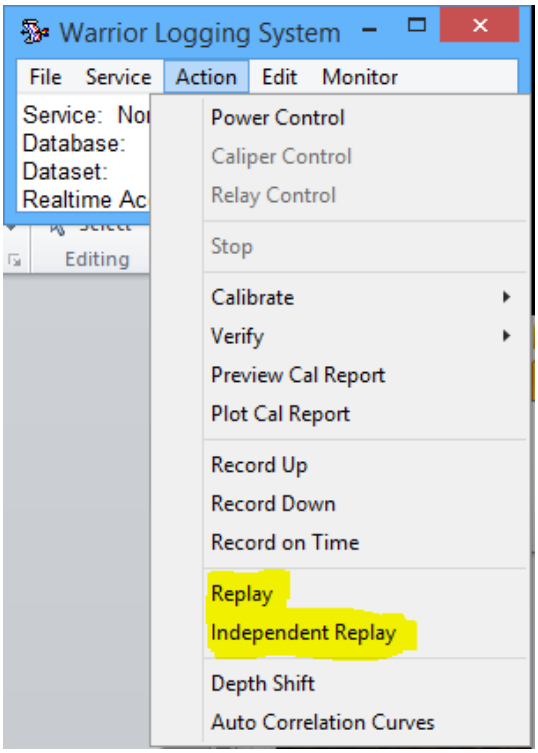


Fig. 7.2 Invoking additional instances of Interactive Plot from Acquisition.

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

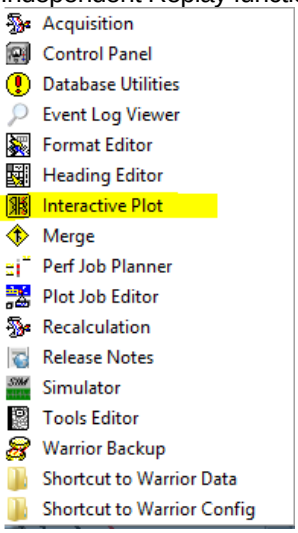


Fig. 7.3 Starting Interactive Plot from the Warrior Software group

7.1.1 Interactive Plot – File Selection – Select Dataset

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

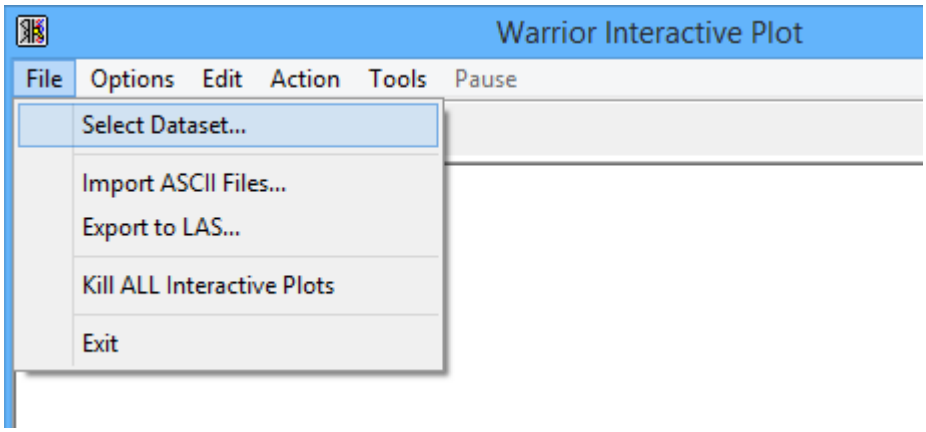


Fig. 7.4 Interactive Plot File Selection

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

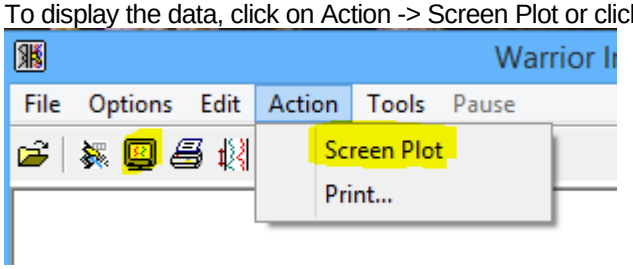


Fig. 7.5 Displaying selected data

7.1.2 Interactive Plot – File Selection – ASCII Data

ASCII data files can be imported into a Warrior database by selecting the File -> Import ASCII Files … selection. The existing database that has been selected can be written to an LAS file by selecting the File -> Export to LAS … option.
Refer to the Database Utilities section 13.x.x

7.1.3 Interactive Plot – File Selection – Exit

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

7.2 Interactive Plot – Options

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

rate of the data can be selected so that if the plot screen is updated it will scroll quickly in the fast speed and more slowly in the normal speed.
If the check box – “Use private copy of presentation with this log” is checked than any changes made to the format presentation will only affect the passes in the current database that is being used. If the box is not checked, then any changes to the format presentation will be written to the presentation file that is saved in Warrior\Format folder and will be in effect when a new database is used.

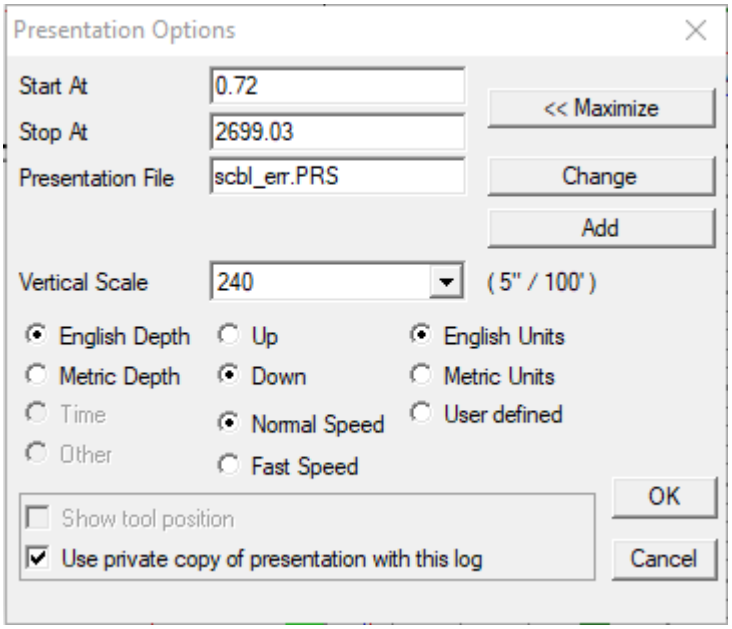


Fig. 7.6 Interactive Plot – Plot Options

7.3 Interactive Plot – Edit

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

7.3.1 Interactive Plot – Edit – Log Format

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

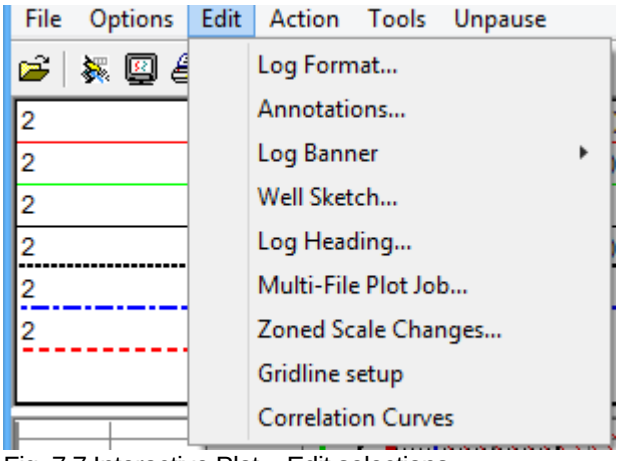


Fig. 7.7 Interactive Plot – Edit selections

7.3.2 Interactive Plot – Edit – Annotations

The Warrior software allows the user to place annotations or text on the plot. By clicking on any of the text shown in the three windows, the text selected will be placed in the bottom text box. The User can also type any text that he wants into the text box.
When the text has been entered in the text box, click the first icon, that looks like an arrow with an ab (<ab).

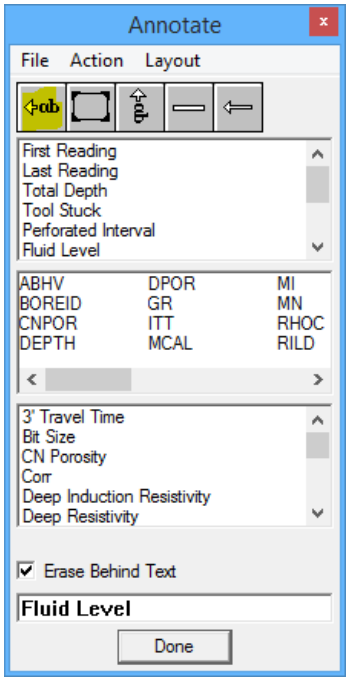


Fig. 7.8 Annotate Window

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

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

There three groups of default annotations shown in the annotate window. The first group are text that appears in the annotate window no matter what is plotted. The second group is Warrior database mnemonics for all the Database items that are in the presentation. The third group contains “translations” for the mnemonics in the second window and all the labels that are used on the curves.
The list of curves in the first group can be edited and the translations can be changed. Click on “File -> Edit Default Annotation Text” to open the file Warrior\config\annotate.ini.

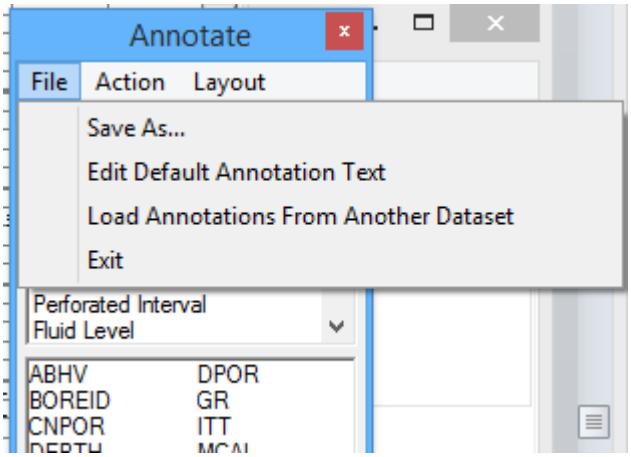


Fig. 7.9 Annotate File selection

The [Always] group must be a sequential number list that contains the text that the User wants. The order can be rearranged, and items added if the list remains sequentially numbered.
The [Translations] group allows for common labels to be shown for Warrior mnemonics used in the presentation. For example, if GR is in the current presentation, the translation “Gamma Ray” will show up in the third window of the annotate window.

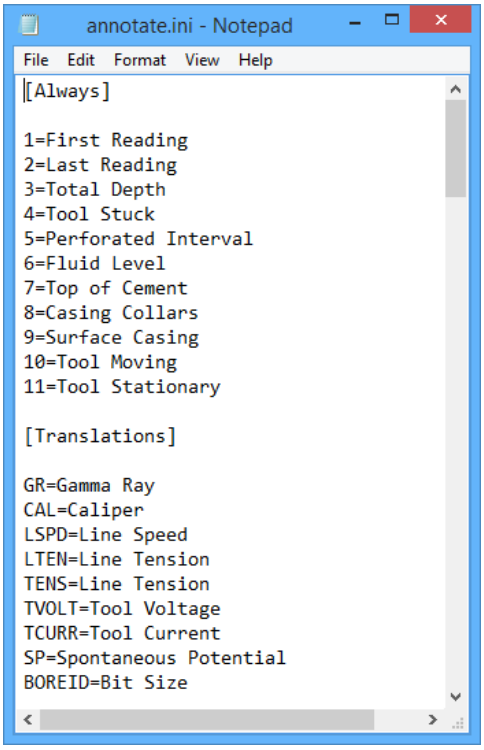


Fig. 7.10 Annotate.ini file

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

Warning! Annotations are place at a depth and horizontal position on the plot. This mean that if the presentation is changed, the pass is depth shifted, scales changed, or anything

that would affect the position of the curve data, annotations are not moved and do not necessarily point to the curve that they originally pointed at.

7.3.3 Interactive Plot – Edit – Log Banner

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

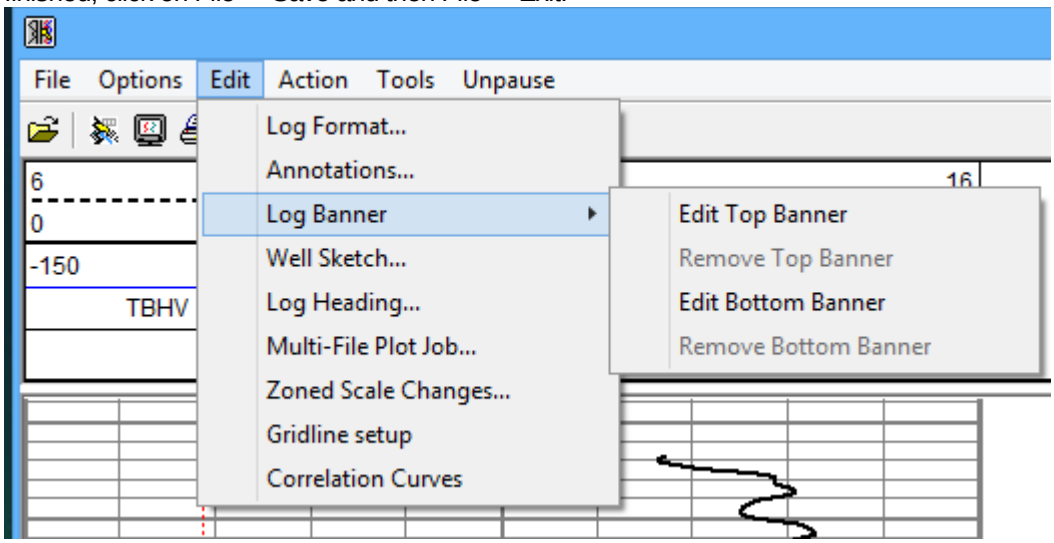


Fig. 7.11 Edit Log Banner

Fig. 7.12 Entering text in log banner

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

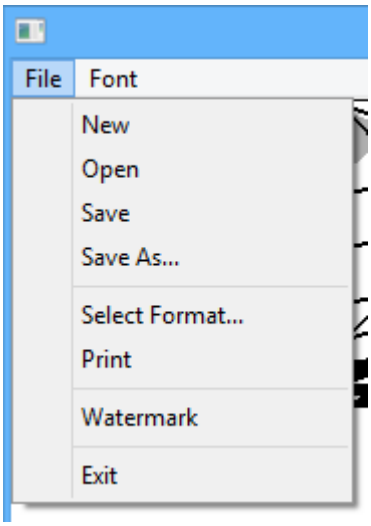


Fig. 7.13 Log Banner File Selections

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

7.3.4 Interactive Plot – Edit – Well Sketch

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

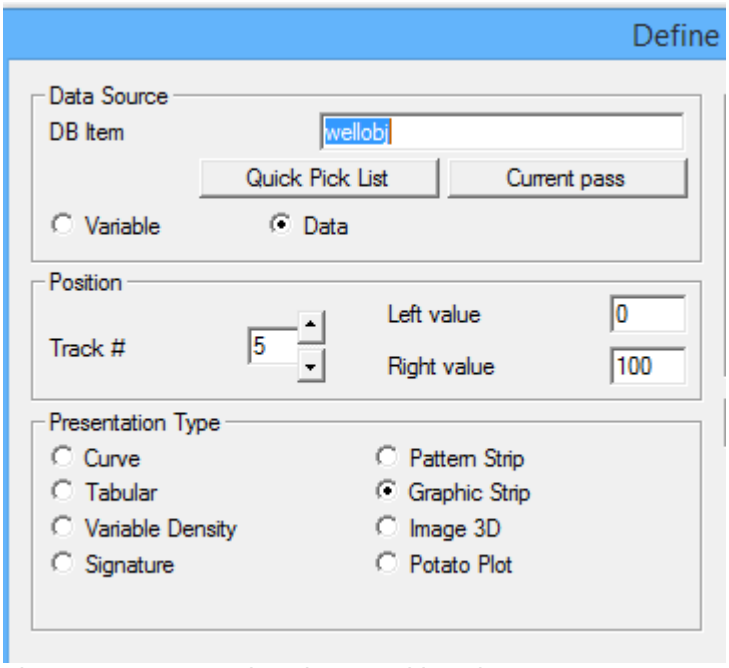


Fig. 7.14 WELLOBJ plotted as Graphic Strip

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

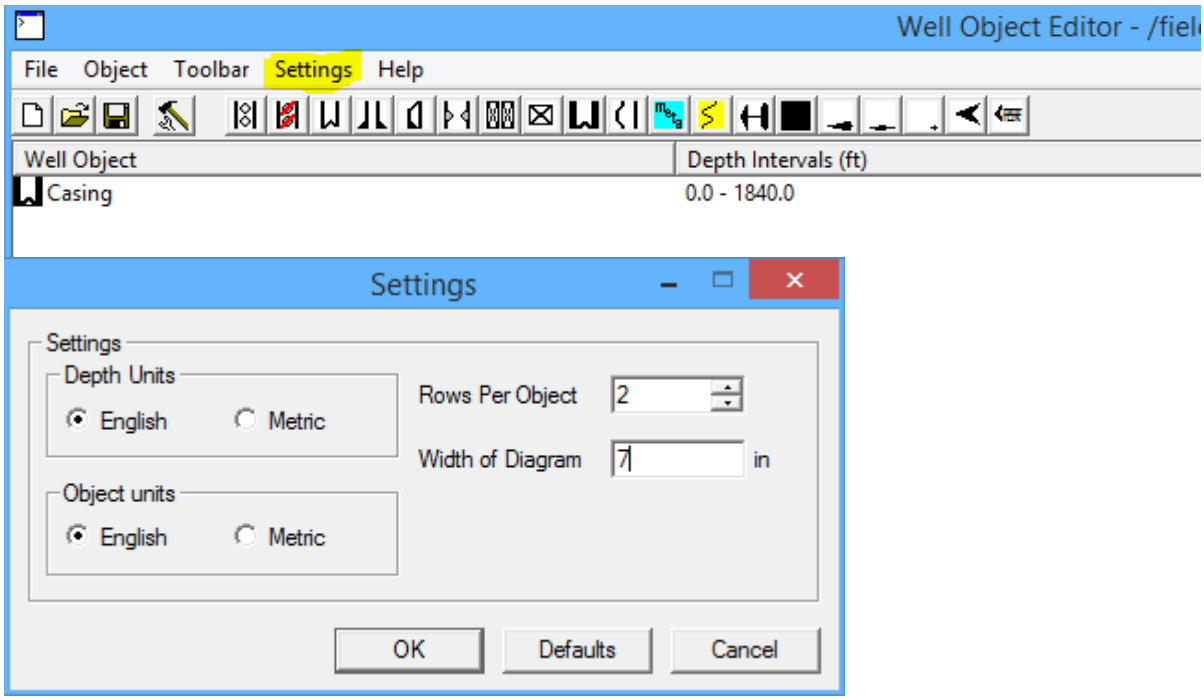


Fig. 7.15 Well Object Editor Menu and Toolbar and Settings

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

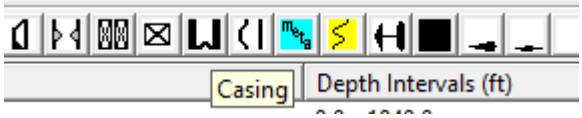


Fig. 7.16 Identifying Icons

The first string of Casing that we will put in will be 7” surface casing from surface down to 105 feet. Enter the depth interval from 0-105, and the width of object as 7 inches. Notice that the Horizontal positions are automatically adjusted to fit the diagram and casing size. Click [OK] to save that string of casing.
The next string will be 5 ½” casing from surface down to 1600 feet. On this string we are going to check “Yes” to the show bond. If the dataset being presented has bond curves, it will use the BONDIX to show shading as a representation of bonded pipe.
The last string of casing will be put in as a liner from 1550 -1850 and will be 4 ½”. We will also show bonding on this string.

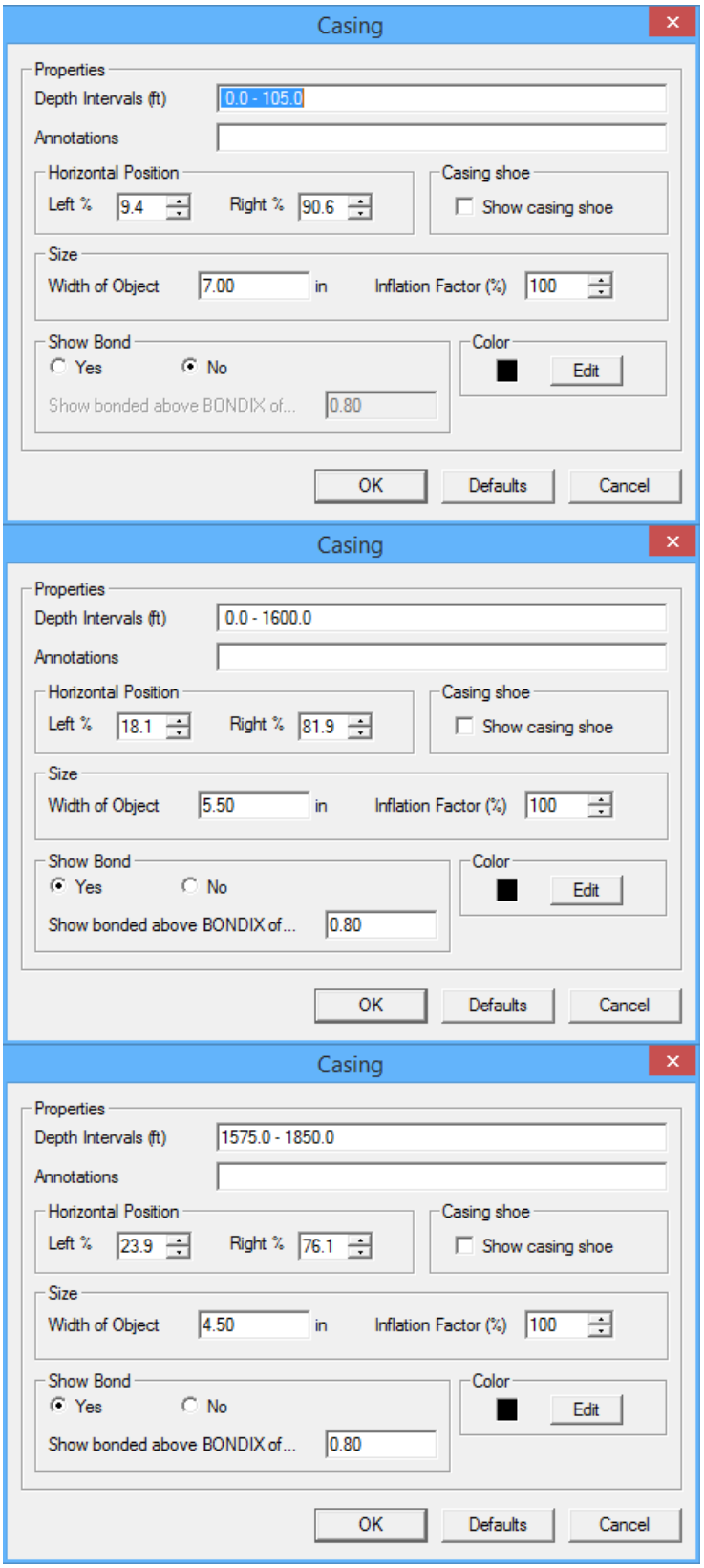


Fig. 7.17 Entering casing depths for stings of casing

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

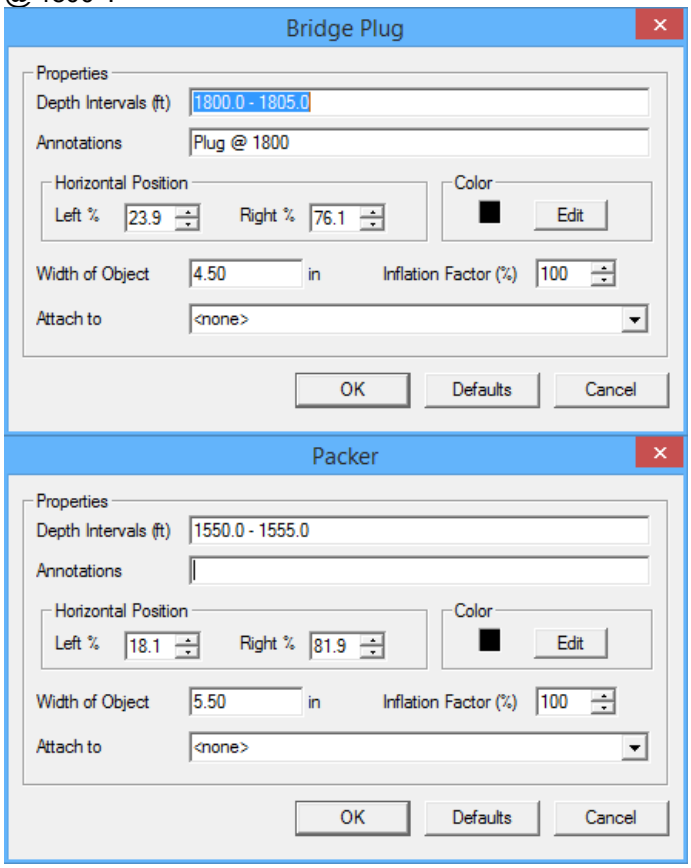


Fig 7.18 Showing a plug in 4 ½" Casing at 1800' and packer in 5 ½" at 1550"

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

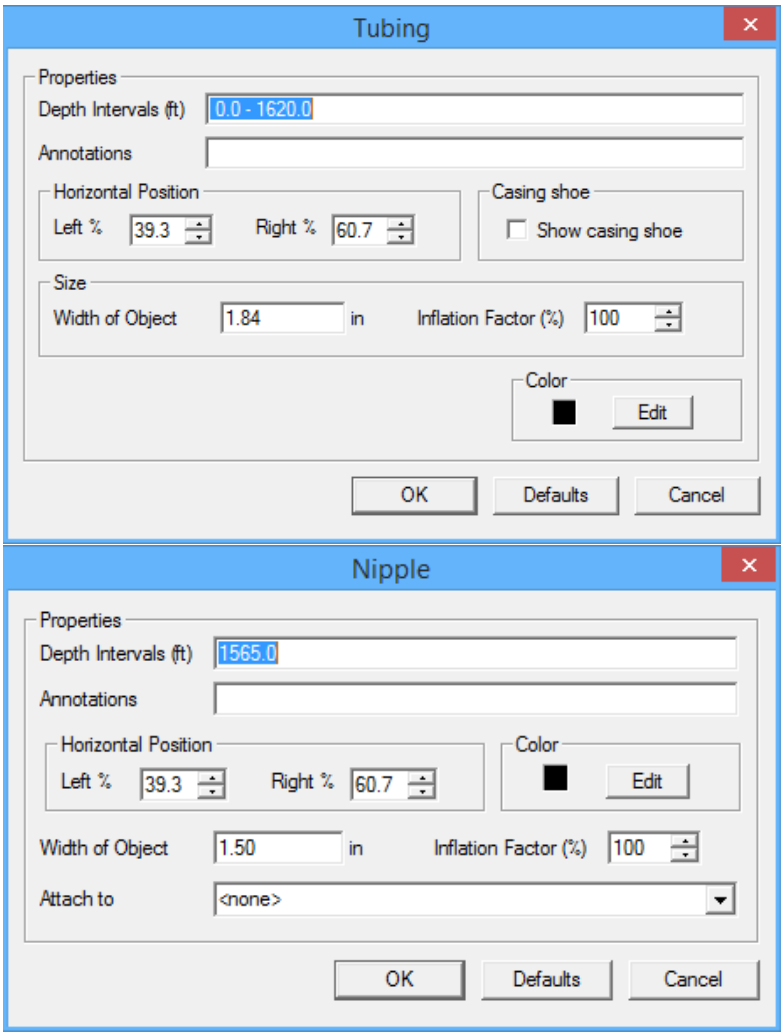


Fig. 7.19 Tubing to fit 5 ½" Packer and seating nipple at 1565'

The last thing that we want to do to our well sketch is to add some perforations. Zones are entered by top depth, a hyphen (or minus sign), and bottom depth. Multiple zones can be entered by separating each zone with a space or comma. Single shots can be entered by putting just the single depth. In the example below we have zones from 1630-1640, 1650-1655, and 1660-1667 with a single shot at 1683.
Use the left% and Right% to position the perforations. The default is 0 and 20. In this example, that puts the perforations into the area where the bond index is shaded and makes them difficult to see. Since the 4 ½" casing starts at 17.9%, I started the perforations at 18% and kept them 20% wide. This puts them inside the edge of the 4 ½" Casing.

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

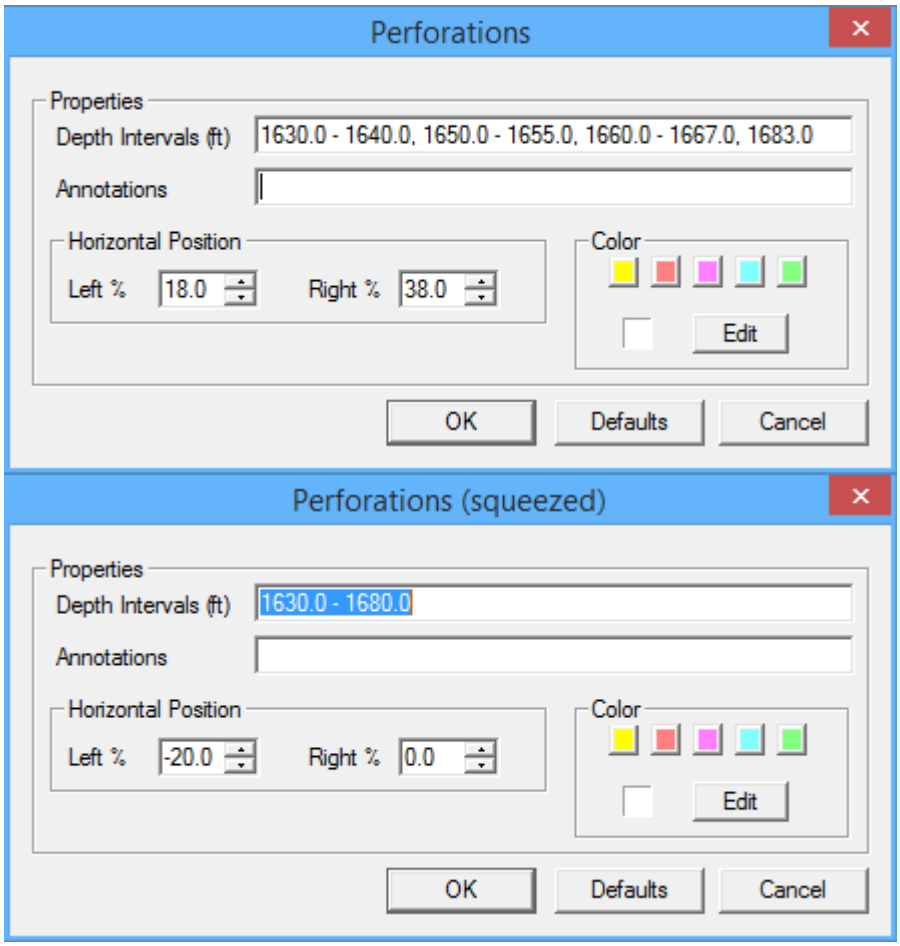


Fig. 7.20 Entering Perforations

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

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

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

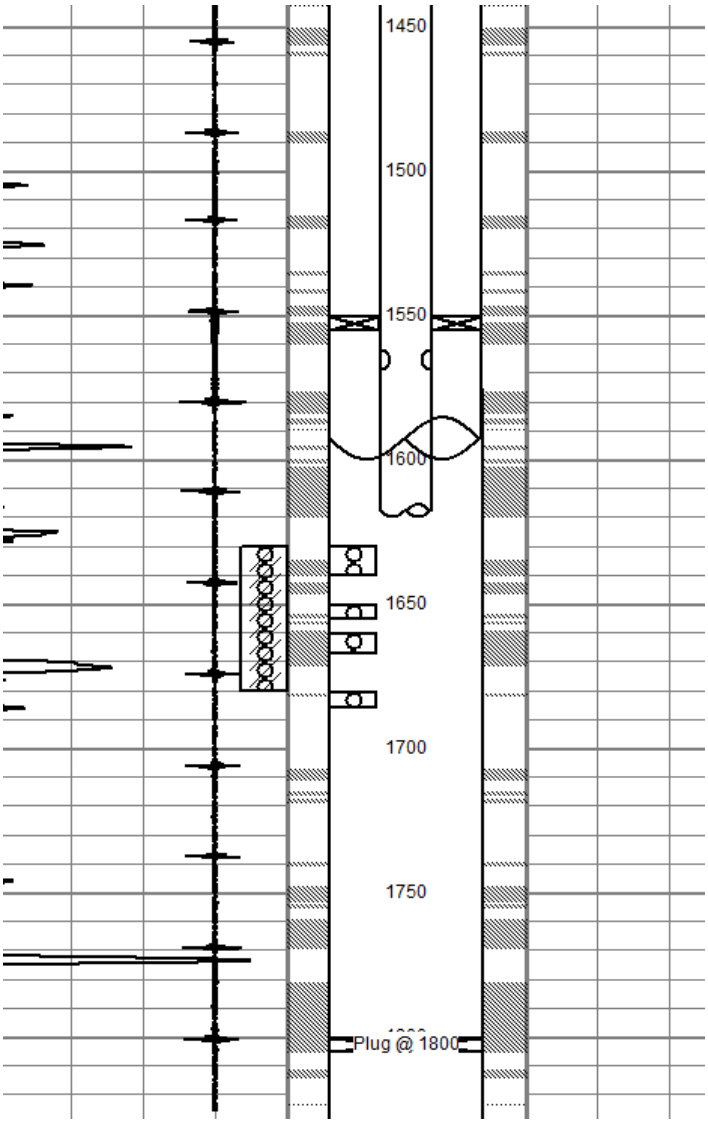


Fig. 7.21 Well Sketch example image

7.3.5 Interactive Plot – Edit – Log Heading

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

7.3.6 Interactive Plot – Edit – Multi-File Plot Job

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

7.3.7 Interactive Plot – Edit – Zoned Scale Changes

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

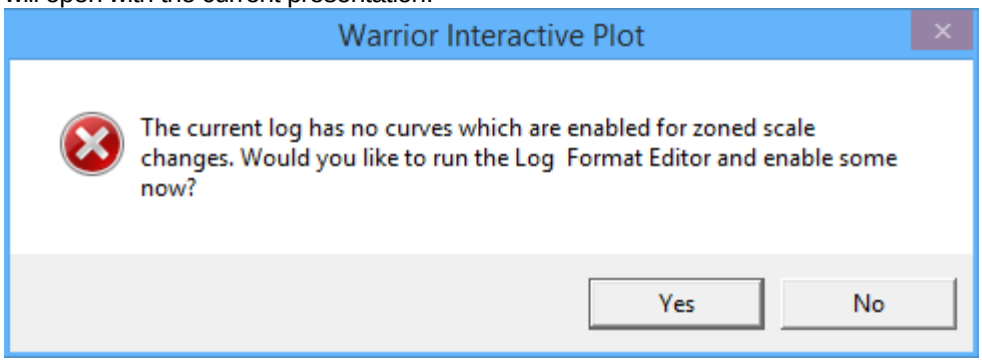


Fig. 7.22 Zone Scale change invoked with no zoned scale curves

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

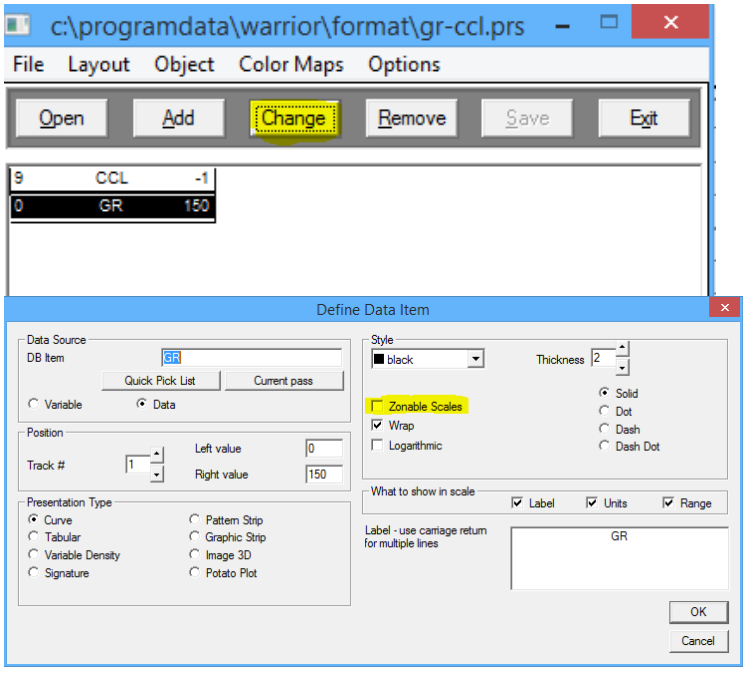


Fig. 7.23 Setting up Zoned Scale changes in Format Editor

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

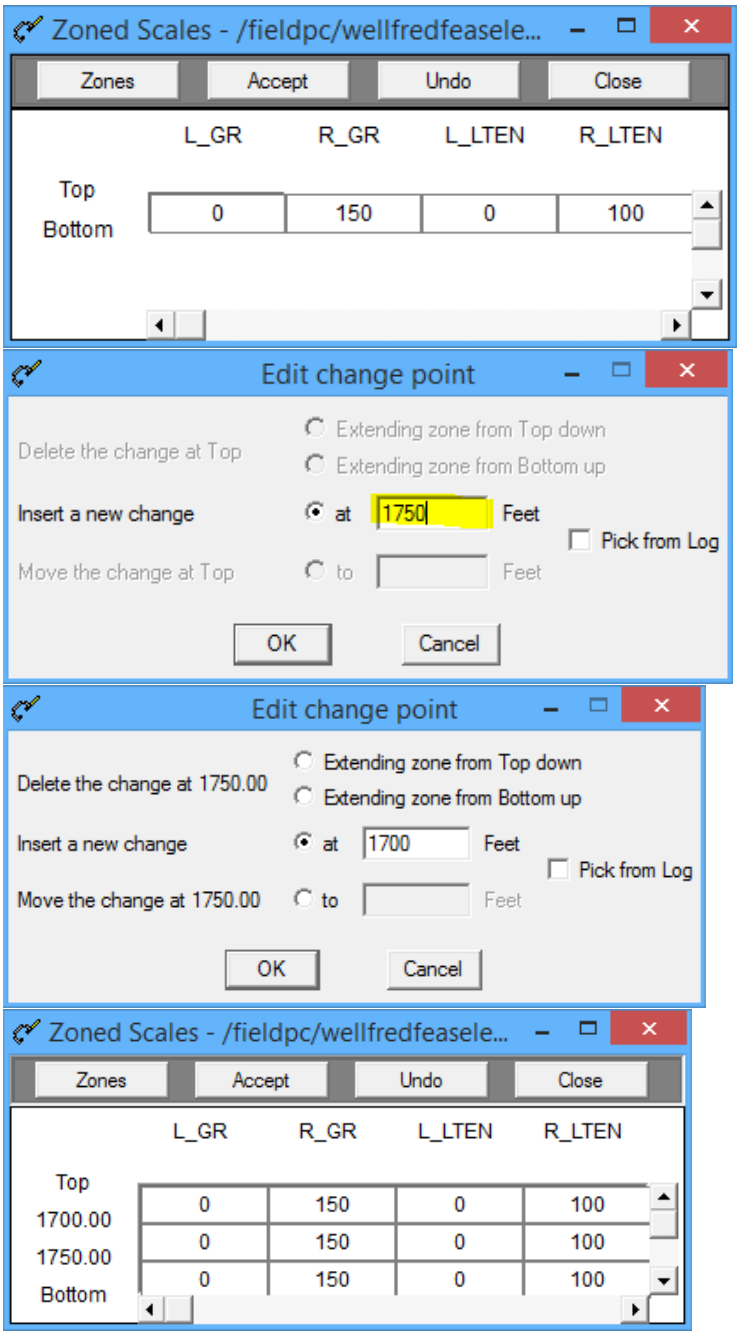


Fig. 7.24 Zoneable Scales

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

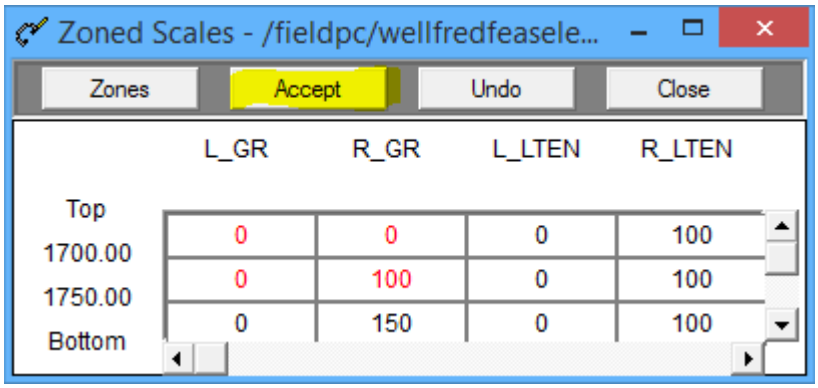


Fig. 7.25 Scales changed on zones

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

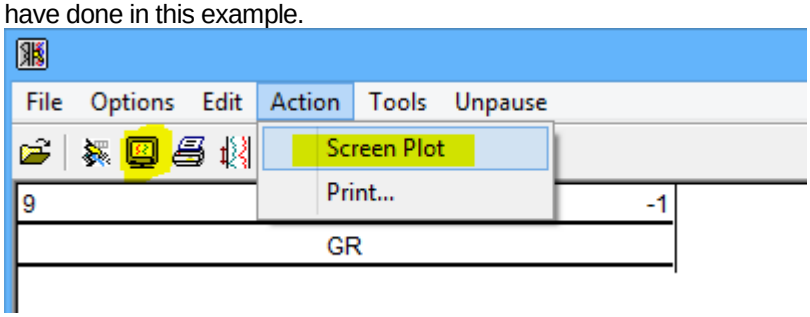


Fig. 7.26 Refreshing the screen with Screen Plot

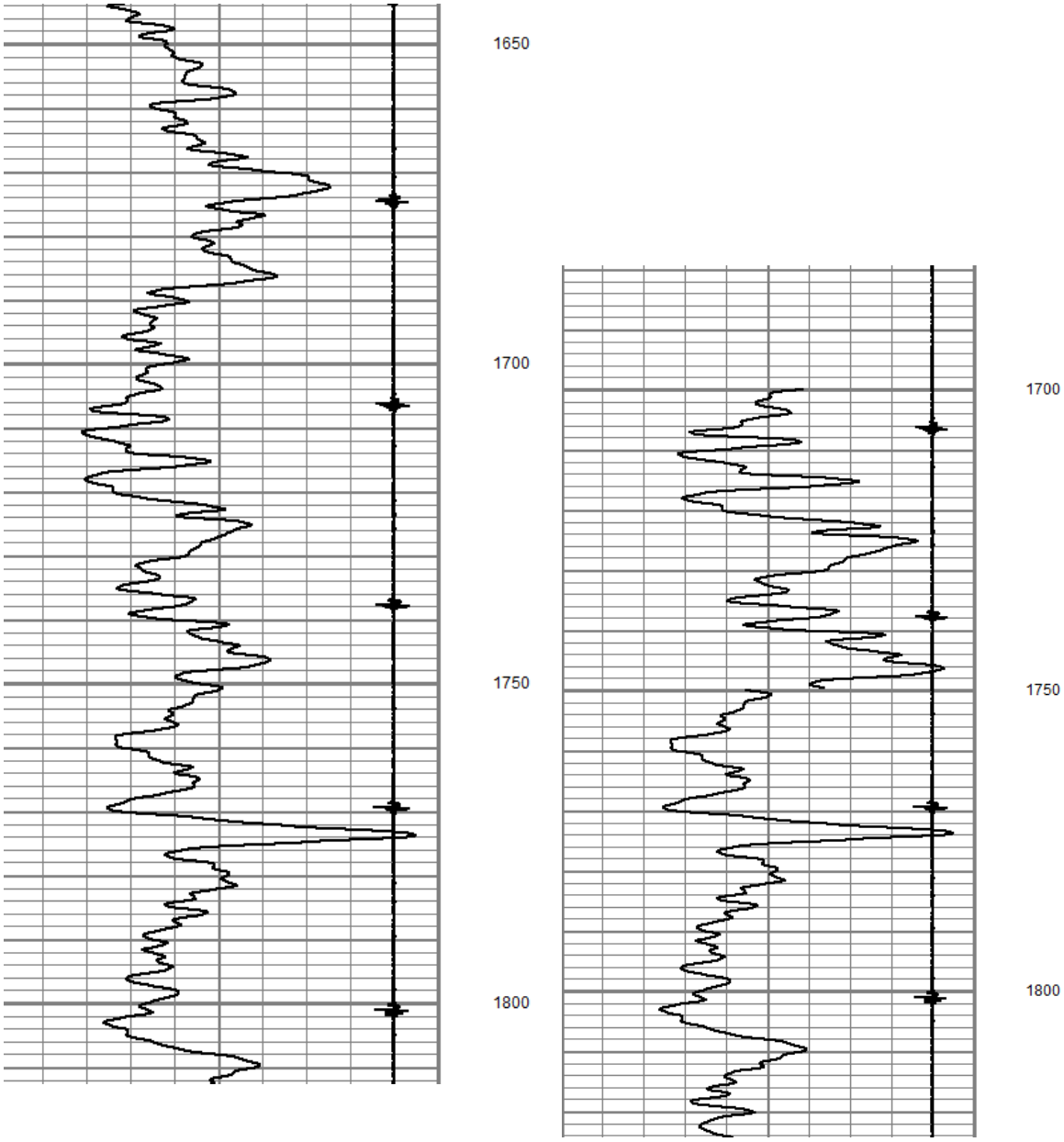


Fig. 7.27 Pass before and after zoned scale changeS

7.3.8 Interactive Plot – Edit – Gridline Setup

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

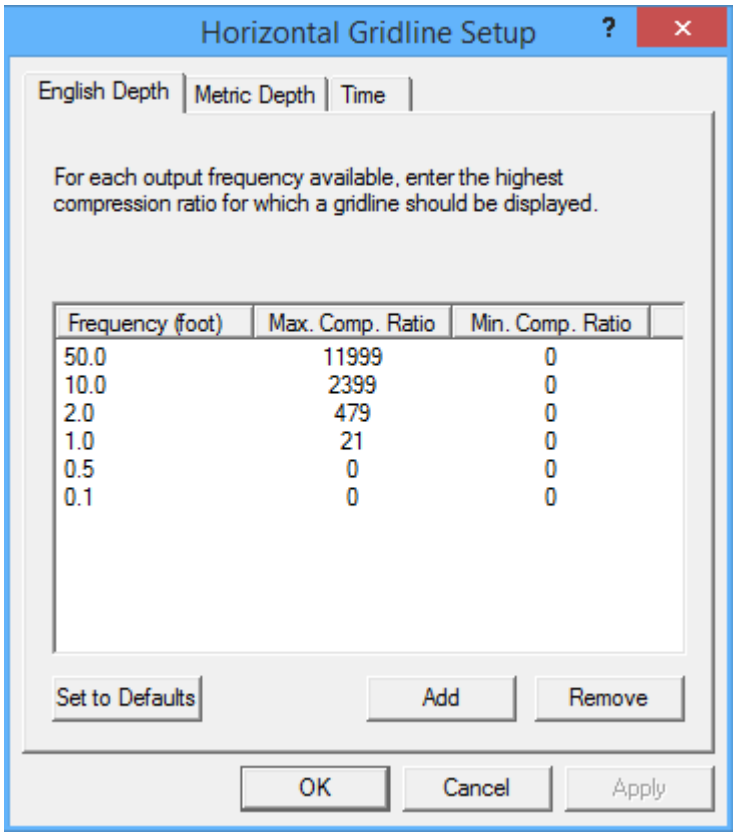


Fig. 7.28 Gridline Setup

7.3.8 Interactive Plot – Edit – Correlation Curves

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

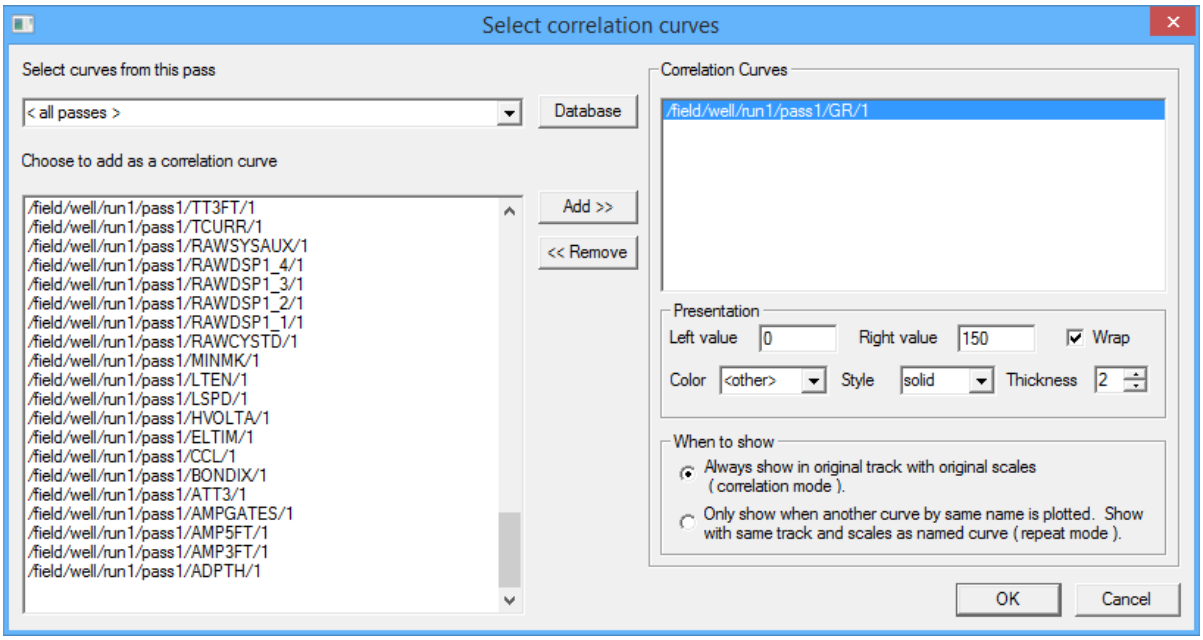


Fig. 7.29 Setup of correlation curves

If the displayed pas is depth shifted, the data in the pass will be shifted as usual but the correlation curve displayed will show the depth from its original pass and not be shifted.
There are now some additional options in Interactive plot. The default setting for correlation curves is to show the correlation curve, but do not plot the correlation curve in any hard copies (or PDF and TIFF). There are options to both display and print the correlation curves and to hide the correlation curves.

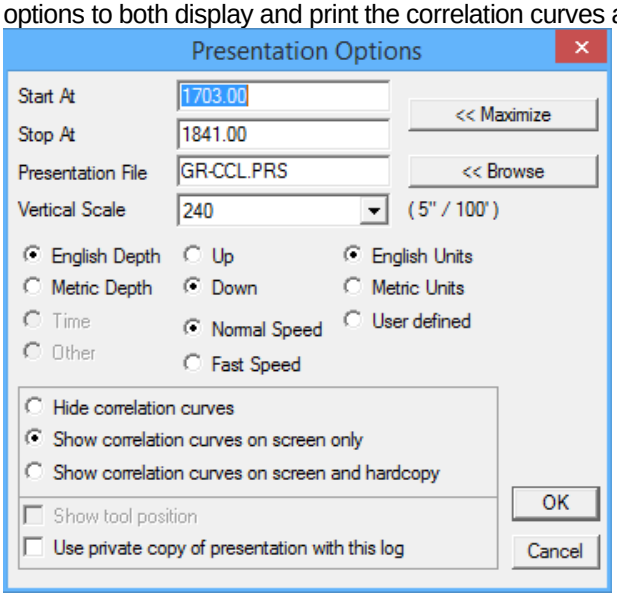


Fig. 7.30 New options for correlation curves

7.3.9 Interactive Plot – Action – Screen Plot

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

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

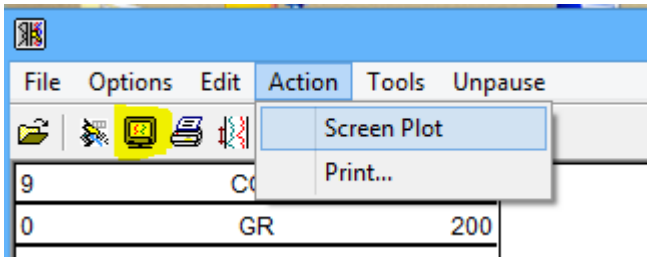


Fig. 7.31 Action -> Screen Plot and Screen Plot Icon

7.3.10 Interactive Plot – Action – Print

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

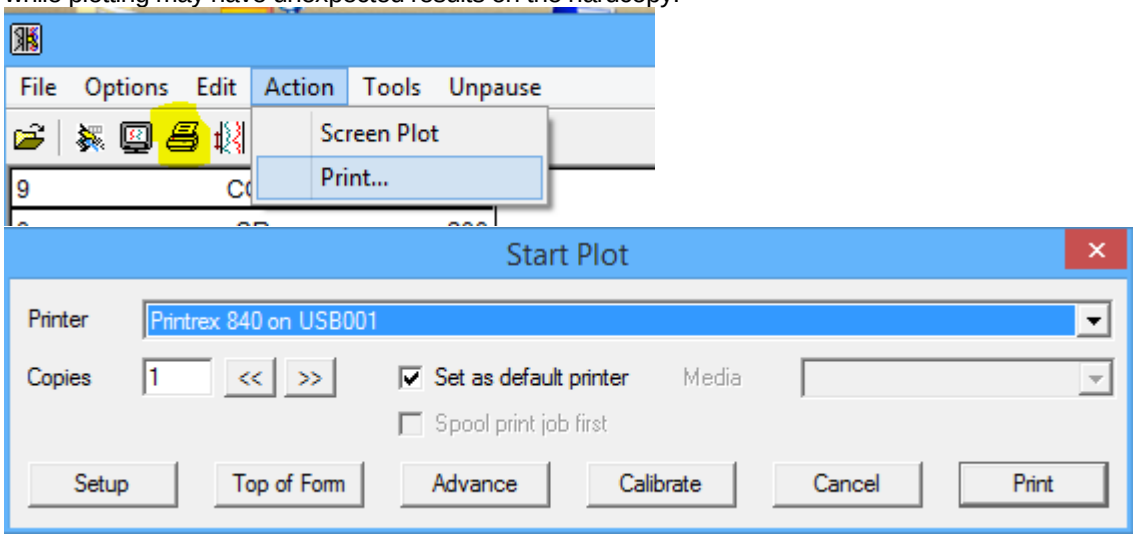


Fig. 7.32 Action-> Print and Print Icon

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

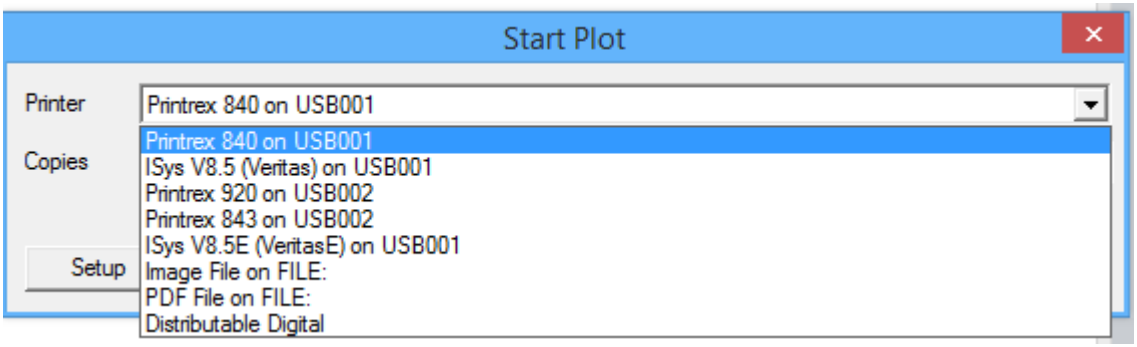


Fig. 7.33 Installed printer list

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

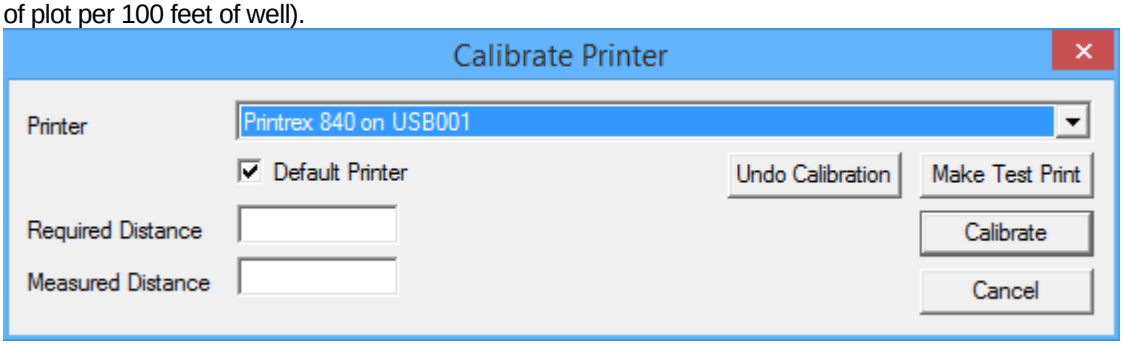


Fig. 7.34 Calibration of printer

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

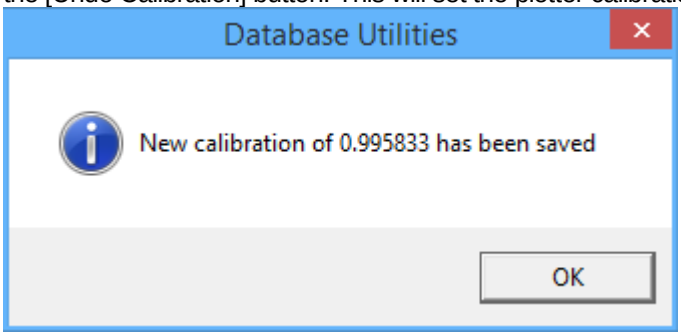


Fig. 7.35 New plotter calibration saved

7.3.11 Interactive Plot – Tools – Depth Shift a Curve

The Warrior Software can depth shift a single curve in a dataset while keeping all the other curves at their current depths. It should be noted that while this feature does exist it should not be a general practice to need to do this. Tool offsets should be adjusted to ensure that curves are on depth. Depth Shifts to a data item or curve can be done in Interactive Plot or Database Utilities.
The first step is to select the data or curve to shift. Click the [Select Data] button to bring up a list of data items in the database. Be aware that all data in the database will be shown, not just the data from the current pass that is displayed if you are in Interactive plot. Find and select the curve and click [OK]. Now enter the amount of shift with negative amounts shifting up hole. If the "Shift current Encoder Depth also" is checked, the encoder depth will also be moved by that amount when the [Apply] button is clicked. If you are in Interactive Plot, the screen will be refreshed with the curve shifted.
No records are maintained of which curves have been shifted or by what amount. It is a good idea to make a backup of the database before doing depth shifts in case of operator mistakes.

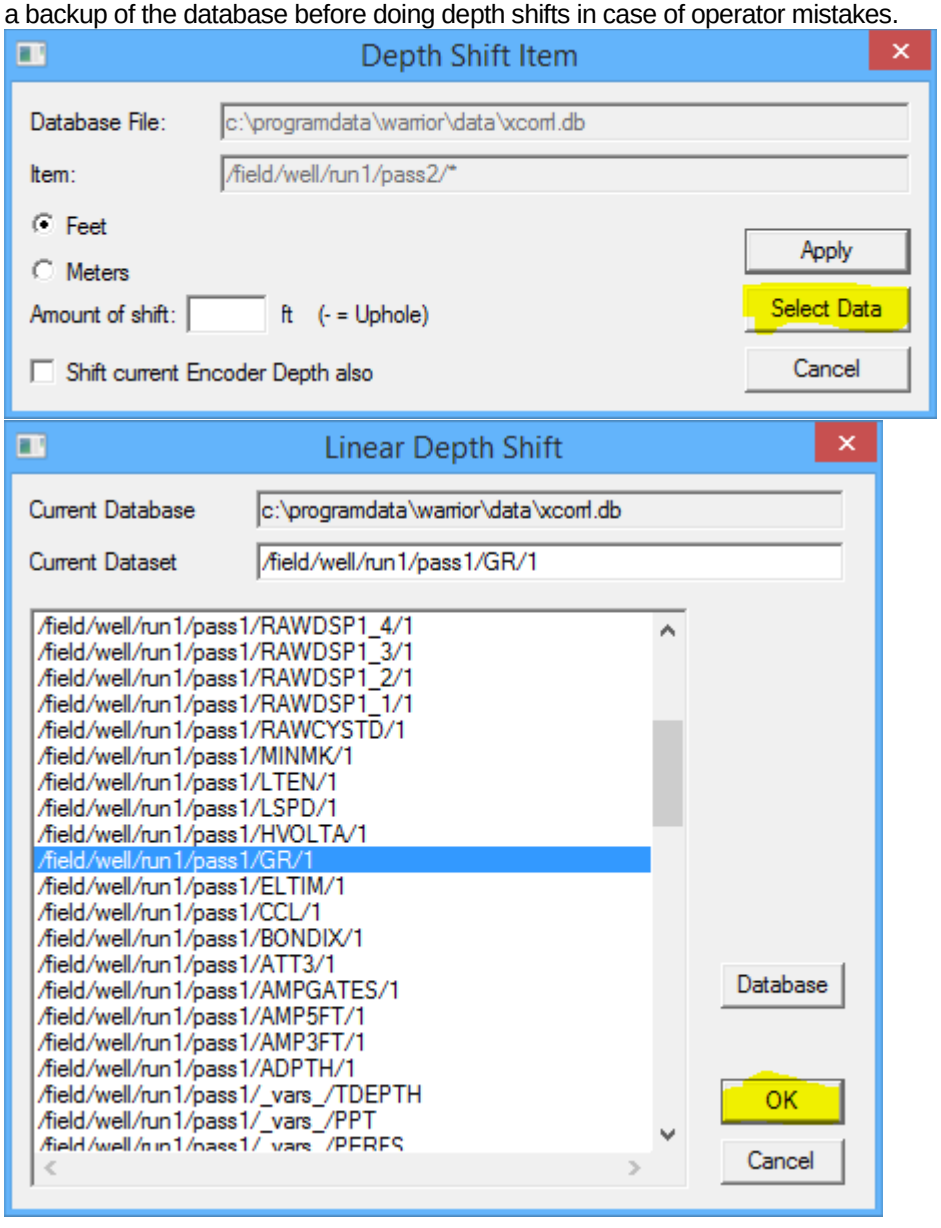


Fig. 7.36 Depth Shift a Curve

7.3.11 Interactive Plot – Tools – Depth Shift a Whole Pass

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

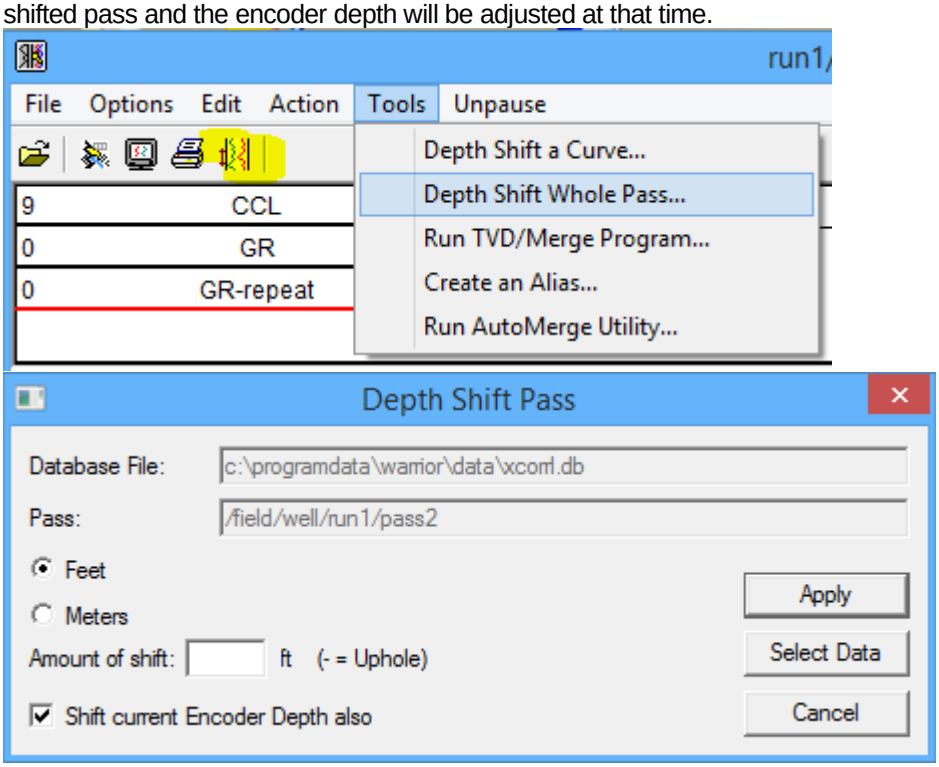


Fig. 7.37 Depth Shift a Whole Pass

7.3.12 Interactive Plot – Tools – Run TVD/Merge Program

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

7.3.13 Interactive Plot – Tools – Create an Alias

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

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

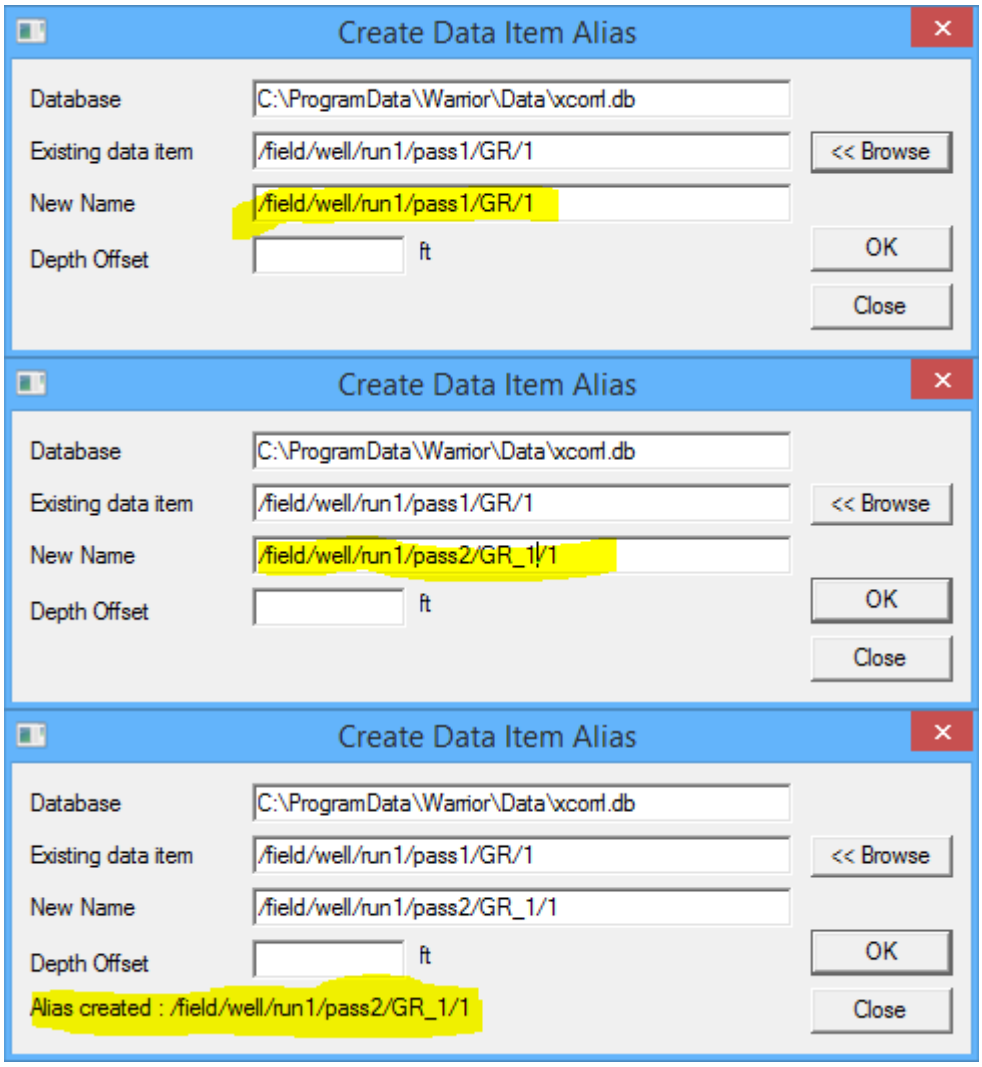


Fig. 7.38 Creating an Alias of GR from Pass1 as GR_1 in pass2

7.3.14 Interactive Plot – Tools – Run AutoMerge Utility

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

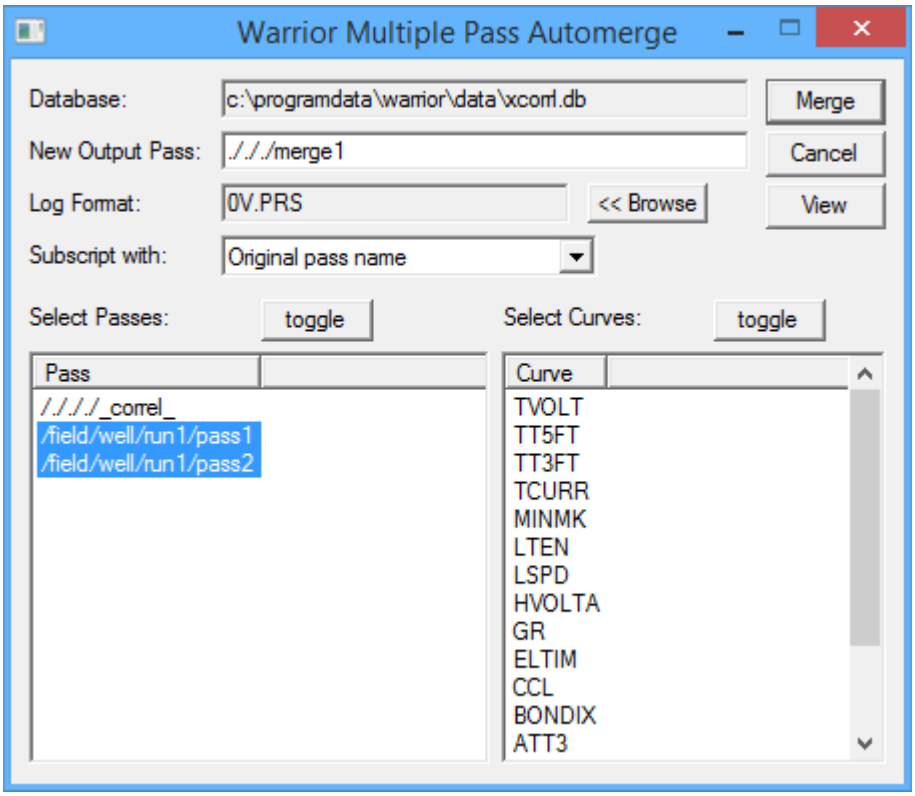


Fig. 7.39 AutoMerge Utility

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

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

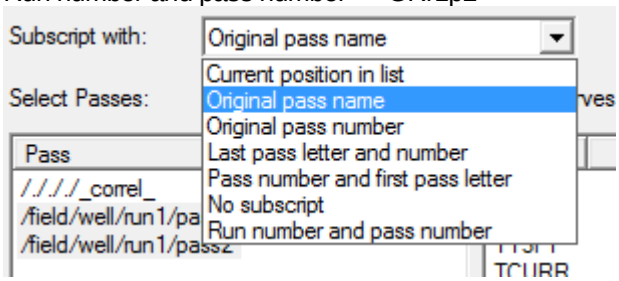


Fig. 7.40 Curve rename options in automerge utility

7.3.14 Interactive Plot – Pause / Unpause

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

Section

8

8 Warrior Backup

Every computer system will, sooner or later, suffer a failure, like a disk crash, where potential loss of programs and/or data is possible. This will generally happen at the most inconvenient time. **The importance of keeping current backups cannot be overemphasized**. It is vital that current backups are kept of all essential programs and data.
The warrior system is usually configured for the selection of services to be run by a given client. This information is primarily contained in three files, namely wproperties.ini, services.ini, and tools.ini. A copy of all your customized files can be backed up to USB Memory/Hard disk by using " Configuration Backup/Restore" utility.

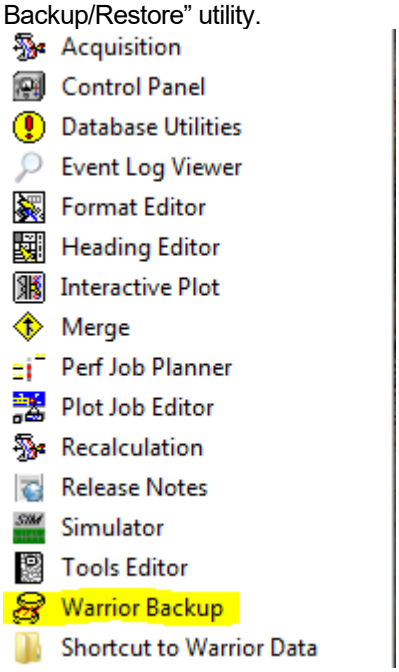


FIG: 8.1 Select Configuration Backup/Restore.

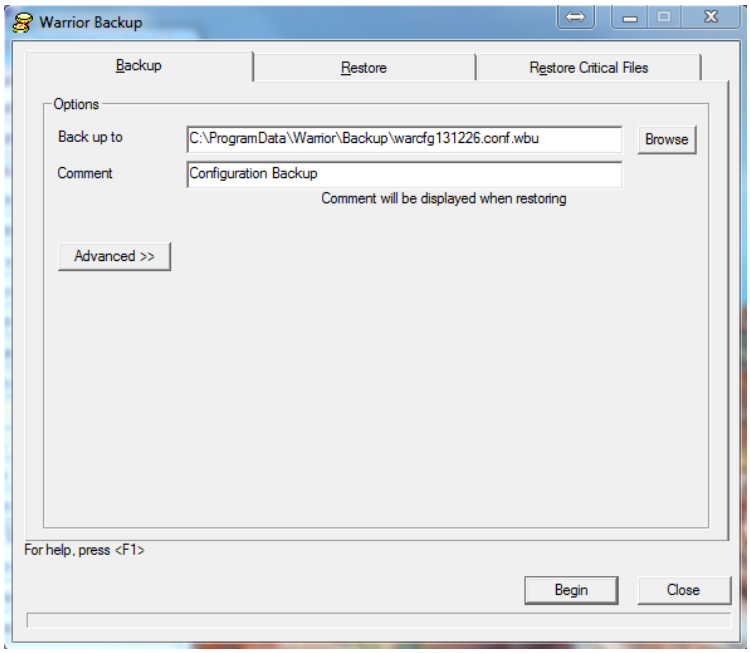


FIG: 8.2 Select Backup, Restore or Restore Critical Files

8.1 Backup

The first tab is used to Backup all you customized files including but not limited to Logo, Services, Depth offsets, calibrations, serial numbers and licenses. With the " wbu " file generated here you can recover all of these or take it on a USB drive to another computer and restore it to the same configuration as the current system. In the Backup to windows you can browse to where you want the backup stored. The comment line lets you add a comment to the file to more easily identify the purpose of the backup. The advanced option allows you select files to include or exclude from the backup, use this option with caution as selecting files other than the defaults may cause the backup file to either skip important files or over write critical software files. To begin the backup, you will need to click on the begin button. Once completed a " Backup completed" will be displayed as a status.

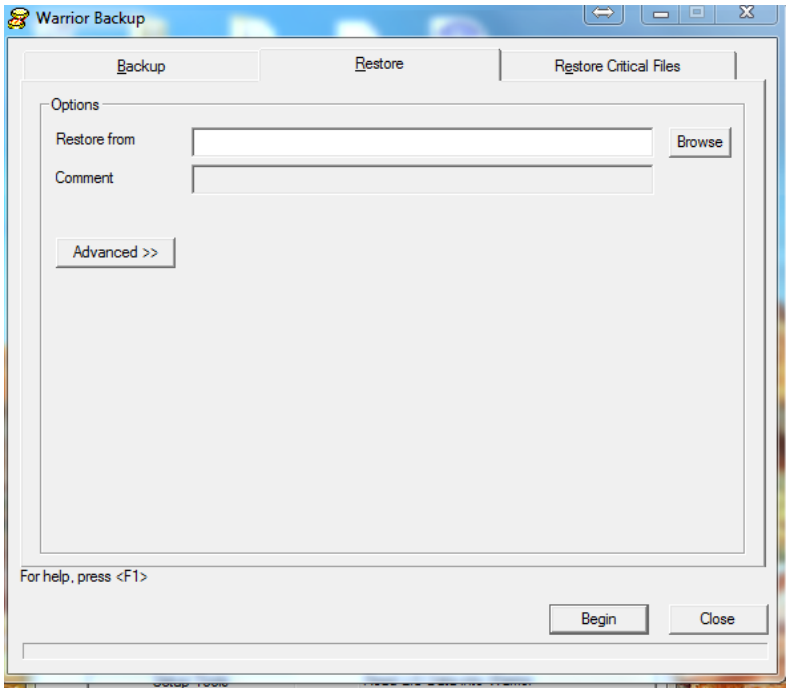


FIG: 8.3 Restore

8.2 Restore

The restore tab can be used to restore a previously backed up system to its working state or copy relevant files to a new system. The restore from line lets you browse to the desired " wbu " file. Once selected the system will read through the file to ensure it is not damaged" this can take some time depending on the system ". Once it reads through the file you will need to click the begin button. Once completed a text dialog will show all the files restored.

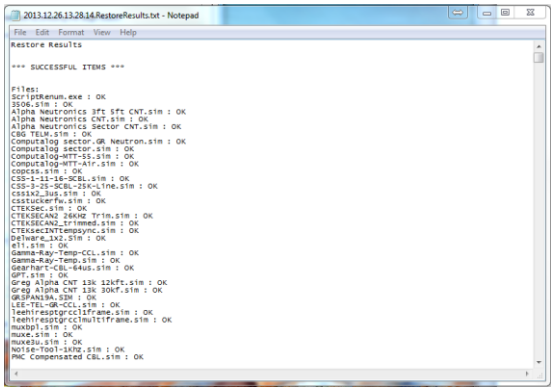


FIG: 8.4 Restore results

This tab has an advanced button as well, the same precautions should be observed, by selecting anything other than the defaults you may cause system instability.

8.3 Restore Critical Files

The third tab " Restore Critical Files " allows you to restore only the critical system configurations. These files are saved every time acquisition is started if there is a check mark in the " Do automatic critical backups " radio button. By clicking on any of the dated files under Critical backup dates the system will show which critical files were backed up.

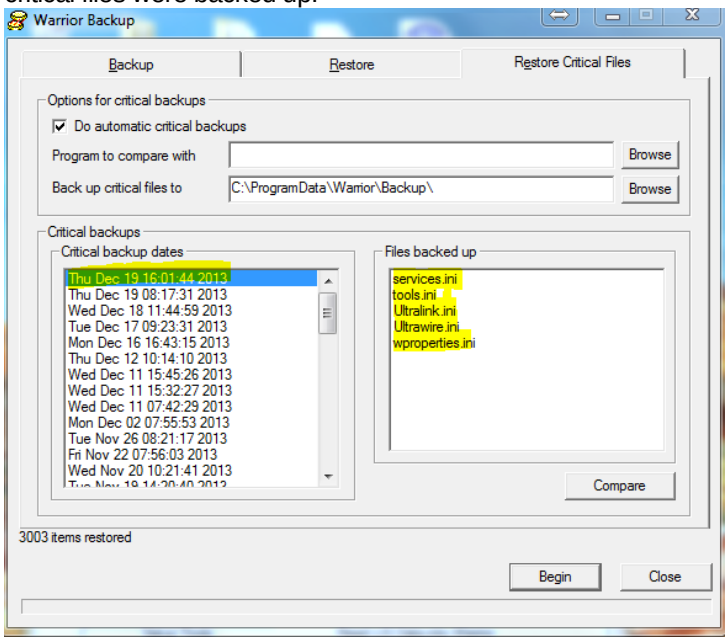


FIG: 8.5 Restore Critical Files

It is generally better to do a "Restore" than a "Restore Critical Files" critical files, Restore Critical Files is a more specific and advanced option.

Section

9

9 Plot Job Editor

The Plot Job Editor is a program module, which enables the operator to assemble the various components (heading, log sections, etc.) of a well log into its final presentation. The resultant plot job information is saved in a well log database, usually alongside the log data. The Presentation Plot program uses the plot job information to create the graphical output to a plotter or other graphics device (fax file, etc.).
The Plot Job Editor is started from its icon in the Warrior group, the Presentation Plot File menu, or the Acquisition module Edit menu.
Double click on the program group icon, the Acquisition Edit menu or the Presentation Plot File menu

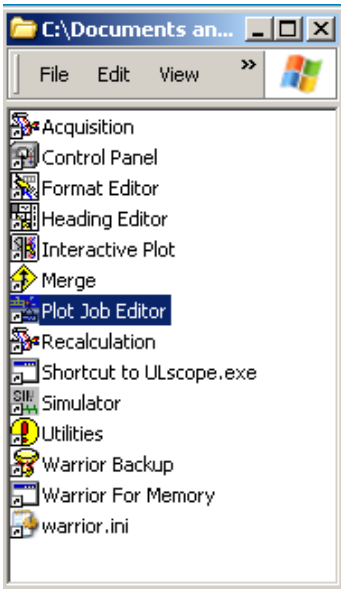


FIG: 9.1Select Plot Job Editor

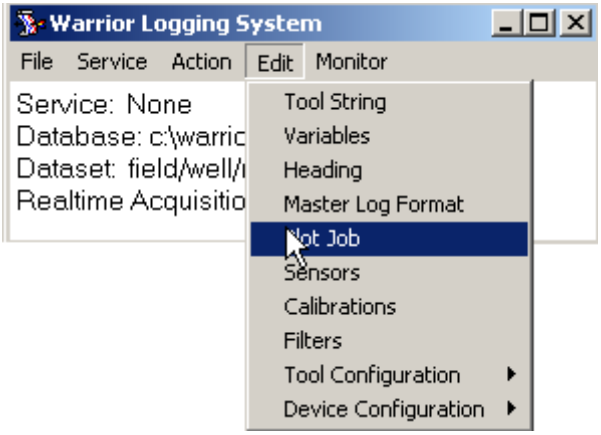


FIG: 9.2 Select Plot Job

9.1 Select File

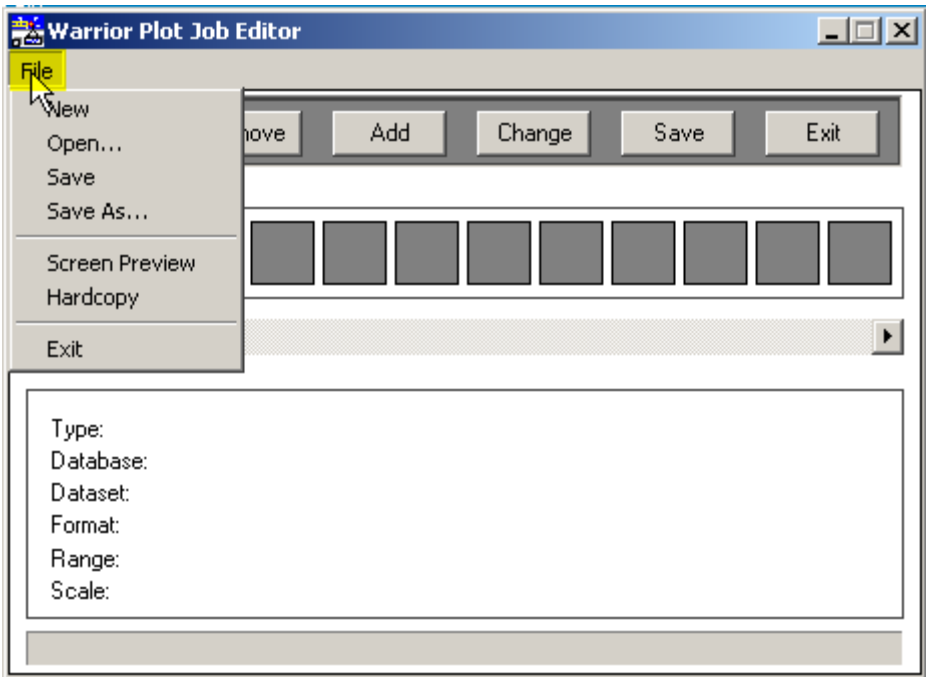


FIG: 9.3 File Menu

The menu functions are as follows:

9.1.1 New

If a plot job is currently selected, New clears the editor for a new plot job.

9.1.2 Open

Displays the file selection window to allow the operator to select the database file containing the plot job to be edited. Note that plot job information is stored in the Warrior database file at the run level.

9.1.3 Save

After creating or editing the plot job it may be saved within a Warrior database file

9.1.4 Save As
Allows a plot job to be edited and subsequently saved to new location with a different name.

9.1.5 Screen Preview
Starts Screen Preview of the selected plot job, see section 6 in the manual on Presentation Plot.

9.1.6 Hardcopy
Displays a list of the plotters supported on the logging system. Selection of one of the plotters causes the plot job to be output to the hardcopy device (plotter).

9.1.7 Exit
Closes the Plot Job Editor

9.2 Start the Plot Job Editor.

When the selection of the items is complete the plot job data is saved in the Warrior database.
If the Plot Job editor is invoked from within the Acquisition module the database path and name are set to be those of the current database. If invoked from elsewhere the full path must be entered by the user. (LEAVE NO ASTERISKS / WILDCARDS) The blank plot job appears as shown above.

9.2.1 Change
Changes plot job to be edited.

9.2.2 Remove
Removes the selected file from the plot job.

9.2.3 Add
To create a new plot job, start with the Add button

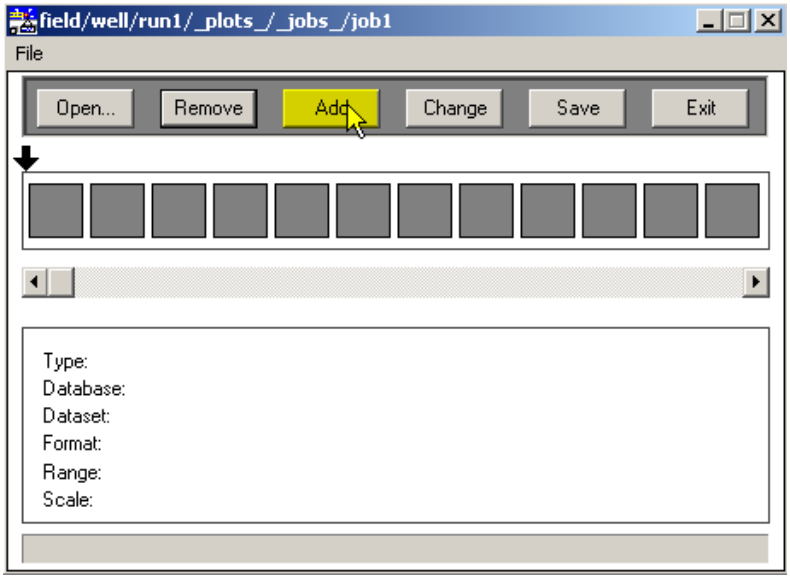


FIG: 9.4 Add File

Add Displays the selection box containing types of files, which may be included in the plot job.

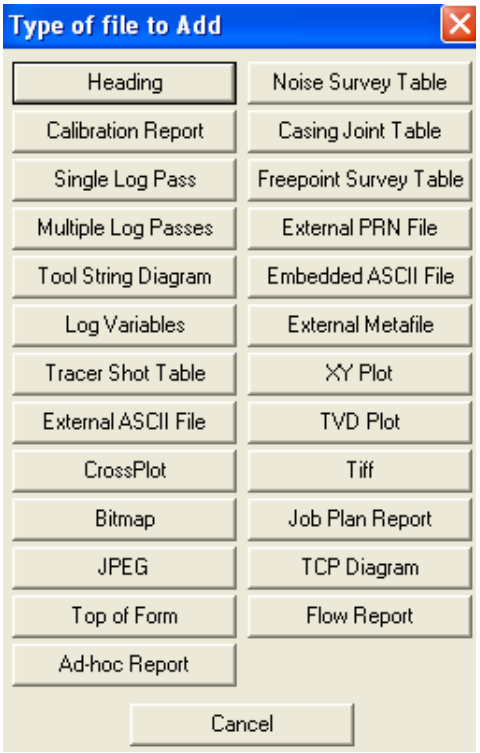


FIG: 9.5 Select the File to add

Selecting a database file causes a list of plot jobs stored within the database to be displayed.

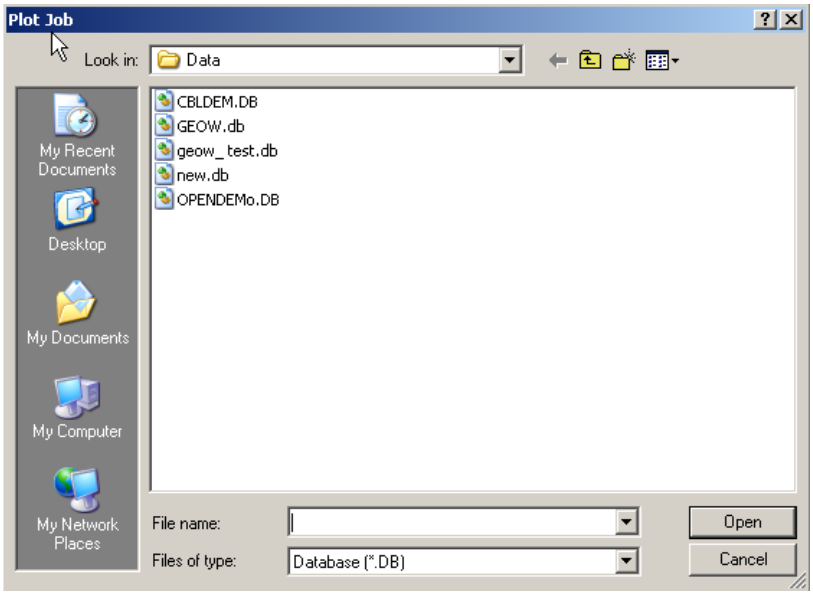


FIG: 9.6 Select Database

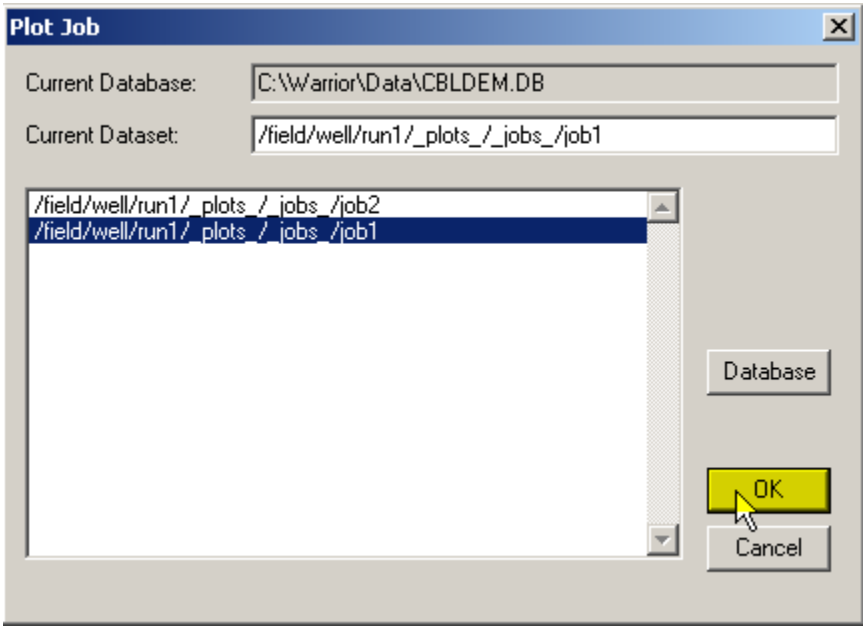


FIG: 9.7 Select Plot Job

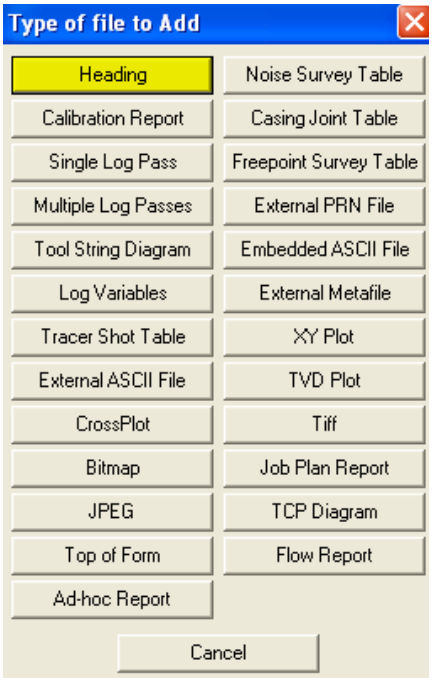


FIG: 9.8 Select Heading

Typically, a log heading would be the first file to appear in the plot job. Click on Heading and, because headings are stored in the log databases, the database selection window is displayed. Select the database where the required heading is stored. A list of the headings stored in that database is displayed

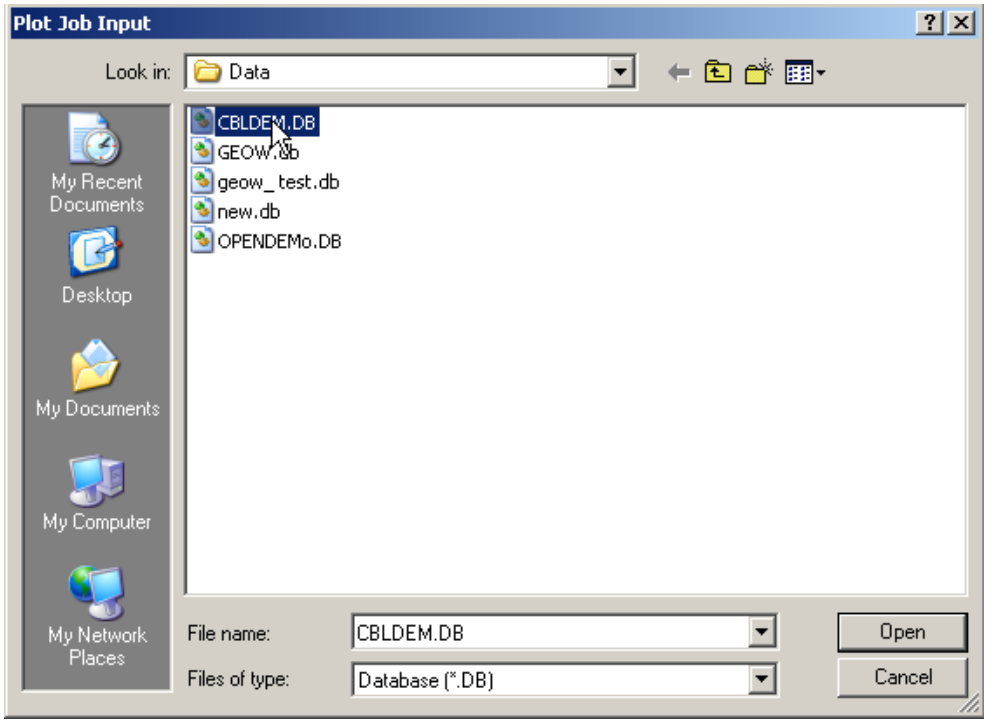


FIG: 9.9 Select Database

Select the required heading by double clicking or highlighting and the OK button. The heading appears as an icon at the start of the plot job sequence, as shown below.

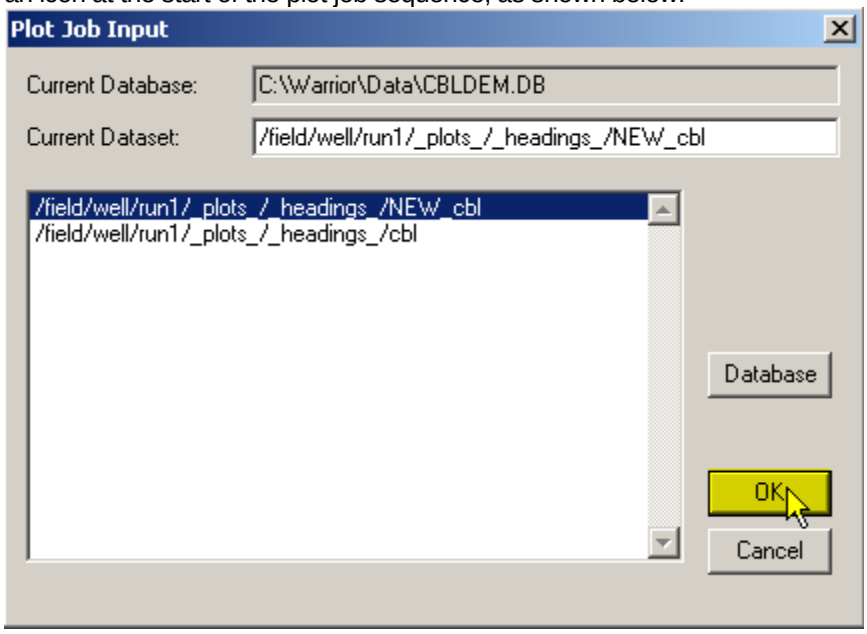


FIG: 9.10 Select Plot Job Input

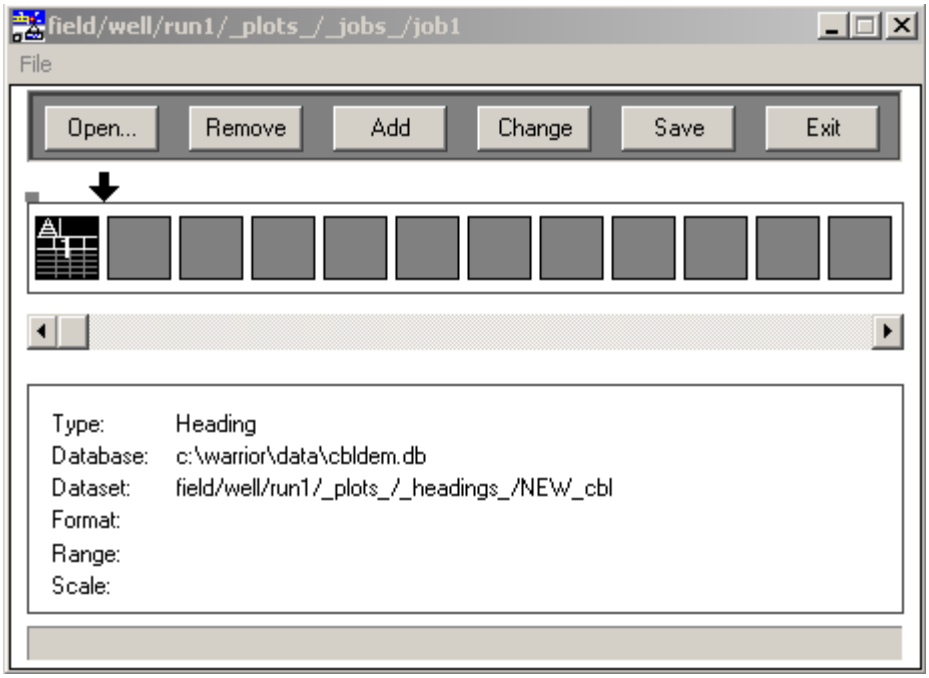


FIG: 9.11 Add Heading

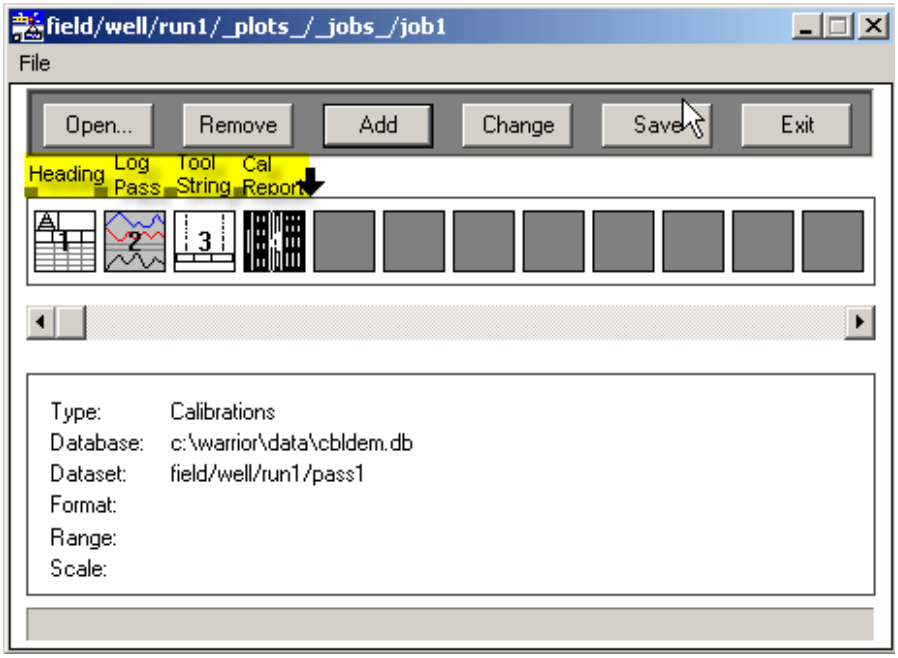


FIG: 9.12 Add Heading, Log Pass, Tool String, and Calibration Report

Other files may be added as required in the order they are to appear on the final log presentation.
To add a log section, click on Single Log Pass and a list of the log passes in the currently selected database is displayed.

Selecting Multiple Log Passes allows the operator to select for inclusion the plot job several log passes at the same time. This is useful when there are many passes to be included, as with production logging.
Other items from the type list may be added as required. Tool string diagrams and calibration reports are stored at the pass level, therefore when adding an item of these types, a list of the log passes is presented.
In this way the items to be presented on log print are defined together with the order in which they are to appear. Each item appears as an icon as shown below.

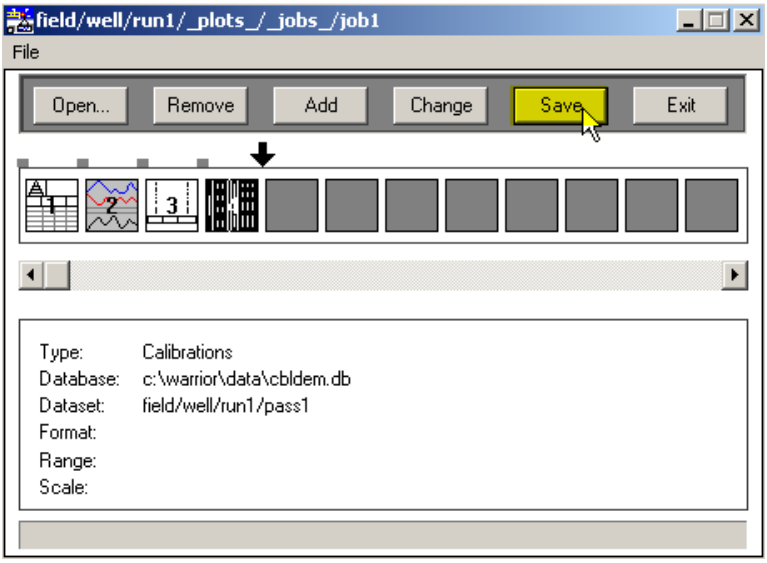


FIG: 9.13 Save

Note that the plot job contains information concerning which files are to be plotted, in which order, and with what presentation. It does not contain the files themselves, therefore the files may be modified e.g. by adding annotations, without the need to recreate or modify the plot job itself.
Selecting External PRN file allows the inclusion within the plot job of plot or print output from any Windows application. It is necessary that the material to be added to the plot job have been previously printed to a PRN file from the application. See Windows Help - Print to a file for details on how to do this.
Upon completion of the plot job sequence the job may be plotted by choosing the Hardcopy option from the file menu. Alternatively, the Presentation Plot program may be started from the Warrior program group (particularly if a Screen Preview is required).

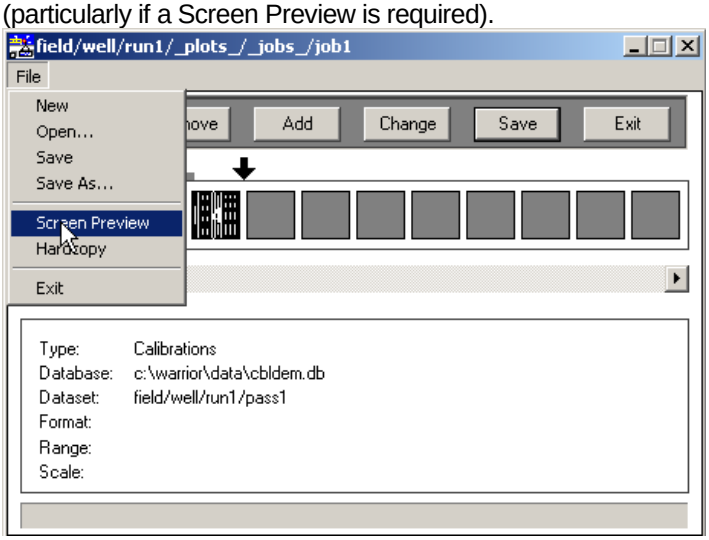


FIG: 9.14 Select Screen Preview

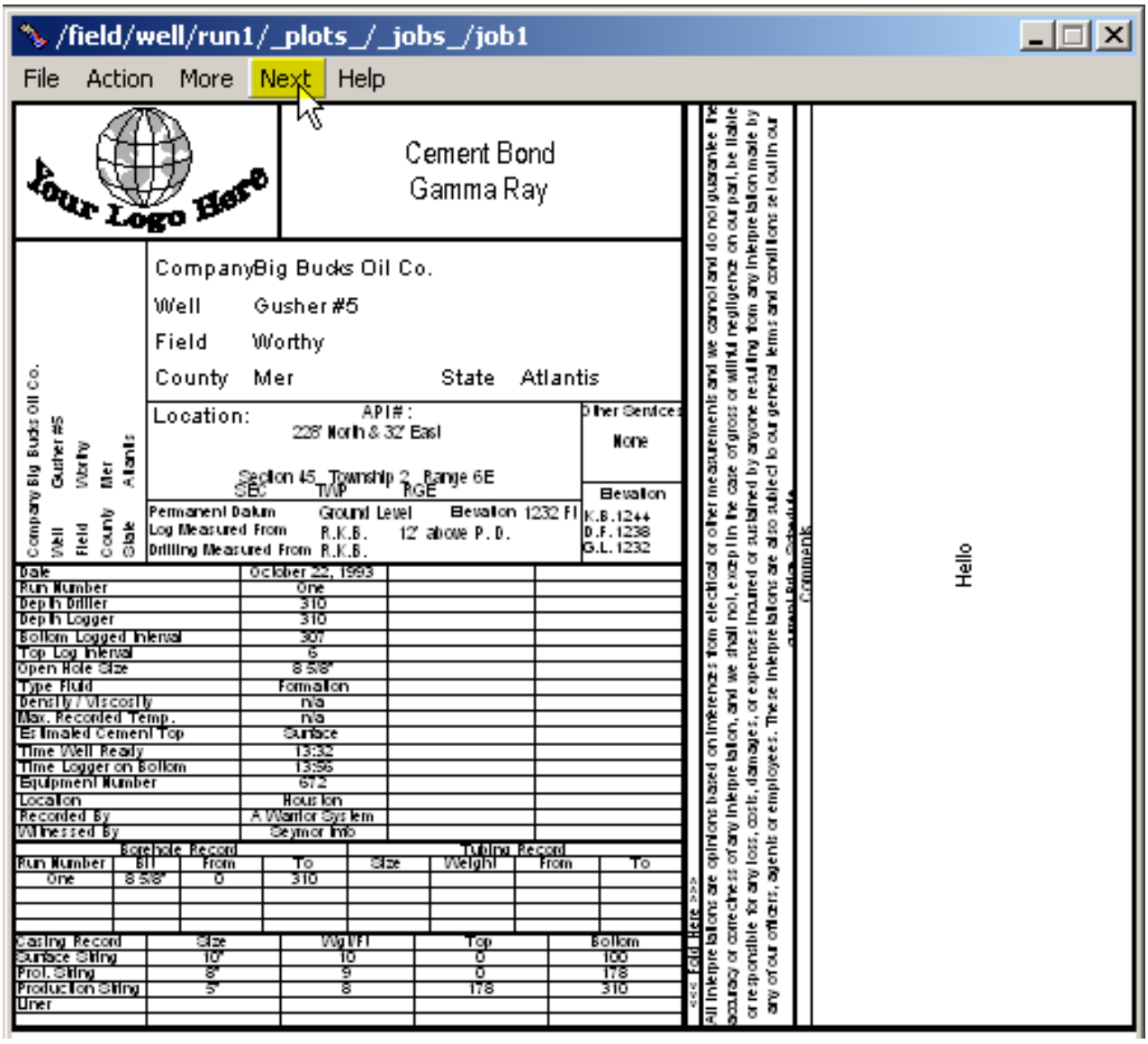


FIG: 9.15 Heading

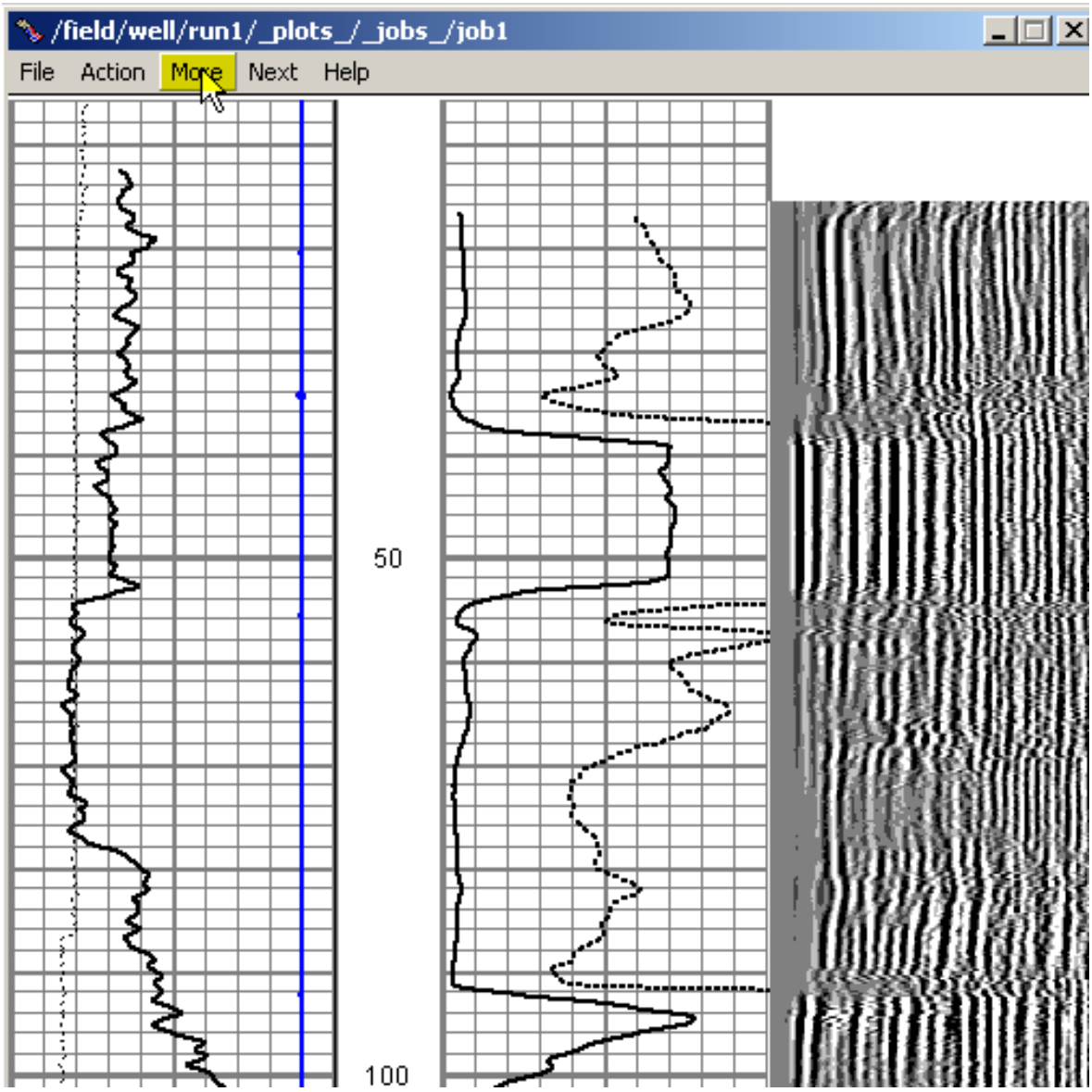


FIG: 9.16 Log Pass

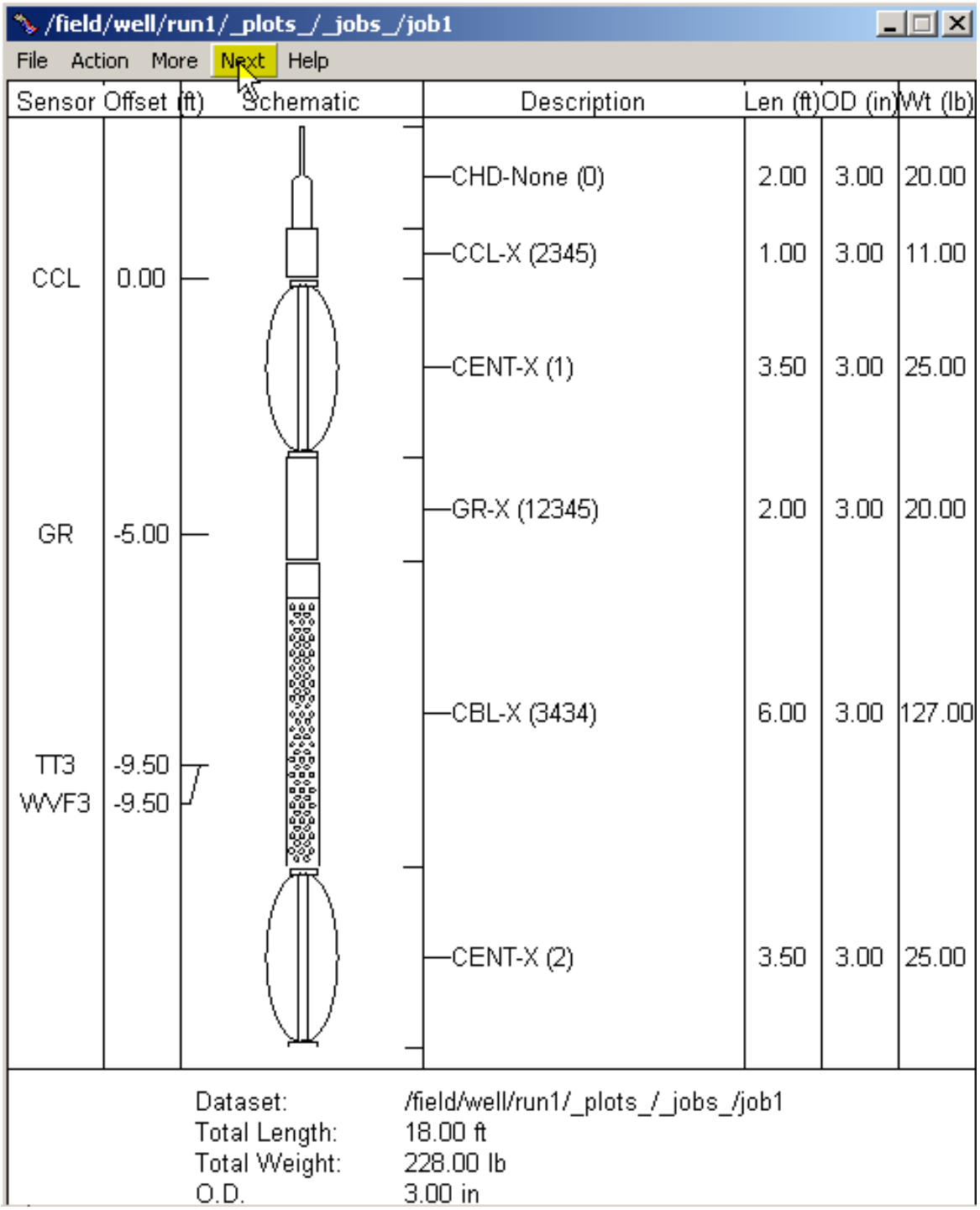


FIG: 9.17 Tool String Add

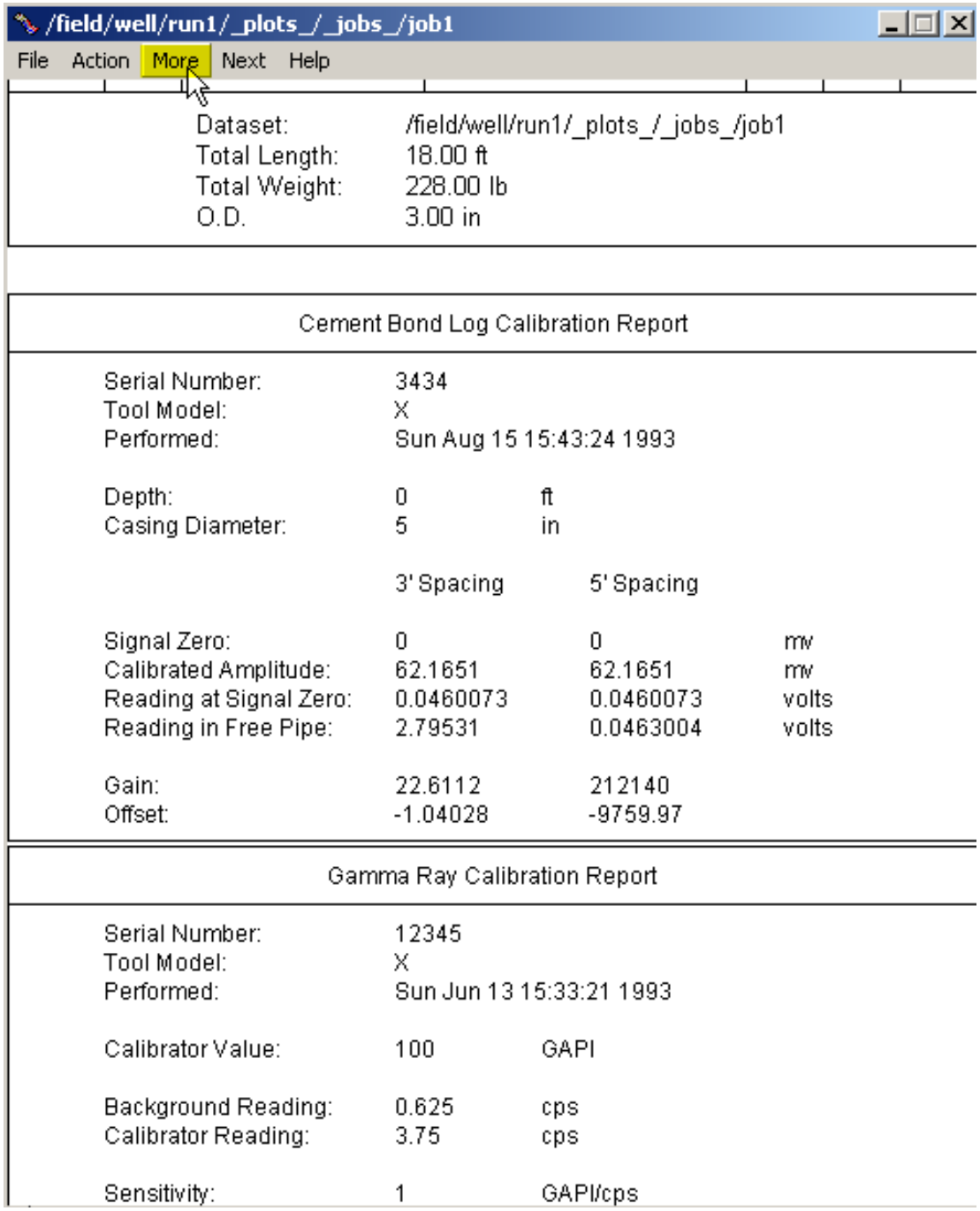


FIG: 9.18Calibration Report

Section

10

10 Recalculation

The recalculation mode allows log data to be recalculated or relogged from raw data. Calibrations and other acquisition parameters, such as filters and depth offsets, may be changed. The data monitors used during actual logging are available to the operator during recalculation.
Double-click the Recalculation icon in the Warrior group and a menu box like that of Acquisition will appear. In this case though, Service and Action are disabled (appear feint on the menu bar). The Edit and Monitor menus are identical to those of Acquisition.

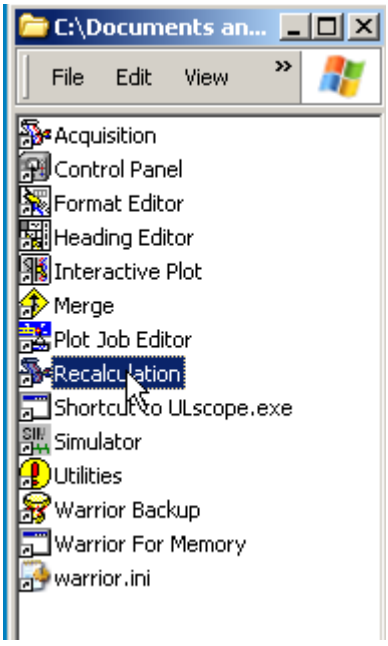


FIG: 10.1 Recalculation

10.1 File

The following option can be select in File:
Select Dataset, About, Exit, Close All.

10.1.1 Select Dataset

The Warrior well log database can (optionally) contain data from many wells, and within each well, data from many log passes. Each log pass is stored in a dataset. The dataset contains not only log data, but also other information about the logs, e.g. calibration and tool data

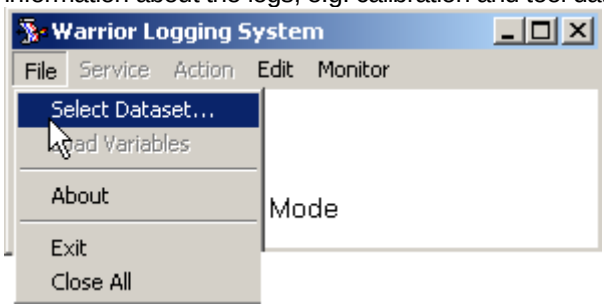


FIG: 10.2 Select Dataset

Choose the Select Dataset option from the File menu. A dialog box will appear as shown below.
The software includes a database named cbldem.db that may be used for the purpose of demonstrating the Recalculation mode. Select the dataset as shown below.

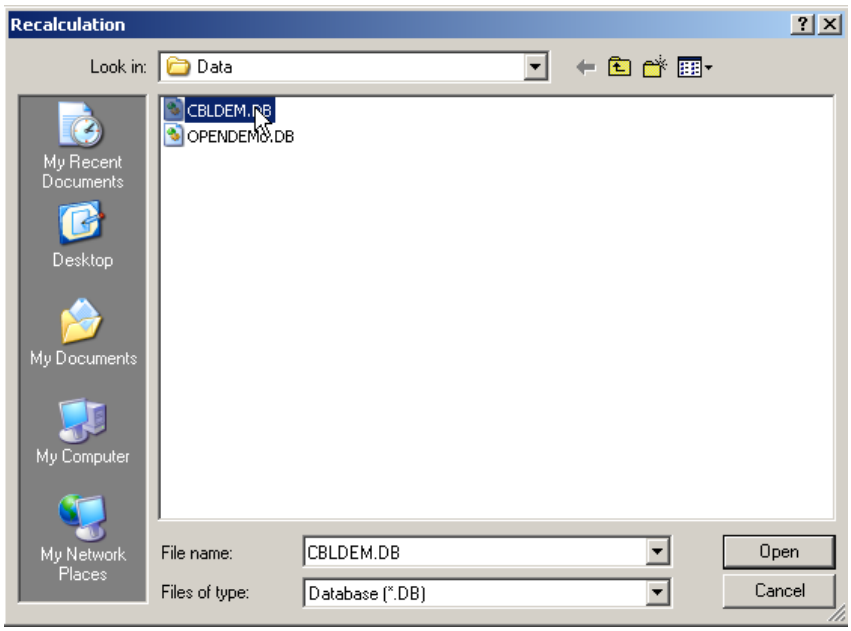


FIG: 10.3 Select Database

The Recalculation Output is the destination pass (or dataset) of the recalculated data. It may be named anything you like. If this pass already exists in the database when Recalculation. Is invoked, the software will give an error message and a new Recalculation Output should be selected.
Allowing the system to give a default name to the recalculated output will cause it to be named x.1, where x is the name of the original pass. Repeated passes through Recalculation. Will cause an incrementing number to be attached to the Recalculation. Output. In this case pass1.2, pass1.3 etc.

When recalculating, for example, pass 1.1 to 1.2, upon selecting 1.1 as the base pass the system will still indicate 1.1 as the output pass. It will however create a new pass 1.2

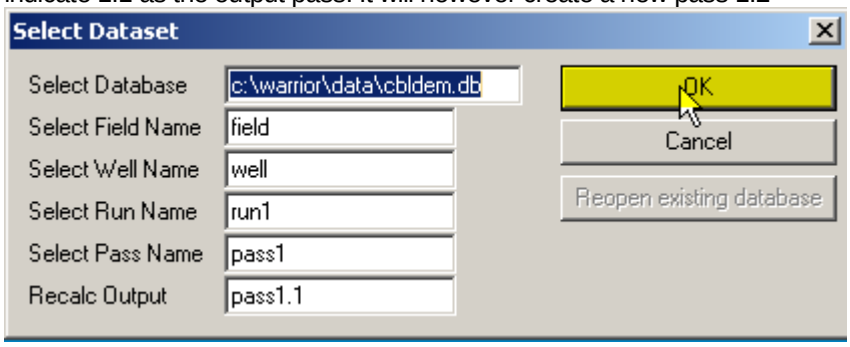


FIG: 10.4 Select Pass Name and Set recalculated Output

When OK is selected the software reads information from the log database and displays the Recalculation Control dialog box, as shown below.

10.2 Recalculation Control

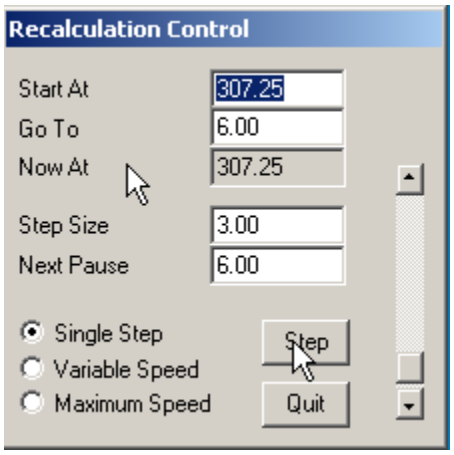


FIG: 10.5 Recalculated Control

The Recalculation Control allows setting of Start, Stop and Pause depths. It also enables setting of the Step size. The Step size is the log interval that Recalculation attempts to recalculate during its share of the CPU time and functions effectively as a speed control.
Recalculation may be run in three modes.

10.2.1 Run single step

Select a step size. This may be as small as a single sample.
Click the Single Step radio button. The log plot will appear on the left of the screen.
Successive clicks on the Step button will cause the pass to be recalculated step by step.

10.2.2 Run variable speed

Select a step size.
Click the Variable Speed radio button. The log will appear on the left of the screen and will scroll at a rate that may be varied by the scroll bar in the Recalculation dialog box. Increasing the step size also increases the recalculation rate.

10.2.3 Run maximum speed

Select a step size.
Click the Maximum Speed radio button. The log will appear on the left of the screen and scroll at its maximum rate. It is likely that the recalculation will complete quickly, but that the log on the screen will lag.

10.2.4 Pause Recalculation

Click once on the QUIT button causes the Recalculation to pause.

10.2.5 Quit Recalculation.

Click twice on the QUIT button.

10.3 Load Variables

The Load Variable is invoked from the Recalculation File menu. It is used to Load variables from the database.
Load Variables the other Dataset, enabling depth dependent parameters associated with the selected service to be zoned and values to be set.

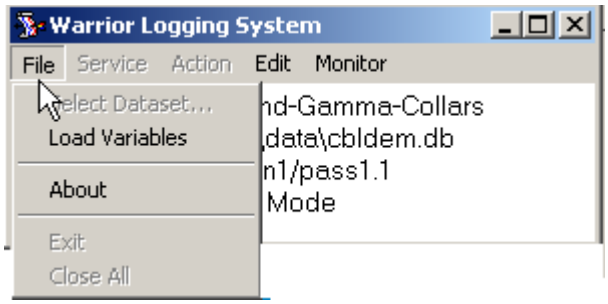


FIG: 10.6 Load Variables

10.4 Monitor

The Monitor option in recalculation has the same properties that Monitor in acquisition. (See Section 4.6)

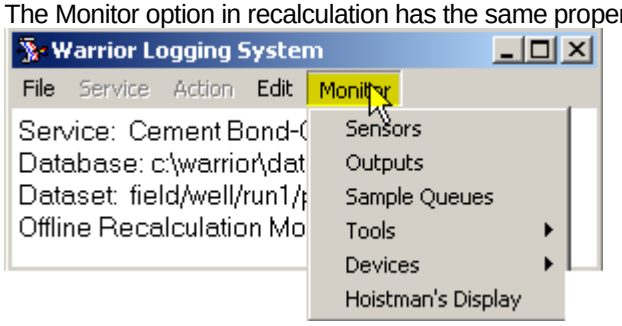


FIG: 10.7 Monitor Options

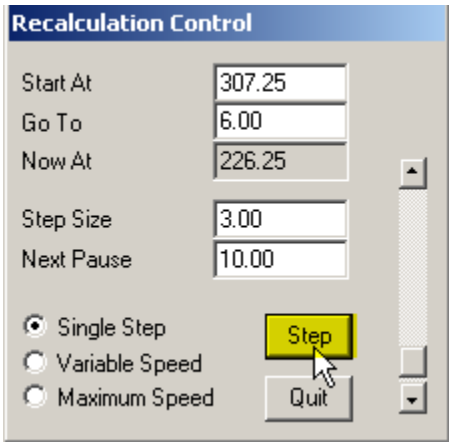


FIG: 10.8 Step Control

10.5 Edit

The Edit option in recalculation has the same properties that Edit in acquisition. (See Section 4.5).
Change parameters as required. These may include:
Tool String, Variables, Heading, Master Log Format, Plot Job, Sensors, Tool Configuration, Device Configuration, depth offsets, input channels, curve filters, calibrations, sonic amplitude gate settings.

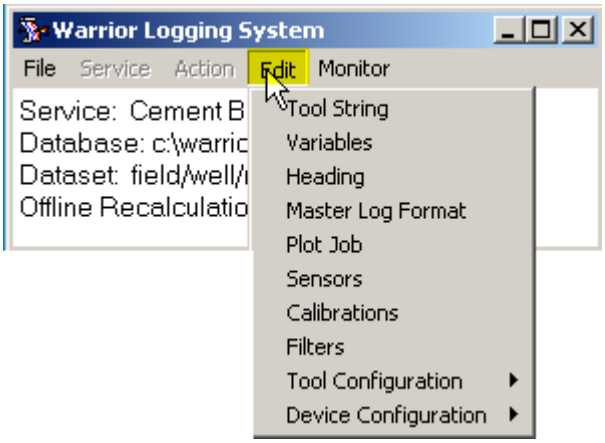


FIG: 10.9 Edit Options

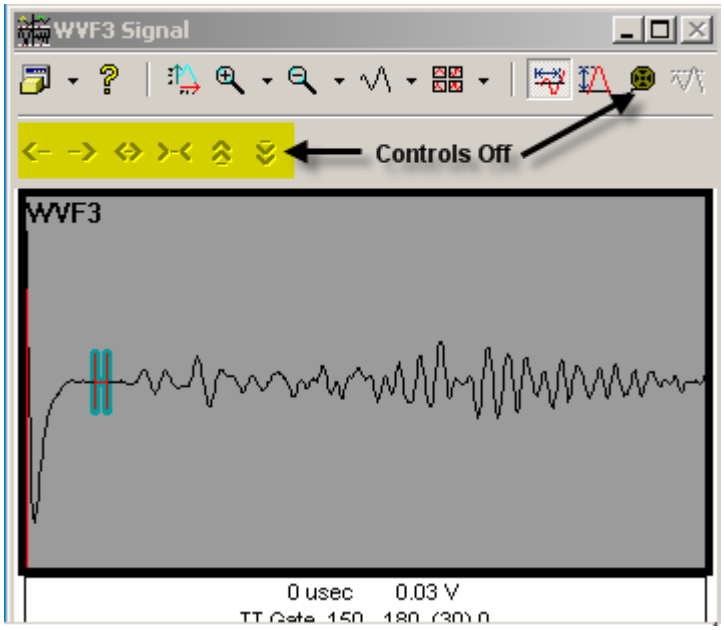


FIG: 10.10 Acoustic Signal Control Off

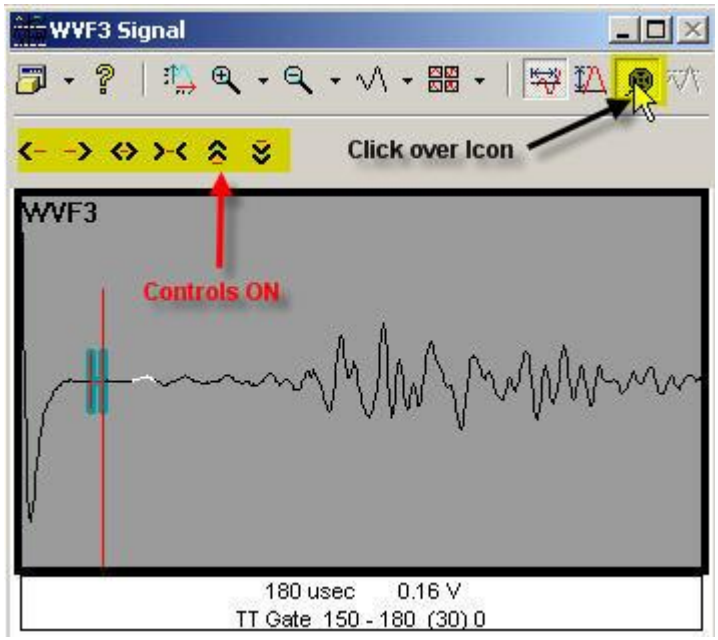


FIG: 10.11 Acoustic Signal Control set ON

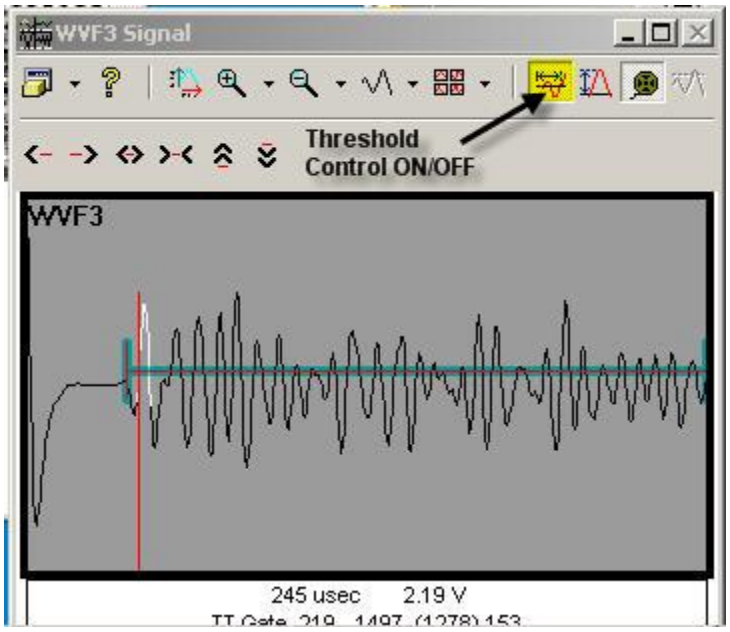


FIG: 10.12 Thresholds and Gate Control ON

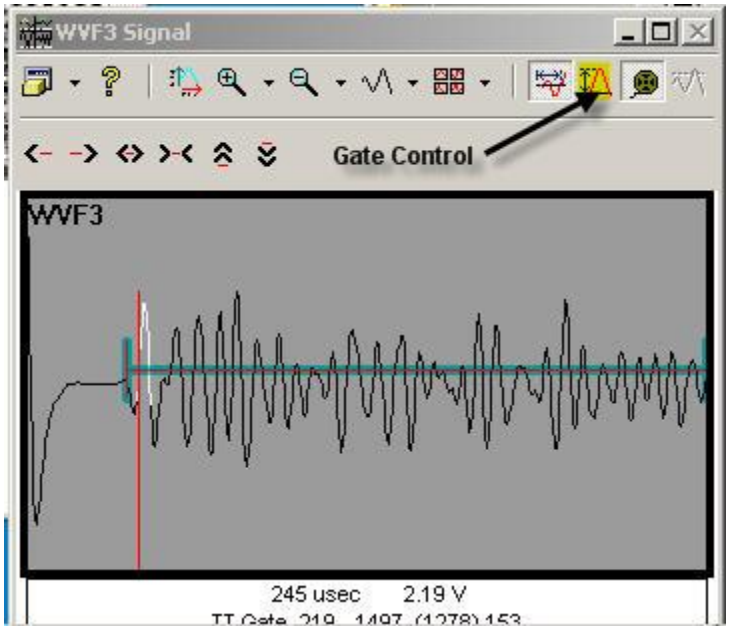


FIG: 10.13 Gate control Set ON

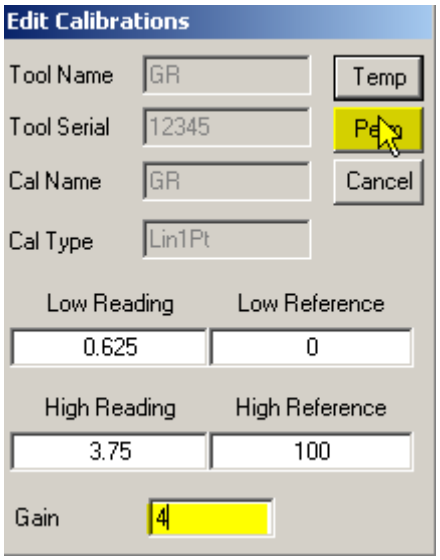


FIG: 10.14 Edit GR Calibrations

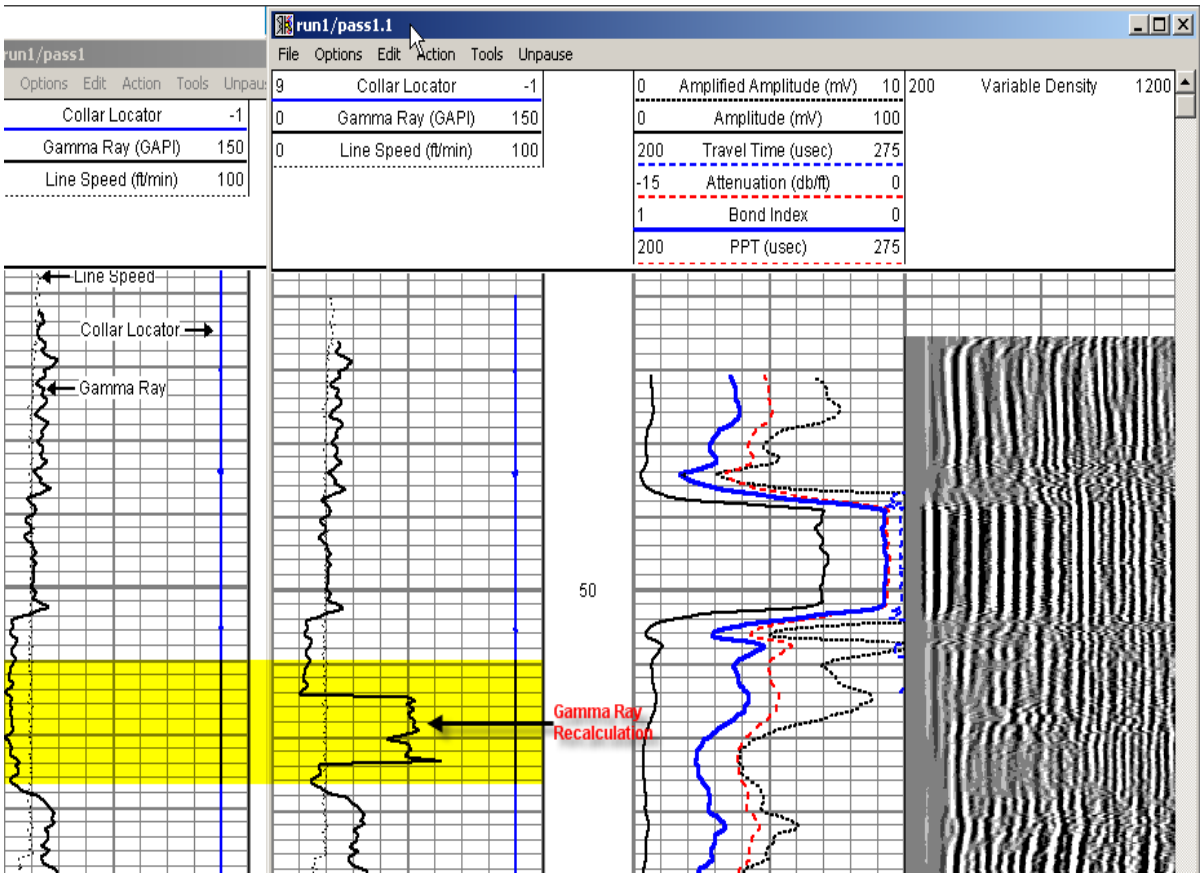


FIG: 10.15 GR Curve Before and After the Recalculation

Section

11

11 Merge/Splice, TVD Merge/Splice

The Wizard, Merge, Splice and TVD module allows data from one or more database files to be manipulated in the depth domain and output to one or more destination files. Data may be depth adjusted and correlated, curves from multiple runs spliced together, outputs renamed etc. The module also includes the capability to calculate True Vertical Depth (TVD) from directional survey data and generate log data referenced to TVD for subsequent plotting and other operations. Most of the Merge program operations may be accomplished with only one pass through the data.
Double-click the Merge icon in the Warrior group

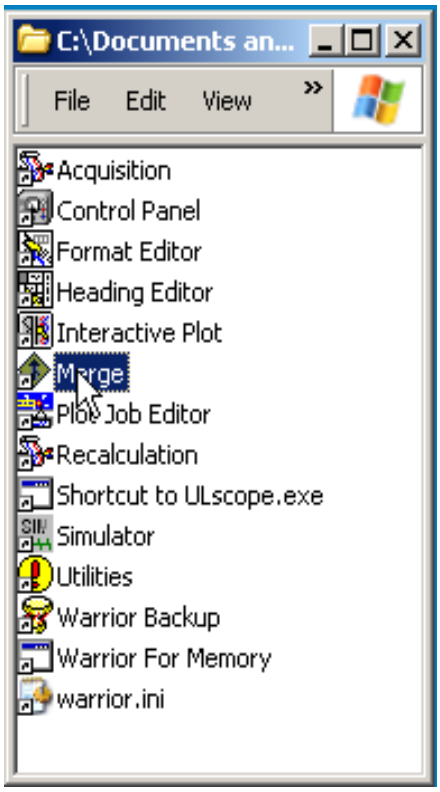


FIG: 11.1 Warrior Group

11.1 Wizard

The Wizard option is easy way to do Merge two Passes, Splice, Replace and Add curves

11.1.1 Merge two Passes

Double-click the Merge two Passes option.

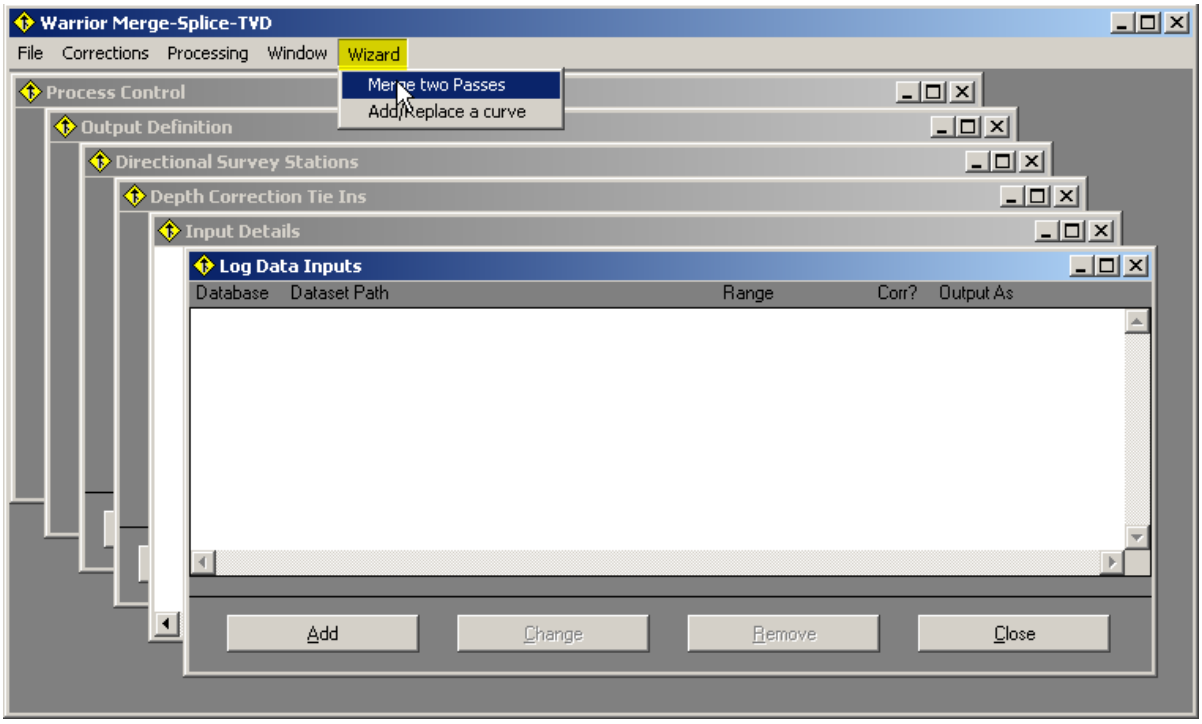


FIG: 11.2 Wizard/Merge two passes option.

Set the Base Pass as Upper Pass or Lower Pass and select the Database

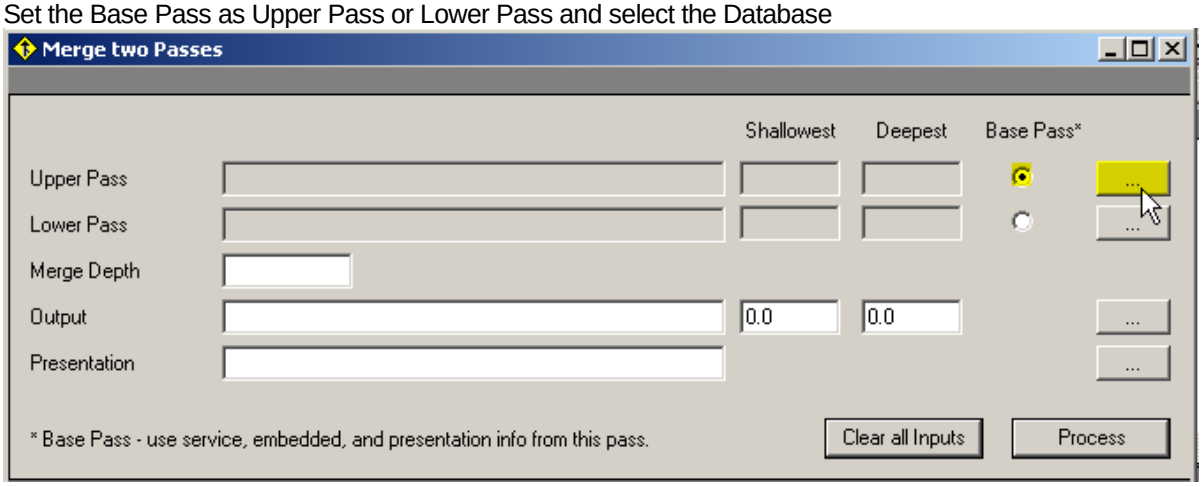


FIG: 11.2 Merge two Passes set the Base Pass as Upper Pass

Select the Input pass to merge from the Database

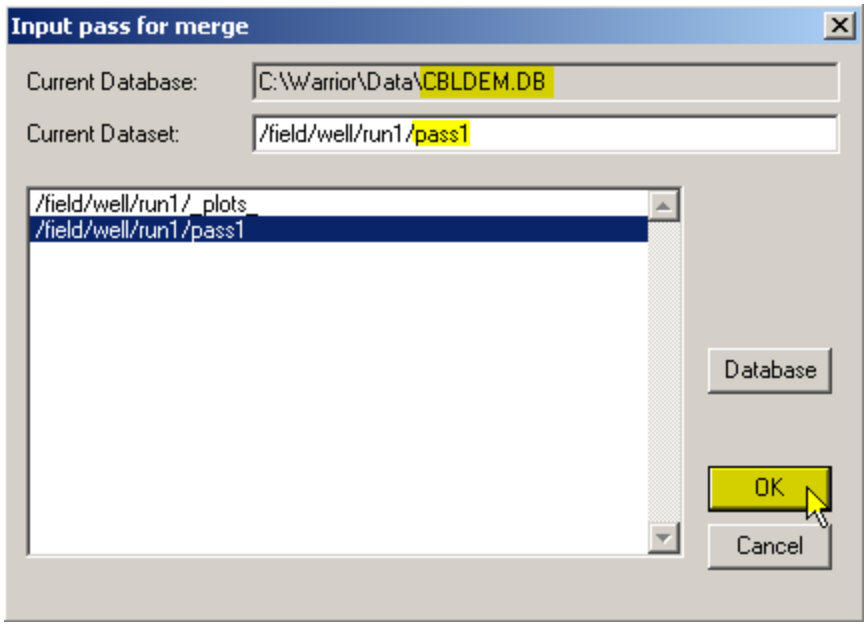


FIG: 11.3 Select Input pass for Merge

Select the Pass from the database to set as Lower Pass

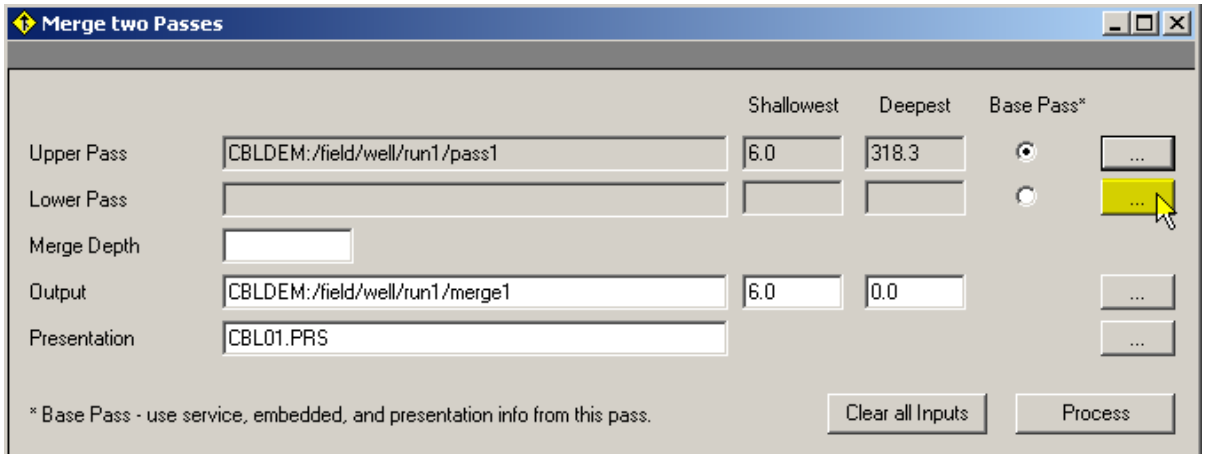


FIG: 11.4 Select Pass as Lower Pass

Select the Pass from another Database

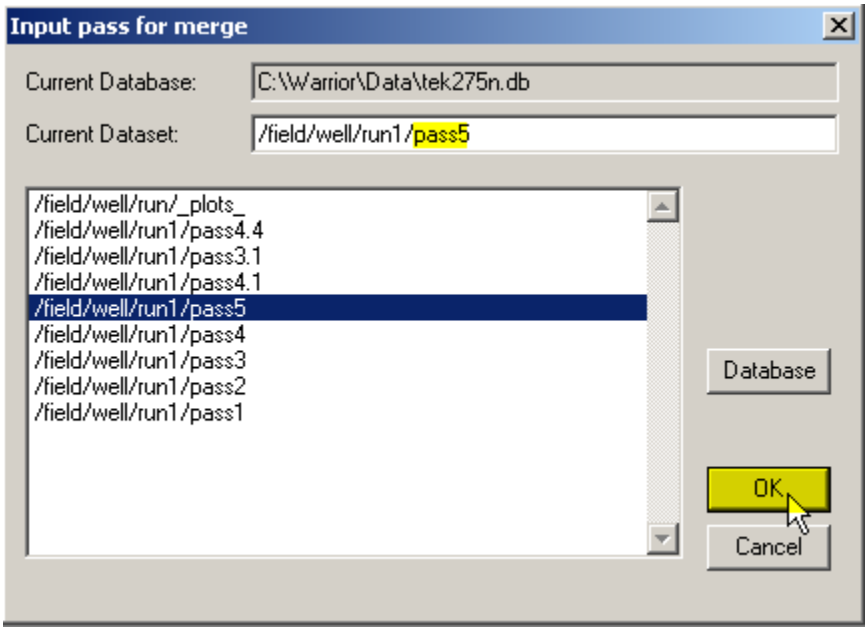


FIG: 11.5 Select pass from the Database

The software by default created a pass (Merge1).
Set the depth to start the Merge1 (Splice the curves), Define the log interval and set the presentation.

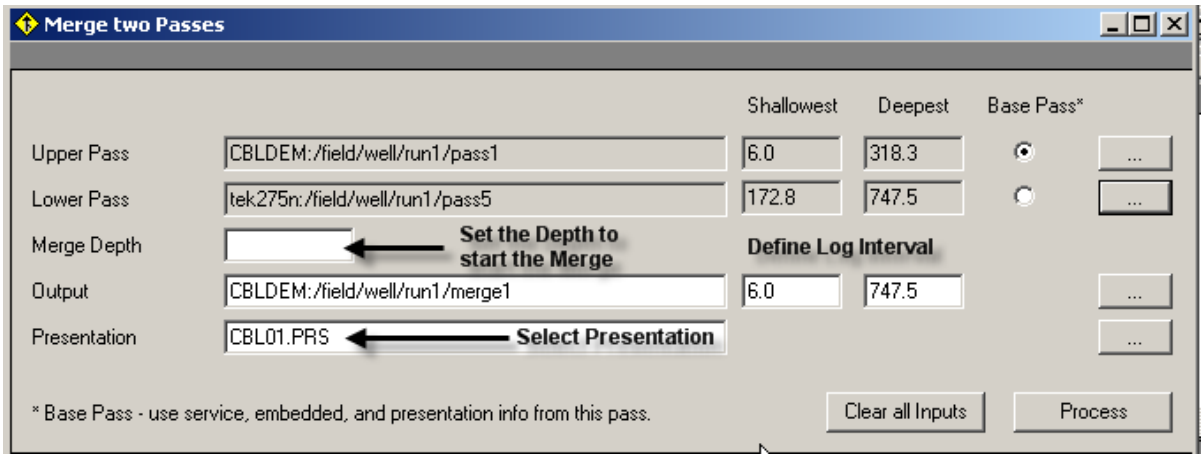


FIG: 11.6 Merge two passes

Double-click the Process bar

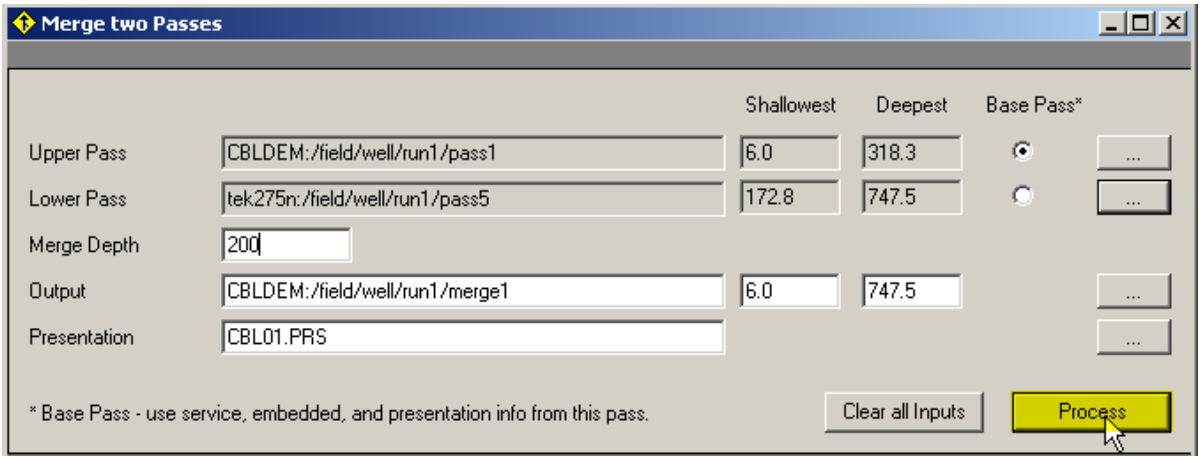


FIG: 11.7 Start the Process

Processing the Merge 1

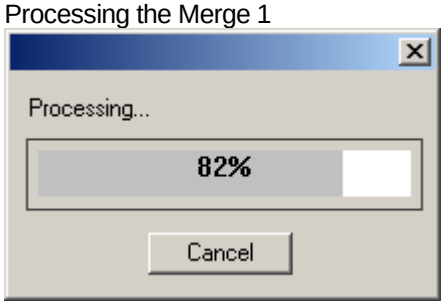


FIG: 11.8 Processing

Select Interactive Plot in the warrior group

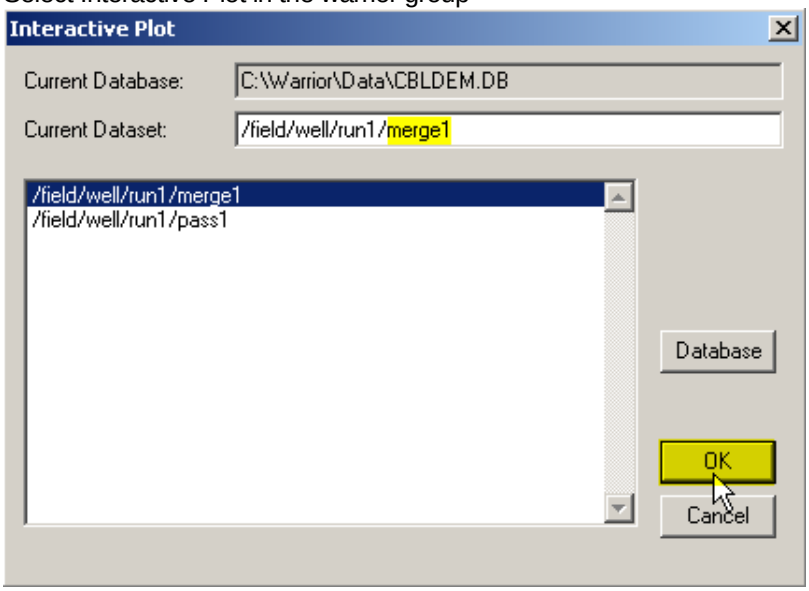


FIG: 11.9 Select Database from interactive plot

Screen plot the Merge1 check the Merge the curves (Splice) at 200 FT.

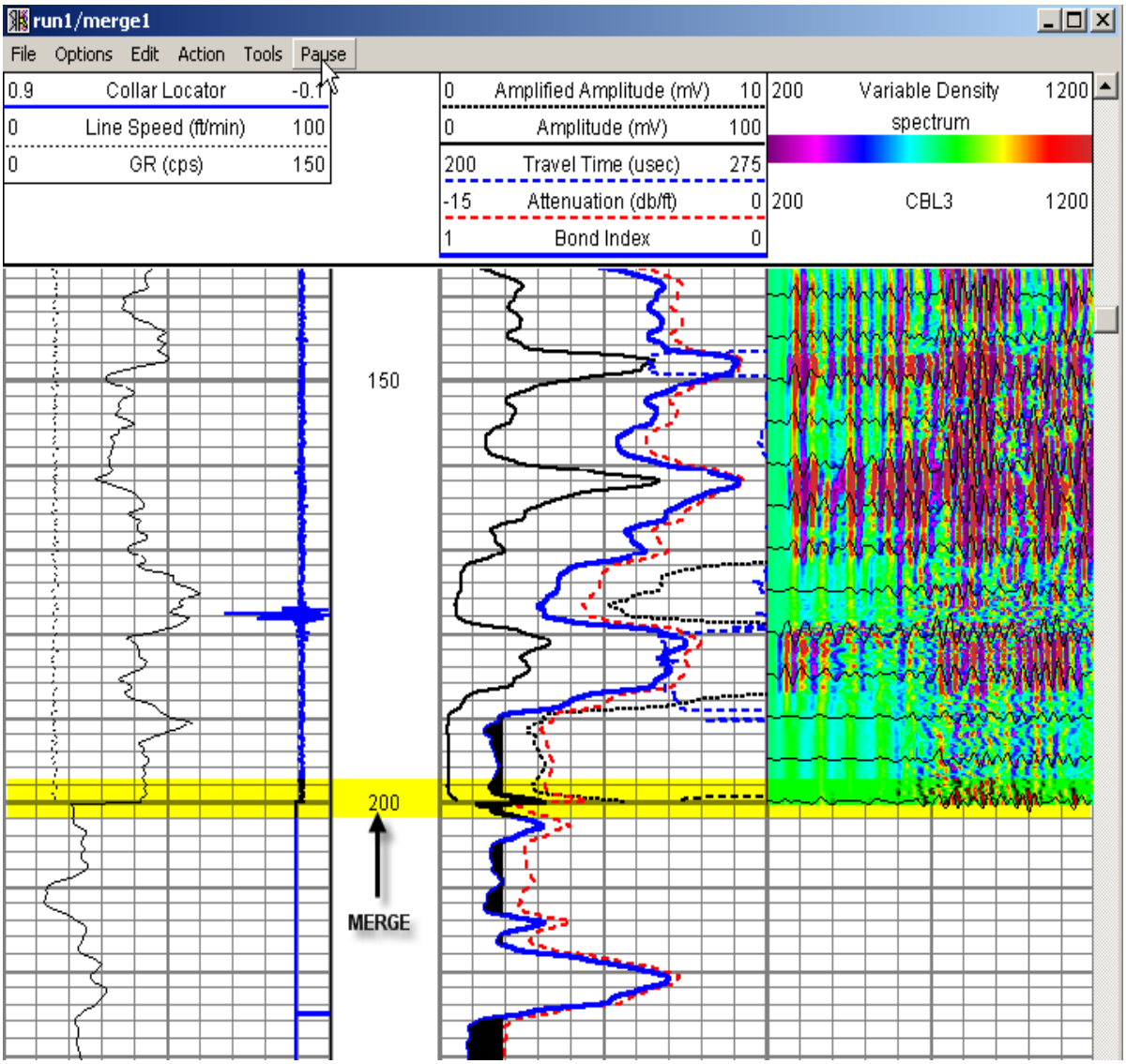


FIG: 11.10 Screen Plot Merge1

11.2.2 Merge two Passes (Add Curves)

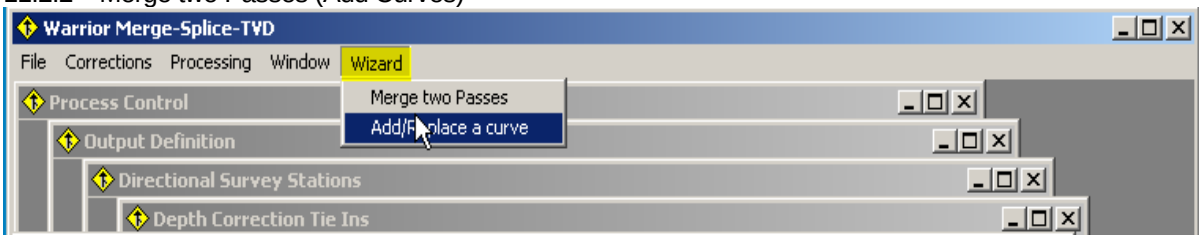


FIG: 11.11 Select Add/Replace a curve

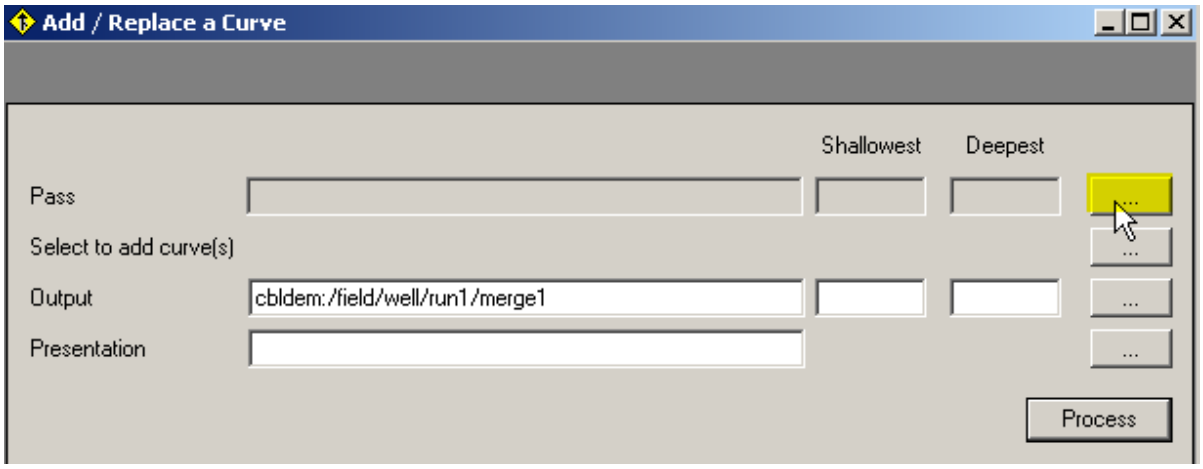


FIG: 11.12 Select the Base Pass

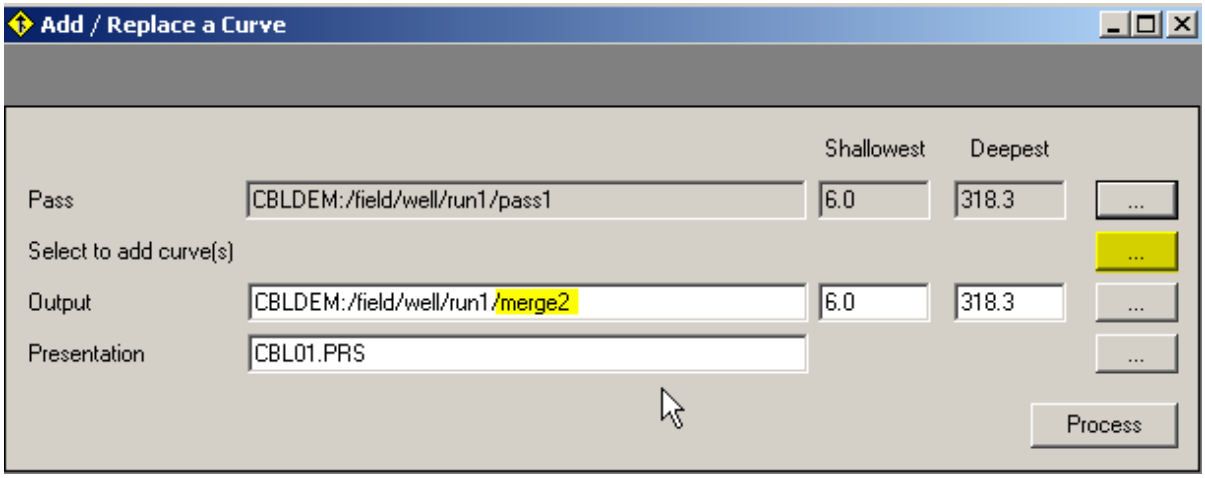


FIG: 11.13 Select to add curve

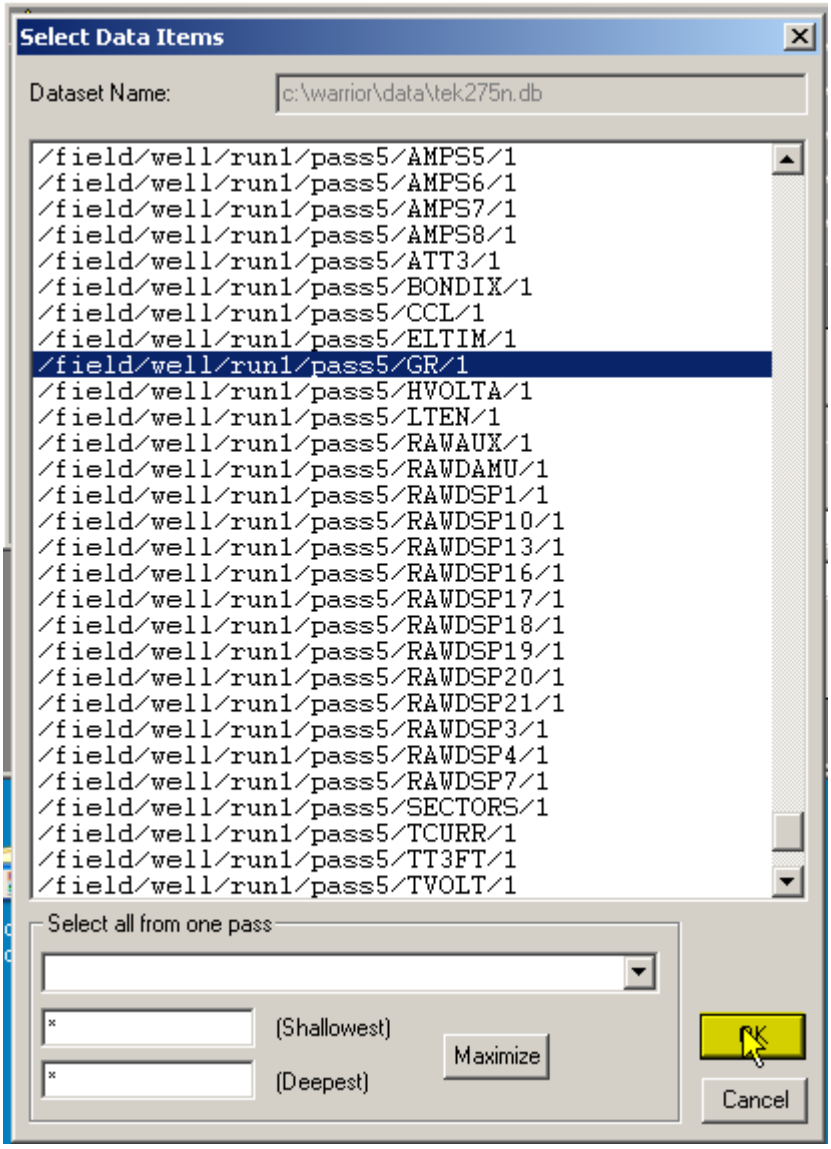


FIG: 11.14 Select the curve

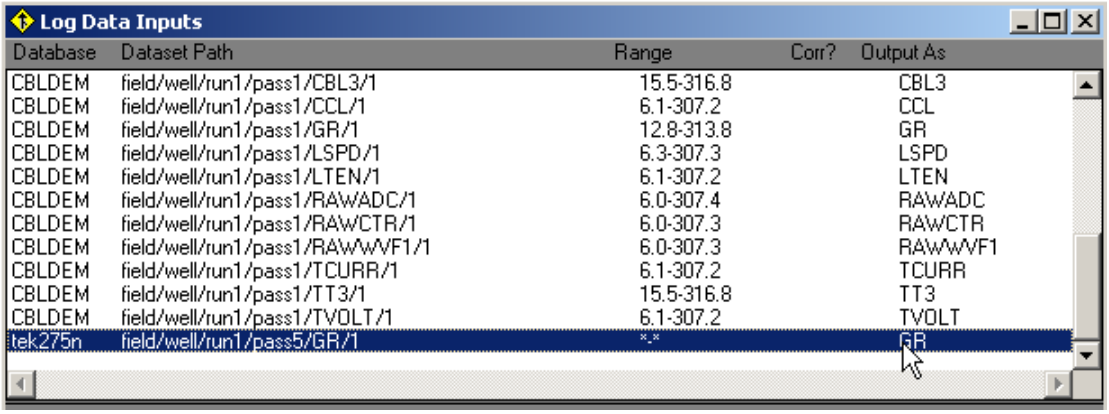


FIG: 11.15 Select the curve in log Data Inputs

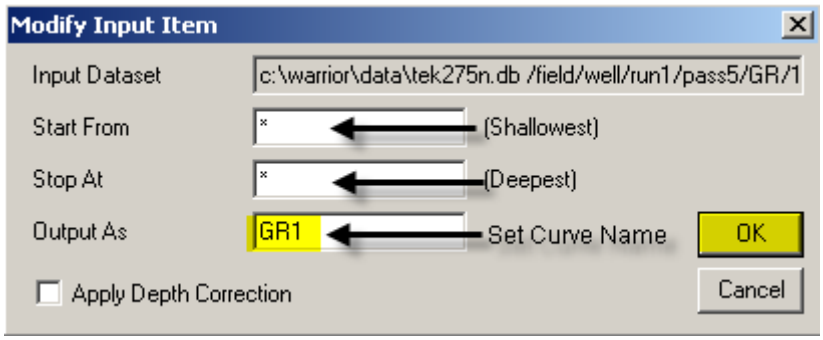


FIG: 11.16 Modified input Curve

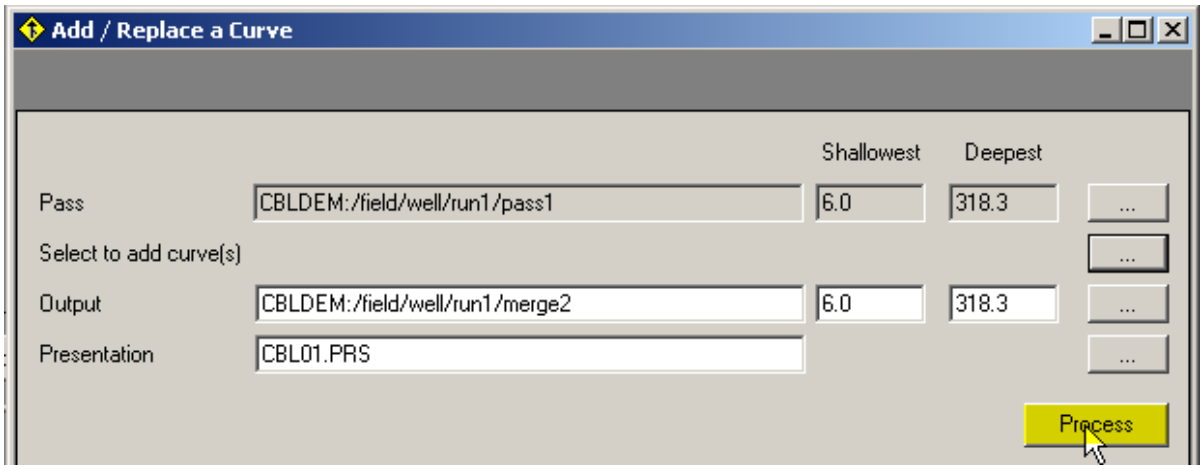


FIG: 11.17 Add Curve and Process

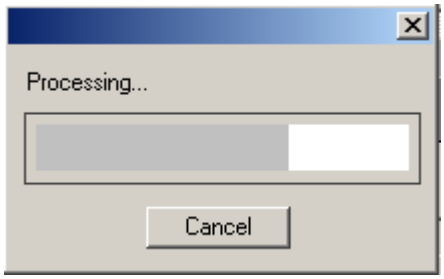


FIG: 11.18 Processing

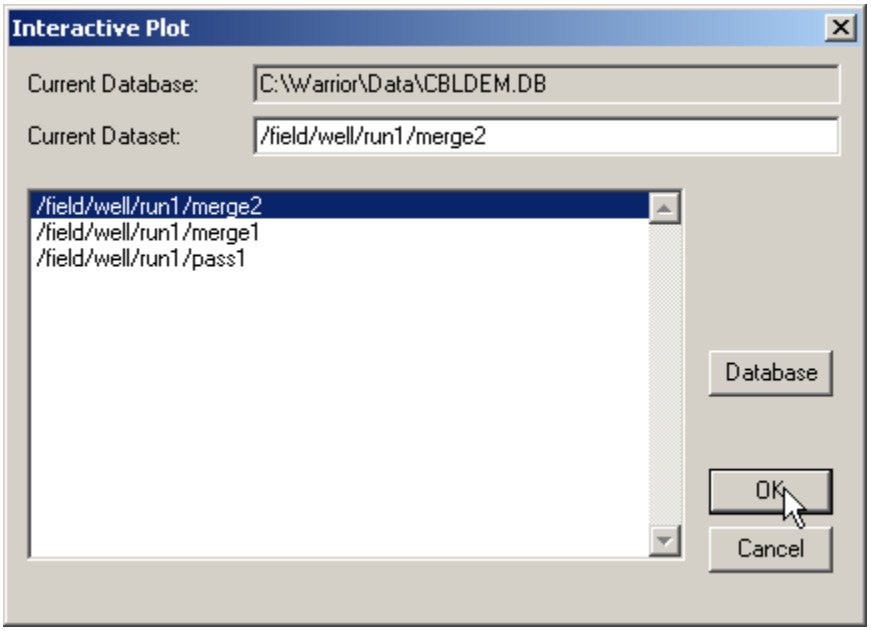


FIG: 11.19 Interactive Plot select pass

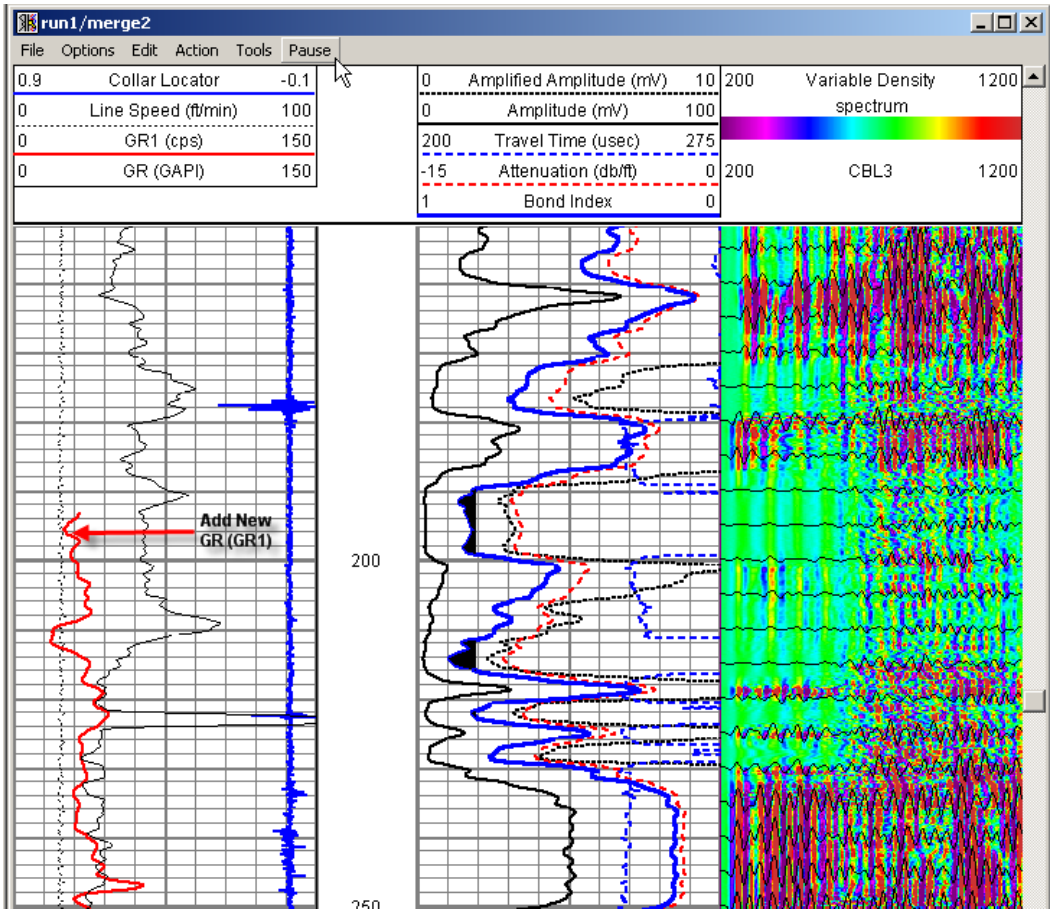


FIG: 11.20 Plot the Pass

11.2.3 Merge two Passes (Replace curve)

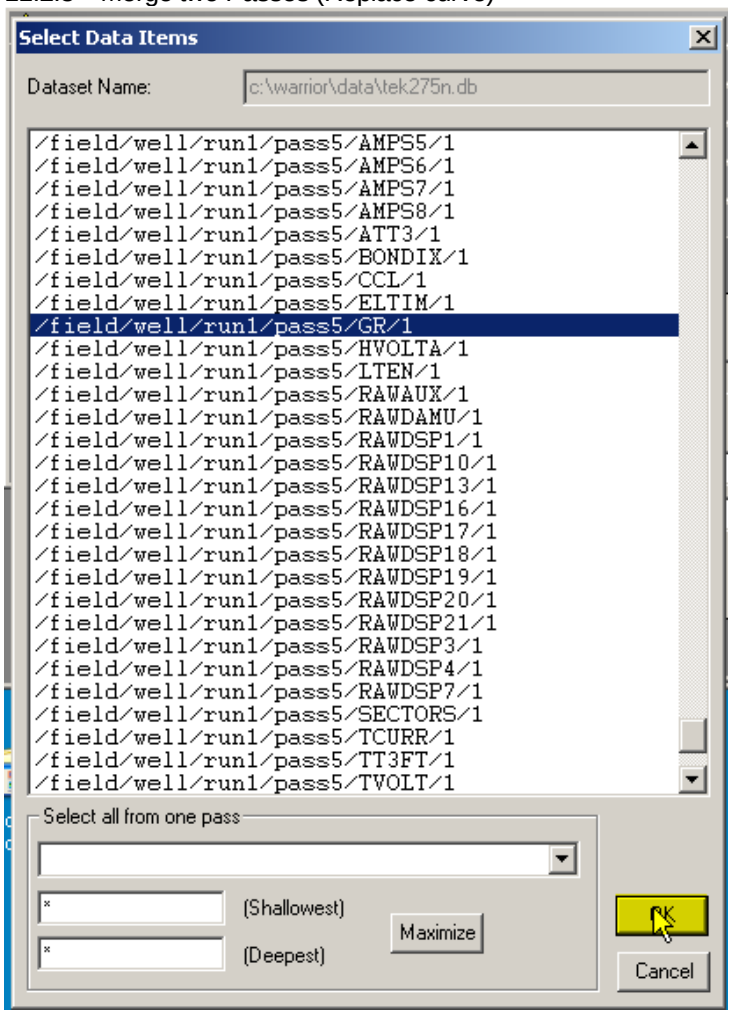


FIG: 11.21 Select Curve from the database

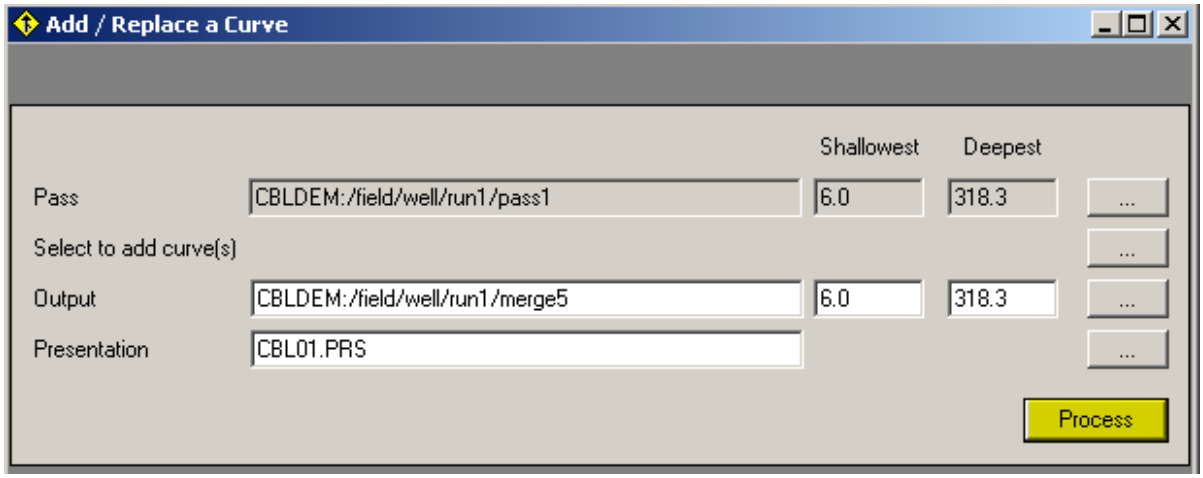


FIG: 11.22 Process

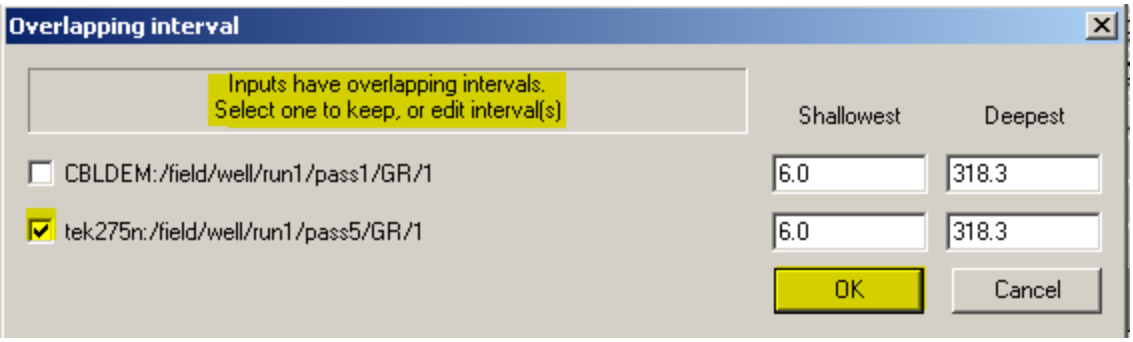


FIG: 11.23 Select the database to keep the curve

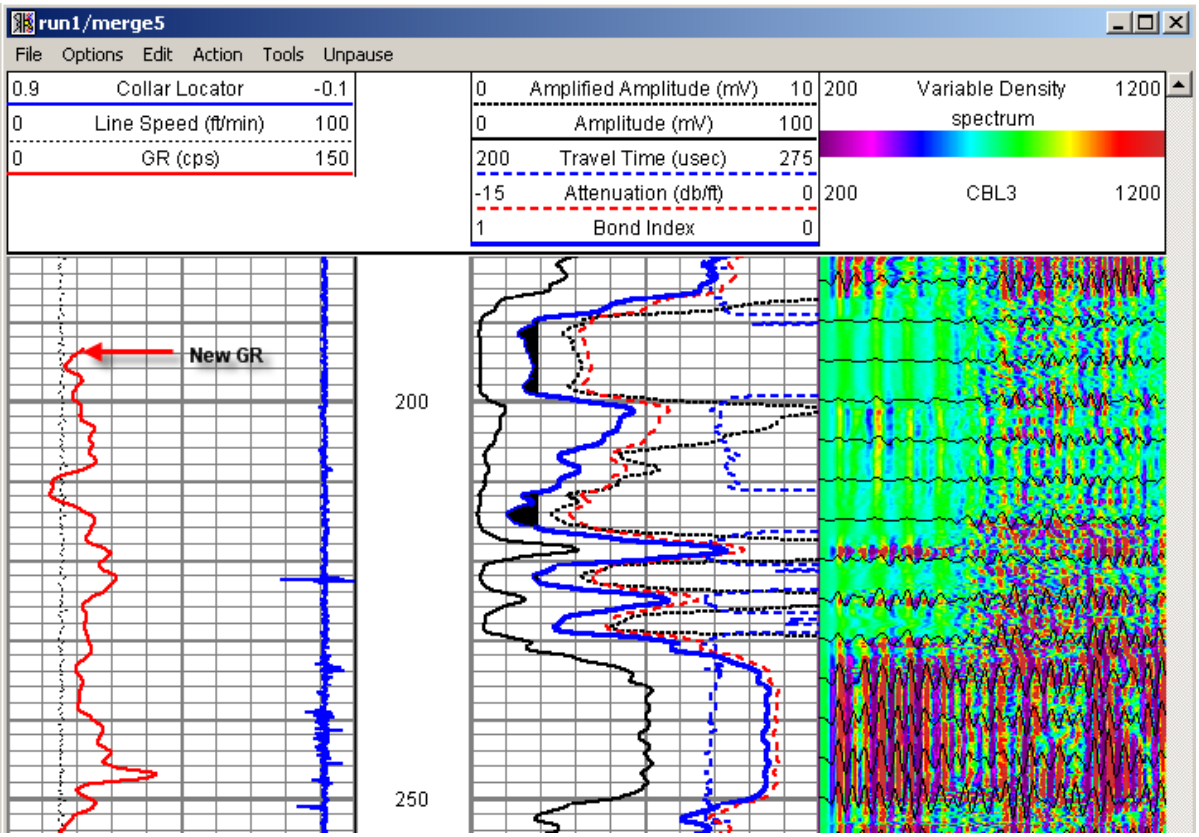


FIG: 11.24 Plot the pass with the new curve that replaced the old ones.

11.2 Merge

Double-click the Merge icon in the Warrior group. The Merge Splice TVD window will appear as shown below.

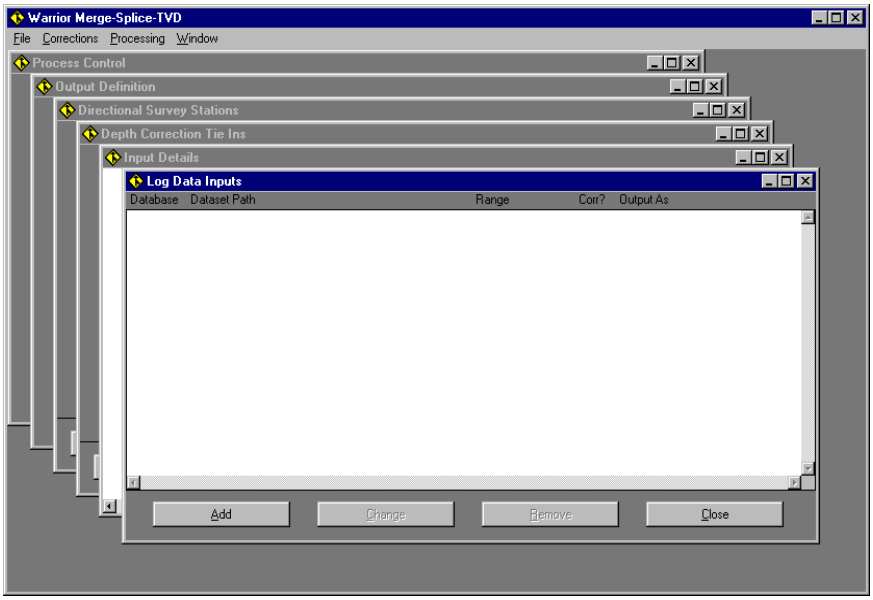


FIG: 11.25 Log data Inputs

The Merge module interface consists of six independent windows within the main Merge window. Any or all the windows may be displayed at the same time.
Note that if you lose a window by inadvertently or deliberately closing it, you can get them all back by clicking Window/Open All in the main menu bar.
The main Merge menu box contains several pull down menus and selection options, which control the operation and set up of the Merge sub-system. The pulls down menu functions are as follows:

11.2.1 File

11.2.1.1 Select Input Log Data.
Selecting this option brings the **Log Data Input** window to the foreground. Data items e.g. curves, are selected from their source database(s) and dataset(s) and displayed as a scrolled list in the Log Data Input Window. Within the Log Data Input window several processing parameters are set.

11.2.1.2 Detail Selected Inputs
Selecting this option brings the **Input Details** window to the foreground. This window displays detailed information concerning the data items selected for processing.

11.2.1.3 Select Output Path/File
Selecting this option brings the **Output Definition** window to the foreground. This allows definition of the database and dataset to which the processed data is to be output. A default presentation, with start and stop depths, may be *associated* with the output database in this dialog also. Note that **Browse** buttons are available so that existing databases and presentation files may be easily selected.

11.2.2 Corrections

11.2.2.1 Enter Depth Tie Ins
Selecting this option brings the **Depth Correction Tie Ins** window to the foreground. Processing parameters for data depth corrections are entered in this window.

11.2.2.2 Enter Directional Data
Selecting this option brings the **Directional Survey Stations** window to the foreground. Entry of directional survey data for TVD calculations is made in this window.

11.2.3 Processing

11.2.3.1 Process Commands.
Selecting this option brings the **Process Control** window to the foreground. Three selections may be made in this window. The type of processing to be performed, if the processing is to be done as a foreground or background task, and to the default depth units are to change.

11.2.3.2 Windows
Conventional Windows commands for manipulating windows on the screen

11.3 Merge data items (curves) from two (or more) log passes

If the Log Data Inputs window is not active, click on **Select Input Log Data .....**. under the **File** menu. The Log Data Input window appears in the foreground. Clicking the **Add** button brings up a file selection box where an existing log database may be selected in the usual way.
Once a database is selected the contents in terms of runs, passes, curves etc. are displayed as a scrolled list, as shown below.

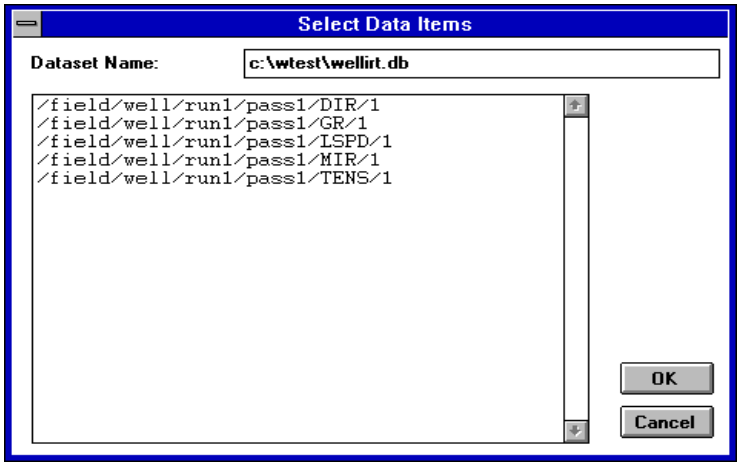


FIG: 11.26 Select Curve from the database

Select the curves and other items, present in this list that you wish to merge. When all the required curves present in the current database have been selected click **OK** and the selected items are passed to the **Log Data Inputs** list as shown below.

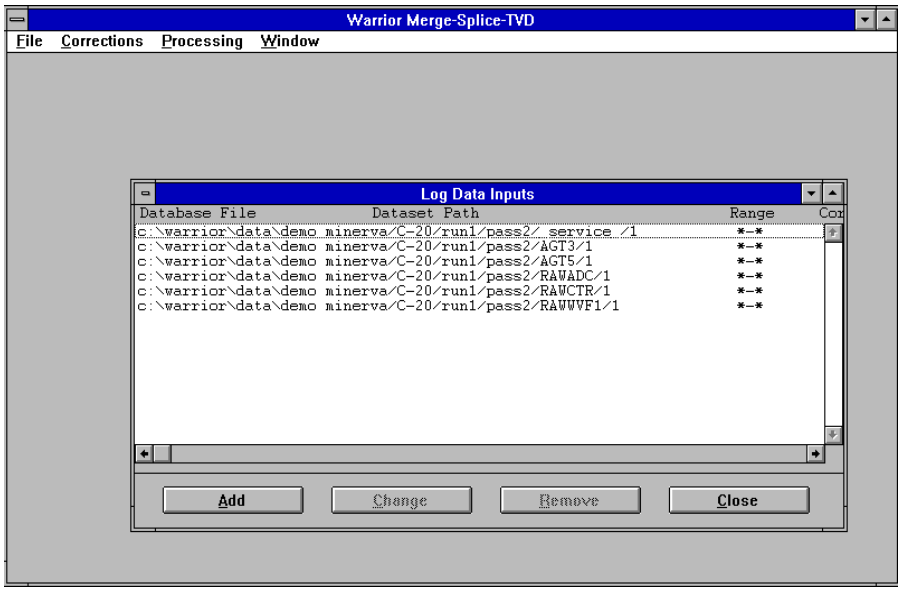


FIG: 11.27 Log Data Inputs

In the same way (**Add** etc.) curves and other data items may be selected from other databases until all the required curves are present in the Log Data Inputs window.
From within the Log Data Inputs window, details of the processing parameters for the individual data items are set. The processing parameters which may be adjusted are the depth range, the name of the output curve and the application (or otherwise) of depth corrections.
Select one or more curves from the input list by highlighting them in the normal way. Note that **Change** button is now activated.
Clicking the **Change** button brings up the **Modify Input Item** dialog as shown below.

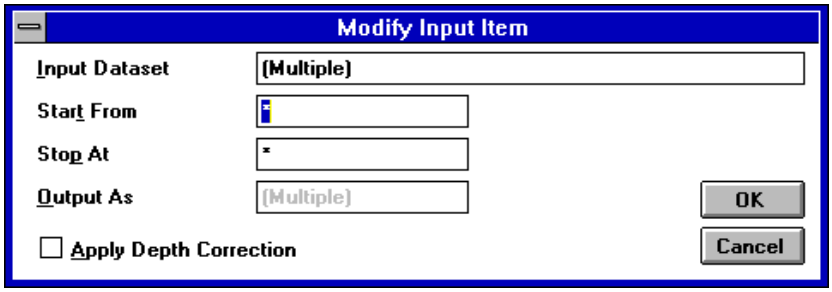
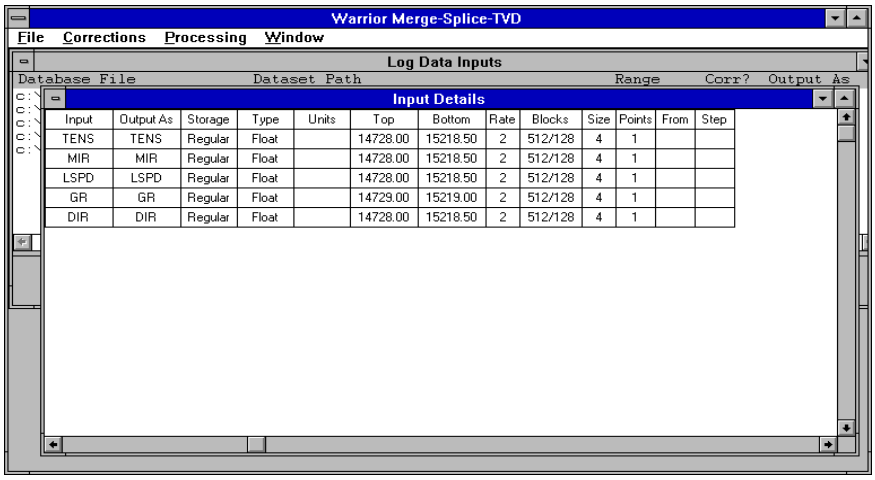


FIG: 11.28 Modify input item

If a group of curves was selected, the Input Dataset is shown as Multiple because several curves have been selected. If a single curve is selected the actual name of the curve us presented.
The depth range of the output curve(s) may be set as desired or left as the initial range. The name of the output curve may be changed only if a single curve was selected.
If depth corrections are to be applied the **Apply Depth Correction** box must be checked and depth correction tie-in points entered (see below).
Note that currently only one set of curves may be depth corrected per pass through the data. If you wish to correct more than one curve (or group of curves), where one curve (or group) has different depth corrections than the others, then tie-in points must be entered for the first group, the merge process run and then the second curve (or group) selected, the second group of tie-ins entered, and a second merge process run.
Detailed information on all data items in the Log Data window is present in the Input Details window.

11.4 Access detailed information on data items

Select Detail Selected Inputs from the File menu. A new window is generated as shown below. A variety of information is shown about all the curves selected for processing. The horizontal and vertical scroll bars are used to access all the available information.



Input	Output As	Storage	Type	Units	Top	Bottom	Rate	Blocks	Size	Points	From	Step
TENS	TENS	Regular	Float		14728.00	15218.50	2	512/128	4	1		
MIR	MIR	Regular	Float		14728.00	15218.50	2	512/128	4	1		
LSPD	LSPD	Regular	Float		14728.00	15218.50	2	512/128	4	1		
GR	GR	Regular	Float		14729.00	15219.00	2	512/128	4	1		
DIR	DIR	Regular	Float		14728.00	15218.50	2	512/128	4	1		

FIG: 11.29 Input Details

11.5 Enter depth tie in points

Select **Enter Depth Tie Ins....** bringing up the **Depth Correction Tie Ins** dialog as shown below.

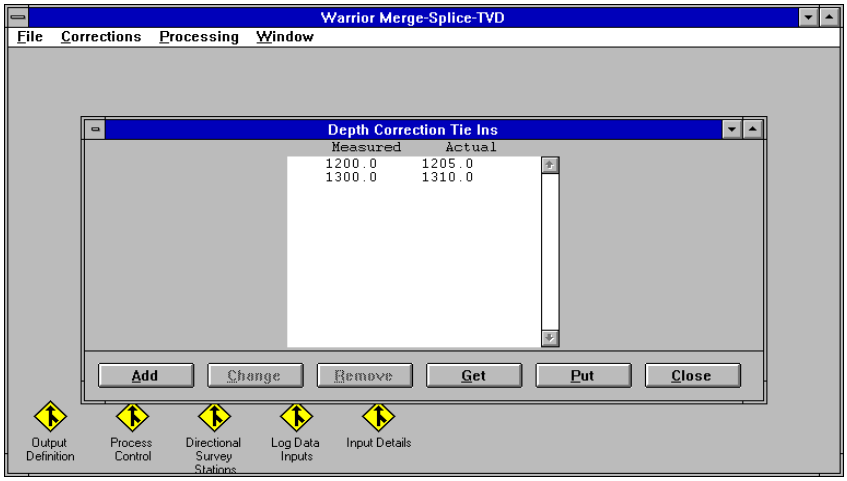


FIG: 11.30 Depth Correction Tie Ins

Depth tie in points may be entered from the keyboard by first clicking the **Add** button to obtain the window shown below

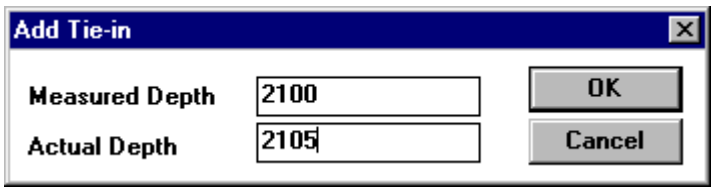


FIG: 11.31 Add Tie-in

Enter the current log depth in the Measured Depth box, and the depth to which you wish to move those log points in the Actual Depth box. Click OK and the points appear in the scrolled list. The Add Tie-in window continues for entry of the next tie-in point. When all tie-in points have been entered, click Cancel.
The log interval below the lowest tie-in point will be linearly shifted up or down, and by an amount corresponding to the lowest tie-in values.
The log interval above the highest tie-in point will be linearly shifted up or down, and by an amount corresponding to the highest tie-in values.
The log data between tie-in points will be linearly stretched or squeezed according to the tie-in values.
Note that if only one tie-in point is entered then all the log data will be linearly shifted up (or down) according to the tie-in values. The same result may be achieved much more quickly by using the Apply Linear Shift to a Dataset or Apply Linear Shift to a Data Item functions in the Utilities package.
Tie-in points mat be read from and written to a file using the Put and Get buttons. Points may be changed or removed using the corresponding buttons.
Once the changes have been made to the input data, it is necessary to indicate where the merged data is to be written.

11.6 Select the output path or file name.

Choose Select Output File/Path from the File menu. The dialog box shown below appears. The output database and dataset are typed in from the keyboard, or an existing database is selected using the Browse button.
Note that it is usually quicker to select an existing dataset with the Browse button and then modify its name and/or dataset path, than to type in all the fields from scratch.
A default presentation file may be attached to the output dataset with a depth range defined in this dialog.
The Browse button may be used to select an existing presentation file from those in the system.

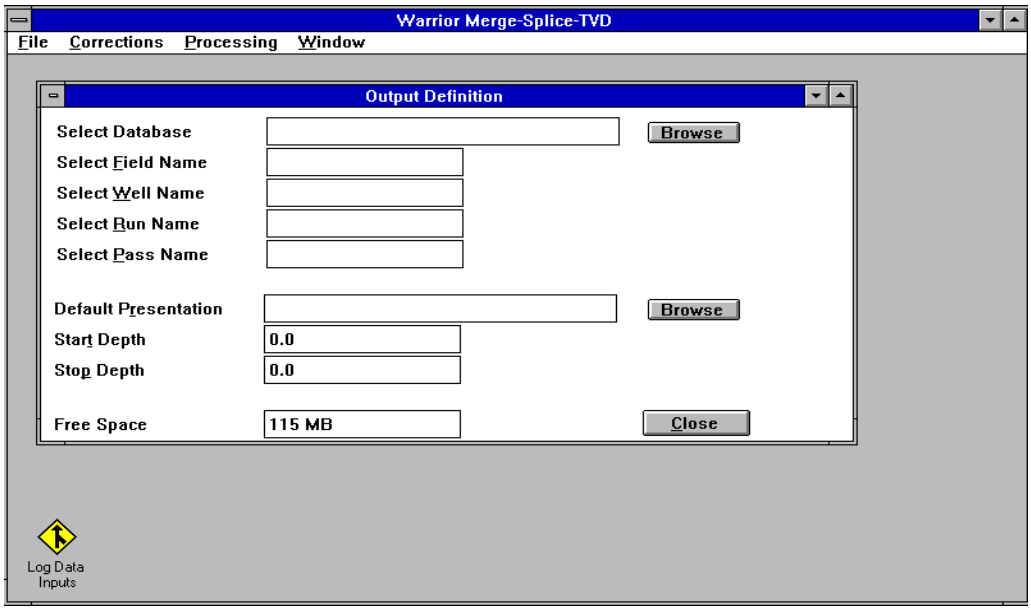


FIG: 11.32 Output definitions

The final step in merging the data is to define the processing operation, the processing mode and the depth units (if other than default).

11.7 Select processing options and start processing

Select Process Commands bringing up the Process Control Window as shown below.

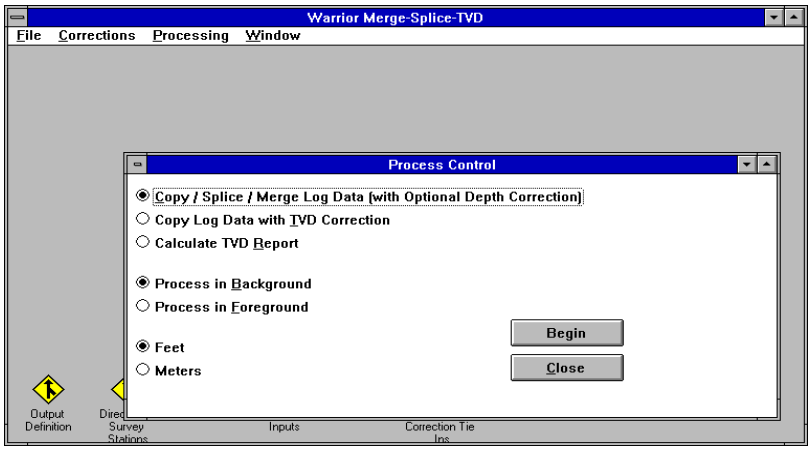


FIG: 11.33 Process Control

Select the Copy / Splice / Merge Log Data to process the data with optional depth corrections. Select Copy Log Data with TVD Correction to generate a new set of log data with depth referenced to TVD calculated from the directional survey data. Select Calculate TVD Report to generate an ASCII directional report.
Process in Foreground causes the processing to take place in Windows foreground mode, whilst Process in Background allows processing to take place whilst other tasks, such as logging, are active.

11.8 Splice a curve

Select first input database as described above. Select the first section of input curve to be spliced from the Select Data Items window, then select the second and so on until all the original curves from which the spliced curve is to be assembled are present in the Log Data Inputs window. The original curves may originate from one or more databases.
Select the first curve and input depth range of this curve to be used in the spliced curve e.g. 1200, 1300. Select the second input curve and set its range e.g. 1300, 1400. Select the third input curve.
When all the sections have been defined go to Output Definition and define where the new curve is to be written, as described above. Process Control select the Copy / Merge...option and click Begin.

11.9 Enter Directional Survey Data

Select Enter Directional Data. bringing up the Directional Survey Stations window as shown below. The depth, borehole inclination, and azimuth are entered in a manner like the depth tie in data. The Add, Change, Remove, Get, Put and Close buttons are used in the same manner as previously described for Depth Correction.

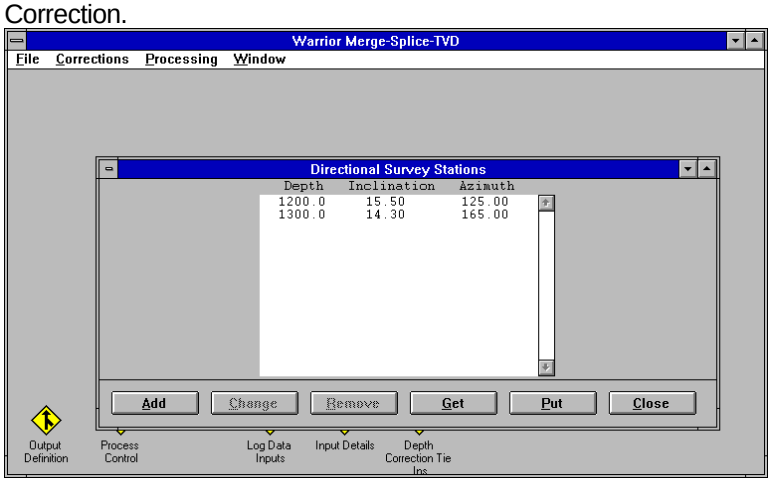


FIG: 11.34 Directional Survey Stations

Once the data items have been selected, the destination file chosen and the processing parameters defined, the Processing menu or Process Control window may be selected to initiate processing of the data as previously described.

The **Window** menu functions are identical to those found in any Windows application, allowing the individual windows e.g. Process Control, Log Data Inputs etc., to be tiled, cascaded, etc., as shown below.

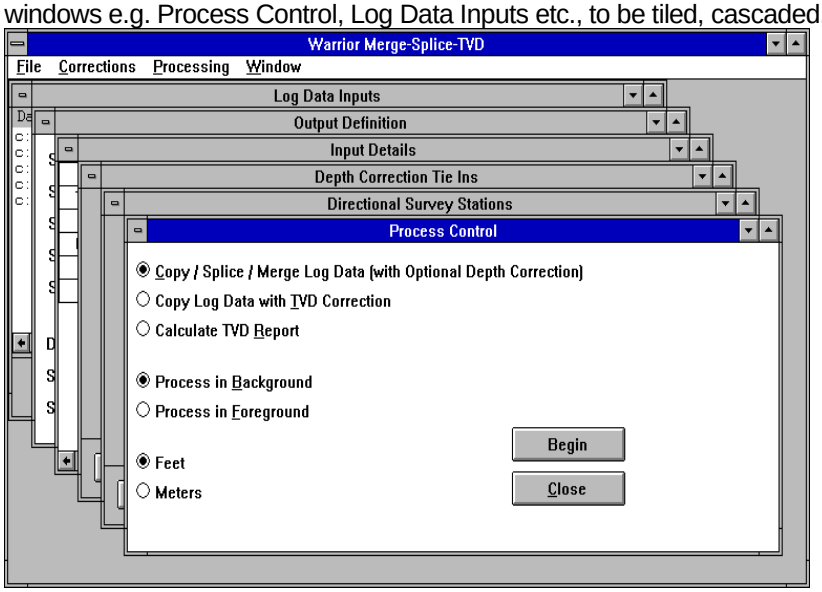


FIG: 11.35 Process Control

Note that the interface to the Merge program may be customized by the user in terms of window sizes and layout. The layout in existence at the time the program is closed will be brought back the next time the program is run.

Section

12

12 Database Utilities

The Utilities icon in the Warrior Program Group allows access to several programs, some with general, and some with more specific, applications.

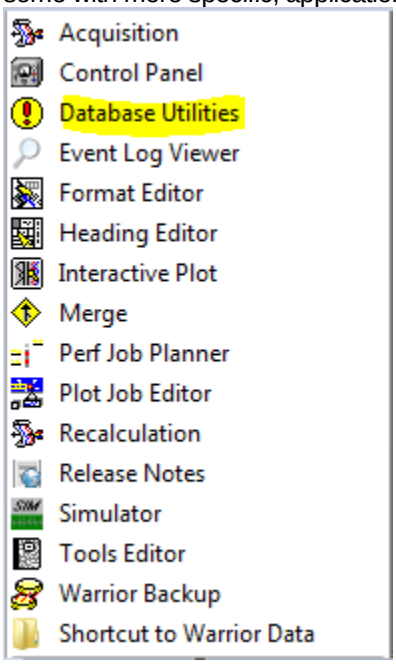


FIG: 12.0.1 Warrior Program Group

The warrior Utilities has six groups:

1) Data Export
2) Interpretation Tools
3) Setup Tools
4) Depth Correction
5) Data Management
6) Data Import

Clicking on the icon Utilities gives a menu list as shown below.

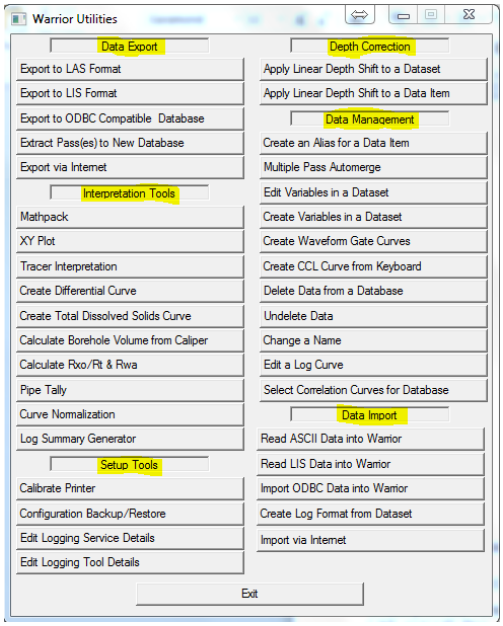


FIG: 12.0.2 Warrior Utilities

12.1 Data Export

Unlike previous versions of Warrior, Warrior 8 now has a single program to export both LAS and LIS files, although the Warrior Utilities still shows them as being separate utilities. Depending upon which utility is selected, the export format for that type will be selected upon entering the export utility, although it can be changed within the utility.

12.1.1 LAS LIS Data Exporter

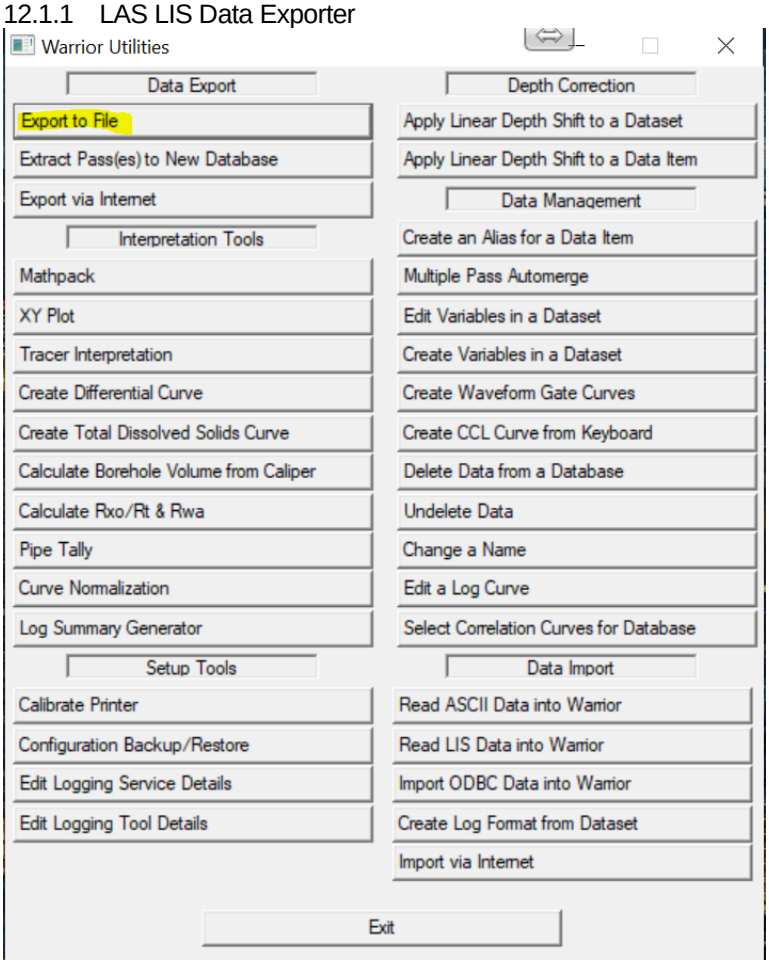


FIG: 12.1.1 Export LAS Format

12.1.2 Warrior Data Exporter

This program will export to LIS, DLIS, LAS2, LAS3 and CSV for LIS the destination can be a file or a tape. The first step is to select the format output with the Format button.

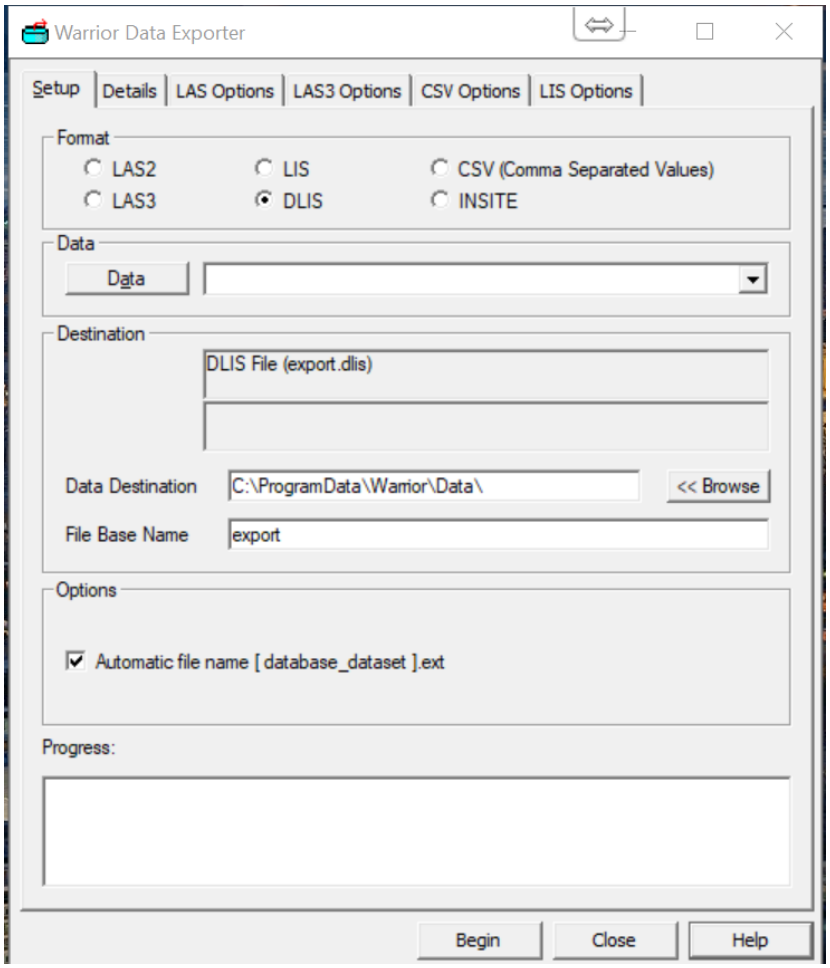


FIG: 12.1.2 Data Exporter

Clicking on the Format button to select the appropriate export option.
Once you have chosen the format type, select the Data button

After Export to LAS2 Format has been selected, the following window will open with LAS selected as the export format. The next step is to click on the Data Button to select the data to export.

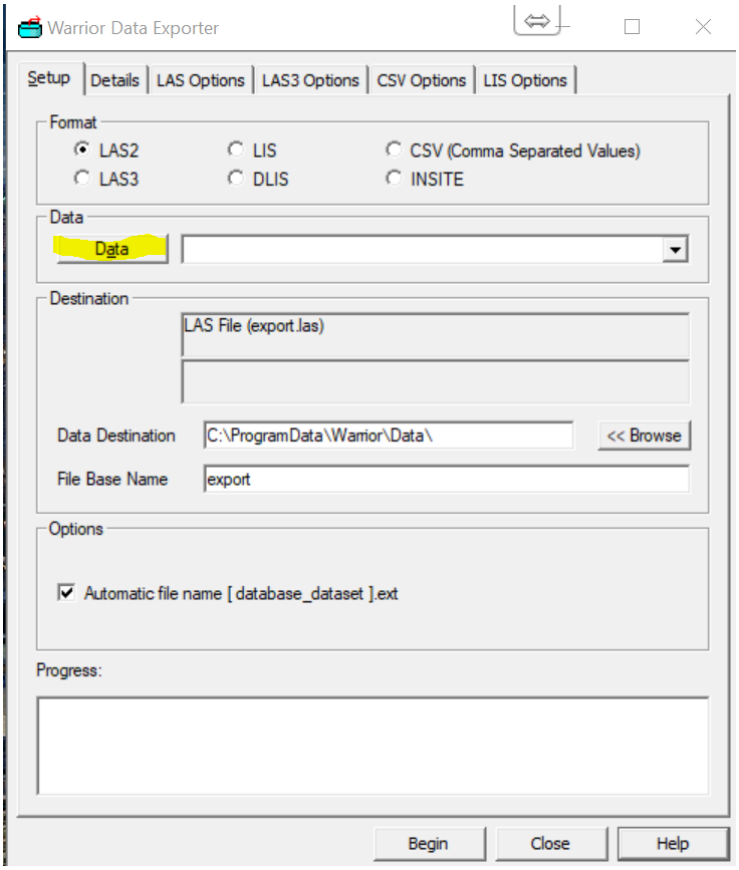


Fig. 12.1.3 Select Data to Export

A heading and log passes can be added from the Build Export File List window. Warrior 8 now uses an export template with the extention .AET to identify which curves are to be exported and sample rates for the export. The first time that you export a file, you may not have any templates. Just cancel that dialog window to set to default template and you can create and save a template later. Click the Done button after heading and all log passes have been selected.

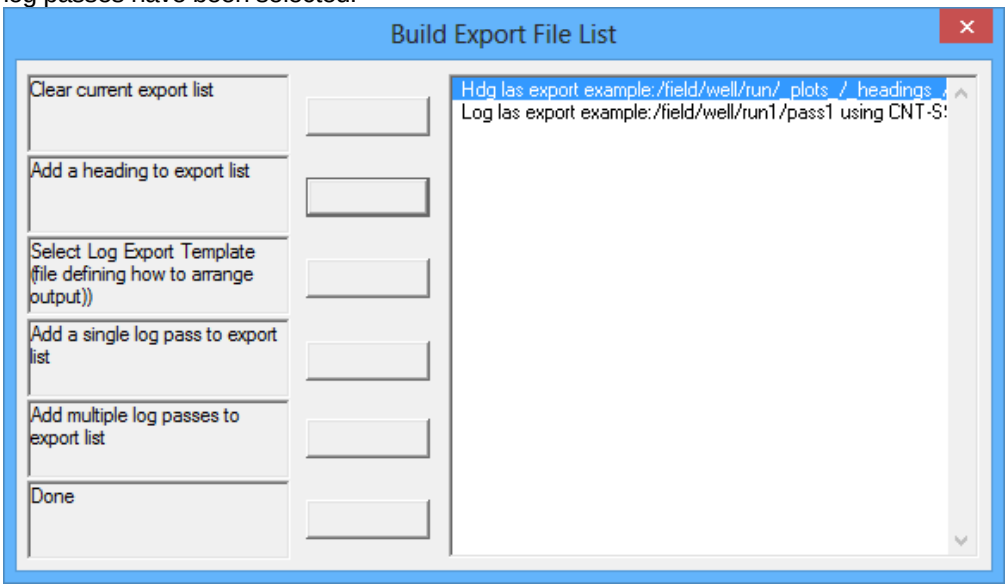


Fig. 12.1.4 Export File List

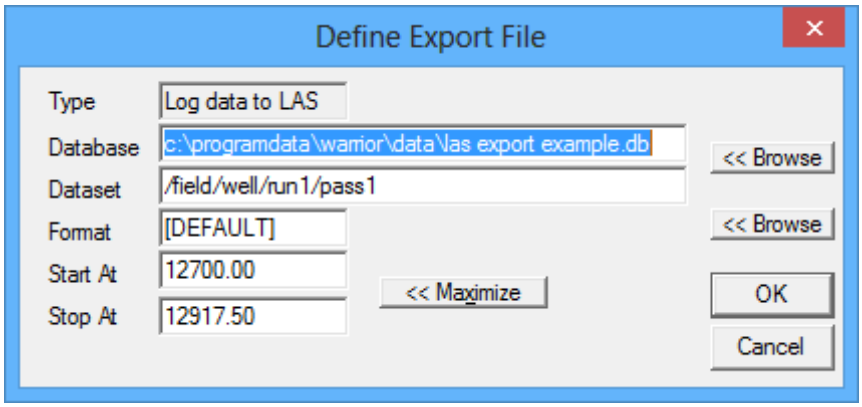


Fig. 12.1.5 Pass selected with no template selected

The default destination for the LAS file that is created is normally C:\ProgramData\Warrior\Data\ but the User may use the [<<Browse] button to select a different destination. Be sure to give a proper Windows file name for the output.

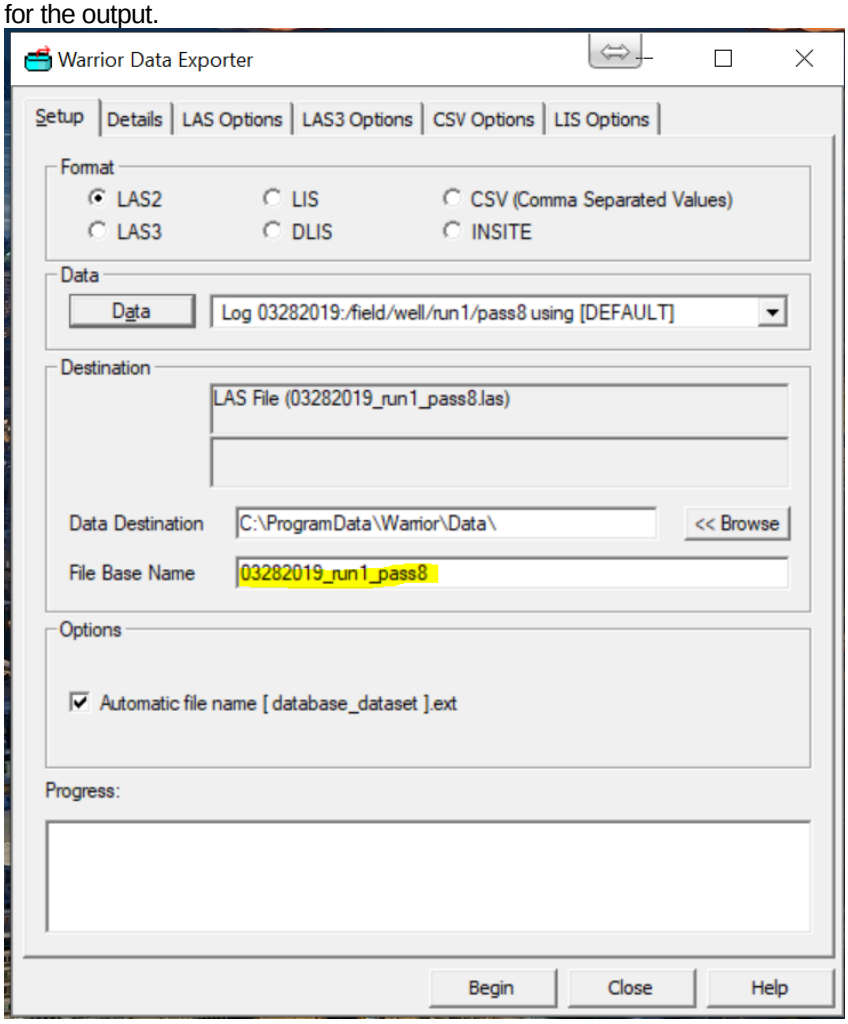


Fig. 12.1.6 File Base Name

Once the Format and Data has been selected go to the Details Tab.

The Available list just shows whether that curve is on the current dataset. From this dialog, you can make your own template that will contain the curves that you want to export. For LAS you can rearrange the order of the curves to be exported in the order that they are listed. If you want GR to be exported first, then click on GR and drag to the top of the list.

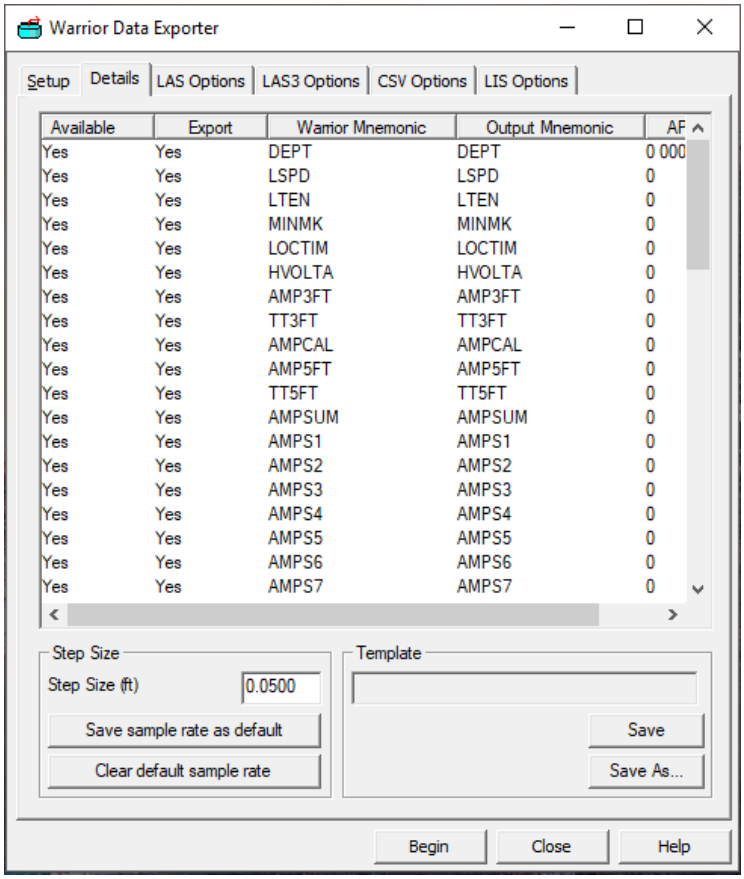


Fig. 12.1.7 Details Tab

You can double click on a curve to change the output mnemonic, API Code, or the sample rate.

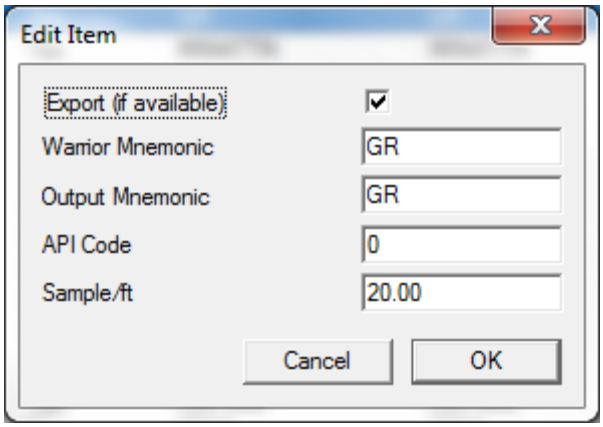


Fig. 12.1.8 Edit Item Window

You can right click on a selection of curves to bring up a context menu – from there you can toggle the curve output on or off. Right click to bring up context menu.

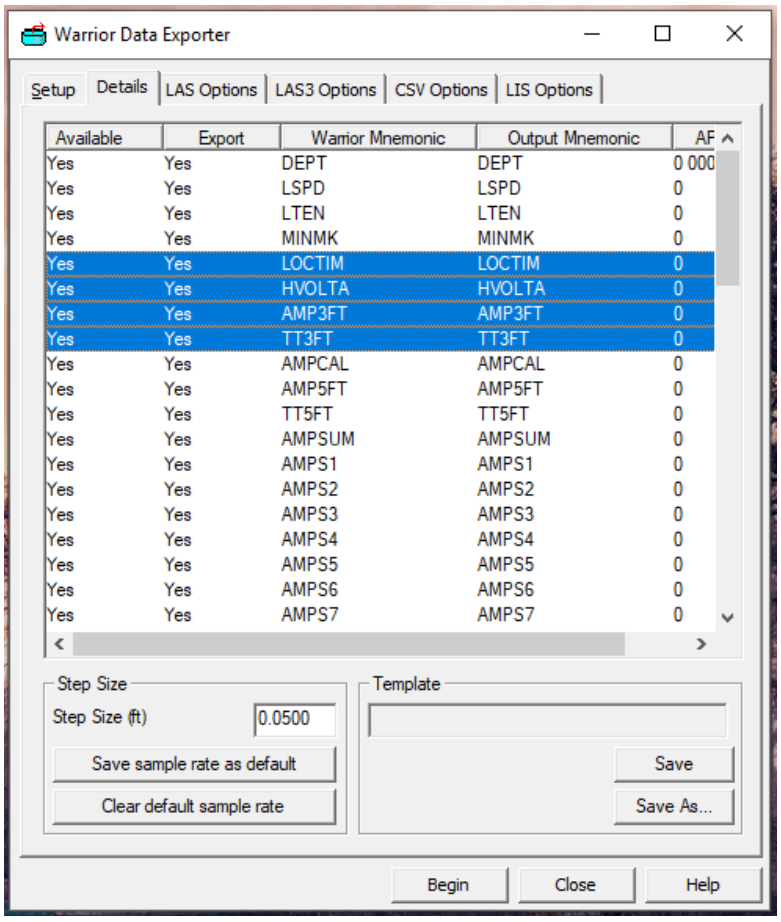


Fig. 12.1.9 Selecting Curves

Once you are satisfied, you can make your own template by selecting Save As…

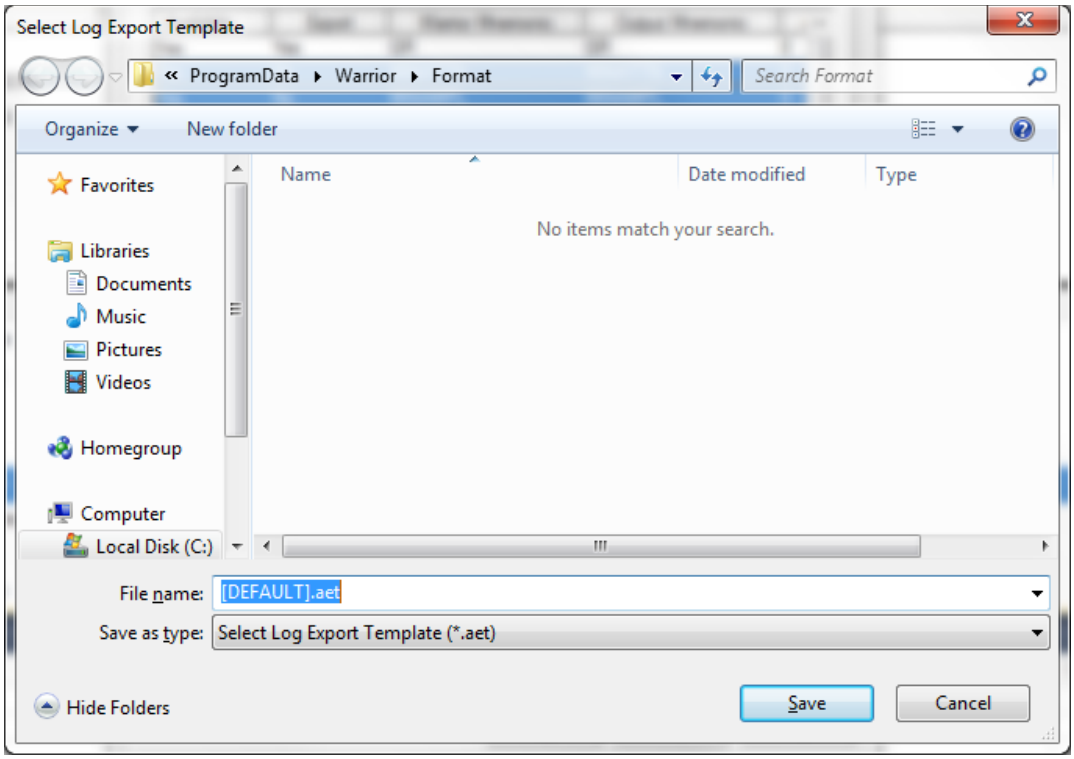


Fig. 12.1.10 Saving Template

LIS export templates have the extension ‘iet’, and LAS export templates have the extension ‘aet’.

The next time you start an export, you can select the template you made.

12.1.3 LAS Options

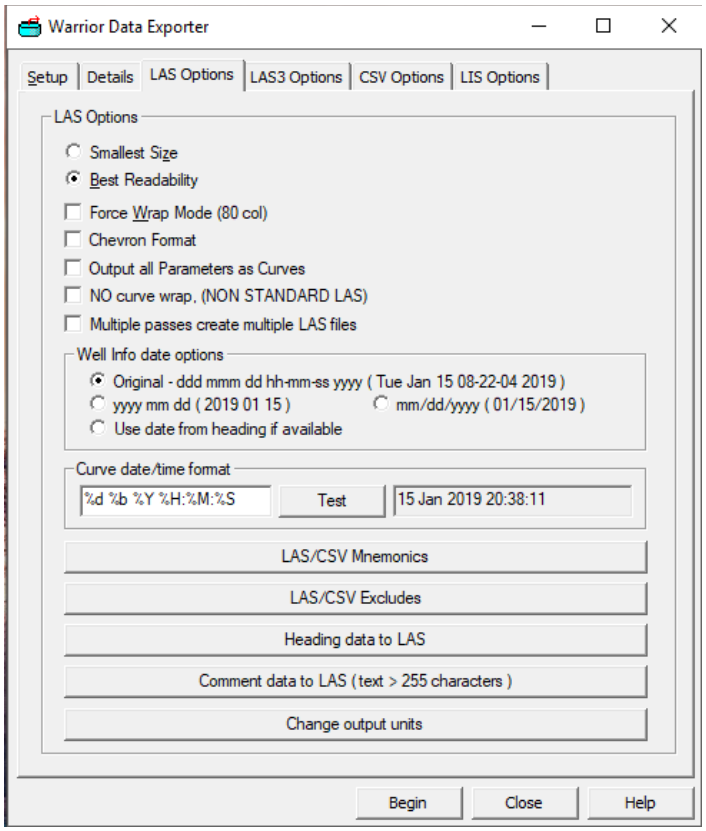


Fig. 12.1.11 LAS Options

There are two radio buttons on the LAS options tab .
Smallest Size generates the most compact LAS compatible file, it is best suited for email.
Best Readability generates a LAS with a more intuitive header for opening in a text editor such as notepad.
There are also five check boxes.
Force Wrap Mode (80 col) will generate a LAS that is wrapped at 80 colums, this makes it eiser to read in a text editor but may be less compatible with other intperetation software.
Cheveron Format this will generate a LAS that folows the Chevron specific LAS format.
Output all Parameters as Curves this will treat all paraneters from the pass as data and output it as LAS data
No Curve Wrap, (Non Standard LAS)
Multiple Passes Create Multiple LAS Files this will generate a separate LAS for each pass sellected if checked.
Use Data From heading if available the wil use heading data in theLAS header if it is present in the selected data.l

12.1.4 LAS and LIS Mnemonics

The LAS Mnemonics will be the default mnemonics that are loaded without using a template. For example, if you have set up your mnemonic for LSPD to be SPED:
The LIS Mnemonics will refer to the same list.

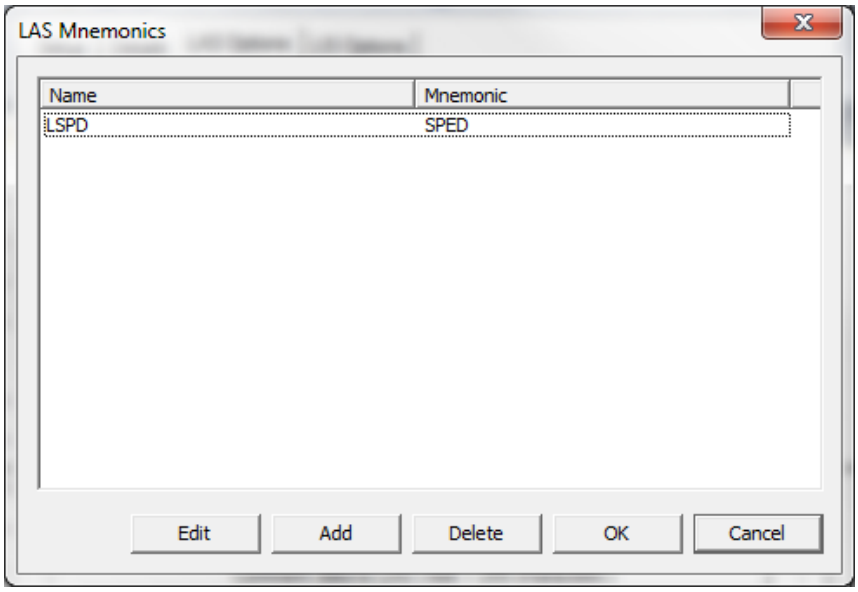


Fig. 12.1.12 LAS, LIS Mnemonics

Then when you select a pass to be exported, the default name for the output mnemonic will be SPED. That can be overwritten if you use a template file:

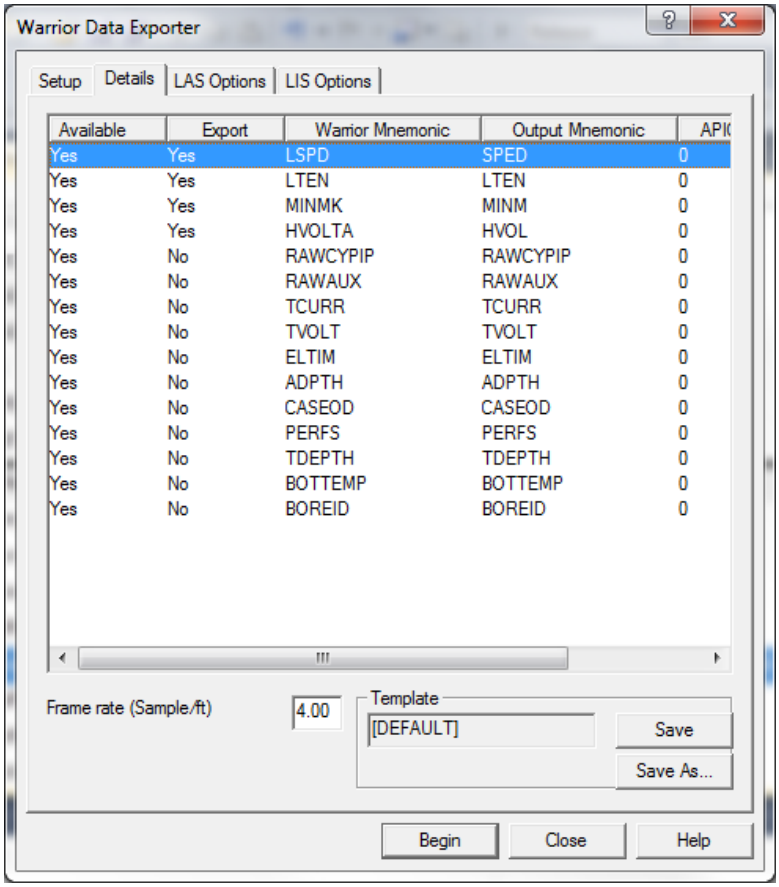


Fig. 12.1.13 LAS, LIS Mnemonics

12.1.5 LAS and LIS Excludes

Any output listed in the excludes list will not show up to be exported.

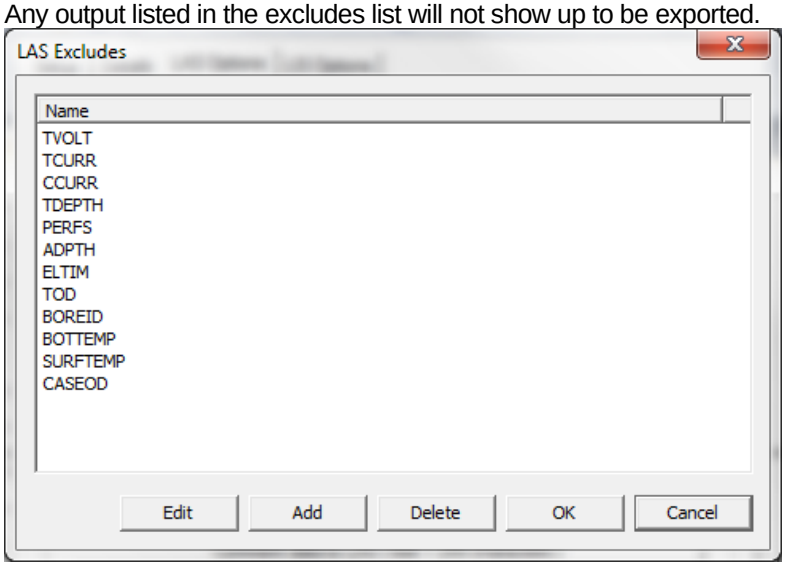


Fig. 12.1.14 LAS, LIS Excludes

12.1.6 Heading data to LAS

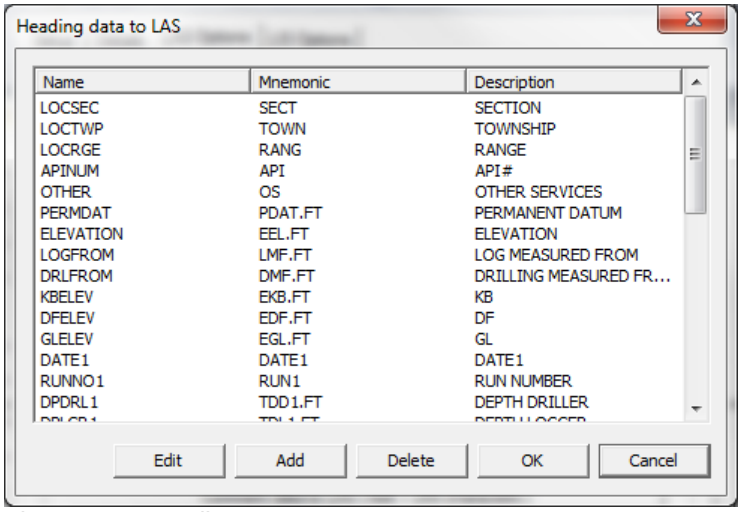


Fig. 12.1.15 Heading to LAS

The first column is the name of the heading item as saved in Warrior. Those names are defined in your heading format file (*.hdg). The Mnemonic is how that item will show up in the LAS file:

Mnemonic. *Name from heading information*: Description

The heading data to LIS will work in a similar manner.

12.1.7 Comment data to LAS

If your heading has some longer data you want to display in the LAS file, then add the name to this section. LAS specifications are limited to 255 characters per line. This allows multiple lines of data to be shown – each line < 255 characters. The result will end up in a LAS section labeled as *~Other Information.*

12.1.8 Exporting to LAS3

Exporting to LAS3 is like LAS2 except that you have the option to export waveform data and raw data.

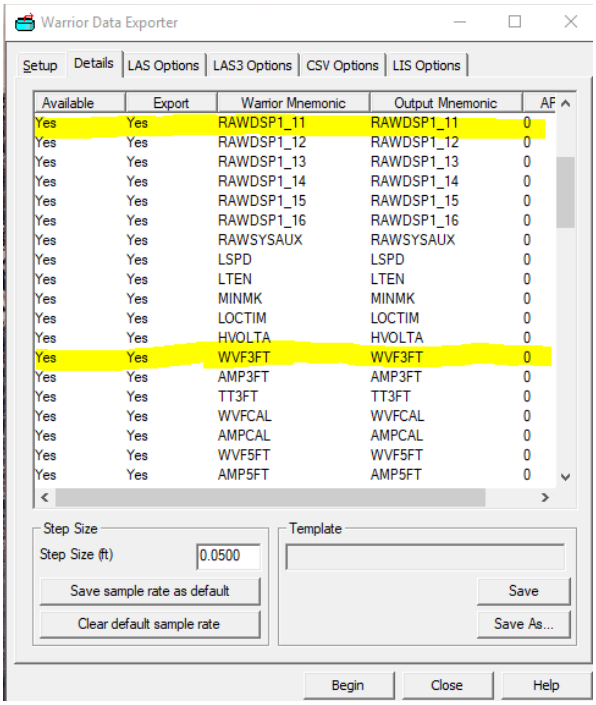


FIG: 12.1.16 LAS3 Details

LAS3 has its own options selection, that function similarly to LAS2.

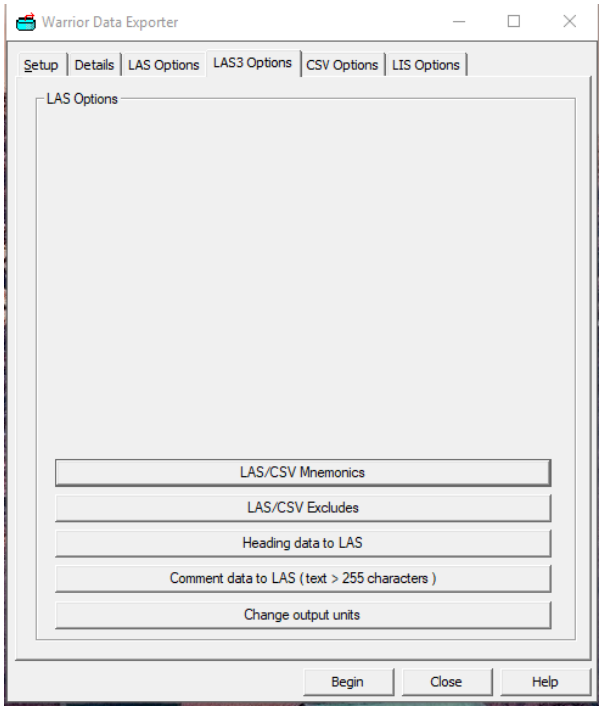


FIG: 12.1.17 LAS3 Details

12.1.9 Exporting to LIS and DLIS

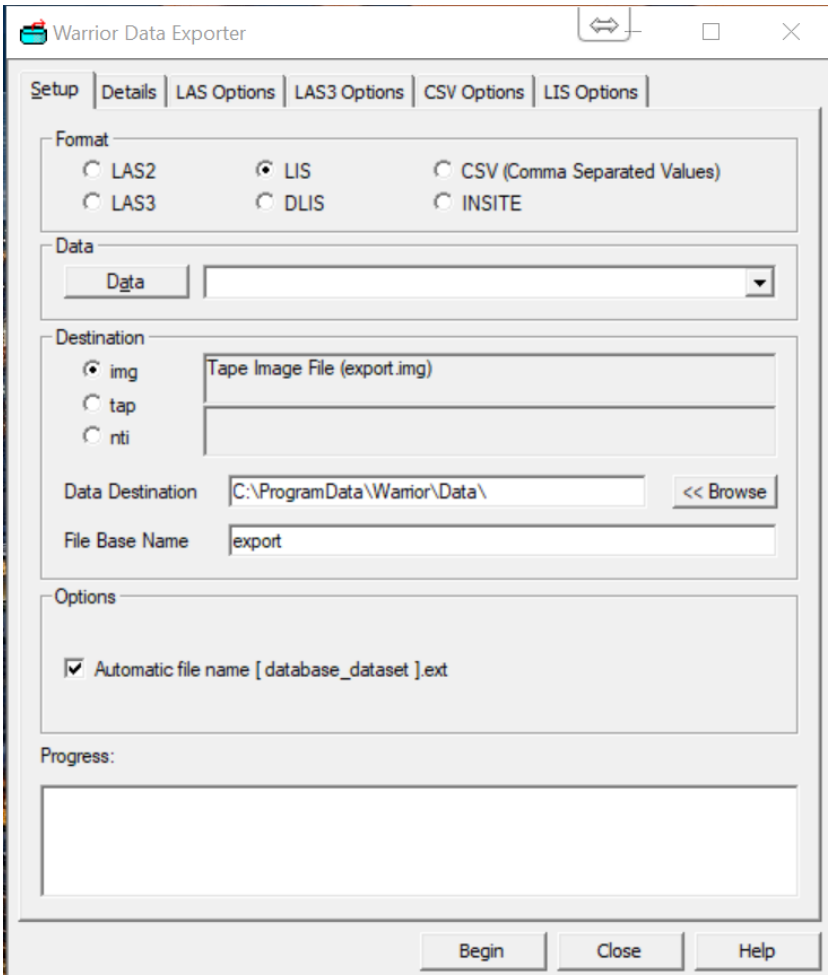


FIG: 12.1.18 LIS Data Exporter

LIS has three destination formats, tap, nti, img and .dlis.

TAP is a tape compatible format.

NTI and IMG are image formats.

DLIS is a Digital LIS format.

There are three different tape image file types that can be selected by clicking on the [Destination] button when writing LIS files. .IMG files are raw image files. .NTI files are compressed disk image files. .TAP a tape images that were originally use for the Commodore 64 computer. In addition, if the computer you are using has a tape drive installed, it will be shown as a destination.

Consult with your client or computing center to select the most compatible format to their needs.

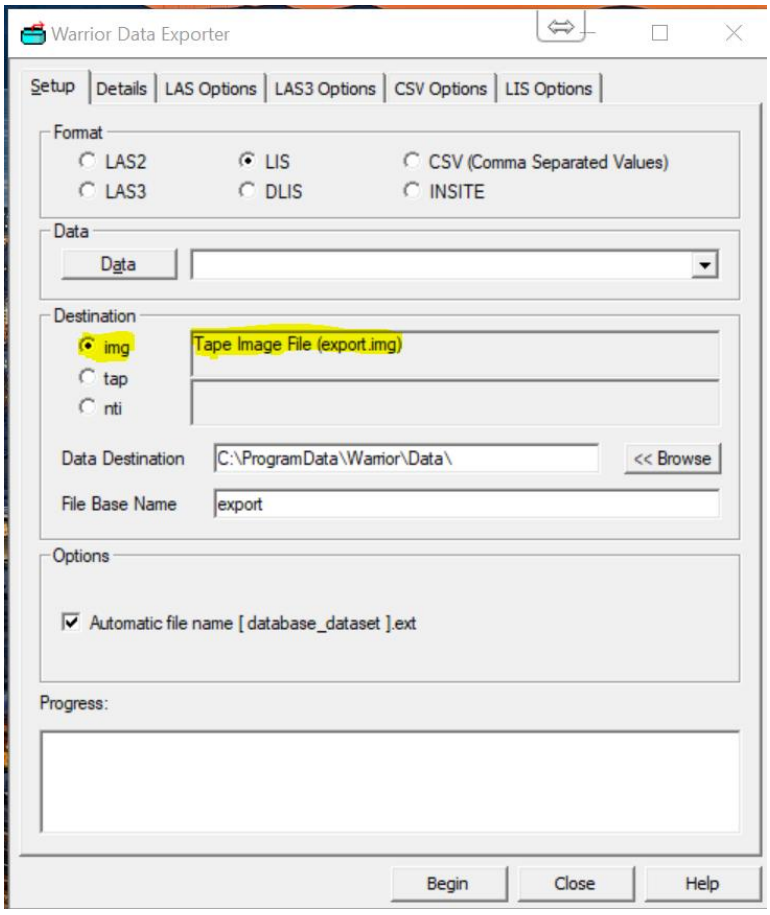


FIG: 12.1.19 LIS Data Exporter

Selecting the LIS data to export is done in a similar manner to LAS data. The main difference is that the Template that is used is an .LET file rather than an .AET file.

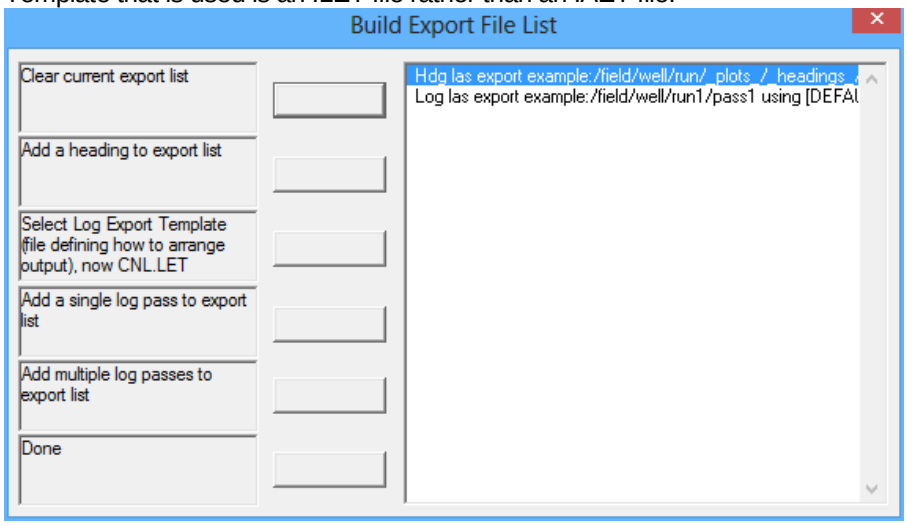


FIG: 12.1.20 Select DATA to Build the LIS File

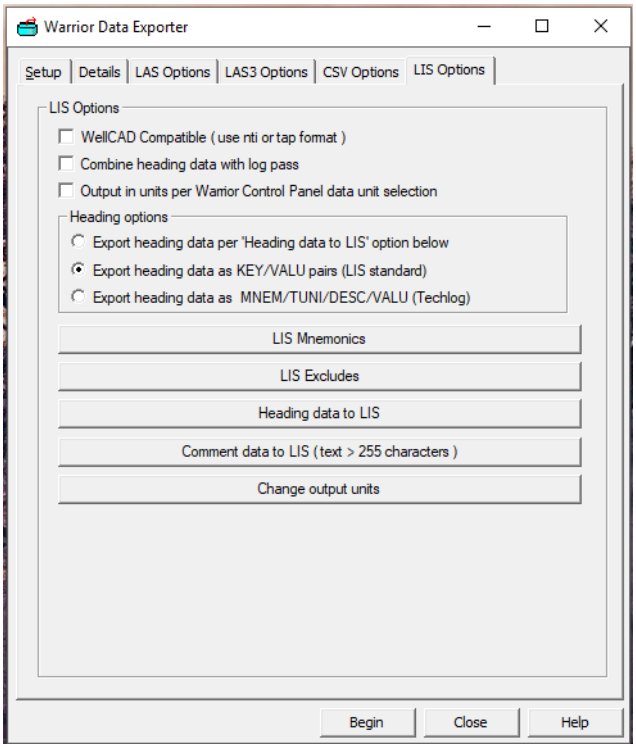


FIG: 12.1.21 LIS Options

The LIS Options has three check boxes.

WellCAD Compatible (use nti or tap format) This will generate a Well CAD software compatible LIS

Combine Heading data with log pass will generate a LIS with both Heading and log data.

Heading data as KEY/VALU pairs (LIS standard) unless otherwise instructed use this selection for LIS generation.

There are three heading options. The consult your customer for the appropriate standard.

The LIS Mnemonics, LIS Excludes, and Heading data to LIS are the same as they are for LAS.

The Comment data to LIS will take longer comments from your heading and export them to a comment section in the LIS file (LIS logical record type 232).

The Change Output Units allows you to select a specific Warrior unit and asign a text string to it. From the menu you can choose to add delete or edit your asignments. All the Warrior units will appear in a pull down menu ad your output unit will be a free for text.
In the example the pull down unit was degF and the text asigned was degC.

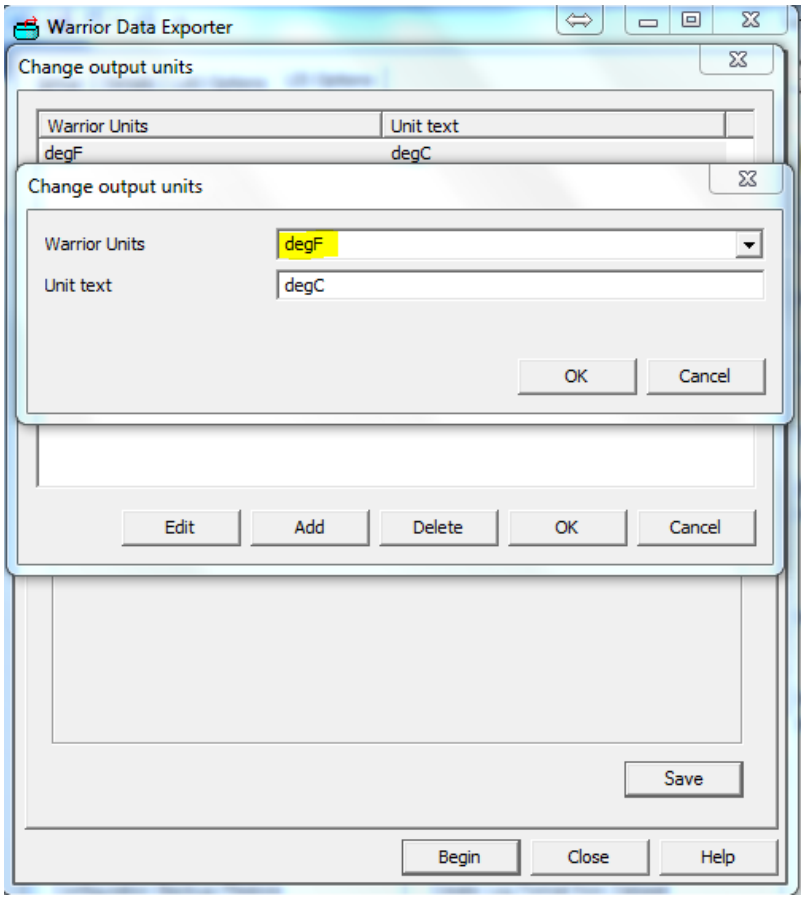


FIG: 12.1.22 LIS Change output units.

12.1.10 Export to ODBC compatible Database

The Export ODBC Compatible Database and Import ODBC into Warrior use the same program and either menu option may be selected. The computer exporting or importing must have Microsoft Office installed in order to use this option.

This program will export data for Excel, Access and other ODBC compatible databases. The limit for exporting data is 255 data points per sample. A normal curve is one data point, but a waveform will be many more points for each sample. You will see a message in the progress window that the column count has exceeded if you exceed that amount. In order to export to an ODBC format, you must have Microsoft Office installed.

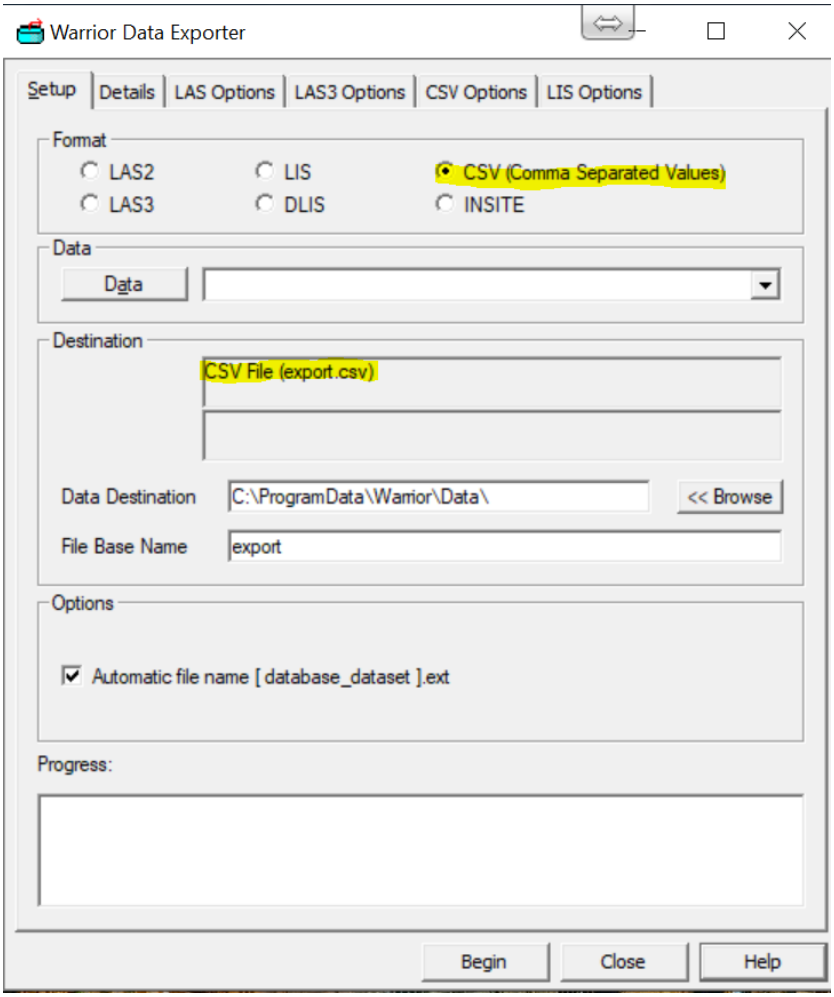


FIG: 12.1.23 Export to CSV comma separated values

CSV export opens the same program as LIS and LAS exporter, ODBC export has be discontinued because the underlying software from Microsoft Office is discontinued. By exporting to CSV, you can easily manipulate your data in Excel.
There is an options tab specific to CSV.

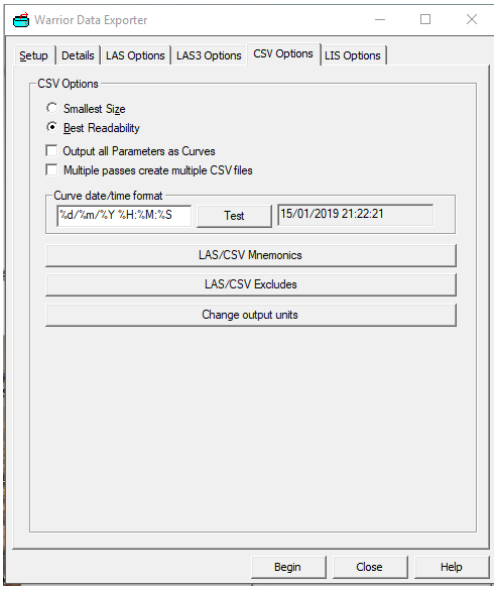


FIG: 12.1.24 CSV Options

12.1.11 Extract Pass(es) to New Database.

The Extract Pass(es) to a New Database Utility allow the User to selectively copy passes from an existing database to a new one.

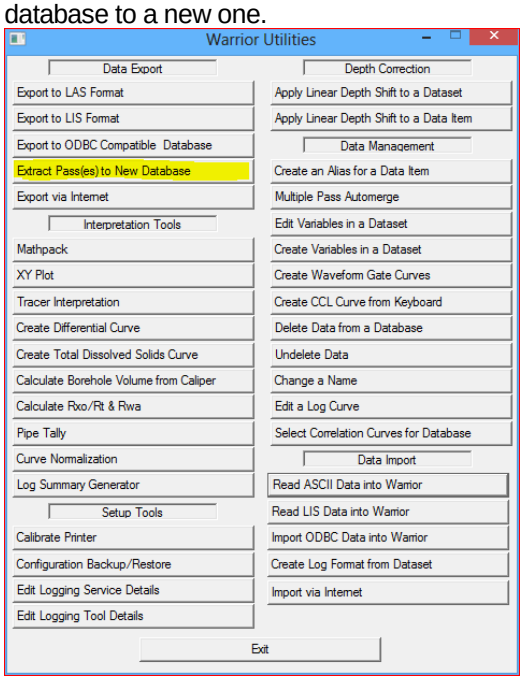


FIG: 12.1.25 Extract Pass(es) to New Database

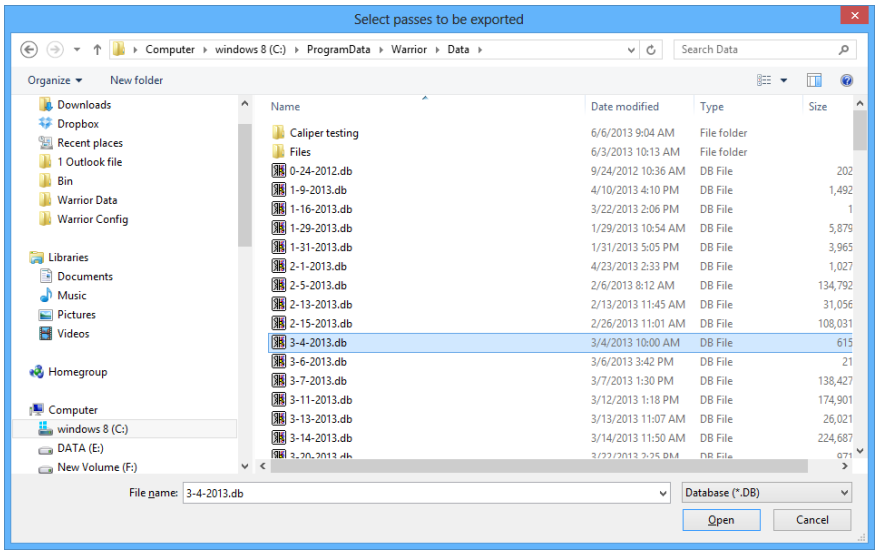


FIG: 12.1.26 Select Database

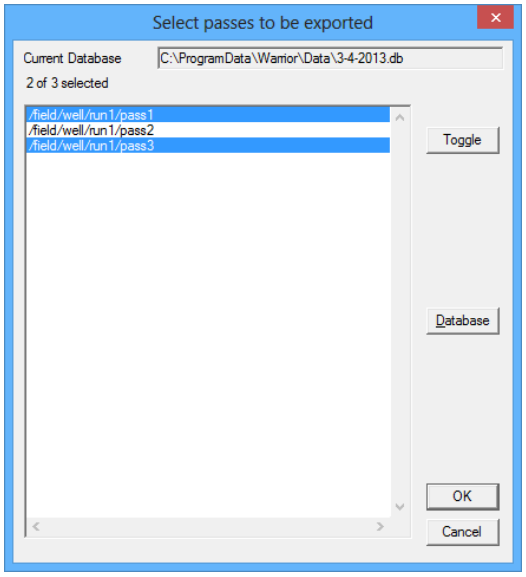


FIG: 12.1.27 Select Pass(es)

You will be first asked to select the database and the pass / passes that you want extracted. Hold {CTRL} to select multiple passes. Then you will be asked for the copy target where the extracted passes will be sent.

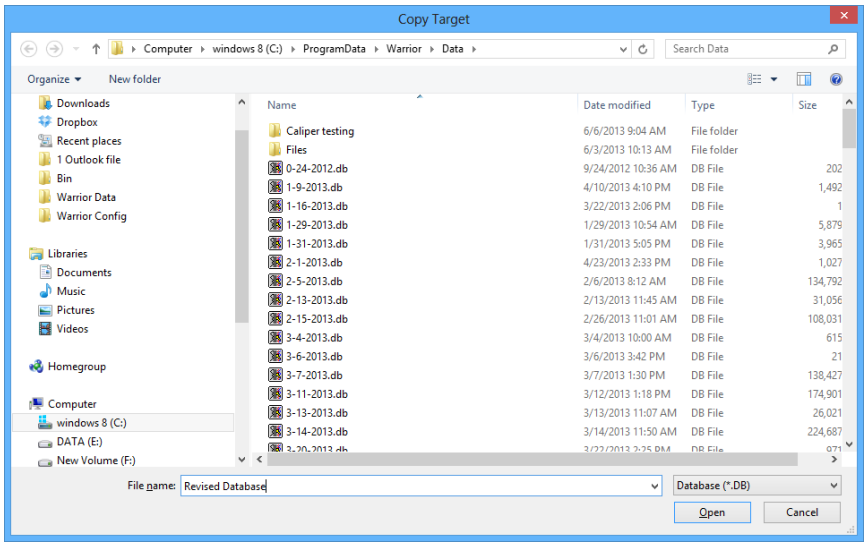


FIG: 12.1.28 Copy Target

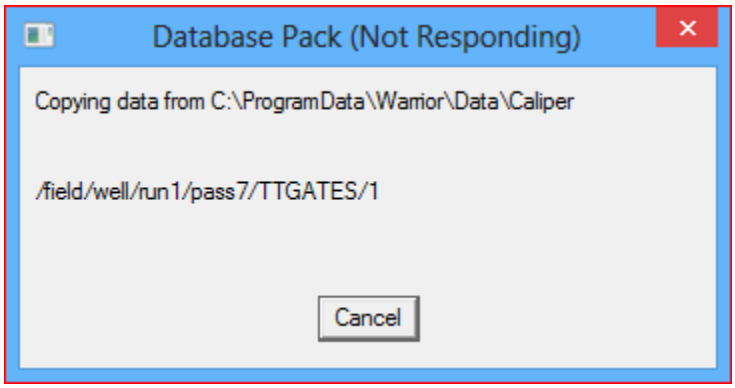


FIG: 12.1.29 Packing

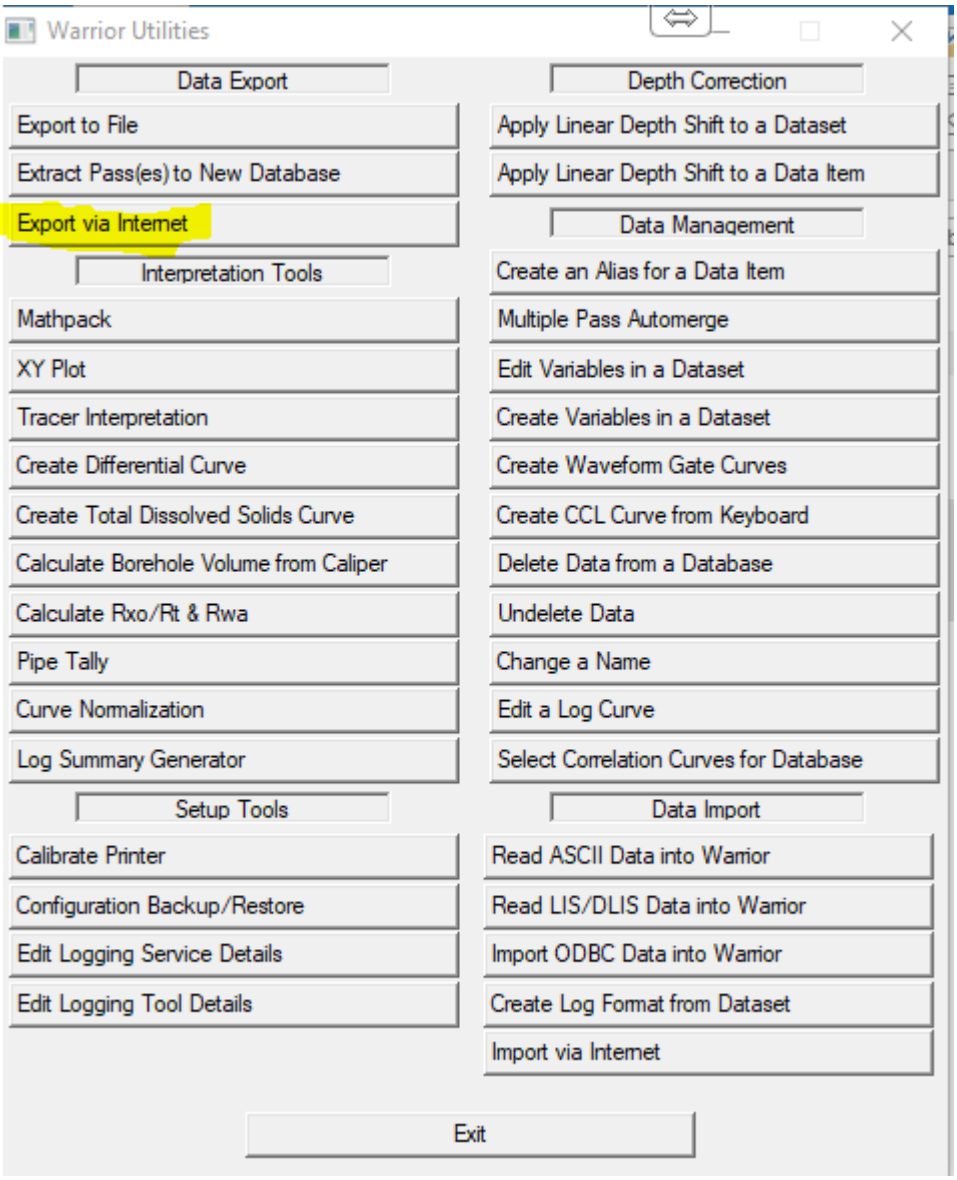
Depending upon the amount of data being copied, you will see a progress showing each item being copied into the new database.

12.1.12 Export via Internet

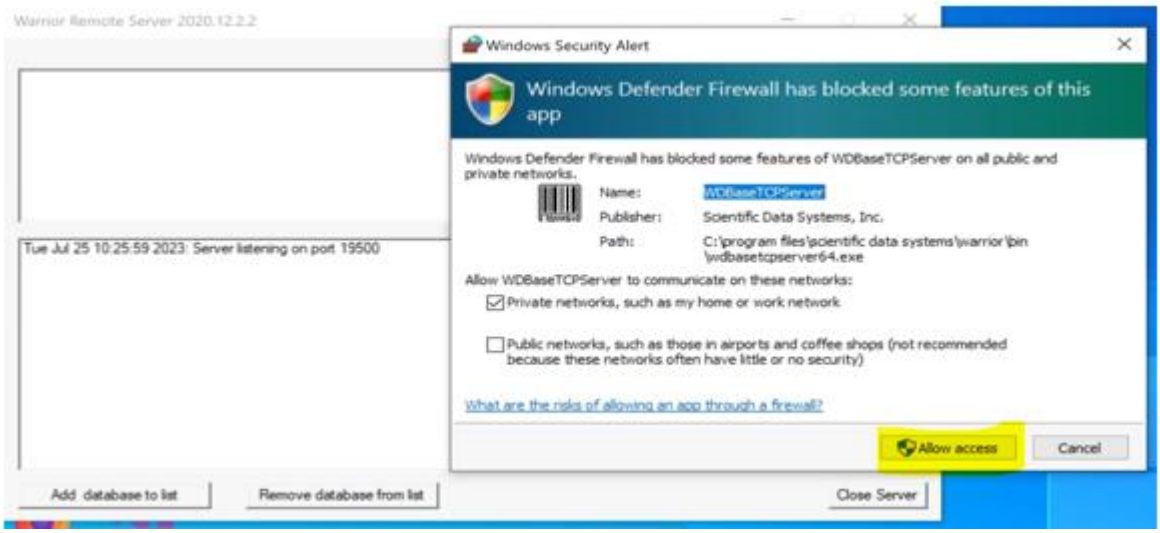
Before you can start sending data you must ensure that the sending computer's firewall has been properly configured.

Log into your local NETWORK ROUTER, and OPEN the defualt port 19500 and forward it to the specific Lan IP of the exporting computer.

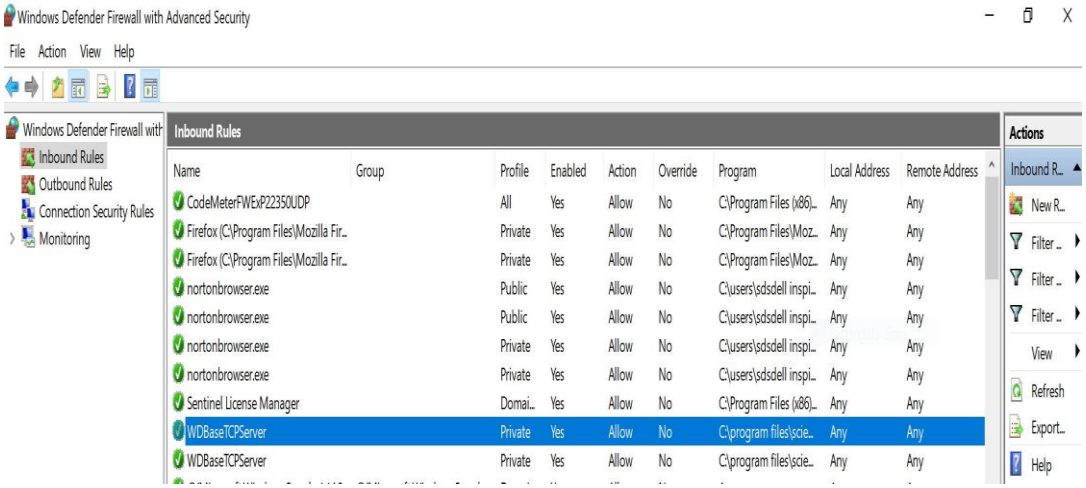
Then start the server software on the sending computer.
It is found under Database Utilities.



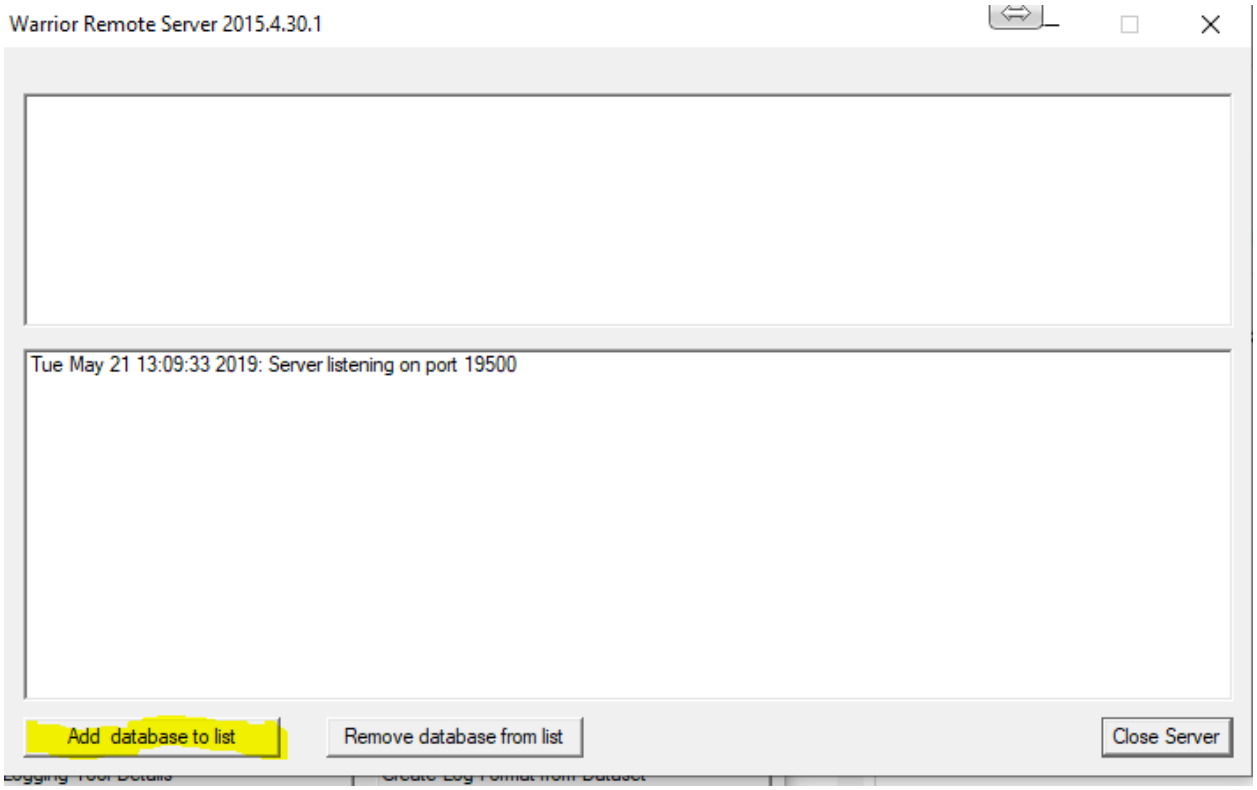
You should receive a Windows pop-up, from the Windows Firewall regarding Warrior's WDBaseTCPServer. Click on allow access.



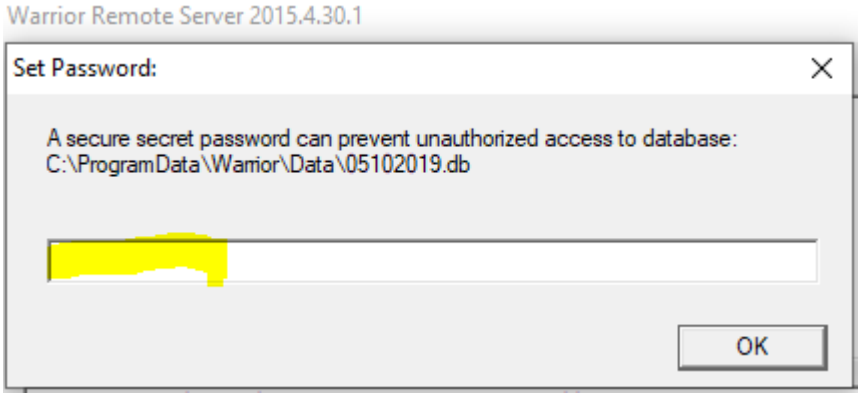
If you do not receive the pop-up, Windows Defender Firewall may have already blocked the WDBaseTCPServer. To check this open the Windows Defender Firewall by typing Windows Defender Firewall with Advance Security in the Windows Search box. Check to make sure that WDBaseTCPServer is allowed through the firewall.



Once the Server is open you will need to select the database you plan to use. To do this click on the Add Database to List button. You can send completed passes or passes in progress. Those choices are made on the receiving side.

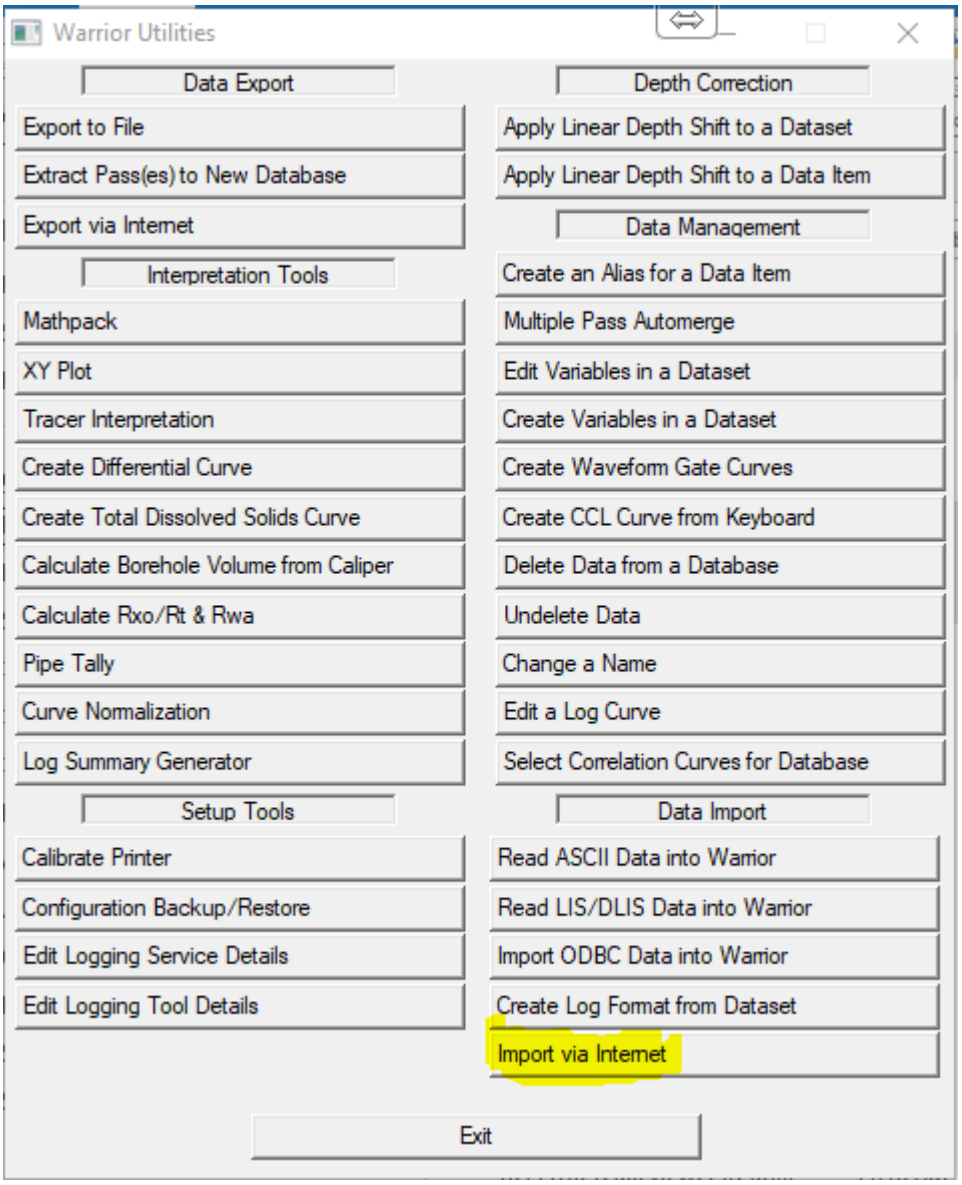


Once you have selected a Database you will have the option to use a password, if you do not wish to use one just click on OK.

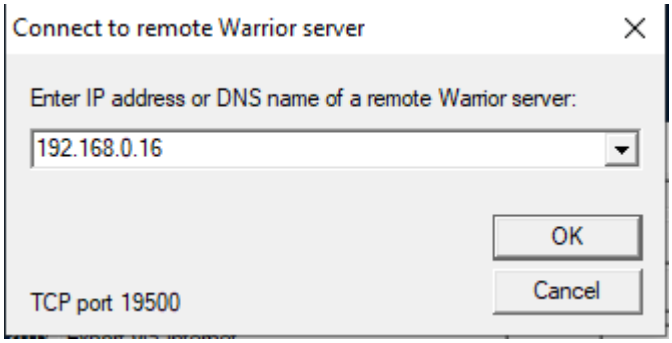


That is all that is required on the sending side.

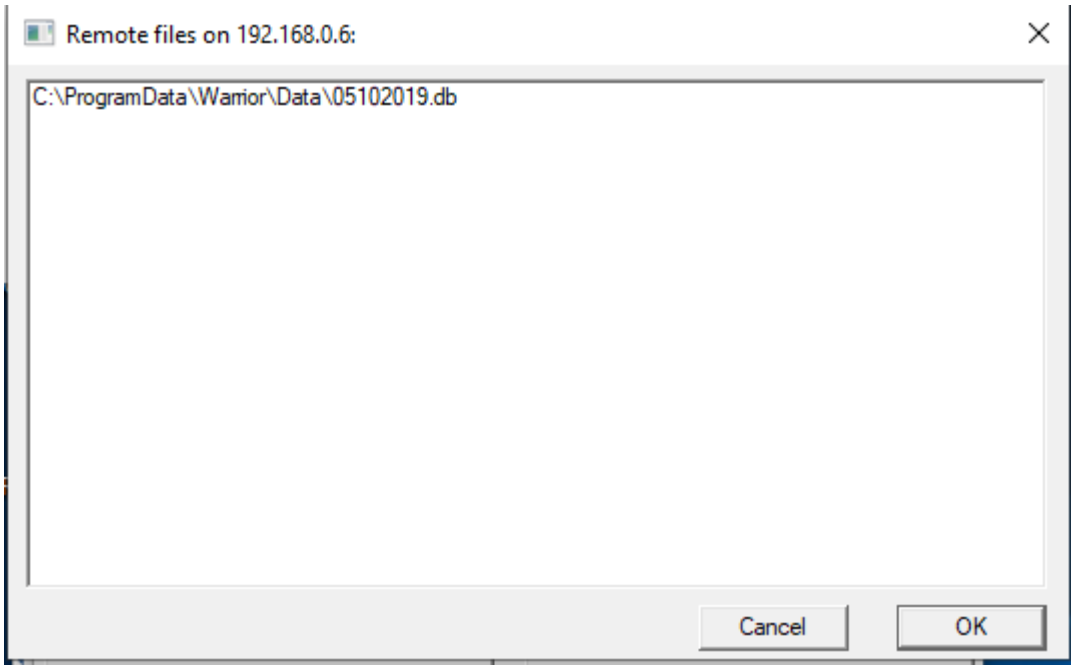
On the receiving computer go to Database utilities and select Import Via Internet.



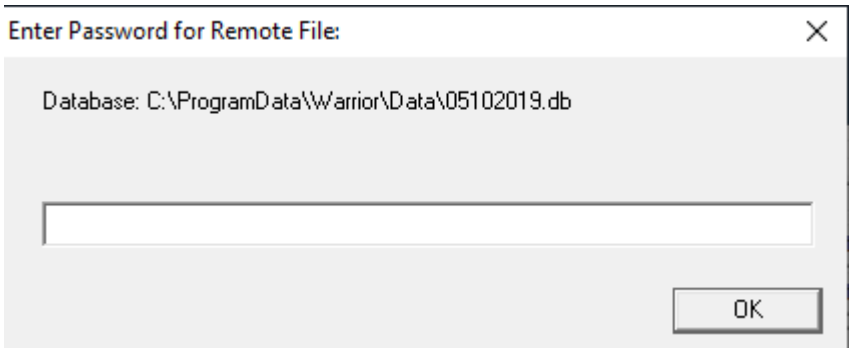
The first thing you will need to enter is either an IP address or DNS name server. This is the most difficult part of the setup. You may need to contact someone from IT. To find this information. They may request the TCP port number located on the lower right of the screen.



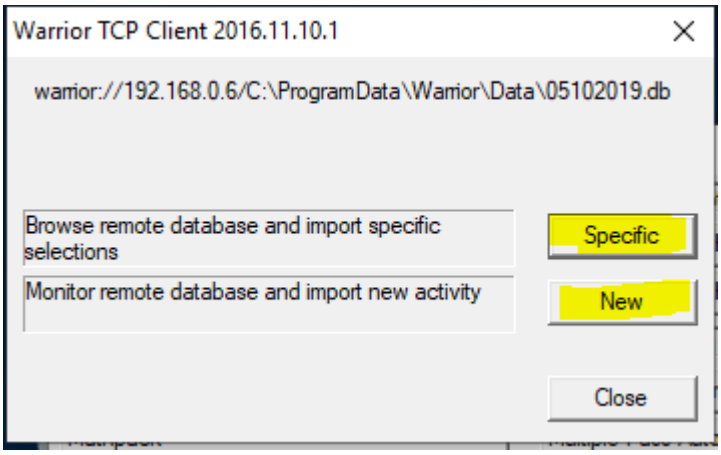
Once connected you will see a list of available Databases on the host computer. Select the desired Database by clicking on it. It will then be highlighted in blue.



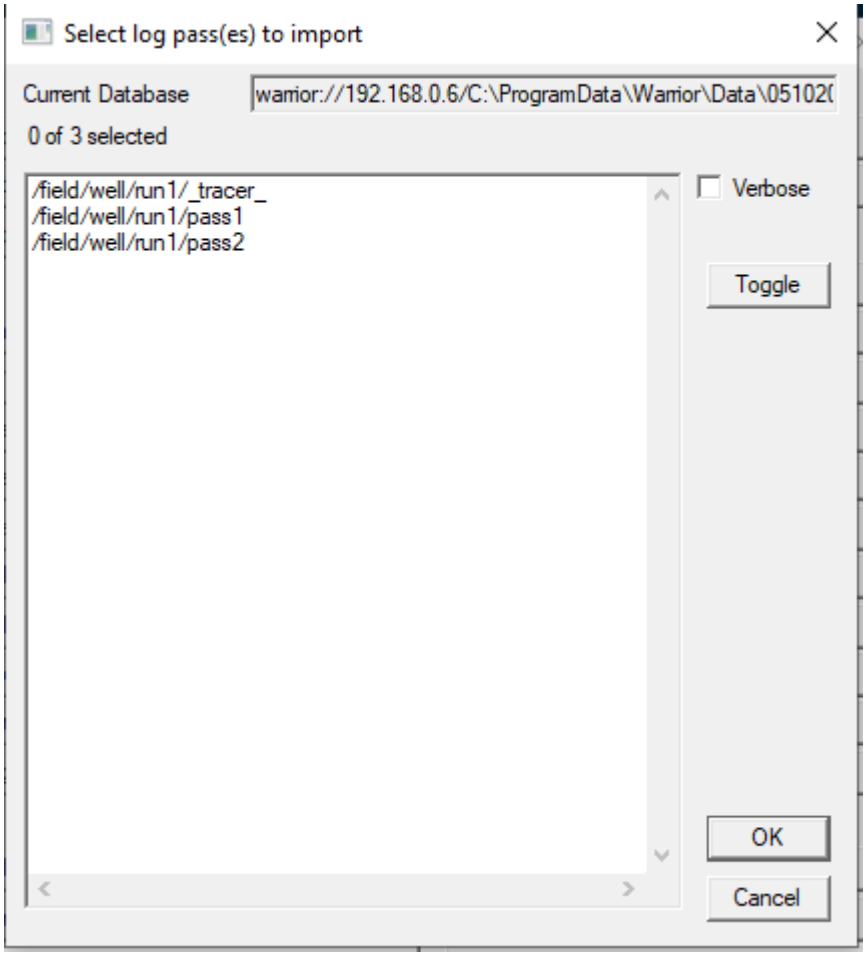
Next thing you will be prompted for is the password entered earlier on the host computer.



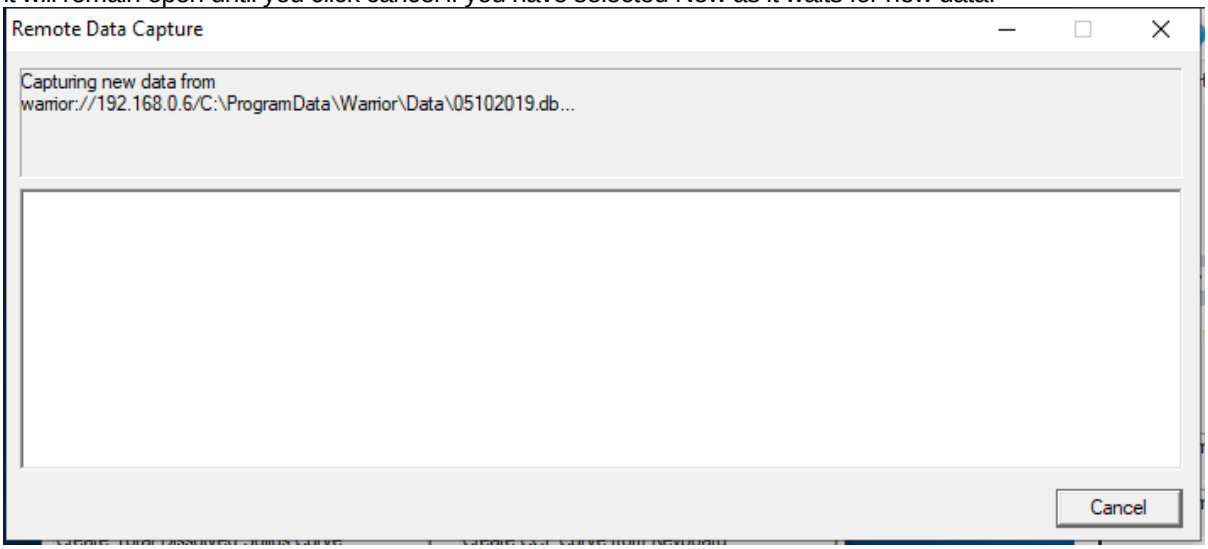
At this point you can transfer a completed pass or if you select New you will receive any passes updated after you have made this choice. In this way you can receive a current pass as it is being acquired.



I have chosen specific for this example. Once selected I am prompted to select which pass or passes I wish to receive. Once again clicking on a choice will highlight it in blue. Once you are satisfied with your choice click OK.



After clicking OK the next window will display the transmission status. This window will close once completed, it will remain open until you click cancel if you have selected New as it waits for new data.



12.2 Interpretation Tools

12.2.1 Mathpack

See section 15

12.2.2 XY Plot

A cross plot will consist of one or more curves. Each curve will be created by plotting database items against depth or time or from one database item against another database item.

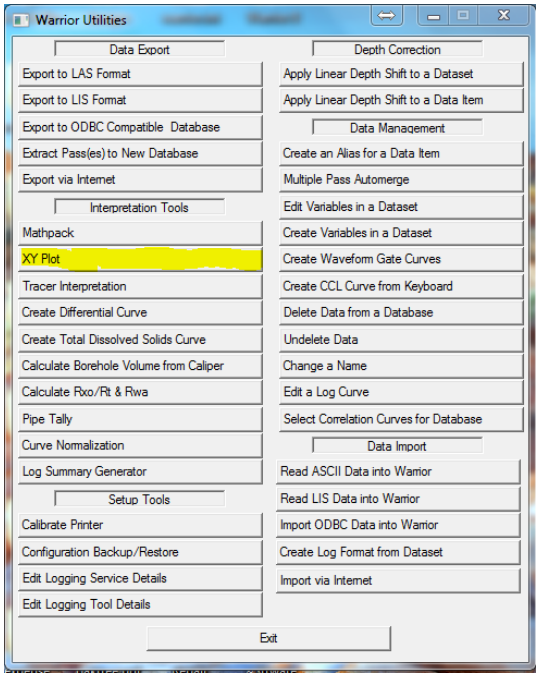


FIG: 12.2.1 XY Plot

Select a database to work with.

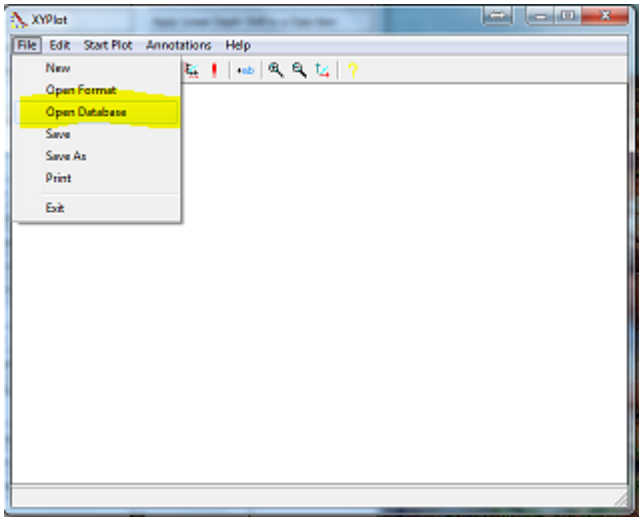


Fig: 12.2.2 Database selection

If you have an existing format file (.xpt) you can open it at this time.

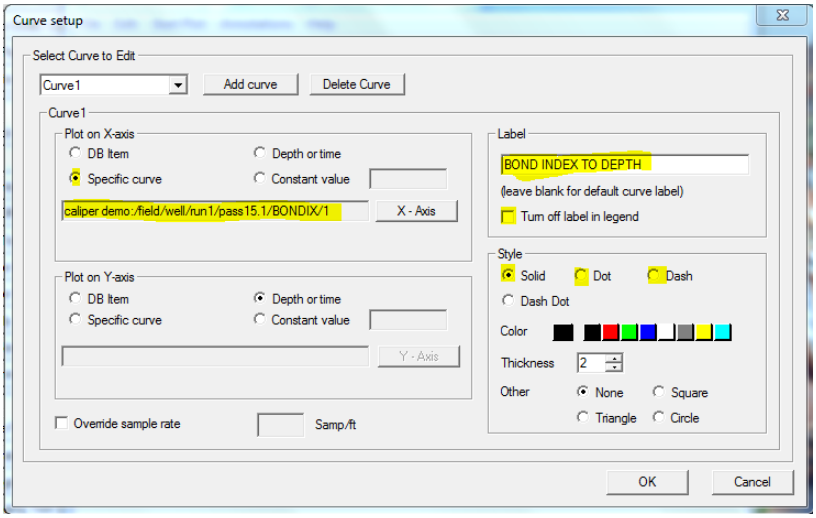


Fig:12.2.4 Curve Setup

Select New from the menu, if you have not loaded an existing (.xpt) file.
Select **Add Curve** to create each curve. Each curve name will increment by 1 as you add curves. Select **Delete Curve** to delete the selected curve from the plot.
To set up the cross plot you must first select what will be plotted on each axis. If depth or time is selected to plot on the x-axis, then no item will be selected to plot on the x-axis. Next select what database item(s) to plot by selecting the X - Axis or Y - Axis buttons. If you want to plot one database
item vs. another, the items do not have to come from the same pass, but they must both be recorded on depth or both be recorded on time. Also, the items must have an overlapping depth or time interval to plot from.
Once the plot setup is complete select the **OK** button, and the plot will start. The scaling will be done automatically. To change how the plot is scaled select **Edit/Scaling**.
The plot can be made real-time, and if the auto-scale option is used, the plot will resize automatically
to fit all the data points as needed.

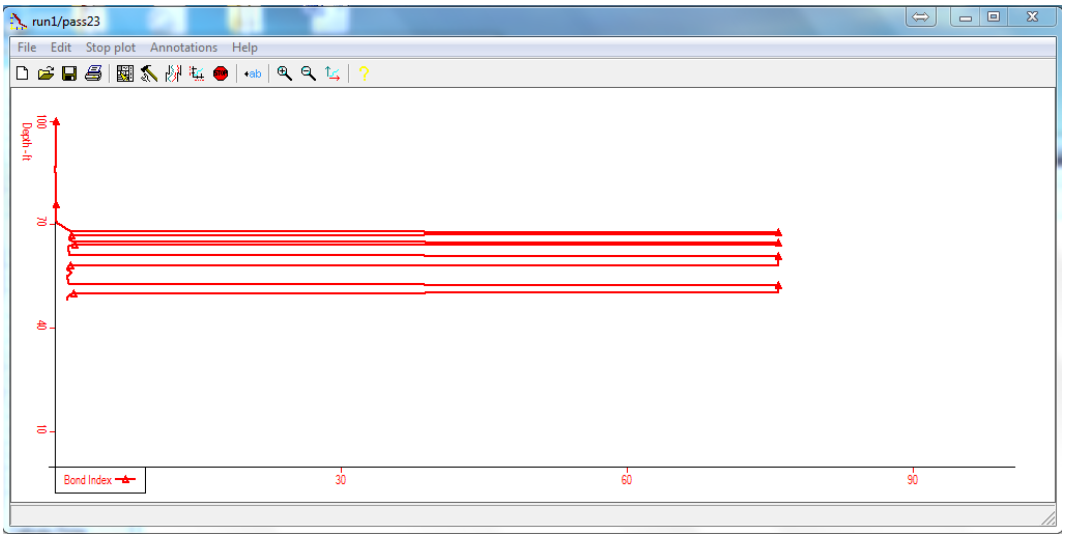


Fig:12.2.5 XY Plot Bond Index depth

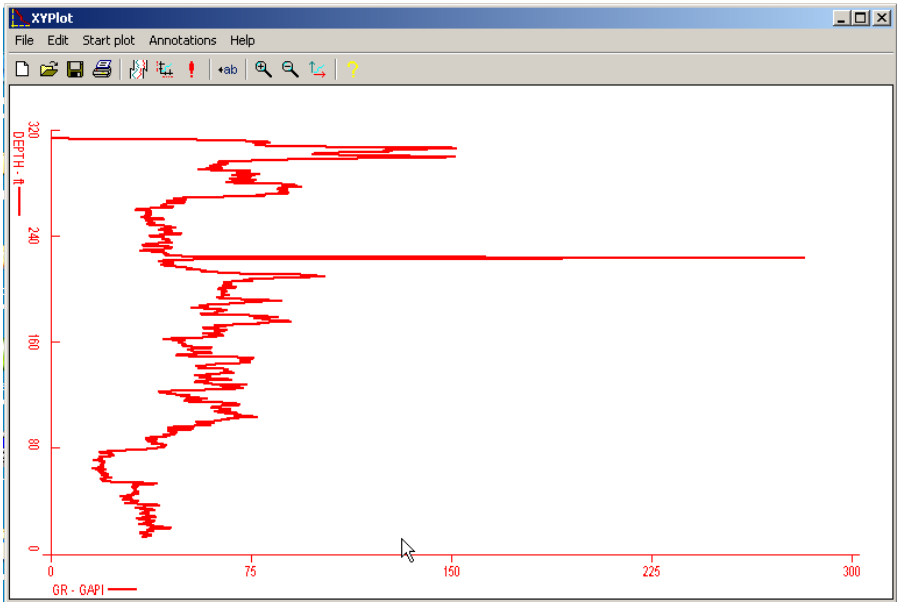


FIG: 12.2.6 XY PLOT Gamma ray Depth

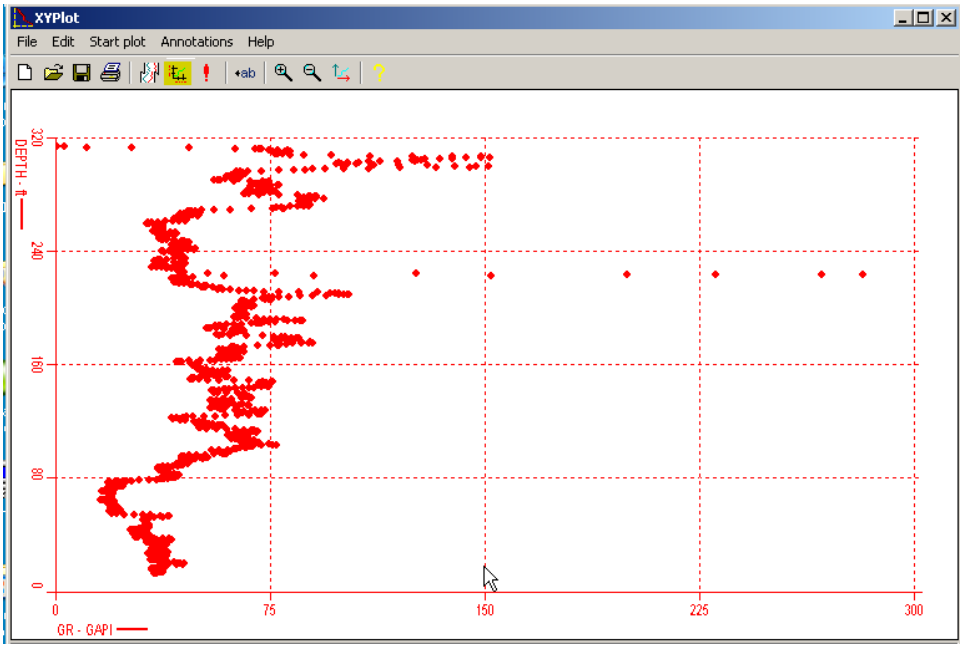


FIG: 12.2.7 XY Plot Selecting no lines between points

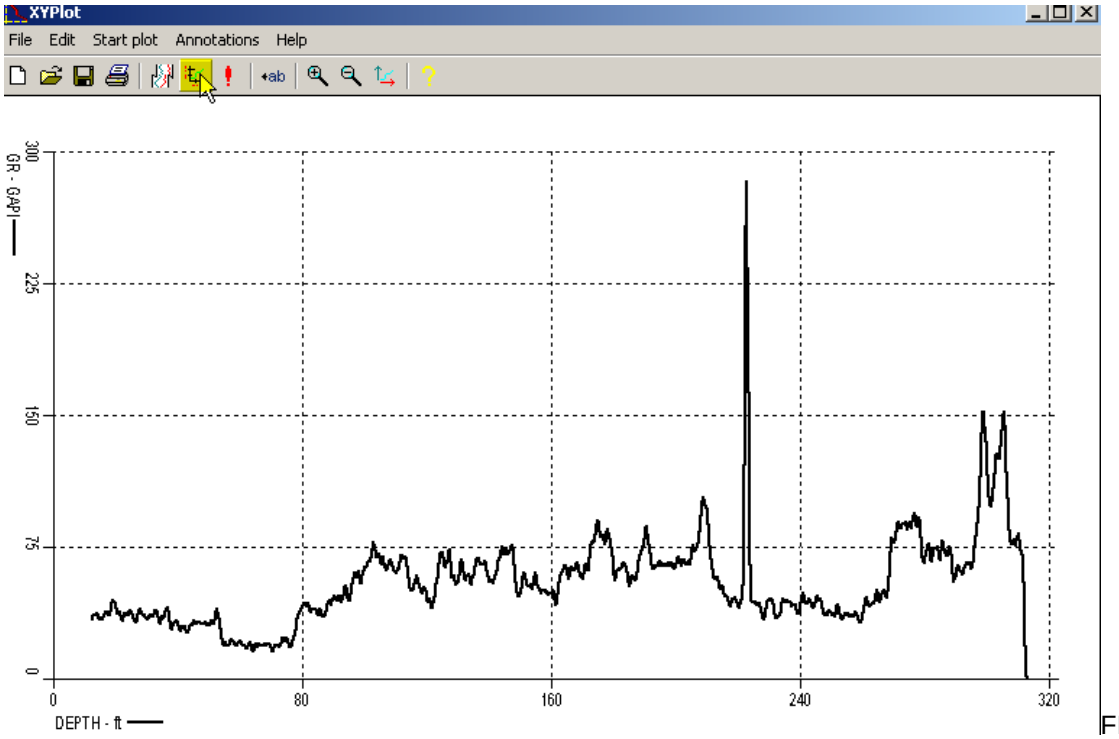
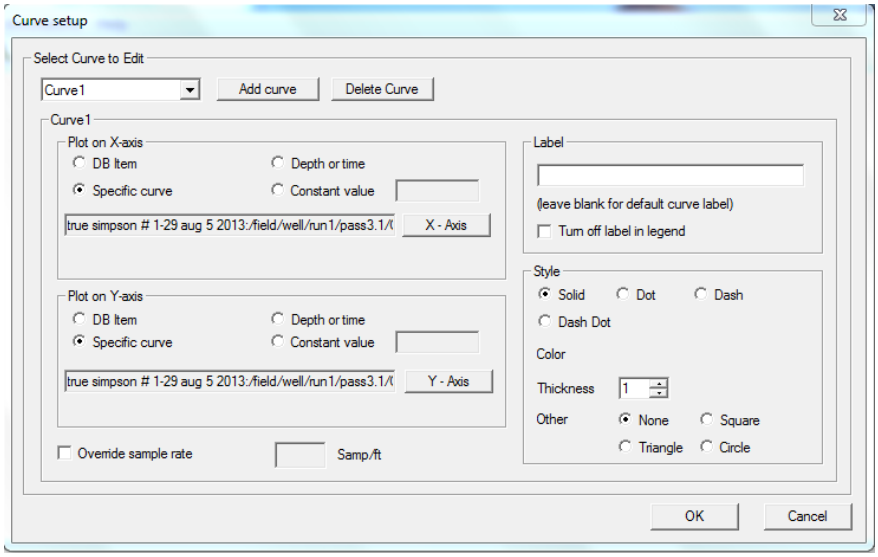


FIG:

12.2.8 XY Plot Depth Gamma ray



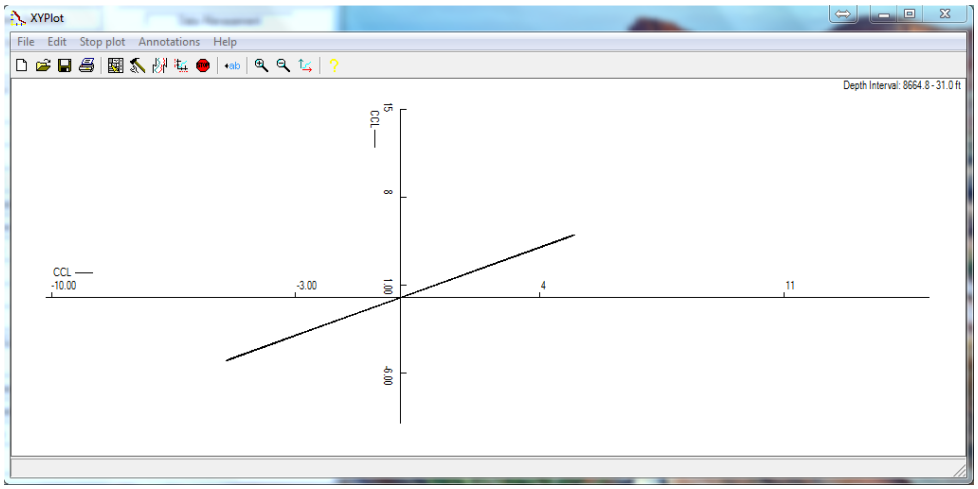


FIG: 12.2.9 Selecting CCL for X and Y Axis

A separate axis will be drawn for each curve unless the option **Overlap scales for each curve** is selected. If the auto-scale option is selected for the x or y axis, the left, right and/or top, bottom scales will automatically be calculated to fit all the data within the plot. If it is not selected, you can enter the scales yourself. If only one database item is selected to plot, then one of the axis will be depth or time.
When plotting two database items, there is a depth or time scaling option. It can be auto-scaled, or a range can be selected. The scales for the depth or time must be within the recorded range of the interval being plotted.
The x and y origin is defaulted to (0,0). If the origin is outside the range of data being plotted, then the origin will be moved to the bottom left corner of the plot.
The X and Y ticks give an approximate count to the number of gridlines that will be shown on that axis. The gridlines will attempt to be drawn at an integral distance apart, so the displayed ticks may not be the same as what are requested.
Sometimes it may not be appropriate to draw a line to connect each data point. To make a dot for each data point, deselect the option "Draw a line between plotted points".

12.2.2.2 Plotting

If the plot is being created as the data is being collected, then the **Start Plot** button will change to **Stop Plot**. Press the **Stop Plot** button to halt the plotting. If the data collection continues, then press Start Plot to plot the entire collected interval again. Starting the plot in the middle of data collection will plot over the interval as described in Scaling.

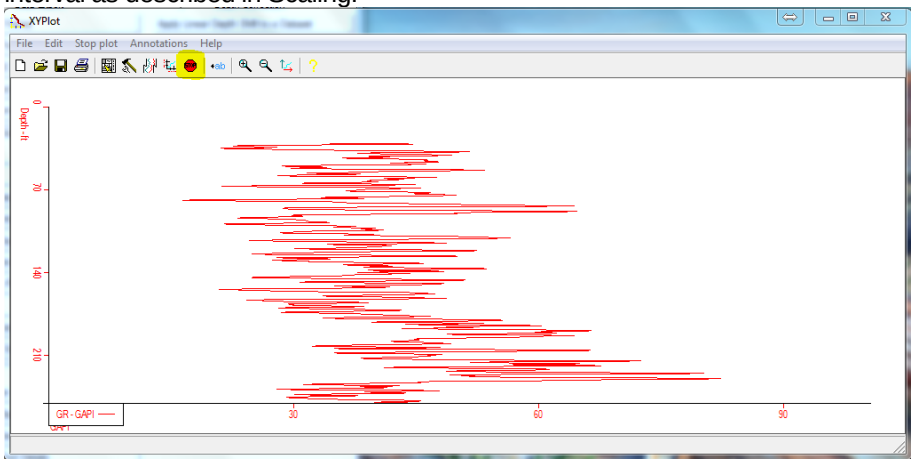


FIG: 12.2.10 Start Stop Plot Button

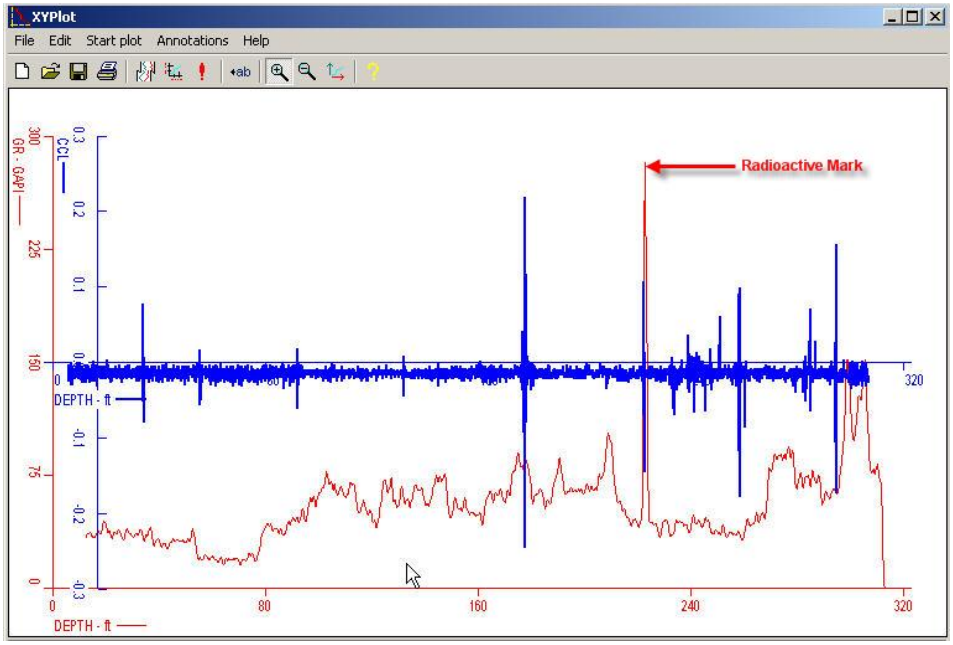


FIG: 12.2.11 XY Plot Two curves in the same chart

12.2.3 Scaling

The scaling menu allows you to manually or automatically scale both the x and y axis. It also has the options to set grid for both the x and y axis. There are four check boxes that select either displaying or not the grid lines, drawing lines between points and displaying scales.

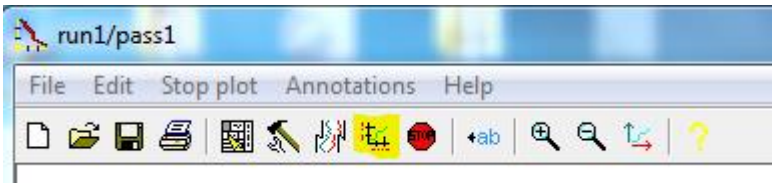


FIG: 12.2.12 XY Plot Scaling

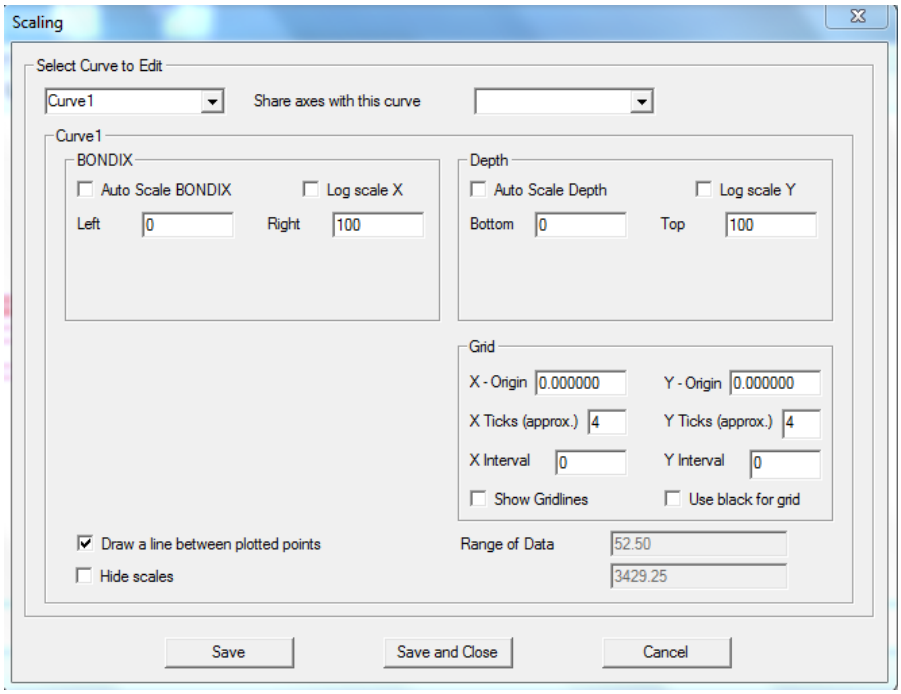


Fig:12.2.13 Scaling Menu

12.2.4 Annotations

To create an annotation, select **Annotations/Create** or click on the "<-ab" annotation button in the toolbar. When the annotation button is depressed, an annotation can be added. When the cursor is moved in to the plot area, the cursor will change to indicate the type of annotation that will be added. Right click on the mouse to change the annotation type. Left click to place the annotation on the plot. Type in the text for the annotation while the annotation is highlighted. To move an annotation, click and hold the left mouse button and drag the annotation to the appropriate position. To delete an annotation, left click on the item to be removed. When it is highlighted, press the delete key. To edit an annotation, left click on the item and then type in the new text.

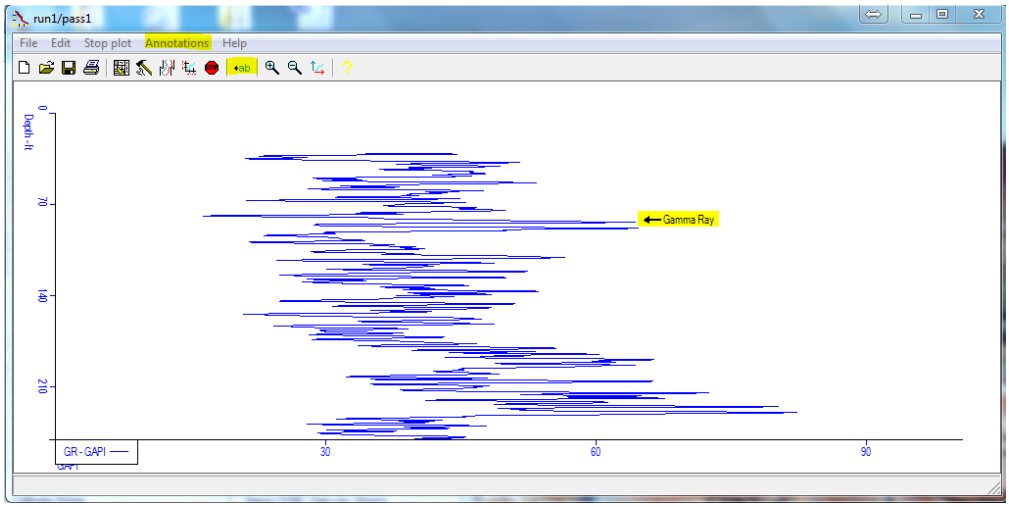


Fig:12.2.14 Anotations

12.2.5 Zoom

Select the Zoom in, zoom out buttons to change the cursor to a magnifying glass. Then select the area of the plot to magnify. To set the plot back to its default size, select the Auto scale button.

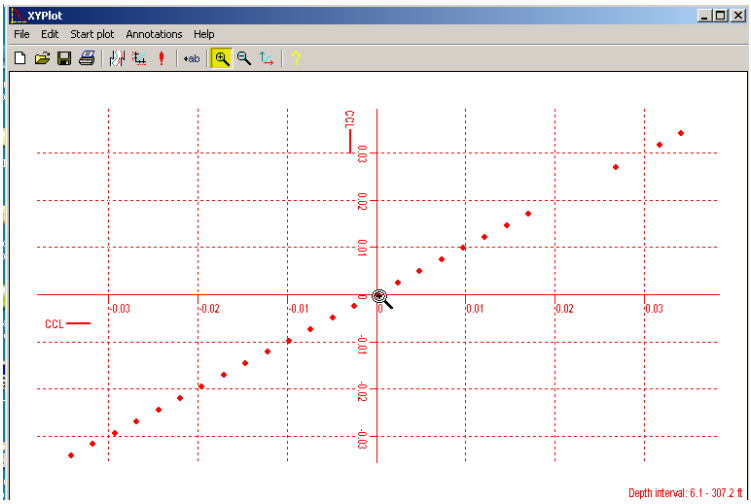


FIG: 12.2.15 XY Plot zoom feature

12.2.6 Save and Restore

When saving the cross plot, two items can be saved. First the cross plot can be saved to a Warrior database to be plotted with pplot. Second, the plot setup can be saved and restored later with the cross plot program. Saving the setup does not save the plot itself - it only saves the curve(s) being plotted and the setup used to create the plot.
The plot heading is only seen when the plot is printed. It can accept multiple lines by hitting the enter key at the end of each line.

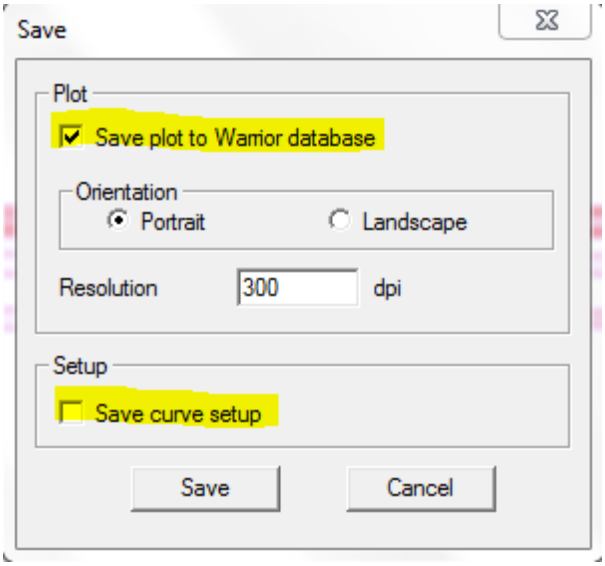


Fig:12.2.16 Save Plot and Setup

12.2.3 Tracer Interpretation

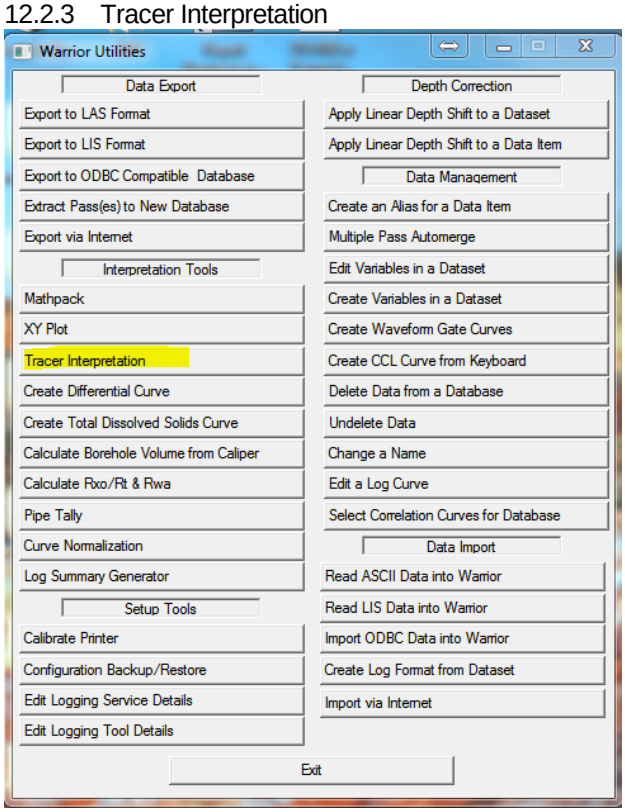


FIG: 12.2.17 Tracer Interpretation

See Section 27

12.2.7 Create Differential Curve

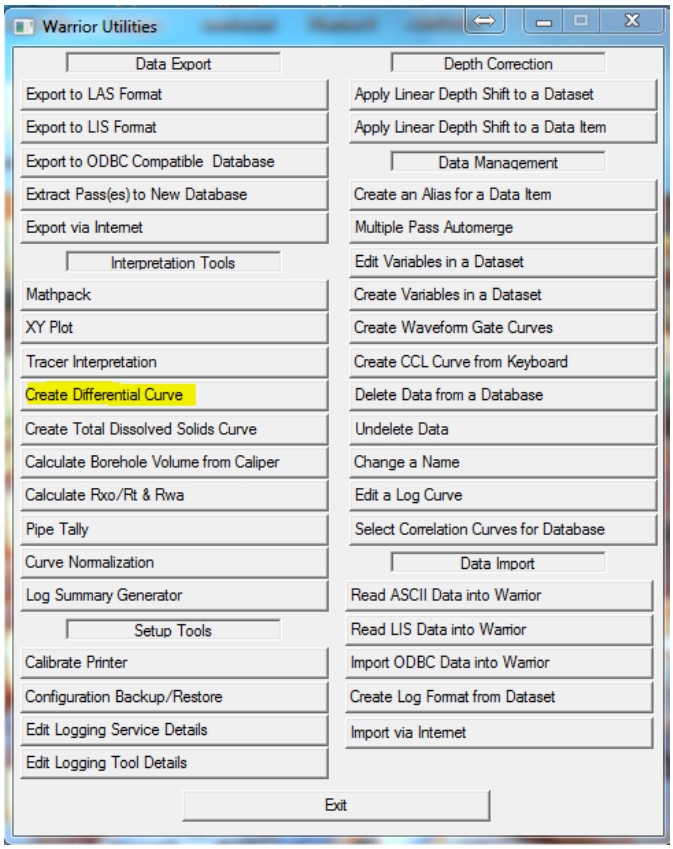
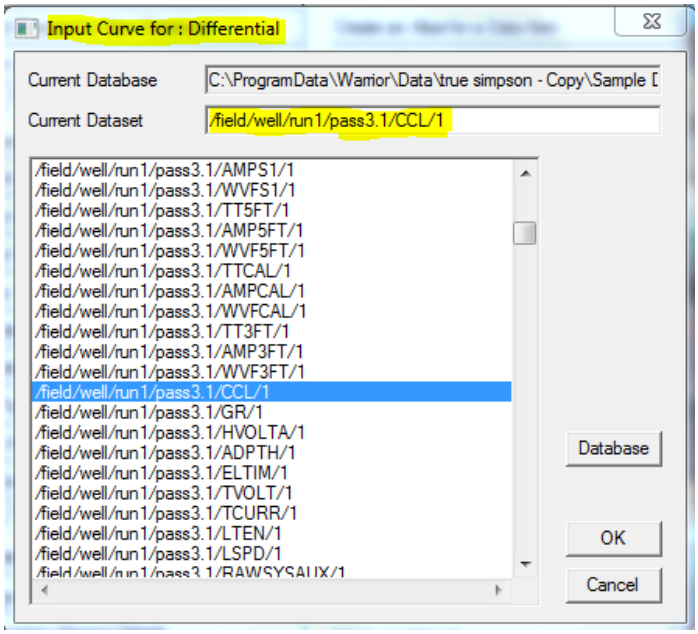


FIG: 12.2.18 Create Differential Curve



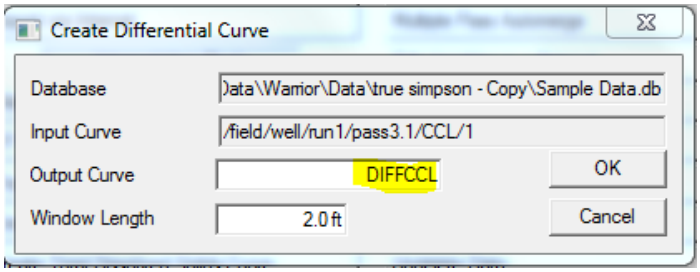


FIG: 12.2.19 Create Differential curves. (DIFFCCL)

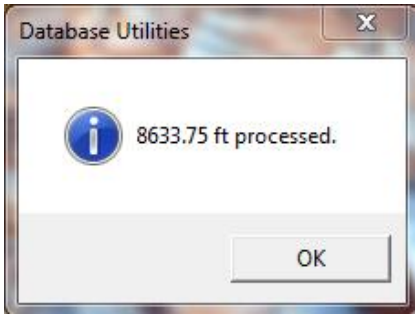


FIG: 12.2.20 Processing

12.2.8 Create Total Dissolved Solids Curve

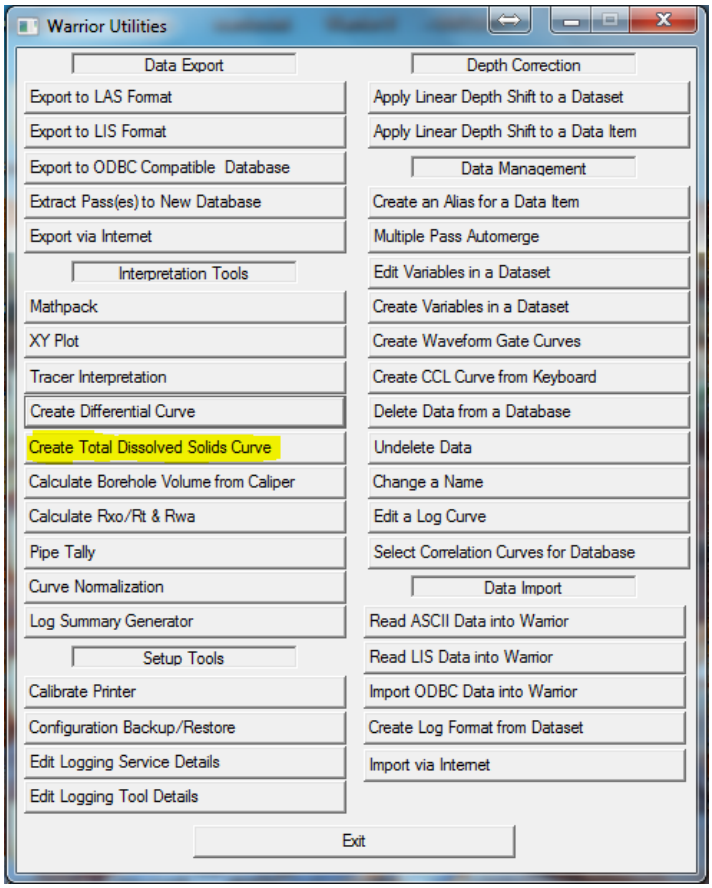


FIG: 12.2.21 Create Total Dissolved Solids Curve

When you select the Create total Dissolved Solids Curve the system will prompt you to select either a calculation using resistivity and delta travel time or resistivity density porosity in either decimal or percentage.

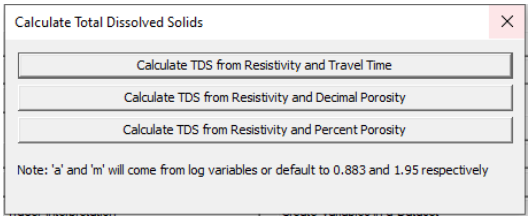


FIG: 12.2.22 Total Dissolved Solids Options

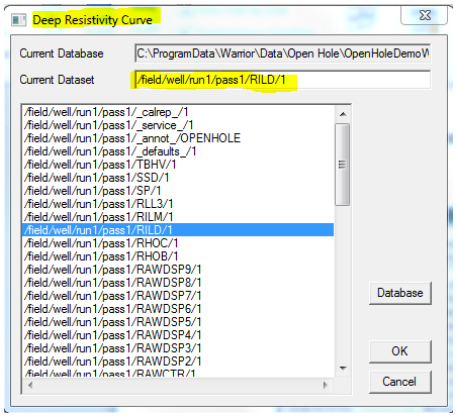


FIG: 12.2.23 Deep Resistivity

Then it will request the Delta Travel Time curve or density porosity.

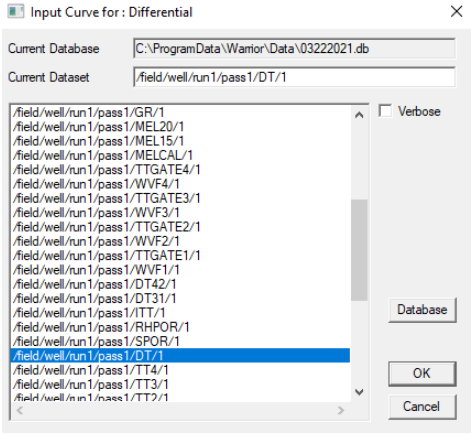


FIG: 12.2.24 Delta Travel Time

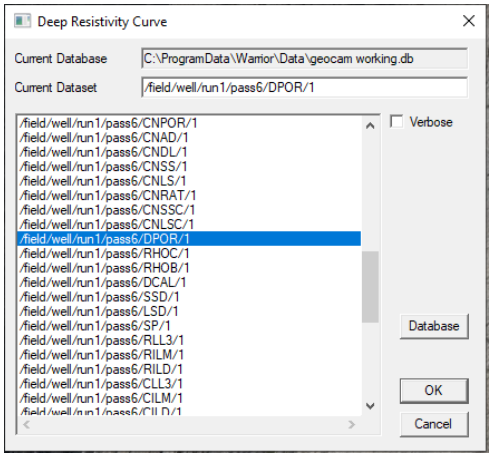


FIG: 12.2.25 Density Porosity

12.2.9 Calculate Borehole Volume from Caliper

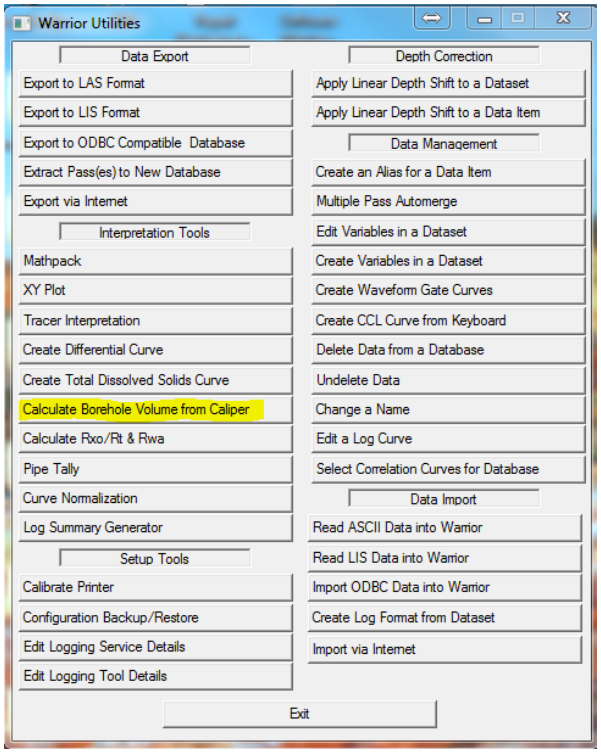


FIG: 12.2.26 Calculate Borehole Volume from Caliper

When selecting the “Create Borehole Volume from Caliper” the software will prompt you for Volume X Caliper Curve select your X Caliper and then OK.

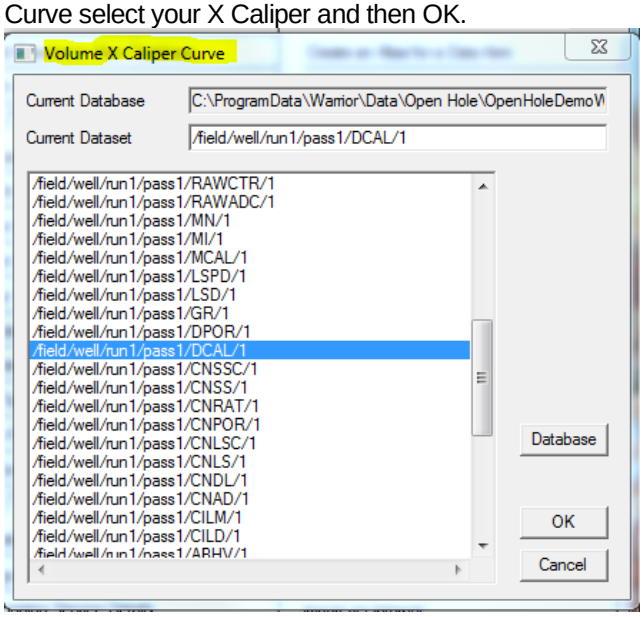


FIG: 12.2.27 Volume X Caliper Curve

Then you will be prompted for “Volume Y Caliper Curve” If you do not have one select the same curve as for the X Caliper.

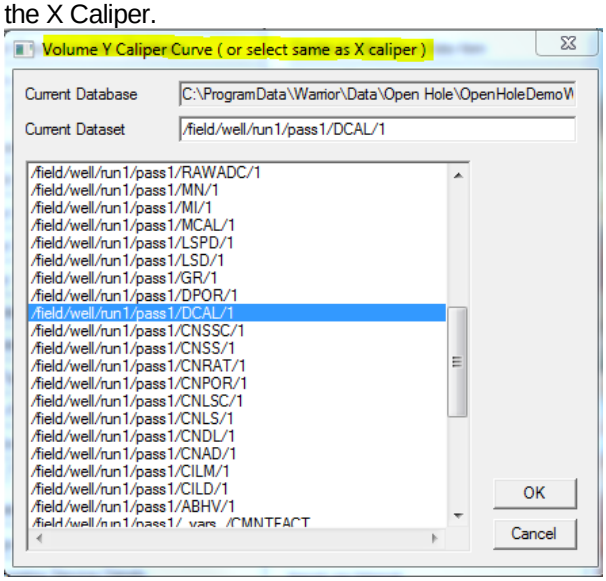


FIG: 12.2.28 Volume Y Caliper Curve

This will generate the Hole volumes. It ask if you want to calculate volumes to surface answer appropriately. It will then indicate the total footage processed.

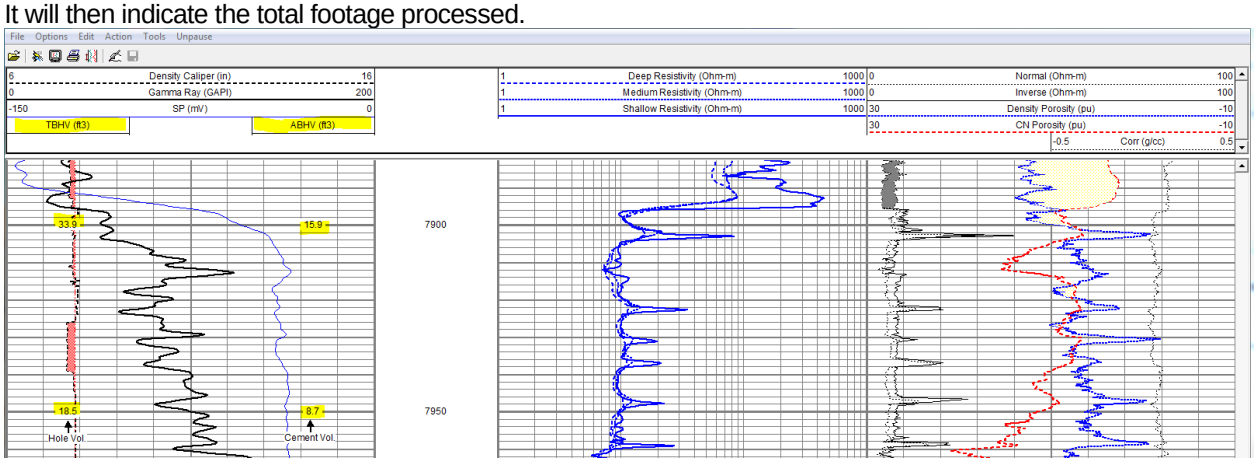


FIG: 12.2.29 Hole Volumes displayed As Tabular curves.

12.2.10 Calculate Rxo/Rt and Rwa Curves

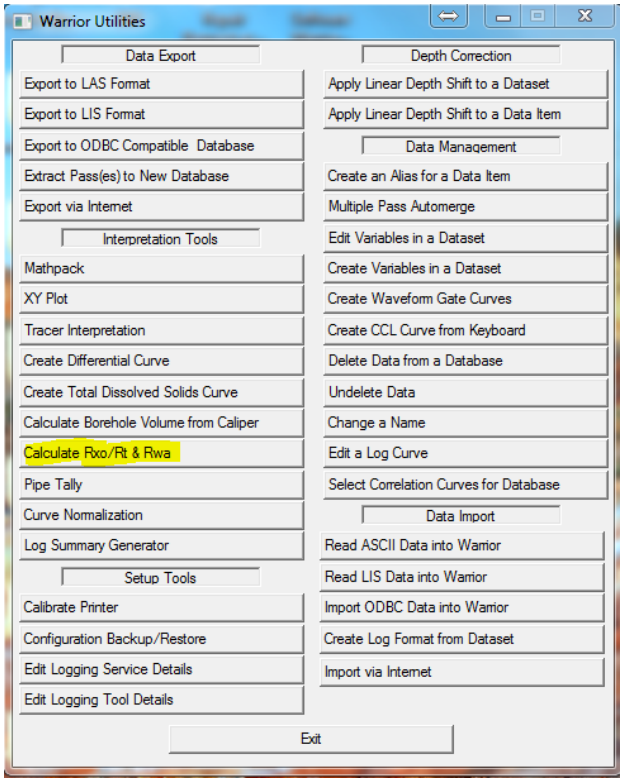


FIG: 12.2.30 Create Total Dissolved Solids Curve

Click on the Calculate Rxo / Rt button. This produces as file selection box, where the required database may be selected. Double click or Open the database file containing the input data for the calculation.
The program presents a list of the log curves present in the database and requests selection of the Rt curve. Select the desired curve.

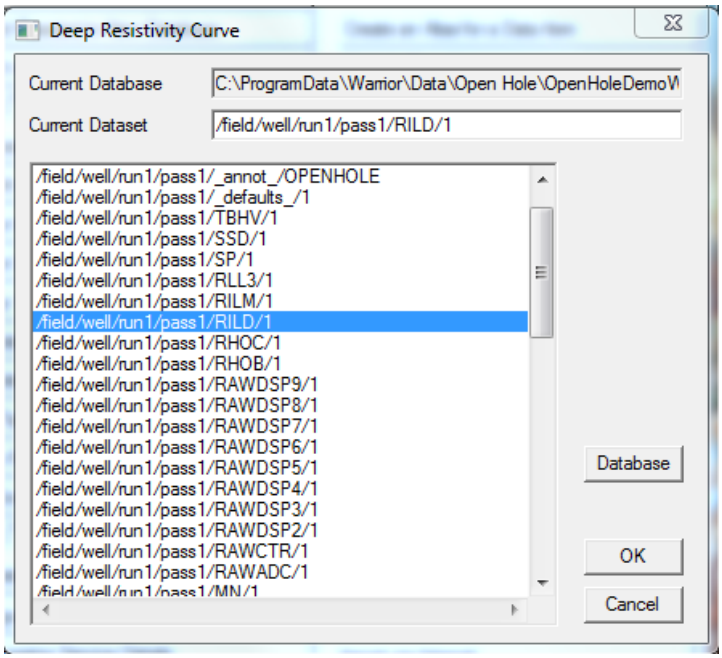


FIG: 12.2.31 Select Dataset for Deep Resistivity Curve

The system then requests the selection of the shallow resistivity curve.

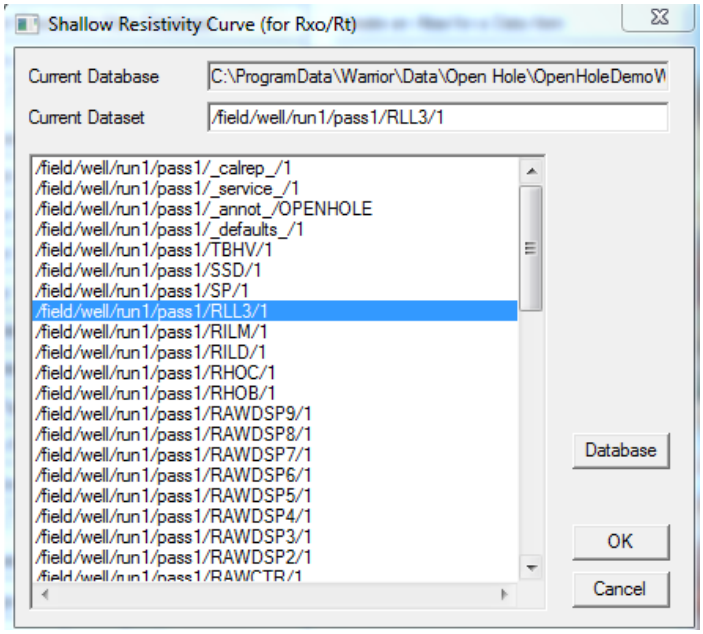


FIG: 12.2.32 Select Dataset shallow Resistivity Curve

The system then requests the porosity curve for the calculation of Rwa.

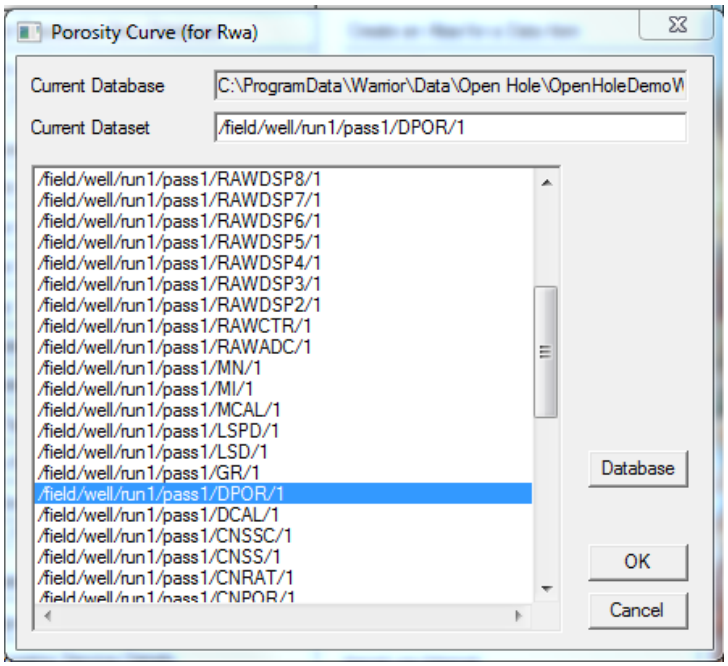


FIG: 12.2.33 Select Dataset for Porosity

Note that the “A” and ‘M” variables must be present in the dataset for Rwa to be calculated. To set the values of “A” and “M” use Edit Variables in a Dataset. After selecting the porosity curve the system requests the name of the dataset for the output.

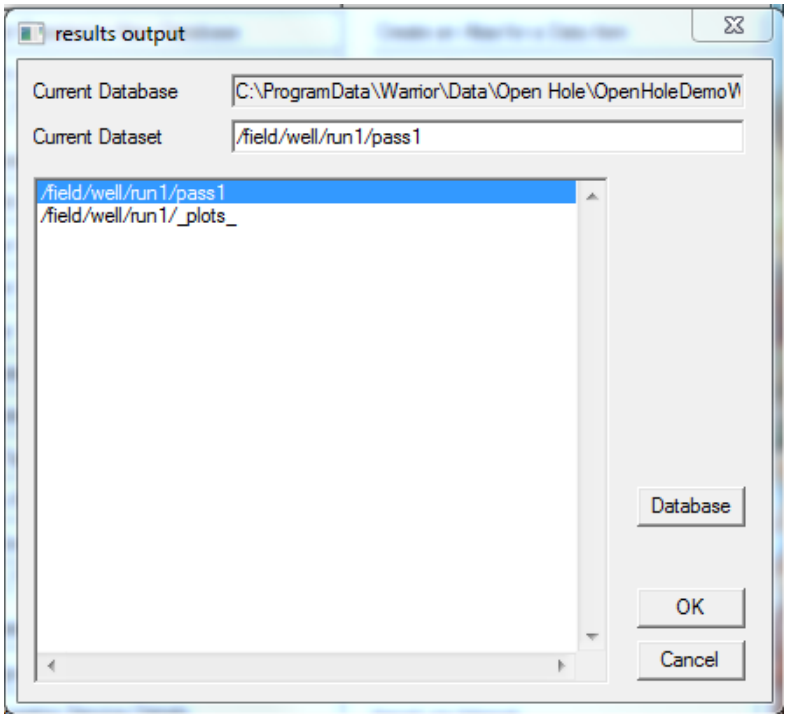


FIG: 12.2.34 Select Dataset Output

Select the required dataset and the system computes the Rxo / Rt and Rwa curves and displays a message indicating completion and log interval processed.

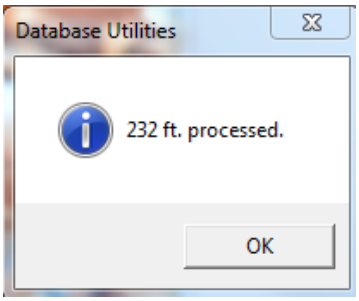


FIG: 12.2.35 Processing

Note that for the Rxo / Rt and Rwa curves to appear on the log, the respective curves must be added to the log format. The mnemonic for the Rxo / Rt and Rwa curves are RXORT and RWA respectively.

12.2.11 Pipe Tally

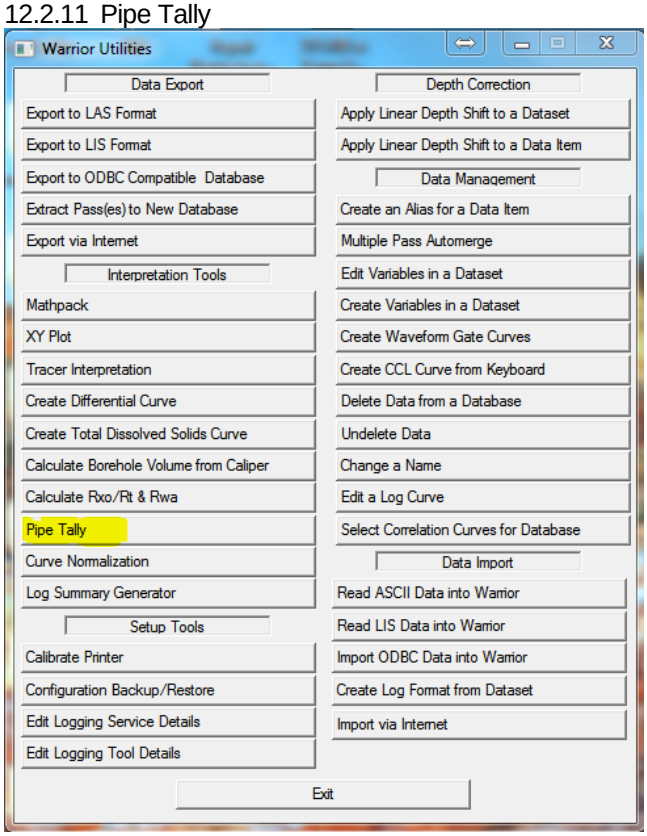


FIG: 12.2.36 Pipe Tally

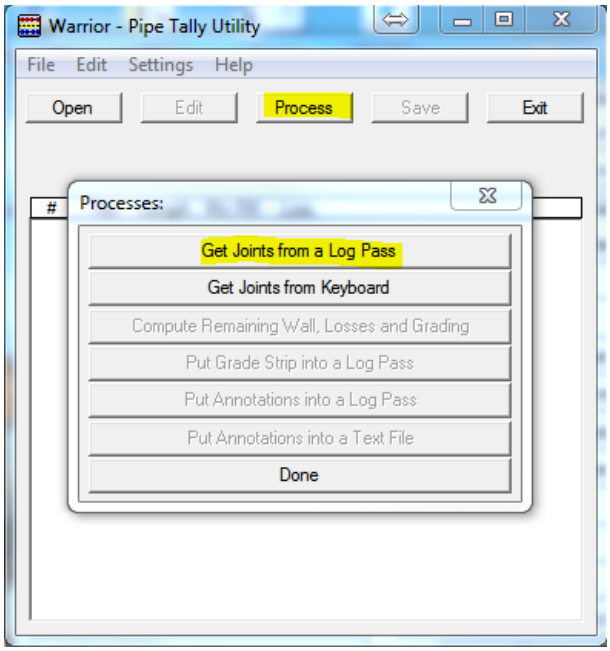


FIG: 12.2.37 Get Joints from a Log Pass

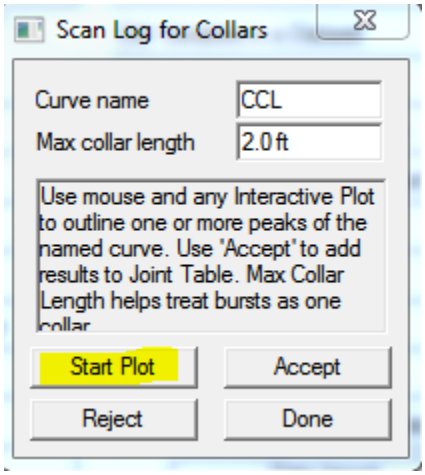


FIG: 12.2.38 Scan log for Collars

FIG: 12.2.39 Screen Plot

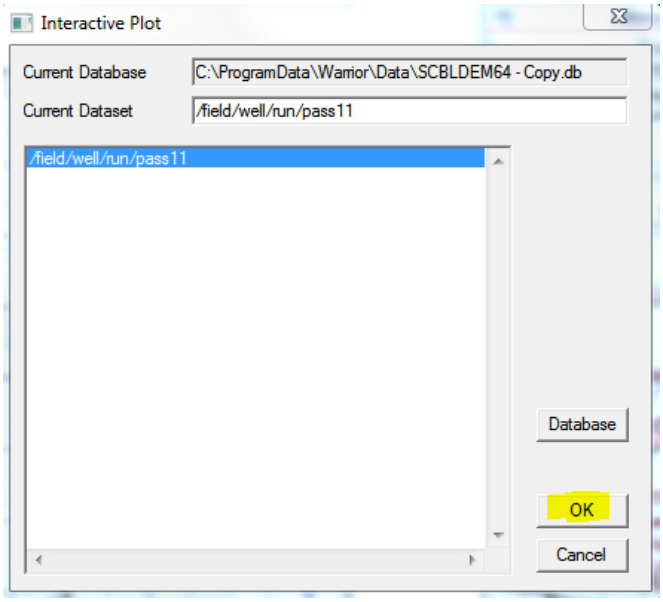


FIG: 12.2.40 Scan Pass

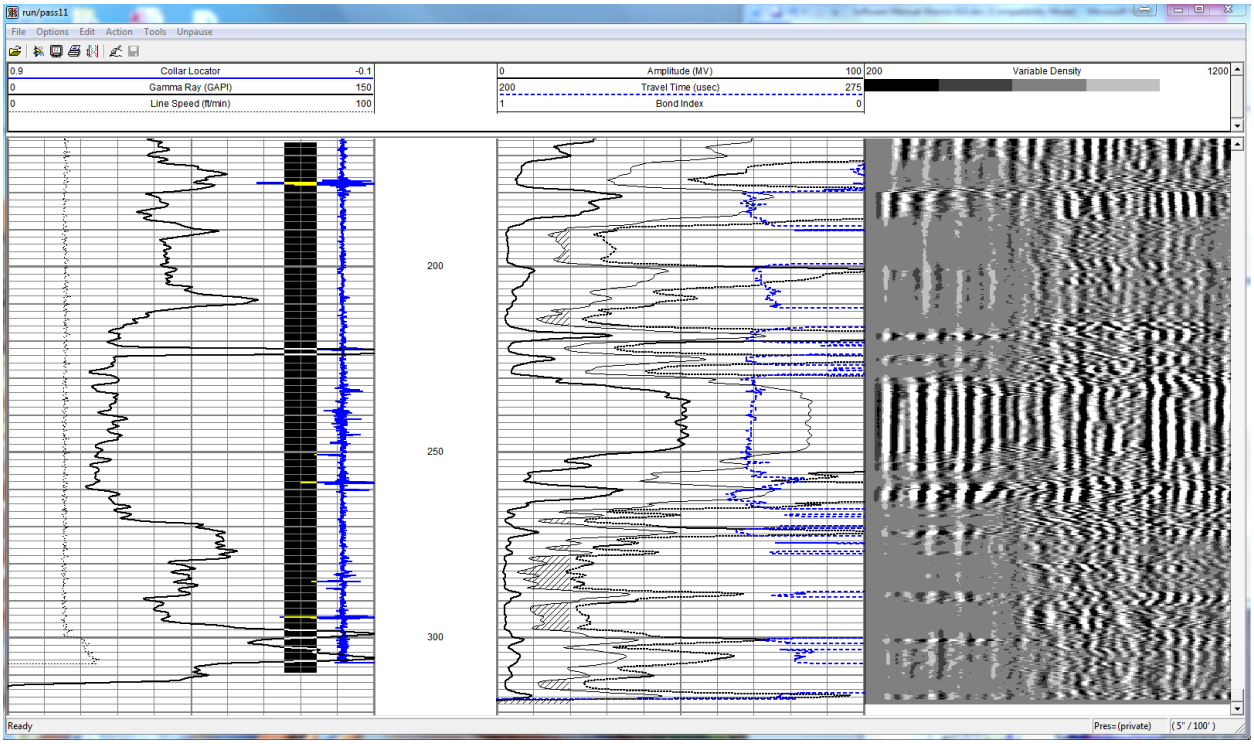


FIG: 12.2.41 Plot Pass and select area

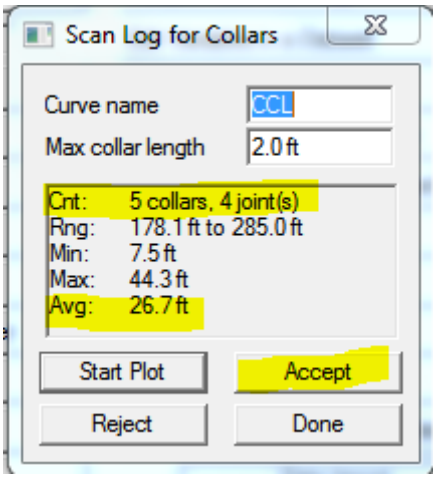


FIG: 12.2.42 Accept

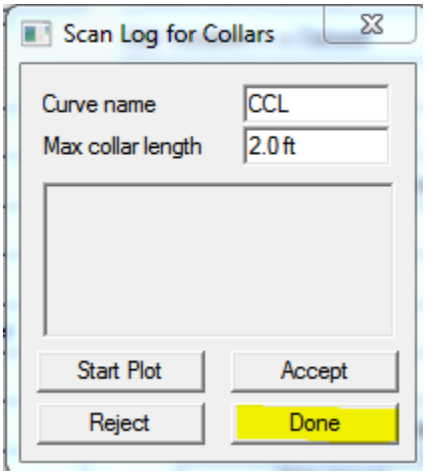


FIG: 12.2.43 Done

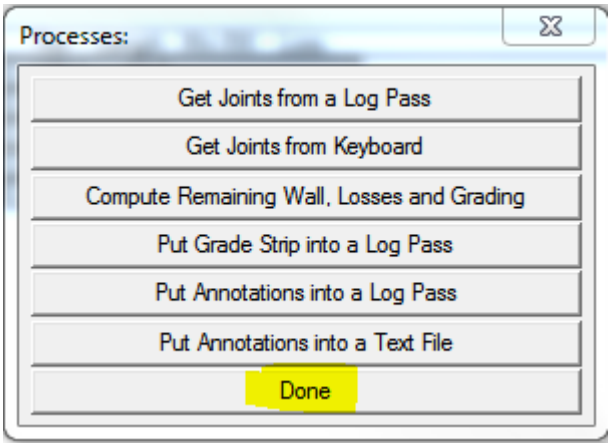


FIG: 12.2.44 Done

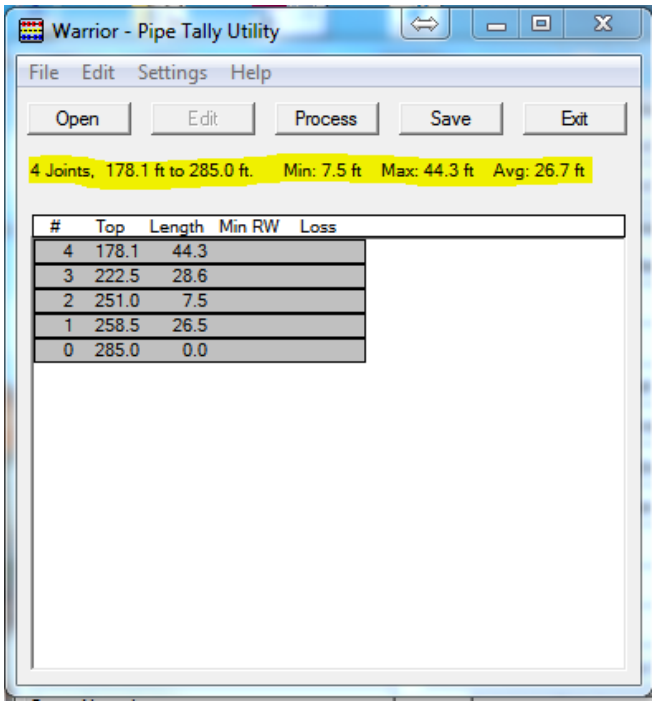


FIG: 12.2.45 Results

For a more detailed look at Pipe Tally as it relates to multi armed caliper see section 18.
18.1 Caliper Presentation

12.2.12 Curve Normalization

This program will cross plot two curves over a chosen interval. Then it calculates the gain and offset required to apply to the second curve (Curve to be normalized) to make it overlay the first (Reference curve).
Select the reference curve, then the curve to be normalized. Interactive plot should start with the reference log pass. You should be able to plot the curve to be normalized on that same pass - look in the progress window to see the name (alias) that was created for the normalized curve. From interactive plot you can drag a rectangle over the interval to choose the depth range for normalization. Once that is done, and then selects MakeXY. If you are satisfied with the data points in the XY plot, then select Normalize. Interactive plot will start again, but this time with the pass from the normalized curve. If you look in the progress window, another curve will have been created in the Normalized pass. That curve will be what the curve looked like prior to the normalization. The name should be the same as the normalized curve except preceded by a **'.'**, and the normalized curve will have the original name.

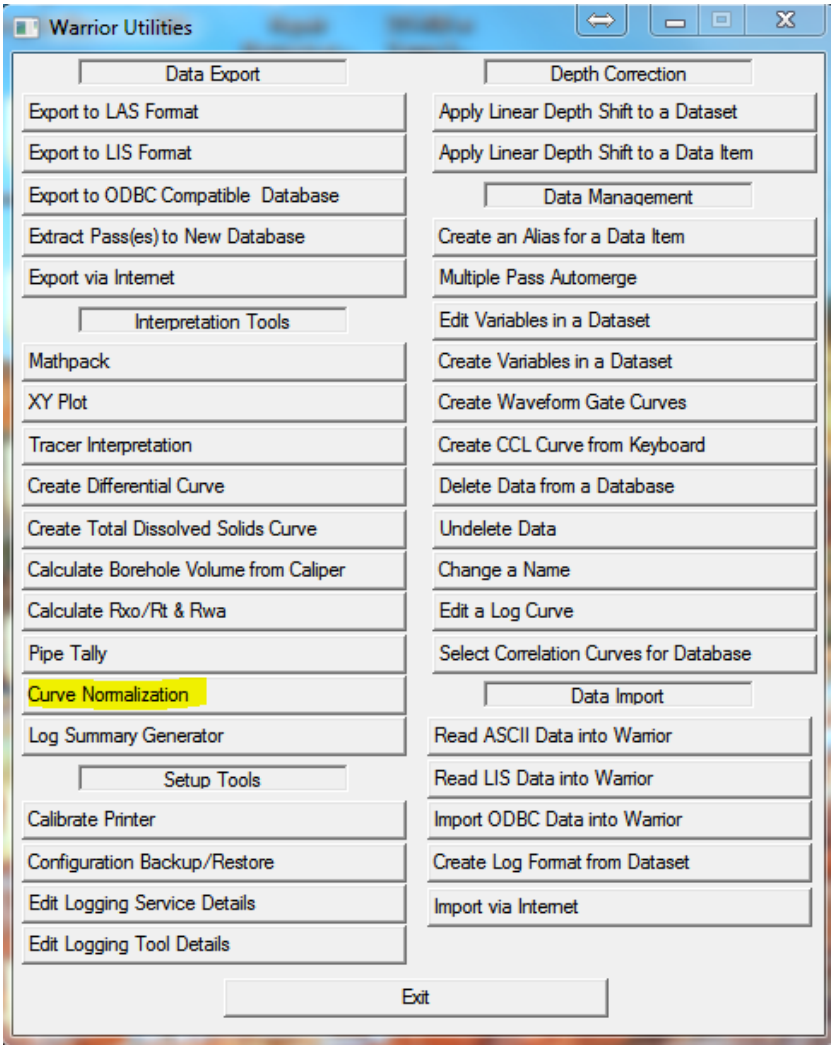


FIG: 12.2.46 Curve Normalization

12.2.13 Log Summary Generator

The log summary generator will produce a statistical analysis of tabular data in a database. There are radio buttons to select **Minimum, Maximum**, **Average** and **Standard Deviation**. The resultant table can is appended to the database and can be included in the plot job.

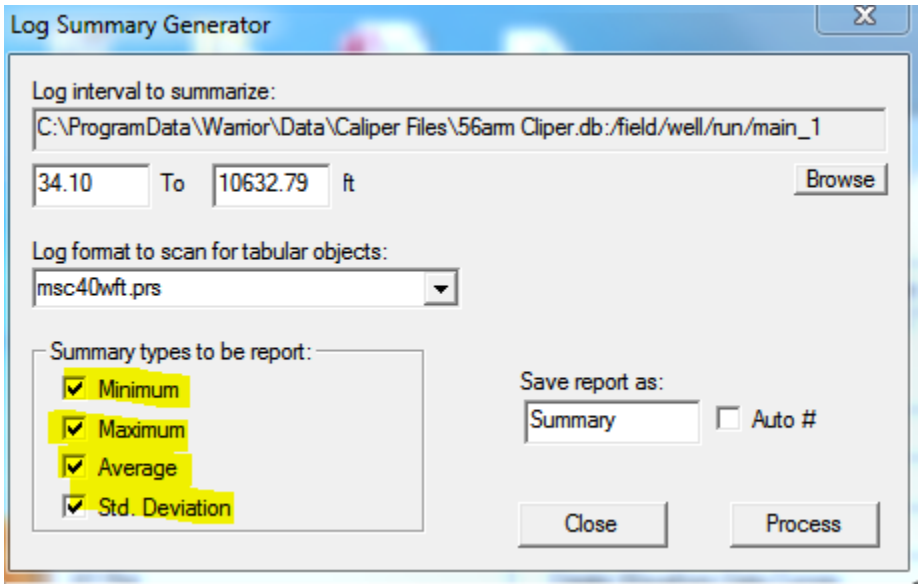
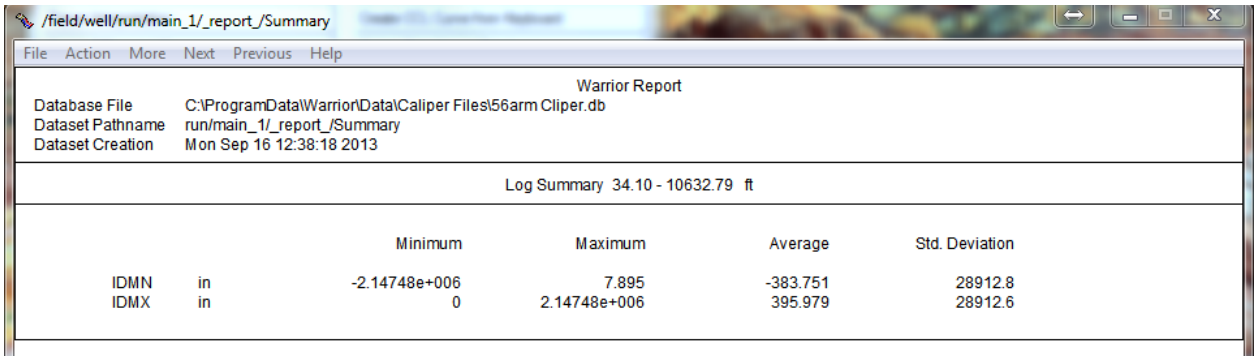


FIG: 12.2.47 Log Summary Generator



12.3 Data Import

12.3.1 Read ASCII Data into the Warrior (LAS)

In the Warrior System group, choose the database Utilities icon. The window shown below appears.
The ASCII Importer reads data from existing ASCII file(s) and writes the data to one or more Warrior well log database files.
Start the ASCII importer from the program group or Interactive Plot. The dialog and control box is presented as shown below.

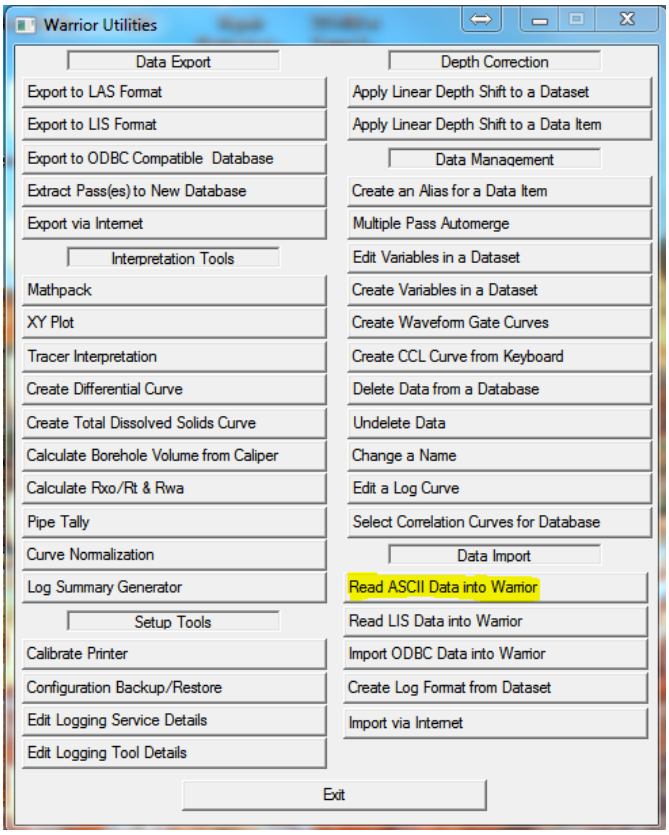


FIG: 12.3.1 Read ASCII Data into Warrior

The input files are selected by clicking the Add Files button. This produces a file selection box as shown below.

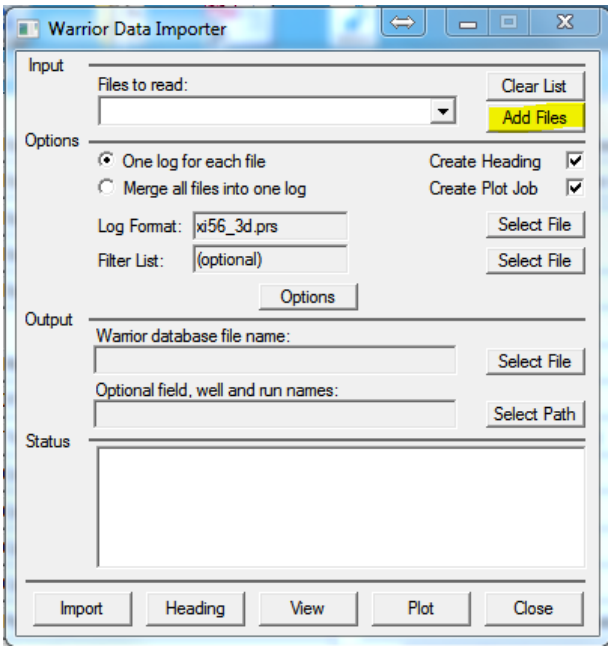


FIG: 12.3.2 Input File to Read

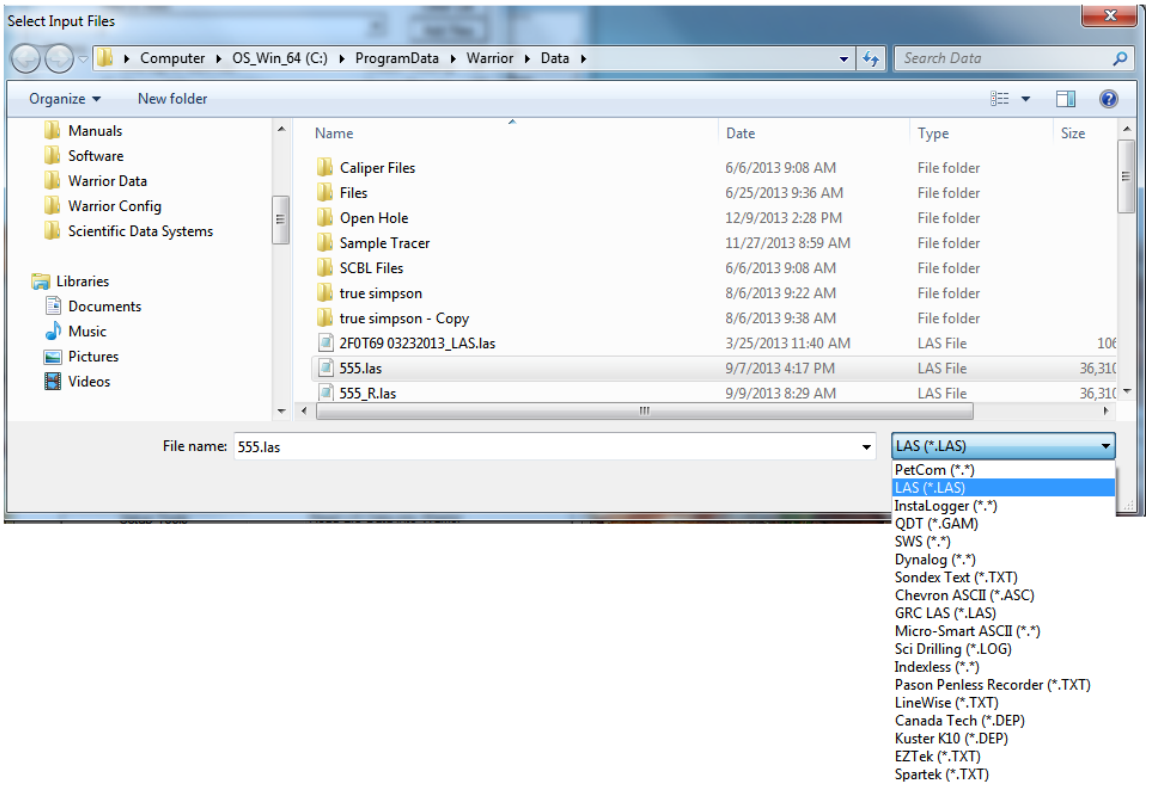


FIG: 12.3.3 Select the ASCII File Type

The importer will automatically import several common ASCII file types. Clicking on the Files of type selection displays the various ASCII formats handled. Select the type to be imported.
If the ASCII file format to be imported is not displayed here, contact SDS.

Select the required ASCII files in the normal way and click Open.
The selected files may be viewed by clicking the button in the Files to read: field. The selected files may be cleared by clicking the Clear List button.
In Options Clicking the One log for each file radio button generates a warrior log pass for each ASCII file selected.
Clicking the Merge all files into one log button merges all the selected ASCII files into one log pass. If the ASCII files contain curves of the same name, the importer will automatically add a numerical subscript to the duplicate curves according to the order they appear in the Files to read: list.
The default presentation file for the new log pass is entered in the Log Format field by clicking the corresponding Select File button.
The filter list file has the default extension .wif. It may be selected by clicking the corresponding Select File button.
Checking the Create Heading selection causes the importer to create a log heading file based on any available information from the ASCII input file(s). If no information is available, it will create a blank heading in the new database.
Checking the Create Plot Job selection causes the importer to create a default plot job based on the log heading (if any) and the imported log passes.

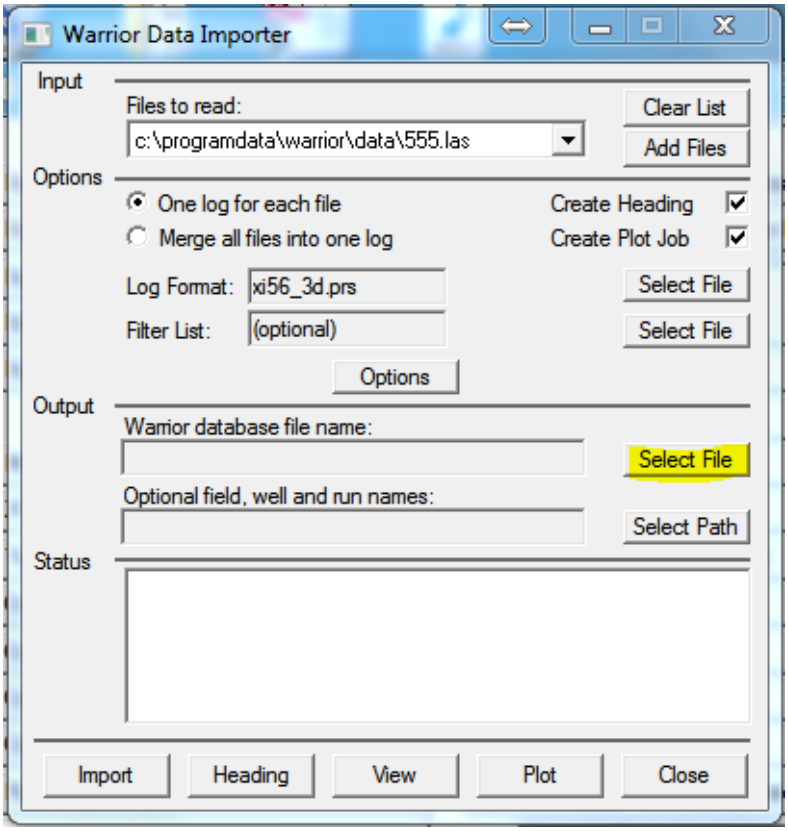


FIG: 12.3.4 Select File

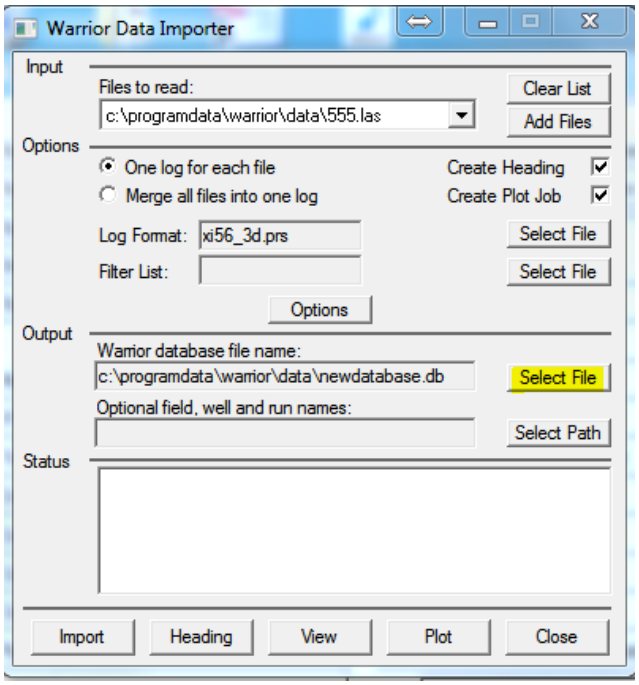


FIG: 12.3.5 Setup Warrior data Importer

If required, the curves may be filtered during the import process. An ASCII text file must be created in the \warrior\bin directory and consist of a list of filter definitions like those used in the tools.ini file to define default filters

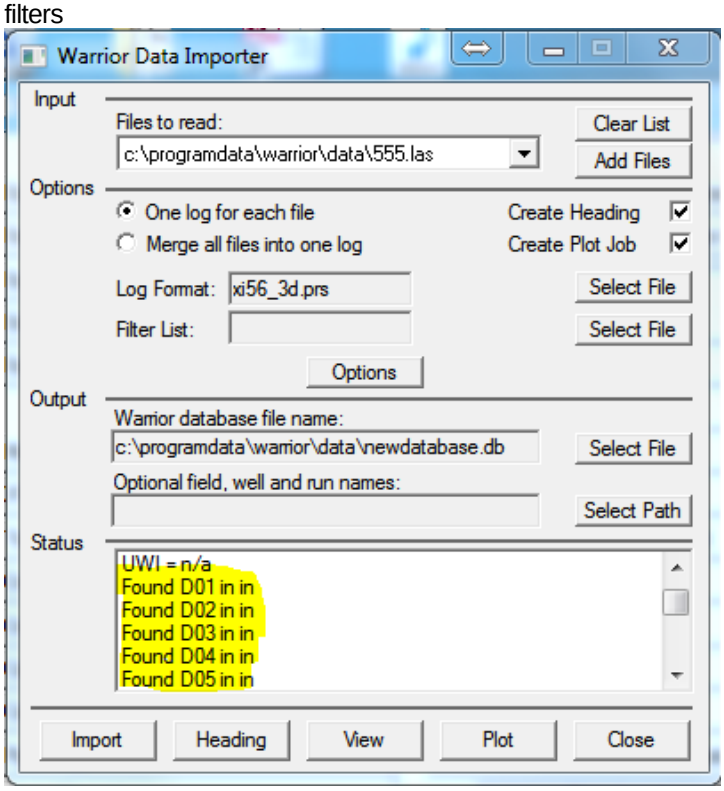


FIG: 12.3.6 Start to select the curves

If a curve is found with units that warrior does not recognize you will be prompted to select the appropriate units along with a radio button to select weather the unit referenced should be save for future imports.

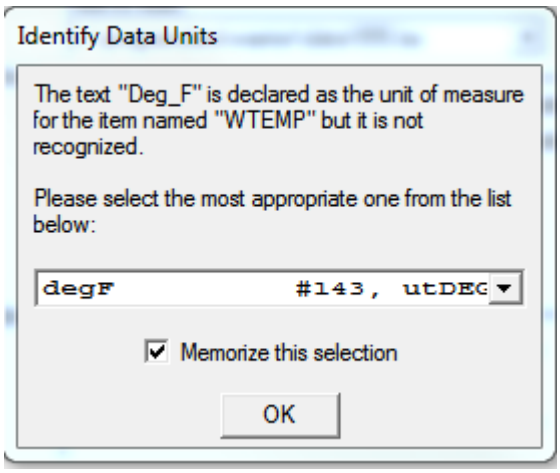


FIG: 12.3.7 Identify Data Units

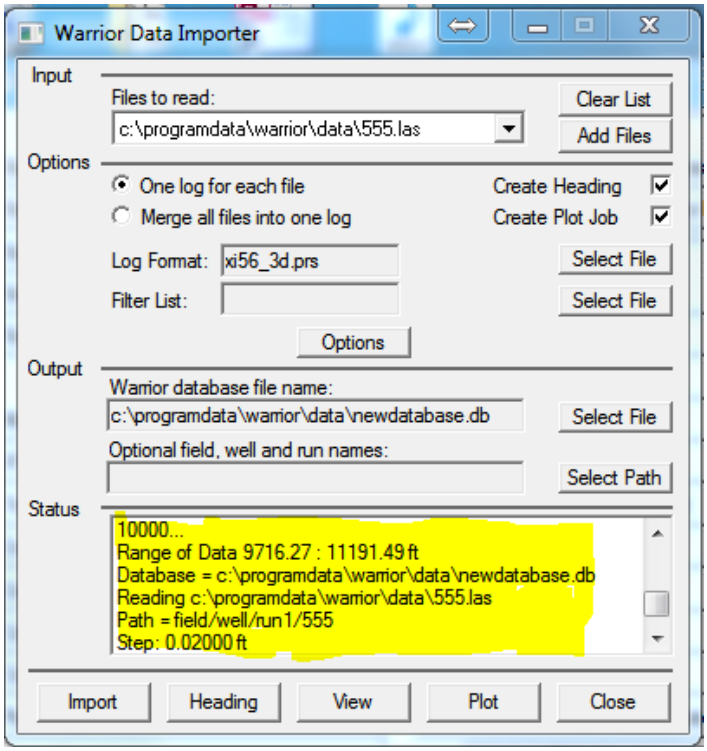


FIG: 12.3.8 Reading the ASCII and convert to DB

The status window displays a log of the importing operations.
Having made the various selections and chosen the required options the importer may be run by clicking the Import button. The importer will read the selected ASCII files and display the status.

Clicking the Heading button starts the Heading Editor program and displays the heading generated by the import process. If Create Heading was not selected a blank heading will be presented.
Clicking the View button starts the Interactive Plot program for screen display of the results of the import process.
Clicking the Plot button starts the Plot Job Editor program with the plot job generated during the import process (if any). If Create Plot Job was not checked a blank plot job is presented.
The Close button closes the Importer program.

12.3.2 Read LIS Data into the Warrior

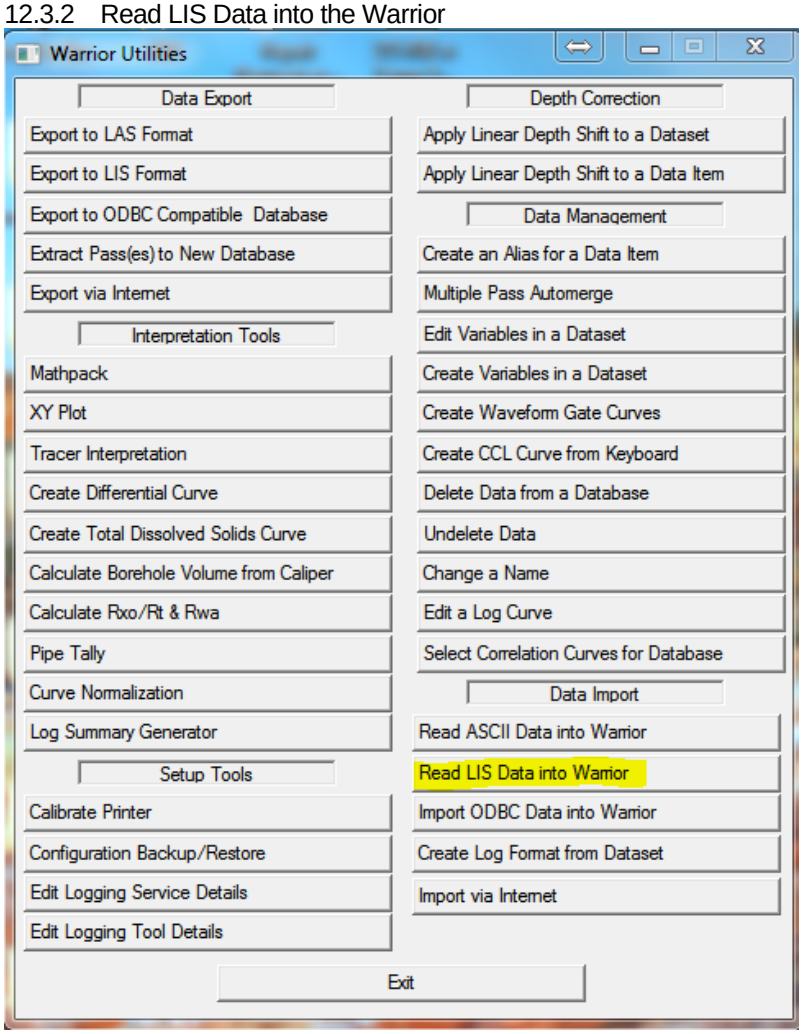
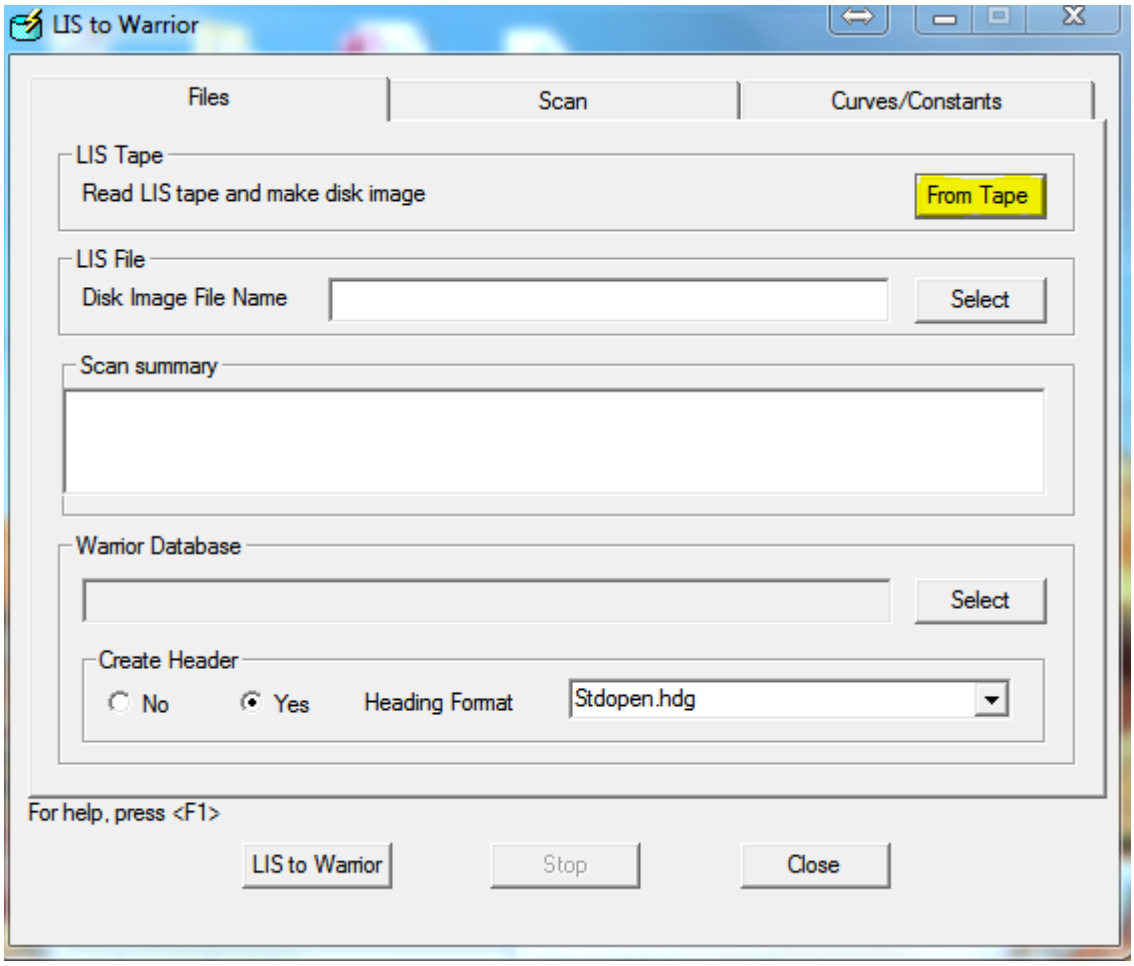


FIG: 12.3.9 Select Read LIS Data into Warrior

If you are using a tape it must be copied to a disk file before it can be read in to a Warrior database. Select 'From Tape' and then select the tape drive and the output file name. Once that is completed, select OK to copy the data to a file. Once the data is read to a file, then a scan or conversion can be done.



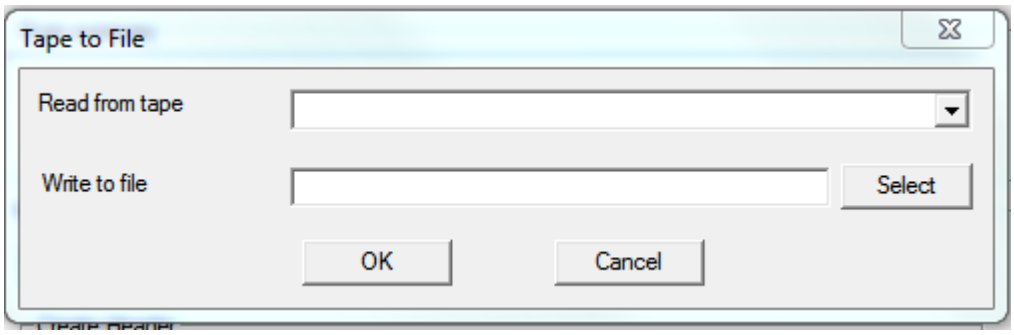


FIG: 12.3.10 Tape to file conversion

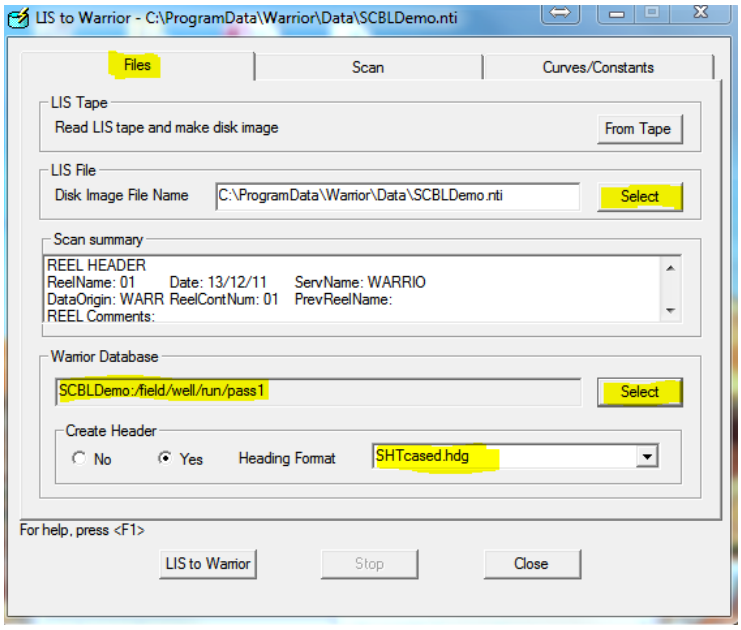


FIG: 12.3.11 Select LIS file

When opening the LIS, the default extensions will be shown on the lower right hand side of the open file dialog.

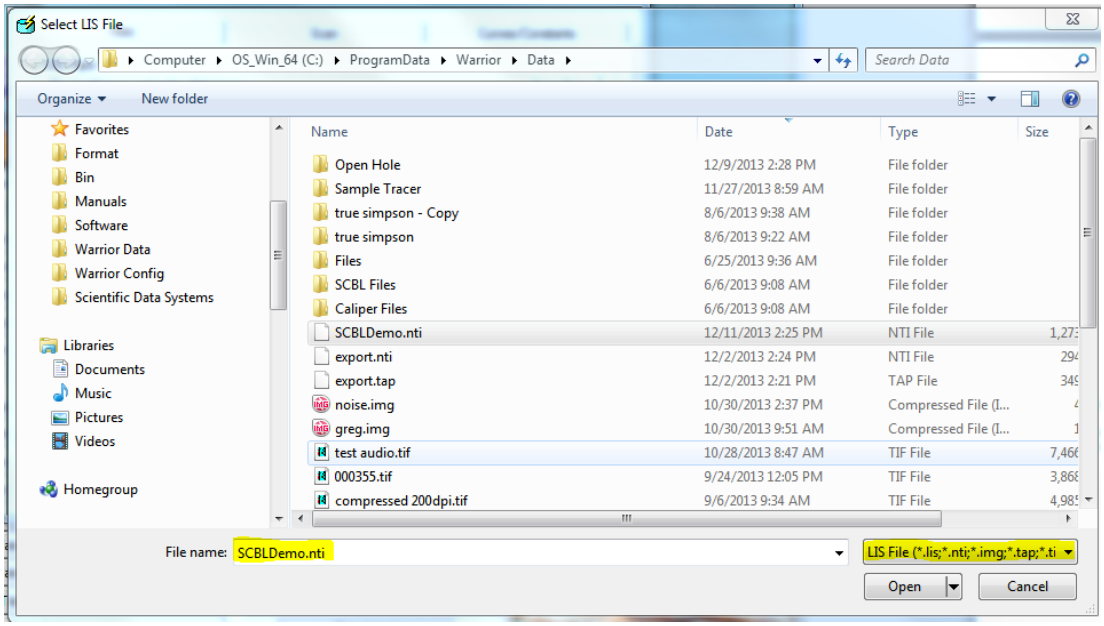


FIG: 12.3.12 SCBLDemo.nti File

Once you have selected an input file and an output database you can scan the LIS file.
The scan dialog has an optional radio button to save the scan as a text file.

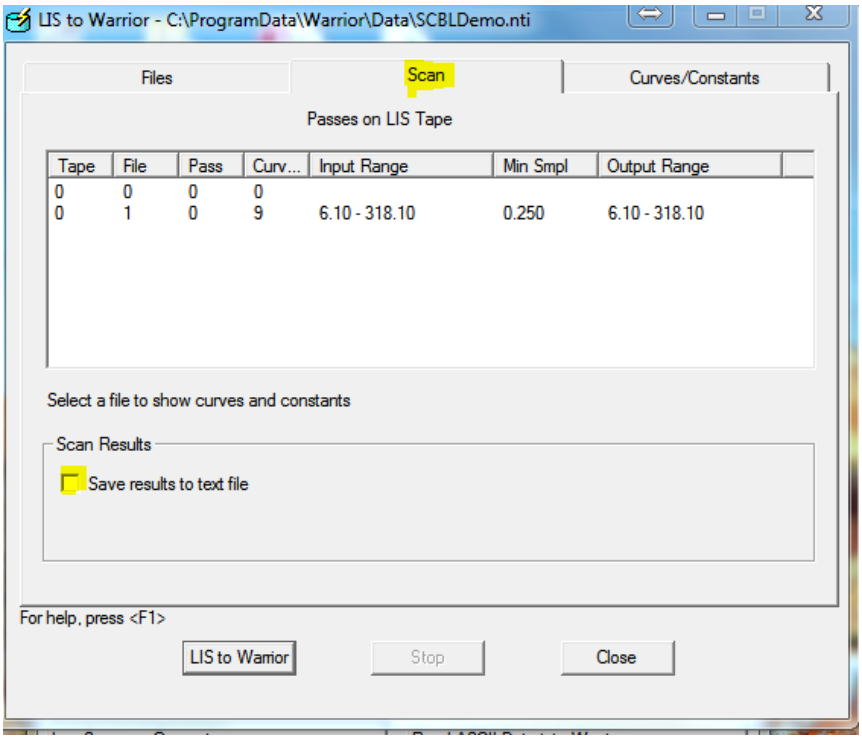


FIG: 12.3.13 Scan

Once you scan your file then select Curves/Constants. Here you can change the LIS Mnemonic to a Warrior Mnemonic. This way you can use your standard presentations, if you make a change here it will be stored by the system so that the next file will have the edited mnemonics. Double clicking on any of the curves will bring up the mnemonics editor. At this point you can also select whether to output the curve to the database.

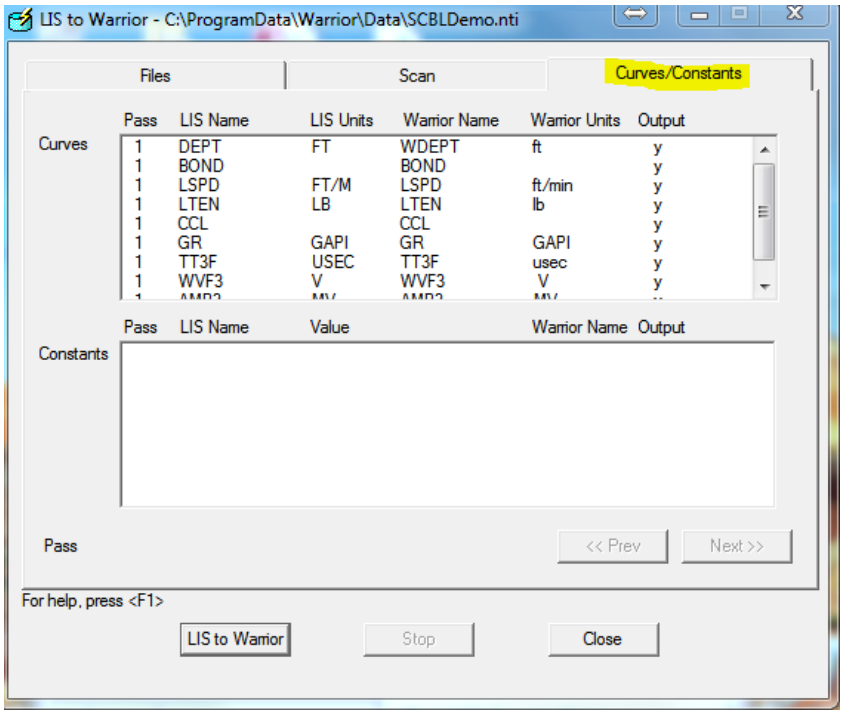


FIG: 12.3.14 Curves/Constants

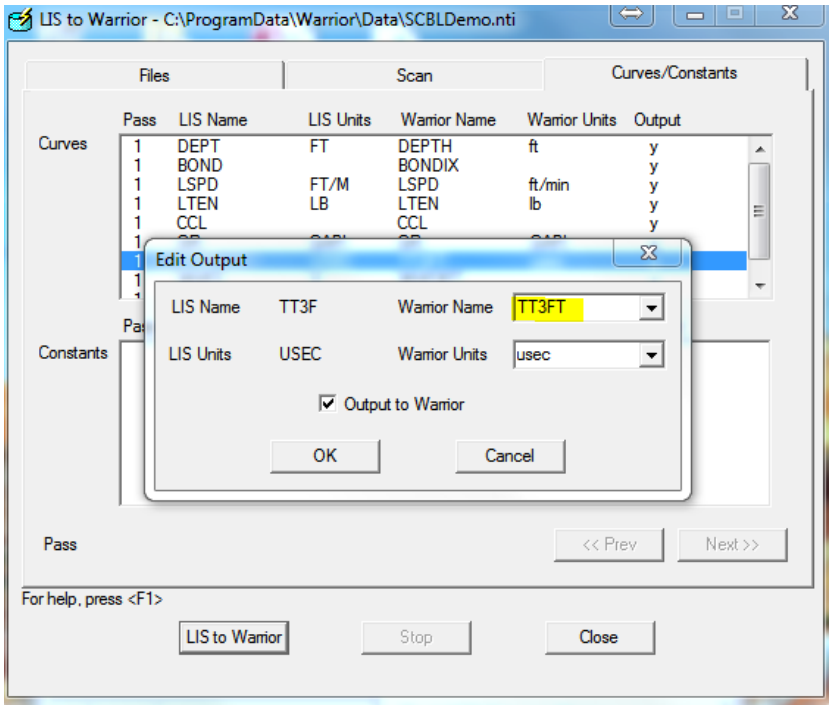


FIG: 12.3.15 Mnemonics Change

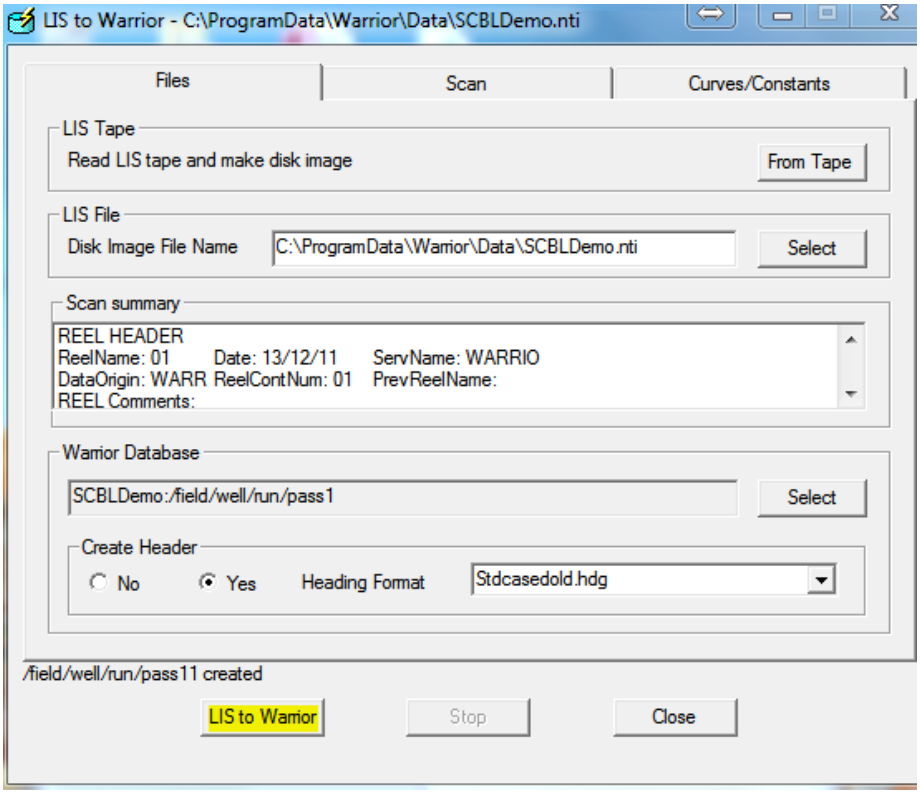


FIG: 12.3.16 Convert List to Warrior

The destination database file name does not have to exist, but the specific run given for the destination cannot exist. For any LIS passes greater than the first pass, the LIS pass number will be appended to the output Warrior database pass name to create a unique Warrior name for each pass.
If a header is requested, then the heading information will be filled out based on the type of heading chosen. The heading that is chosen will affect the list of available heading names shown when editing constants from the Curves/Constants dialog. The heading that is created will go to /[field]/[well]/[run]/_plots_/_headings_/1. Only one heading is allowed per /[field]/[well]/[run]/. Therefore, if a database is created from a LIS file with multiple passes, only the heading information from the first pass will be used to create the heading

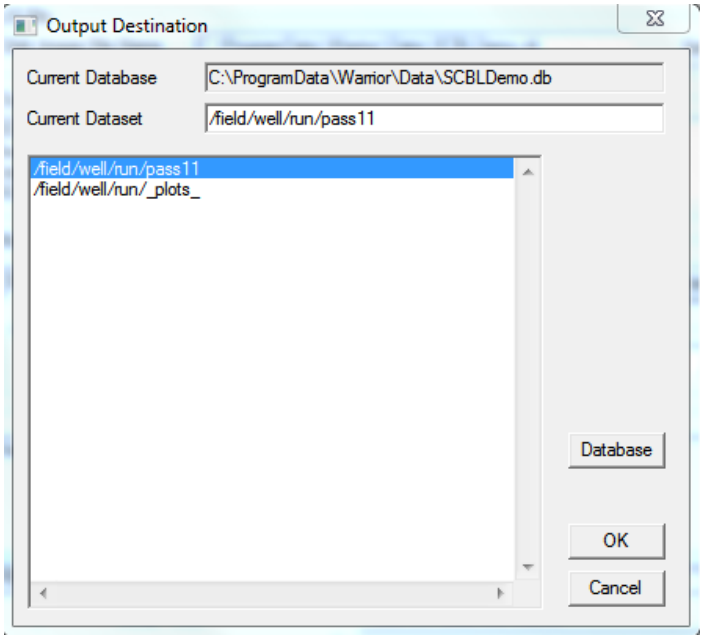


FIG: 12.3.17 Output

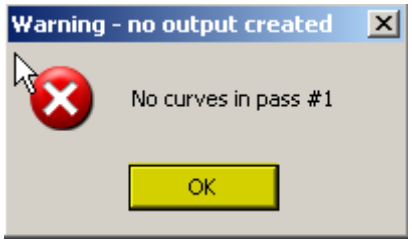


FIG: 12.3.18 Header not Output Curves

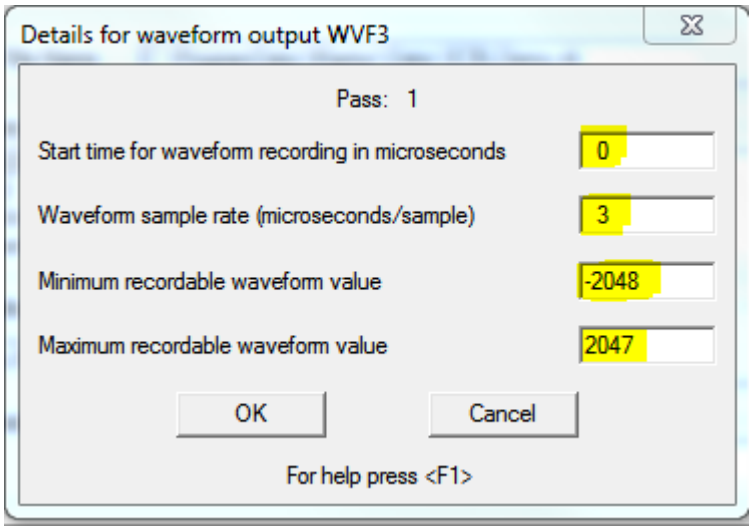


FIG: 12.3.19 Setup Output Details

More Information Required for Waveform Data
The top line of the dialog contains the pass number and name from the LIS tape.
The start time for the waveform is the number of microseconds that elapsed prior to the beginning of recording the waveform.
The waveform sample rate is the total sample interval (in microseconds) divided by the total number of samples taken.
The minimum and maximum recordable waveform values are required for scaling the waveform plot properly. For example, a 13 bit-sampling device may have a range of values from –2048 to +2047.

12.3.3 Import ODBC Data into Warrior
This program will import data for Excel, Access, and other ODBC compatible databases. The limit for exporting data is 255 data points per sample. A normal curve is one data point, but a waveform will be many more points for each sample. You will see a message in the progress window that the column count has exceeded if you exceed that amount. The Import ODBC to warrior opens the same executable as the export to ODBC but in the Import tab.

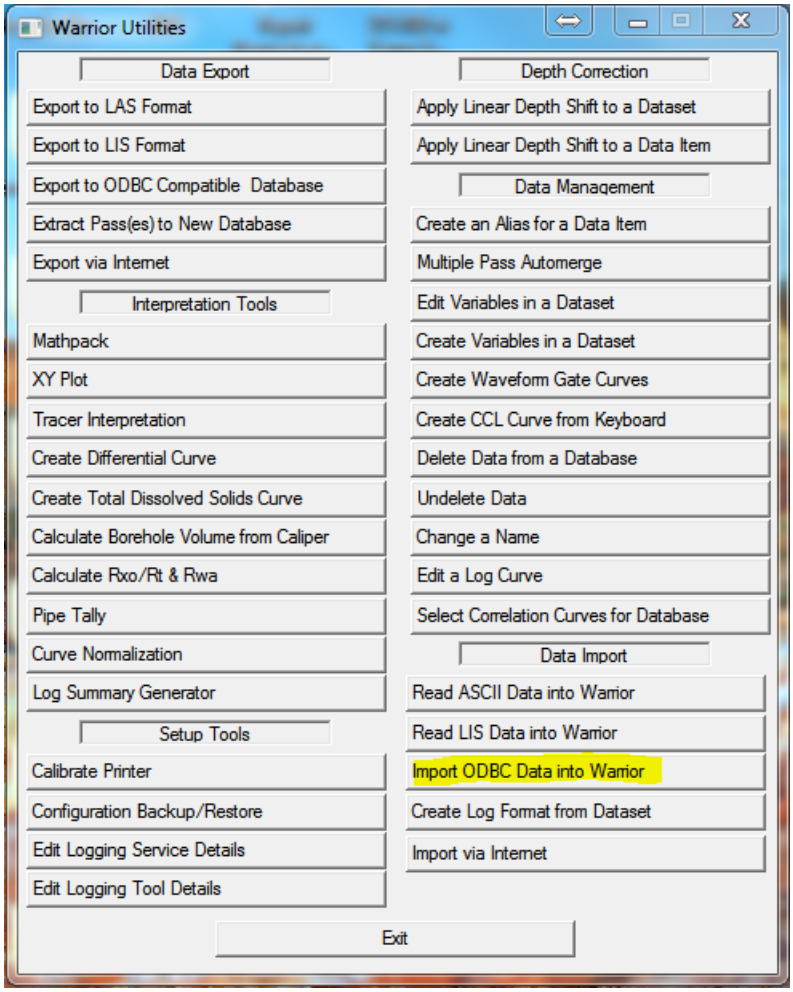


FIG: 12.3.20 Import ODBC Data into Warrior

The Import ODBC to warrior opens the same executable as the export to ODBC but in the Import tab.

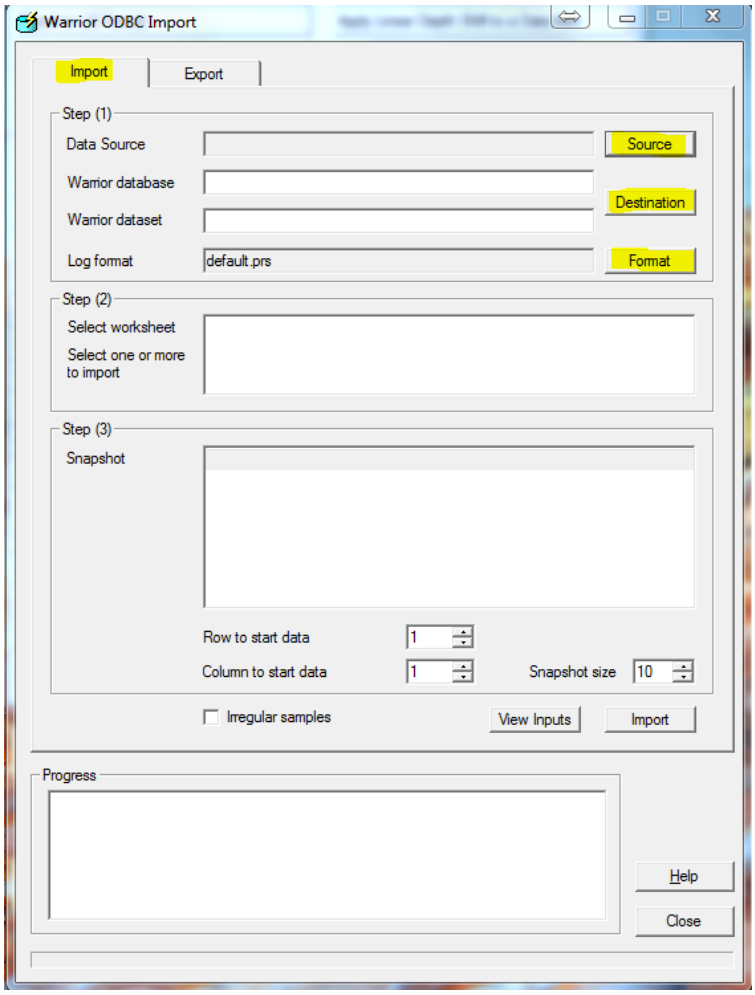


FIG: 12.3.21 Import ODBC Data Dialog

From here you can select the source Destination and presentation.
When you select source the select data source window will open from here you can select either dBase, Excel or MS Access. There is a new button that can be used to import another ODBC Type, unless you need one that is not listed you should not need this option. There is also a tab for File Data Source, unless you are using a server to retrieve you file you should not need this option.

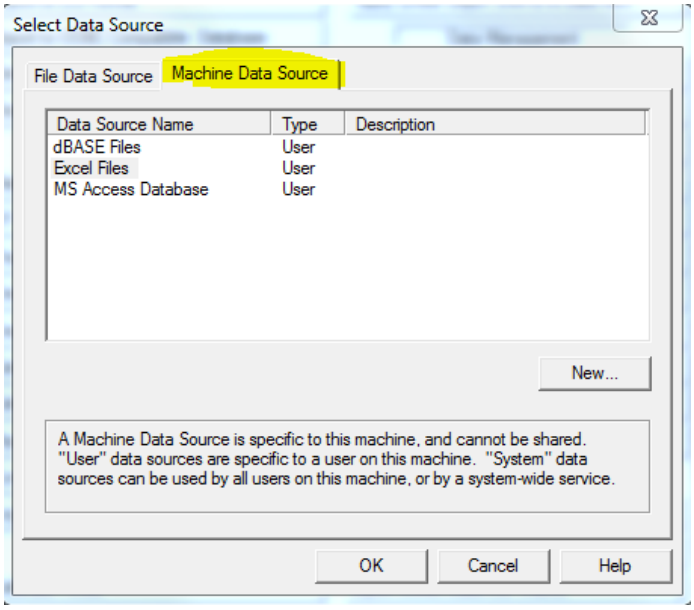


FIG: 12.3.22 Machine Data Source

Once you select Ok the Select Workbook or another dialog will appear. Select your file that you wish to import and click OK.

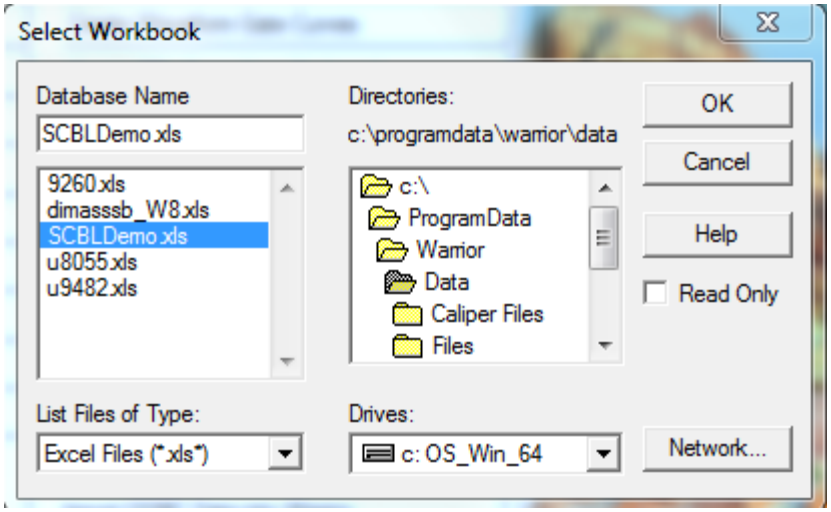


FIG: 12.3.23 Machine Data Source

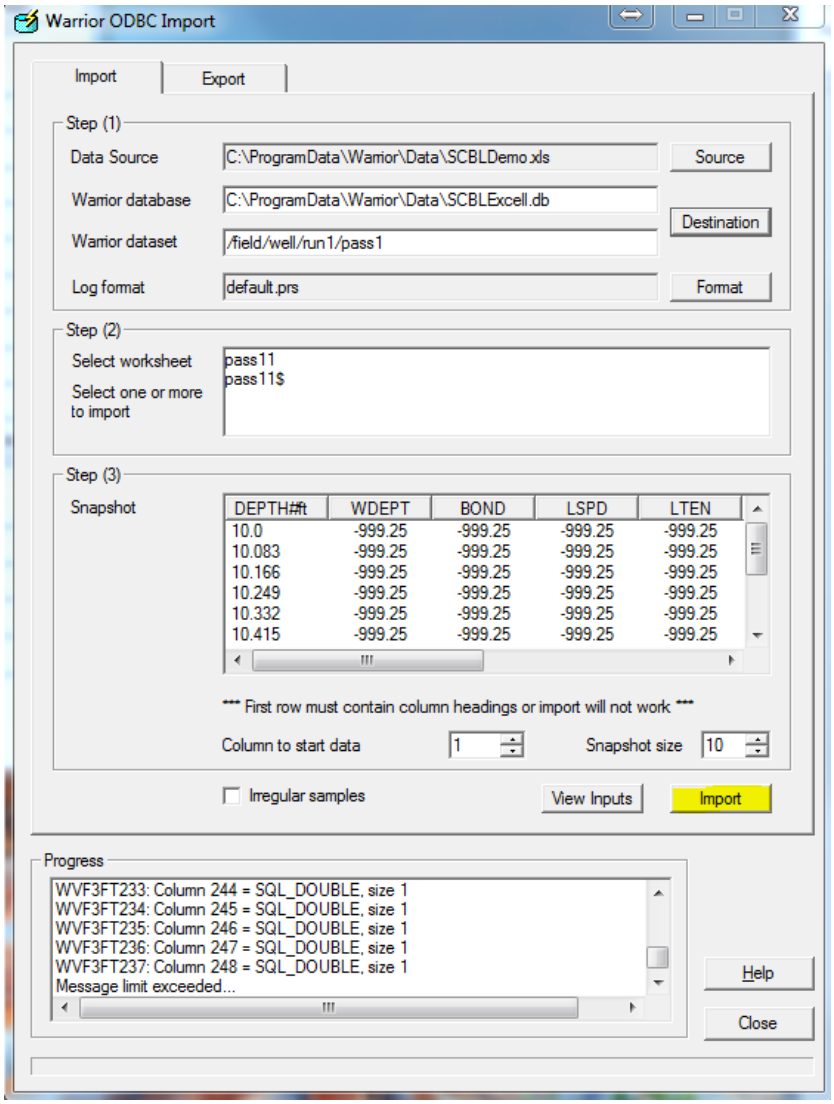


FIG: 12.3.24 Importing File Data

12.3.4 Create Log format from Dataset

This utility will allow you to create a presentation file from a log pass.

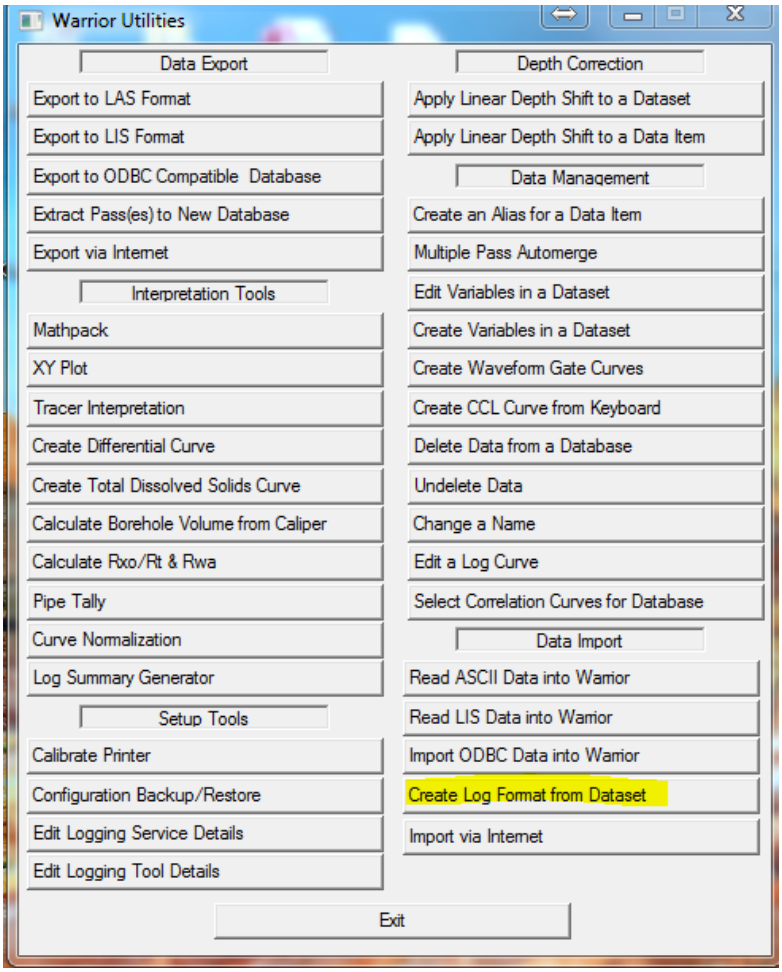


FIG: 12.3.25 Create Format from Dataset

Select the pass that has the desired embedded format you wish to save.

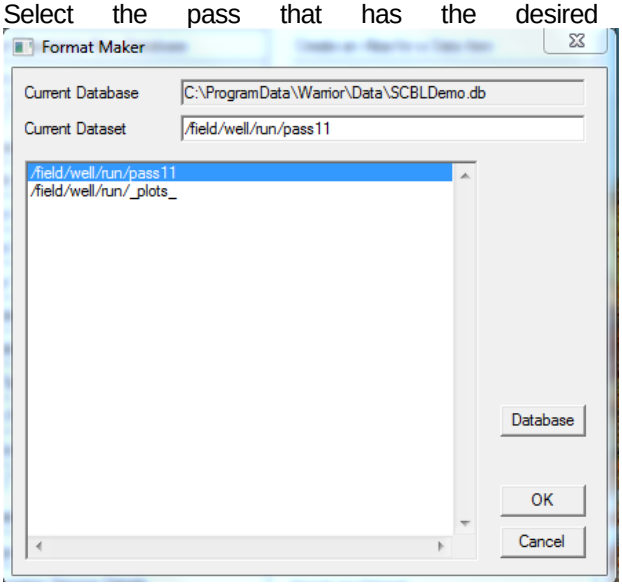


FIG: 12.3.26 Create Format from Dataset

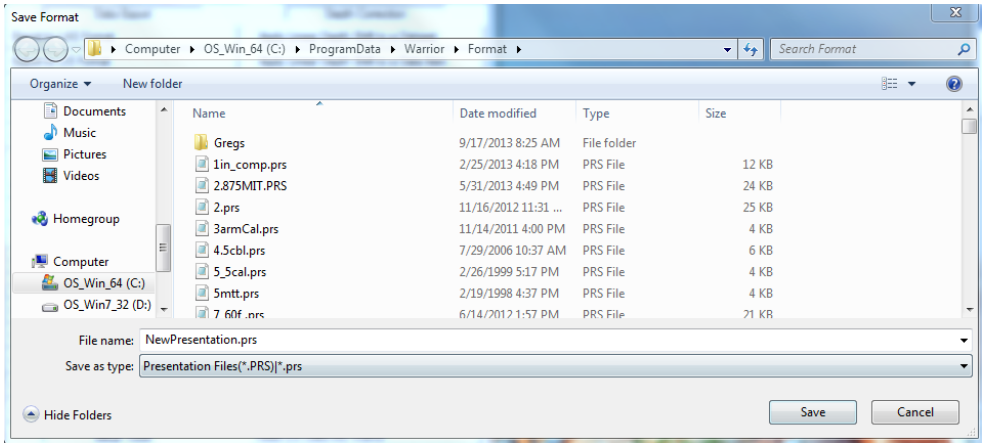


FIG: 12.3.27 Select new presentation name

12.3.5 Import VIA Internet

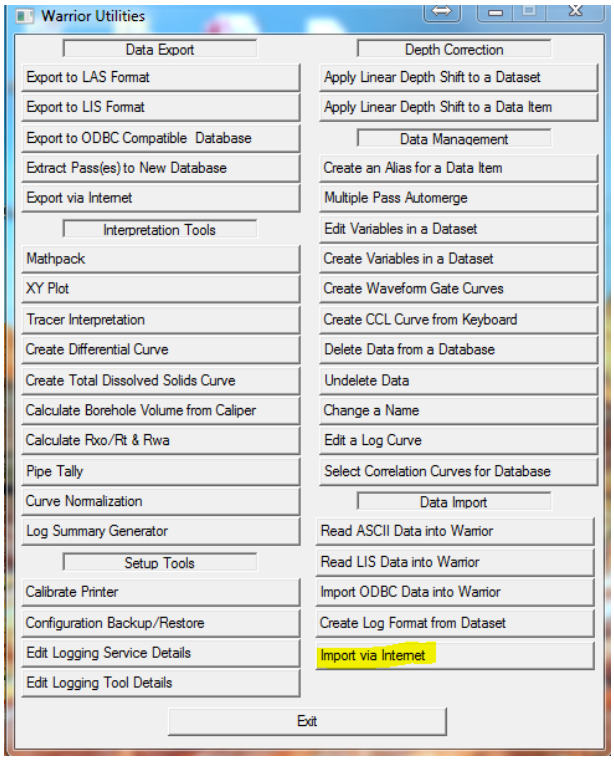


FIG: 12.3.28 Import via Internet

You can receive a saved data base or a real time database with the Import via Internet function.
You will need the IP address of the sending computer and the port if different than the default the port number.

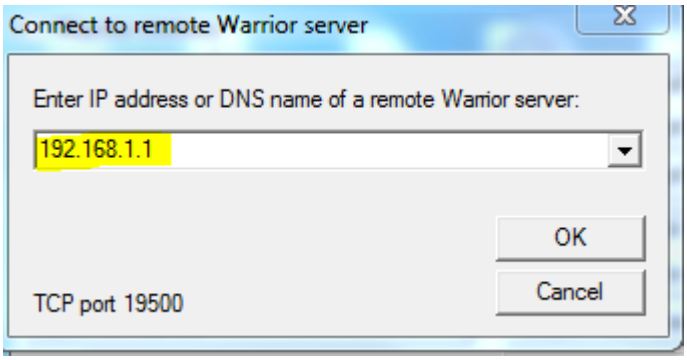


FIG: 12.3.29 IP address and Port setting.

12.4 Depth Correction

See Interactive Plot Section 7

12.5 Data Management

12.5.1 Create an Alias for a Data Item

Clicking on this button brings up a dialog box, which allows a data item, typically a curve from a log pass, to appear as though it were present in another (different) log pass. This allows curves and other data items to be effectively merged to other datasets, without using the Merge program or creating new merged log passes. Essentially a form of link is defined in the database(s) that allows application programs (such as Interactive Plot) to access data items from datasets other than the dataset currently selected.
In the Warrior System group, choose the Utilities icon.

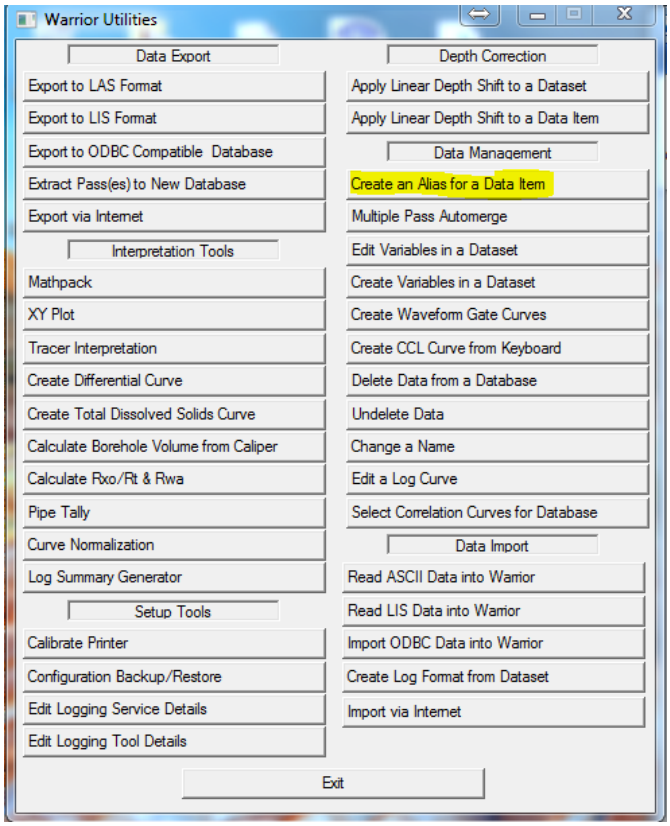


FIG: 12.5.1 Select Create an Alias for a Data Item

Click on the Create an Alias for a Data Item button. A dialog box will appear as shown below:

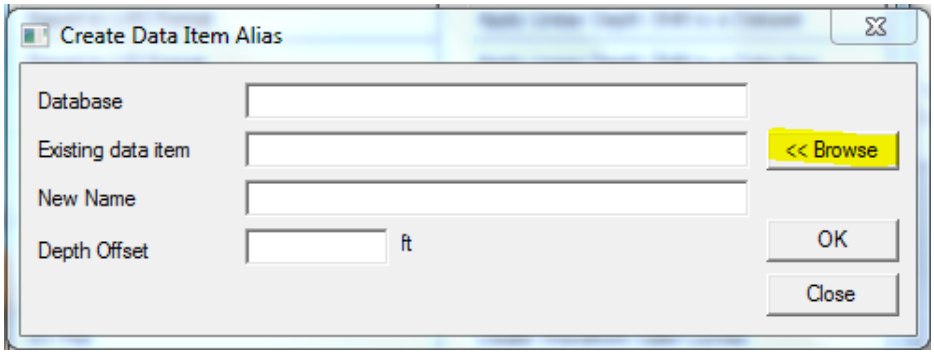


FIG: 12.5.2 Browse DataBase

Click the Browse button and select the database file, then the dataset (log pass) and finally the data item to aliased. In the case shown below the curve GR has been selected from pass12 of the cbldemo.db database.

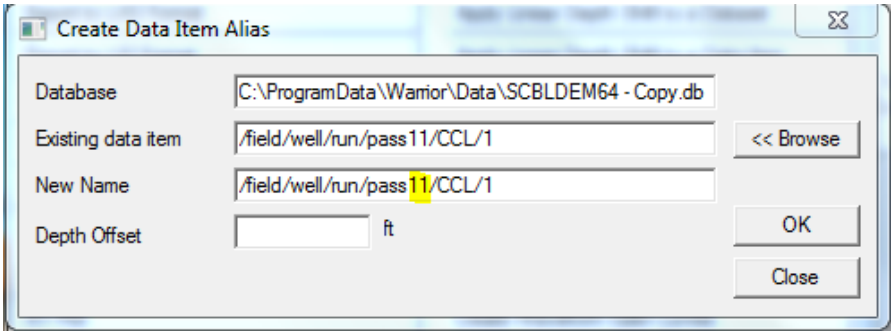


FIG: 12.5.3 Create data Item Alias

This is the database item to be aliased to another pass.
In the New Name for item field replace any or the entire data item path. For example, if we want this CCL curve to appear in pass1, we type over pass11 with pass1, as shown below:

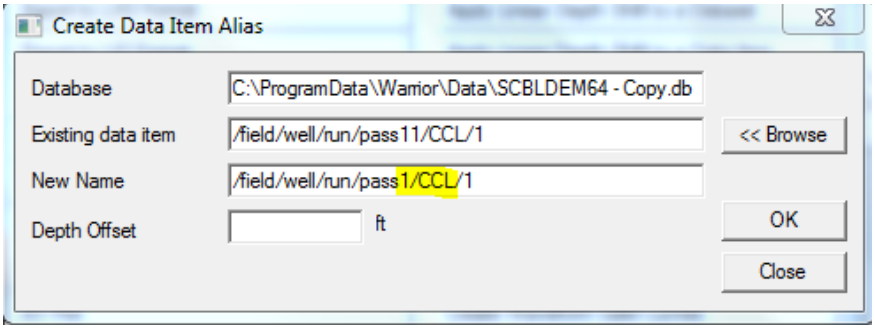


FIG: 12.5.4 Create Pass1

The OK button is clicked and the CCL curve from pass11 will now appear in pass1. If a curve with the same name already exists in pass1 then the program will give a message indicating that this is the case and the alias will not be performed. The easiest thing to do in this case is to rename the CCL curve to something else (which does not already exist in that pass) e.g. CCL2.

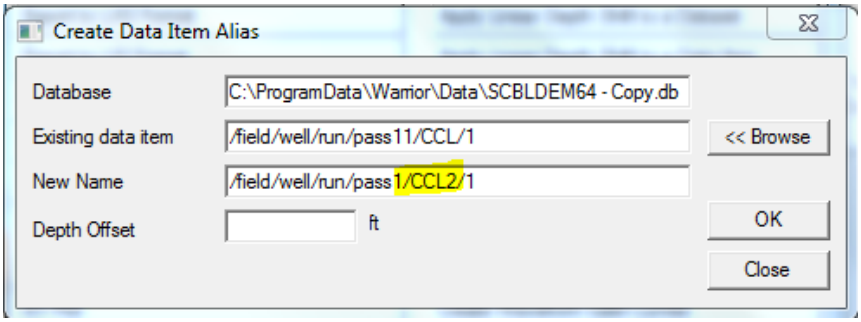


FIG: 12.5.5 Create CCL2 Curve

Clicking the OK button will now alias the pass12 CCL curve to pass1 as CCL2. Note that if you now wish to plot this curve it will be necessary to include a curve called CCL2 in the presentation file with which the pass will be plotted.
Note that a linear depth offset may be applied to the data item as it aliased, so if the curve is not depth aligned with the other data in the destination path, it may be corrected at this point.
Note also that no new log passes are created in this process and the size of the database(s) remains the same. This is very important when wishing to present waveform data from several passes simultaneously, as large amounts of data would otherwise be created.

12.5.2 Multiple pass Auto merge

FIG: 12.5.6 Multiple Pass AutoMerge

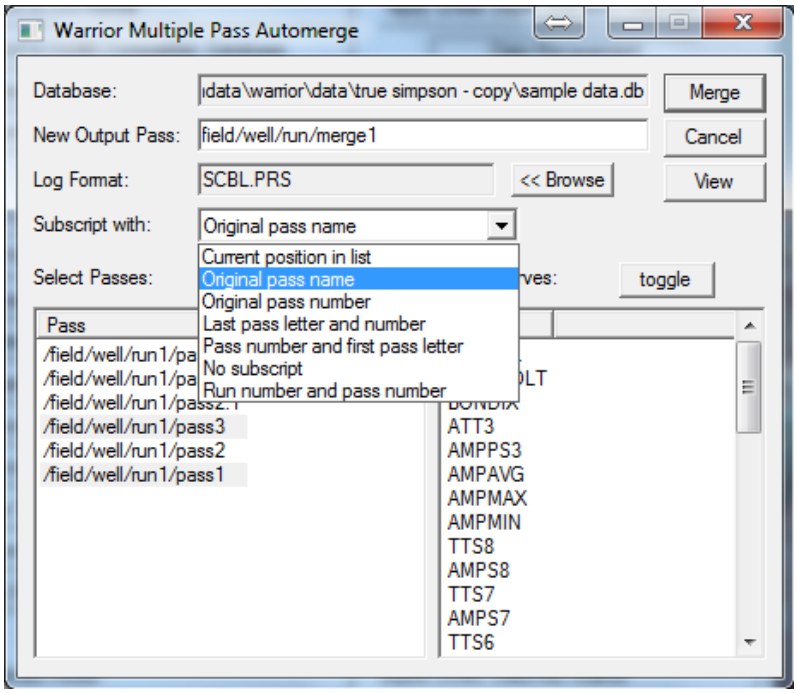


FIG: 12.5.7 Multiple Pass Automerge

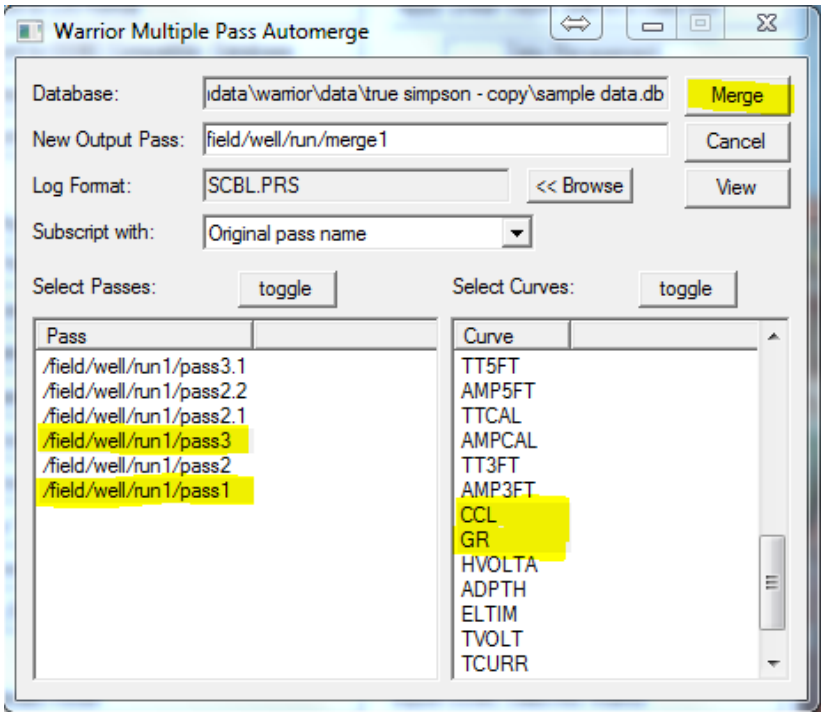


FIG: 12.5.8 Set Passes and Curves

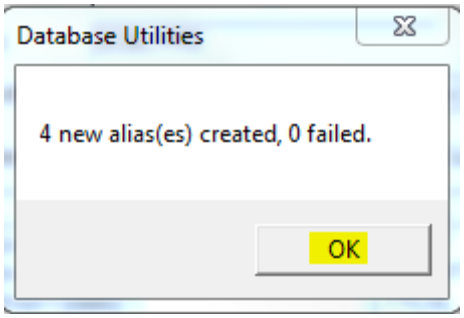


FIG: 12.5.9 Four new aliases curves

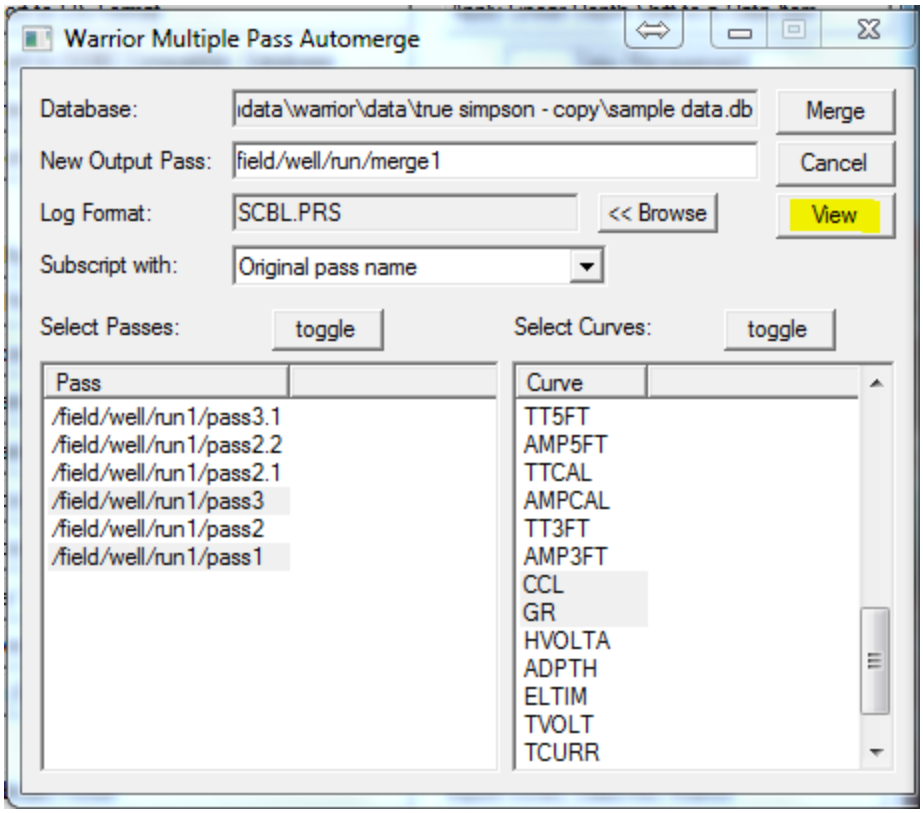


FIG: 12.5.10 View option

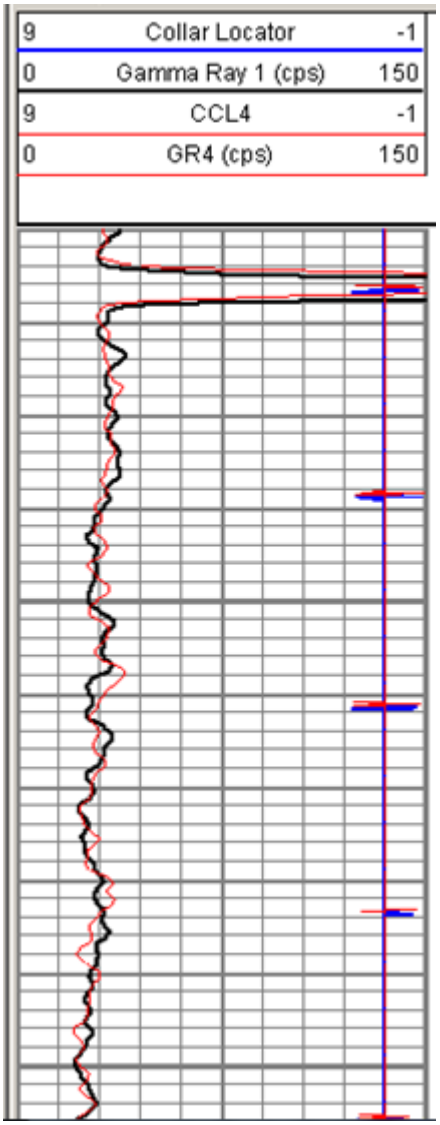


FIG: 12.5.11 Plot the new add curves

12.5.3 Edit Variables in a Dataset

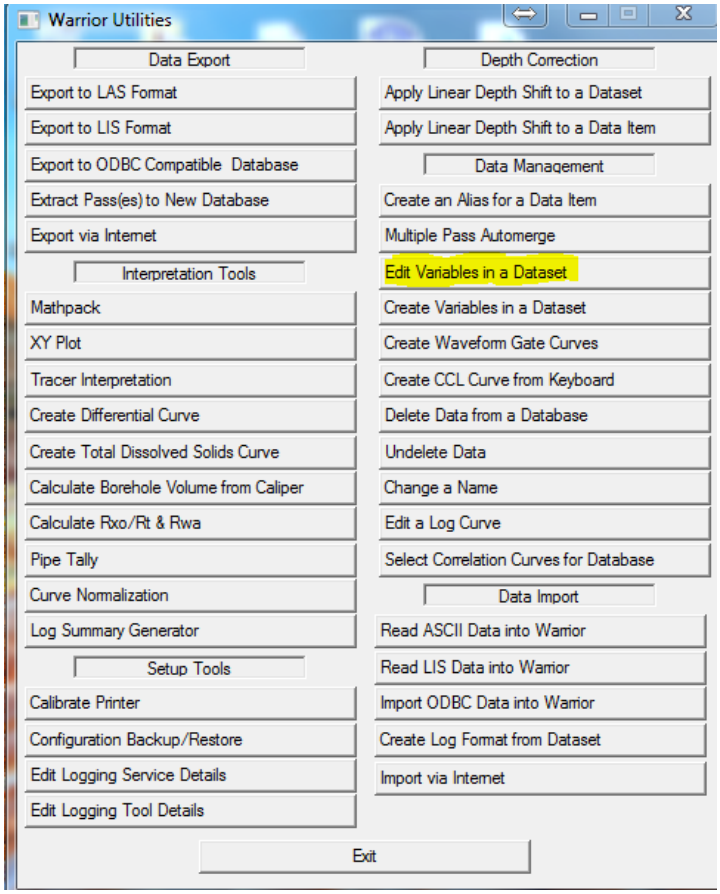


FIG: 12.5.12 Edit Variables in a Dataset

See Section 4.5.2

12.5.4 Create Variables in a Dataset

In the Warrior shortcut folder, double-click the **Database Utilities** icon. The Warrior Utilities menu box will appear. Click on the **Create Variables in a Dataset** button.

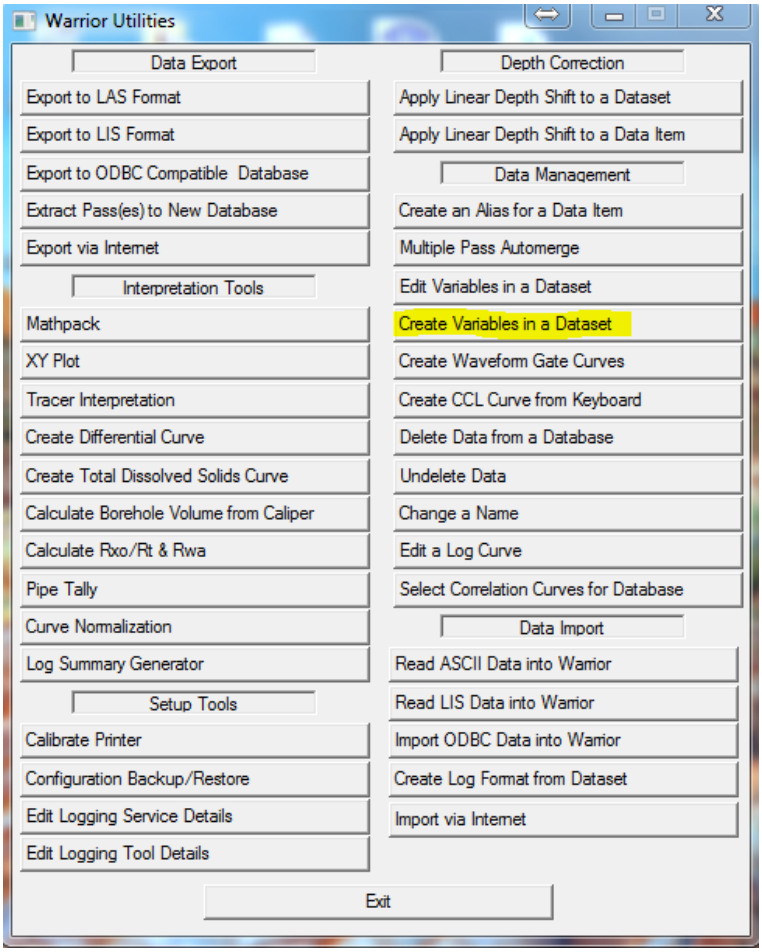


FIG: 12.5.13 Create Variables in a Data set.

A file selection dialog box appears. Select the required database, followed by the log pass (dataset). At this point a selection box is displayed allowing selection of the variable to be created in the log pass. Fig: Create Variables in a Dataset Double-click on the required variable name to create it in the pass variables.

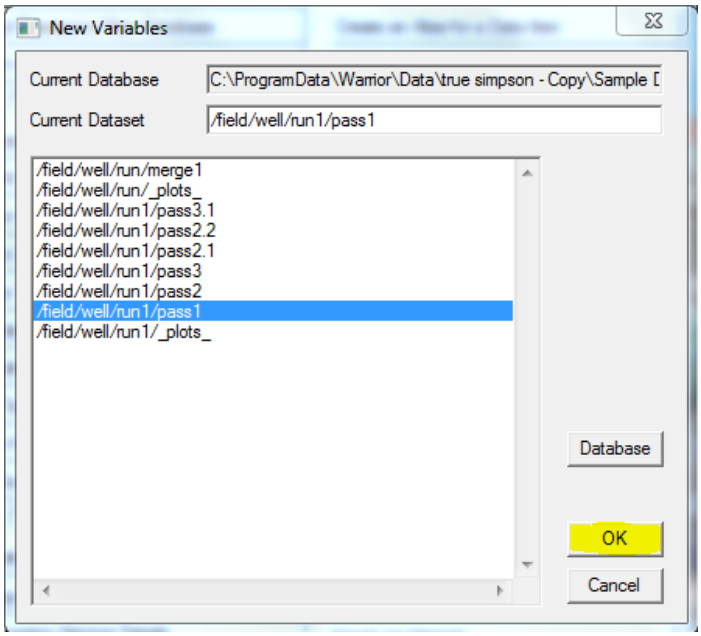


FIG: 12.5.14 New Variables

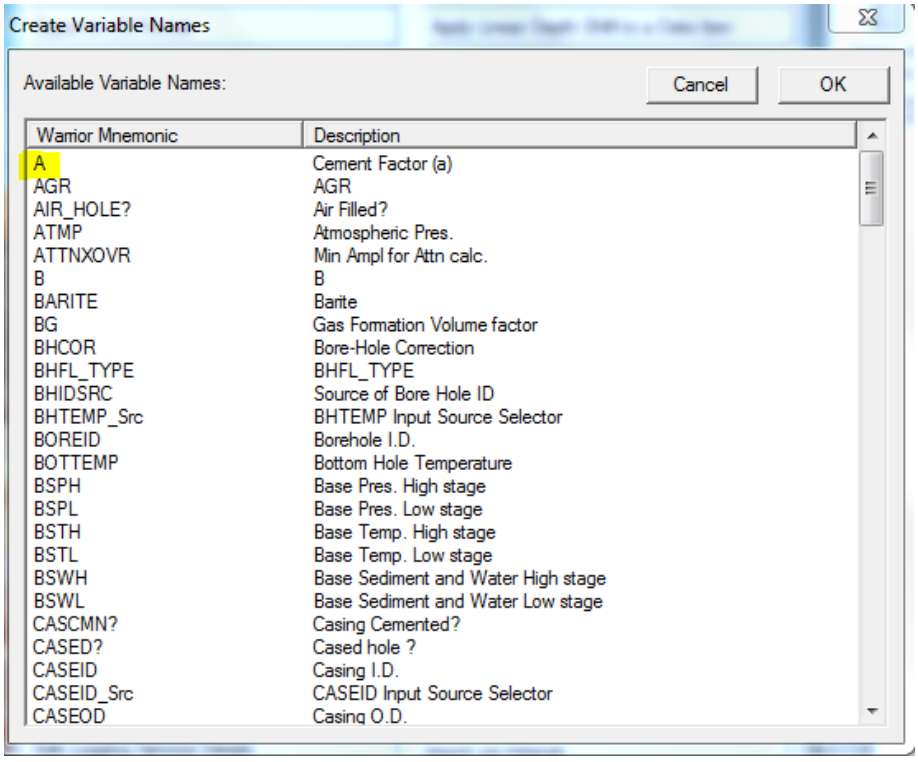


FIG: 12.5.15 Choice the Variable

Once you have chosen a variable to add you should go back to edit variable in a dataset and enter the appropriate value.

12.5.5 Create Waveform Gate Curves

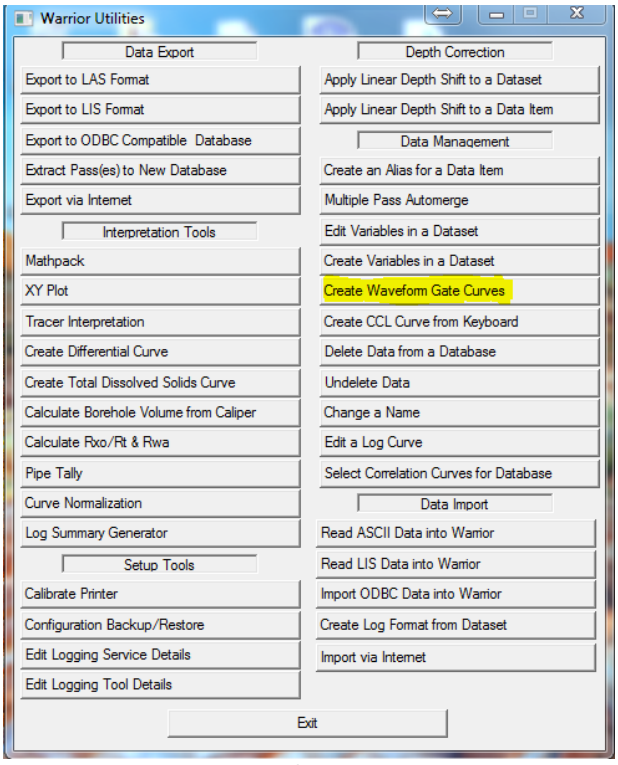


FIG: 12.5.16 Create waveform Gate Curves

Select the Database

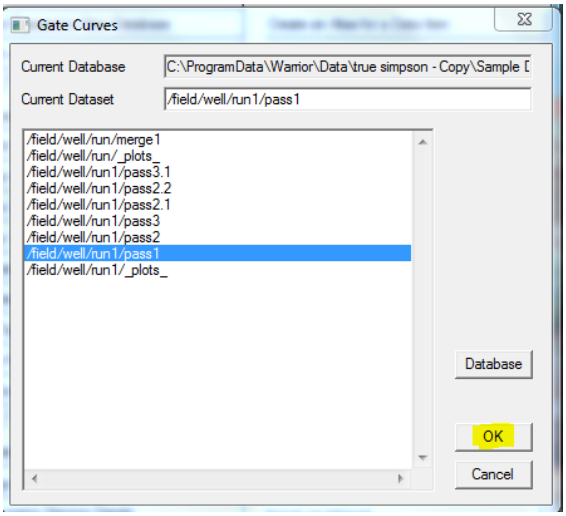


FIG: 12.5.17 Gate Curves

This option is used to generate the high and low gate curves for sonic tools (e.g. CBL and RBT).
You are prompted to select a database and pass containing a sonic tool with waveform data. The high and low gate curves are then automatically generated and added to the pass.
When a CBL tool is in the database Warrior looks for the WVF3FT and WVF5FT waveform curves in the pass and generates WVF3FTLG (3ft low gate) and WVF3FTHG (3ft high gate) if the WVF3FT curve is present, and the WVF5FTLG and WVF5FTHG if the WVF5FT curve is in the database.

These curves can be added to the Signature track as shown below in Fig:4.86 , and the low and high gate curves should straddle the first peak in the waveform.

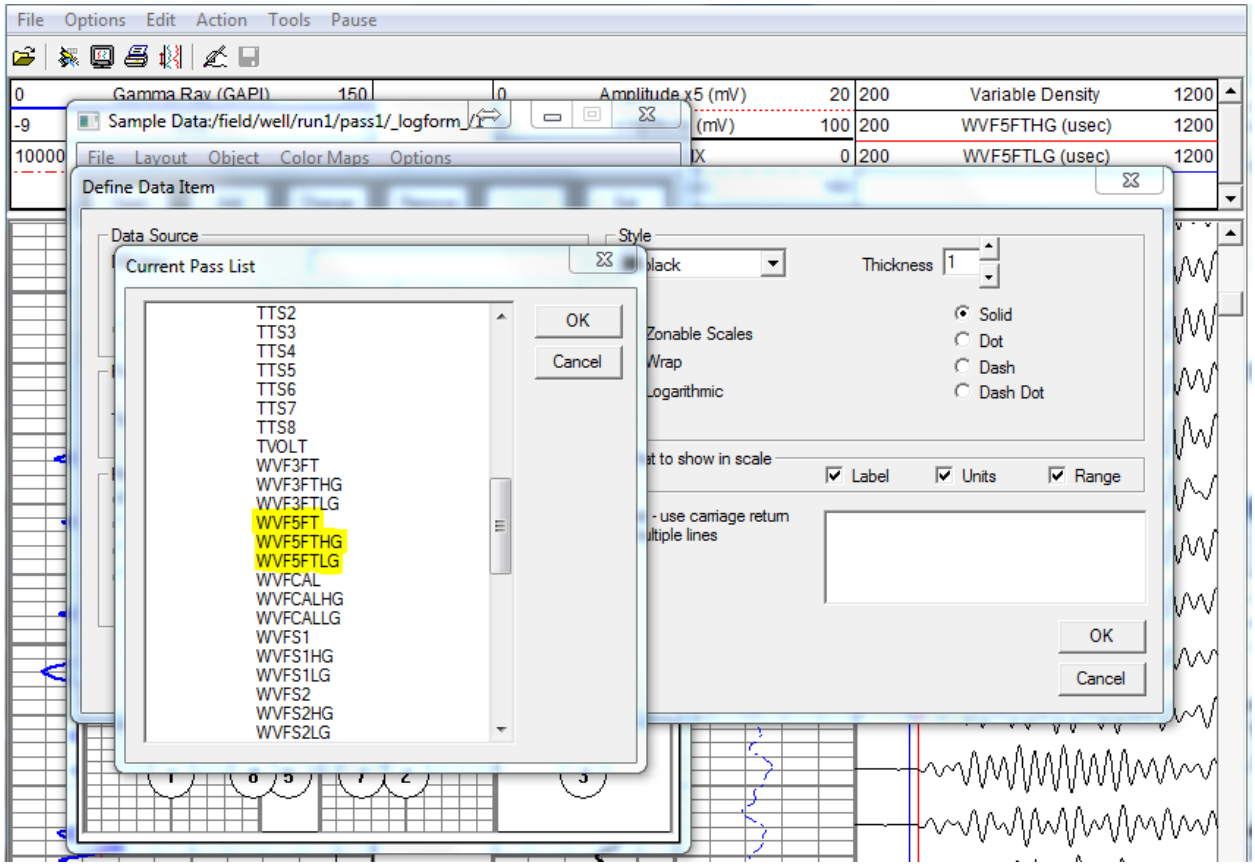


FIG: 12.5.18 Current pass List

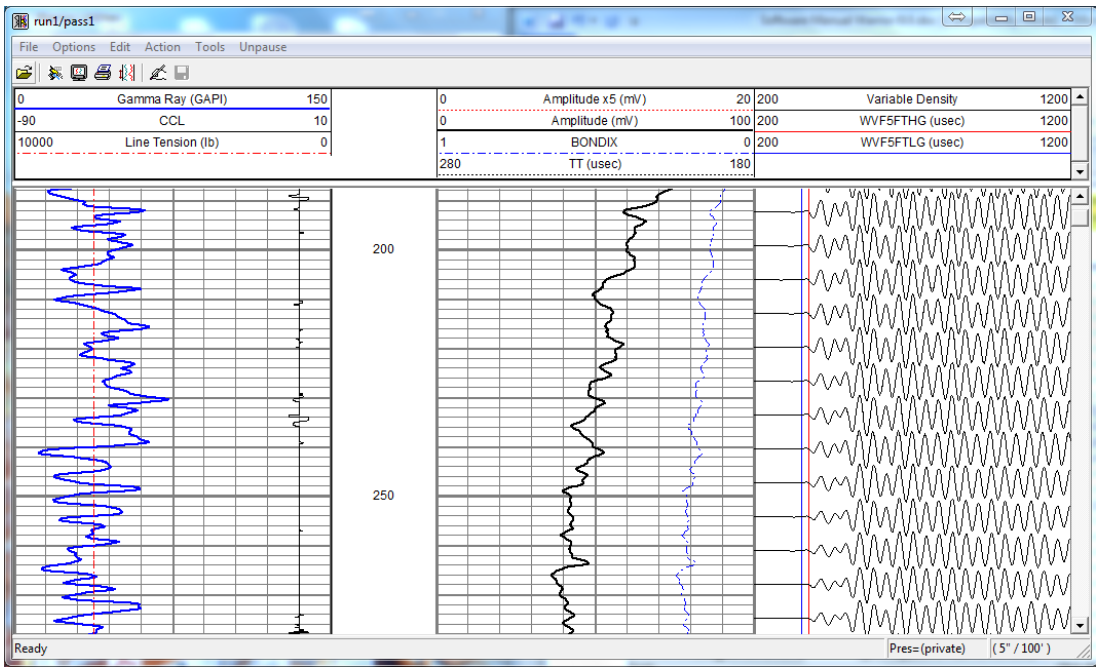


FIG: 12.5.19 Plot Curves

12.5.6 Create CCL Curve from Keyboard

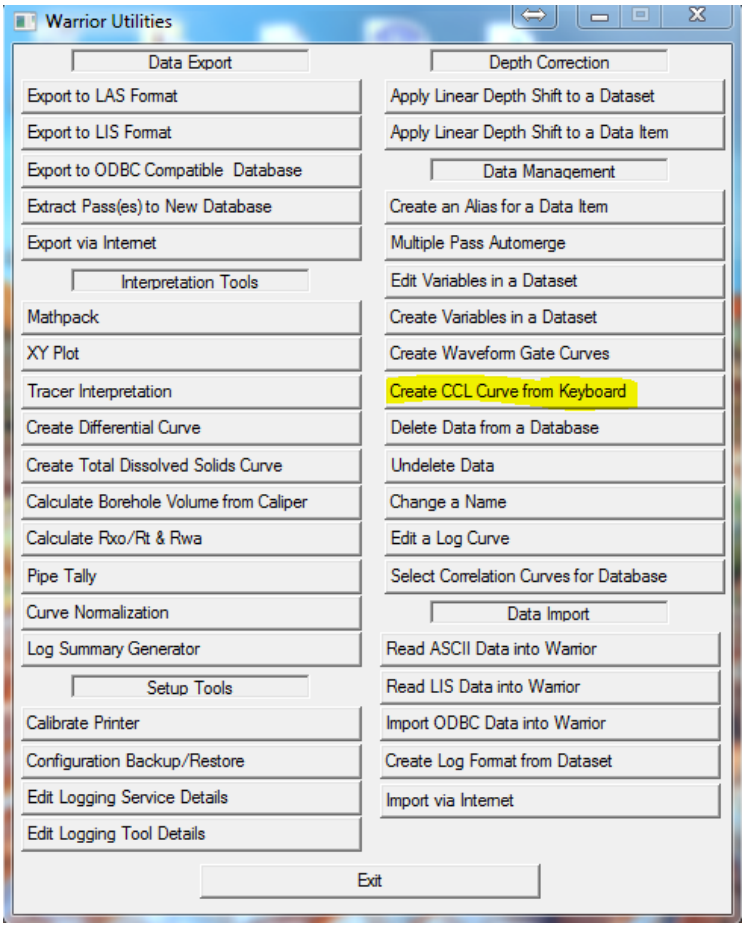


FIG: 12.5.20 Create CCL Curve from Keyboard

To add collars to a log select Create CCL Curve from Keyboard. This will open a dialog that will allow free form text box for the depth entries of the collars. Once entered and excepted a dialog will show the depth range of the collars to be created. You will then be prompted for a Database and pass to modify. A completion dialog will confirm the changes, the generated collars will be one division negative.

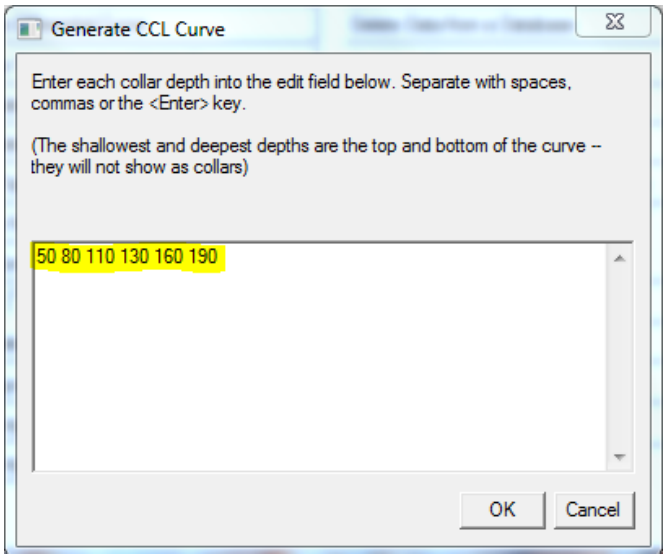


FIG: 12.5.21 Enter Depths of Desired CCL

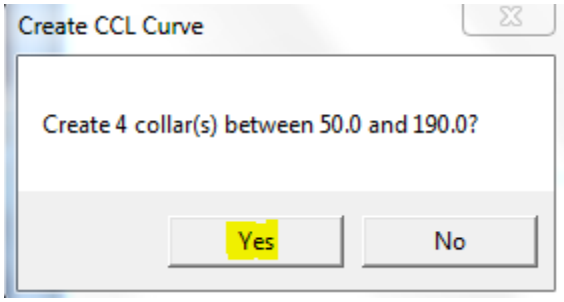


FIG: 12.5.22 Dialog of CCL to be created

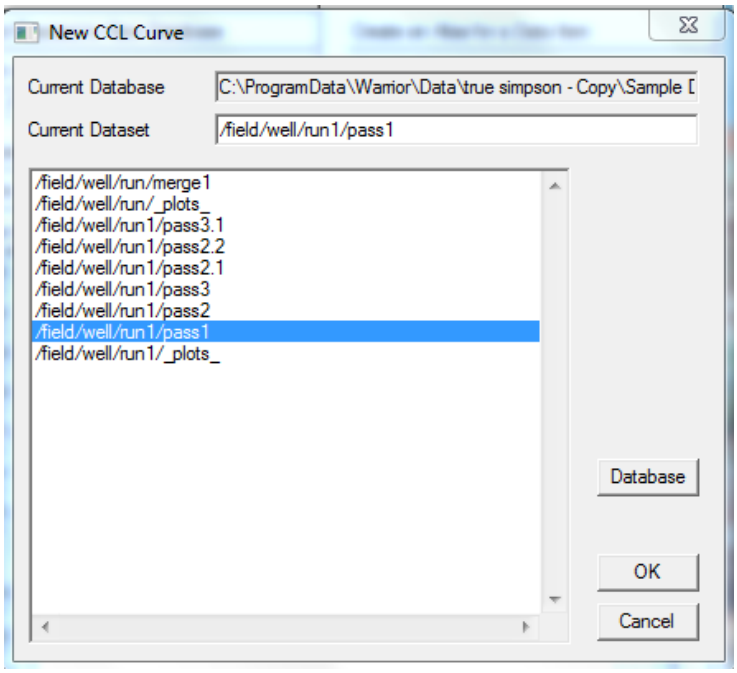


FIG: 12.5.23 Select Database and Pass to add CCL

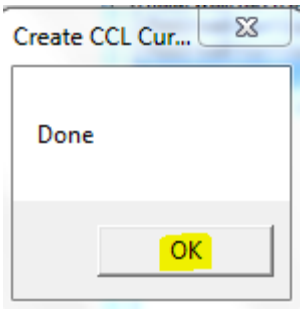


FIG: 12.5.24 Ok Dialog

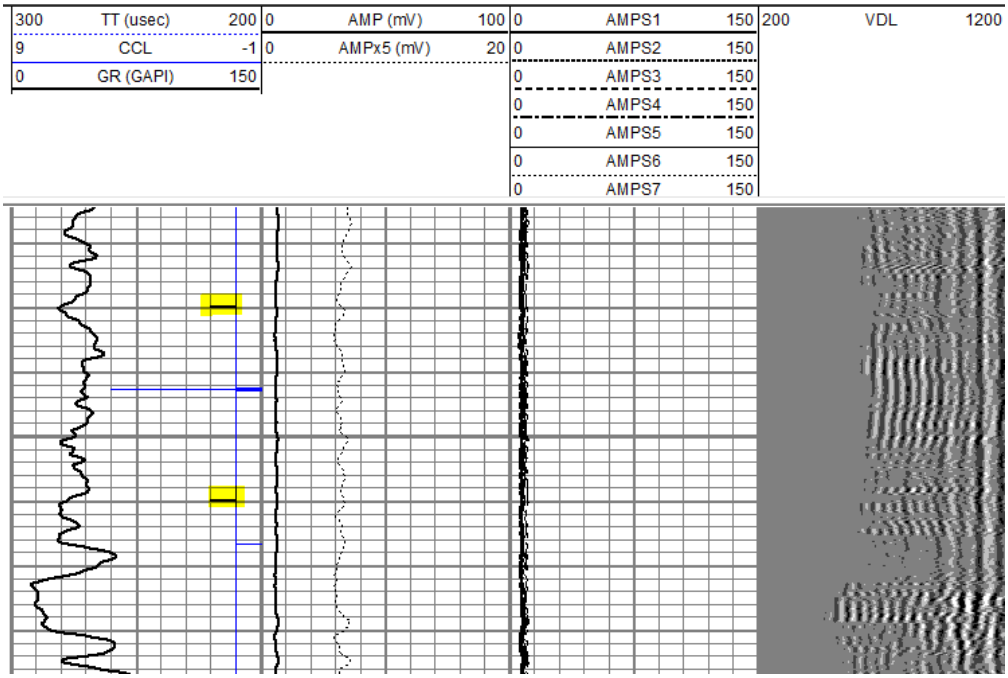


FIG: 12.5.25 Inserted CCL's

12.5.7 Delete Data from a Database

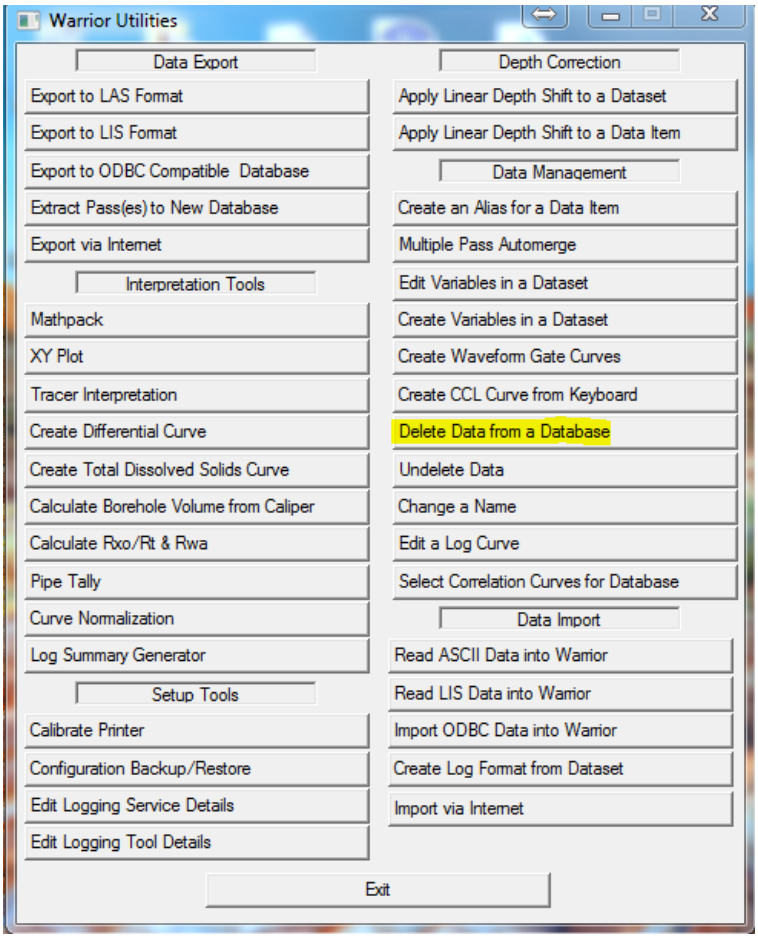


FIG: 12.5.26 Select Delete data from a Database

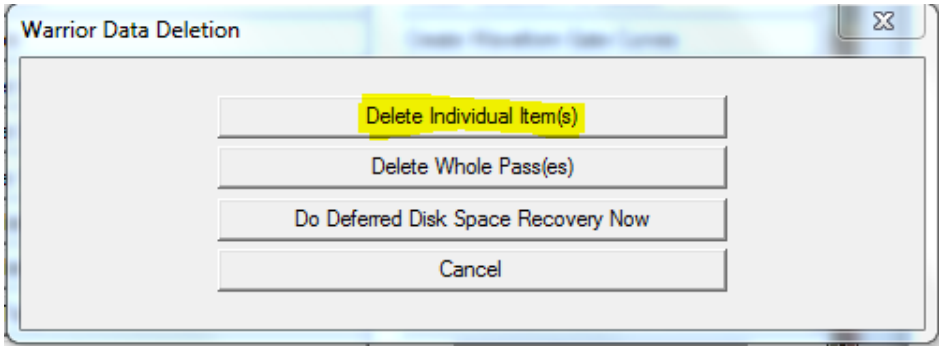


FIG: 12.5.27 Delete Individual Item(s)

To delete a database item e.g. a curve, click on Delete Individual Item(s). The standard database file selection dialog appears.

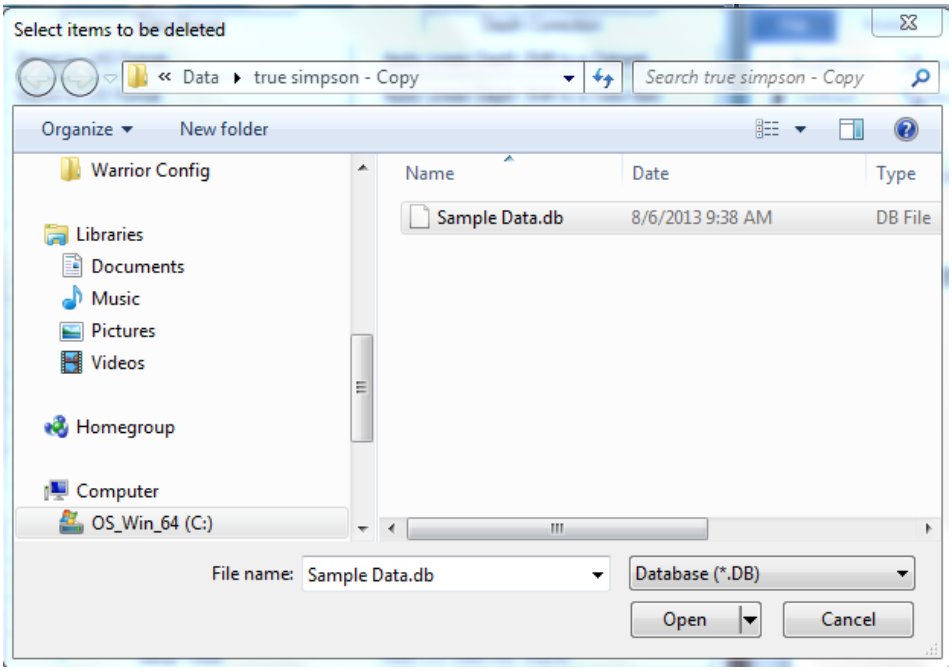


FIG: 12.5.28 Select Database

After selecting the database, the dialog for selection of the data item appears.
Select the data item(s) to be deleted. All or no items may be selected by using the Toggle button.

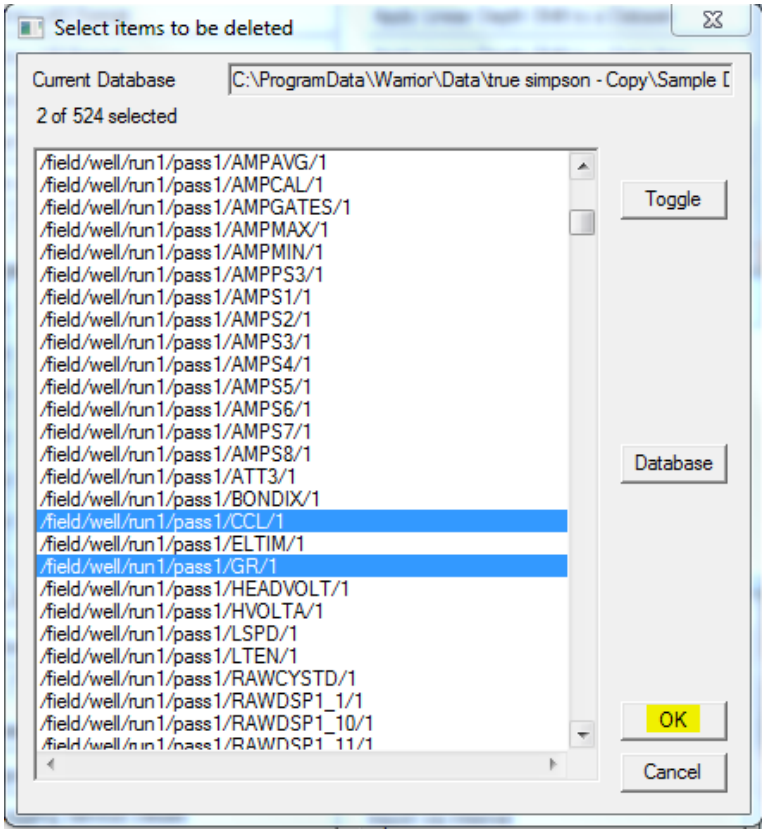


FIG: 12.5.29 Select Items

A warning message appears informing that permanent data deletion is about to take place.

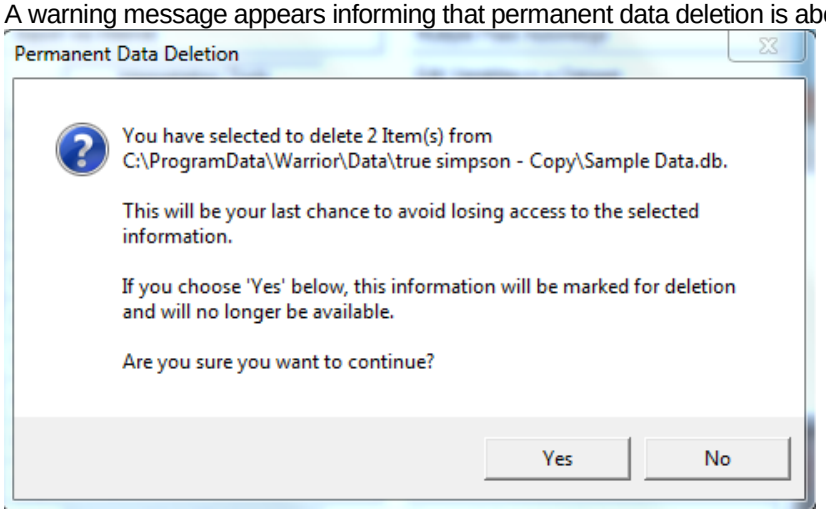


FIG: 12.5.30 Permanent Data Deletion

Warning! DATA DELETED WITH THIS UTILITY CANNOT BE RECOVERED

Clicking No in the above aborts the operation. Clicking Yes proceeds with the operation and allows the choice to repack the database file immediately or to defer the operation until later.

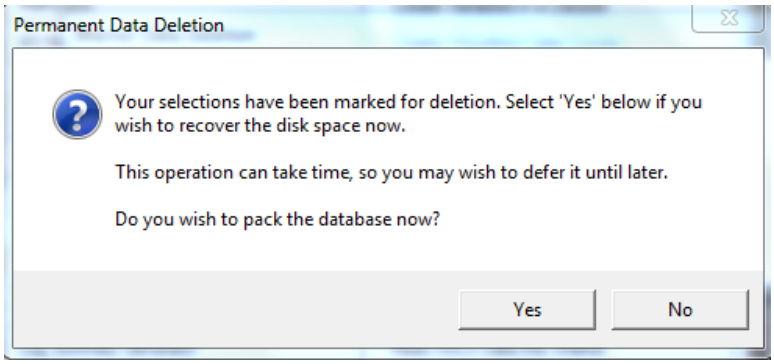


FIG: 12.5.31 Permanent Data Deletion and pack database

Deleatig a whole pass is the same procedure but will eliminate all traces in the sellected pass

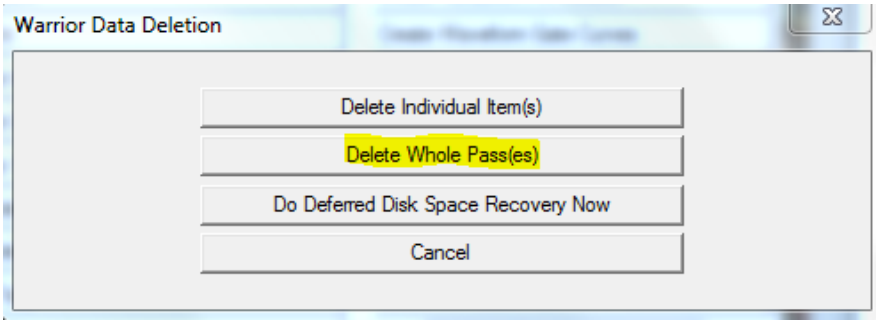


FIG: 12.5.32 Delete Whole Pass(es)

Selecting "Do deferred Disk Space Recovery Now" will repack the database eliminating unused spaced freed up during the deletion.

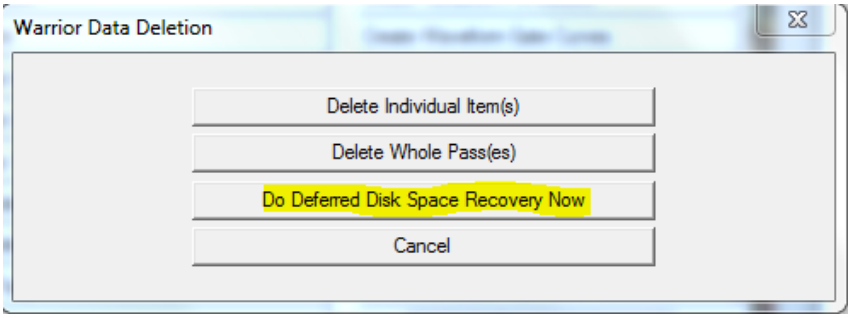


FIG: 12.5.33 Disk Space Recovery

Clicking Yes causes the data item to be removed and the database repacked immediately and clicking No marks the data item for deletion, buts defers the packing of the data base.

12.5.8 Undelete Data

To undelete Data, select the " Undelete Data" tool from Data Management, select your database and you will be prompted with a list of deleted data that can be restored. You can only restore one item at a time. Highlight the data to restore and click on restore. If you are done after the restore click close or select the next data item to restore, continue until complete.

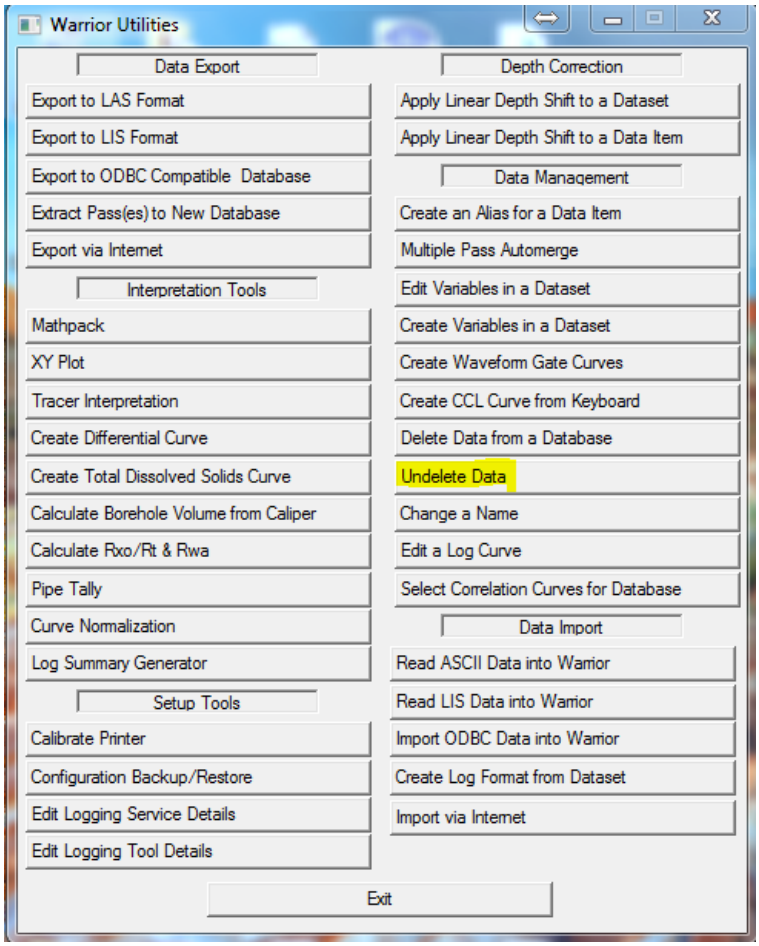


FIG: 12.5.34 Undelete Data

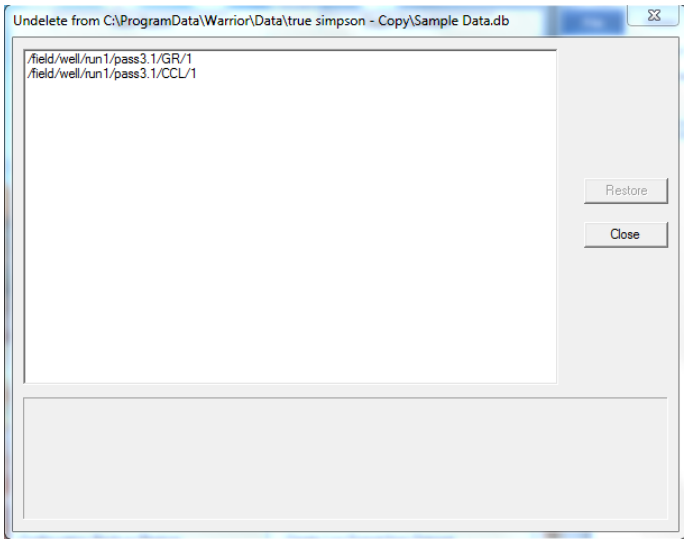


FIG: 12.5.35 Select Data to Undelete

12.5.9 Change a Name

The change a name utility allows you to change the database name of a field, Well, Run, Pass or Item. Select the appropriate radio button for to rename, then browse to the desired database and item. Once you have selected the item to edit you will be prompted for a new name and optional new description.

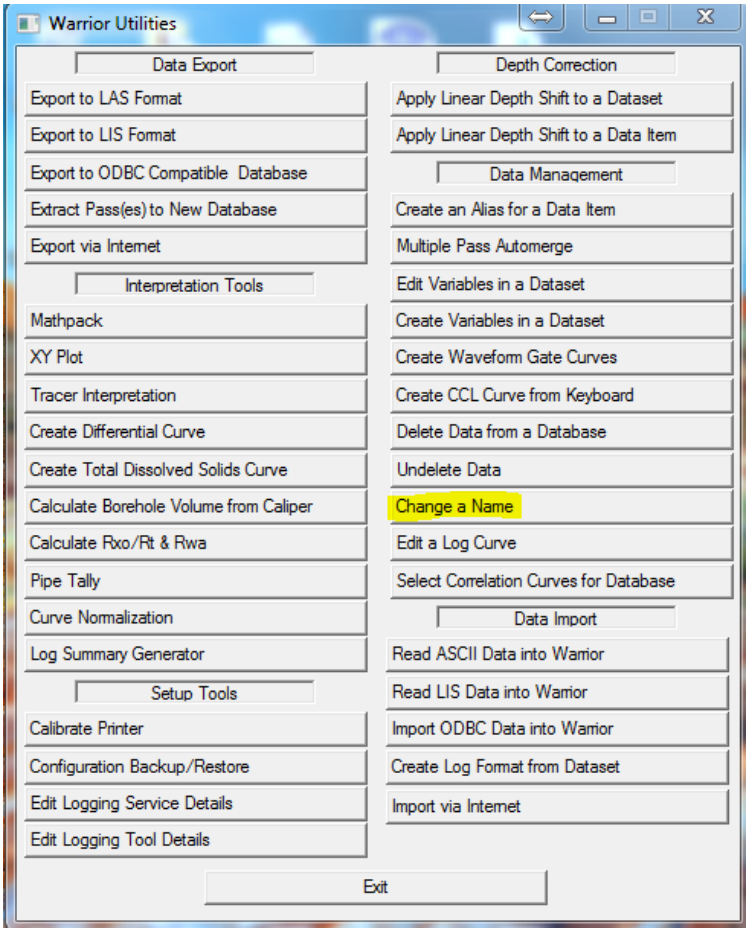


FIG: 12.5.36 Change a Name

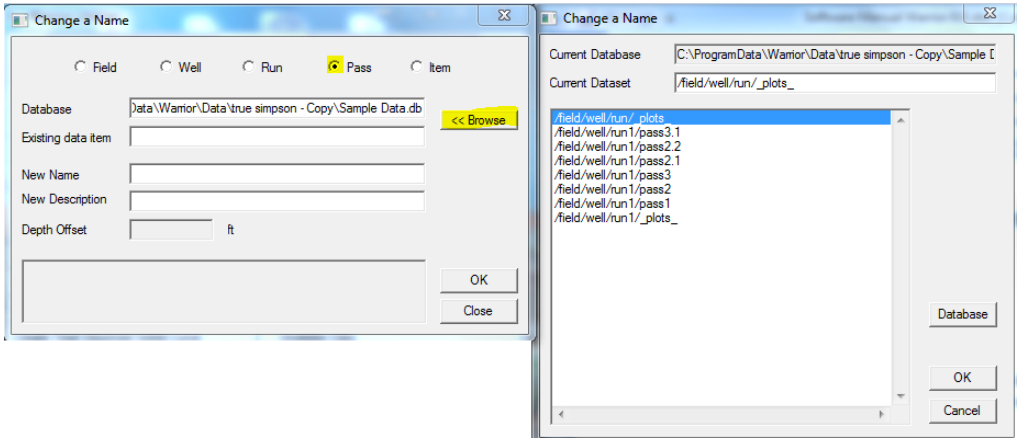


FIG: 12.5.37 Change a Name Selection

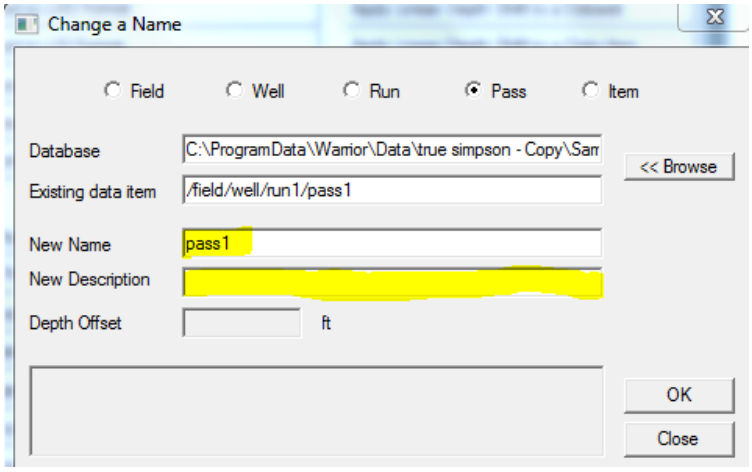


FIG: 12.5.38 Change a Name Selection

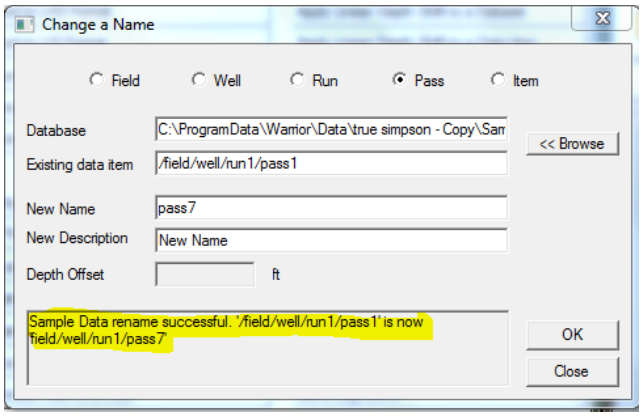


FIG: 12.5.39 Name change completed

12.5.10 Edit a Log Curve

To edit a log curve, select " Edit a Log Curve " and you will be prompted for a database and pass, select the appropriate pass.

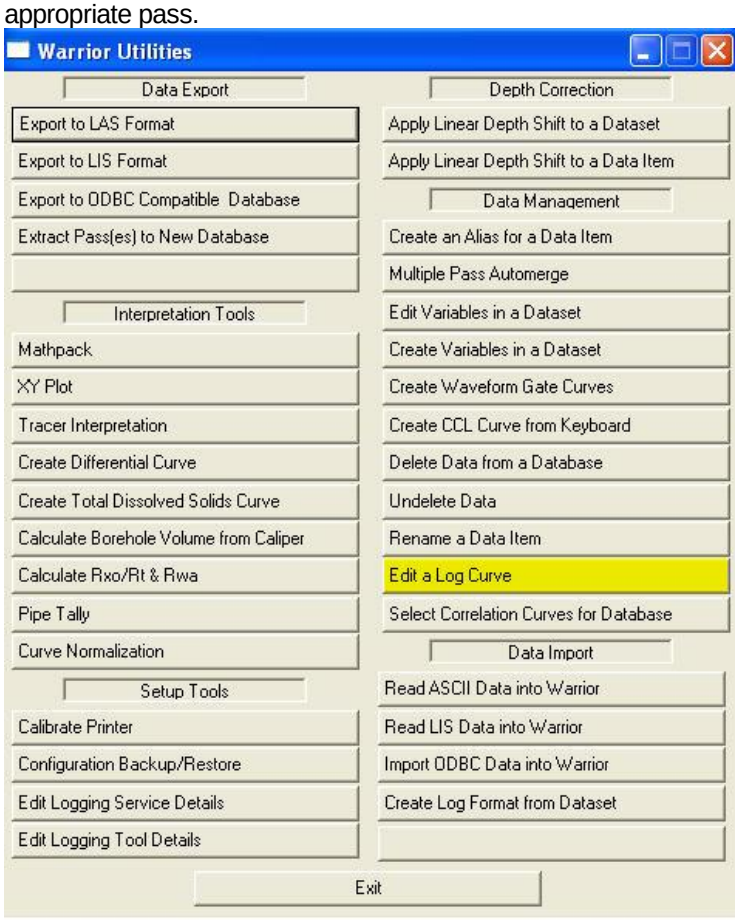


FIG: 12.5.40Edit a Log Curve

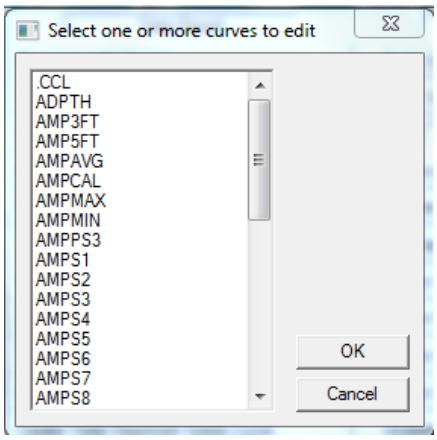


FIG: 12.5.41 Select one or more curves to edit

You do not need to select a curve at this time in warrior 8 this has been replaced, click on OK to continue. This will bring up an interactive plot with an edit tool in the tool bar.

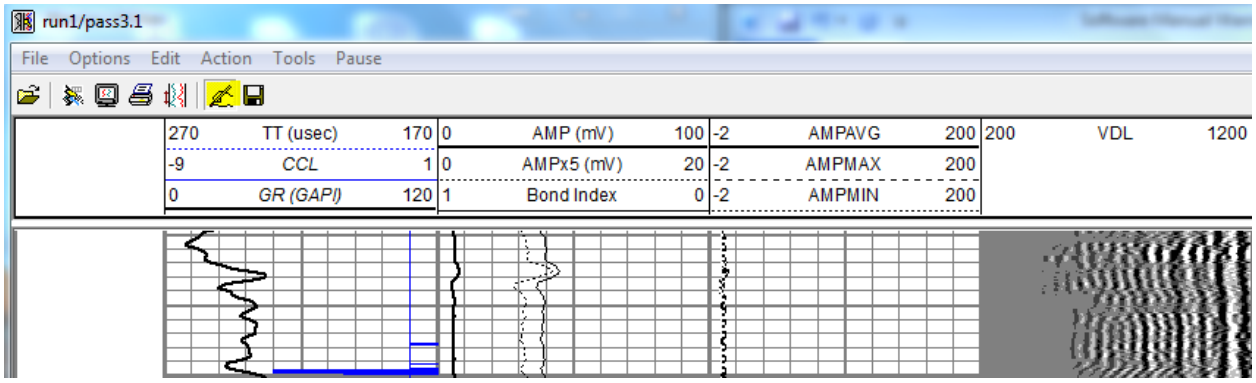


FIG: 12.5.42 Plot Curve

After clicking on the edit tool right click on the curve you wish to edit, make sure that it is not wrapped. After right clicking you will be prompted to left click and draw a rectangle around the area to be modified.

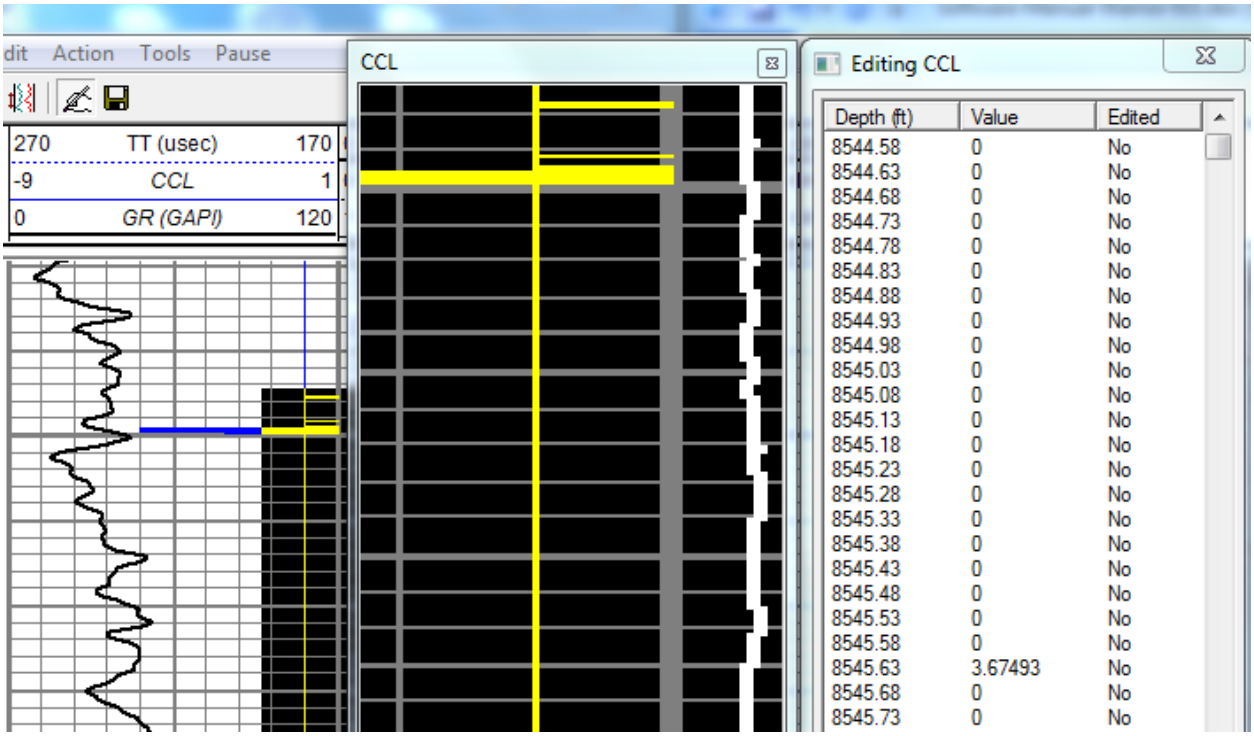


FIG: 12.5.43 Zoom Curve

At this point you can either hand draw the curve changes in the zoomed box or by double clicking on the text windows depth you can manually enter curve values.

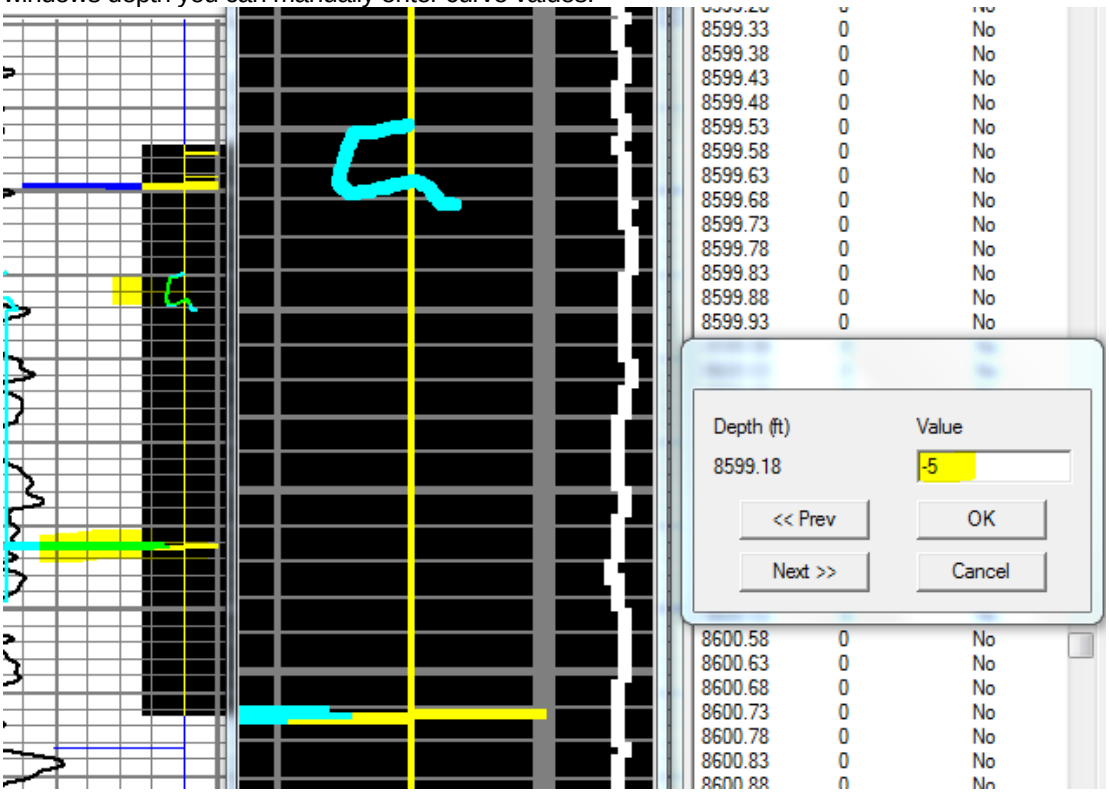


FIG: 12.5.44 Draw Curve Free Hand and Manually.

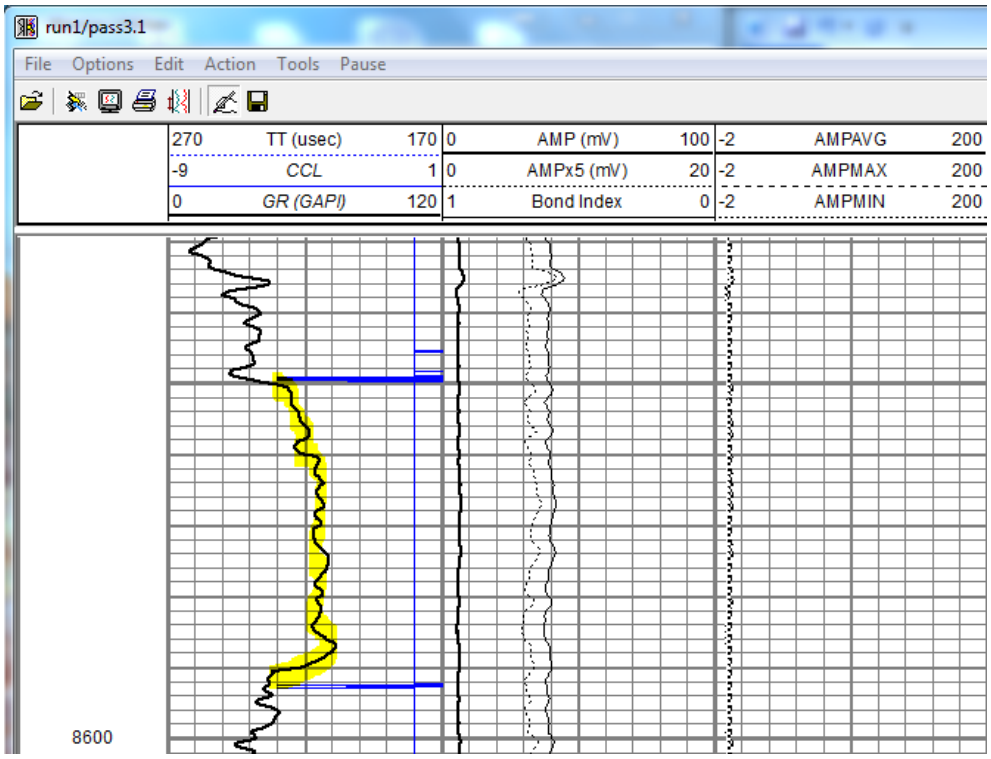


FIG: 12.5.45 Free Hand Gr

12.5.11 Select Correlations Curves from Data Base

Selecting correlation curves allows you to plot a curve (es) within a database along with any other pass. The first thing you will be prompted for is the database and then pass. Then you will be given the option to select a curve or curves. Highlight the curve and select add. On the right hand side of the window you can select scales color and wrap like the format editor. You also have two radio buttons the first one “Always show in original track with original scales “ will place the curve in the same track with the same scales as the pass it originated in this will bypass the scales and tracks from above. This is the standard correlation mode. The second radio button “Only show when another curve by the same name is plotted, show with the same name and scales as the named curve” will plot the selected curve only if it exists in the pass to be plotted, it will use the same scales and track as the current pass.

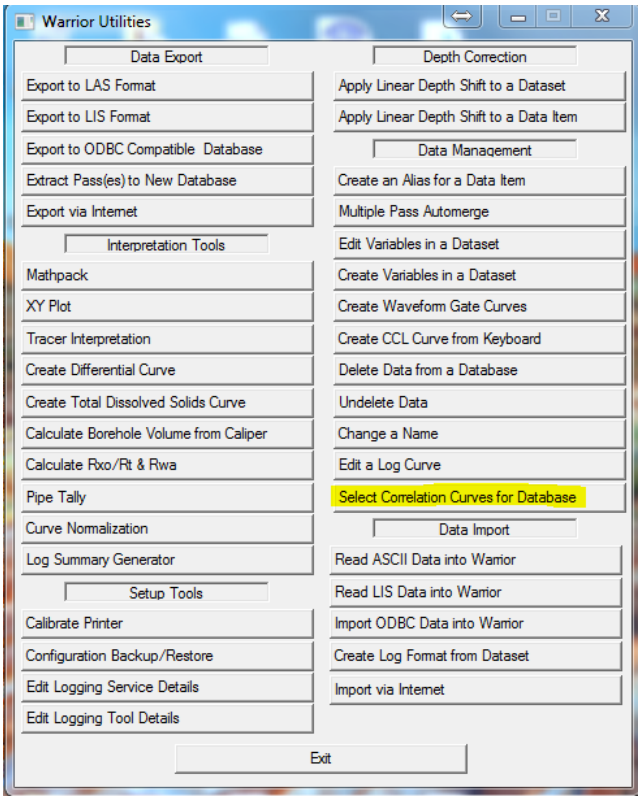


FIG: 12.5.46 Select Correlation Curves to for Database

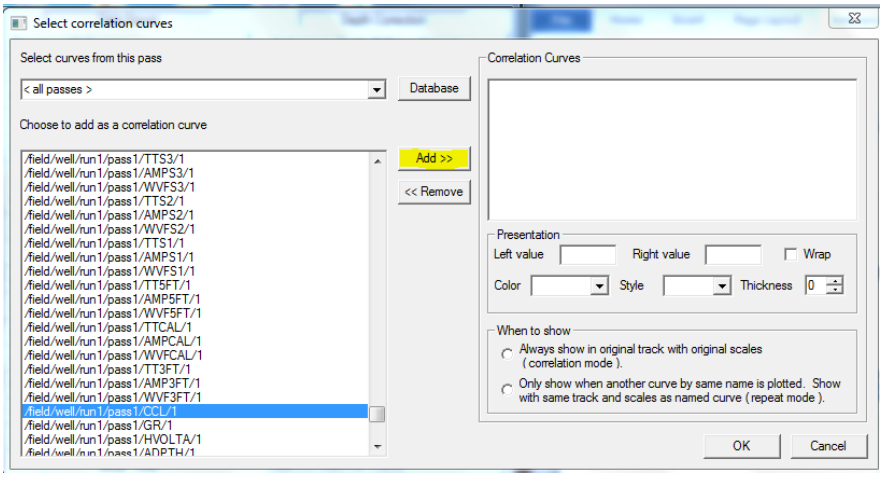


FIG: 12.5.47 Select Curve(es) for Correlation

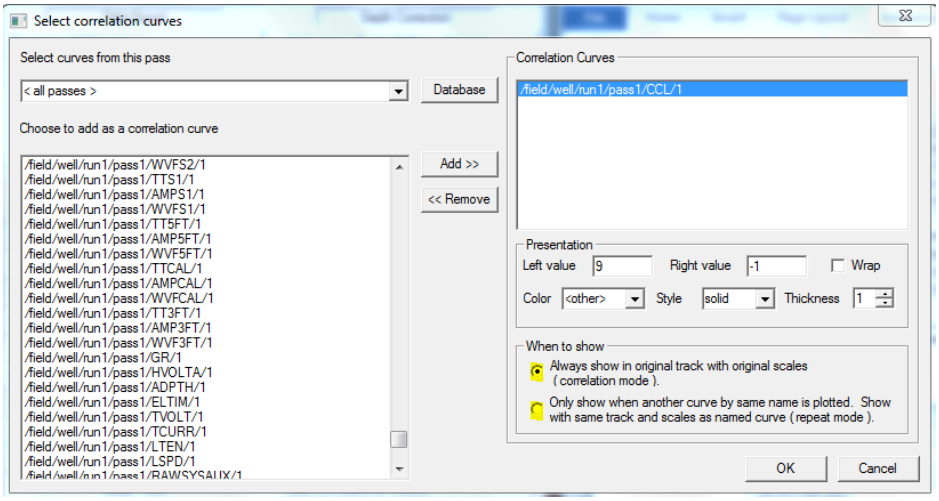


FIG: 12.5.48 Plotting Options

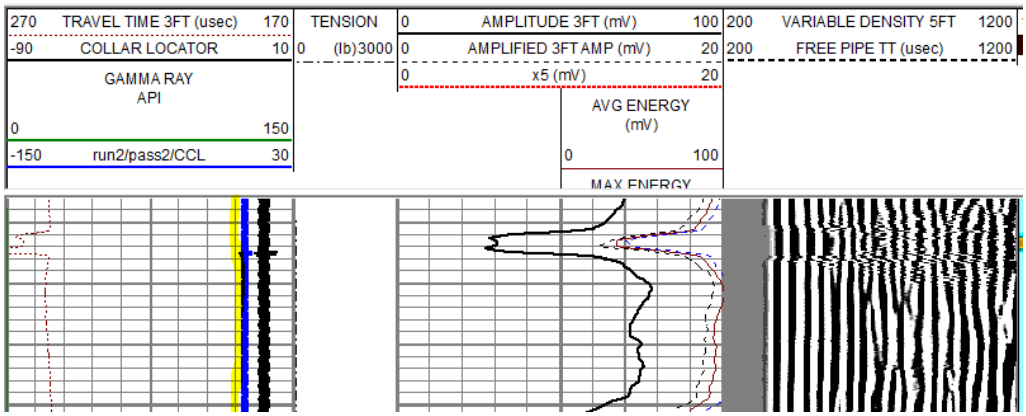


FIG: 12.5.49 CCL Correlation Curve

12.6 Setup Tools

12.6.1 Calibrate Printer

In Database Utilities click on the Calibrate Printer button.

FIG: 12.6.1 Select Calibrate Printers

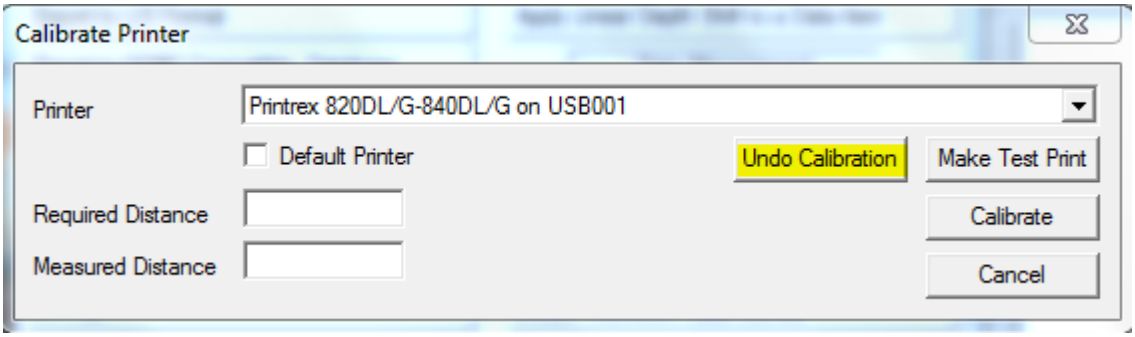


FIG: 12.6.2 Select from Hardcopy Calibrate

Printer box. It is recommended but not necessary Select the printer you want to calibrate. This printer may be made the Default Printer by checking the Default to undo calibration first, this will set the gain to 1.000000.

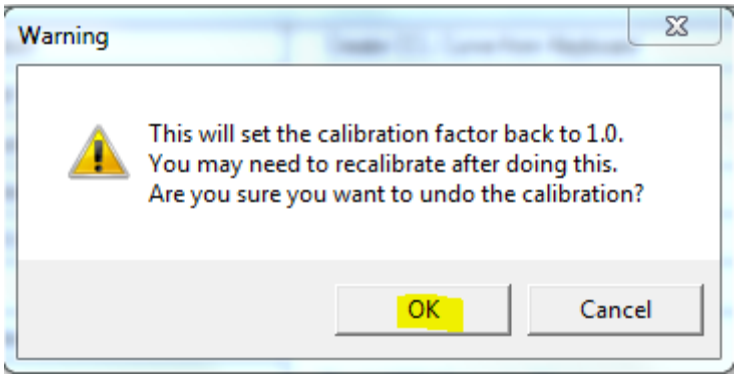


FIG: 12.6.3 Undo Calibration

Select "Make Test Print" this will prompt you for a database to plot.

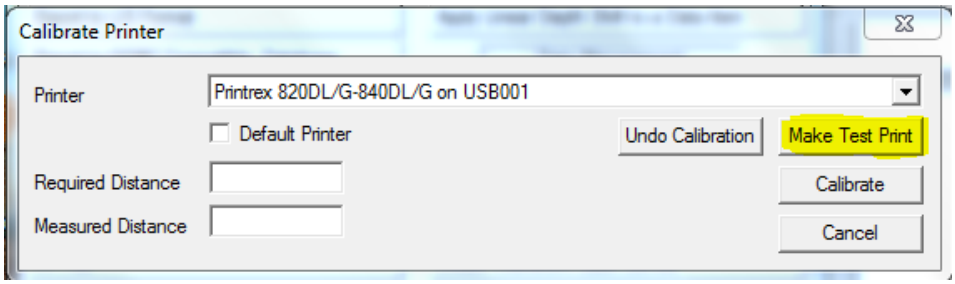


FIG: 12.6.4 Select Make Test Print

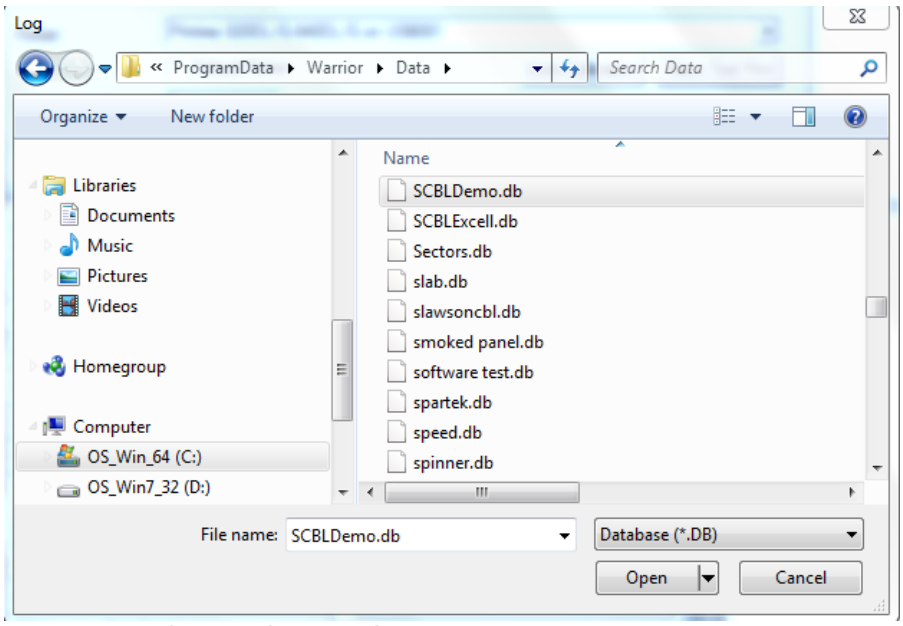


FIG: 12.6.5 Select Database to Plot

The calibration is based on two parameters entered by the user. Enter the required length of print output for any given log interval, e.g. 10 inches for 200 feet of log on a 5-inch scale (5 in = 100Ft).
It means Scale 1: 240. Enter the actual length of plot currently output by the plotter for the same log interval. Press Calibrate.

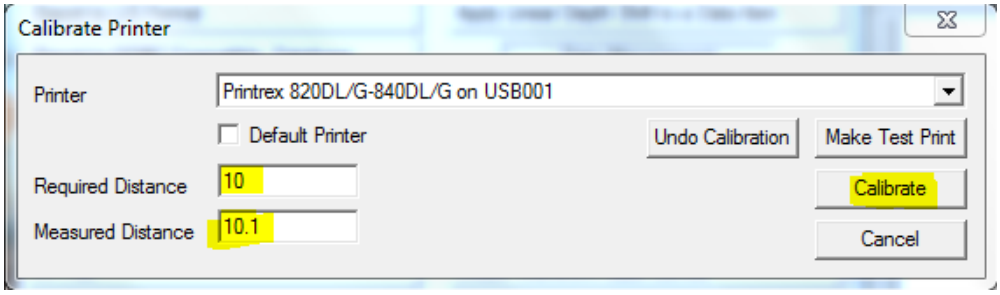


FIG: 12.6.6 Calibrate

Note that the required length can be any length, so that the current hardcopy may be forced to match any correlation log, even one with an incorrect hardcopy scale.

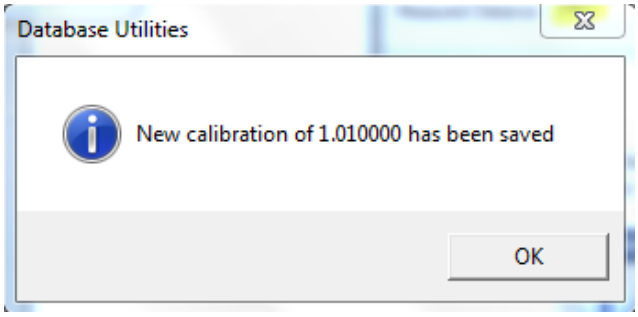
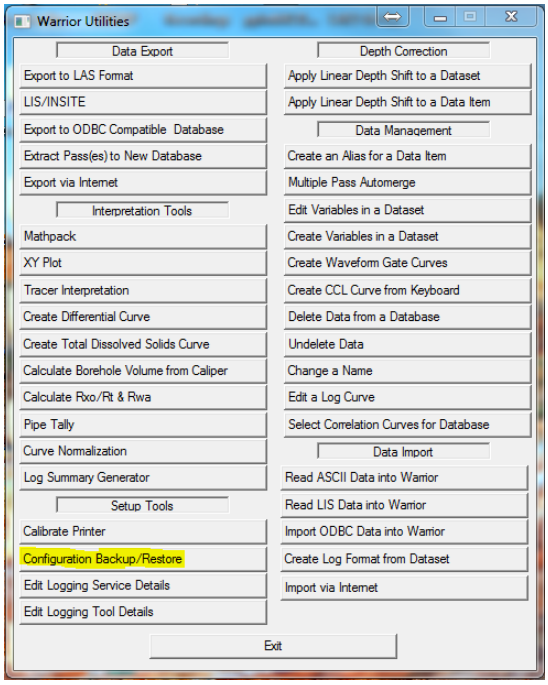


FIG: 12.6.7 Click on OK

12.6.2 Configuration Backup/Restore



See Chapter 9

12.6.3 Edit Logging Service Details

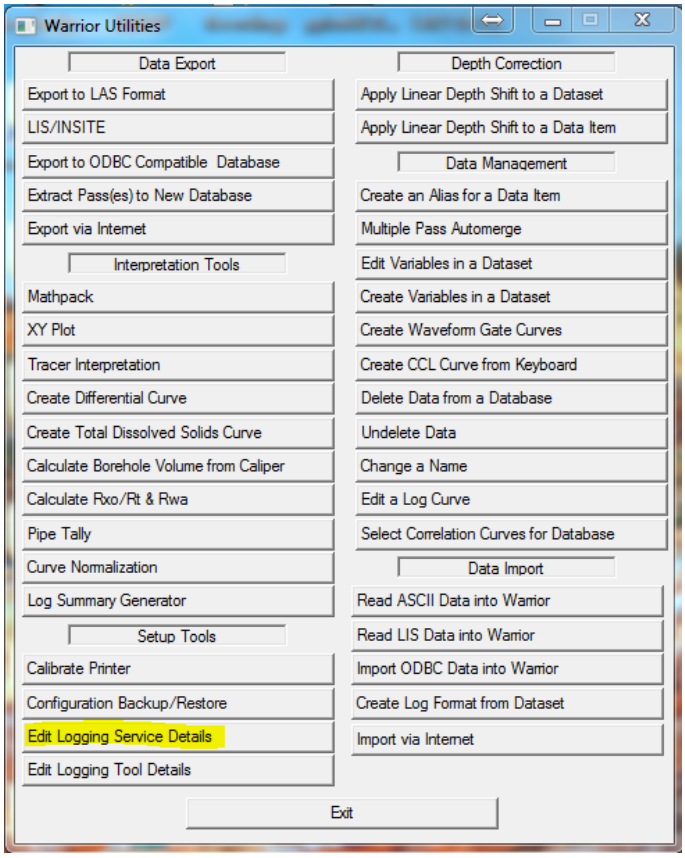


FIG: 12.6.8 Edit Logging Service Details

See Chapter 13

12.6.4 Edit Logging Tool Details

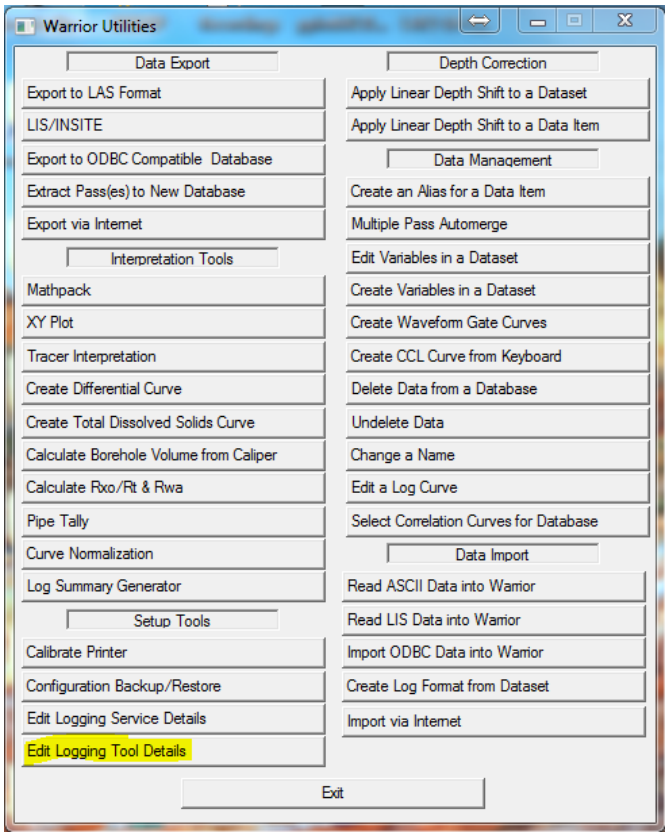


FIG: 12.6.9 Edit Logging Tool Details

[See Chapter 14]

Section

13

13 Service Editor

The purpose of the Services Editor is to aid in modifying current services, creating new services, and importing and exporting services from similar types of Warrior systems. To start the Service Editor, go to Warrior Utilities and click on the Edit Logging Service Details.

We suggest that a backup of the Services.ini file be made before any service editing, so that existing service information may be recovered if mistakes are made while editing. Probably the easiest way to do this is to use the Warrior Backup utility and do a backup.

13.1 Edit logging services Details

FIG: 13.1 Edit Logging Services Details

When the Service Editor window comes up, on the left side of the window are two service lists, labeled Active and Disabled. The active list of services will be displayed when a service is selected from Warrior Acquisition. The disabled list of services are included in the service.ini file but are not displayed in the acquisition service list. Normally there will be no services in the disabled list.

When an active service is selected by clicking on it in the list, all the service details are displayed in the Service Details panel on the right side of the window. This information includes the default interactive plot for that service, the selected zero point (encoder depth reference for zero offset) for the service, a service title, if a title other than the service name is desired, and a choice whether the service should always use the master copy of the presentation or open the master and use it for editing as a private copy of the presentation in the database. There are also four lists that are labeled Devices, Controls, Sensors, and Tools. Each list contains specific details about the service.

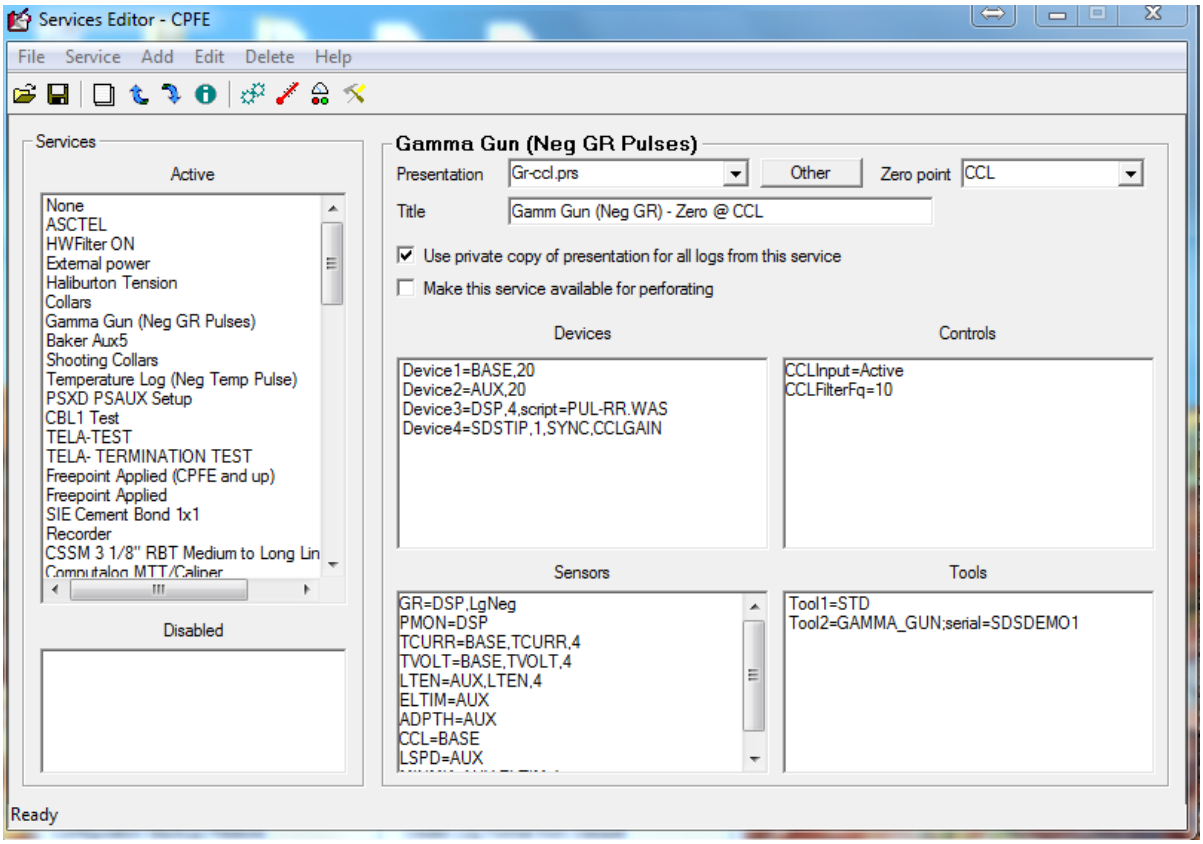


FIG: 13.2 Services Editor

The Tools list contains all the tool types that are available in the service. If a tool type is not listed in a service, then it is not possible to use that tool in that service. Tools may be listed but excluded. (Tools are normally excluded by removing them from the tool string using the tools string editor in Acquisition.) The STD tool type will normally be listed in every service since this includes sensors for depth, tension, line speed, tool voltage and current, etc.

The Devices list contains acquisition devices that the system uses to acquire information. Depending upon the panel type, it may include a BASE, AUX, DSP, SDSTIP, ASCTEL, and others. Each device is set with a default sample rate of the maximum number of samples per foot. Some of the devices also require additional information such as the DSP Script file, the type of ASCII telemetry, and what hardware gain controls that the service will provide.

The Controls list contains settings for hardware devices within the interface panel. This includes items such as filter settings for various signal paths, I2C Initialization codes for setting various initial relays states, and software controlled tool voltage setting for that service.

The Sensor list contains the sensors for the tool types that are available. Each sensor definition must have the device that it uses to acquire its information. The definition also should contain a device channel number or a device channel name. If the device channel name is the same as the sensor, then that name is not required. The definition could also have a sample rate. If the rate is less than the device default sample rate, then the sensor data will be saved at the slower rate. If the rate is greater than the device default rate, then the sensor data will be saved the default rate of the device. If omitted, the sample rate will be at the device default sample rate. The sample rate can only be used if the channel is listed. (Sensor=Device, channel, rate).

13.2 Editing an Existing Service

The Service Editor can be used to modify settings in an existing service. To view the settings for a service, click on the service in the Active service list. The right side of the window will display the service information and settings for that service.
The default presentation for a service can be selected from the Presentation drop down list. The list will include all PRS files that are in the “C:\ProgramData\Warrior\Format” folder. The interactive plot presentation will display outputs from the sensor information at that are included in the presentation. You can add more than one presentation, if added each presentation will be displayed as a tabbed output in interactive plot.
If the box labeled Use private copy of presentation for all logs from this service is checked, then when the first pass of the service is started in a database, the default presentation is copied into the database as a private presentation. If any changes are made to the log format presentation, then those changes are made in the private copy of the presentation in the database. The changes are not made to the original presentation that is in the “C:\ProgramData\Warrior\Format” folder.
If the box is not checked, then the presentation is not copied into the database. Any changes that are made to the presentation from interactive plot are made to the original presentation file. If later in time the file is viewed using interactive plot, then since the presentation is not part of the database, the current copy of the presentation (if it exists on the system) in the “C:\ProgramData\Warrior\Format” folder is used to display the presentation. If the presentation is not located in the Format folder, then no presentation will be displayed. Interactive Plot options would have to be used to select a presentation format for display.
The Zero Point drop down list has a list of sensors in the service. Any of the sensors or the bottom of the tool string may be selected as the zero point. The zero point of a tool string has zero offset to the encoder depth reading. Scientific Data recommends that the bottom of the tool string be used as the zero point in most logging services. In perforating services, the CCL is set as the encoder depth. In services that are normally run in a time drive mode at a set depth, such as a Noise Log or Freepoint Log, the sensor of interest should be set as the zero point to be able to position the sensor as desired.
In acquisition, when a service has been selected, that service name will normally be displayed. By typing in the Title field of the Service Editor, the service displayed may be different than the service name.

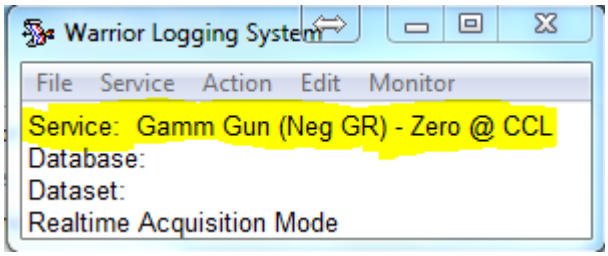


FIG: 13.3 Service

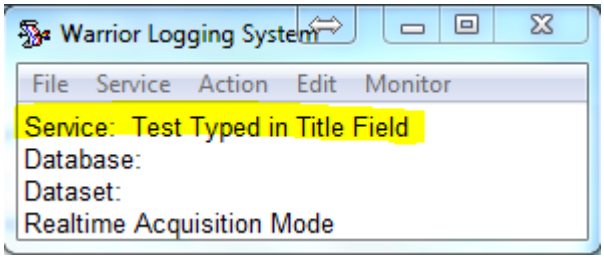


FIG: 13.4 Service different Name

13.3 Adding and Removing Tool Types

Tool types can be added or deleted from a service. To delete a tool type from a service, click on the tool type in the Tools drop down list. Then either push the <Delete> key on the keyboard or on the Services Editor menu bar, click on Delete. A window will come up to confirm that you wish to delete the selected tool type.

Warning! Tool names, Model names, and Serial names can contain a maximum of 39 characters and cannot have any spaces.

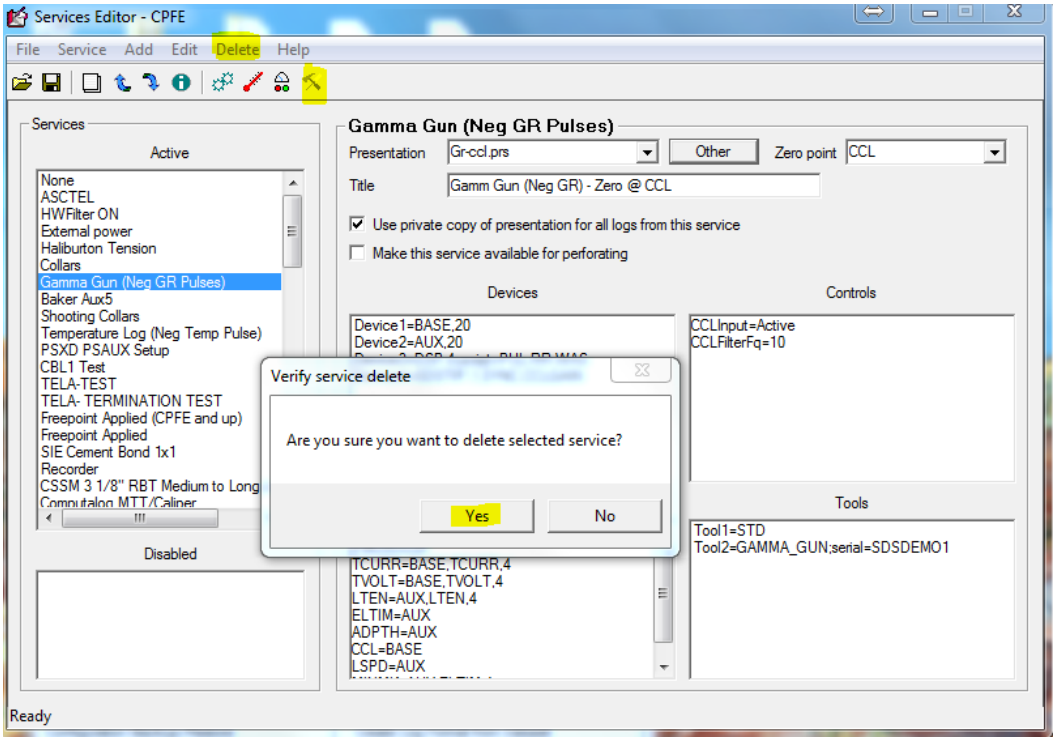


FIG: 13.5 Tool Delete

It is recommended that the sensors that the tool type produced be deleted in a similar manner at the same time, although if the sensors are left in, the service should still work.
To add a tool type to a service, on the Menu Bar click on Add -> Tool. An Add tool dialog box will come up with the next available tool number. Enter the tool type in the dialog box. Only the tool type needs to be entered, a specific serial number for that tool type is not required at this time (i.e. Tool6=GR not Tool6=GR; Serial=1234). When the service is next used, it will call up the first available serial number of that tool type that it can find. It is necessary for the tool type to exist in the tools.ini file. If the tool type does not exist, then when the service is called up from acquisition, you will get an error message and it will not work.

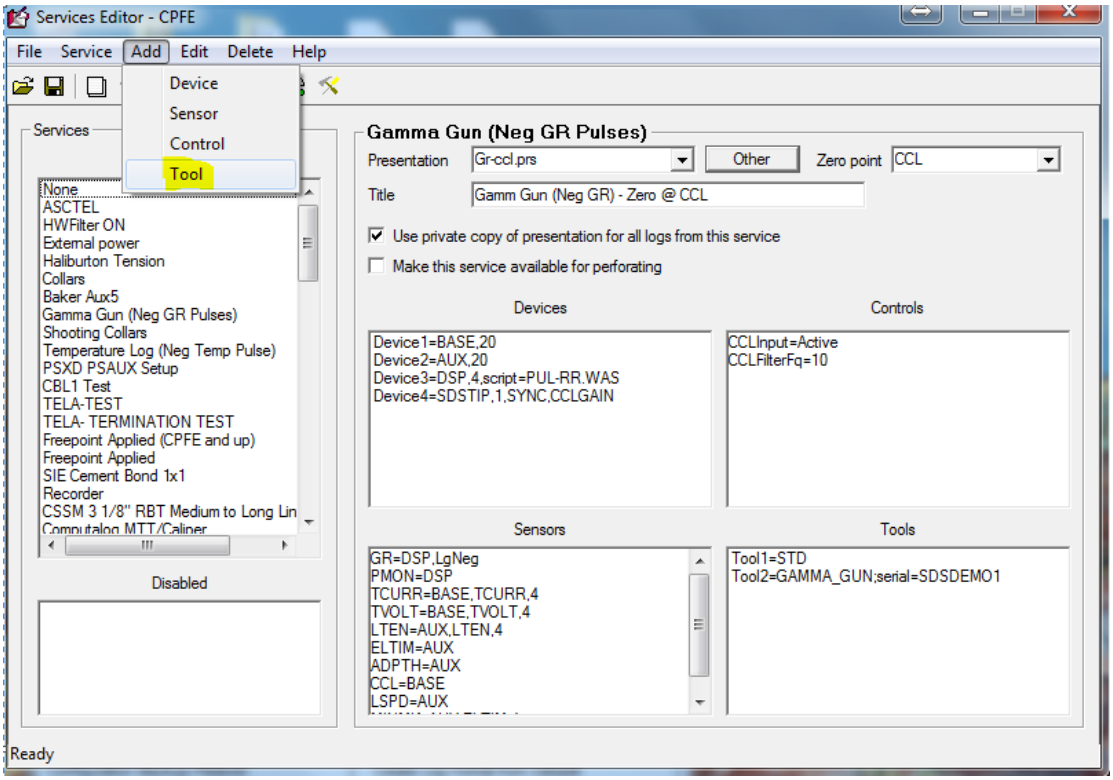


FIG: 13.6 Add Tool

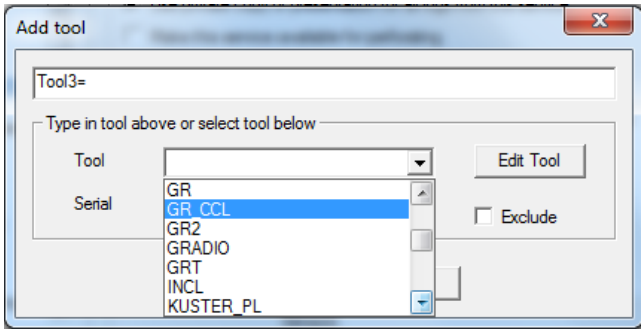


FIG: 13.7 Edit Tool

When a tool is added to a service, sensor(s) will normally have to be added also. The software modules that the tool type uses will have specific sensors, as shown in the Tool Editor. Each of these sensors will have to be added to the service or when the service is called up from acquisition you will get an error message and the service will not work.

To add a sensor to a service, click on **Add -> Sensor** on the Service Editor menu bar. The Add Sensor dialog window will come up. Enter the sensor mnemonic, followed by an equal's sign "=", then the Device that the sensor acquires data from, then the channel of that device, and the sample rate for storing the sensor data (Sensor=Device,Channel,Rate). The Device must be listed in the Devices drop down list. The device and channel that a sensor will use is hardware dependent, and in the case of the DSP also script dependent. It is beyond the scope of this document to explain further. For more help contact Scientific Data Systems, Inc.

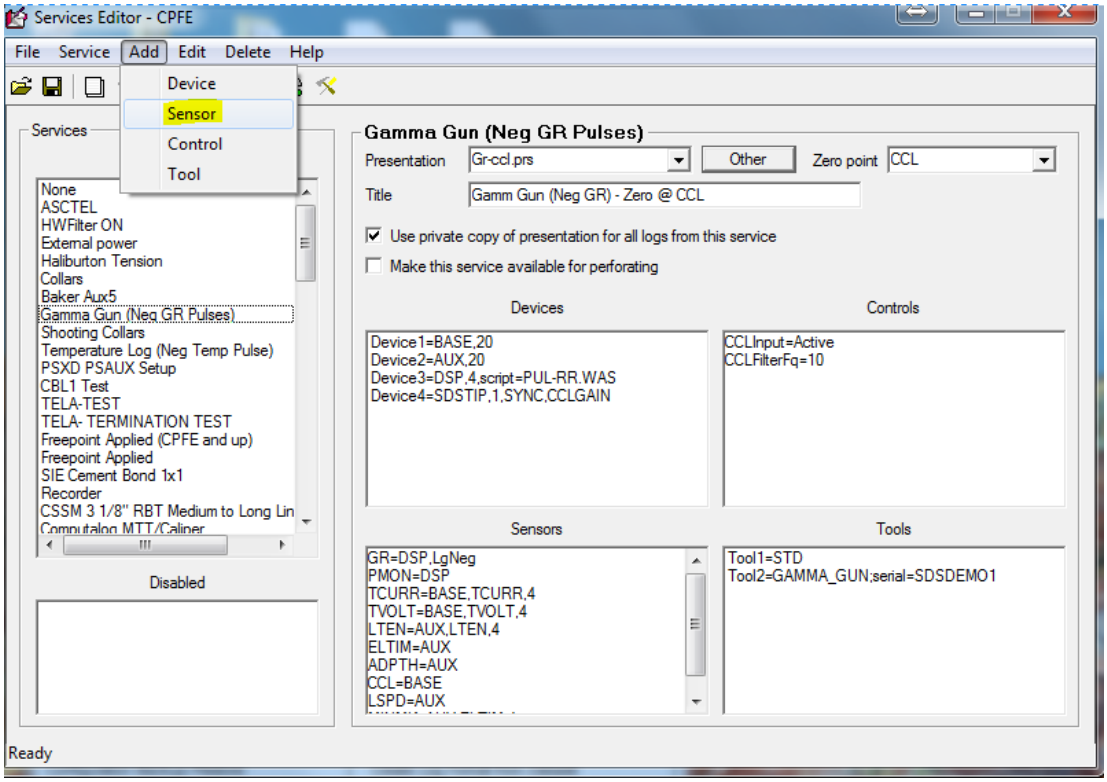


FIG: 13.8 Add Sensor

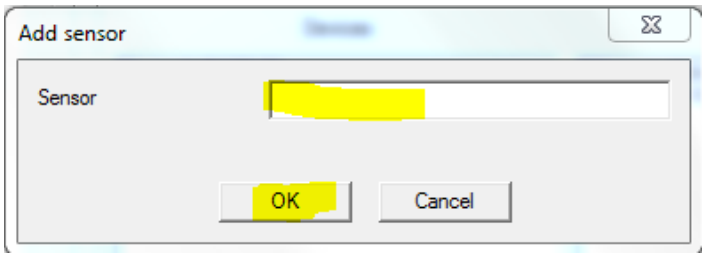


FIG: 13.9 Type New sensor

Devices and Controls may be added and removed in a similar manner. Again, they are hardware dependent and beyond the scope of this document. For more information contact Scientific Data Systems, Inc.
Any line in the Devices, Controls, Sensors, and Tools list may be edited. To edit a line, click on the desired line, then on the menu bar click **Edit**. Double clicking on a line will also invoke the edit command.

13.4 Add Surface Sensors

ADD Wellhead Pressure Sensor on AUX4

Select Database Utilities

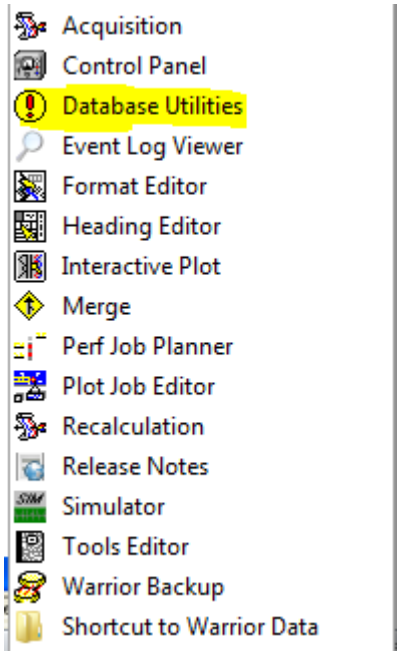


FIG: 13.10 Database Utilities

Select Edit Logging Tools Details

FIG: 13.11 EDIT Logging services Details

Select the service to add the new WHP sensor

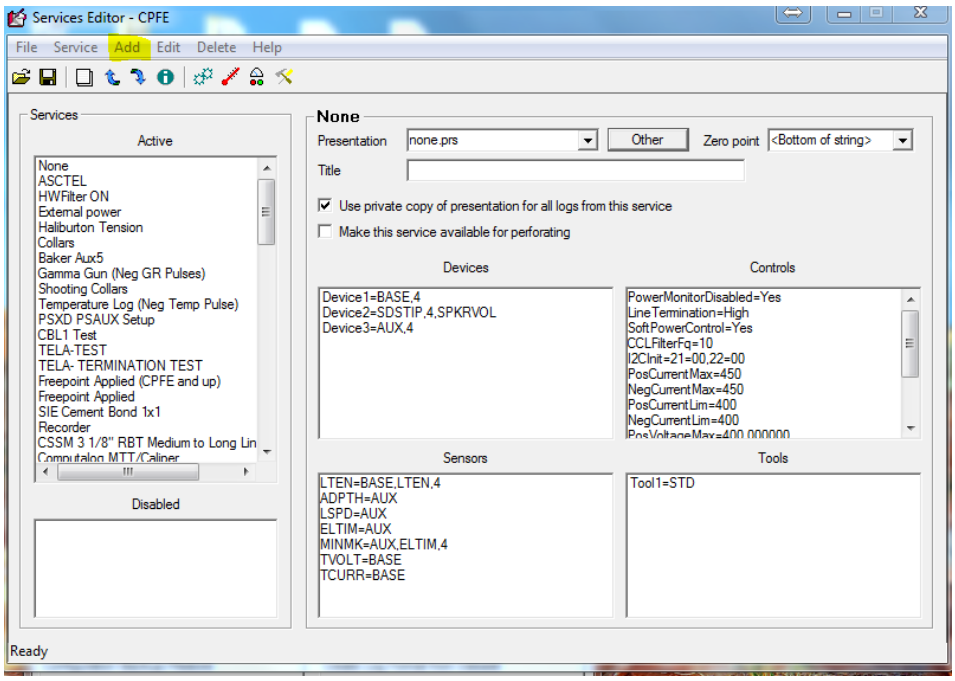


FIG: 13.12 Select the Service

Add new Sensor

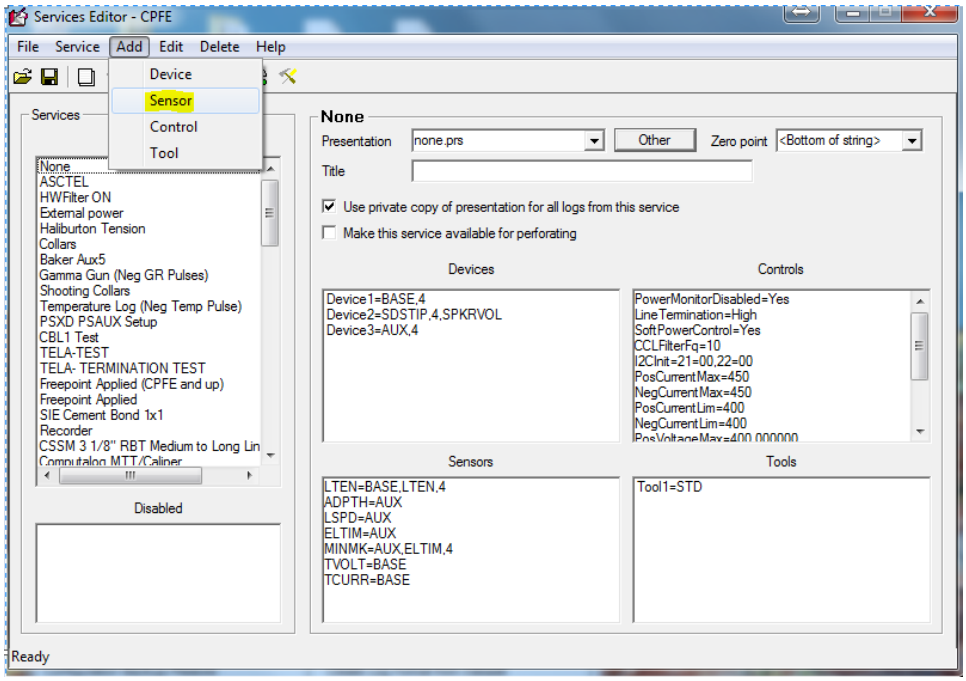


FIG: 13.13 Sensors

Type WHP1 = BASE, 11

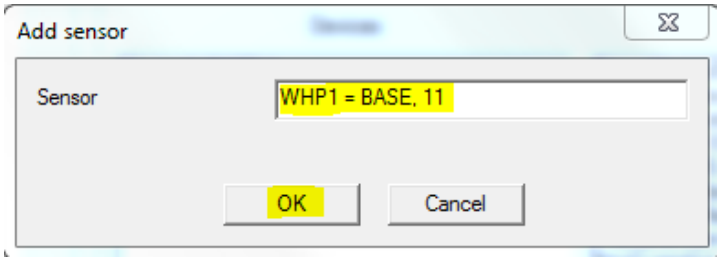


FIG: 13.14 Add sensors

Select **OK** and Save the service

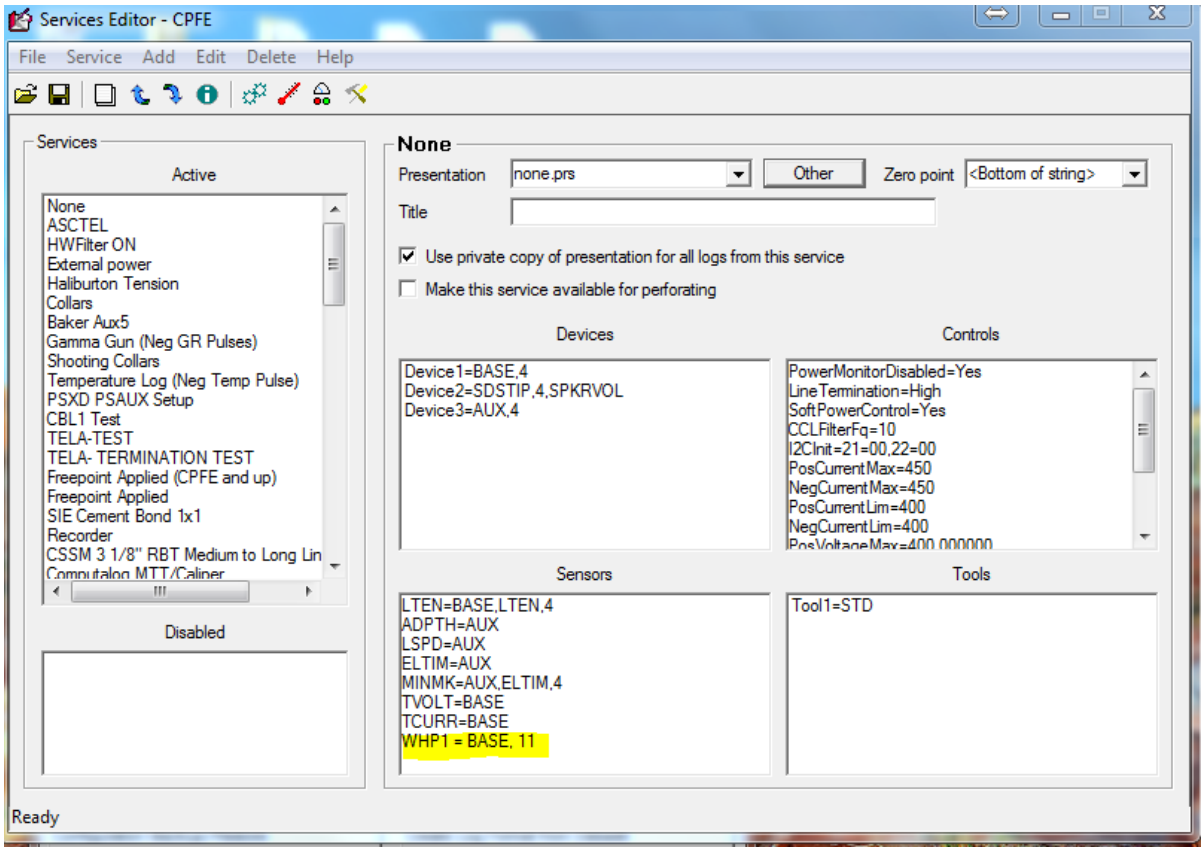


FIG: 13.15 Set sensors

Open the service

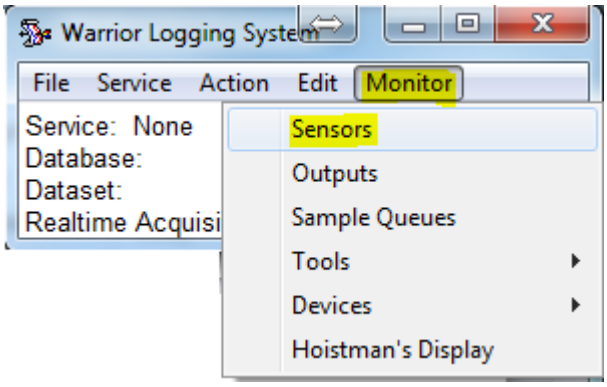


FIG: 13.16 Monitor sensors

Select Monitor/Sensors

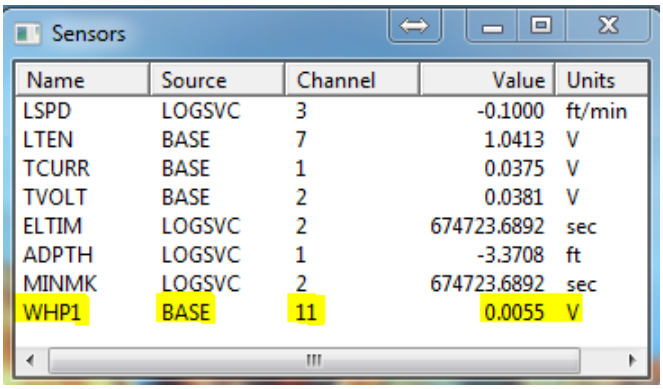


FIG: 13.17 Sensors Value

Sensor Value in Volts

Select Monitor/Outputs

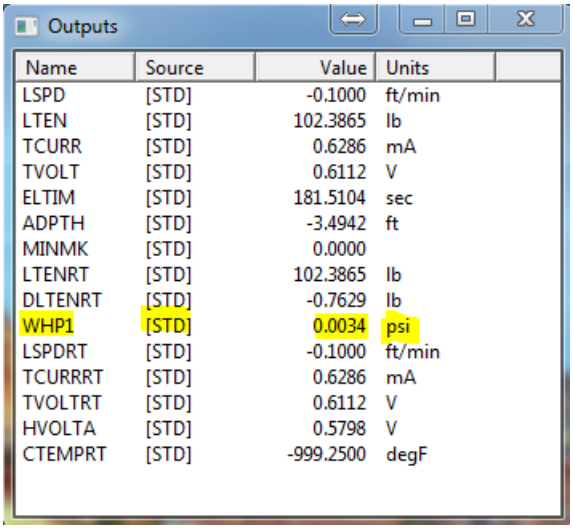


FIG: 13.18 Output Value

WHP1 (psi.)

Select Action/Calibration Wellhead Pressure 1

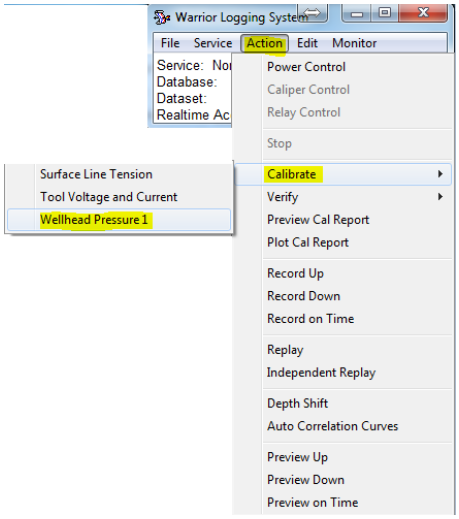


FIG: 13.19 Action/Calibrate

Set the low and high value to calibrate the WHP1 Sensor.

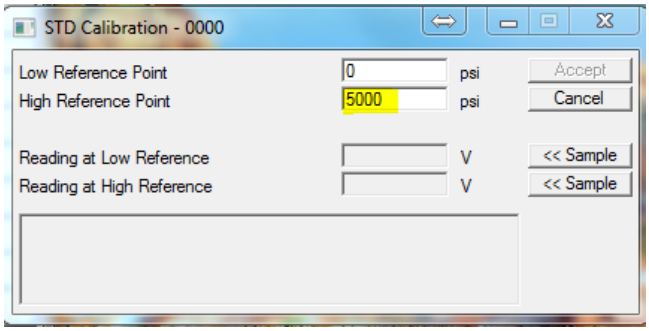


FIG: 13.20 Set Calibrations Points

On side DB25 Add 250 Ohms

AUX4 - Auxiliary Inputs	DB25 Pin OUT	USB44	SOFTWARE CHANNEL
4-20 mA	AUX4-2	CC13-2	BASE,15
4-20 mA	AUX4-3	CC13-3	BASE,14
4-20 mA	AUX4-4	CC13-4	BASE,13
4-20 mA	AUX4-5	CC13-5	BASE,12
4-20 mA	AUX4-6	CC13-6	BASE,11
Frequency	AUX4-9	CC13-34	CTR3
Frequency	AUX4-10	CC13-35	CTR2
	AUX4-21	CC1-19	+5V
	AUX4-22	CC1-20	GND
	AUX4-23	CC1-21	-15V
	AUX4-24	CC1-22	+15V

Add Resistors (250 ohms) to convert the current loop 4-20mA to Voltage 1 -5 volts

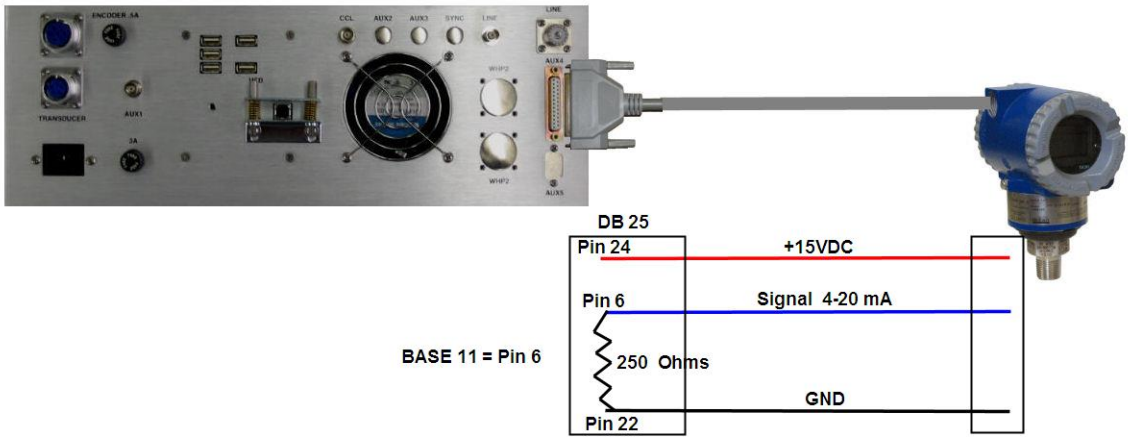


FIG: 13.21 AUX 4 Hardware Connections

WPH1 and WPH2 Connectors for ASW-Board version 11 or latest

CONNECTORS INPUTS	ANSW	SOFTWARE CHANNEL	SIGNALS
WHP1-A	CC7-11	BASE,9	-(4-20MA) Input Negative
WHP1-B	CC7-10		+(4-20MA) Input Positive
WHP1-C			
WHP1-D	CC7-8		WHP1 +15V Excitation
WHP1-E	CC7-20		Ground
WHP2-A	CC7-14	BASE,10	-(4-20MA) Input Negative
WHP2-B	CC7-13		+(4-20MA) Input Positive
WHP2-C			
WHP2-D	CC7-18		WHP2 +15V Excitation
WHP2-E	CC7-42		Ground

13.5 Realtime Calculator

13.5.1 Realtime Calculator

Real time calculations can be added to a service. From the Service menu drop down, select RTCalc. Or right click the service from the service in the tree view and select RTCalc from the context menu.

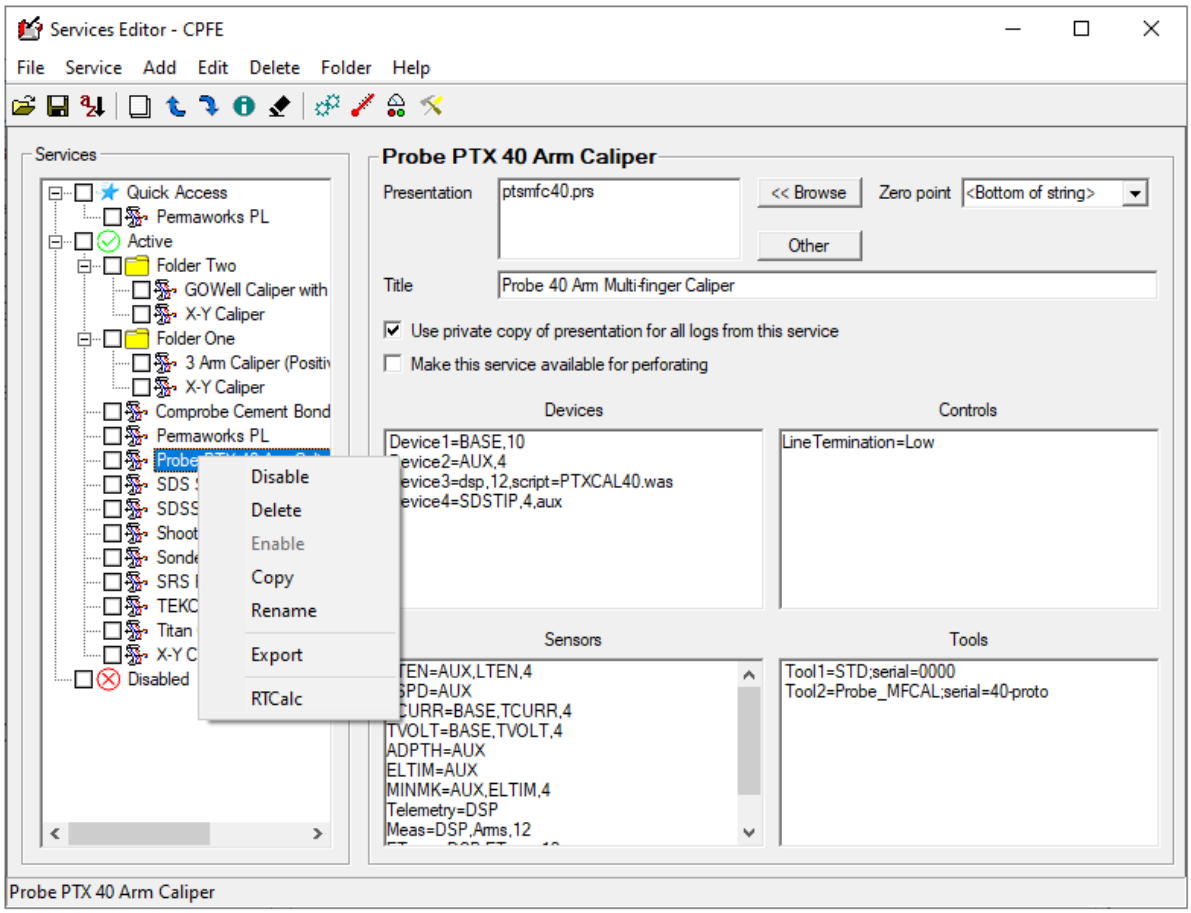


FIG: 13.22 Realtime Calculator Service Editor

Select RTCalc will bring up a formula editor.

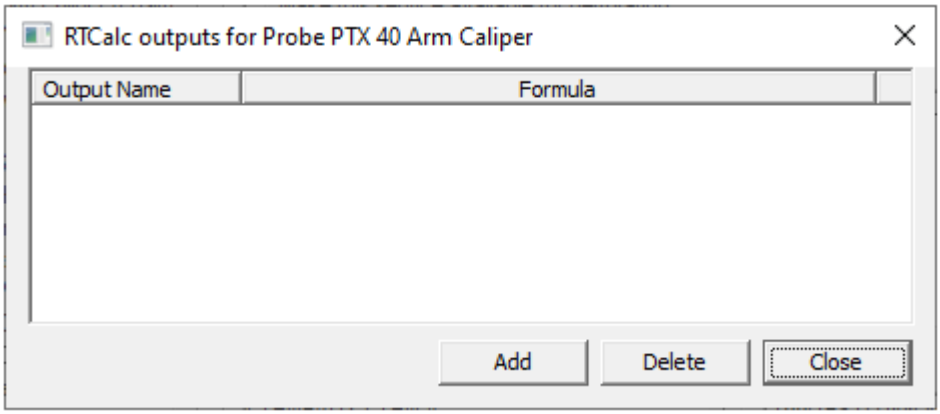


FIG: 13.23 Realtime Calculator Output Window

Formula will require an output name and a formula to apply.

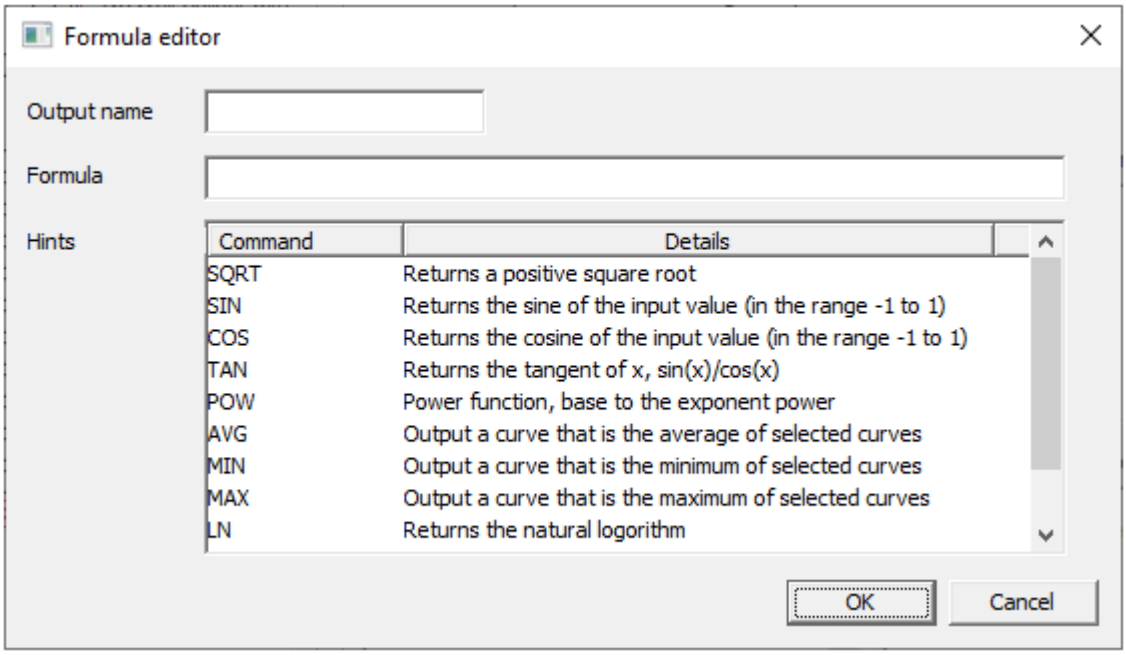


FIG: 13.24 Realtime Calculator Formula Editor

Type in a name for the output. Select a formula to apply from the list.

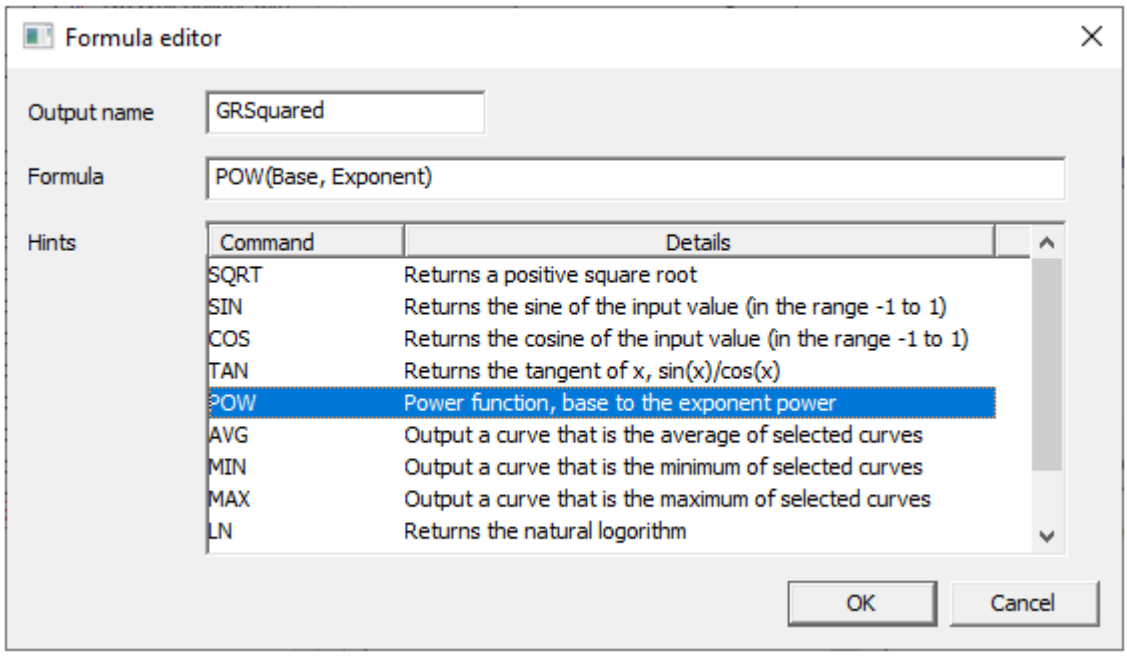


FIG: 13.25 Realtime Calculator Formula Selection

Fill in the formula with output names and constant values - OK to save.

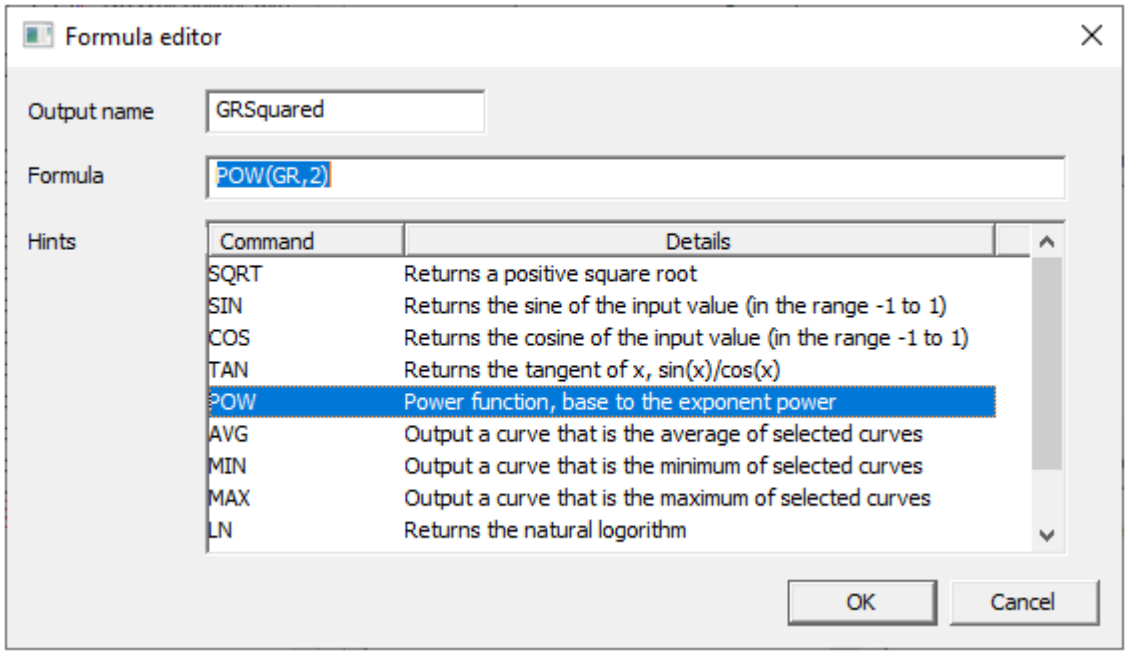


FIG: 13.26 Realtime Calculator Formula Editing

Add as many as you need to the formula list:

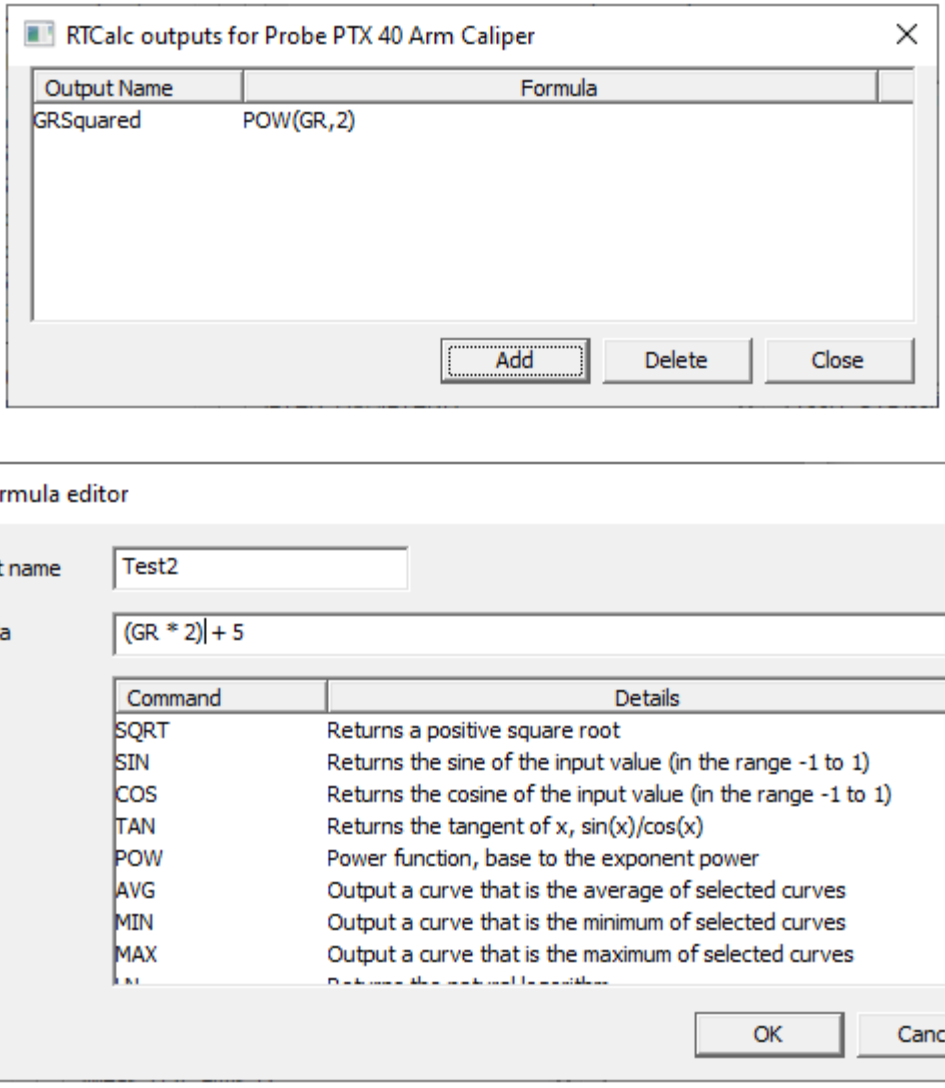


FIG: 13.27 Realtime Calculator Multiple Entries

Errors will be indicated at the bottom of the dialog

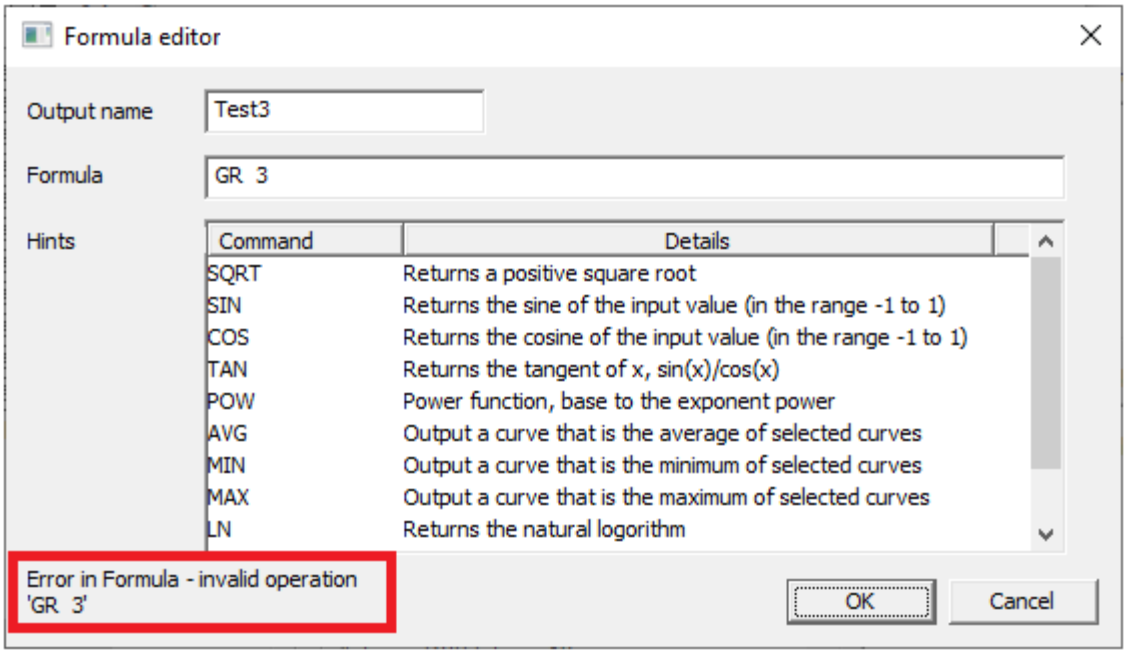


FIG: 13.28 Realtime Calculator Error Indications

Formulas can have optional arguments. Insert in brackets:

AVG(CAL1, CAL2, [CAL3], [CAL4])

** AS ALWAYS, save and exit service editor before loading service to pick up formula changes.

13.6 Modifying the Service List

The Service Editor can be used to modify the appearance of the service list in a variety of ways. Services can be renamed, have where they appear in the list changed, be temporarily disabled so that they do not appear as a selection in **Acquisition**, or can be completely removed from the services.ini file.
To change the name of a Service in the active service list, click on the service. (Only services that are in the active service list can be renamed.) Then on the menu bar, click on **Service -> Rename.** A dialog box will come up with a place to type in the new name for the service. When the **OK** button is pressed, the service name will be changed.

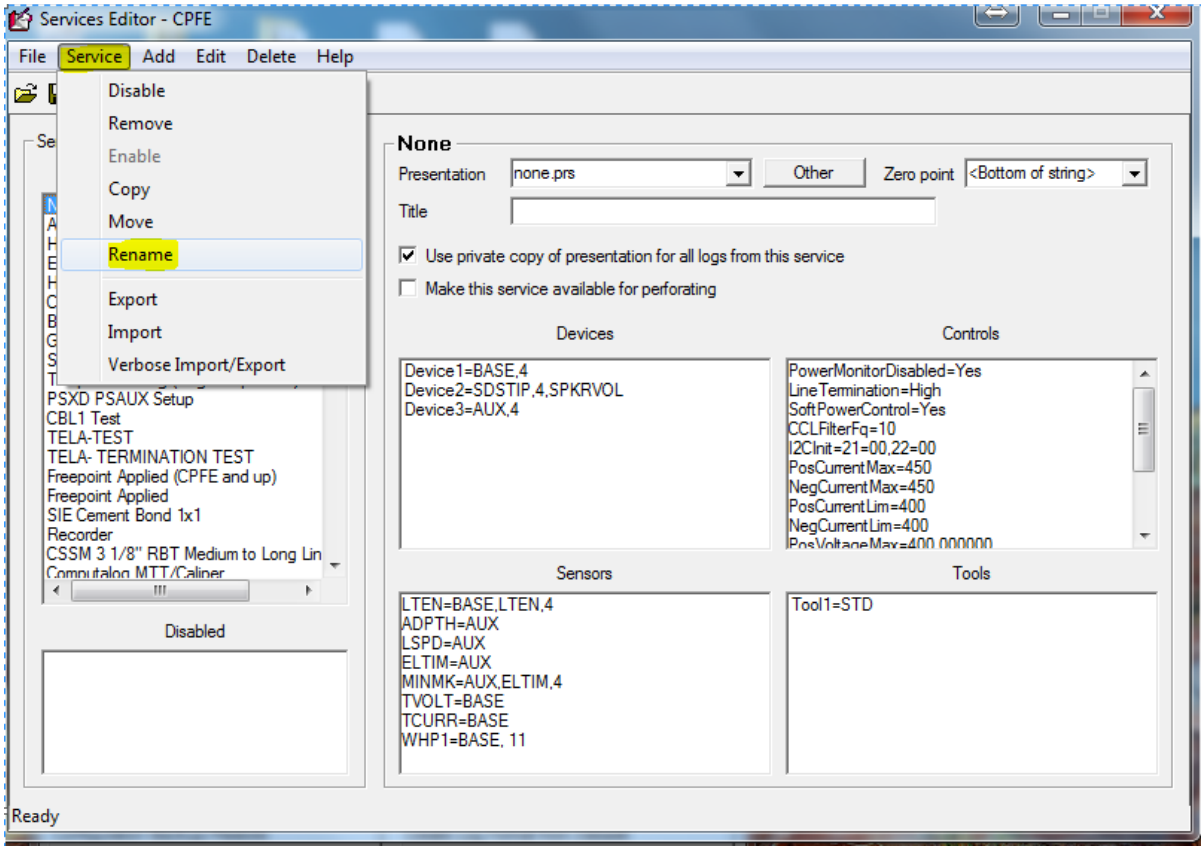


FIG: 13.29 Rename

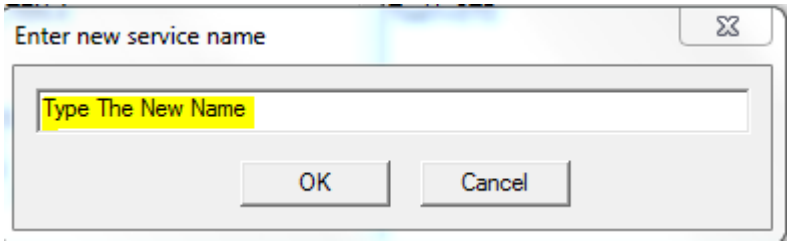


FIG: 13.30 Enter new Service Name

Moving a service can change the order of the services in the active service list. To move a service, click on the service in the list. Then on the menu bar, click on **Service -> Move.** A dialog box will ask you to choose a location in the current list to move the service to. The service will then be moved to the selected location in the list with other services between the original location and the new location moving up or down in the list as needed.

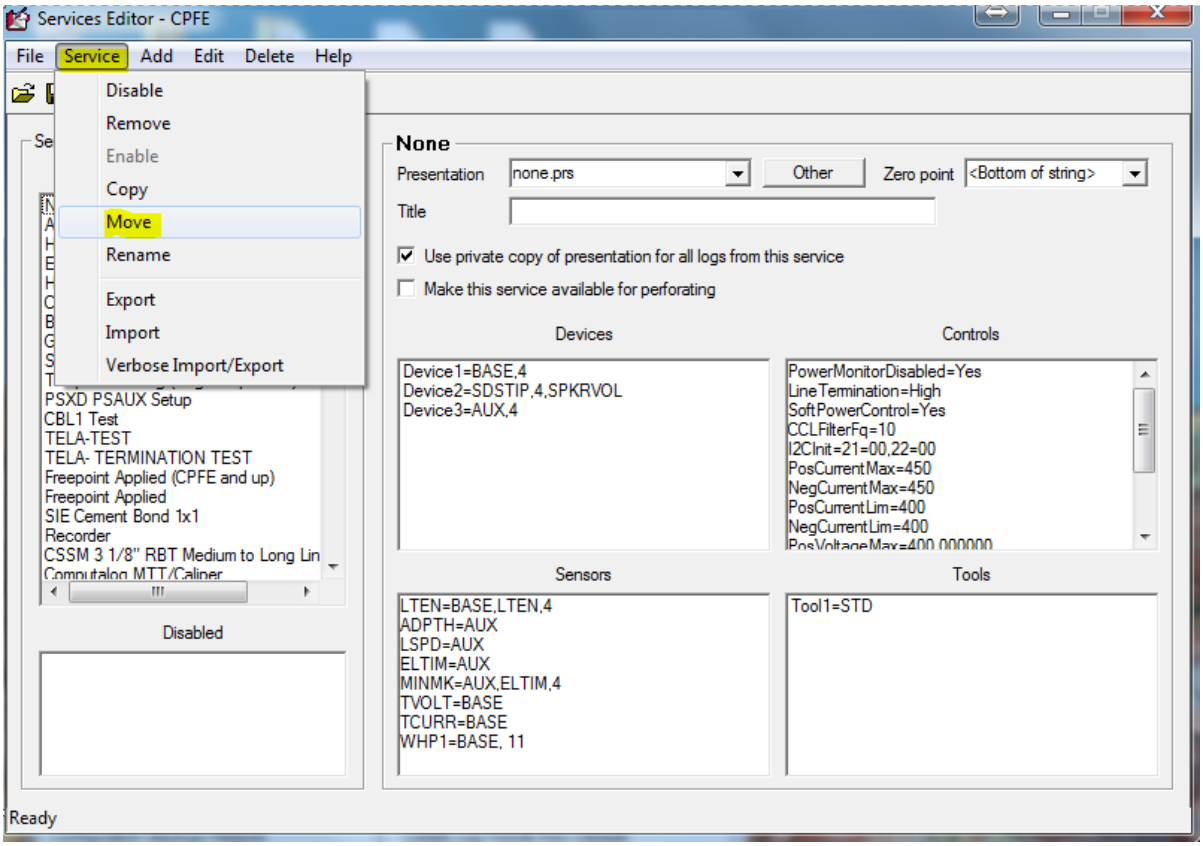


FIG: 13.31 Move Service

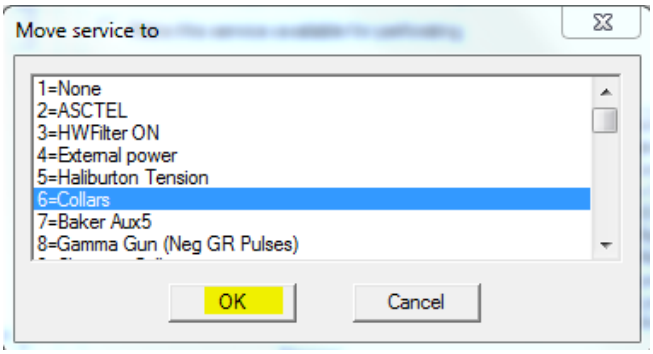


FIG: 13.32 Move service to

A service can be disabled so that it does not appear in the Acquisition service selection list. It will remain in the services.ini file so that it can be reactivated or enabled at some later date. To disable a service, click on the service in the Active list. Then on the menu bar, click on **Service -> Disable**. The service will immediately be moved to the disabled list. Any service that is in the Disabled list can be put back into the

Active list. Click on the service in the Disabled list. Then on the menu bar, click on **Service -> Enable**. The service will immediately be moved from the Disabled service list to the bottom of the Active service list.
A service from either the Active service list or the Disabled service list may be removed. Once removed it will no longer be available. When the service has been selected and **Service -> Remove** clicked on from the menu bar, a confirmation window will come up. If you click **No,** the removal process will be terminated. If you click **Yes**, the service will be removed from the list.

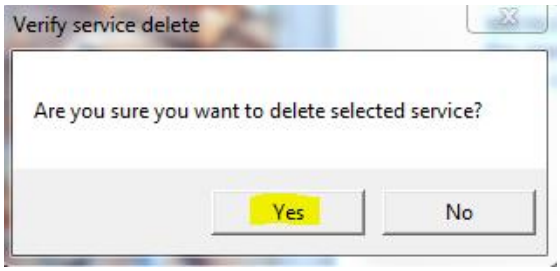


FIG: 13.33 Service Delete

13.7 Adding Services

The two most common ways to add new services are to copy an existing service that you have or to import a service from an exported service list or a different services.ini file. Copying a service is normally used if you have an existing service that works, but you need an additional service that is very similar, such as having a Gamma Ray service that detects positive pulses and needing a Gamma Ray service that detects negative pulses. Importing a service is normally used to add a service that has tool types that the present service list does not support.

13.6.1 Copying a Service

To copy an existing service, click on the service that you wish to copy that is in the active service list. Then on the menu bar, click on **Service -> Copy.** A dialog box will come up requesting you to enter a name for the new service that you are about to create. The name cannot be the same as any name that currently appears in either the existing active or disabled service list. When you click on the **OK** button, the new service will be added to the bottom of the active service list. Be aware that the service information that is displayed on the right side of the Service Editor window is the information for the original service that was selected. If changes are to be made to the new service that was created, you must first click on that service in the active service list.

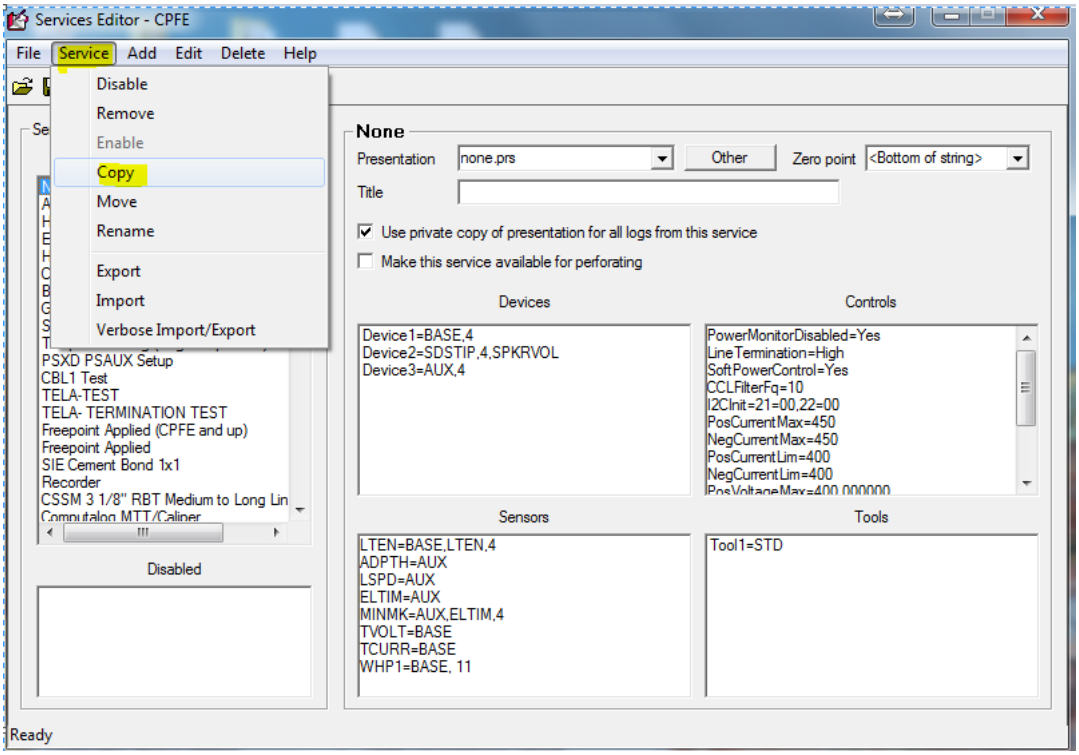


FIG: 13.34 Copy service

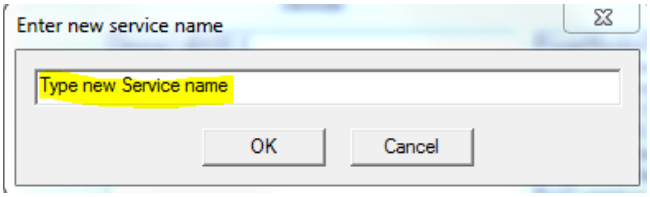


FIG: 13.35 Type new Service name

13.8 Importing Services

Services can be imported from a variety of sources. They can come from the Warrior cased hole (CH_80.serv.wbu) service list or from services that have been exported from other warrior systems. With a little effort, they can be imported from service.ini files. Be aware that for an imported service to work, the tool types that the service calls out must exist in the tools.ini file. The Tool Editor can be used for restoring calibrations for tool types to the tools.ini file.

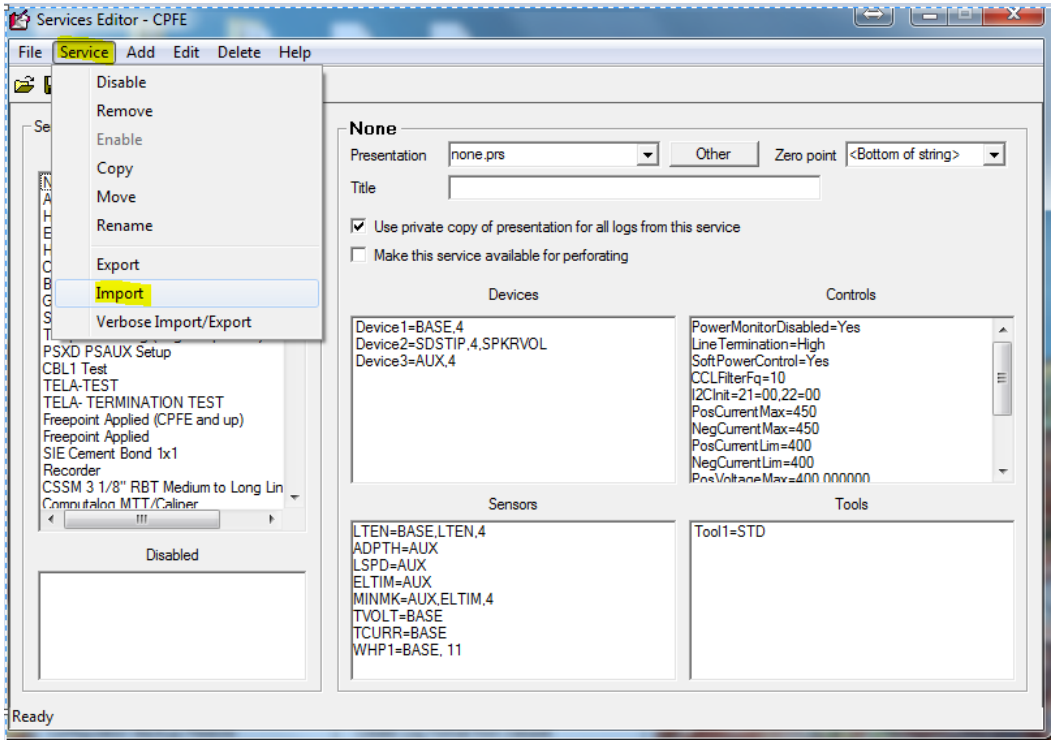


FIG: 13.36 Import service

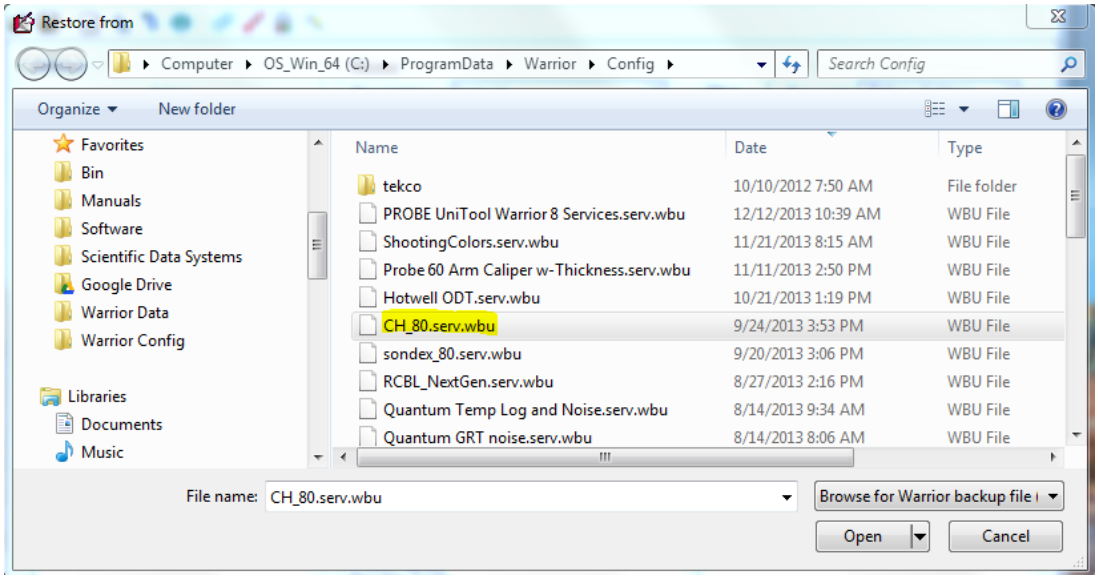


FIG: 13.37 Select warrior service file

To import a service, on the menu bar, click on **Service -> Import.** A browse window will come up looking for a WSV file in the Warrior\Config folder. If you select the **CH_80.serv.wbu** file, it contains nearly 135 logging services that support most types of cased hole equipment. Click on one or more of the services that are listed. Each of the services chosen will be added to the bottom of the active service list.
Services that have been exported from the service editor are normally saved with the **WBU** extension but have been given a file name at the time they are exported. These files may be read in the same manner. You may have to use the look in drop down list to locate the correct drive (and folder) to read them.

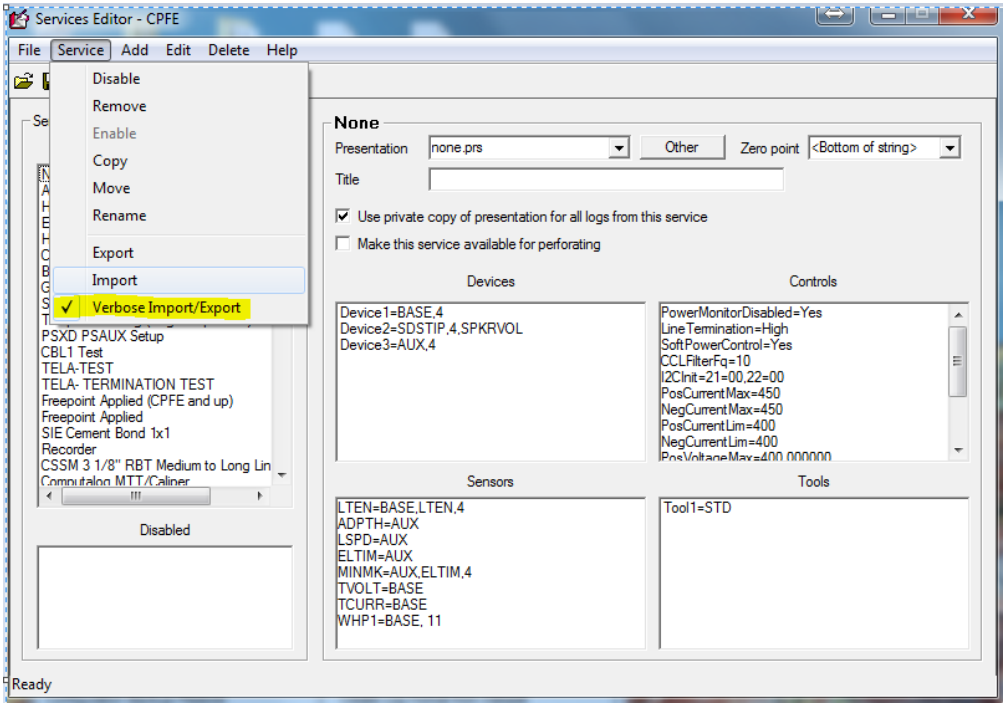


FIG: 13.38 Select Verbose Import/Export

IF YOU ENABLE THIS CHECK BOX AT THE END OF EITHER AN IMPORT OR EXPORT A TEXT STATUS WINDOW WILL POP UP INDICATING WHAT WAS IMPORTED OR EXPORTED AND THE STATUS OF THE PROCEDURE.

13.9 Exporting Service

The purpose of exporting a service or multiple service is so that they can be imported and used on a similar system that uses the same type of devices. To export a service, on the menu bar, click on **Service -> Export**. A list of the existing active services is then brought up. Click on one or more services in the list and each will become highlighted. When the **OK** button is clicked, a **Browse** for Warrior Service File window will come up. Enter a file name in the file name box. When the **Save** button is clicked, the file will be saved in the folder indicated in the Save in: drop down list.

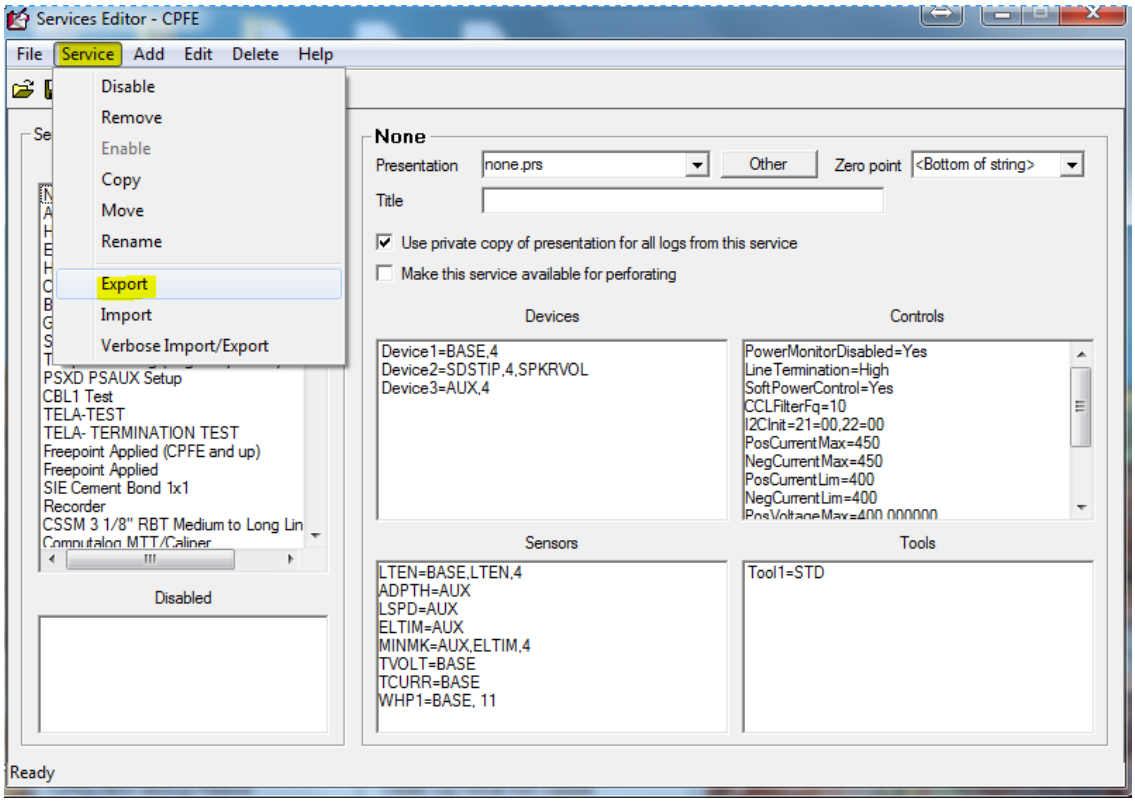


FIG: 13.39 Export

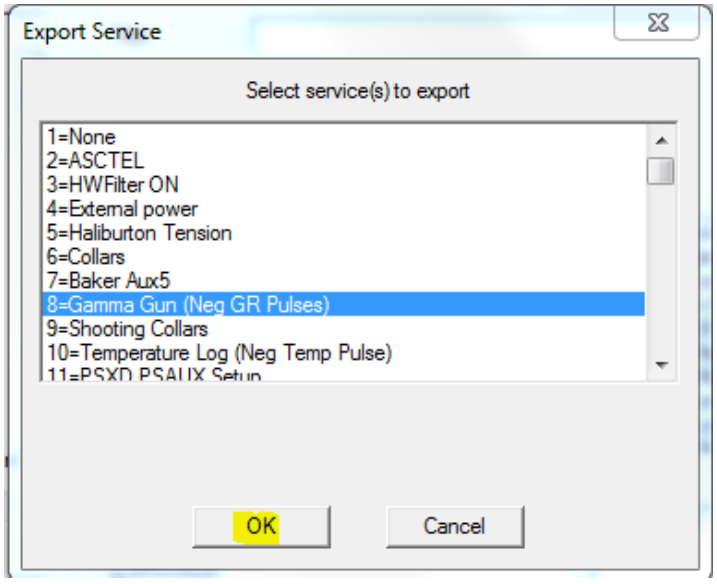


FIG: 13.40 Export service

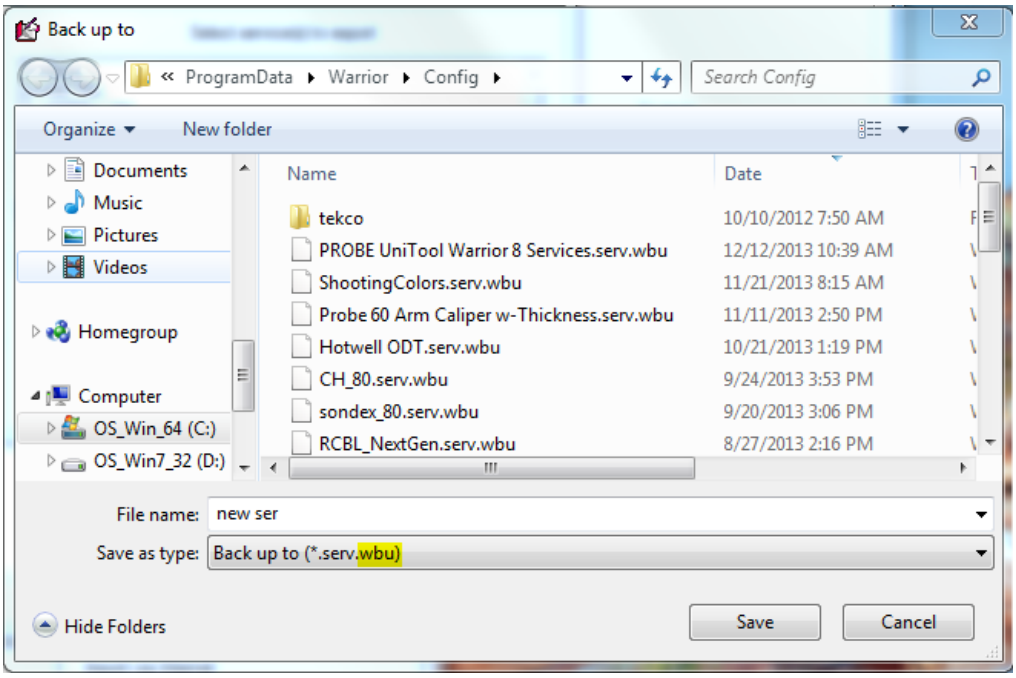


FIG: 13.41 Save new service

This will create a wbu file containing the service(s) and serial numbers of all the services and tools selected. This file can be brought over to any warrior 8 system and imported.

Section

14

14 Tools Editor

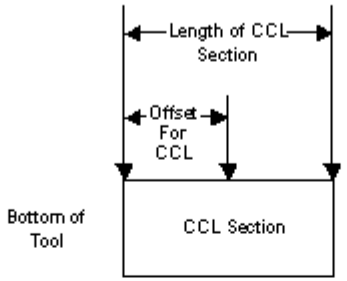
When tools are ran in a service (by editing the tool string for a service), they are chosen by type and serial number. Each serial number is assigned to a specific tool model. Each model of tool has the information that the Warrior System Software uses to process the data that it receives. This includes such general information as type of software, sensor offsets, sensor filtering, and tool length (which effects the offsets of other sensors in the tool string).
By using the tool editor, the pertinent information for each model can be easily changed, new serial numbers created, and new models created. The Tool Editor can be accessed from the Utilities Program in the Warrior Software Group Menu.

We suggest that a backup of the tools.ini file be made before any editing is done so that information may be recovered if mistakes are made.
Tool names, Model names, and Serial names can contain a maximum of 39 characters and cannot have any spaces.

FIG: 14.1 Select edit logging Tool Details

In the Fig: 14.2 through 14.7 show the way to take the tool measurements for Length and Offsets

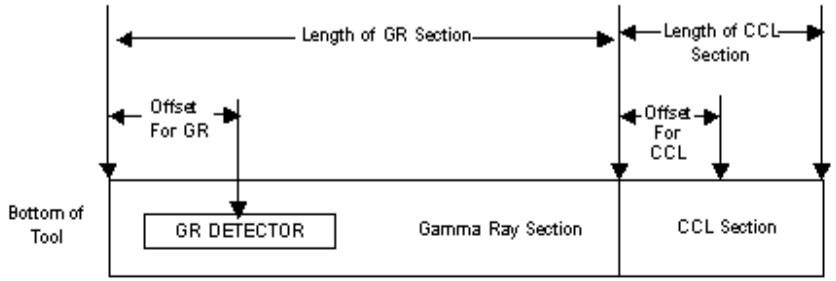
CCL Tools



Model					
Serial Number					
Diameter of Tool					
Length of CCL Section					
Offset For CCL					

FIG: 14.2 CCL Tool Length and Offset

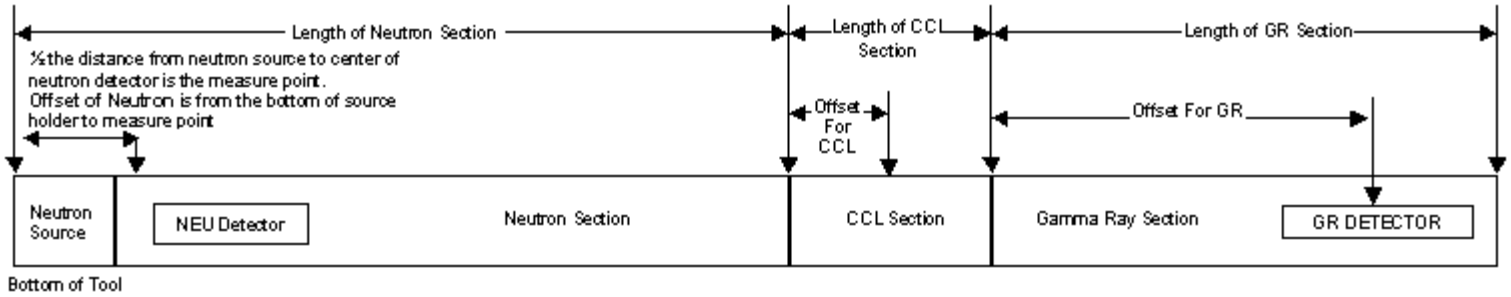
Gamma Ray CCL Tools



Model					
Serial Number					
Diameter of Tool					
Length of GR Section					
Offset For GR					
Length of CCL Section					
Offset For CCL					

FIG: 14.3 Gamma Ray /CCL Tool Length and Offset

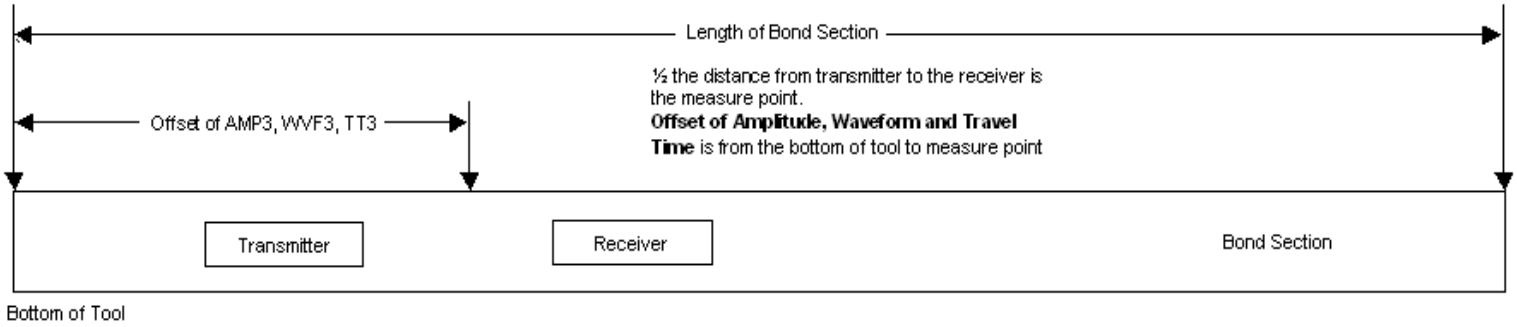
Gamma Ray Neutron CCL Tools



Model					
Serial Number					
Diameter of Tool					
Length of Neutron Section					
Offset For Neutron					
Length of CCL Section					
Offset For CCL					
Length of GR Section					
Offset For GR					

FIG: 14.4 Gamma Ray /Neutron/CCL Tool Length and Offset

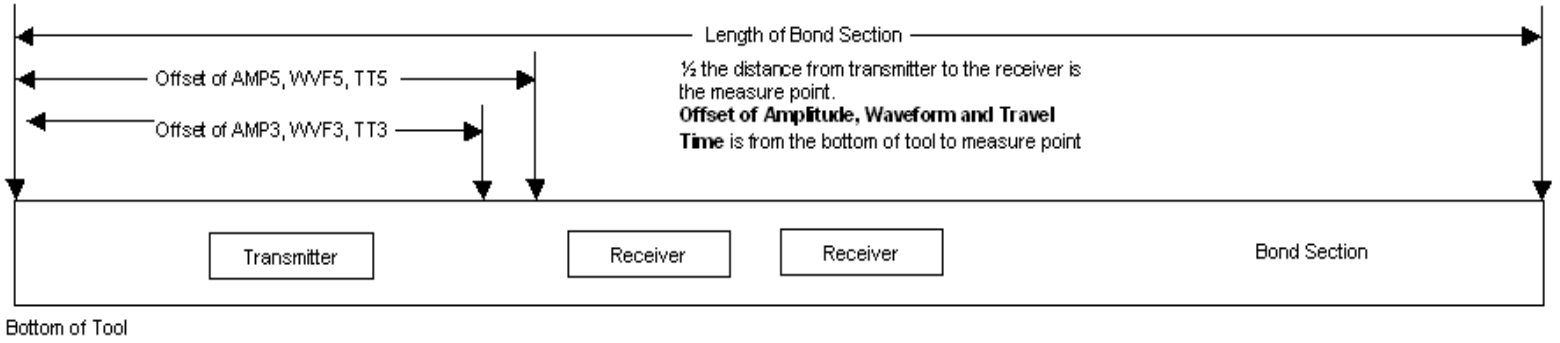
Single Receiver Bond Tools



Model					
Serial Number					
Diameter of Tool					
Length of Bond Section					
Offset For AMP3, WVF3, TT3					

FIG: 14.5 Single Receiver Bond Tool Length and Offset

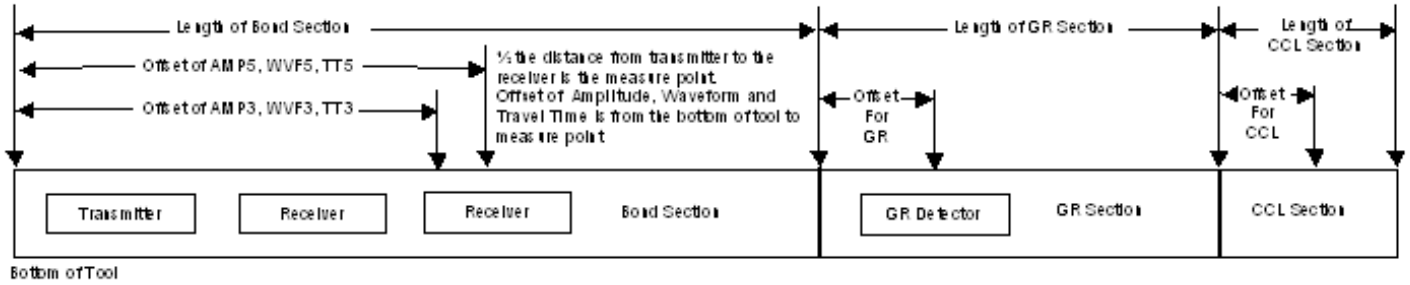
Dual Receiver Bond Tools



Model					
Serial Number					
Diameter of Tool					
Length of Bond Section					
Offset For AMP3, WVF3, TT3					
Offset For AMP5, WVF5, TT5					

FIG: 14.6 Dual Receiver Bond Tool Length and Offset

Dual Receiver Bond Tools GR CCL



Model					
Serial Number					
Diameter of Tool					
Length of Bond Section					
Offset For AMP3, WVF3, TT3					
Offset For AMP5, WVF5, TT5					
Length of GR Section					
Offset For GR					
Length of CCL Section					
Offset For CCL					

FIG: 14.7 Dual Receiver Bond/Gamma Ray/CCL Tool Length and Offset

14.1 Editing an Existing Model or Serial Number

To edit the information for a tool, click the **+** beside the Tools icon. This will show all the different types of tools that are currently available. Click on the **+** beside the type of tool that you want to edit. This will show all the serial numbers that are available for that tool type. Next click either a Serial Number shown or click on the Model drop down list and choose a model type. Any information that is changed will be changed for all serial numbers that are of that model type.
The measuring Units used for all dimensions, sensor offsets, and filters can be selected to be entered as either English (In, Lbs.) or Metric (Cm, Kg).
The Change Tool button can be used to convert a tool to a non-serialized item such as a centralizer or weight bar. Extreme caution should be used with this button. This is to be used to convert files from older versions of Warrior, to Warrior version 8.0. If a tool is converted to a tool with no serial number, the software type and all sensor information is removed.
Tool information is entered by selecting the Model, Software, and Diagram tabs at the top of the window. Each tabbed sheet will contain specific information about the tool model.

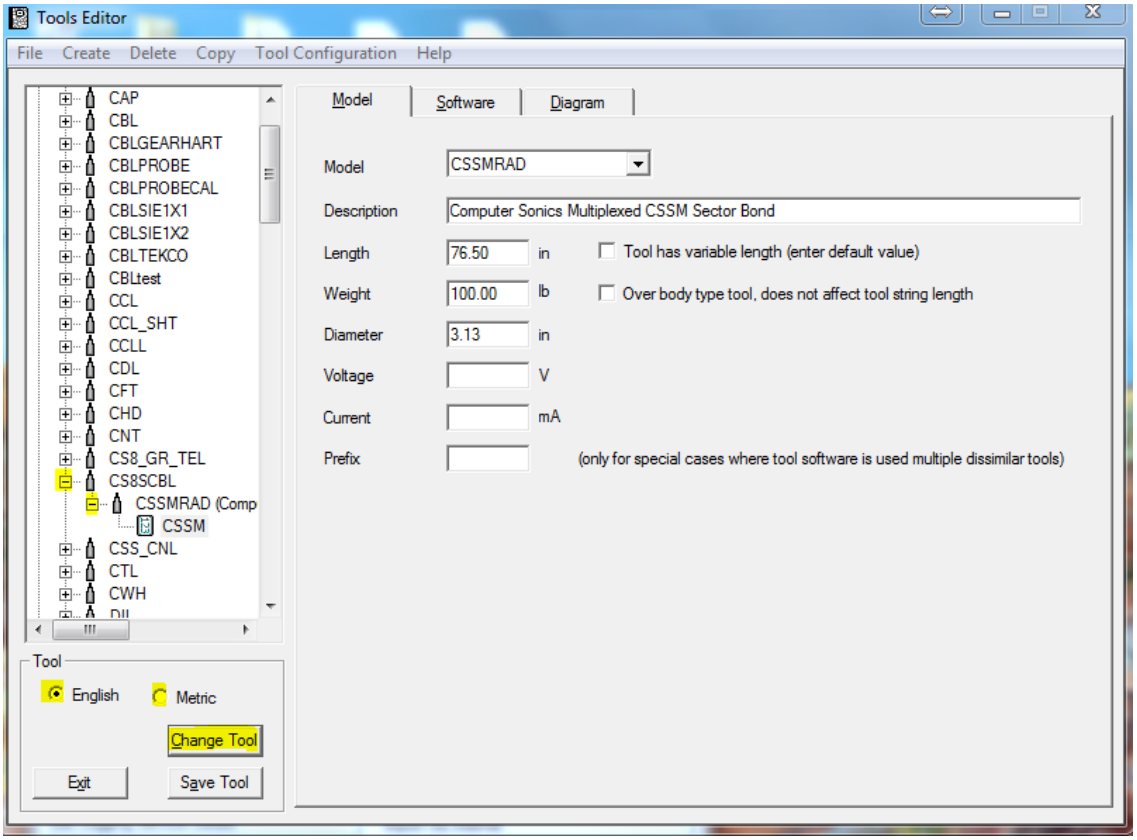


FIG: 14.8 Tools Editor

Under Model Specific information, a brief description of the model can be given (This description will appear in the tool string diagram and in some calibration reports). The Length of the tool should be measured from tool joint to tool joint. This should be an accurate measurement in that it can affect sensor measurements for other tools in the string. The Diameter of the tool can affect services that do flowrate calculations. The combined string length, string weight, and maximum tool diameter will be presented on any tool string

diagrams that are printed. Voltage and Current entries are not used by the Warrior software at this time but can be used as a reference for the user. A check box is supplied for tools that may have a variable length that can be set at run time such as guns or sinker bars.
The Software modules to be used for logging can also be selected. The selection of the software modules will determine what sensors and filtered outputs will be available for that model of tool. Other model specific parameters may be available depending on the software modules selected. The Warrior 8.0 Software now provides for selection of multiple software modules in the same tool model although the sensors for each module are configured separately.

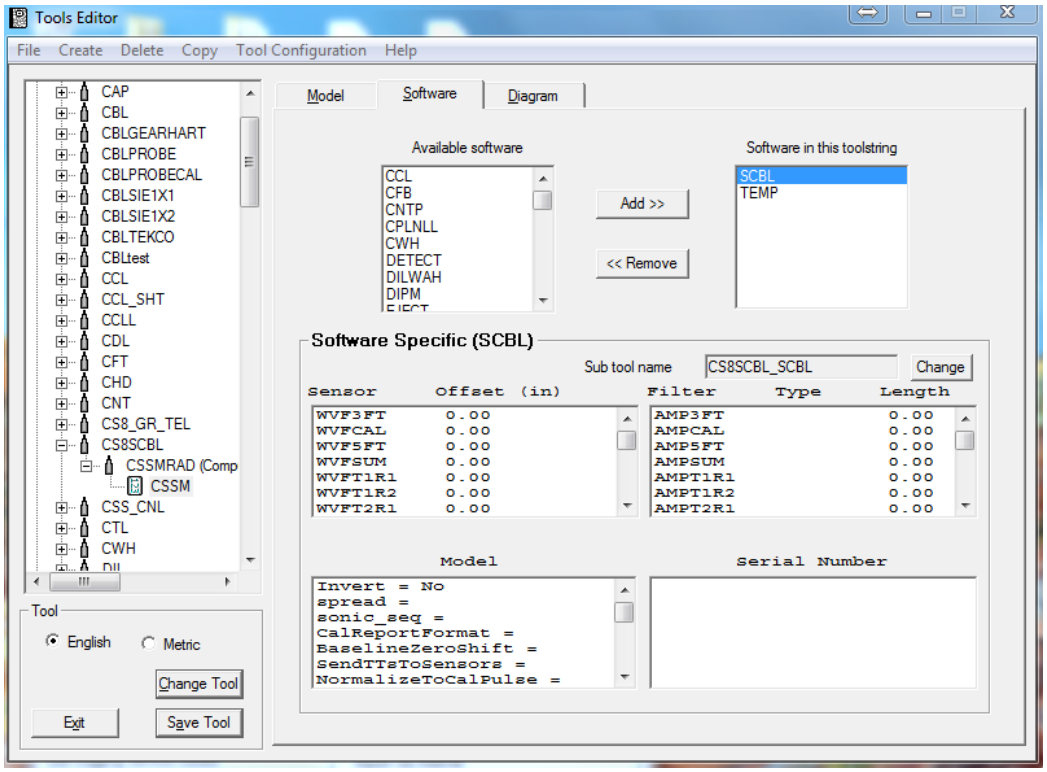


FIG: 14.9 Select Tool Model

Sensor Offsets should be measured from the lower makeup joint of the tool. Note that the sensor measurement for a source / detector or transmitter / receiver pair is half way between the two points. To change a sensor offset, double click on the sensor to bring up the edit box. Enter the appropriate measurements and click save.

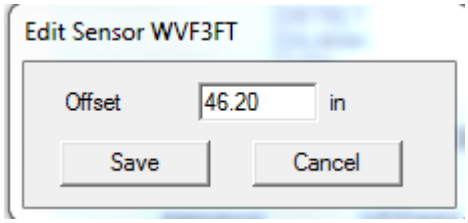


FIG: 14.10 Set Offset

To change a filter setting, double click on the appropriate sensor. There is a drop down list for the different filter types. Square filtering should be used with sensors that would change slowly, such as Tool Voltage, while Gaussian filters should be used with statistical sensors, such as Gamma Ray. The longer the Filter Length, the more pronounced an effect the filtering would have.

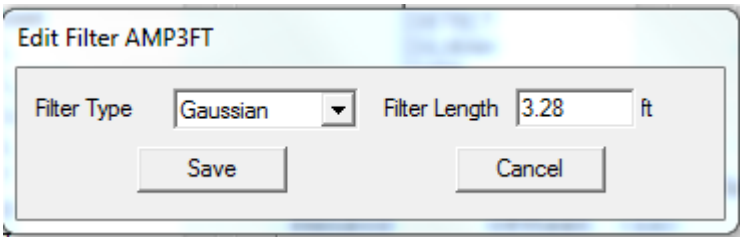


FIG: 14.11 Select the Filter Type and Filter Length

For some software modules, a specific Cal Report (Calibration Presentation) can be selected for the tool model.
The Model area contains information that is again determined by the software type. The Serial Number section is used for limited types of tools at this time.

14.2 Tool Diagrams

The diagram section of the tool editor allows the used to select or create tool diagrams for the tool model. If no Name is entered, the tool will be represented in tool string diagrams as a rectangle with the length and diameter given in the Model Specific area. The browse button next to the name box can be used to select an existing Warrior tool diagram. The selected tool diagram will now appear in the diagram window. The Zoom button can be toggled to change the display to see the complete width that will be displayed in a tool string diagram, although the length may not be to scale.

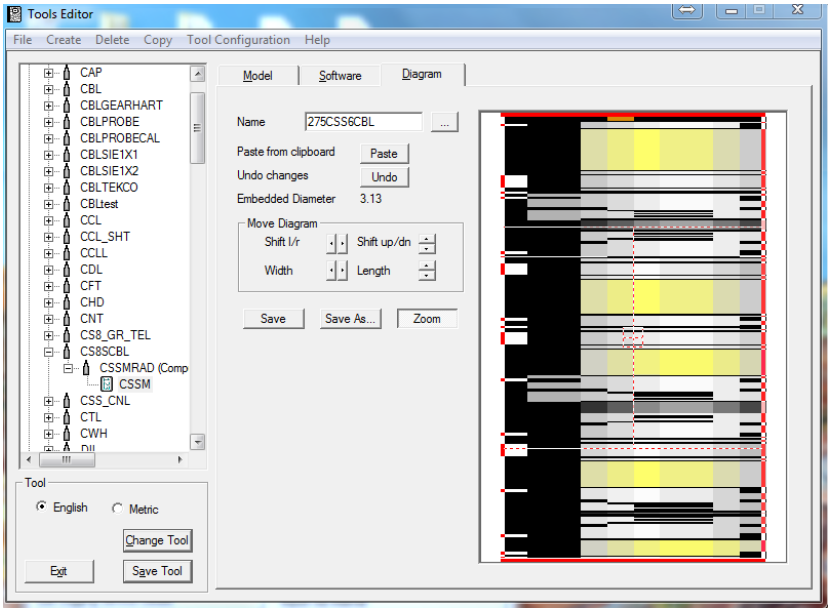


FIG: 14.12 Select Diagram

If you want to create your own tool diagrams using a third party graphics package, the only requirement is that the output file format be either Windows Metafile (*.wmf) or Windows Enhanced Metafile (*.emf). Once you have created the file, copy it to your C:\ProgramData\Warrior\Format directory and rename it to (*.wtd) for Warrior Tool Diagram.
For any diagram to line up when it is placed in a tool string, it needs to be modified by using the Tools Editor. Select the diagram you want to edit from the Tools Editor and the image should appear on the right side of the window. A red box will appear also which indicates the location where the image should appear for it to line up with another image of the same diameter. It is important that the image be sized using the proper diameter. If you have two devices that you want to use the same image for, but they have different diameters, then you need to save two different tool diagrams, one for each diameter.
To size the image, use the buttons to change the width and height as well as shift the image up/down and left/right. You can also use the mouse to drag the image into position. The mouse moves the image by clicking and dragging from the appropriate portion of the screen.
Some tools, such as centralizers, may extend outside the red box.
When you click the save button, the image gets written to disk and then read back and redrawn to verify that the save was done properly.

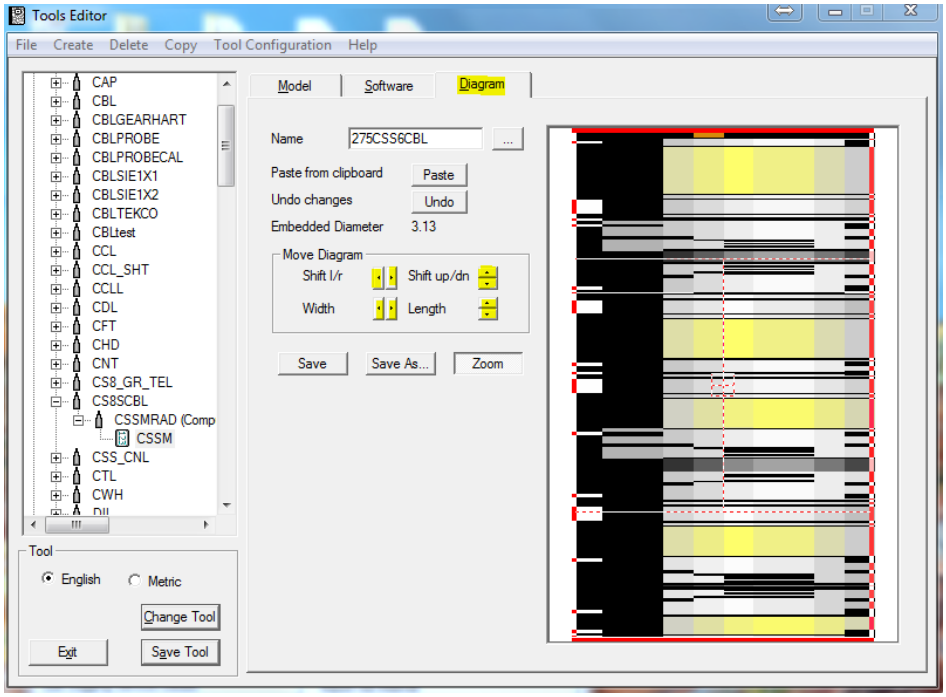


FIG: 14.13 Select Zoom

In the zoom mode, the red rectangle reflects the appropriate length and diameter specified for the tool. The user can now use the controls in the Move Diagram box to resize and configure the drawing as needed to shift the drawing **left/right** or **up/down** or to **widen/narrow** or **lengthen/shorten** the drawing. Ideally, the body of the tool should fit the red rectangle, with external components (centralizer springs, etc.) allowed to extend outside of the red rectangle.
Within the red rectangle, there are four quadrants. The mouse can be used in each of these quadrants to configure the diagram in the same manner as the Move Diagram controls. By clicking the mouse in the top quadrant and dragging it up or down, the diagram will move up or down. Clicking and dragging up or down in the bottom quadrant will lengthen and shorten. Clicking and dragging to the left or right in the left quadrant will move the diagram left or right. The right quadrant will widen or narrow the diagram.
Once the diagram has be resized and configured as desired, the **Save** and **Save As** buttons can be used to save the diagram as a Warrior Tool Diagram. The Save button will replace the existing diagram that was

called up. Be aware that if any other model of tool uses this diagram, the drawing will be changed for that model also. The **Save As** button will prompt you for a new file name.
The Undo button, will undo any changes that have been made since the file was opened or since the last Save or Save As.
The user can create his own tool diagrams by pasting from the Windows Clipboard. Using a drawing application, you create the initial tool drawing. Then copy it onto the windows clipboard (**Edit – Copy**, right mouse click **–Copy,** etc.). When the paste button in the tool editor is clicked, you are first prompted to enter or select a file name for the drawing. When the file name is saved, whatever is on the Windows Clipboard is displayed in the diagram window. The drawing should then be reconfigured as described above to fit into the red rectangle. Finally, it should be saved again after the reconfiguration.

14.3 Creating a New Serial number for an existing tool model

If you have existing tools and wish to create a new serial number, find and select the serial number of an existing tool in the tool drop down list. Then on the menu bar, click **Create** - **Tool.** The New Tool dialog window will then come up and show the selected tool type, model type, the software module being used, and a list of existing serial numbers for that tool type. Enter a new serial number in the New Serial Number box and click **OK**. The new tool will use the same physical dimensions, sensor offsets, filters, and tool diagram as the model of the selected tool.

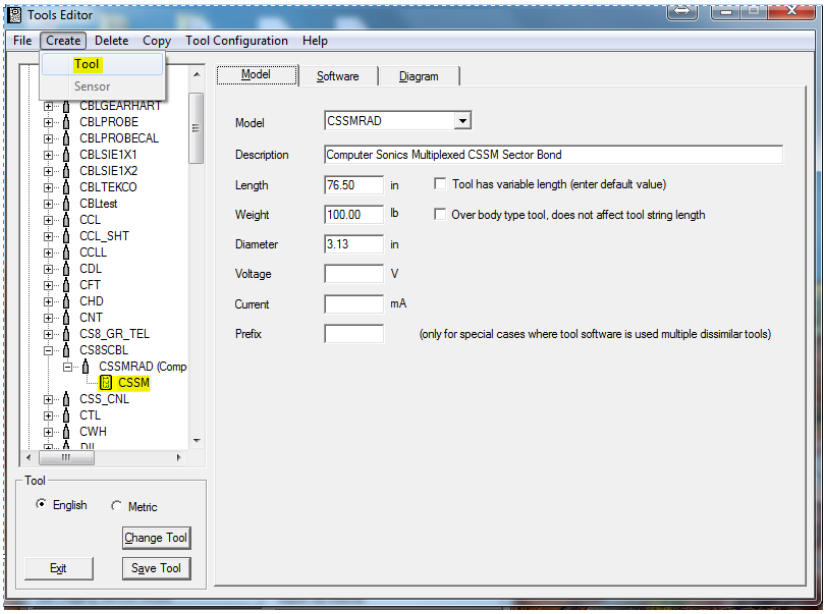


FIG: 14.14 Select Tool

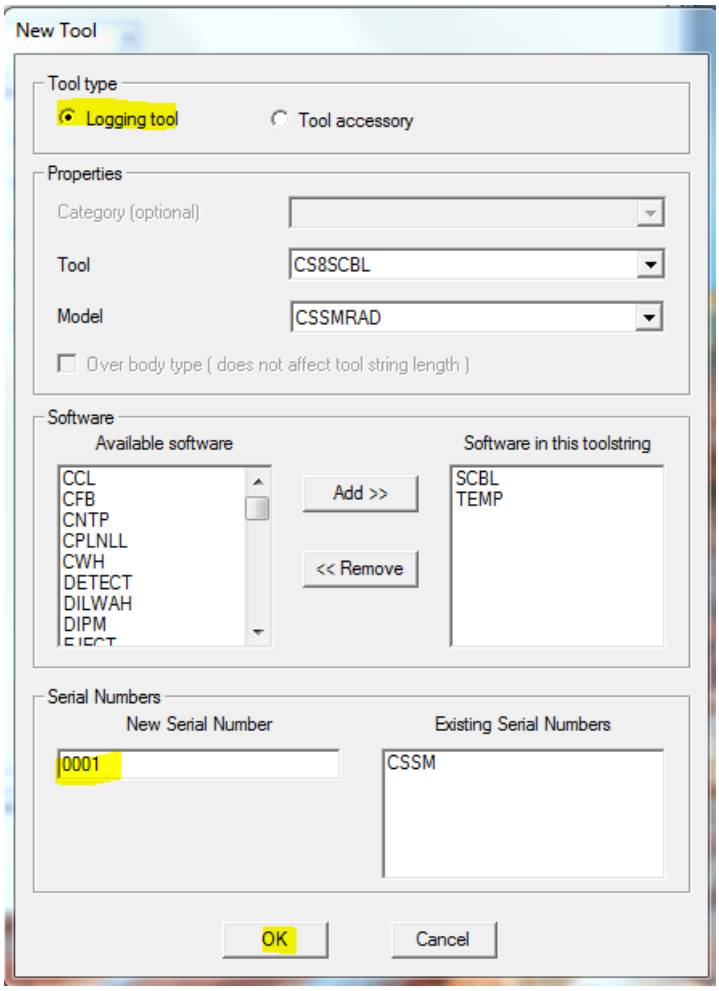


FIG: 14.15 Type the new serial

14.4 Creating a new tool type or a new model for existing tool

To create a new tool, click on the **Create** selection in the Tools Editor menu bar. To create a new tool type, click the Tool drop down list and click on the first item in the list, <new tool type>.
You will then be prompted to enter a new tool type. - Be aware that any new tool that you have created can only be used if a Service in Services.INI lists that tool type as one of its available tools.
If you are creating a new tool type, the Create New Model Type box will appear. If you are going to create a new model for an existing tool type, once the tool type has been selected from the Tool drop down list, from the Model drop down list, select the first item in the list, <new model type>.

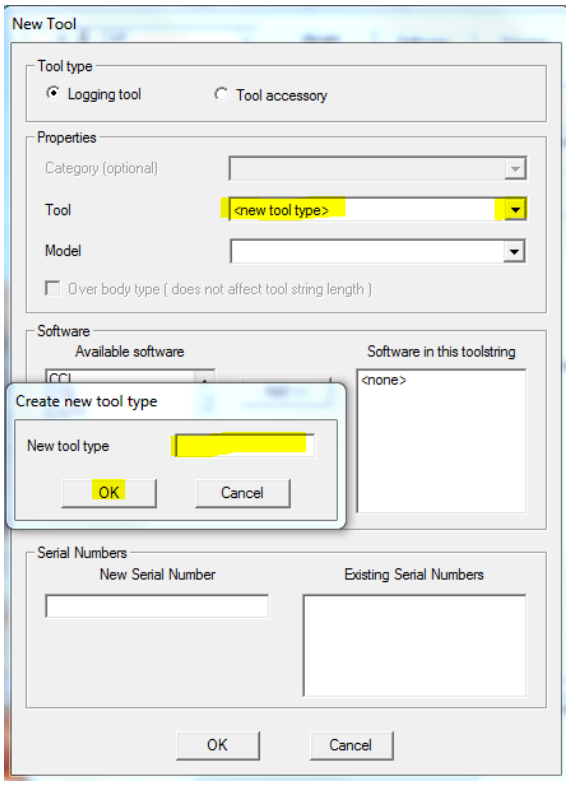


FIG: 14.16 Select new tool type and create a new tool type

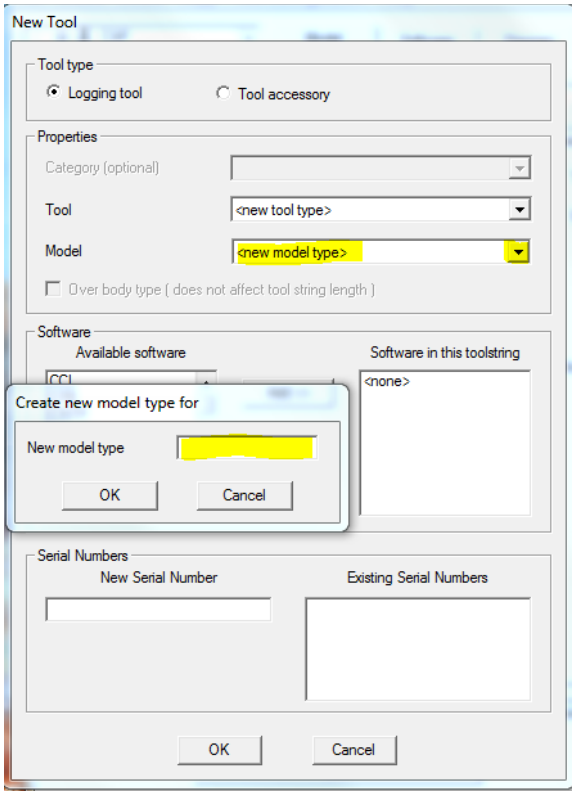


FIG: 14.17 Create new model type

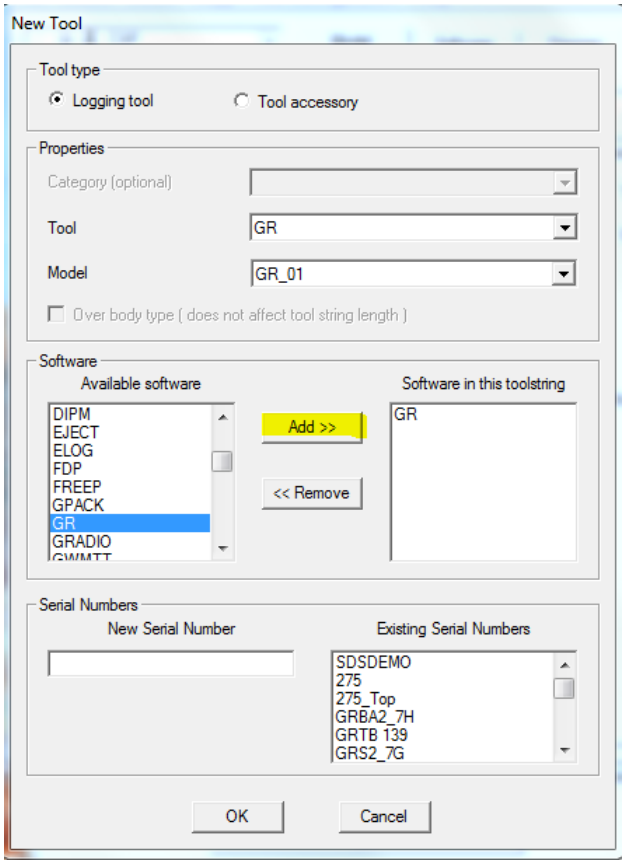


FIG: 14.18 Select GR software for GR tool.

You will then be prompted to enter a new model type. For any new model type, the software module(s) to be used must be selected from the software drop down list and then click the **ADD>>** button.

Tool names, Model names, and Serial names can contain a maximum of 39 characters and cannot have any spaces.

Continue selecting and adding software modules as need to include all the sensors in the tool. A list of sensors for the different software modules is included at the end of this section (Software Module Description).
The last step is to enter a New Serial Number. An Existing Serial Number drop down list is provided so that duplicate serial numbers are not entered.
Certain software modules will allow you to also create a new sensor. Note that all boxes of the Sensor Details section must have data entered for the created sensor to work properly. The Sensor is the name that you wish to have as an output; it cannot be a duplicate of any sensor that would be in the same string of tools. The Units can be chosen and printed on the log insert and calibration reports. The Description can be printed on calibration reports that include this sensor.
Once the basic sensor has be created and saved, reciprocal and/or differential outputs can also be created for the same sensor.

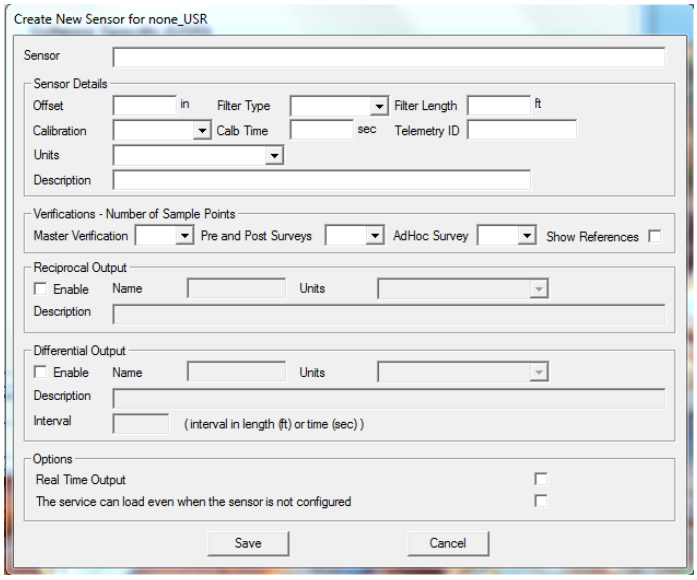


FIG: 14.19 Create a new Sensor

14.5 Creating a Tool

As an example, we will go through the steps necessary to create a new tool sting for a Gearhart COSMOS GR/N tool. One version of the Gearhart COSMOS Gr/N tool is a single tool that is approximately 7 ¼ feet long and 1 11/16" in diameter, has a total weight of 25 pounds, and has three sensors, gamma ray, collar locator, and neutron. There are two different ways that we can create this tool. We can break it up into three separate tool types, with each type having its own software module. Or, we can make one tool type that has three software modules. We will do an example of each way.

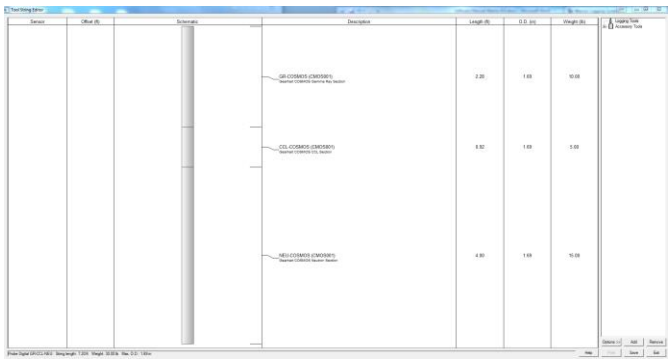


FIG: 14.20 Tool string editor

First, we will do the three separate tool types with each type having its own software module.
The first tool we will create is the neutron. Open the tool editor and click **Create** – Tool. Scroll down the Tool drop down list to NEU (if not in the list, click <New Tool Type> and enter NEU). Now enter a Model name by clicking on the model drop down list and clicking <New Model Type> and entering COSMOS (if not already in the list). Use the Software drop down list to pick NEU software, and it to. Enter a unique serial number (CMOS001) in the New Serial Number box. You should now have a tool created but with no information for it as shown.

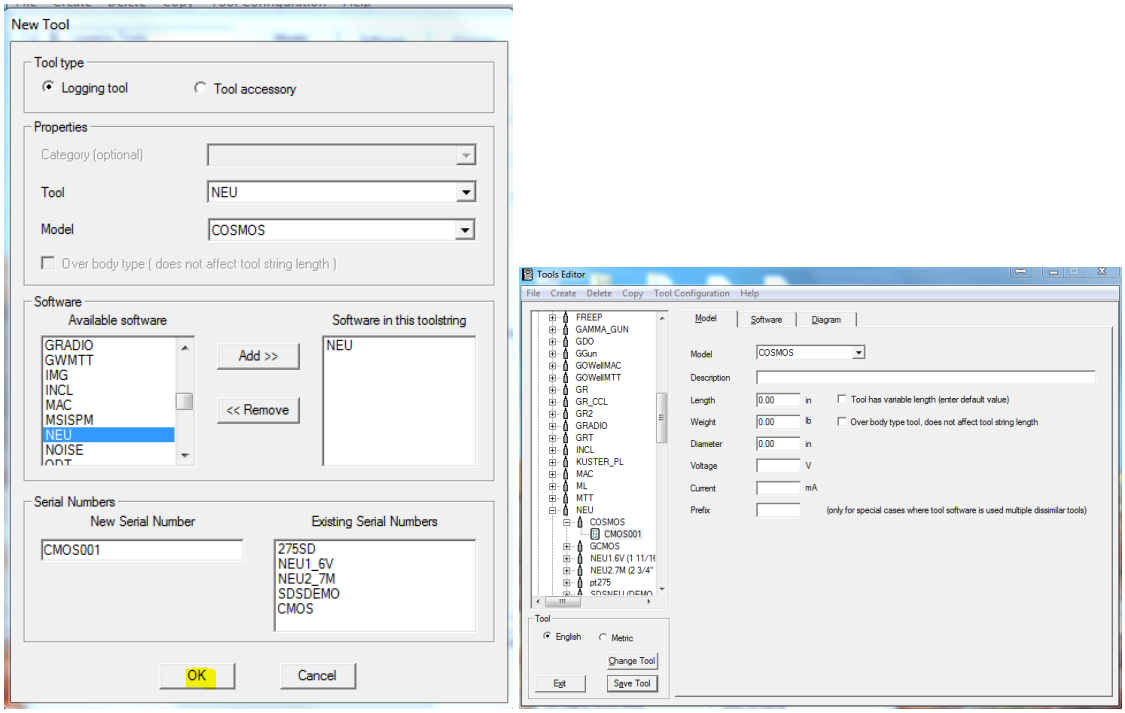


FIG: 14.21 Select Tools Editor

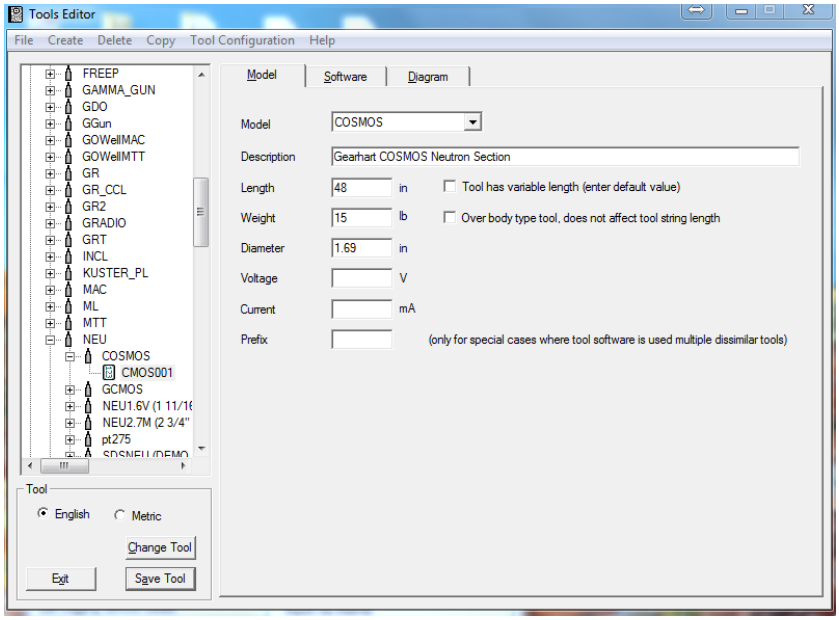


FIG: 14.22 Select Model

Now we will have to enter all the information for our COSMOS model of neutron tool. The length from the bottom of the source to the ccl joint is 48", the weight we will guess at 15 pounds, the diameter is 1 11/16" or 1.68".

The neutron detector is 14" from the bottom of the tool, but if we measure from halfway between the neutron source and the neutron detector to the bottom of the tool, we measure 8", so our NEU offset is 8". We will set the filter type to use a Gaussian 3 foot filter to start with.

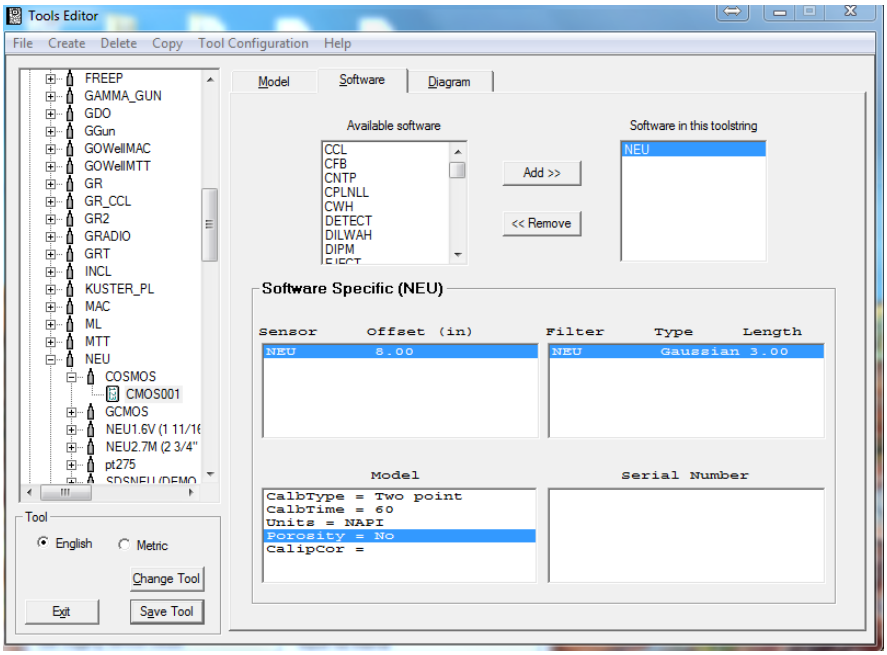


FIG: 14.23 Set Sensor, Filter, and Model values

We will use a two-point calibration and use 60-second averaging for the calibration time. We will plot our output as Neutron API counts (NAPI), and not have a porosity curve. Our completed neutron tool should look as shown.

We will use the length and diameter rectangle for a tool diagram Therefore we will not have to do anything on the Diagram page.

We now need to create our next tool – the CCL. Click on **Create** – **Tool**. Chose **CCL** from the Tool list. Check the Model list for COSMOS. If COSMOS is not in the list, chose new model type and enter COSMOS. Software should be set to CCL and a New Serial Number will need to be entered (CMOS001).

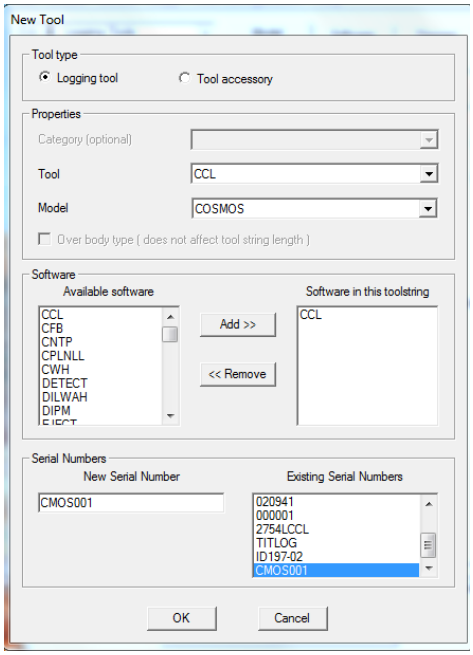


FIG: 14.24 Set New Tool

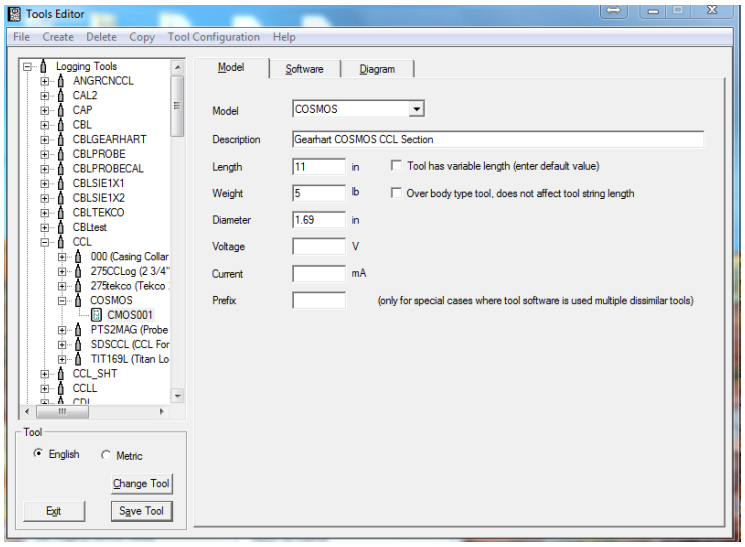


FIG: 14.25 Set Model values

The length from the lower case to the upper case is 11 inches, we will guess at a weight of 5 pounds, and the diameter is 1.68 inches. The center of the CCL coils is 5 1/2" from the bottom case. We do not want to use any filtering with a CCL, so we set the filter to NONE and the length to 0.00 Feet. We will not set any of the model specific parameters.

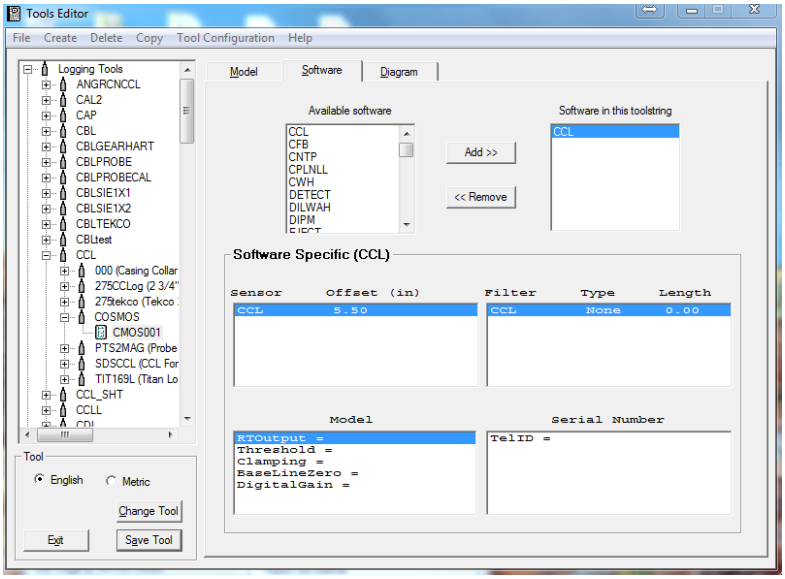


FIG: 14.26 Set Sensor, Filter, and Model values

Finally, we need to create our Gamma Ray tool. Once again click on **Create** in the menu bar. Then choose **Tool**. Scroll down the **Tool** drop down list to **GR** (if not in the list, click on **<New Tool Type>**and enter GR). Now click on the **Model** drop down list and click on **<New Model Type>** and enter COSMOS. Click on the **Software** drop down list and choose GR software. Enter a serial number (CMOS001) in the **New Serial Number** box.

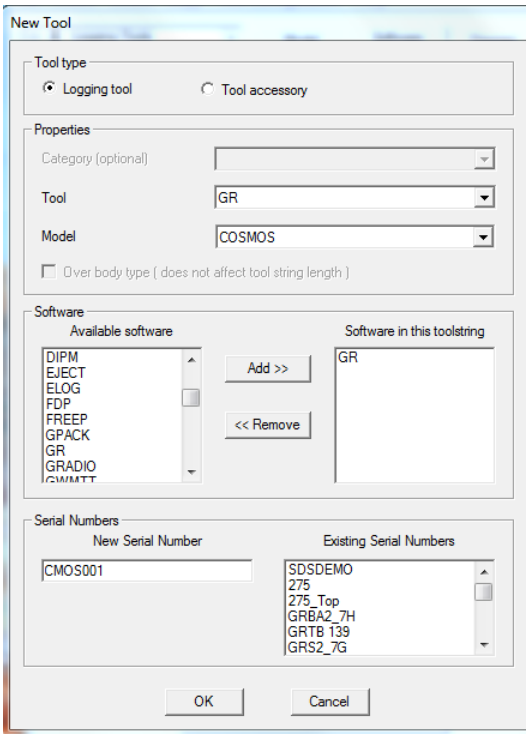


FIG: 14.27 Set New Tool

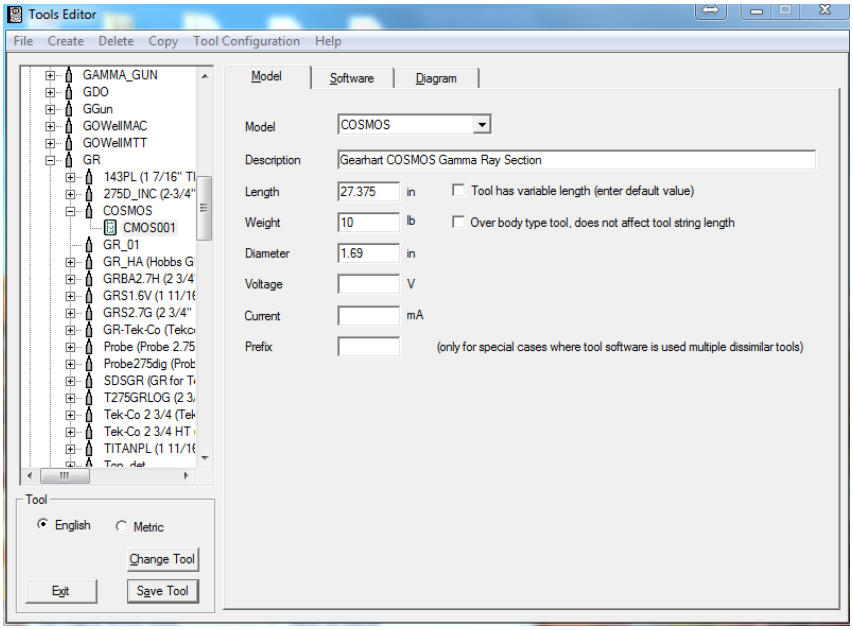


FIG: 14.28 Set Model values

We now need to enter our model specific information. A tool description can be entered if desired. The length from where the upper case makes up to the top of the tool is 27 3/8". We will guess at a weight of 10 pounds. The diameter is 1 11/16".
The center of the gamma detector on this model is 16.68 inches up from the CCL. We want to use a Gaussian filter of 5-foot length, since this is a GM type detector. We will set this up with a two-point calibration with a

gain and offset and use 60-second averaging. The output will be plotted a Gamma Ray API counts (GAPI). We will not do field verification. Our completed Gamma tool should look as shown below.

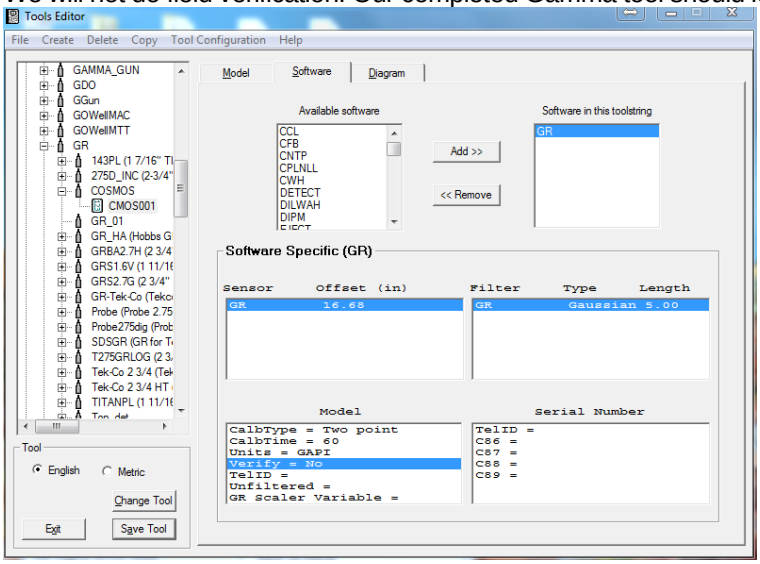


FIG: 14.29 Set Sensor, Filter, and Model values .

This completes all three sections for the tool being set up as separate tool types. To use this tool in a service, the service must include each of the separate sections in the list of available tool types (GR, CCL, and NEU). When the service is selected from acquisition and the tool string editor comes up, the proper configuration must be set up (GR on top, CCL in the middle, and Neutron on bottom), and the serial number for each section should be selected.

Now we will go through the same process of creating the tool but will use a single tool type with all three software modules.

Click on Create, then Tool. Click on the tool drop down list and choose new tool type. Enter GR_N_CCL for the tool type. For the new model type, enter COSMOS. Choose and add the GR, CCL, and NEU software modules. Enter CMOS001 for a serial number.

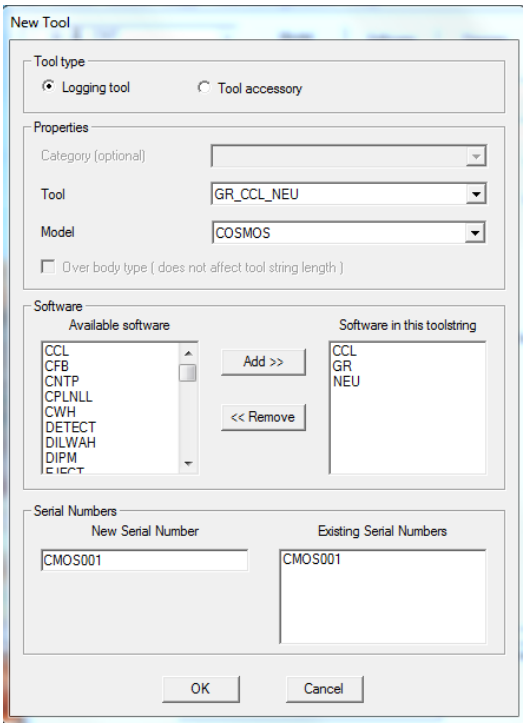


FIG: 14.30 Set New Tool

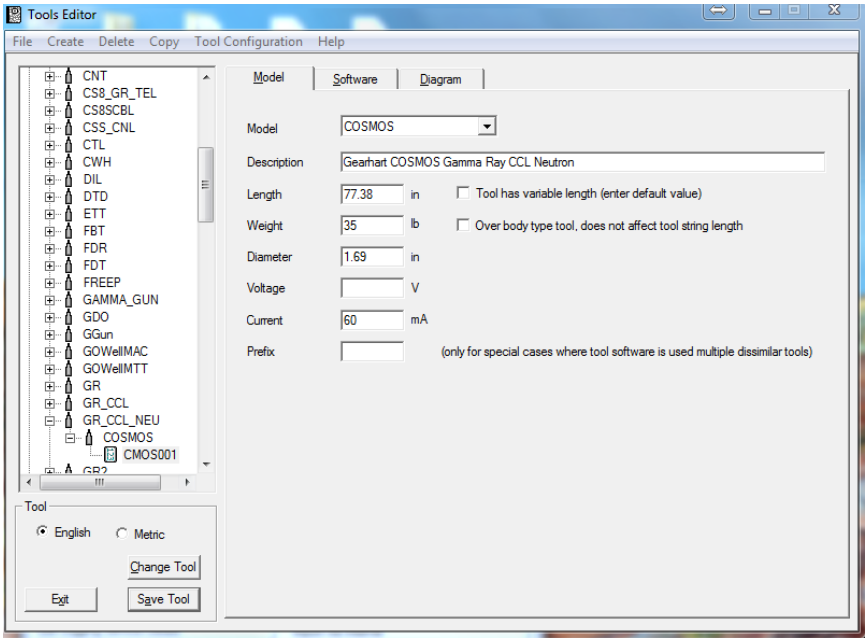


FIG: 14.31 Set Model values

The overall tool length is 77 3/8”, weighs 35 lbs., and is 1 11/16” OD. This information is entered the Model page. We measure the CCL from the bottom of the tool to the middle of the coils as 44.5 inches. The Gamma Ray detector is 66 5/8” from the bottom of the tool. And the Neutron measure point is 8 inches as in the previous example. For each software type, we will have to set up the appropriate sensors using these offsets. We will do the CCL module first. The offset is 44.5 inches. The rest is set the same as the previous example.

We do not want to use any filtering with a CCL, so we set the filter to NONE and the length to 0.00 Feet. We will not set any of the model specific parameters.

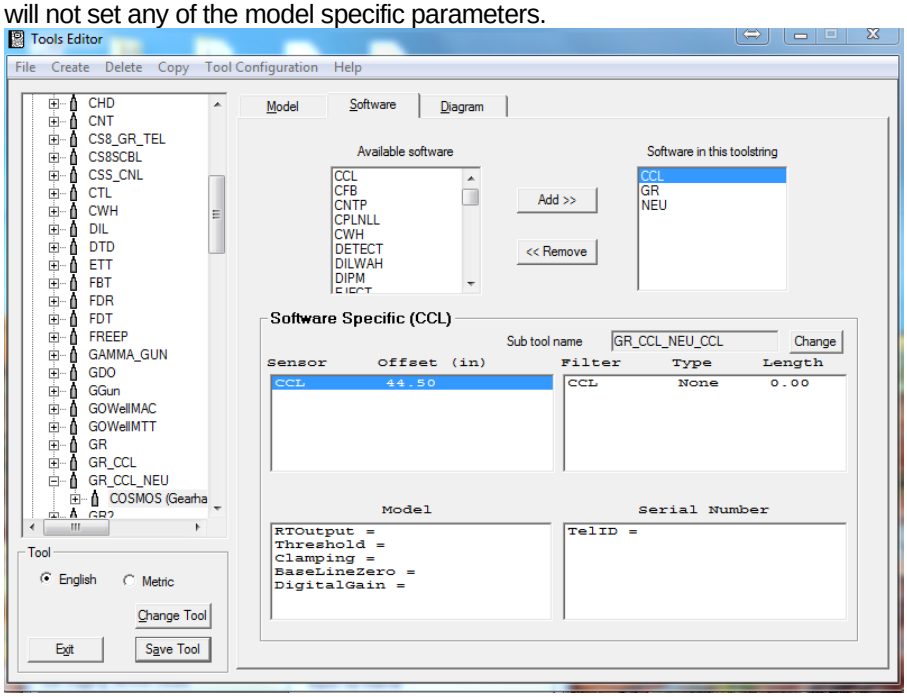


FIG: 14.32 Set Sensor, Filter, and Model values

To edit the Gamma Ray sensor, click on the GR software in the list. The sensor offset is 66.68 inches. The rest of the information is the same as the previous example. Gaussian 5-foot filter, two point calibration, 60-second calibration averaging, output as Gamma Ray API counts (GAPI), and no field verification.

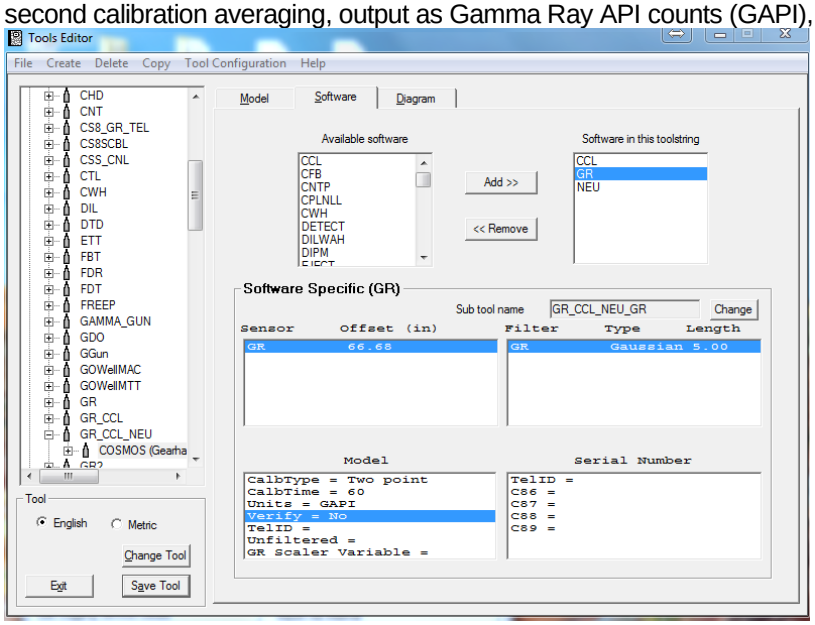


FIG: 14.33 Set Sensor, Filter, and Model values

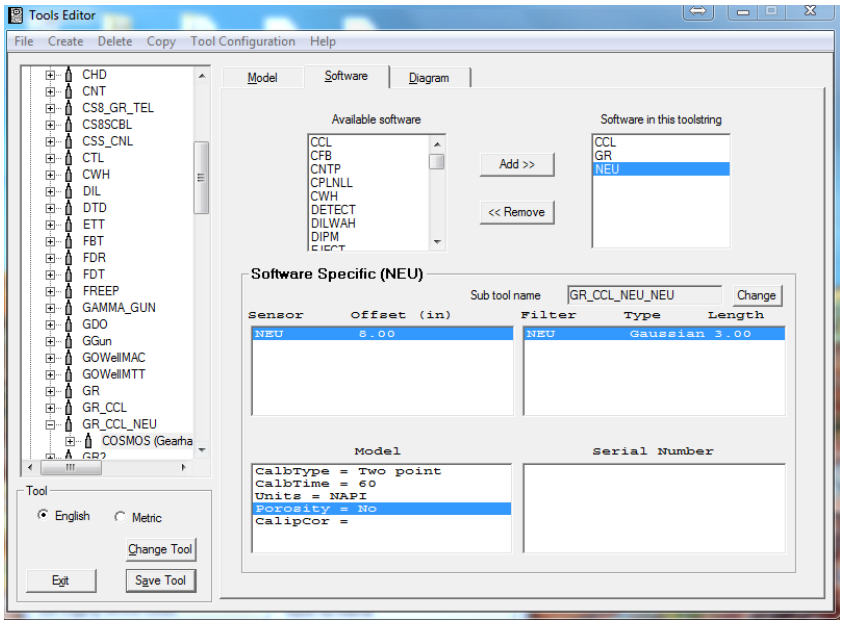


FIG: 14.34 Set Sensor, Filter, and Model values

Select NEU software to edit the neutron senor settings. Our NEU offset is 8”, Gaussian 3 foot filter, two point calibration, 60-second averaging, and output as Neutron API counts (NAPI), and not have a porosity curve.

14.6 Deleting Tool Entries

Options are available under the **Delete** selection of the menu bar. Sensors, Serial Numbers, Models, or Tool types can be deleted. Be careful in deleting information. Read the whole confirmation box closely. You would not want to lose a whole tool type when you meant to delete only a serial number.
If a tool model has a user-defined sensor, click on the **Sensor** listed in the software specific area, and then clicking on **Delete** -> **Sensor** will remove that sensor from the tool model.

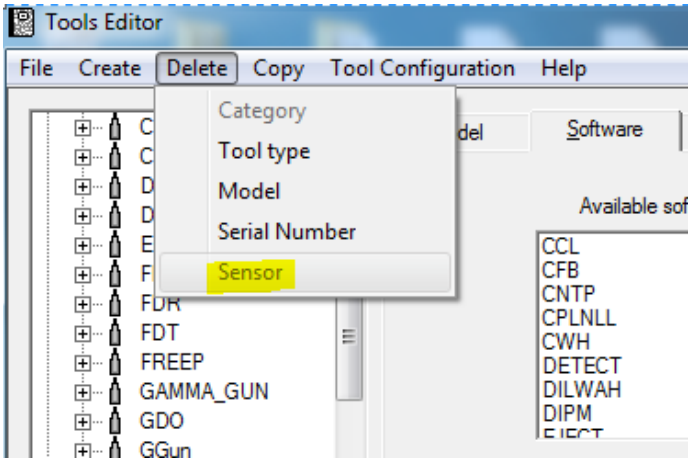


FIG: 14.35 Select sensor option to Delete

If a specific tool serial number has been selected from the tool list, then clicking on **Delete** -> **Serial Number** will remove that specific tool serial number from the tools.ini file.

If a tool type has been selected from the tool list, then clicking on **Delete** -> **Model** will provide a drop down list of models of that type of tool. Selecting a specific model and clicking **OK** will allow you to delete that model only if no serial numbers are currently set to that model type.
If a tool type has been selected from the tool list, then clicking on **Delete** -> **Tool Type** will delete all information for that type of tool. This includes all serial numbers and model information for any tools that are of that tool type.

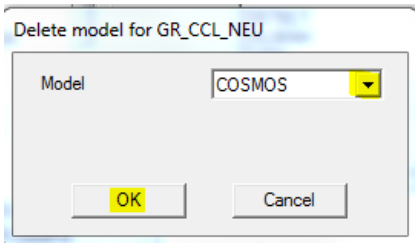


FIG: 14.36 Delete model for GR

14.7 Saving Calibrations

Calibrations can be saved to disk or restored. This is meant to be an aid in the transfer of calibrations between different units or to transfer tool type and model information from one unit to another.

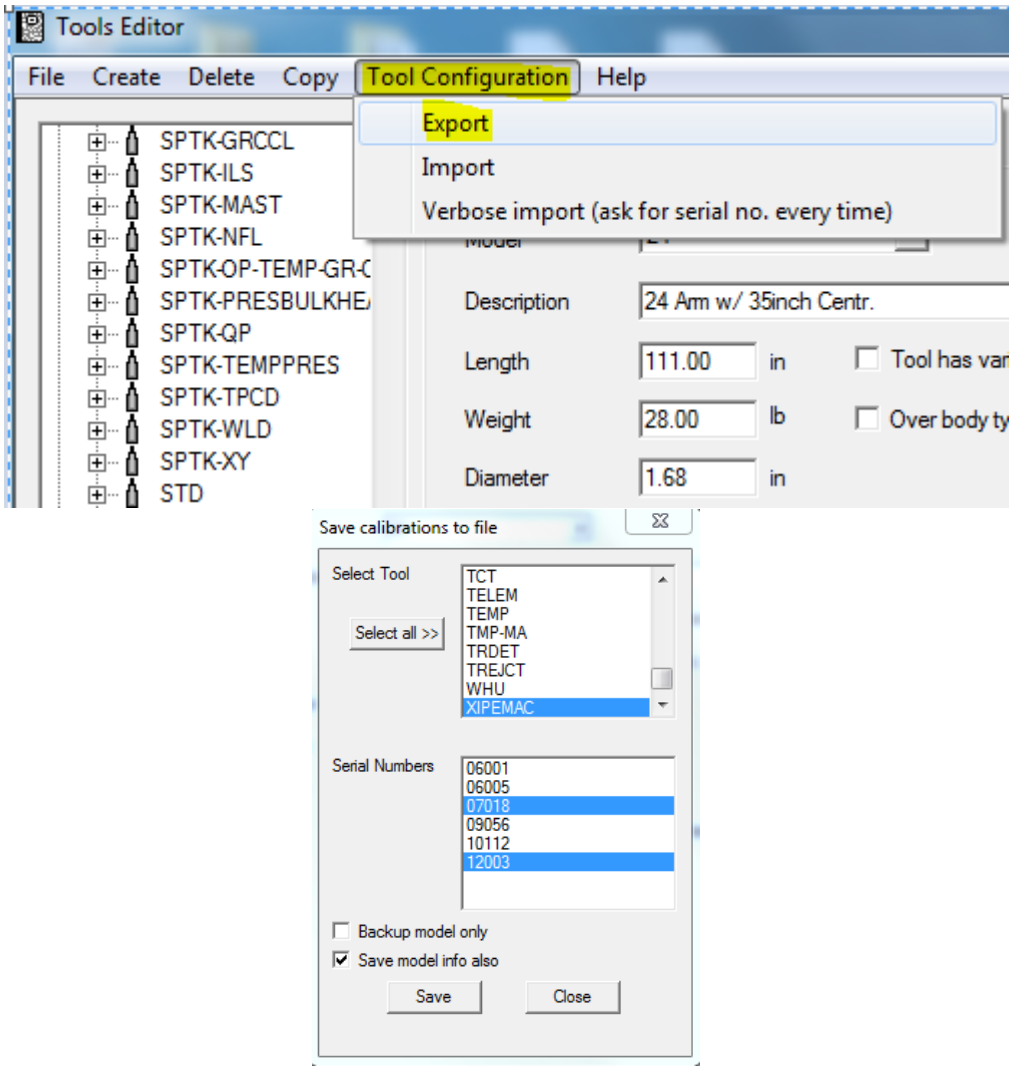


FIG: 14.37 Select Tool and serial number

On the menu bar click on **Tool Configuration**, then click **Export.** Only one tool type can be selected, but as many serial numbers as desired can be placed into the file. The model information for each selected serial number can also be included. The file is given a WBU extension but is a mini tools.ini file if the model information has been included. When the **Save** button is clicked, the save dialog box is brought up. The default is file name is the tool type and it is saved into the Warrior\Config directory. You can change the drive, folder, and name of the file.

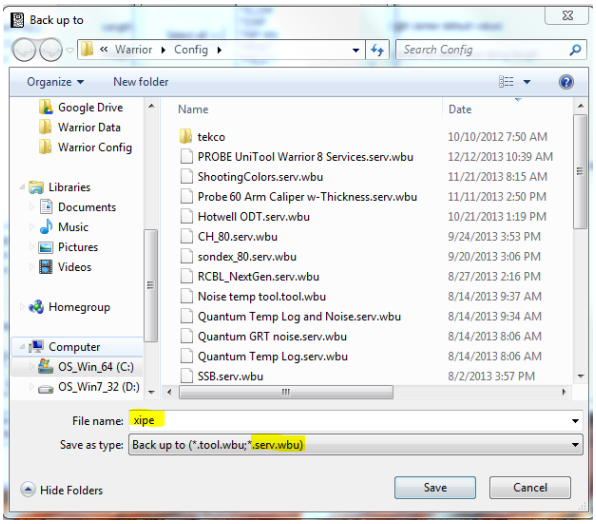


FIG: 14.38 Save Xipe calibration

If you select an existing WBU file, you will be given the option of appending to the file or overwriting the file.

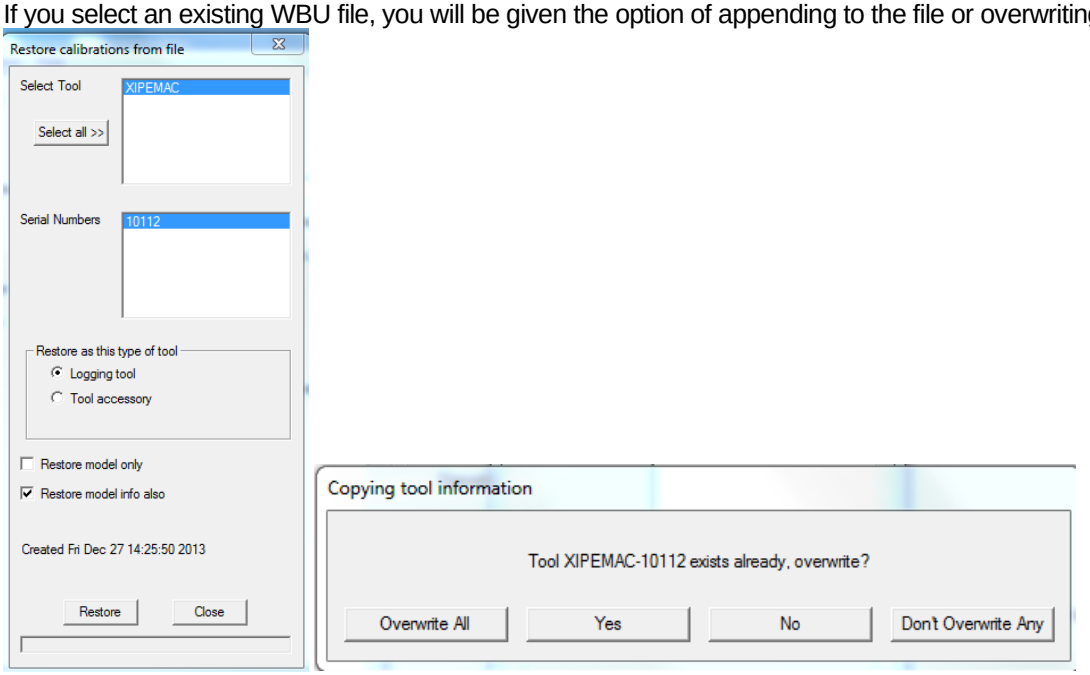


FIG: 14.39 Save XIPE

To restore calibrations, click on **Tool Configuration** on the menu bar, then click **Import.** When the dialog box appears, select the saved file from the appropriate drive and directory. Then select as many serial numbers as desired to be restored.

Software Module Descriptions

Software	Description	Sensors	Outputs
CBL	Cement Bond Log – 1 and 2 receivers	3FT, 5FT	AMP3, AMP5, TT3, TT5
CCB	Obsolete – USE SCBL		
CCL	Casing Collar Locator	CCL	CCL
CDLG	Compensated Density Log	LSD, SSD, DCAL, PER	LSD, SSD, DCAL, PER, RHOB, RHOC
CFB	Caged Full Bore (Spinner Tool)	User Defined	FRATE, FDIR
CNTG	Obsolete – USE CNTP	------	------
CNTP	Compensated Neutron Tool	CNLSC, CNSSC, (NCAL)	CNLSC, CNSSC, CNRAT, CNLS, CNSS, CNDL, CNAD, CNPOR, CNPORU, (NCAL)
CWH	Capacitive Water Holdup	CWH	CWH
DETECT	Tracer Detector	DET	(Outputs are derived from EJECT)
DILG	Dual Induction Log - Gearhart	CILD, CILM, RLL3, SP, (CLL3)	CILD, CILM, CLL3, RILD, RILM, RLL3, SP
DILP	Dual Induction Log - Phoenix	CILD, CILM, RLL3, SP	CILD, CILM, CLL3, RILD, RILM, RLL3, SP
DILWAH	Dual Induction Log - Hotwell	ILD, ILM, LL8, SP	CILD, CILM, CLL8, RILD, RILM, RLL8, SP
DIPM	Dipmeter	PAD1-PAD6, PADF, CAL1-CAL6, EA, EB, EC, EX, EY, EZ	PAD1-PAD6, PADF, CAL1-CAL6, INCL, RB, AZI, BDIR, GFLD, BFLD
DLL	Obsolete – USE DLLP	------	------
DLLP	Dual Lateral Log	VD, VS, ID, IS, DLLCAL	VD, VS, ID, IS, RLLD, RLLS, CLLD, CLLS

FIG: 14.40 Software Module Descriptions

EJECT	Tracer Ejector	- none -	EJECT, AREA, DET1, DET2, etc.
Software	Description	Sensors	Outputs
ELOG	DETEQ ELOG tool	IEE, VSN, VLN, SP	IEE, VSN, VLN, SP, RSN, RLN, CSN, CLN, SPR
FDP	FLUID DENSITY - Sondex	FDEN	FDRATE, FDEN, FDENC
FREEP	Free Point	FREEP	FREEP
GPACK	GRAVEL PACK Tool	?	?
GR	Gamma Ray Tools	GR	GR
IEL	INDUCTION ELECTRIC Log	DIC, SN, SP	DIC, DIR, SN, SP
LITH	Probe Litho- Density	W1, W2, W3, W4, SSD, Q, DCAL	W1, W2, W3, W4, SSD, Q, DCAL, LSD, RHOB, RHOC, DPOR, PE
MAC	Multi- Arm Caliper	MIN, MAX	MIN, MAX, MINRW, MAXRW,AVG, AVGRW, PCTRW, WDIFF
MAGN	MAGNOTOMETER?	?	?
ML	MICRO-LOG	MN, MI, MCAL, MSFL	MN, MI, MCAL, MSFL
MSFL	MICRO Spherically Focused	MSFL, MSFLCAL	MSFL, MSFLCAL
MSISPM	?	?	?
NEU	Single Detector Neutron	NEU	NEU, (NPOR)
NOISE	NOISE	RANGE1, RANGE2, RANGE3, RANGE4, NOISE, (200Hz, 400Hz, 1000Hz, 2000Hz, 4000HZ, 6000Hz)	200Hz, 400Hz, 1000Hz, 2000Hz, 4000HZ, 6000Hz
PIA	?	?	?
PNXFLOW	?	?	?
PRESTEMP	Pressure - Temperature	USER - DEFINED	USER - DEFINED
QPS	Quartz Pressure / Temperature	QP, QTMP	PRES, TEMP

FIG: 14.41 Software Module Descriptions

SCBL	Sector Cement Bond Log Compensated Cement Bond Log (BOND TOOLS WITH SEPARATE CAL SIGNAL WAVEFORM)	WVFCAL, WVF3FT, WVF5FT, WVFT1R1, WVFT1R2, WVFT2R1, WVFT2R2, WVFT1R3, WVFT2R3, WVFS1, WVFS2, WVFS3, WVFS4, WVFS5, WVFS6, WVFS7, WVFS8, WVFSYNC, WVFSUM	AMPCAL, AMP3FT, AMP5FT, AMPT1R1, AMPT1R2, AMPT2R1, AMPT2R2, AMPT1R3, AMPT2R3, AMPS1, AMPS2, AMPS3, AMPS4, AMPS5, AMPS6, AMPS7, AMPS8, AMPSIM, TTCAL, TT3FT, TT5FT, TTT1R1, TTT1R2, TTT2R1, TTT2R2, TTT3R1, TTT3R2, TTS1, TTS2, TTS3, TTS3, TTS4, TTS5, TTS6, TTS7, TTS8, TTSUM
SFT	Sequential Formation Tester	SPRES, HPRES, VTIX, SWPOS	- - - -
SGR	Spectral Gamma Ray	SGR	K, U, T, GR, GRUF
SLT	Sonic Logging Tool	TT1, TT2, TT3, TT4, WVF1, WVF2, WVF3, WVF4	DT, AMP1, AMP2, AMP3, AMP4
SLTN	Obsolete – USE SLT	----	----
STD	STANDARD – (Truck Settings)	- none -	
SWNP	Sidewall Neutron	SWN, SCAL	
TCC	?	?	
TEMP	Temperature	TEMP	TEMP, DTMP
USR	USER DEFINED TOOL	USER DEFINED SENSORS	USER DEFINED
XYC	X Y Caliper	XCAL, YCAL	XCAL, YCAL

FIG: 14.42 Software Module Descriptions

14.8 Accessory Tools

These tools such as centralizers, sinker bars knuckle joints etc., have no measurement. The only thing they affect in the tool string is the depth offsets of the other sensors and the tool diagram. If they are Over body tools, they will not affect depth offsets either. In the Tools Editor they are separate from the Logging tools.

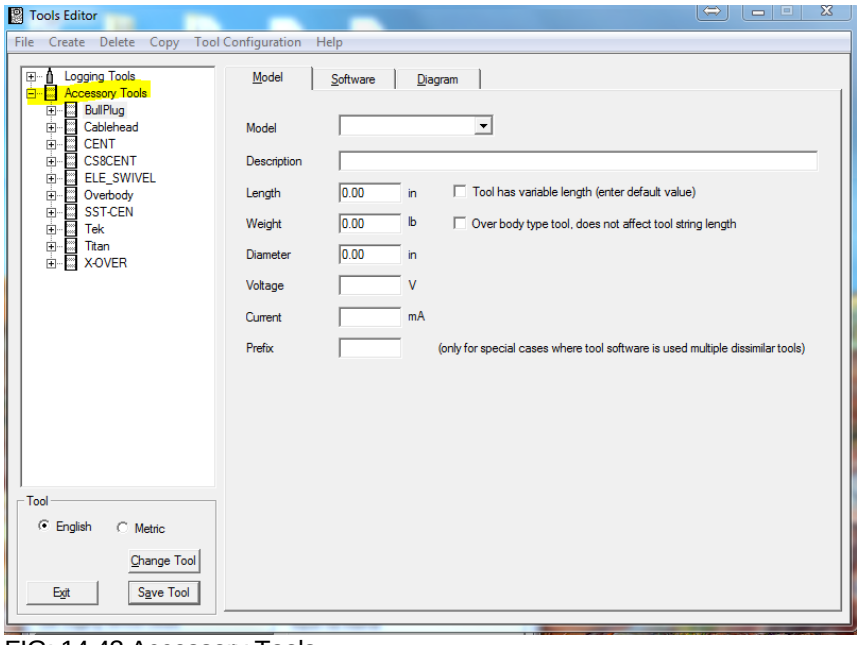


FIG: 14.43 Accessory Tools

To create a new Accessory Tool is like creating a new logging tool, select create > Tool from the menu. This will bring up the New Tool window, in this case you will want to ensure that the “Tool accessory” radio button is selected. Notice that Category is now optional. You can now select an existing tool or a new tool type, if you select new tool type you will be prompted for a name, then a name for new model type. Once selected you can check the “Over body type” this is used for centralizers such as Gemcos and will not affect depth offsets. Now if you desire you can use a serial number, but it is not required.

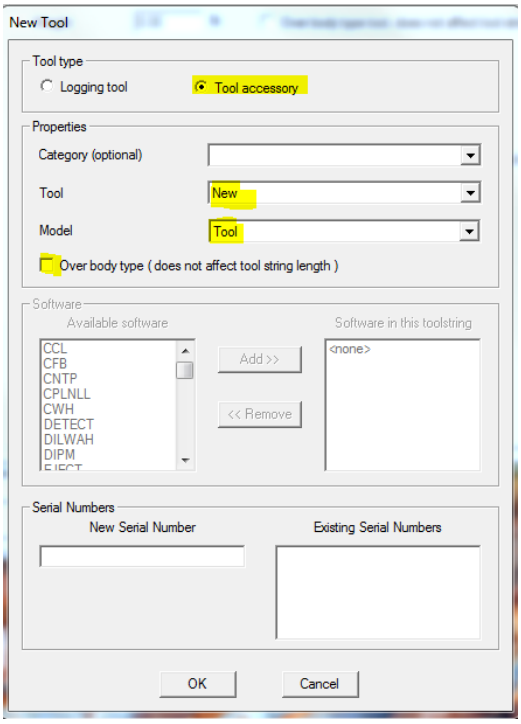


FIG: 14.44 New Accessory Tools

You can now enter a description, tool length, Diameter and Weight. You have another opportunity to select Over body type. Here you will also notice a check box to select “Tool has Variable length” if you chose this option the length you enter here will be the default but when the service loads you will be prompted with the option to change the length.

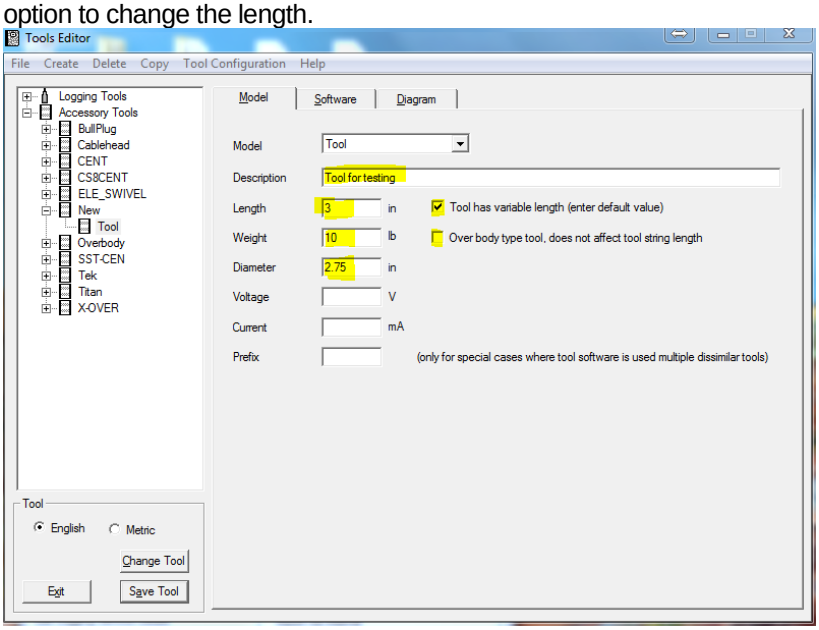


FIG: 14.45 tool Information

If you click on the Software tab you will notice that it is grayed out and is not used for Accessory Tools. The next thing to change is the tool diagram it is modified in the same way as a Logging Tool.

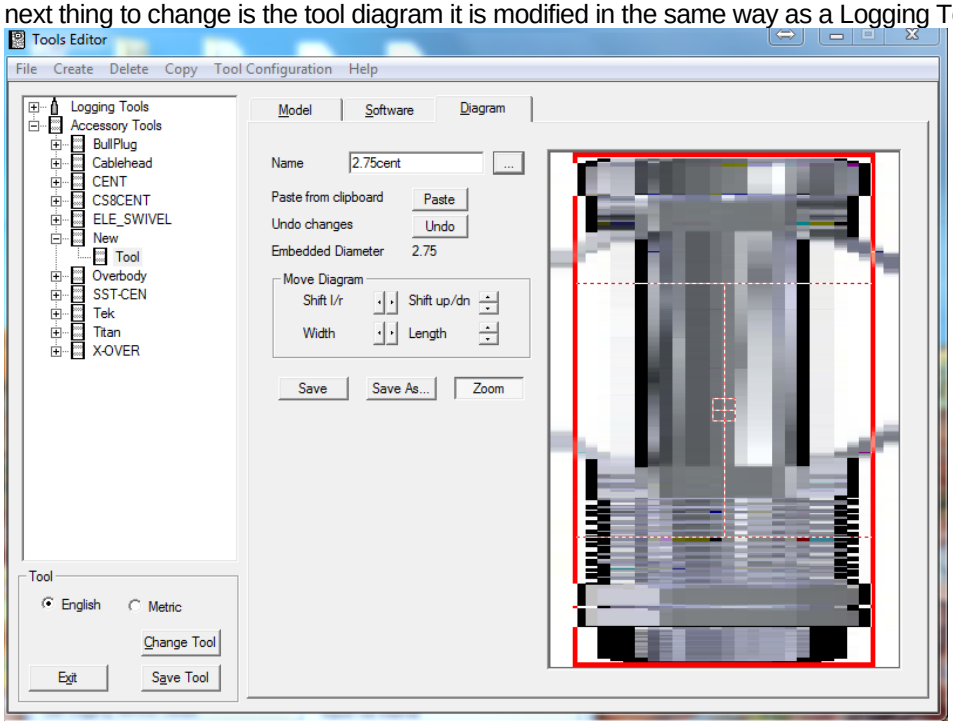


FIG: 14.46 tool diagram

If you have selected a tool with a variable length when you load a service with your new tool you will be prompted with the following window.

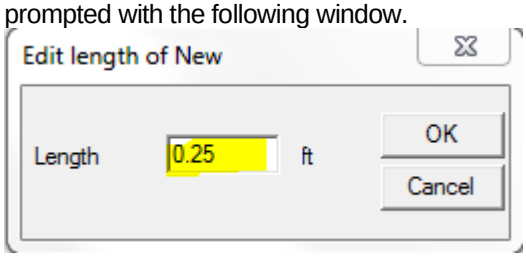


FIG: 14.47 Edit length of New tool

If you had selected an over body, you would be able to potion it anywhere in the tool string without affecting the stack length.

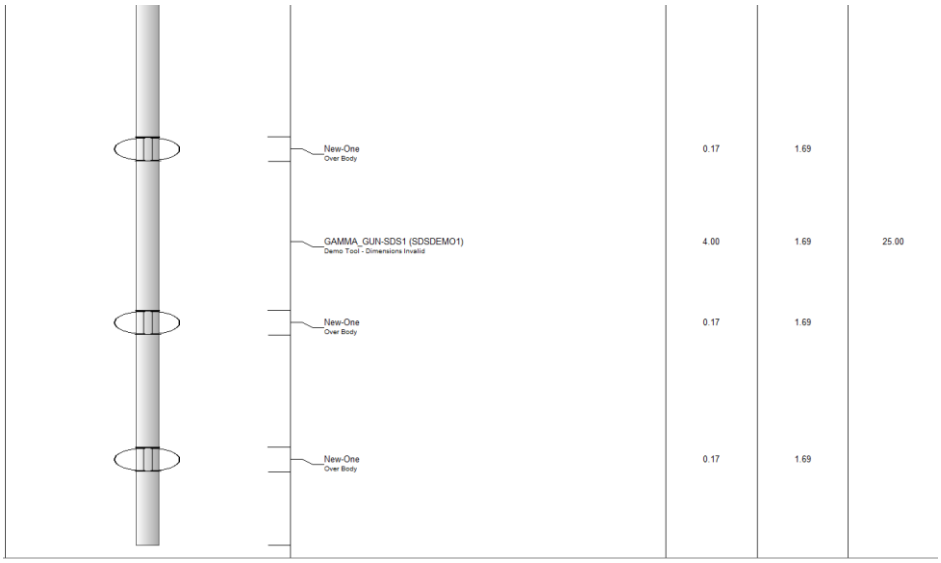


FIG: 14.48 Over Body

14.8 Multiple Similar Instruments

In certain instances, it may be necessary to have several similar tools, such as multiple pressure tools in a production logging stack or gamma Ray detectors in an ejector service. The easiest way to accomplish tis is with the use of the Prefix function.

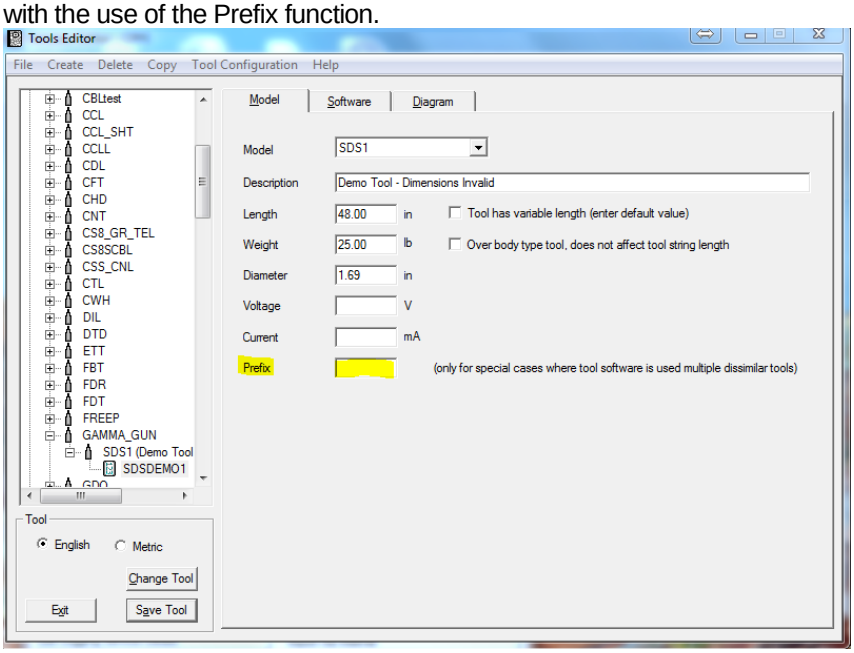


FIG: 14.49 Tool Prefix

In this example shown we will and a dual detector GR. The first step is to add a Prefix we used “Dual_” to an existing GR instrument.

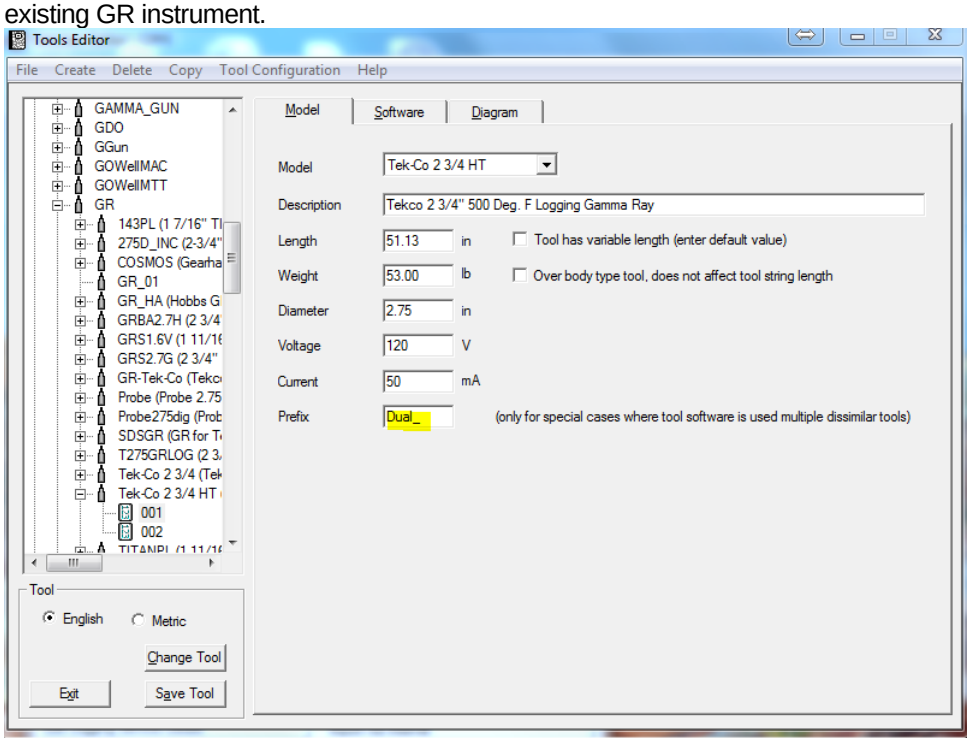


FIG: 14.50 Tool Prefix Example

Once that is done click on the software tab and add another “GR” from the available software, this will and a GR$2 to the software in the tool string and rename the “GR” to “GR$1”

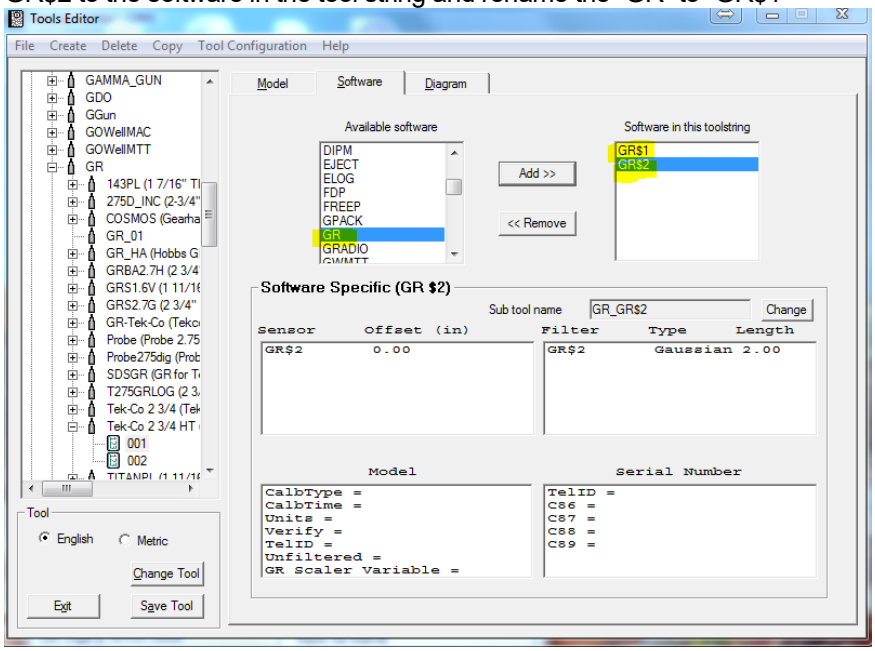


FIG: 14.51 Multiple similar sensors

Once you have your sensors added you must enter the appropriate depth offsets for the detectors, and if necessary, change your tool diagram. Once that is completed save the tool and open the “Edit Logging Service Details”. Here you will need to edit the sensors so that they match your instrument.

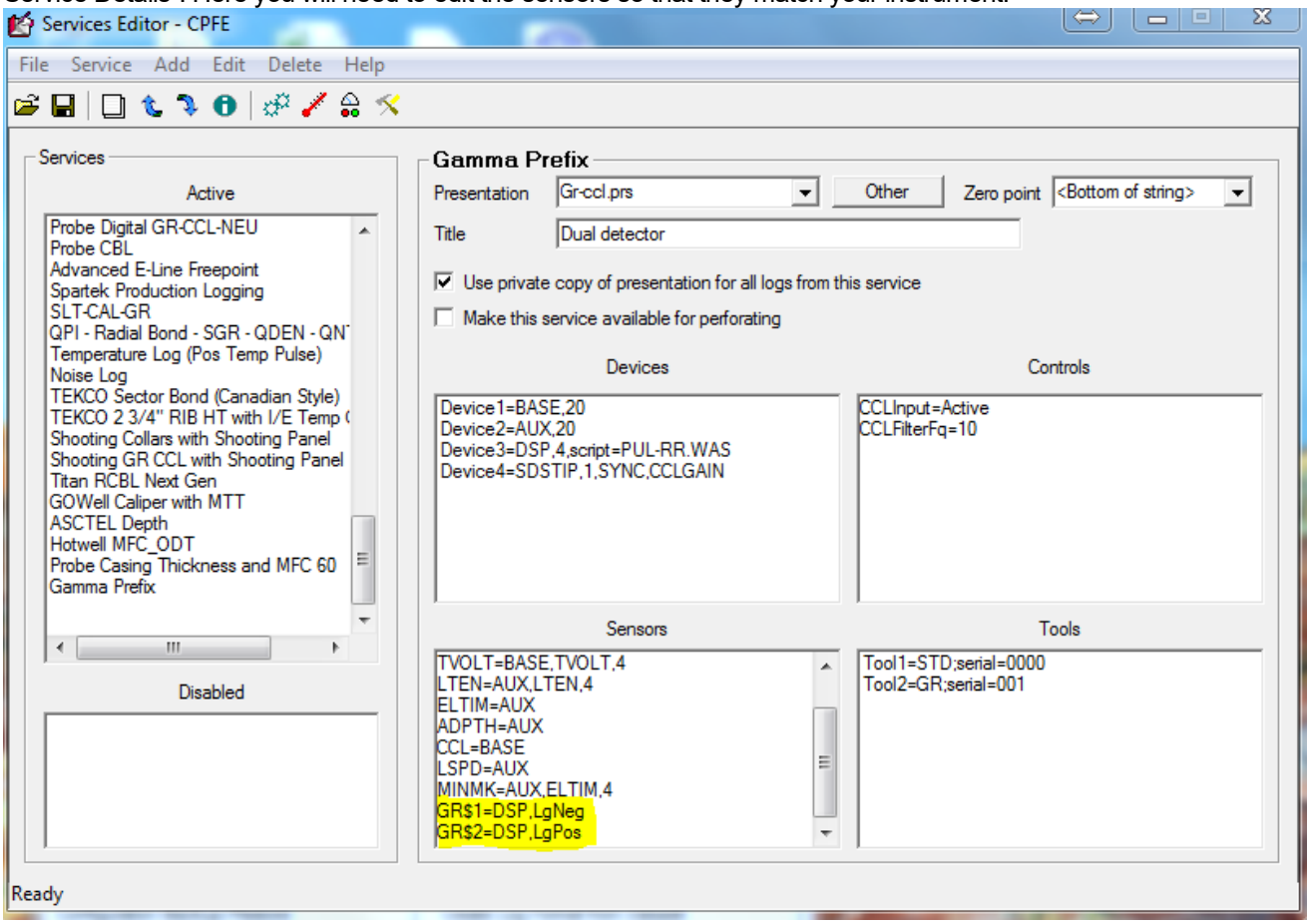


FIG: 14.52 Service Editor for GR$1 and GR$2

Save your service and load acquisition to test your new service.

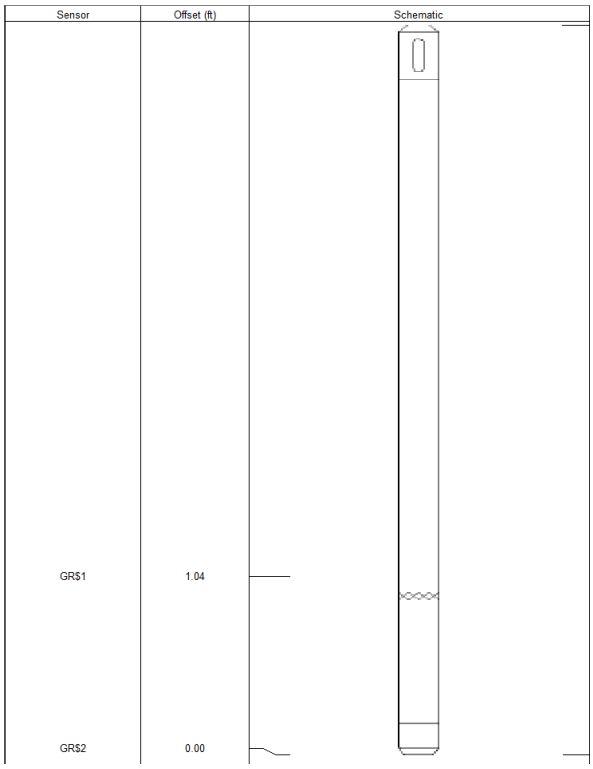
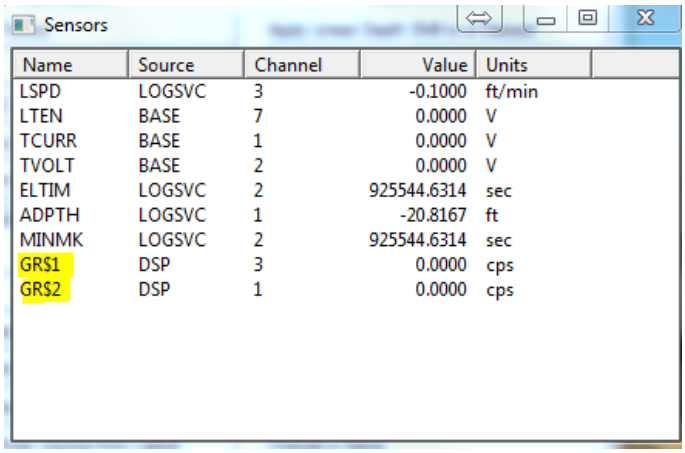


FIG: 14.53 Tool Diagram with GR$1 and GR$2



Name	Source	Channel	Value	Units
LSPD	LOGSVC	3	-0.1000	ft/min
LTEN	BASE	7	0.0000	V
TCURR	BASE	1	0.0000	V
TVOLT	BASE	2	0.0000	V
ELTIM	LOGSVC	2	925544.6314	sec
ADPTH	LOGSVC	1	-20.8167	ft
MINMK	LOGSVC	2	925544.6314	sec
GR$1	DSP	3	0.0000	cps
GR$2	DSP	1	0.0000	cps

FIG: 14.54 Sensors GR$1 and GR$2

Section

15

15 Math Pack

A math pack output is created by a formula applied to one or more values from existing databases.
A math pack job consists of one or more math pack outputs. Each math pack job is saved in a file with the extension ".wmp".

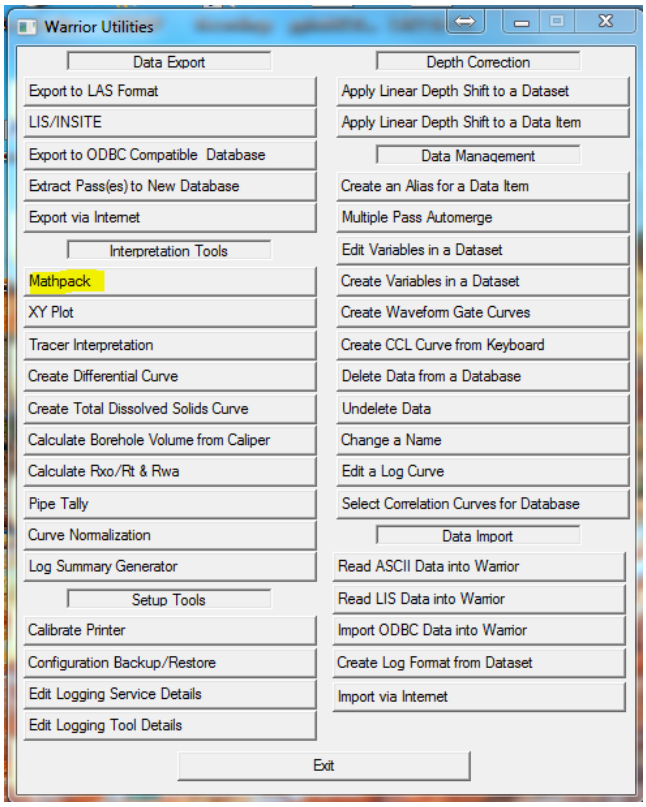


FIG: 15.1 Warrior Utilities-Math Pack

Math Pack user interface
The Math Pack job file contains:
A presentation file name and scale.
Each output name, output units, data id, sample rate, description, and the formula used to create the output.
The units for each input variable.
Math Pack can be run from the command line - "Math Pack.exe [wmp file name]" to load a job file
When the program loads. Note that the presentation file and scale will not be necessary if a Report is being generated.

15.1 File Menu

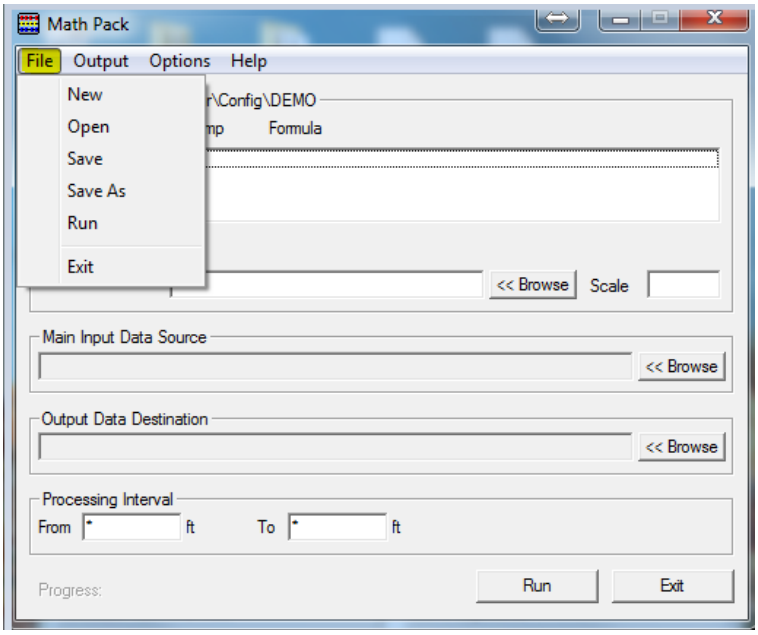


FIG: 15.2 Math Pack window.

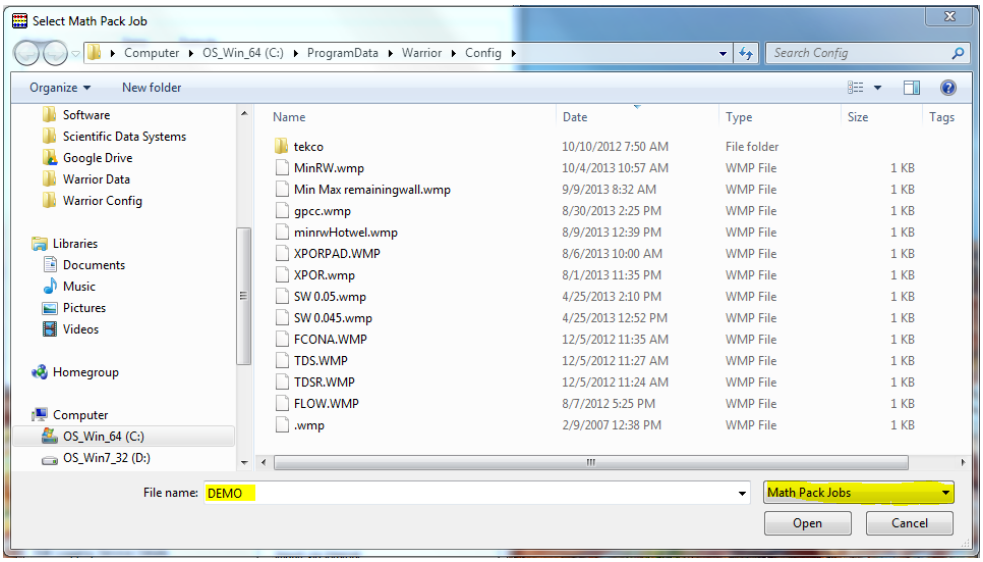


FIG: 15.3 Save Math Pack Job

The file menu controls the Math Pack job files. The default directory for Math Pack jobs is "C:\ProgramData\Warrior\Config". The default extension is ".wmp".

15.2 Output

Each output requires a formula to create the output.

To create a formula, either select **Output/Add** from the main menu, or press the Insert key when inside the Output box in the Math Pack window.
To delete a formula, first highlight the formula to be deleted. Then either select **Output/Delete** from the main menu or press the **Delete** key.
To edit a formula, first highlight the formula to be edited. Then either select **Output/Edit** from the main menu or press the **Enter key.**

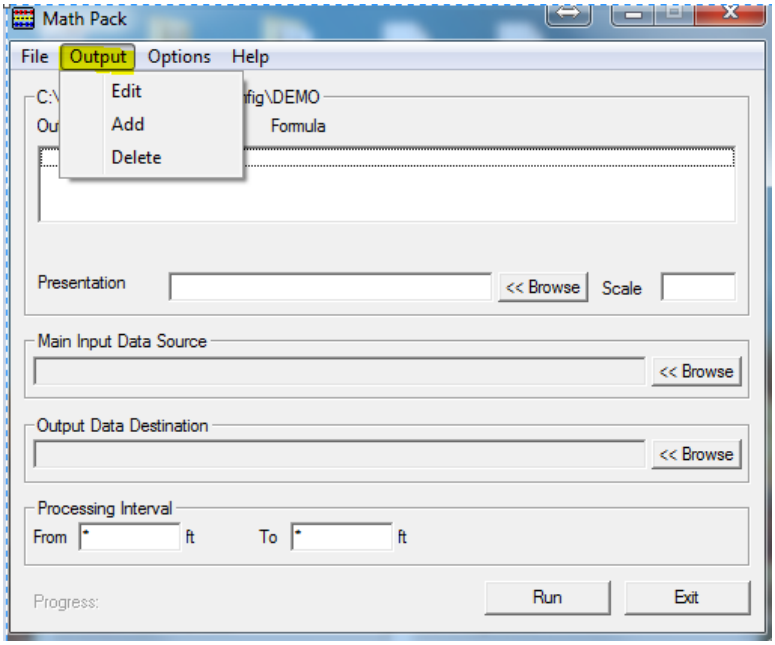
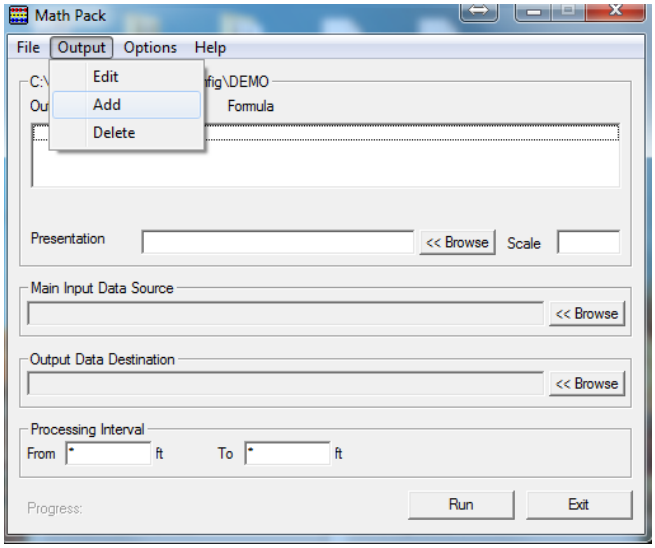


FIG: 15.4 Output options



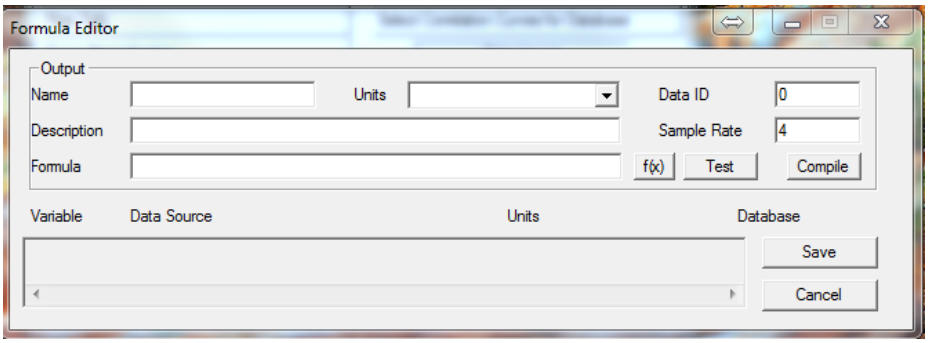


FIG: 15.5 Output /Add

15.2.1 Output Units

If an input variable has units selected as "None", then the units for that variable will come from the database, otherwise the selected units will be used. If the units for the output or input are "None", then no unit conversion will be done. Otherwise, an attempt will be made to convert the value from the input units to the output units.
An example may be:
CalAvg = (Cal1 + Cal2) / 2
CalAvg units may be inches, Cal1 units may be mm, Cal2 units may be cm.
Cal1 and Cal2 will be converted to inches before they are added together.

15.2.2 Output Box

The output box shows the output name, output sample interval, and the formula used to create the output. If the output sample interval is 0, then it will be calculated when the Run button is selected.
The calculated output interval will be the maximum of the intervals of the input curves. Any zoned variables will be sampled at a rate of 600.

15.2.3 Presentation / Scale

The presentation file and scale to be used when creating a new pass. If the data is going to an existing pass, then the existing presentation and scale will be used.

15.2.4 Main Input Data Source

Will overwrite any data sources that were selected for curves. Will default data source for each formula variable to: field/well/run/pass/[variable name]/*
At runtime, if it cannot locate field/well/run/pass/[variable name]/* then it will try to locate it as a zoned variable: field/well/run/pass/_vars_/[variable name]
If that cannot be located, then a warning message will appear "Unable to connect to input [variable name] in [database]:[pass]"
If the Output Data Destination is blank when this is selected, then a default new database name will be created. The new name will be: field/well/run/mpk_[x] where x increments for each math pack run.

15.2.5 Output Data Destination

This can be created automatically by selecting the Main Input Data Source first. This can be an existing database if the created curves do not exist already. If the created curves exist, then the following message will appear: "Unable to create output [database]:[pass]/[variable name]/1"
If you select Generate Report from the Options menu, then the destination will be the location of the embedded text report.

15.2.6 Processing Interval

To process the entire input interval, leave **FROM** and **TO** values as "*".

15.3 Formula Editor

15.3.1 DataID

A value used for Warrior databases. Default is 0.

15.3.2 Description

This will be written to the output database along with the output name.

15.3.3 Formula

To see what functions are available, select the **"f(x)"** button. This will also show what parameters are needed for each function. There is a different set of formulas for the Report output and for the Curve output. The AVG curve formula will create a new curve which will be the average of one or more curves - i.e. AVG(GR1, GR2, GR3). The AVERAGE Report will create the average value of the curve(s) over the entire interval. The MIN, and MAX functions are like the AVG function, and the MINIMUM and MAXIMUM functions work like the AVERAGE function.

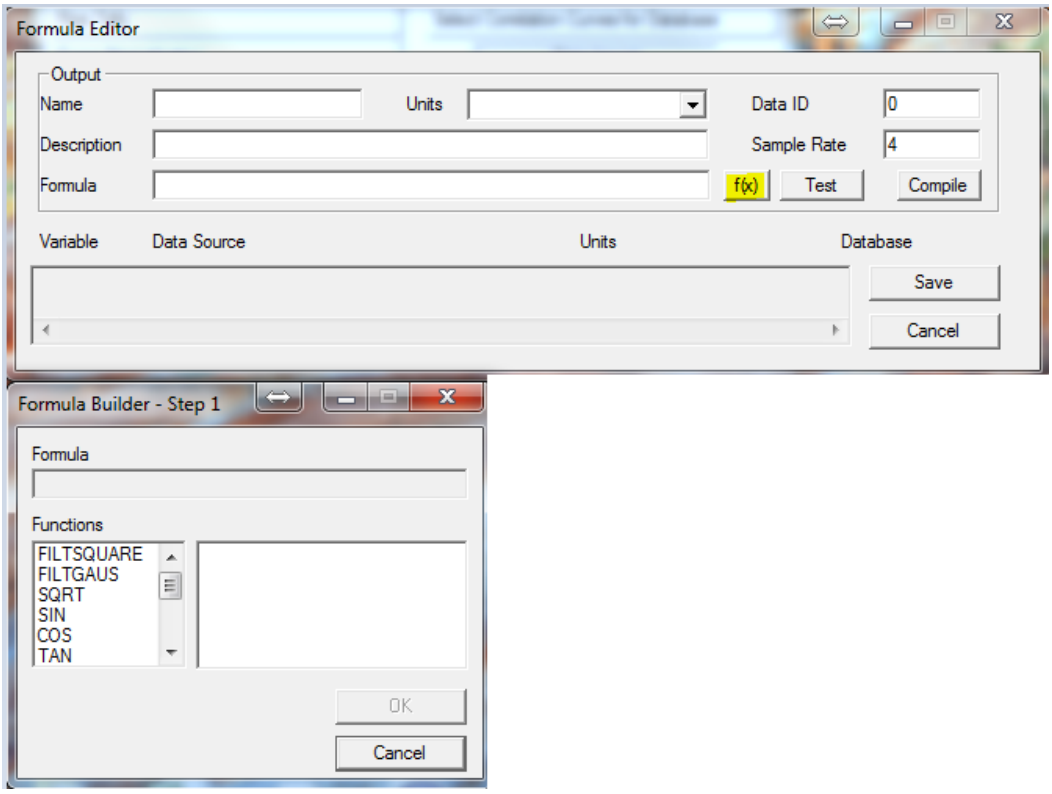


FIG: 15.6 Formula Editor

15.3.4 Test

This will run sample values through the formula and show the result. It will automatically fill the variables with values starting with 1 and incrementing for each variable. You can also test the formula with other values by placing a number in the Data Source box next to the variable name.

15.3.5 Compile

This will determine if the created formula will be able to compute a value. The Formula Editor window will change after the compile to show the new variable list.

15.3.6 Data Source

Select the Curve button to select a curve from a dataset. Select the Var button to select a zoned variable from a dataset. This will be the source of the data for each variable. This will also be filled in if the Main Input Data Source from the Main Window is selected.

15.3.7 Variable Units

To override the units from the database, change this setting; otherwise leave it "None". Also see output units.

15.4 Options

The Math Pack program will generate two types of outputs - curves and reports. The curve output will create another log pass with the output curves generated by applying the formula at each data point. A report output will generate an embedded text report, which will contain the results of the formula(s) applied to all the data points over the entire interval. The output data destination will be the location of the embedded text file in the database.

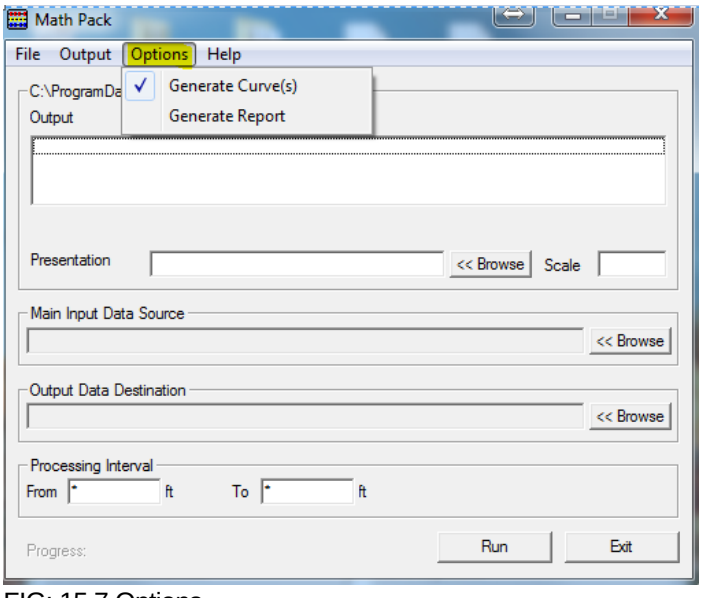


FIG: 15.7 Options

15.5 Demo example

Create a new Math Pack Job (demo), Add new output curve (GRADD), Select GR curve from DB CBLDEMO, ADD 200 API, and plot.

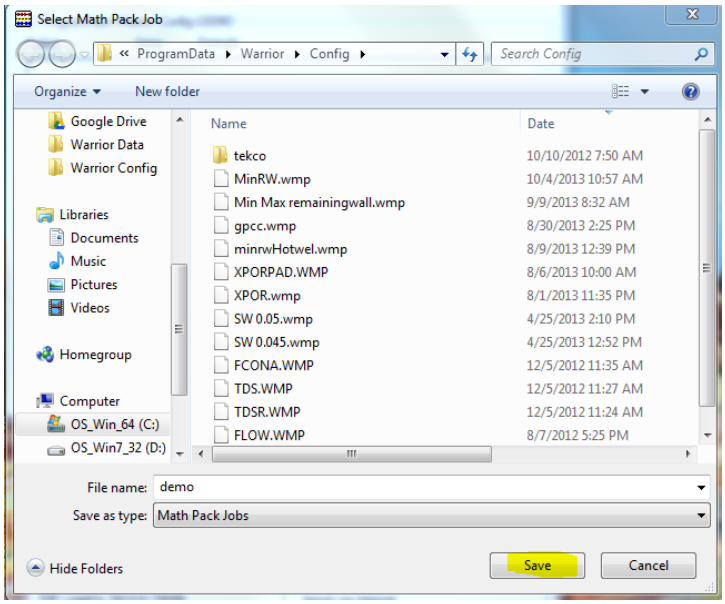


FIG: 15.8 New Job Math Pack

Type new Math Pack job “demo’

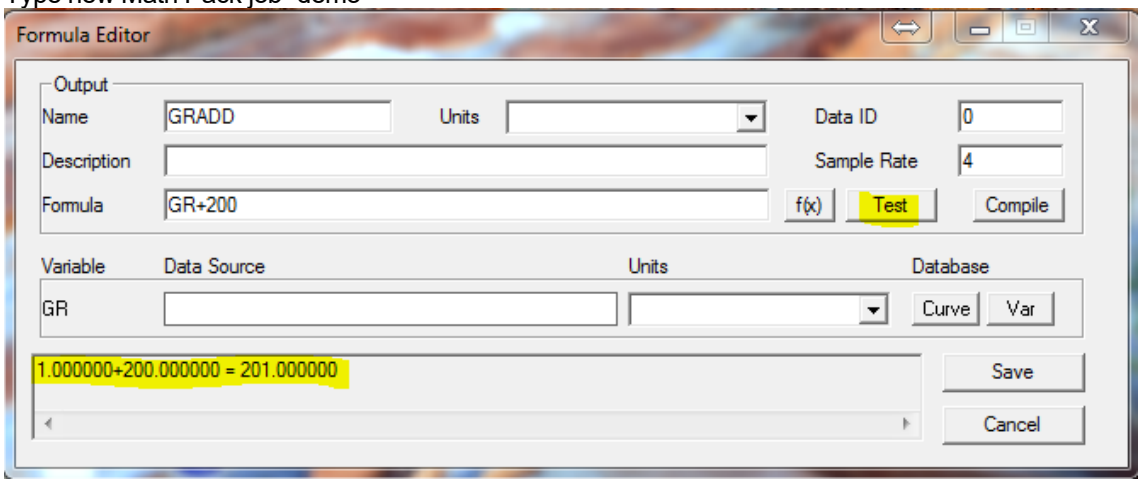


FIG: 15.9 Formula Editor Setup

ADD or create a formula, either select **Output/Add** from the main menu, or press the Insert key
Type on Name box “GRADD”
Type on description box “Gamma Ray ADD “
Type the formula GR+200
Type the formula and click on **Test**
Click on **Save**

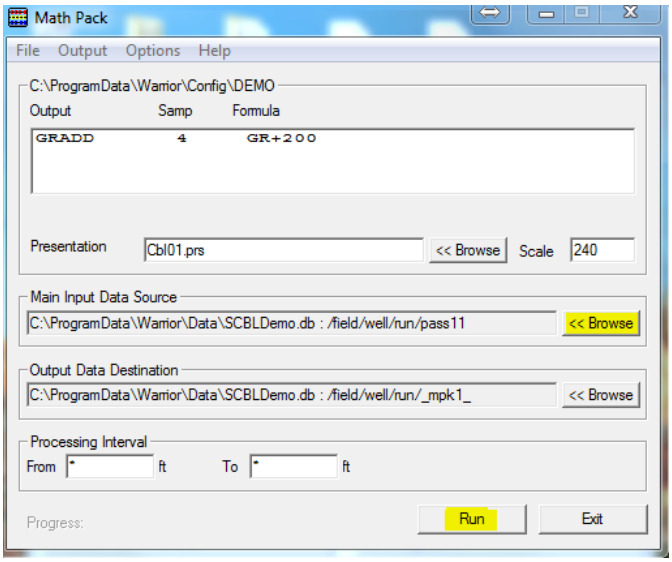


FIG: 15.10 Run Math Pack

Select Main input data source from the warrior Data Base (SCBLDEMO)
The Output Data Destination can be created automatically by selecting the Main Input Data Source first.
Click on **Run**

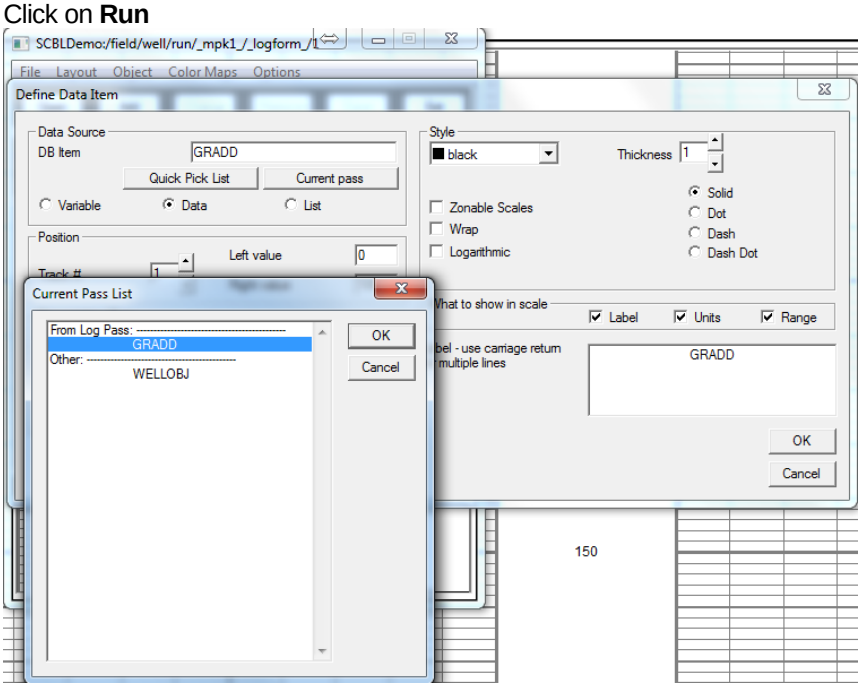


FIG: 15.11 Select New Curve

Add a new curve GRADD

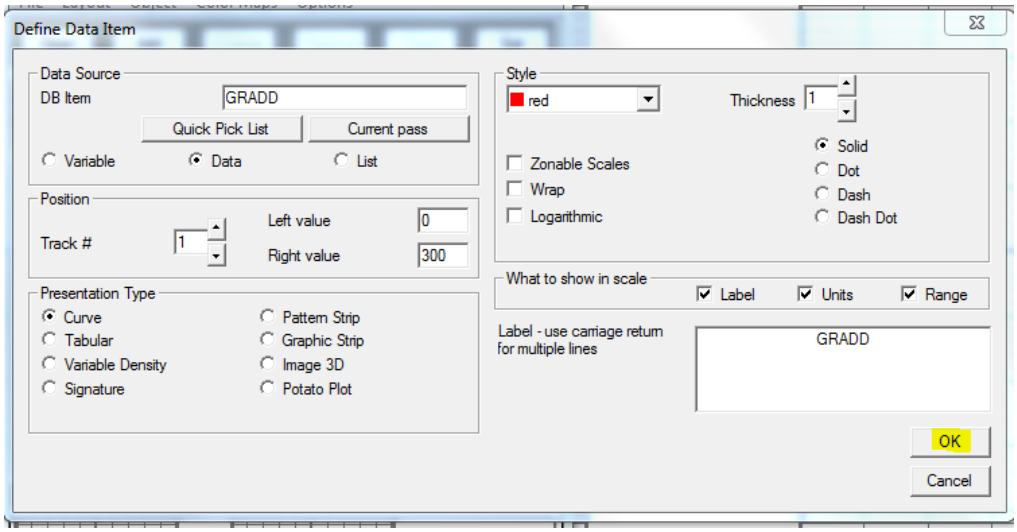


FIG: 15.12 Set Curve

Set Scales and Track values

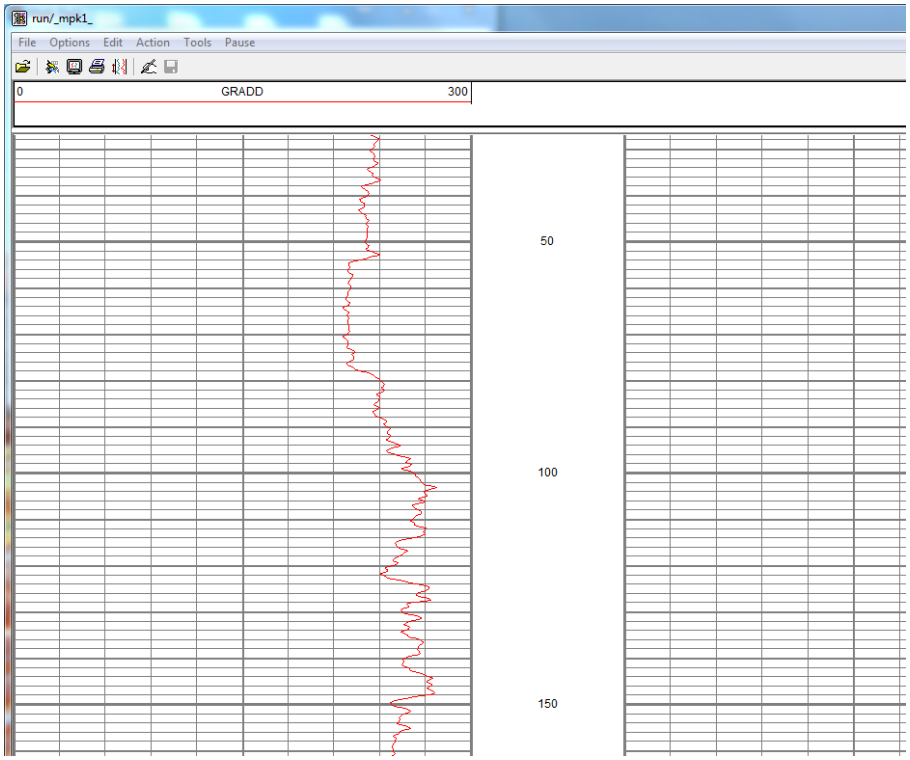


FIG: 15.13 Plot Curve

Plot the Curve GRADD

Section

16

16 Cable Types and Filter Settings

The Warrior 8.0 Software now includes provisions for setting certain parameters for user defined cables. These parameters include the line resistance for that line and filter settings for multiple user declared signal types.
The line resistance setting for a line will be used in computing the Head Voltage Apparent output in all services.
If a service has a signal type control in the service, then when that service is ran the Warrior Software will look for specific filter settings that have been saved for that signal type for the cable that is currently selected.

16.1 Defining Cable Types

The first step in setting up the process to use different cable selections is to define a new cable by name. The name can be any text string that the User wishes to identify that cable or type of cable. The name may be something as simple as “Truck 1234 – 5/16 Line”. It may also be something more specific as “1K22PZ – 7/32 (12000 ft. to 18000 ft.)
To declare a new cable, go to the Control Panel in the Warrior Program group. At the top of the window, click on the Acquisition tab. The Cable type section is in the upper right hand corner of the Acquisition sheet.

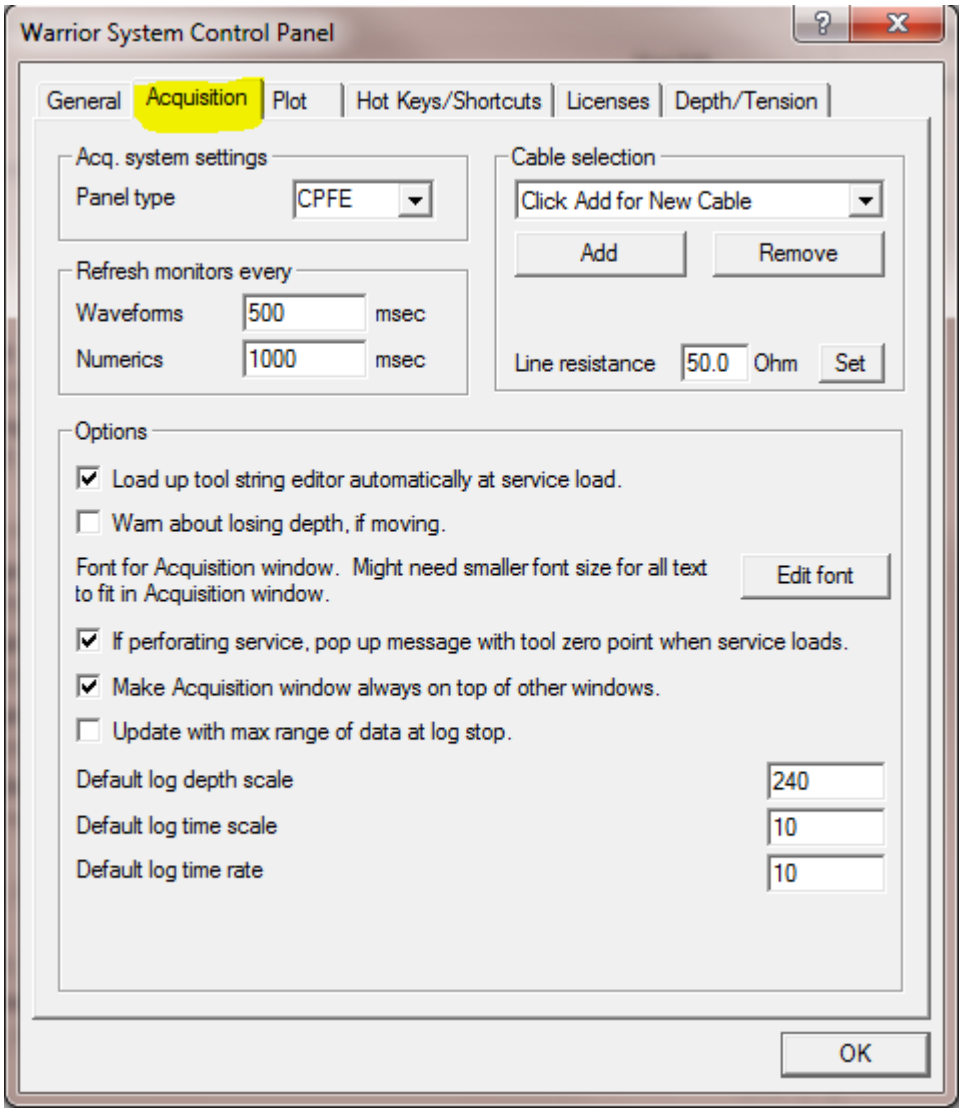


Fig. 16.1 Acquisition Sheet of Warrior Control Panel

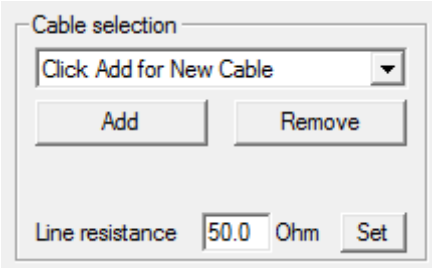


Fig. 16.2 Cable type section of the Acquisition sheet of Control panel.

To add a new line, click on the [Add] button to bring up the New Cable Type Description window.

Fig. 16.3 New Cable Type Description

Type in the new name or description that you wish to use to identify the cable then click [OK] to accept the name.

16.1.1 Setting Line Resistance

Each of the defined lines may have a line resistance setting. Enter the measured resistance of the line, then click the [Set] button to assign that resistance to the currently selected line. The line resistance is used to compute a head voltage apparent output HVOLTA. This is calculated by multiplying the line resistance by the Tool Current output to give a line voltage loss and then subtracting this from the Tool Voltage output. HVOLTA = TVOLT – (TCURR * Line resistance).
Unless the line resistance is accurate and the tool voltage and current are properly calibrated then the head voltage will not be an accurate measurement.

16.1.2 Defining Cable Signal Types

There are two different methods to set up signal types. The first are device signal types for certain proprietary devices. When the device is called out in a service, the software will look for a cable filter setting for the current cable.
The more common method comes from the SDSTIP device (Scientific Data Systems Tool Interface Panel). The cable signal types for the SDSTIP are User defined types of signals, usually telemetry signal from the tool that are filtered through the CBL1D board in the interface panel. If a signal type control has been added to a service, the software looks for saved filter settings for that type of signal in the settings of the cable that is currently selected in the Warrior Control Panel. If cable filter settings are found, it will use those settings, otherwise a notification that no settings were found will be displayed and it will use the service default settings. The first time a cable is used with a signal type control in a service the settings will not be found, and a warning message will be shown. To save the filter settings for the currently selected cable, from Warrior Logging System Acquisition window click on Edit -> Device Configuration -> SDSTIP. Click on the [Update Cable Settings] button to save the filter settings for the signal type to the cable selected. The next time the service is started, no error message is shown, and the service default filters are used. To use the cable signal type filters, you will need to edit the device configuration for the SDSTIP again and select to use the cable type filters. That setting will be saved so that from then on, the cable type filters will be used unless they are turned off in the SDSTIP settings.

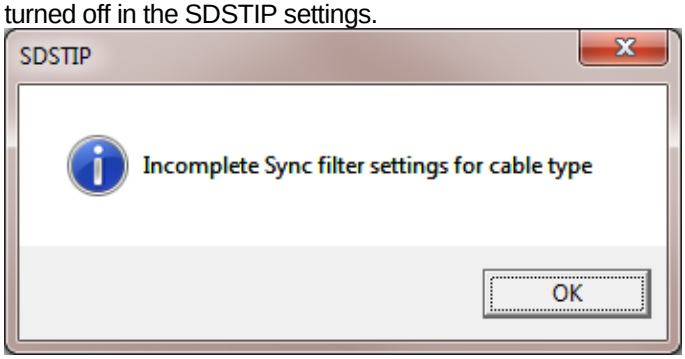


Fig. 16.4 Cable filter settings not found.

16.1.3 Example of Setting up Two Cables with different Filters for the same Service

I realize how convoluted all of this might seem to someone not familiar with the process. As an example, to show the procedure for getting a service to run different filter settings, I will give an example of a CSS (Computer Sonic Systems) tool that has previously required two different services to run on different length of lines.

16.1.4 Setting Two Example Cables

We will be making two lines. The first will be the short to medium line and the second will be the medium to long line. To set up cable types we will need to go to the Warrior Control Panel Acquisition page. In the Cable Selection area, click on the [Add] button to add a new cable.

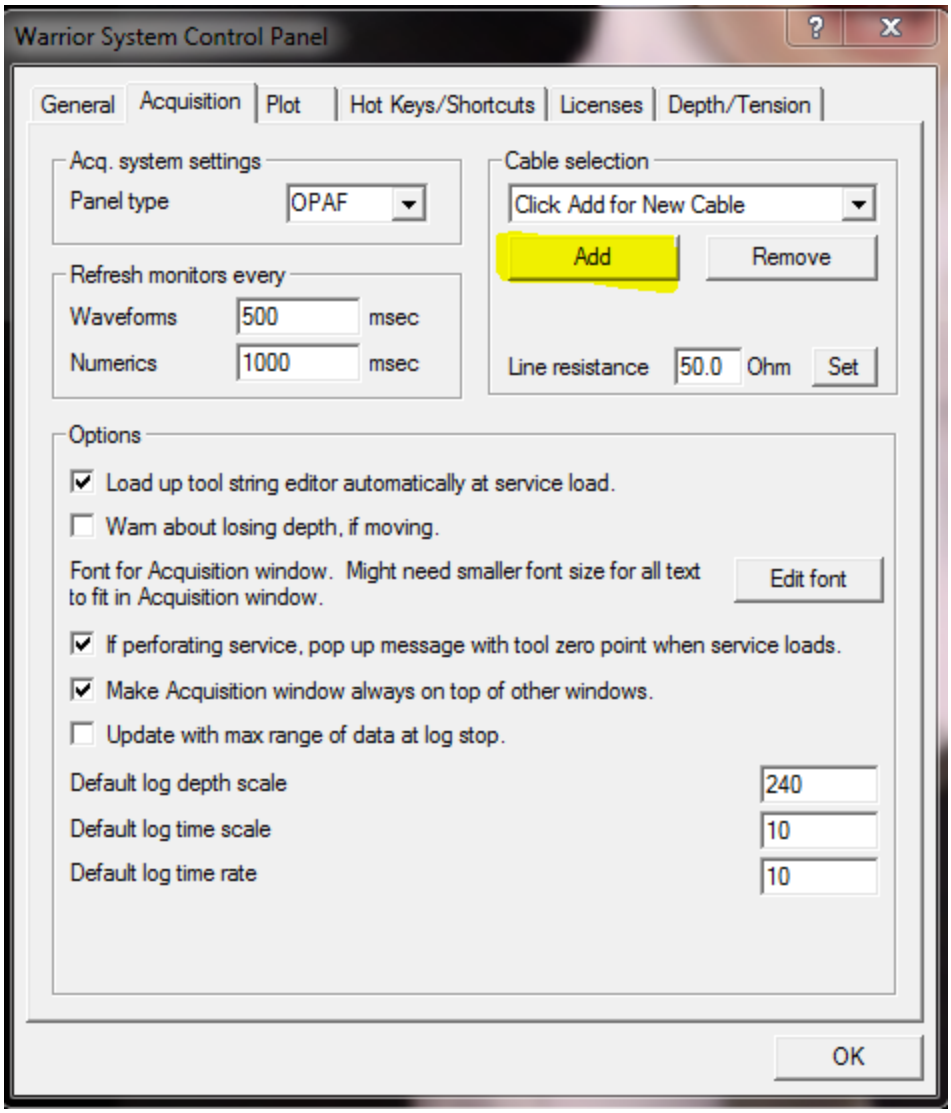


Fig. 16.5 Click to Add a new Cable.

When the Add new Cable Type window comes up, type in the description for the new cable type. Click the [OK] button to accept the description.

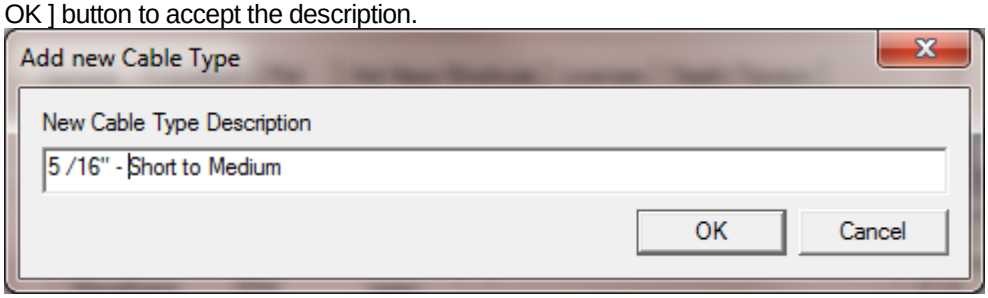


Fig. 16.6 Enter short to medium line description.

Click on the [Add] button again to add the second line. Type in the line description for the medium to long lines in the text window. Then click on the [OK] button to accept the description.

Fig. 16.8 Enter medium to long line description.
Next, we need to set the line resistance for each line. From the control panel acquisition page cable selection area, click the drop down list of cable selections and pick the short to medium line

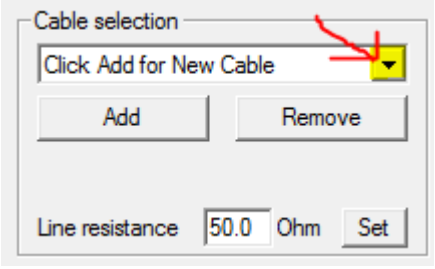


Fig. 16.9 Click Drop Down list to select cable.
For this example, we will set the line resistance to 35 Ohm. Enter 35 in line resistance and then click the [Set] button.

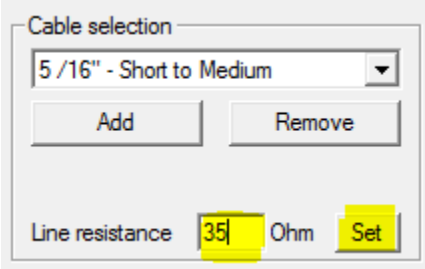


Fig. 16.10 Set Line Resistance for short to medium line to 35 Ohm.
Next, click the cable selection drop down list and select the medium to long line. We will put in an example resistance or 70 ohms, and then we click the [Set] button to save that value.

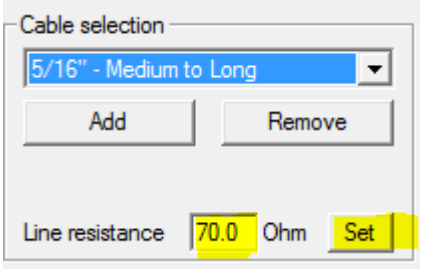


Fig. 16.11 Set Line Resistance for medium to long line to 70 Ohm.
Click the [OK] button at the bottom of the control panel Acquisition page to save changes.

16.2 Setting up Signal Types through the Service Editor

The next step is to add the Signal Type control to our services. From the Warrior Software program group, select Database Utilities. From the Database Utilities, click on Edit Logging Service Details to bring up the Service Editor.

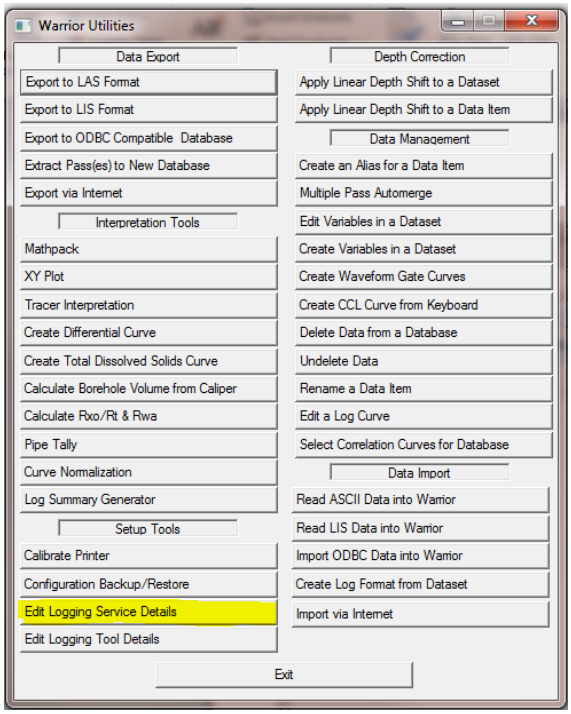


Fig. 16.12 Starting the Service Editor from Database Utilities.

In the Service Editor, click on one of our CSS services to edit it. We will start with the “CSSM 3 18” RBT Short to Medium Lines” service. Then click on Add -> Control.

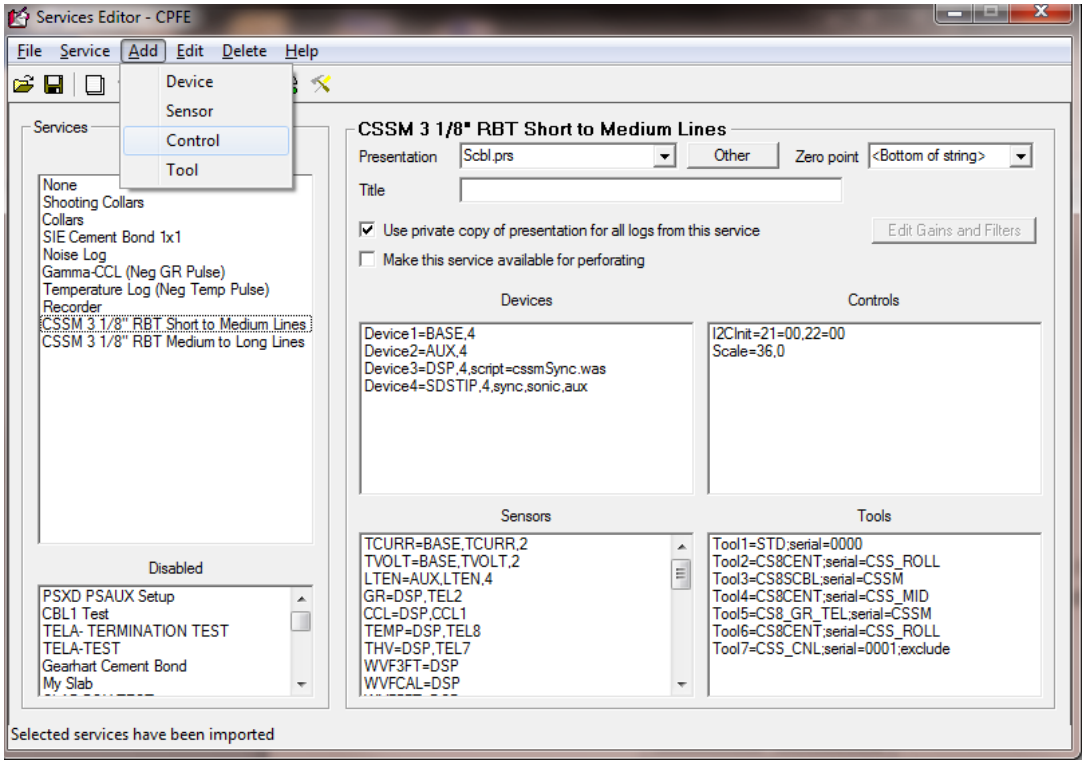


Fig. 16.13 Select CSS Service and Add Control.

Scroll down the Control Keyword dropdown list to “Signal Type”. For this example, we will enter “CSS_TEL” as the Control value for the signal type. Note that any text string that the User chooses may be entered for a signal type. SClick [OK] to save the setting. Click on File -> Save to save the edited service.

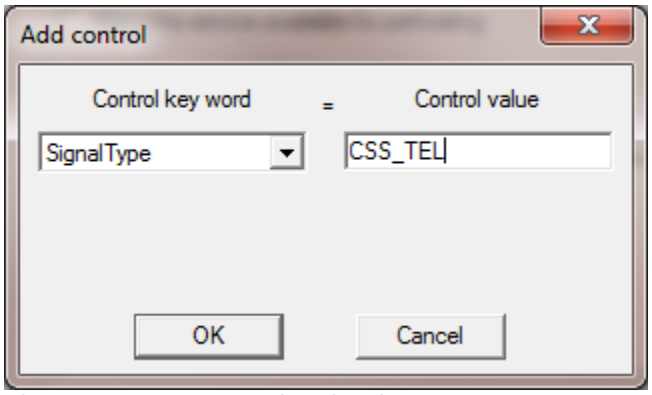


Fig. 16.14 Set CSS Service signal type to CSS_TEL

We now must add the same signal type control to the “CSSM 3 1/8” RBT Medium to Long Lines. Click on the service to edit it. Click on Add -> Control. Select the “Signal Type” Control keyword and enter CSS_TEL for the control value. Click [OK] to save the control value and then click on File -> Save to save the edited service.

16.3 Setting Filter Settings for the Signal Types on each Line

Now we need to set the filter settings for the CSS_TEL signal for each line that we will be using. Go to the Warrior Control panel Acquisition page, and in the Cable Selection area, click the dropdown list to select the 5/16” – Short to Medium cable that we have already declared. Click [OK] to save.

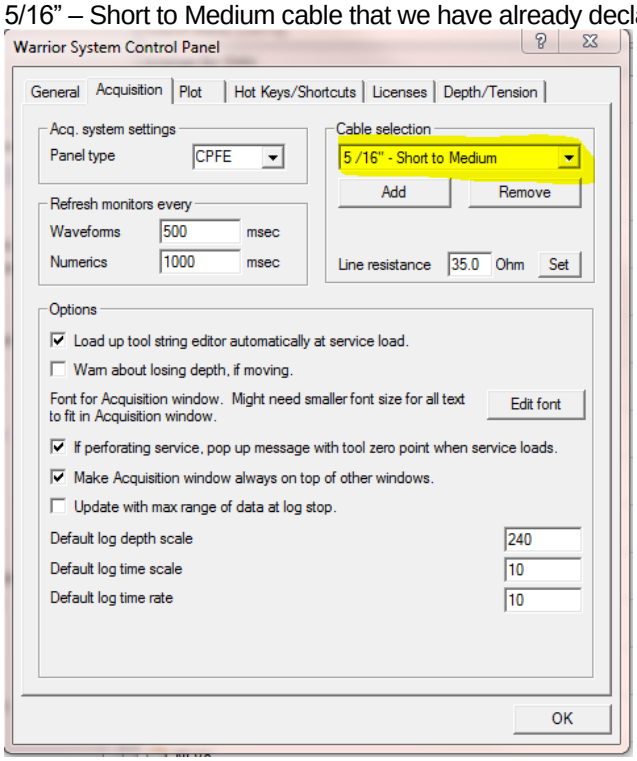


Fig. 16.15 Select Short to Medium line for use.

Now start Acquisition and select the “CSSM 3 1/8” RBT Short to Medium line” service. You will get a message stating that you have incomplete filter setting for cable type. Click [OK] to cancel the message.

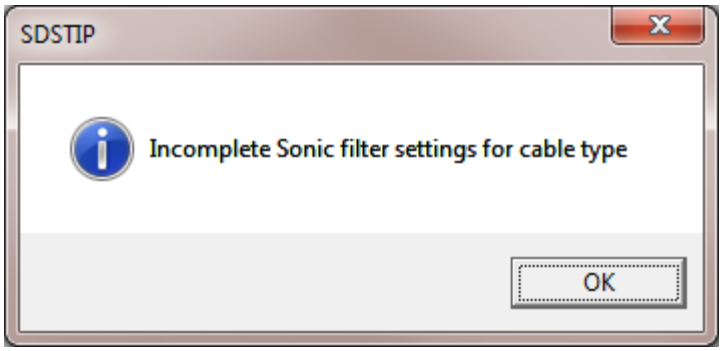


Fig. 16.16 Filter settings not yet saved for this cable and signal type message

To save the settings, Click on Edit -> Device Configuration -> SDSTIP.

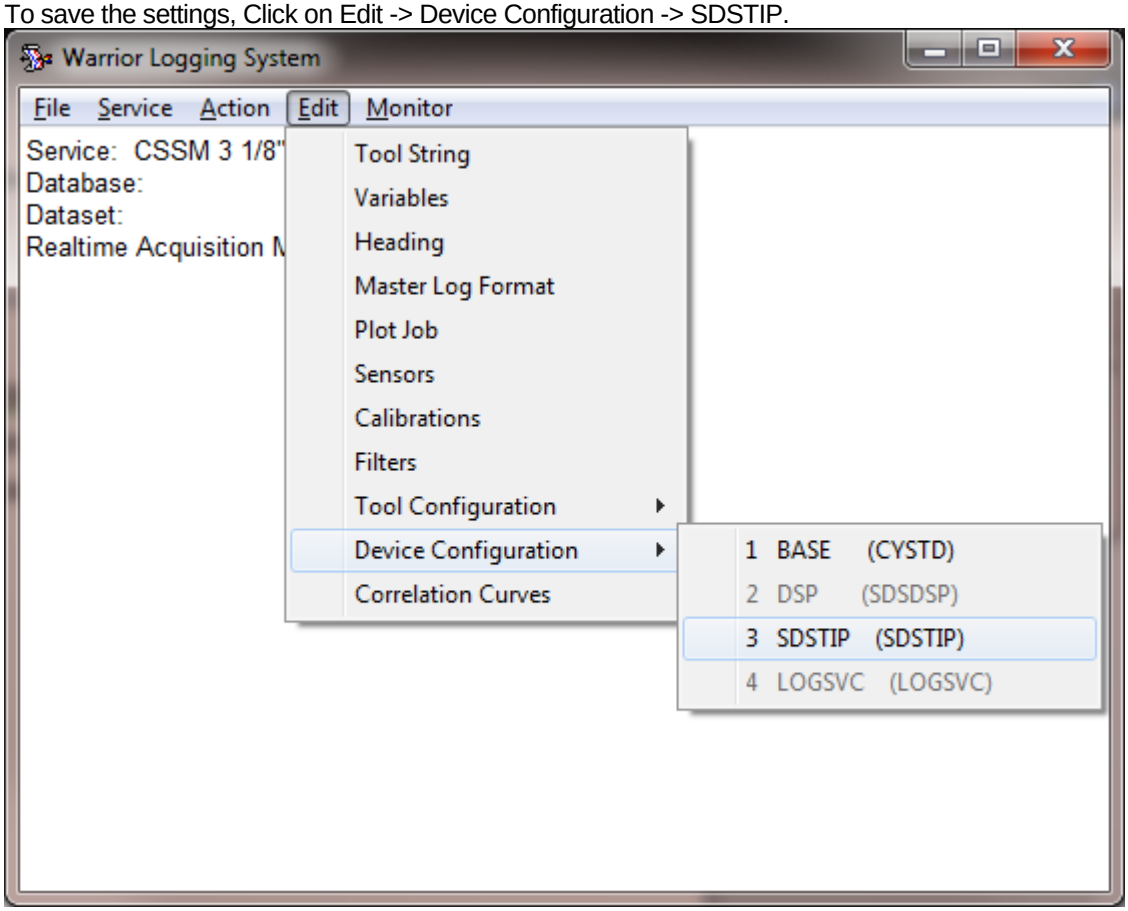
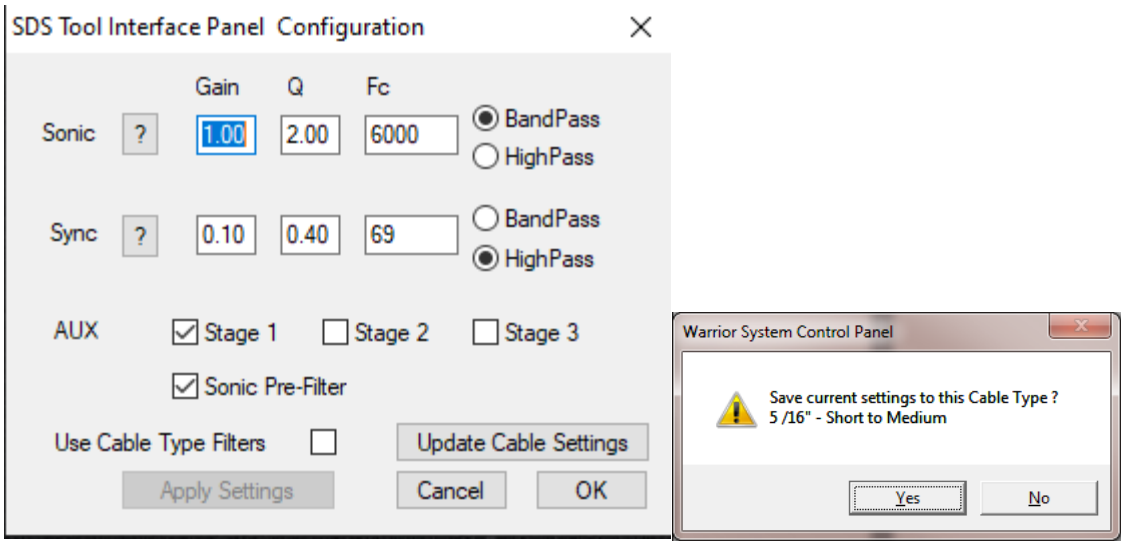


Fig. 16.18 Edit SDSTIP to save filter settings

When the SDS Tool Interface Panel Configuration windows come up, click on the [Save As Cable Settings] to save the current values to the cable type. Then click [OK] to close the window

Fig. 16.19 Saving the filter settings to 5/16” – Short to Medium line



Now restart the “CSSM 3 1/8” RBT Short to Medium line” service and Edit -> Device Configuration -> SDSTIP again. This time the Use cable Type Filters check box has been enable. Click on this box to use the saved cable settings. This service now will use the saved cable filter settings every time until they are changed by editing the SDSTIP configuration settings and unchecking the Use Cable Type Filters box.

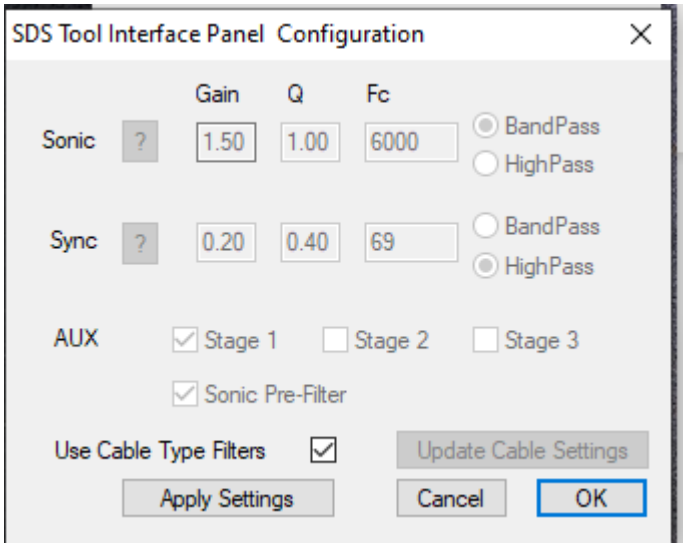


Fig. 16.20 Selecting to use the saved Cable Filter settings.

Now that we have set up a CSSM service to use the short to medium line settings, we must set up the medium to long lines service. Go to the Warrior Control panel Acquisition page and select the 5/16” Medium to Long line. Then Click [OK] to close the control panel and save the selected cable.

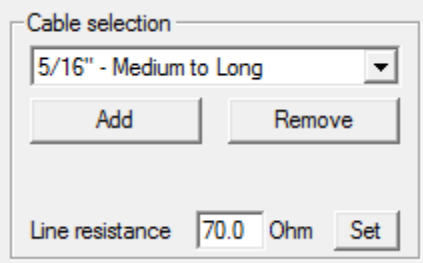


Fig. 16.21 Select the Medium to Long line to start savings CCS_TEL settings

Now go to Acquisition and select the “CSSM 3 1/8” RBT Medium to Long line” service. You will once again get the warning message about incomplete filter settings for cable type.

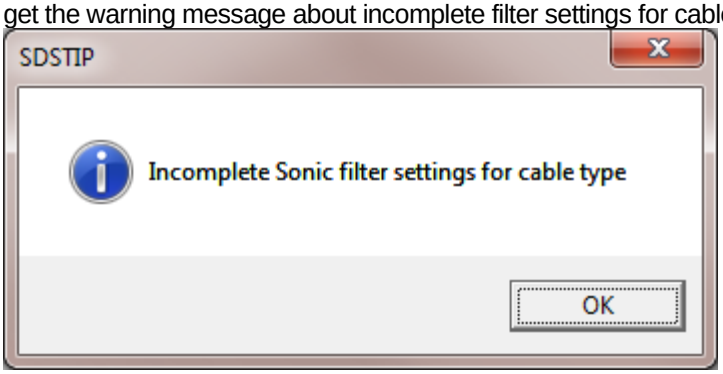
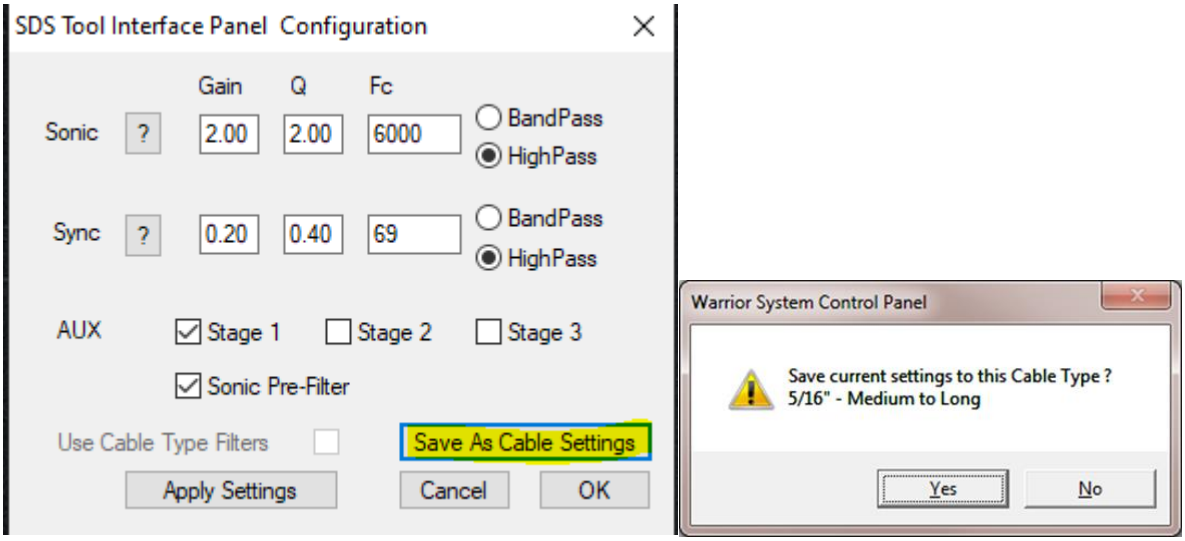


Fig. 16.22 Warning message for incomplete filter settings for cable type

From Acquisition, we need to once again Edit -> Device Configuration -> SDSTIP and Click the [Save As Cable Settings] Button. Click the [YES] button to save the settings. Then click [OK] to close the SDS Tool Interface Panel Configuration Window.
Fig. 16.23 Saving CSS_TEL filter settings for Medium to long line



Now from Acquisition, restart the “CSSM 3 1/8” RBT Medium to Long line” service. When the service is loaded, we need to edit the SDSTIP configuration by clicking again Edit -> Device Configuration -> SDSTIP. Click the Use Cable Type Filters checkbox to bring in the saved cable settings. Then click [OK] to close the SDS Tool Interface Panel Configuration window.

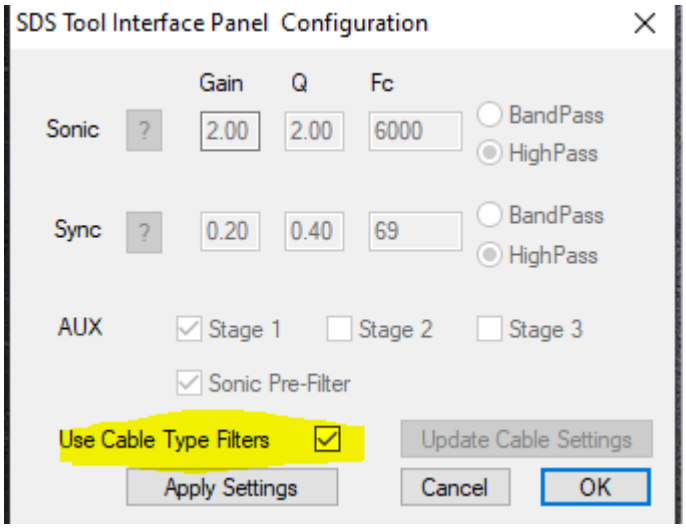


Fig. 16.24 Using CSS_TEL filter settings for Medium to long line

If you look at the filter settings that were saved in Fig 16.20 and Fig 16.24, they were:

	Gain	Sonic Fc	Sync Fc Aux Fc
Short to Medium	1.50	1.00	6000 BP
Medium to Long	2.00	2.00	6000 HP

Now with Medium to Long lines selected in the Warrior Control panel, if you start Acquisition and select either the “CSSM 3 1/8” RBT Short to Medium line” service or the “CSSM 3 1/8” RBT Medium to Long line” service and then edit the SDSTIP configuration settings, you will find that both services are using the filter settings for the medium to long lines. Likewise, if you change the selected cable in the Warrior control panel too Short to Medium line, you will find that the short to medium filter settings are being used in both services.

At this point, you could use the Service Editor to Remove one of these two services and then rename the remaining service to “CSSM 3 1/8” RBT”.

If later, it is decided that you need to change the filter settings of the service for a cable, you would need to edit the SDSTIP Device Configuration and uncheck the Use Cable Type Filters check box. The software will revert the filter settings to what is saved in the service. Make any changes that you need and then [Update Cable Settings]. Restart the service and edit the SDSTIP device configuration to check the Use Cable Type Filters check box.

Section

17

17 Simulator Box

The USB Simulator connects to the USB port of the system pc and receives 5-volt power up to 500ma from it. Tool waveforms can be downloaded and then played back in analog form through the line or directly into the system. Outputs to test the Depth Encoder and Tension are also provided.

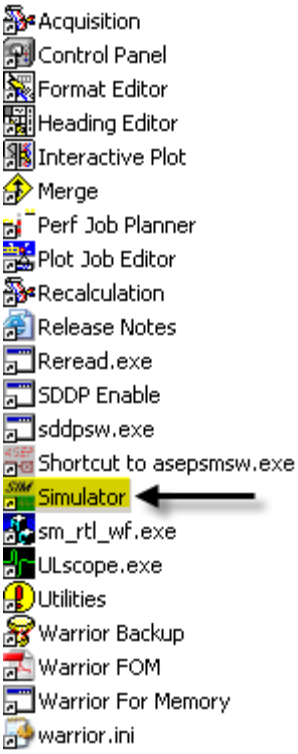


FIG: 17.1 Simulator

When the USB Simulator is powered up by plugging it into the USB port of a PC or the USB HUB of a Warrior Interface panel, it goes through a two-step enumeration according to the device code found on EPROM IC5. Double clicking the SIMULATOR icon in the Warrior panel will bring up the control window.

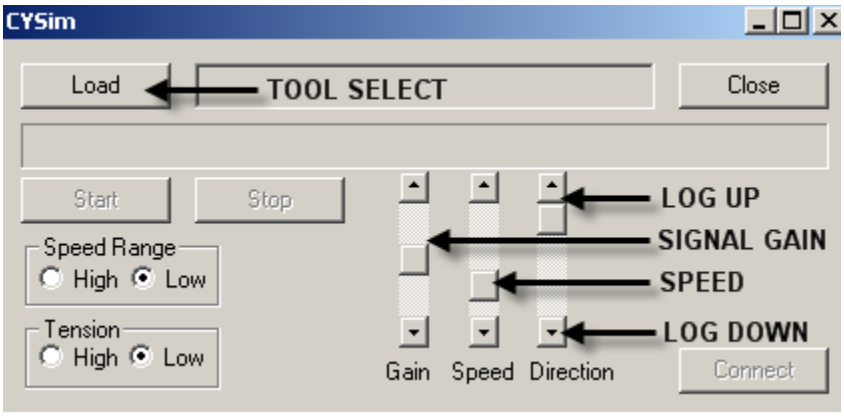


FIG: 17.2 Simulator Controls

Select LOAD and choose the tool waveform from a list. These files are in the Warrior Bin directory.

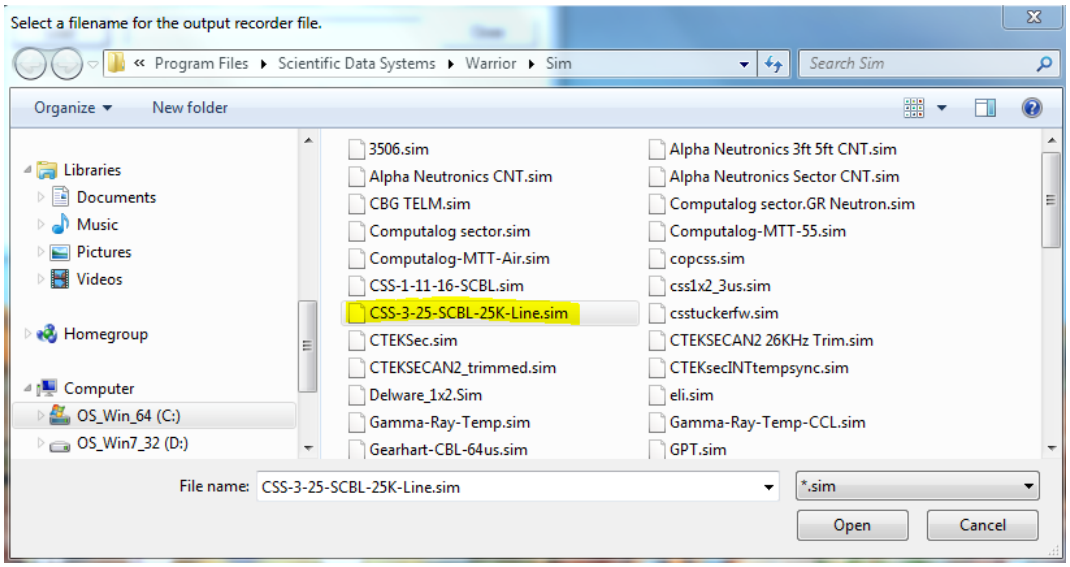


FIG: 17.3 Simulator tool files

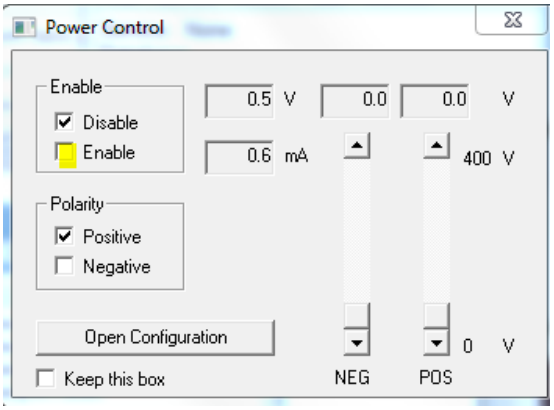


FIG: 17.4 Power Control

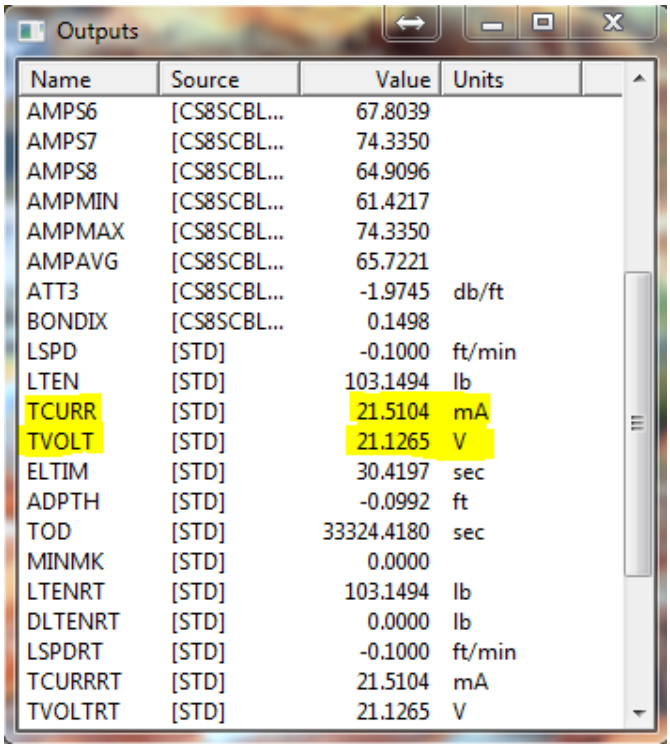


FIG: 17.5 Outputs

To playback the waveforms press the START button.
There are slides for Encoder Speed and Output Gain. The Encoder speed will depend on what number is input for pulses/foot. 120 should give a reasonable range. If less speed is needed change the number to 600 pulses per foot. There is a button for high and long range. Low range will provide speeds less than 100 feet per minute. There is a button for changing the direction, up/down.
The Depth Encoder power from the interface panel lights an LED or both if it is twelve volts.

17.1 Circuit Description

The simulator gets its intelligence from IC1 – a Cypress AN2131Q EZ-USB controller with 8k of internal ram. An external 128k x 8 static ram, IC2 - CY71019B – is used to store waveform data. IC5 - 24LC00P, EPROM is used to store the USB address code, so the device enumerates as a Simulator and not as something else. IC6 provides 3.3 volts for most of the logic from the USB 5 volt supply. A DC-DC Converter supplies +/- 12 volts from the 5 volts supplied by the USB port. An external 5-volt supply can be used if it is needed.
The encoder frequency is set by OUT0 from DAC, MAX519. The DAC output goes to a voltage divider to reduce the 0 to 5 volt swing to 0 to 1 volt for the V to F converter, IC10, AD654. Software controls the high and low range of the encoder speed. The output frequency goes to IC9B, buffer, and then is split and one side inverted. One side goes to IC12A, and the other to IC12B, SN74LS74, dual D flip flop. These are wired to give two wave trains 90 degrees apart. The A signal goes to Encoder Out A. The B side goes to IC9A where PA5 sets direction. When PA5 is changed the output of IC9A will be inverted. That is how UP/DOWN is controlled. The signal then goes to Encoder Out B. IC7 and IC8 test the ENCODER voltage, lighting one led if it is five volts, or both leds if it is twelve volts. The encoder pulses are derived from the supply voltage. A 5 volt supply produces 5 volt pulses and a 12 volt supply produces 12 volt pulses.
SDA and SCL from IC1 control the DAC. IC4 address lines: 01000000 address byte.
PA6 controls IC14, DG411, switch. It connects R32 for 20ma and disconnects it for 2ma. The 12 volts from the STIP is converted to a current by IC7, LM317 to furnish the output signal. The circuit will accept a 24 input also.

The data loaded into the ram, IC2, is sent to the DAC a byte at a time and reproduces whatever waveform has been recorded. The chip enable comes off A15 to allow memory paging. It is inverted. Write enable and out enable are active low. A15 is used because we are only interested in high addresses. A16 comes from PC1/TXDO. R36 was added to shift the DC offset of the DAC to zero. The signal is sent from the DAC to U2A, TL082P, op amp, and then to U3, AD633, and voltage multiplier, through a 1K resistor. The multiplier voltage is supplied by IC4, serial DAC, and OUT1, which set the output gain. The signal then goes to U2B and IC3, BUF634, op amps to the line out connector.
Cable to Encoder and Line Weight:

17.2 SIMULATOR Hookups

5 PIN MALE - Tension ----------Interface Panel

A – TENSION SIGNAL GROUND REF ----------A
B – TENSION SIGNAL OUT ----------B
C – Tied to E ----------C
D – +12 VOLTS IN----------D
E – GROUND ----------E

7 PIN MALE – Depth Encoder

A – ENCODER-A
B – ENCODER-B
C – N/C
D – ENCODER POWER IN
E - GROUND

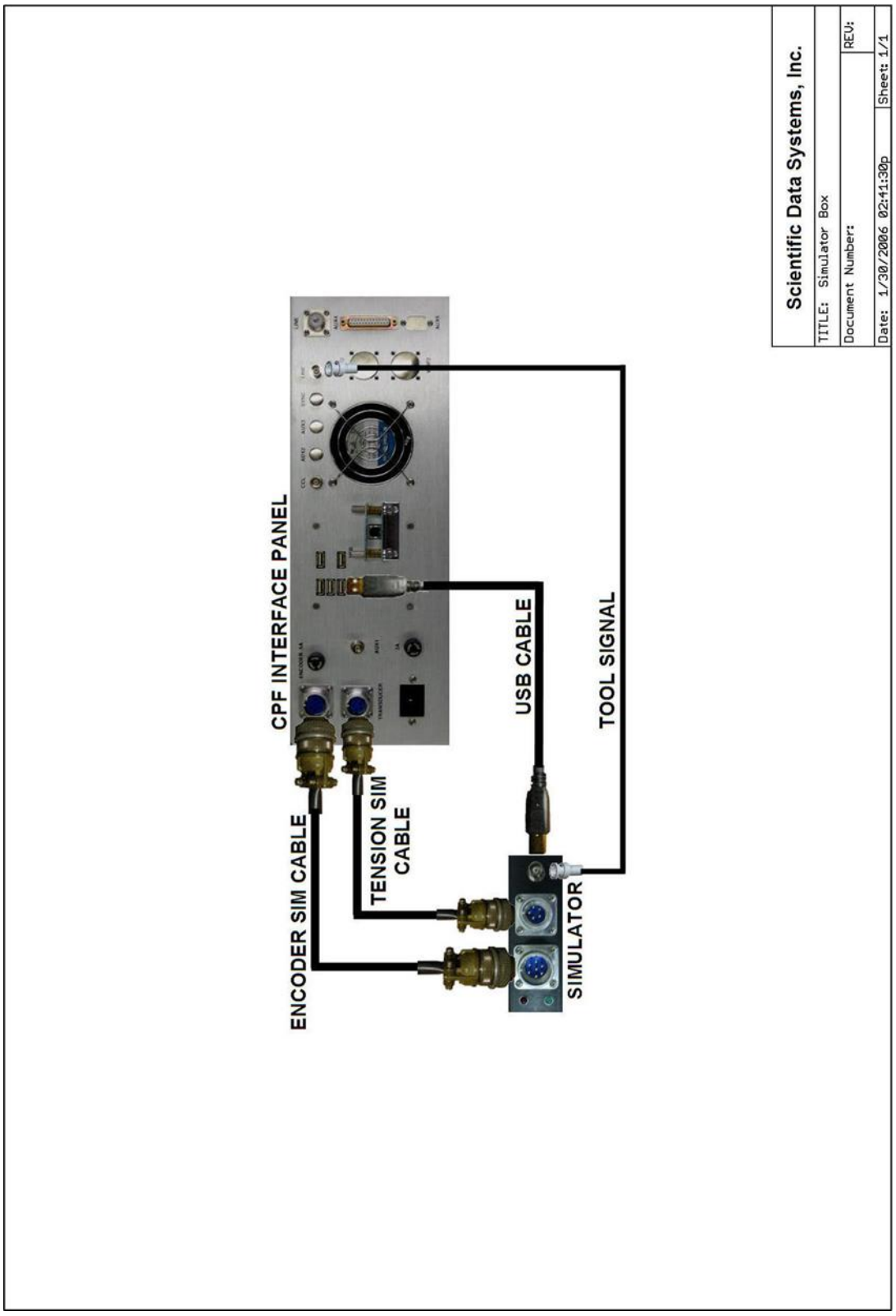


FIG: 17.6 Simulator Box Hookups

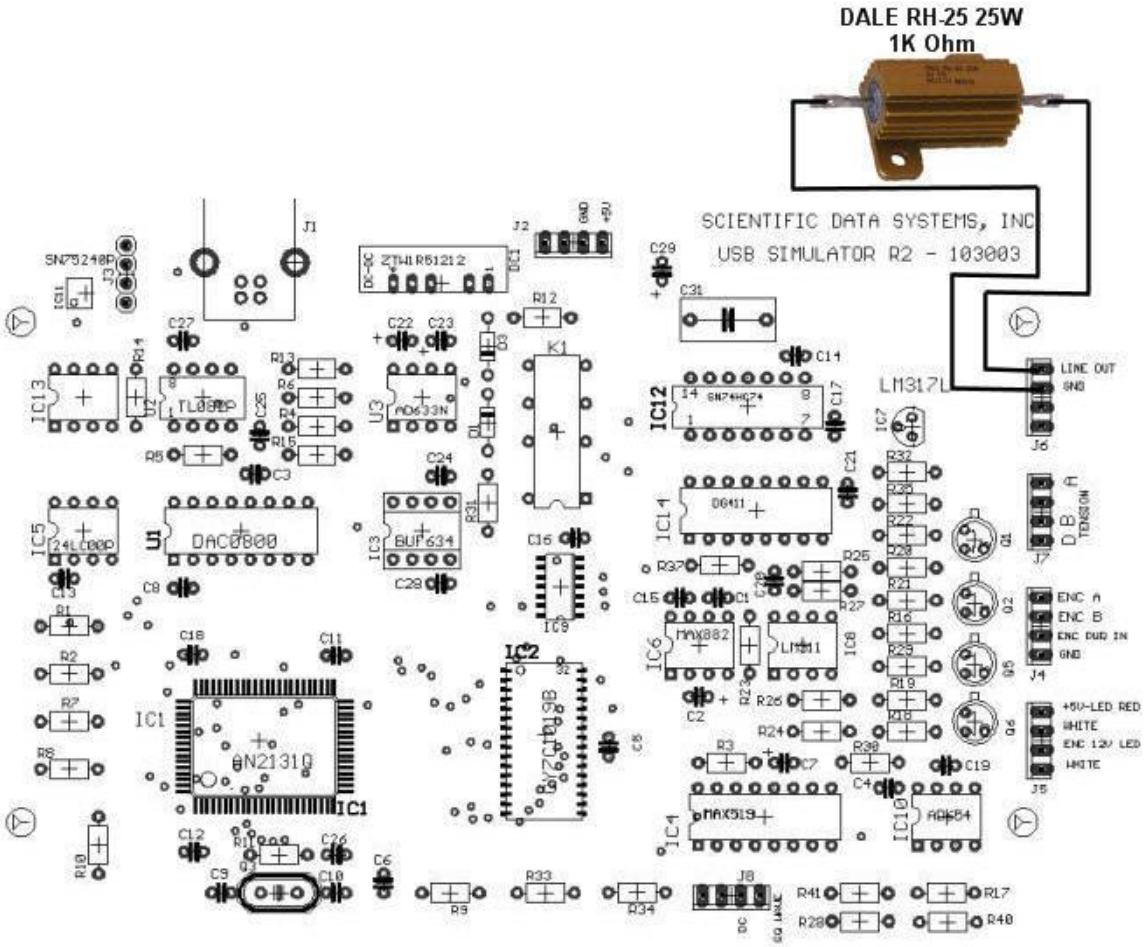


FIG: 17.7 USB SIM R2 board layouts

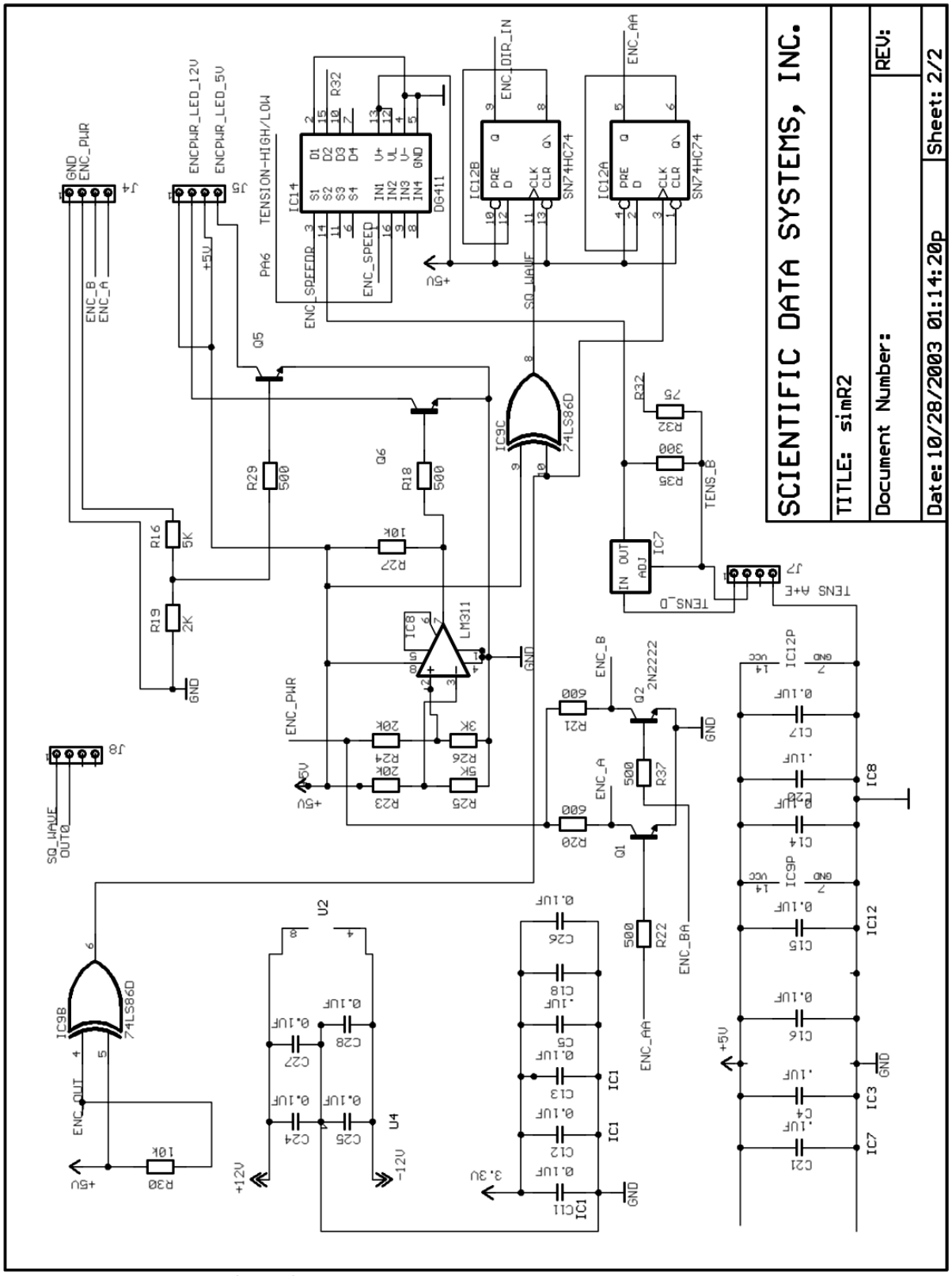


FIG: 17.8 USB SIM R2 Schematic

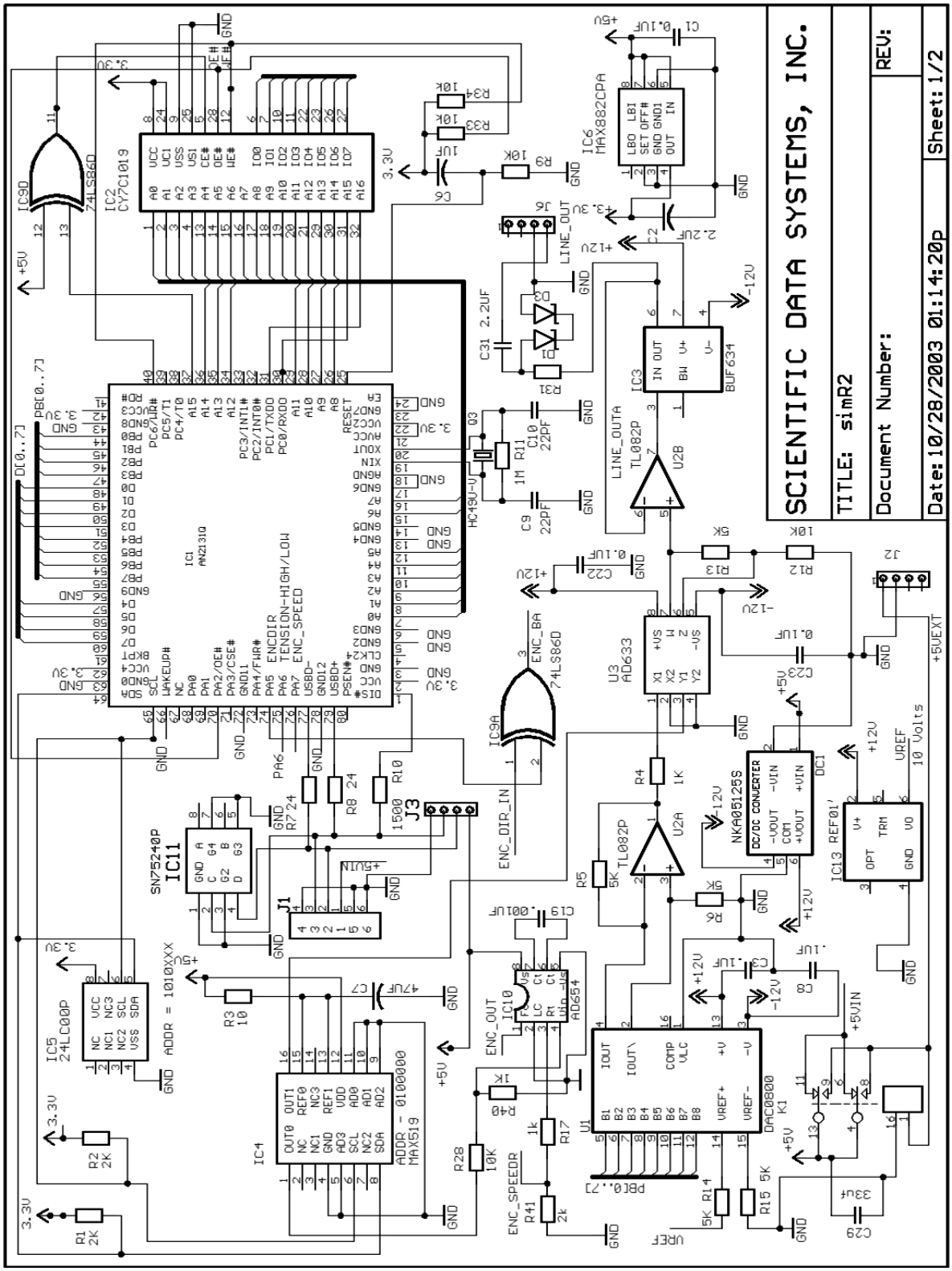


FIG: 17.9 USB SIM R2 Schematic

Section

18

18 Recorder

18.1 Warrior Line Signal Recorder Service

With the Recorder service, it is possible to make a recording of the line signal with minimal filtering. The recording can then be used to make a Simulator file to play back into the system through the Scientific Data Systems Simulator Box. Or the recorded file can be sent to Scientific Data Systems to check the tool telemetry or set up a new service for the tool telemetry. The recorder service is not normally installed as one of the default services. The service can be imported through the Service Editor.

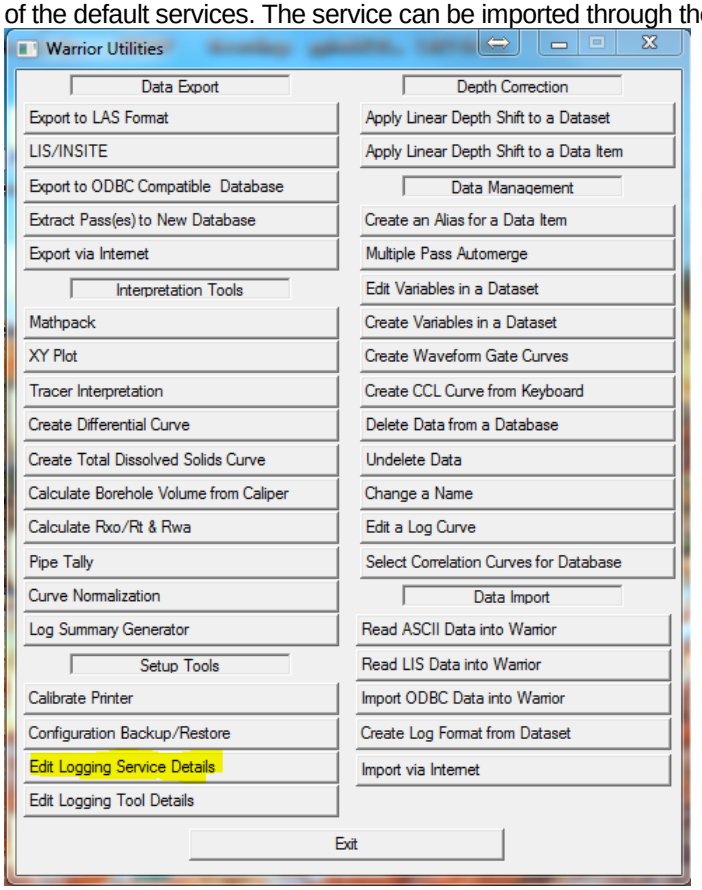


FIG: 18.1 Select Edit logging Details

To install the Service Editor, go to Warrior Utilities and click on [Edit Logging Service Details]. To Import the Recorder Service, Click on Service ->Import. From the Warrior\Config folder, choose the SDS_80.serv.wbu file and click the [Open] button. From the service import list, choose the Recorder service. It will then be added as the last service in your active service list. The Service Editor and Utilities can now be closed. If Acquisition is open, it will have to be closed and then reopened before the Recorder service will be available.

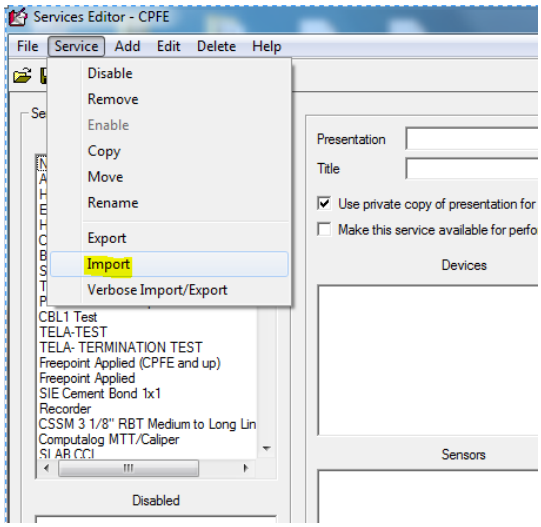


FIG: 18.2 Service\Import

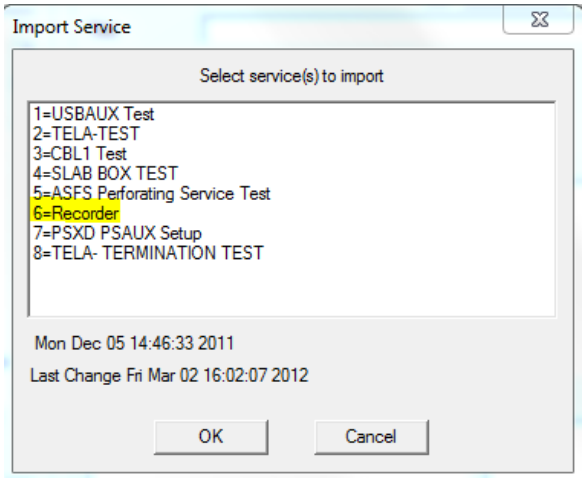


FIG: 18.3 Import Recorder service

To make a line recording, start Acquisition and select Service -> Recorder. When the Tool String editor comes up, click [Save] or [Exit], there are no tools to select or edit. In the Acquisition window click on Action -> Power Control and enable the line in the normal manner. Adjust tool power for proper operating voltage and current for the tool that you are using. The Recorder Threshold window will show a sample of the signal that will be recorded. No adjustments are necessary in the Recorder Threshold window.

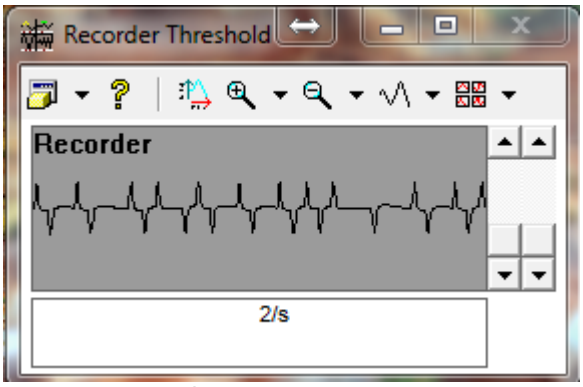


FIG: 18.4 Recorder

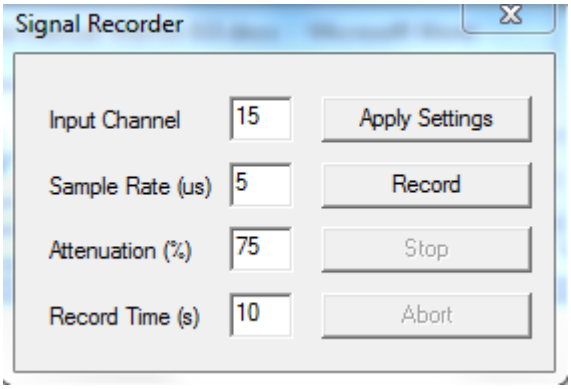


FIG: 18.5 Set up Signal Recorder

There are two other windows that come up when the Recorder service is started. These are the Panel Controls window and the Signal Recorder Setup window. The Panels Controls are not normally used unless the default Input Channel is changed from 15 to a channel that corresponds to the Sync, Aux, or Sonic input channels. This will be discussed further later.
There are 4 settings in the Signal Recorder Setup window that can be adjusted. If any of these settings are changed, the [Apply Settings] button must be clicked before the recording is done, otherwise the original settings are used.
The Input Channel is the selected DSP input channel (0 to 15). These channels are hard wired within the Warrior Interface Panel. Channel 15 comes from the ANASW board. The signal has been capacitive decoupled from the line and ran through a buffer. It is as true a raw signal as the system can digitize.
The Sample Rate is how often the DSP will digitize the incoming signal. A 5us rate is appropriate for most recordings. It should not be set to lower than 3us.
Signals may be attenuated on the DSP before they are digitized. Before doing a recording, the Attenuation setting should be adjusted to maximize the signal in the Recorder Threshold Window. The signal should not go to the top or the bottom of the window. The smaller the Attenuation setting value, the larger the signal will be. An Attenuation of 100 will not show any signal and will not give a usable recording.
The record time is the number of seconds that the signal is recorded.
When settings have been adjusted as needed and the [Apply Settings] button has been set, the next step is to click the [Record] Button. You will need to select a file name to save the file. It is recommended that the file extension show the sample rate so that the file can be played back at the appropriate rate to give a valid recording such as 5us for a 5-microsecond sample rate. Once the [Save] button is clicked, the recording will start and continue for the number of seconds set in the Record Time setting. The Record Time will count down showing the number of seconds left to record until the recording is complete.

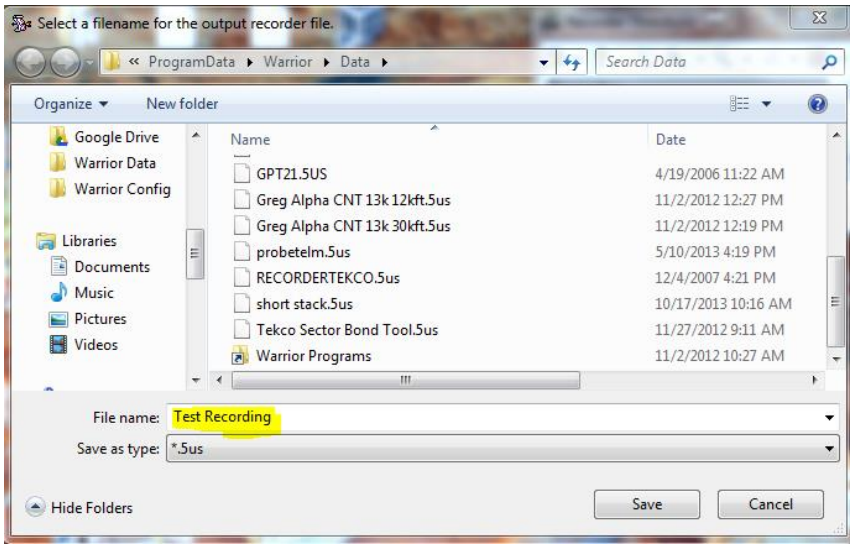


FIG: 18.6 Save the Recorder signal

The following is a list of the Hard Wired DSP channels in the SDS Interface Panel.

Input Channel	Signal	Note
0	Sonic Amplitude	Configurable Filter
2	Audio X10	
3	Audio X1	
4	Sync / Pulse	Configurable Filter
5	Audio X.1	
6	Audio X.01	
8	AUX	Configurable Filter
15	ANASW Signal	Recorder Default

18.2 Converting Recordings to SDS Simulator Box Files

The recording must first be converted from a DSP recording to a WAV file and then the file must be edited to fit a format needed by the simulator box.
In "C:\Program Files\Scientific Data Systems\Bin" is SIMConver32.exe or SIMConver64.exe that will read in a recording and write a WAV file. Click on the [Load Oscope File] button to select the DSP recording. After loading the file and before writing the 8 Bit Wave file, be sure that the sample period matches the sample rate done during the recording. For simple recordings, the difference in the Start Sample and Stop Sample should be less than 128000, since this is the maximum number of samples the Simulator box can hold. Click the [Write 8 bit Wave] button to write the file. If this is a simple file, it can be saved with a .SIM extension and used directly by the Simulator Box.

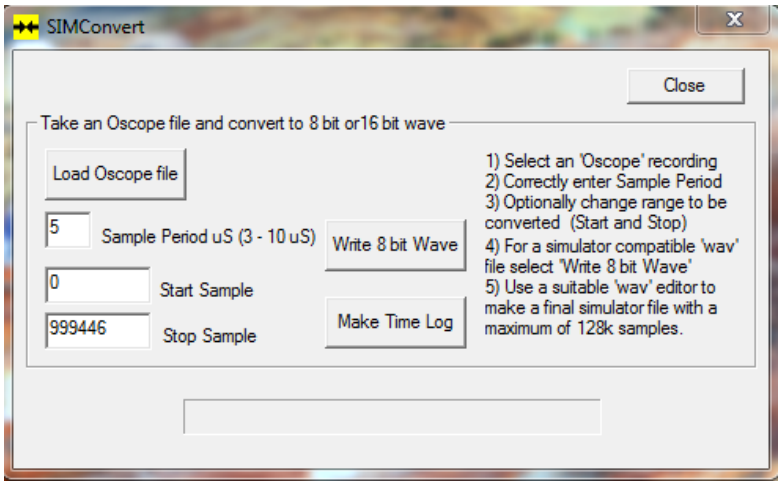


FIG: 18.7 SIM convert

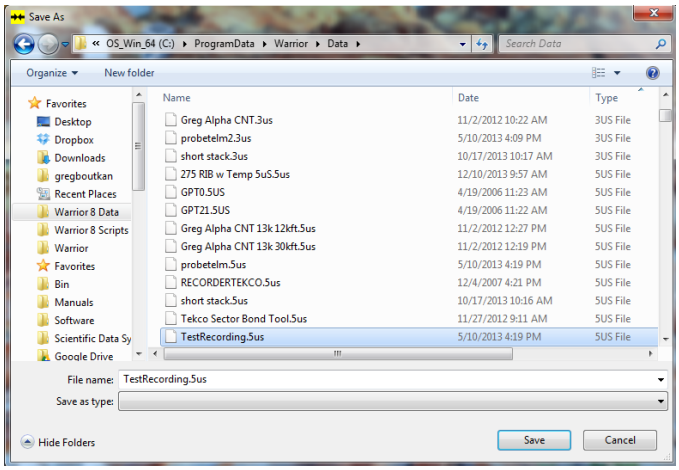


FIG: 18.8 Open

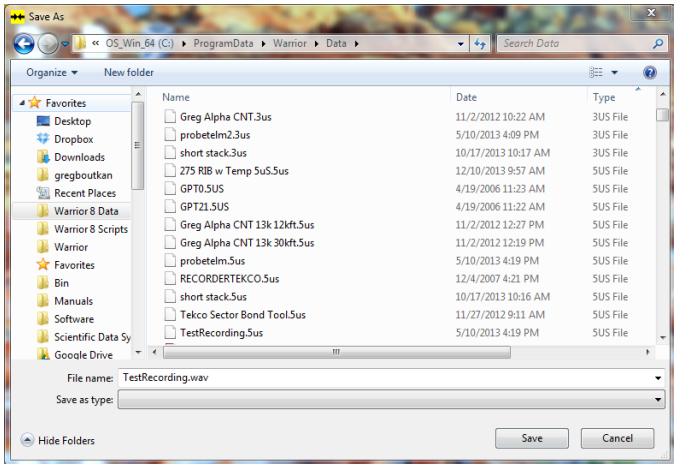


FIG: 18.9 Save As

With more complex recordings, it may be necessary to use a Wave Editor to view and modify the recording before converting it to a simulator file. The Warrior software does not include a waveform editor, but there are many free editors available through the Internet. The following Internet link is a down load for a very versatile editor - http://www.yamahasynth.com/download/twe.html.

If the signal being recorded has a periodic rate, the waveform should be edited to start before a given point in the period of the signal and to end before the same point at several cycles later in time and keep below the 128,000-sample limit of the Simulator Box. The waveform editor could also be used to adjust the amplitude of the recording or insert or enhance features in the recording, such as gamma pulses in a bond tool recording.

Section

19

19 Corrupted Database

It is recommended to do a backup of the file before you begin this procedure.

Run Windows Explorer.

Go to the C:\Program Files\Scientific Data Systems\Warrior\Bin.

Find a file called dbdump32.exe or dbdump64.exe

Double click on the program

This will open a window called Warrior Database Dumper.

In this window click on file and click on Dump Records.

Select corrupted database.

Click on file again and click on Scan Linkage.

Select corrupted database.

Click on file again and click on Scan Data Blocks.

Select corrupted database.

Close the Warrior DataBase Dumper Window.

There will be three new files in the C:\ProgramData\Warrior\Data.

They will have the same name as the corrupted database with the following extension:
dsc, scn, and dmp.

Email these three files to sds.info@warriorsystem.com

The programmer will attempt to create a patch. The patch will be Emailed back to you and you will run dbdump32(64).exe again from the C:\Program Files\Scientific Data Systems\Warrior\Bin.
From the Data Base Dumper Window click on file, then click on Patch. Select corrupt database and following instructions in Email.
An example of a patch is attached below.
Example of Patch for data base 14377.db.
A set of patch number will be supplied by Scientific Data Systems, Inc.
Long word patch:

Hex offset	Old Hex Value	New Hex Value
000000D8	02149C8A	037FFD5A
00000378	02147B86	02112D6C

This is an example so do not use these numbers, the correct numbers will be supplied by Scientific Data Systems, Inc.
Open Dbdump.exe by double clicking on the file.

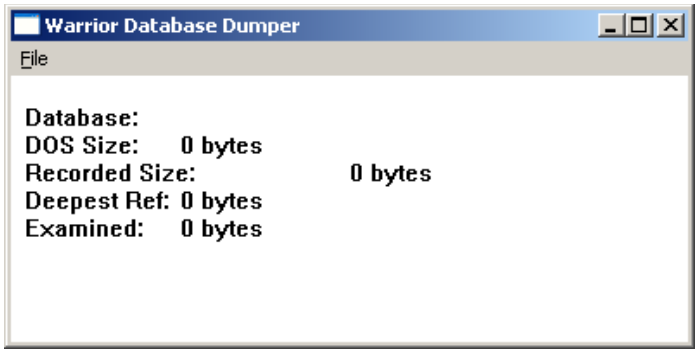


FIG: 19.1 Run Dbdump32(64).exe

Click on File and then click on Patch:
The Select Database for Manual Patch window will appear.
Select the corrupted database and click on open.

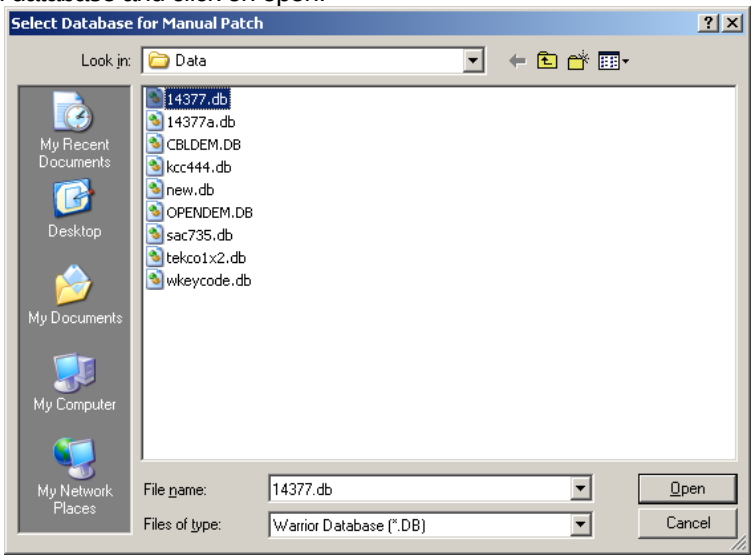


FIG: 19.2 Select Database

The Manual Patch window will appear:
Do not enter anything in the Password box.

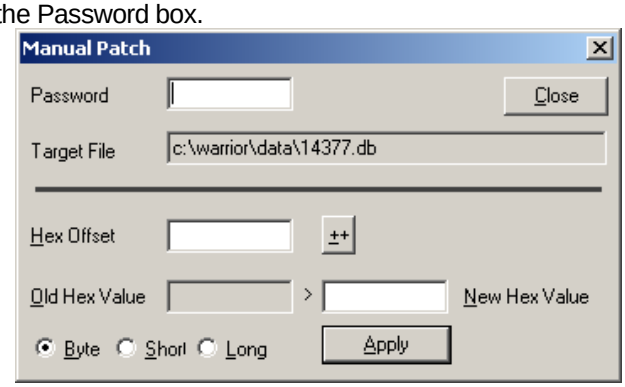


FIG: 19.3 Manual Patch

Long word patch:

Hex offset	Old Hex Value	New Hex Value
000000D8	02149C8A	037FFD5A
00000378	02147B86	02112D6C

Select the Long Button, enter the Hex Offset number, the Old Hex Value will appear enter the New Hex Value, press apply.
If more than one patch set of numbers were supplied enter the next set and select apply.

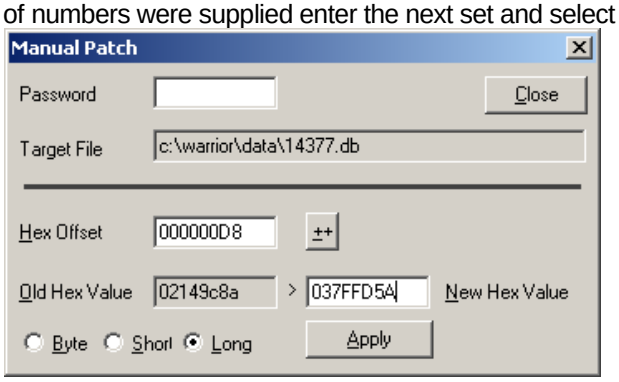


FIG: 19.4 Set values

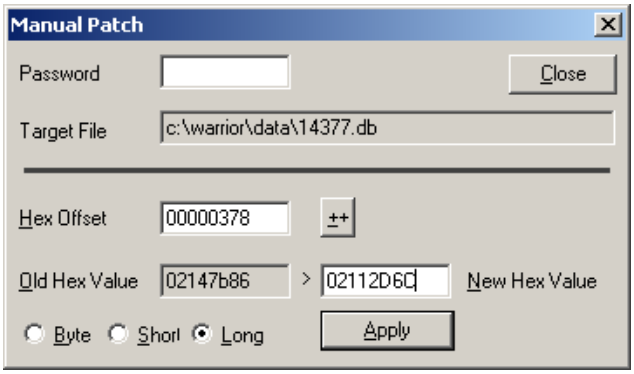


FIG: 19.5 Apply and Close

Close the Manual Patch window, and the Warrior Database Dumper window. The database should be accessible

Section

20

20 Panels Hookups

DEPTH CABLE

Depth Panel 7 Pin Female		Interface Panel 7 Pin Male
A		A (Signal A)
B		B (Signal B)
D		D (5 Vdc)
F		F (GND)
G		

ENCODER CABLE

7 Pin Male		Depth Encoder 7 Pin Female
A		A (Signal A)
B		B (Signal B)
D		D (5 Vdc)
F		F (GND)
G		

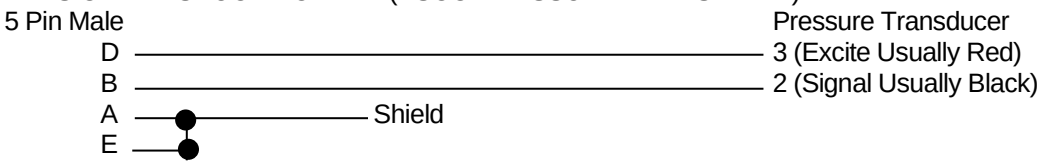
TENSION CABLE

Depth Panel 5 Pin Female		Interface Panel 5 Pin Male
C		A
D		B
E		E

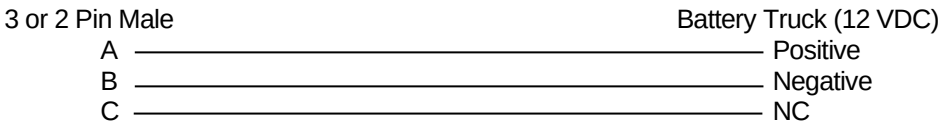
TENSION TRANSDUCER CABLE (XPRO-HONEYWELL PRESSURE TRASMITER)

5 Pin Male		Pressure Transducer
D		1 (Excite Usually Red)
B		2 (Signal Usually Black)
A	Shield	3 (Case)
E		

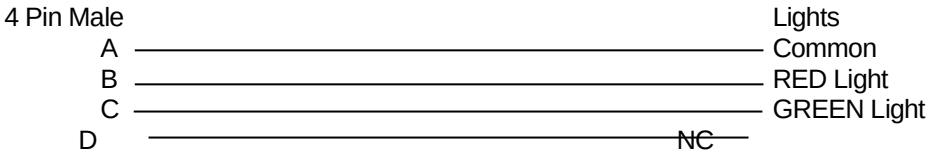
TENSION TRASDUCER CABLE (ASCO PRESSURE TRANSMITER)

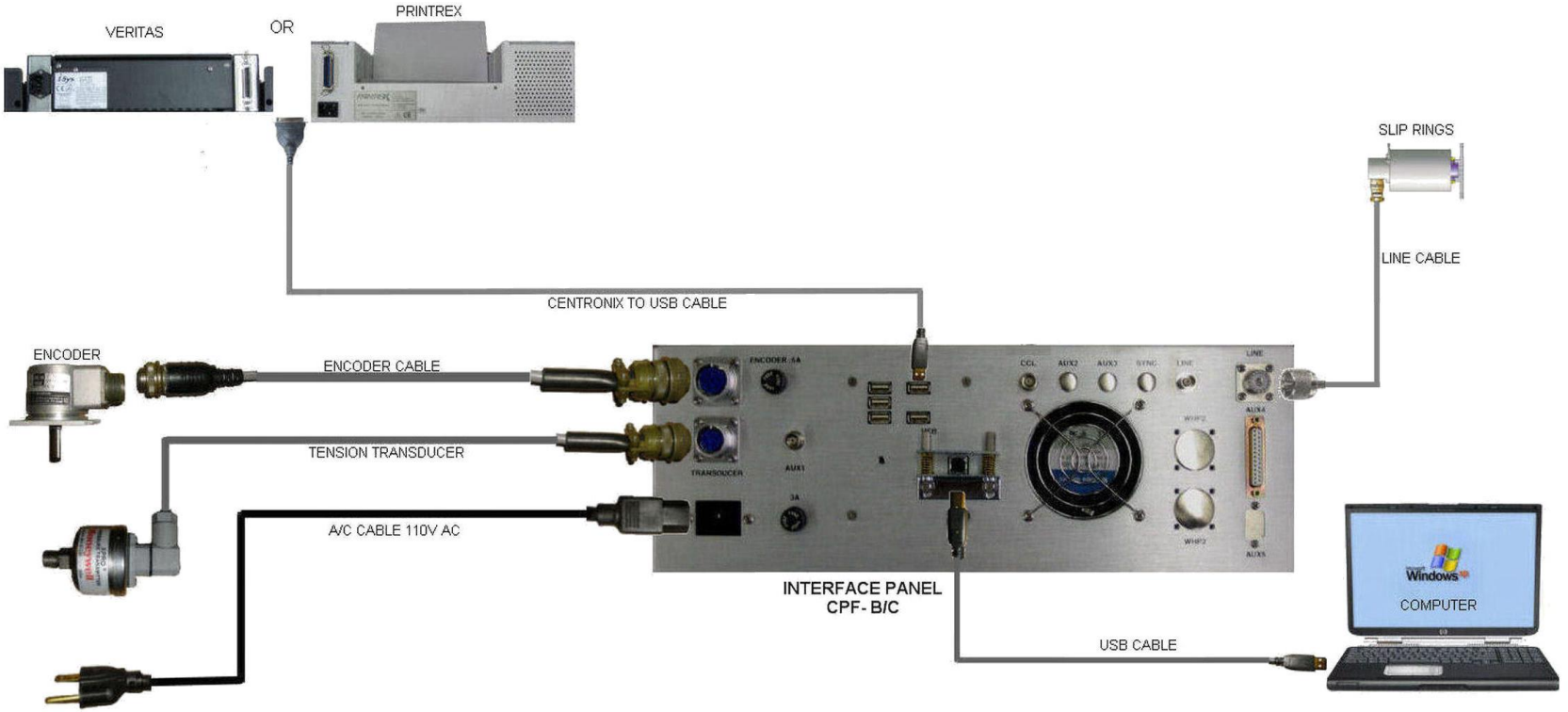


DC CABLE 12V DC



LIGHTS CABLE





Scientific Data Systems, Inc.	
TITLE: CPF-PLOTTER-CPU	
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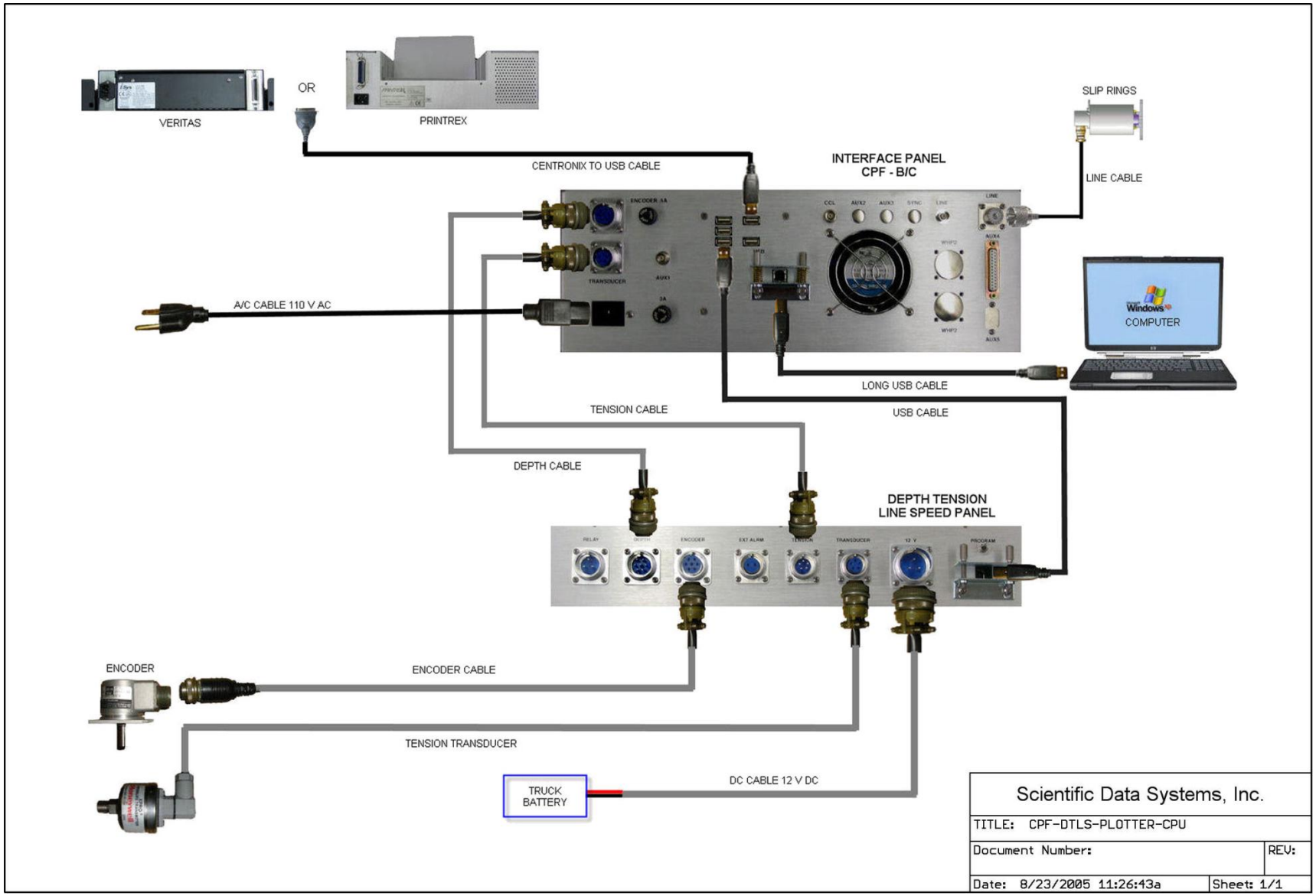
Date: 8/23/2005 03:11:26p	Sheet: 1/1



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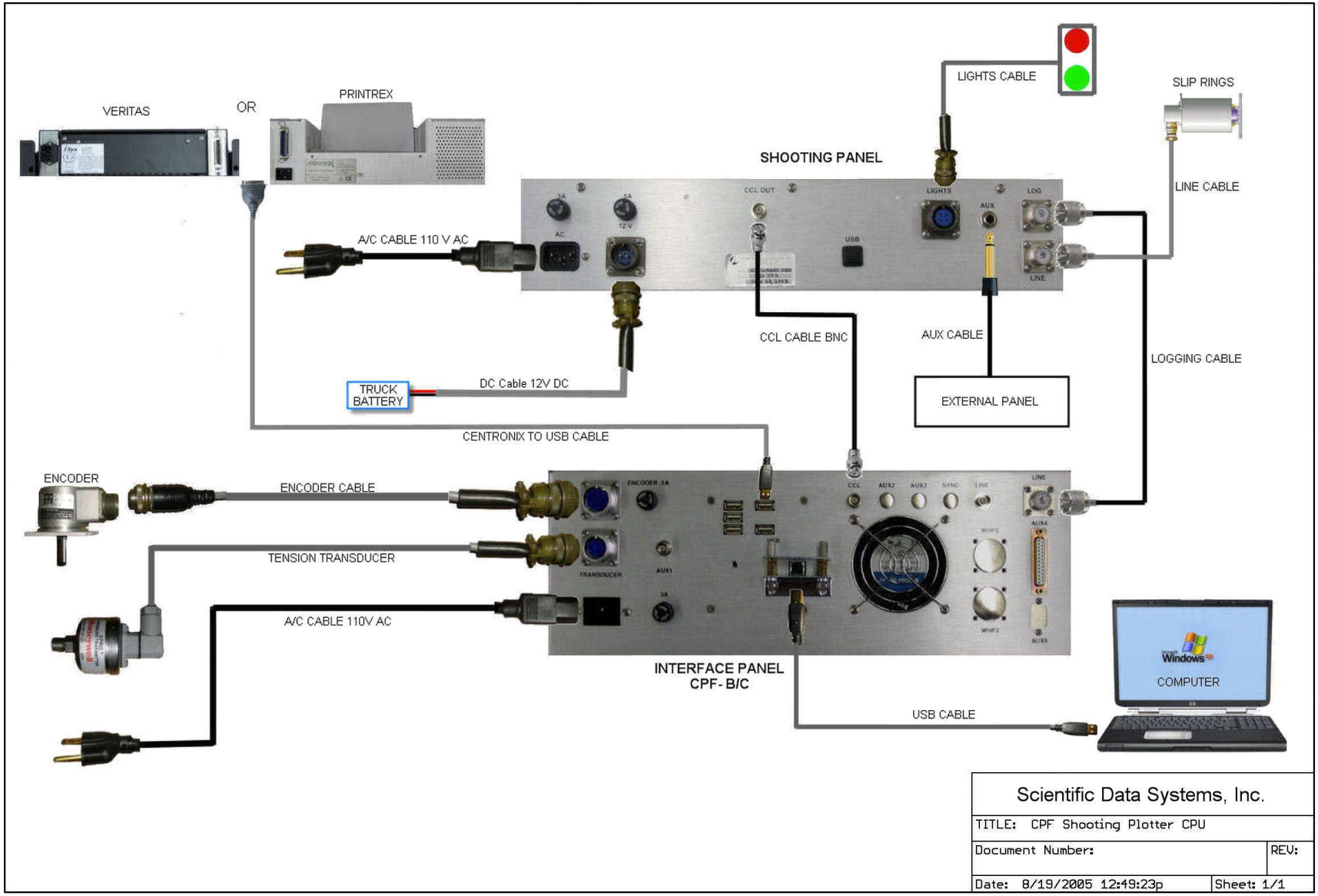

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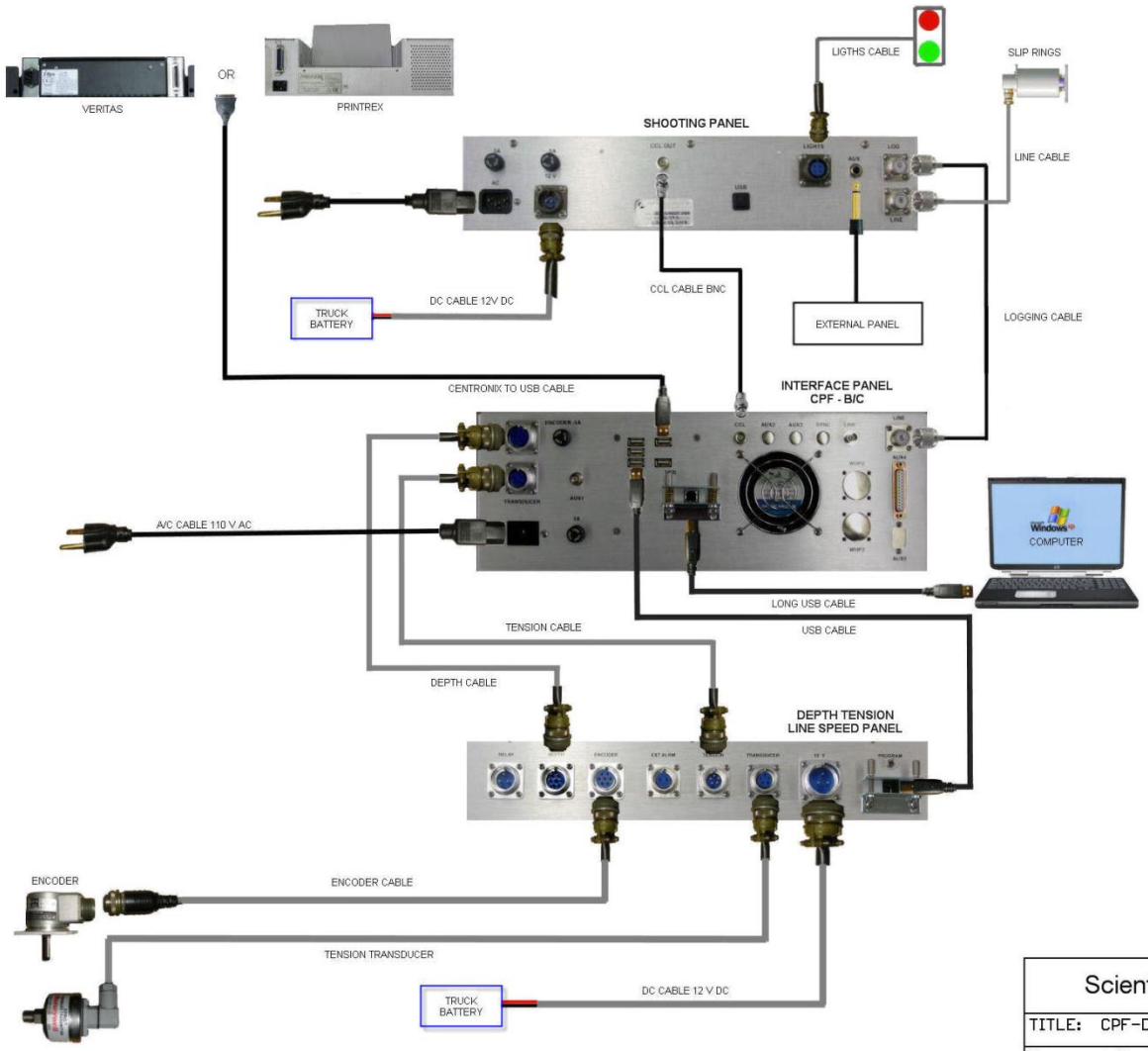
Document Number:		REV:
Date: 8/19/2005 12:49:23p	Sheet: 1/1	



Scientific Data Systems, Inc.	
TITLE: CPF-DTLS-SHOOTING-PLOTTER-CPU	
Document Number:	REV:
Date: 8/23/2005 02:35:09p	Sheet: 1/1

Section

21

21 Perf Job Planner and UniFire

21.1 Perf Job Planner

The primary purpose is to assist in the design and assembly of perforating strings and help the user execute perforating and TCP jobs. For TCP jobs, the result will be an inventory of all the items required to complete your TCP string. For wireline jobs, you will have a list of all the runs you plan on making and the design of each tool string that goes in the hole. For either type of job, you build every gun to your specifications, and then add all the other components required to complete the tool string.

21.1.1 TCP Jobs

For TCP, the job table will be the inventory list of all the items that will go in the hole.

21.1.2 Wireline Jobs

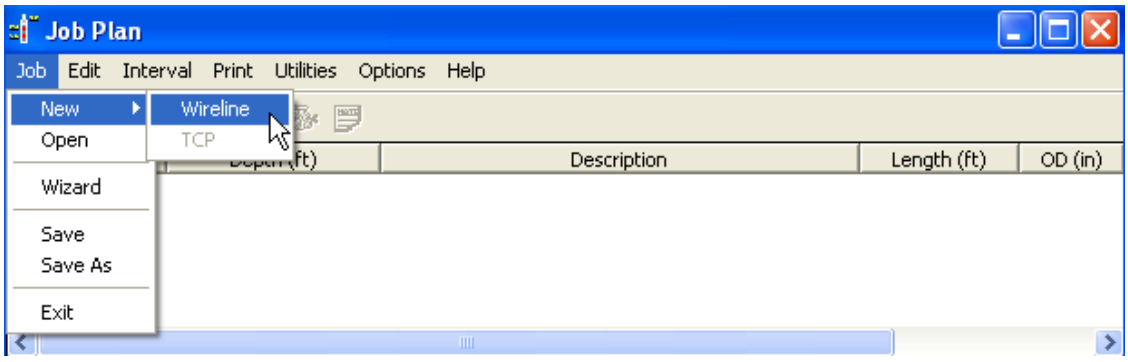


FIG: 21.1 Job Plan

For Wireline jobs, the job table will be a list of all depth intervals that you will be dealing with during your job. One line in the job table will indicate either a depth to be perforated or a depth to set a plug or a depth to cut casing.

Each job consists of 1 or more Runs. Each Run contains 1 or more Intervals. Each run has a Base Service. The Base Service is what service will be run in the hole that will be attached to the gun, plug, whatever. Each interval consists of either a single depth or a single depth range (top depth - bottom depth). A run may contain more than 1 interval if the string contains a select fire assembly, or is a core gun, or is any other combination of devices that can be activated over more than one depth or depth range. The other possibility is that you may have more than one interval that will be part of one gun. If you must perforate from 5000-5002 and 5008-5010, then that may be achieved with 1 10' carrier but will still have to be entered as 2 intervals. The program will verify with the user if two intervals can be placed in the same carrier and that will be shown in the Job table by two intervals with the same serial number. Serial numbers of guns will be generated by the system and not editable by the user.
One interval takes up one line in the Job table. An interval consists of a single depth or a single depth range (top depth - bottom depth). An interval must be associated with a run name and a base service and must consist of some type of device.
here are two types of inventory you will need to do in order to take full advantage of the job plan module.

21.1.2.1 Tools Inventory:
Since the purpose of this is to design perforating and TCP jobs, to start you need to make entries for all the equipment you will run in the hole using the Tools Editor. This includes gun subs, sinker bars, tandem subs, setting tools, firing heads, etc. Some items you may want to create as non-serial items so you can add as many to a tool string as you need. For this to properly calculate offsets and tool string lengths, all items that go in the hole that modify the length of the tool string need to be added to the tool string through the tool string editor. For example, if you choose a 10' carrier for a perforating job, that carrier will automatically be added to the bottom of the service you have chosen. But you will have to add the top and bottom gun subs to the tool string through the tool string editor.

21.1.2.2 Perforating Inventory:
From the job plan module, you can create the gun types that you use. From job plan menu select Job->Wizard, and then go to the Build guns tab. From there you can create your gun types and charge types that you use. Right click on the Gun Type, and then select New Item or New Category. Each gun type can have 0 or more categories and each category can have 0 or more items associated with it. Categories are optional. For each item you create, you will see a picture on the right side. Just click on the item you want to edit. When you are done, select **Save** gun type. Now when you go to creating a perforating job, you will select from your inventory and the gun will automatically be filled in with the requested shot length. You will be warned if the requested shot length does not fit in the gun you selected.

21.1.3 Getting Started

There are two types of inventory you will need to do in order to take full advantage of the job plan module.

21.1.3.1 Tools Inventory:
Since the purpose of this is to design perforating and TCP jobs, to start you need to make entries for all the equipment you will run in the hole using the Tools Editor. This includes gun subs, sinker bars, tandem subs, setting tools, firing heads, etc. Some items you may want to create as non-serial items so you can add as many to a tool string as you need. For this to properly calculate offsets and tool string lengths, all items that go in the hole that modify the length of the tool string need to be added to the tool string through the tool string editor. For example, if you choose a 10' carrier for a perforating job, that carrier will automatically be added to the bottom of the service you have chosen. But you will have to add the top and bottom gun subs to the tool string through the tool string editor.

21.1.3.2 Perforating Inventory:
From the job plan module, you can create the gun types that you use. From job plan menu select Job->Wizard, and then go to the Build guns tab. From there you can create your gun types and charge types that you use. Right click on the Gun Type, and then select New Item or New Category. Each gun type can have 0 or more categories and each category can have 0 or more items associated with it. Categories are optional. For each item you create, you will see a picture on the right side. Just click on the item you want

to edit. When you are done, select save gun type. Now when you go to creating a perforating job, you will select from your inventory and the gun will automatically be filled in with the requested shot length. You will be warned if the requested shot length does not fit in the gun you selected.

21.1.4 Job Wizard

Use the Job Wizard to complete the information for your job. You will have 4 pages (tabs) of information to fill out. The first 3 tabs will be the same whether you are doing a TCP job or a Wireline job.

FIG: 21.2 Job Wizard

21.1.4.1 Job information

You can enter the database name of the correlation log here. If you have a correlation log entered here, when you set your results, a well object will be added to this pass indicating the completion of that interval. All the other information is for reference use only.

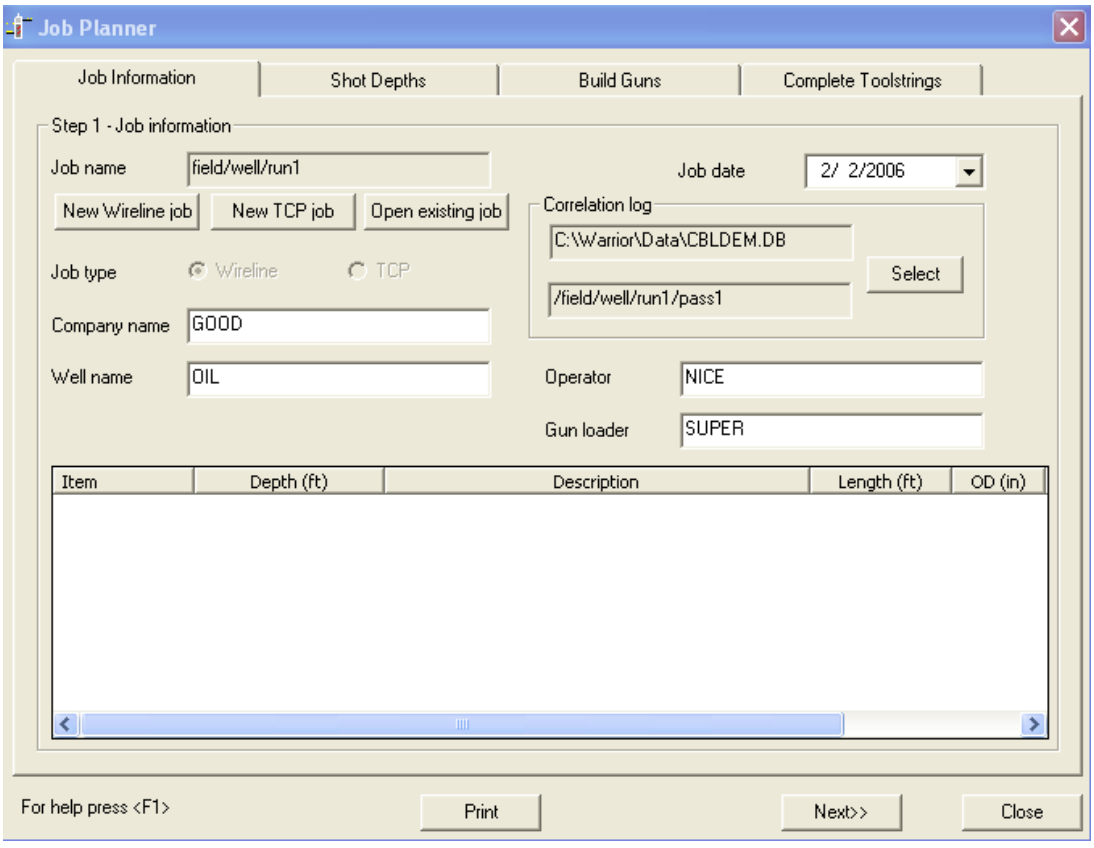


FIG: 21.3 Job Planner

21.1.5 Shot Depths

Enter your shot depth information here. Fill in the job table with shot depths or select an item from the list to edit. To enter a new interval, if the button says Update interval, press the Clear selection button. Then type in your new depths and select the Add interval button.

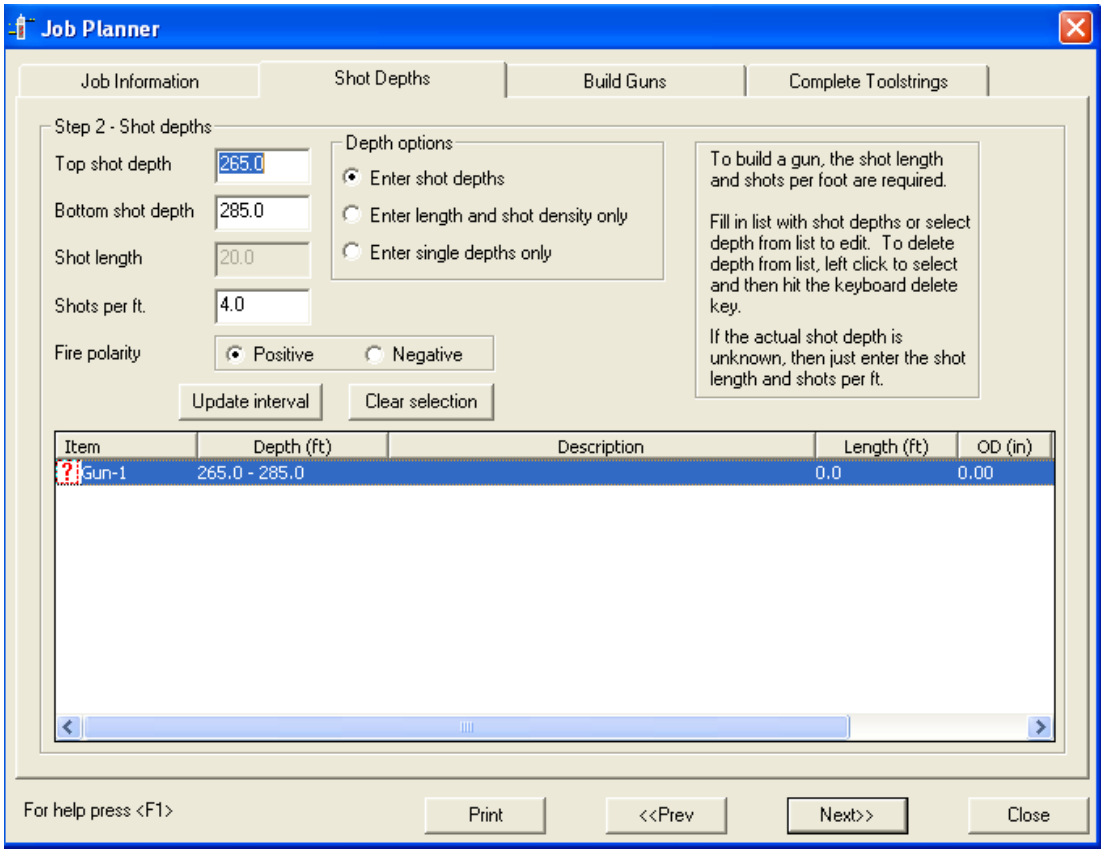


FIG: 21.4 Job Planner

21.1.6 Build Guns

Now that you have intervals in your table, you need to assign a gun type to your depth interval. If you have no gun types in your list, then you must create new ones (see Gun types below). To assign a gun type, first select the interval from the list of intervals, and then choose the gun type from the list of gun types. If you want more than one interval to fit in one gun, then select more than one interval by using <ctrl> left click. If the intervals can fit in one gun, then a message will pop up reminding you that more than one interval has been assigned to a gun. Otherwise the same gun will be assigned to each of the selected intervals. You should see your gun in the picture on the right. The parameters that show up (length, top shot, etc.) are the ones that you assigned to that gun type. You can edit any of those parameters to change them for this gun by clicking on any of the values and typing in new values.

The gun will be loaded by default starting at the top of the gun. To change where the loaded interval starts, click in the loaded area of the gun (where the red dots are) and slide the loaded interval up or down. The distance to the top shot and bottom shot will change as you slide the loaded interval. The distance to the top

shot can be no less than the top loadable number and the distance to the bottom shot can be no more than the bottom loadable number.
When you are viewing the design of a gun with no interval assigned to it, the shots will be indicated in black. When you are viewing a gun that does have an interval assigned to it, the interval will be displayed in the upper left part of the diagram and the loaded interval will be indicated by red shots.
You can print a picture of the gun from here to give to the gun loader.
21.1.6.1 Gun types

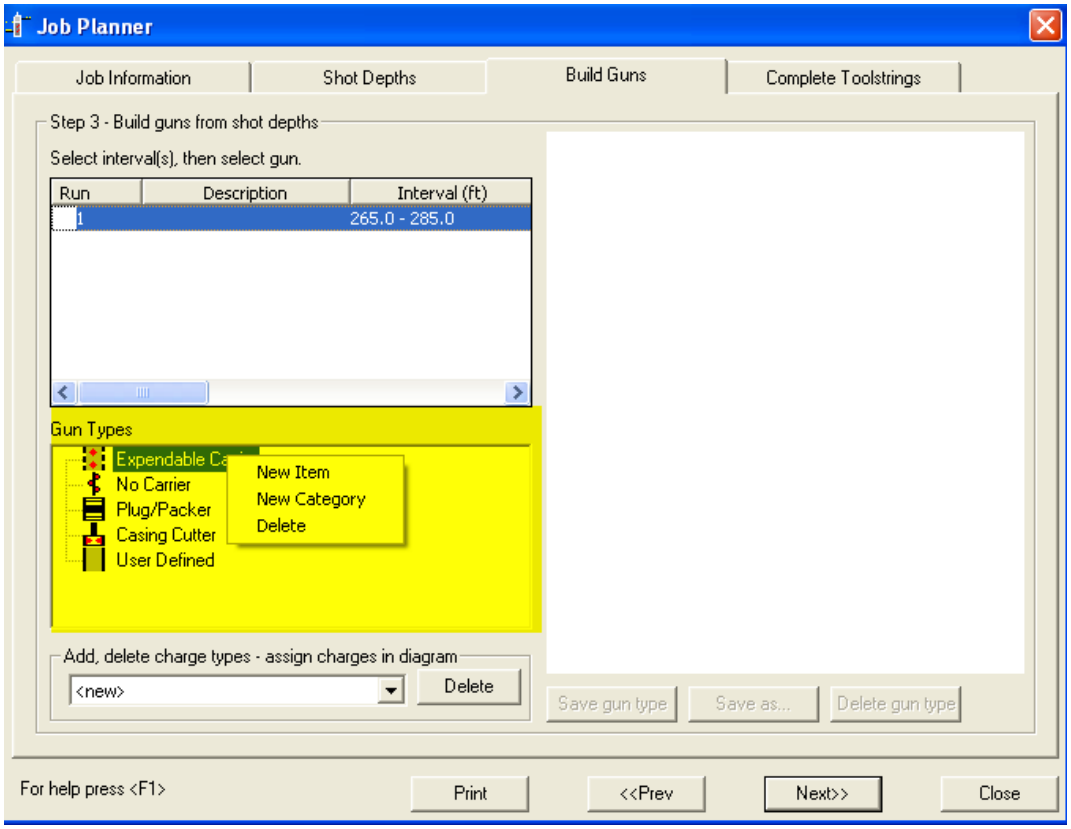


FIG: 21.5 Gun Types

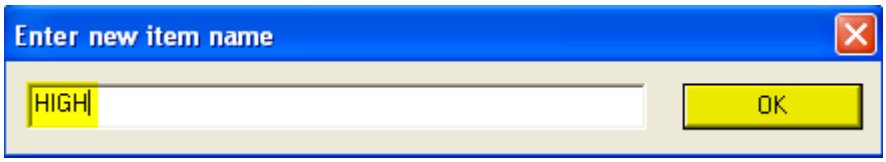


FIG: 21.6 New Item

There are several predefined gun types, or you can add your own gun type. Your own gun type will require a metafile picture to go with it. To add new items, right click on the Gun type and then select New Item, New Category, or Delete. For each type of gun, you can have 0 or more categories, and then for each category you can have 0 or more items. You can drag and drop items and categories within their gun type if you want to organize things differently. All the gun and charge type information goes in the file explobjs.ini so once you have all the standard gun information entered; you can pass out copies of this file.
Once you have a new gun showing in the window on the right, you can edit any of the parameters for the gun. All entries are edited by clicking on the value to be edited and then typing in a new value. The following entries are critical to having the gun diagrams and shot calculations come out properly. The Total length

value is the total length of the item without any gun subs. The Top shot value is the distance from the top of the gun body to the top shot. The Shot length is the maximum shot length that this type of gun can be loaded. All the parameters can be edited for a specific gun once you assign this gun to an interval in case you have a carrier that is slightly different from the generic gun type you created.

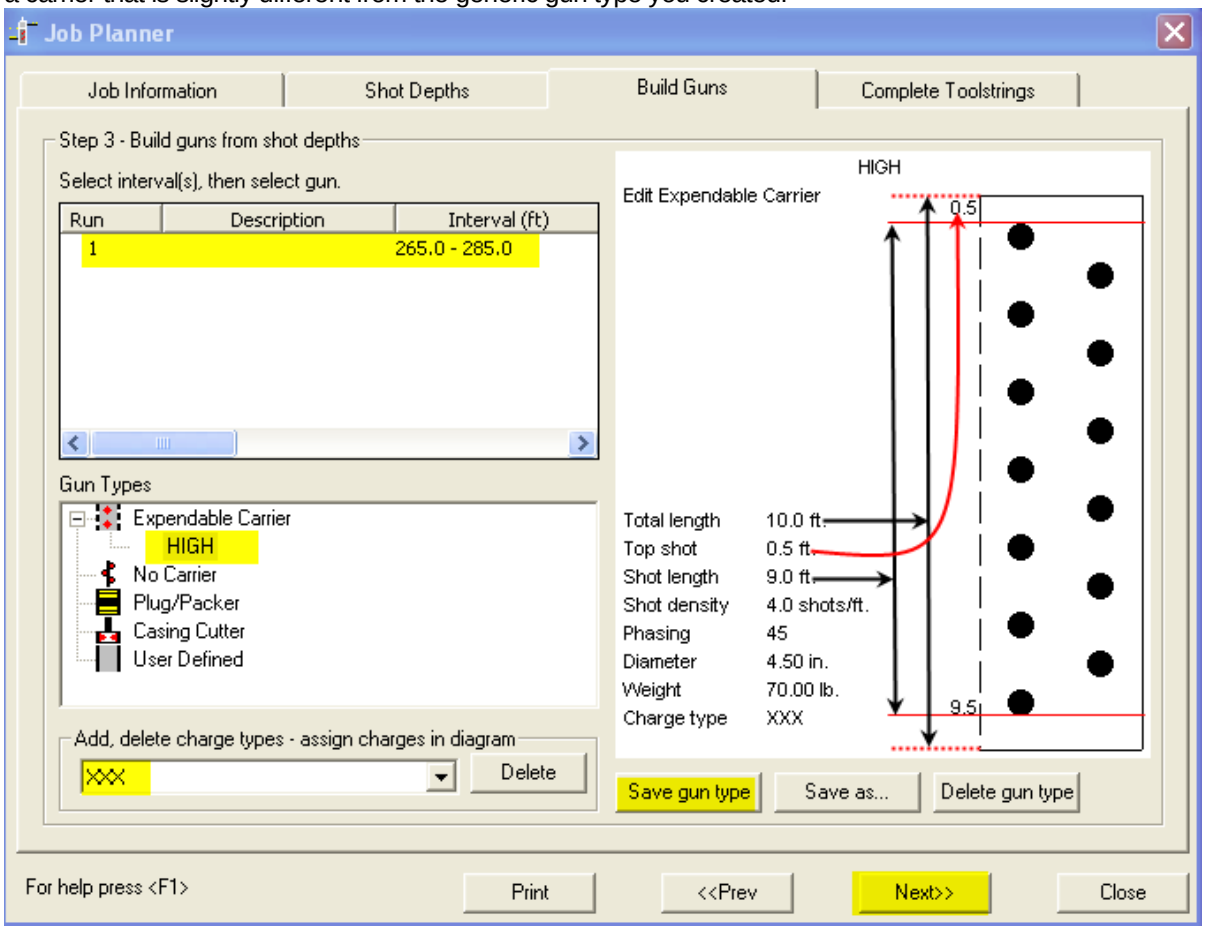


FIG: 21.7 New Gun Type

21.1.7 Charge types

All the charges that you create in this list will show up in the list of charge types that you can choose from when you edit your gun parameters from your gun picture on the right.

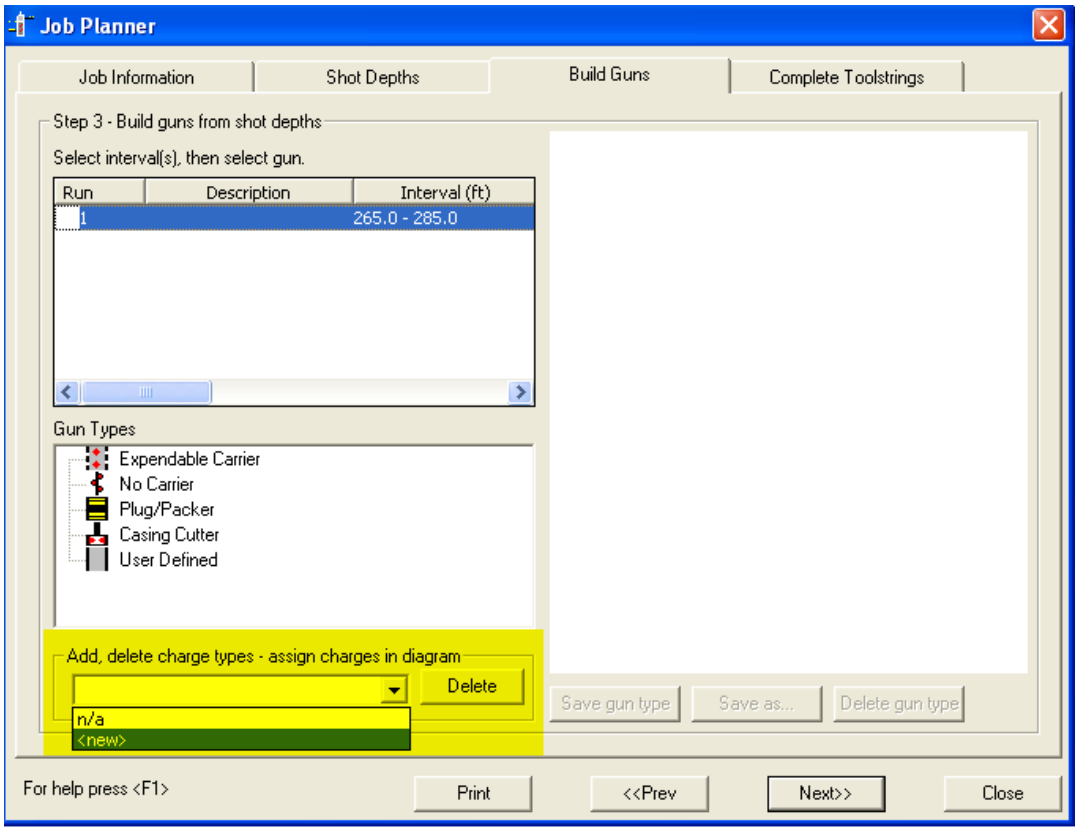


FIG: 21.8 Add New Charge

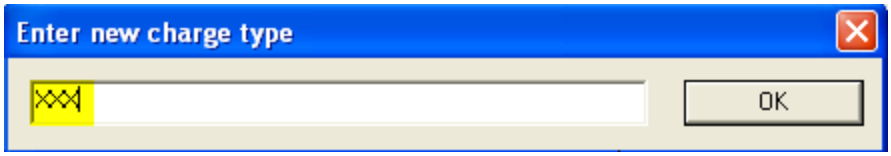


FIG: 21.9 New Charge

21.1.8 Build TCP string

Selected TCP for the job type, then you will see this tab. The TCP job is centered around the gun shot depth, so as you add items to the string, their depth will be calculated based on the gun shot depth. To find items to add to the TCP string, select the Edit TCP string button. This will bring up the tool string editor and allow you to add and remove items from your TCP string. It is up to the user to add any gun subs to the carrier to make the diagram complete. If you have more than one gun in the TCP string, the depths will be referenced from the top gun. You will have to fill in items below the top gun to get the rest of the guns on depth or you will get a warning message. When you are completed with your TCP string, and then select the Finish button.

21.1.8.1 Off Depth Warning:
If you have more than one gun in the TCP string, then you may get a warning message that displays how far off depth the gun is. The depth value is the amount of space you need to add above that gun to make it come out on depth. If it is negative, then you have too much space above the gun. From the Build TCP

String tab, you can modify that amount by changing the value TCP Depths must be within. The default is 0.25 ft.

21.1.9 Build Tool Strings

Selected Wireline for the job type, then you will see this tab. The first thing you must do is assign a service to one or more intervals. From the services editor, there is an option for every service – **"Make this service available for perforating".** Only the services that have this option checked will show up as services you can assign to a perforating interval.
Select one or more intervals from the list that will be run in the hole on one tool string. Say you have 10 intervals in the list. You may have two intervals that you will perforate with one run in the hole - either with select fire or because they both fit on one gun. Once you have those items selected, then choose a service from the list of services at the bottom of the screen and then select the Assign Service button. The tool string editor will start up with those selected guns in the tool string as well as the tools from the service you selected. It is up to you to add your gun subs and any other items to make this match what you are running in the hole. When completed, select the Finish button.

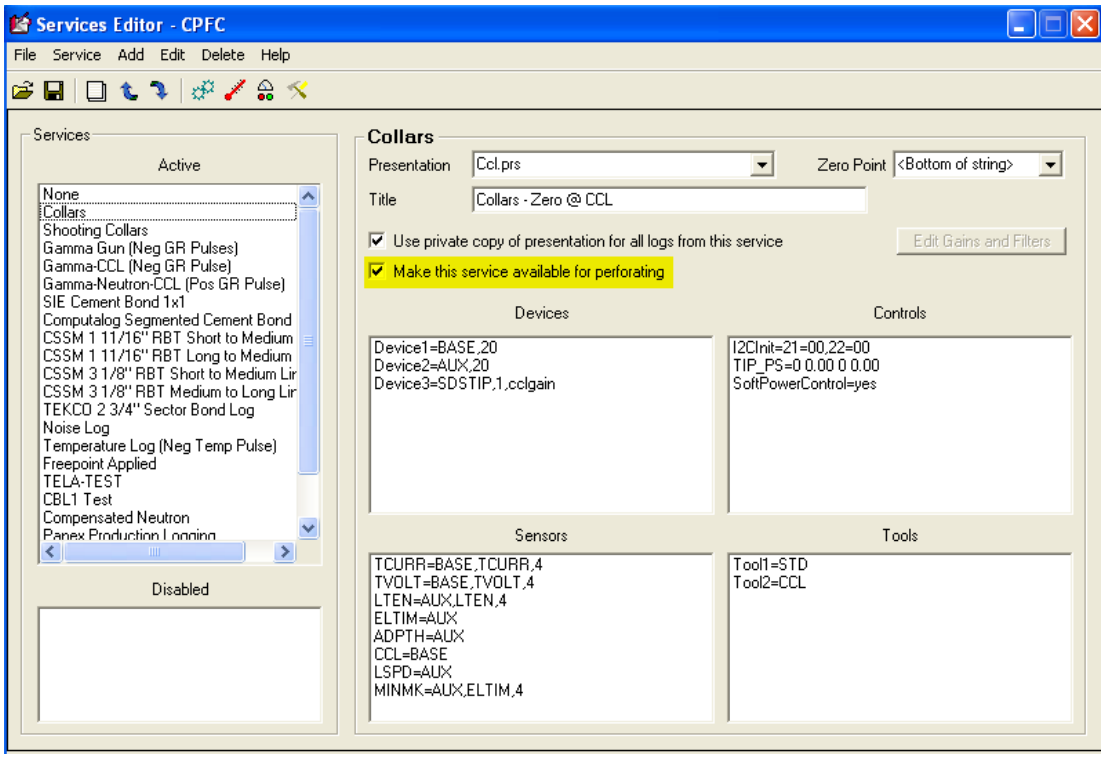


FIG: 21.10 Service editor

21.1.10 Main Window

21.9.1 Job menu
Saving a Job: The following information will be saved with each job:

21.1.11 The job plan itself

- /f/w/r/_jobplan_/_job_/1

The results of the job

- /f/w/r/_jobplan_/_report_/1

Each tool diagram

- /f/w/r/_jobplan_/_wtd_/[name]

The TCP diagram (for TCP jobs)

- /f/w/r/_jobplan_/_tcp_/1

21.1.12 Utilities

Insert a Well Object into a Log: Will create a well object in the run you have chosen. The tool diagrams will be saved in the database also, so you can recreate the picture.

21.1.12.1 Import/Export

The loaded job can be exported to a floppy disk to be imported on another machine. The floppy will contain one file with the job information as well as tool diagram files for the guns. Note that every gun has a serial number assigned to it. When the job is imported to another machine, those gun serial numbers may already exist, so the imported serial numbers may be reassigned to prevent conflicts.

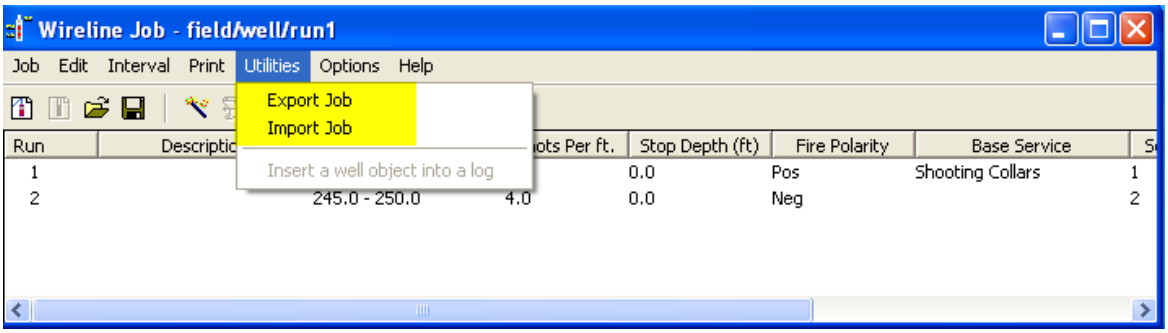


FIG: 21.11 Utilities Charge

21.1.12.2 Changing order of runs

Let's say you have 2 different runs created. Then you decide you want to have run 5 be the first run. Click on run 2 and drag it up above run 1 and drop it. You will be asked "Move run 5 before run 1?". The run numbers will be rearranged; run 5 will be called run 1, run 1 will be called run 2, etc. The renumbering will always start at 1.

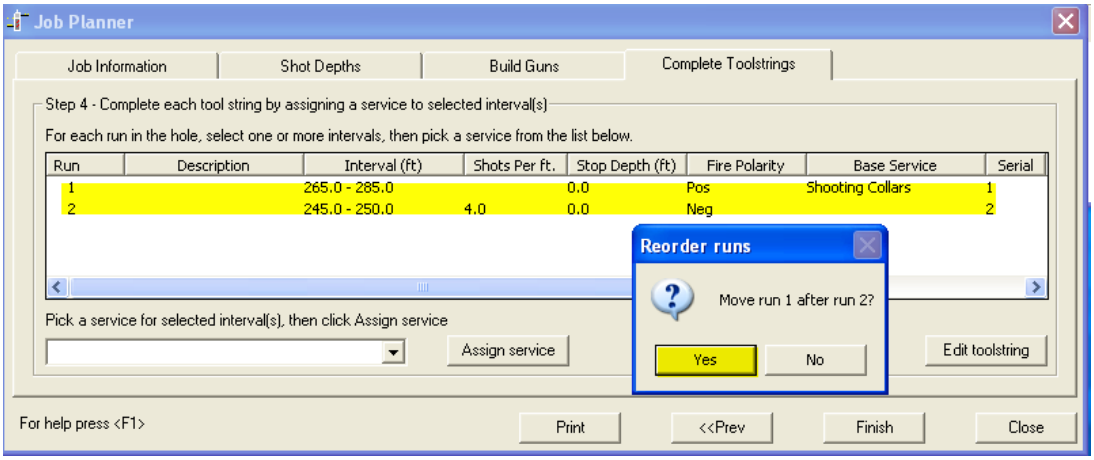


FIG: 21.12 Reorder Runs

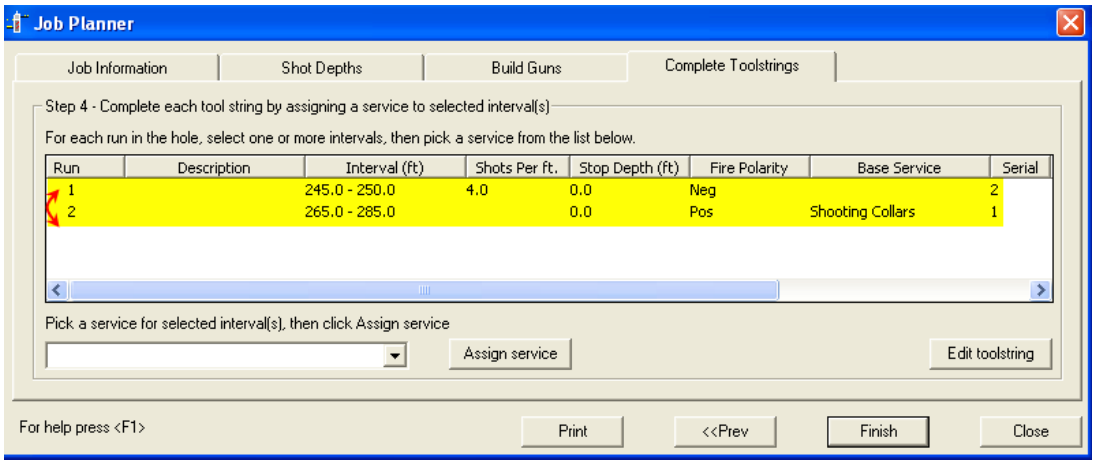


FIG: 21.13 Job Planer swap Runs

21.1.12.3 Running a wireline job

Now that you have built a custom service for each run in the hole, you will control the service that is loaded from Job Plan. Right-click the run you are making from the list of runs and select Load Service. That will start Acquisition with the selected run. Make sure the tool diagram matches what is going in the hole, including gun subs. If this does not match exactly, then your Stop Depths will not be calculated correctly. When you close the tool diagram window, the Stop Depth will be updated, indicating the depth to stop the hoist to make the perforation. If you have made a previous run with this service, then Acquisition should load with the next free pass as the Dataset.

In the Depth Configuration screen, there is a “Stop Depth” setting that you can use to indicate when your logging depth is close enough to perforate.

21.1.13 Active interval

You will also notice there is an Active Interval choice below Load Service. Since a single run in the hole can have more than one interval associated with it, you can choose the interval within the loaded service you want to be active. If you only have one interval within the run, then that interval will be active. The active interval will change the color of the depth to green when the hoist depth is at the active interval stop depth. Also, the active interval will have an icon next to the run indicating it is active.

21.1.13.1 Results

Once you have completed one interval, right click on the interval and select Results. Your interval will show a different icon dependent upon what choice you make for your results. You can also add a text string to go with your results. You must at least choose one of the options (Successful, Unknown, Misfire) so you can keep track of the runs you have made already. If you choose Successful, then it will automatically add a perforating or plug well object to the log pass. If you have a correlation log entry in your Job Information screen, then the well object will be added to that log pass. Else the well object will be added to the current log pass.

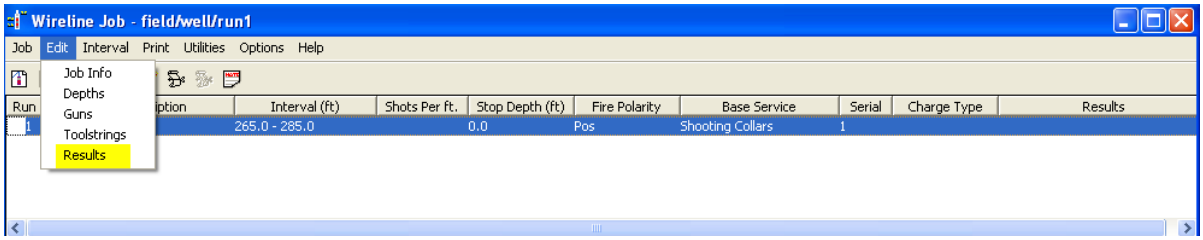


FIG: 21.14 Results

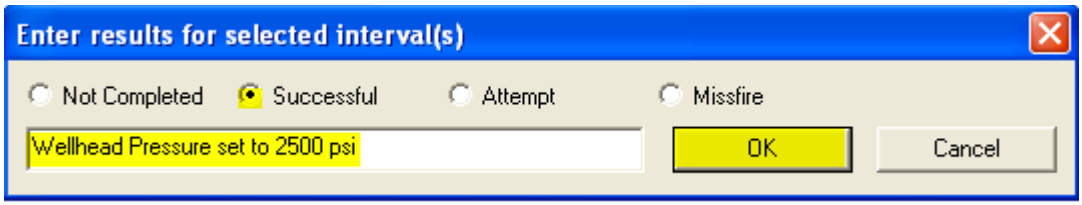


FIG: 21.15 Comments

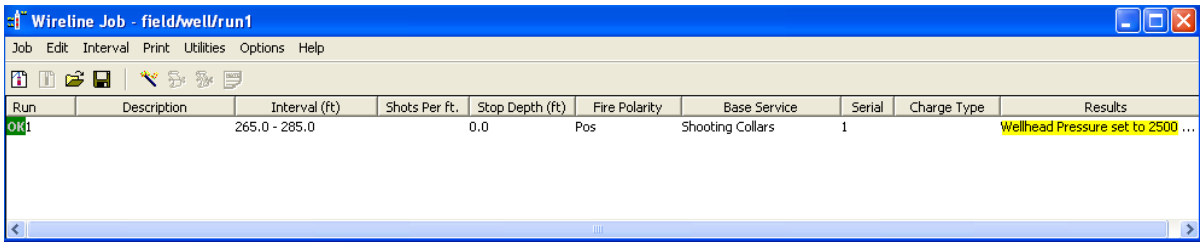


FIG: 21.16 Job Status

21.1.14 Print

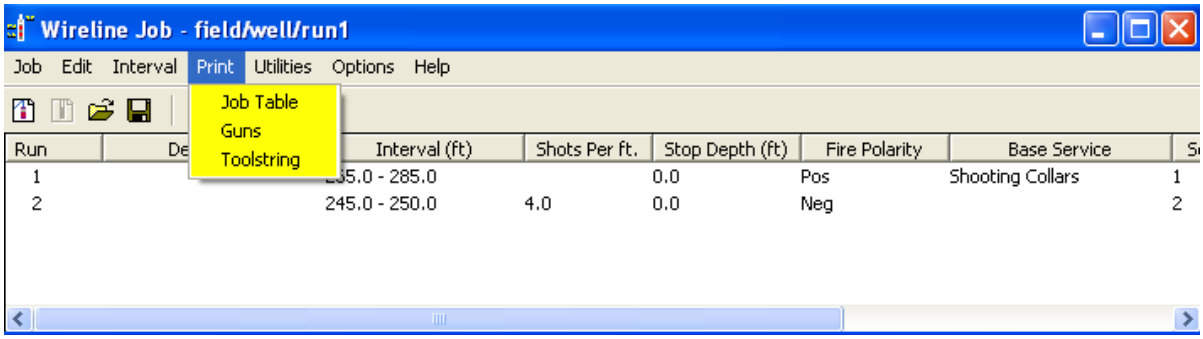


FIG: 21.17 Print options

Select the option to print.

21.2 UniFire

21.2.1 Introduction

Addressable switches provide the client with the ability to perforate zones in sequence and if necessary, out of sequence. This has become extremely popular with the advent of shale oil production and pump down perforating. Warrior supports addressable switches from various manufactures including but not limited to “GEO Dynamics, Guardian, Phoenix, Tru-Perf, Schlumberger, SRS and VeriFire. All the before mentioned switches operate with a Warrior STIP panel and a properly modified Probe shooting panel. The STIP panel must have a PSXD R7. It is recommended that you have a TELA HR5 “with appropriate panel wiring “and an ANASW R15 or R16 with U1 and U2 update to a surface mount OP Amp. All ANASW R20 have the correct op Amp. Most switches that are compatible with Warrior software and hardware operate from the new unified desktop. All screen shots will be made using the Phoenix addressable switches but will be similar for others. The UniFire software has been optimized for pump down perforating for optimal speed and ease of use.

21.2.2 UniFire Menu Option

UniFire is a standalone application that loads the required software in a similar way that Warrior Acquisition does. Most addressable switches supported by Warrior are compatible with this front end. To load the front end simply click on the shortcut.

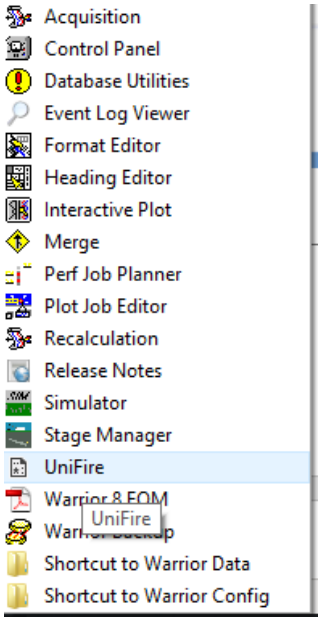


FIG: 21.18 Warrior Shortcuts

Once UNIFIRE is loaded you will be presented with a switch optimized front end.

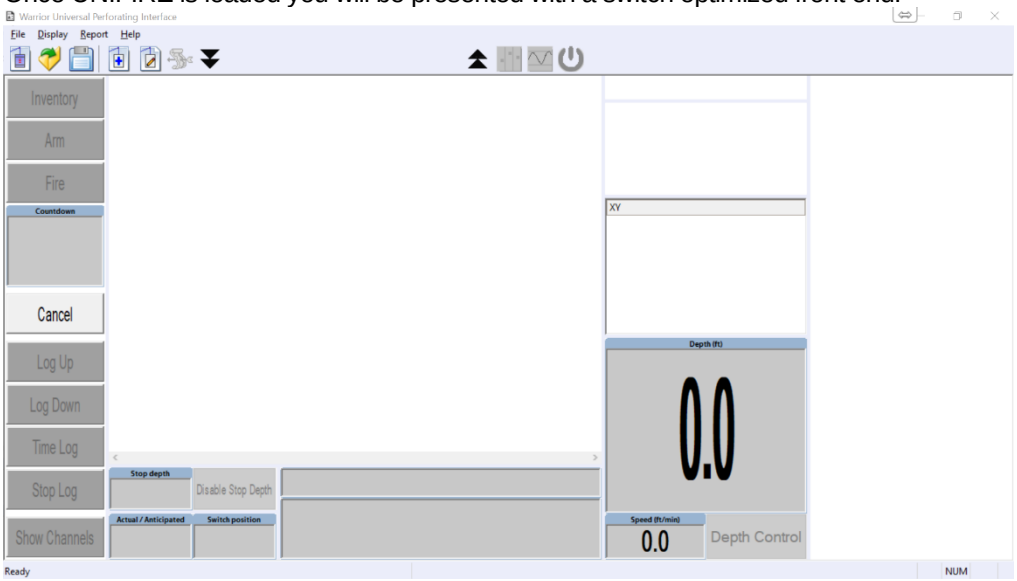


FIG: 21.19 UniFire Front End

If you have a like to add a corporate water mark to UniFire save a bitmap with the name MyWatermark.bmp to the Warrior config directory " C:\ProgramData\Warrior\Config ".

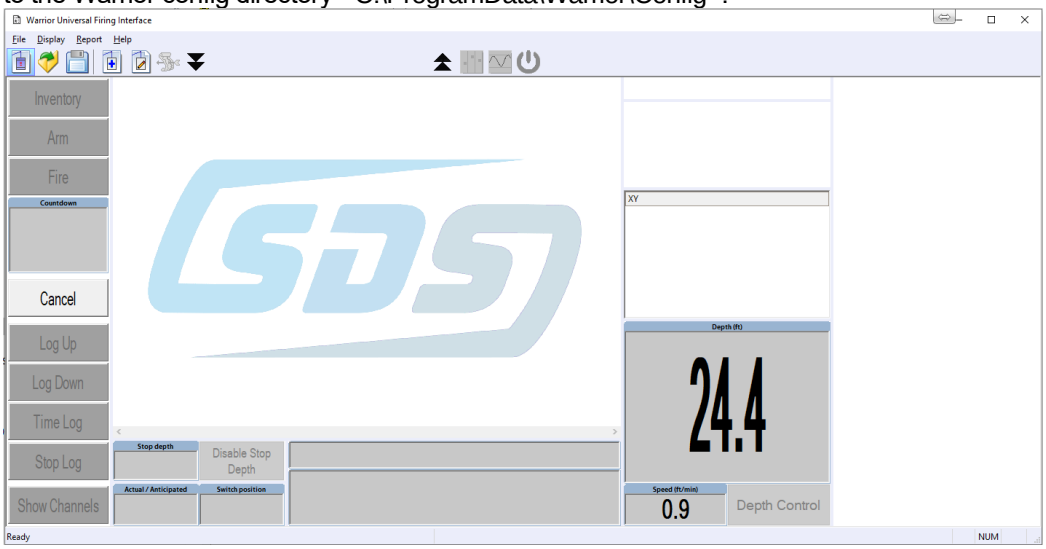


FIG: 21.20 Water Mark

21.2.3 Building a Stage

To build a stage you have a choice of using the icons or the more traditional File pull down menu. Either choice will give you the same results. To create a stage select the tool bar icon furthest to the left.

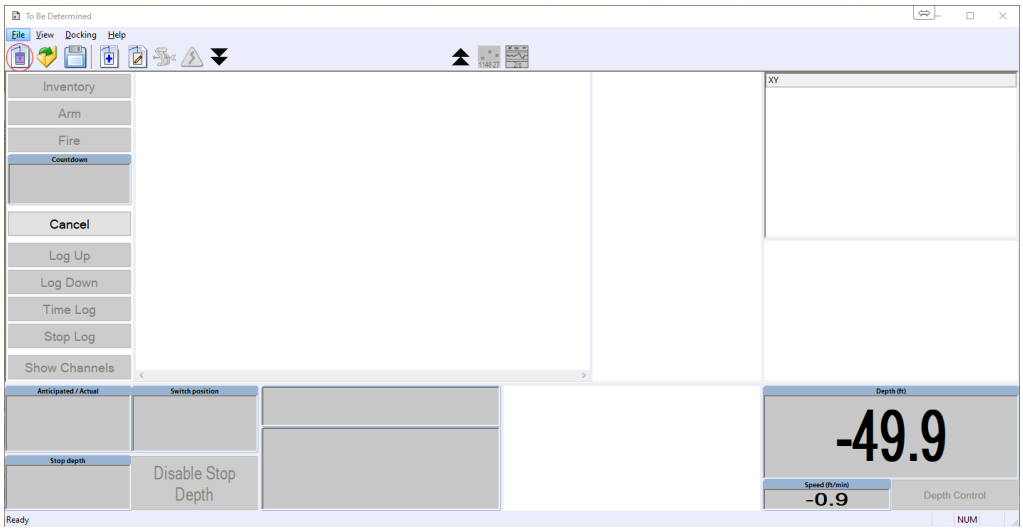


FIG: 21.21 Build a Stage

This will bring up the Create Stages dialog. Enter the field, well, stage number and well color. The UniFire background will be colored in according with the color selected to ensure you are on the correct pad. At this point you can choose to reopen an existing database if you wish to continue a stage. Once you have competed the Create stage fields click OK.

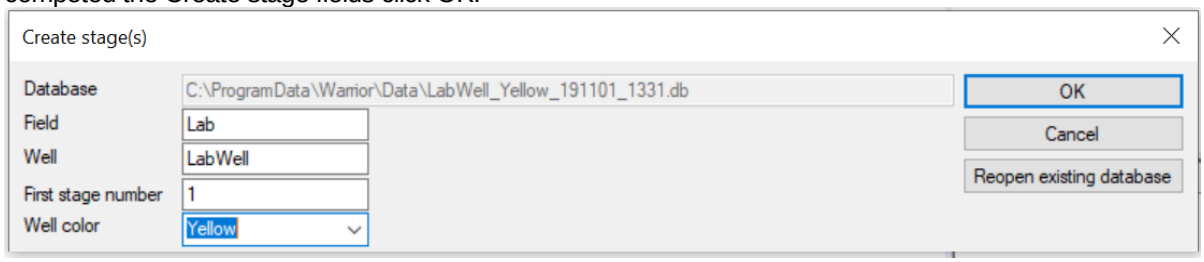
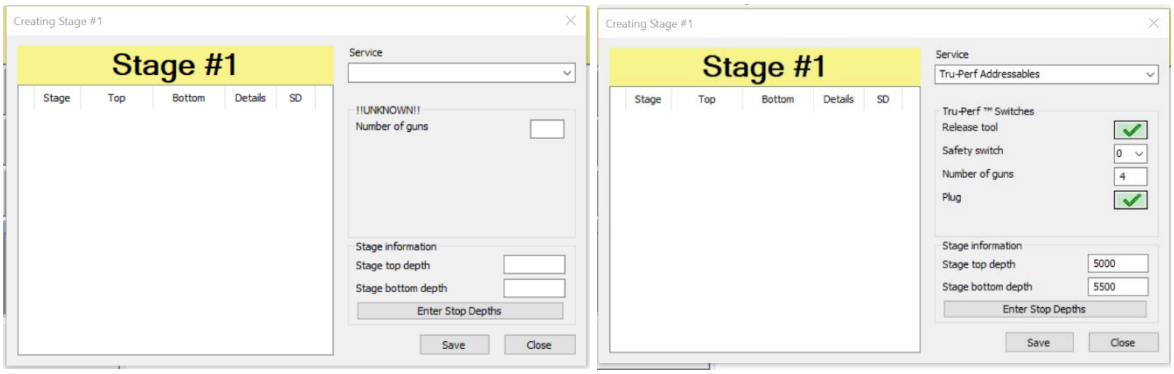


FIG: 21.22 Create Stage Dialog

This will open the next configuration window. In this window you will build your stage, selecting the service will automatically populate the UniFire front end with the appropriate buttons for the switch ‘s manufacture. It will also populate this window with the switch options available. Notice the yellow background this was updated from the stage color selected on the previous screen. All subsequent Stage #1 screens will be yellow. Once you have selected the correct service for your specific switches add the appropriate switch hardware for this stage. Below the Stage bottom depth there is a button that allows you to add optionally specific stop depths within the stage.



Once you have saved the stage you can contiue to add stages by simply entering new dpths and clicking on save assuming the switch configuration remains the same.

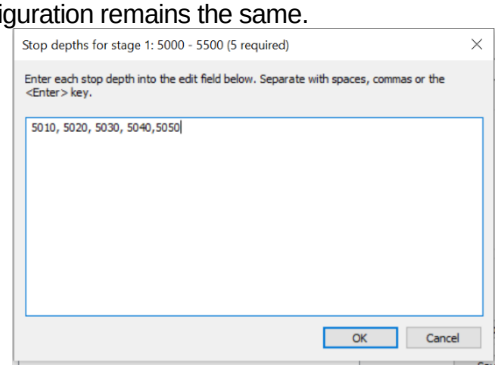


FIG: 21.23 Building a Stage Dialog

When completed save the stage. Check that the stage is displaying the correct depths.
The details Colum in this case indicates a Release Tool, 4 Guns and a Plug. The Details column will show R4P as a representation of your stage. If all the details are correct select close.

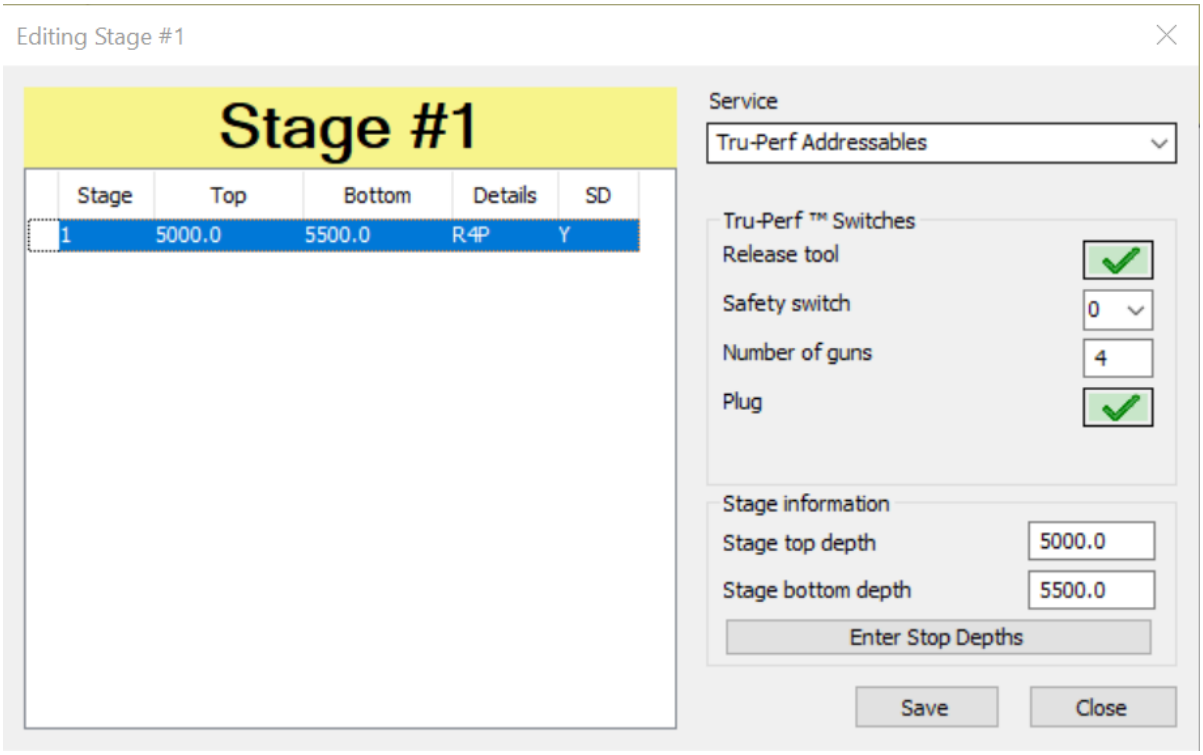


FIG: 21.24 Populated Stage

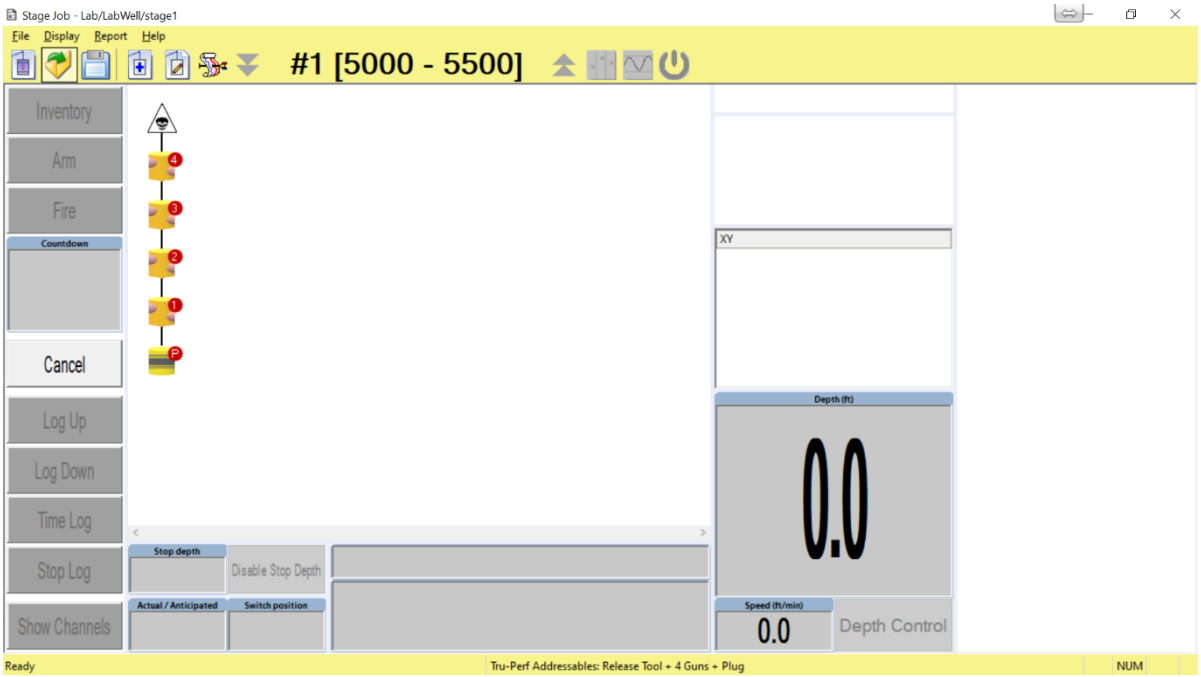


FIG: 21.25 UNIFIRE With Stage Loaded 1

21.2.4 Using UniFire

Again notice the background color is yellow coresponding to the stage color. In the top banner the stage number and top and bottom depths are shown. There are also buttons to add a stage, edit a stage and an acquisition buton. Notice that a Release Tool, four guns and a Plug are shown graphically in the control panel. After the stage is loaded click on the Acquisition button. This will load Acquisition in the background, on the banner the panel control, PMon buttons are now enabled and Near the lower right hand corner the depth and line seed are also enabled. Selecting the Depth Control button will now let you adjust your depth. You may also notice that the status window and Line Tension windows have now become active.

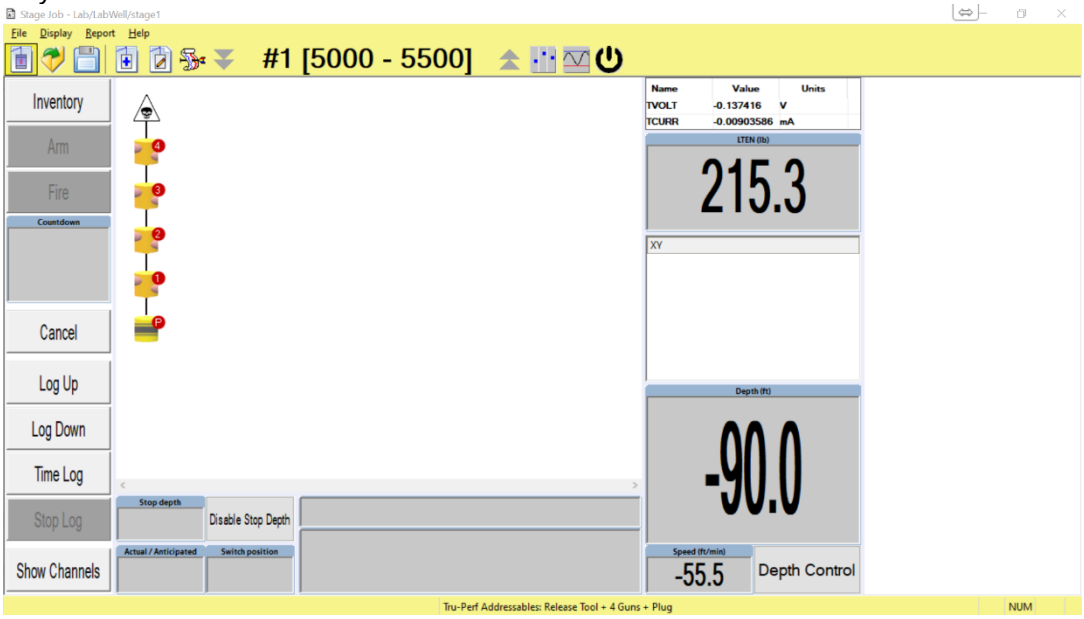


FIG: 21.26 UniFire With Aquisition Loaded

Sellecting the panel control icon next to the PMON and Power icons will allow you to adjust CCL gain, telemetry signal, downlink level and depending on the service Gamma Ray or telemetry signal.

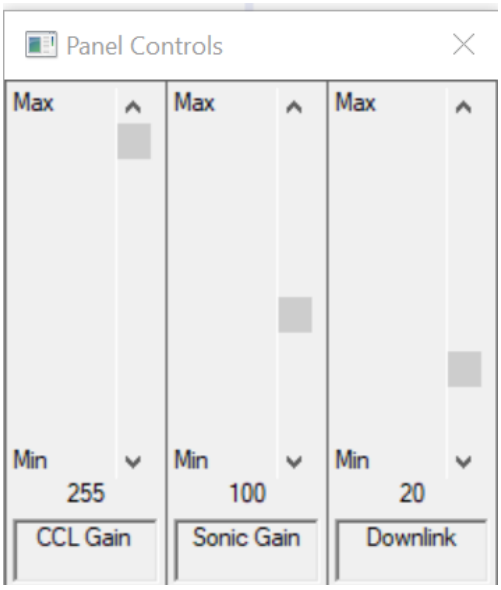


FIG: 21.27 Panel Controls 2

Clicking on the Pmon button displays the telemetry window and if included in the service the corelation window.

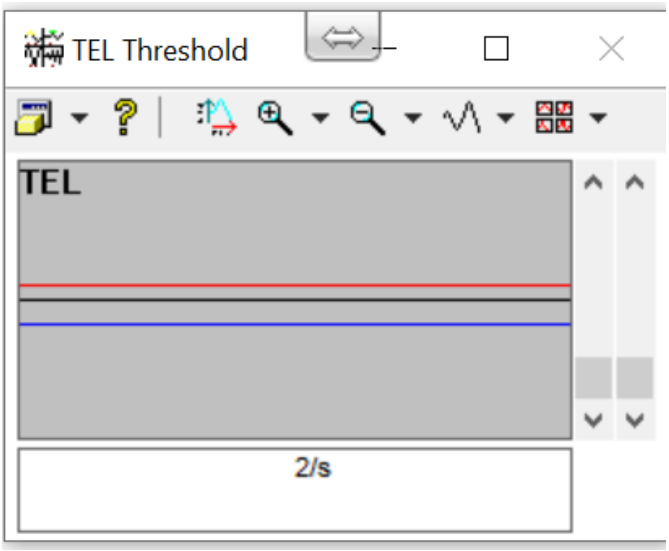


FIG: 21.28 PMon without Corelation 3

FIG: 21.29 PMon with Corelation

21.2.5 Correlation Logging

When Acquisition was loaded the buttons on the left had side of the screen were activated, at this point you can log up , down or on time. You can also inventory your switches. You must be at a save depth 200 ft before you can power up you correlation tool or inventory your switches.
To run a coreclation down pass sellect correlate, make sure your power settings for your corelation tool are set correctly and your PMON thresholds and gains are corect.

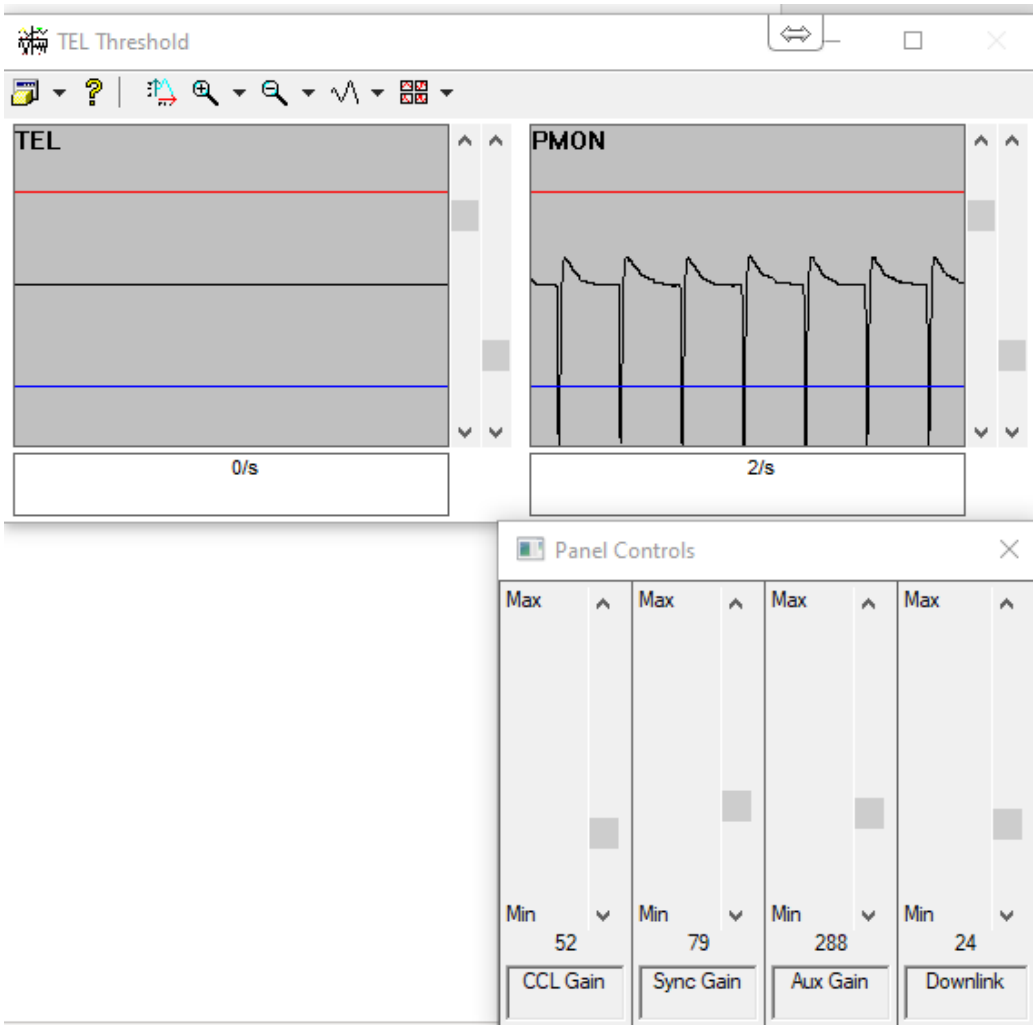


FIG: 21.30 Corelation Settings

To end the corelation log and proceed to firing the switches stop the log and click on the Perf Mode button.

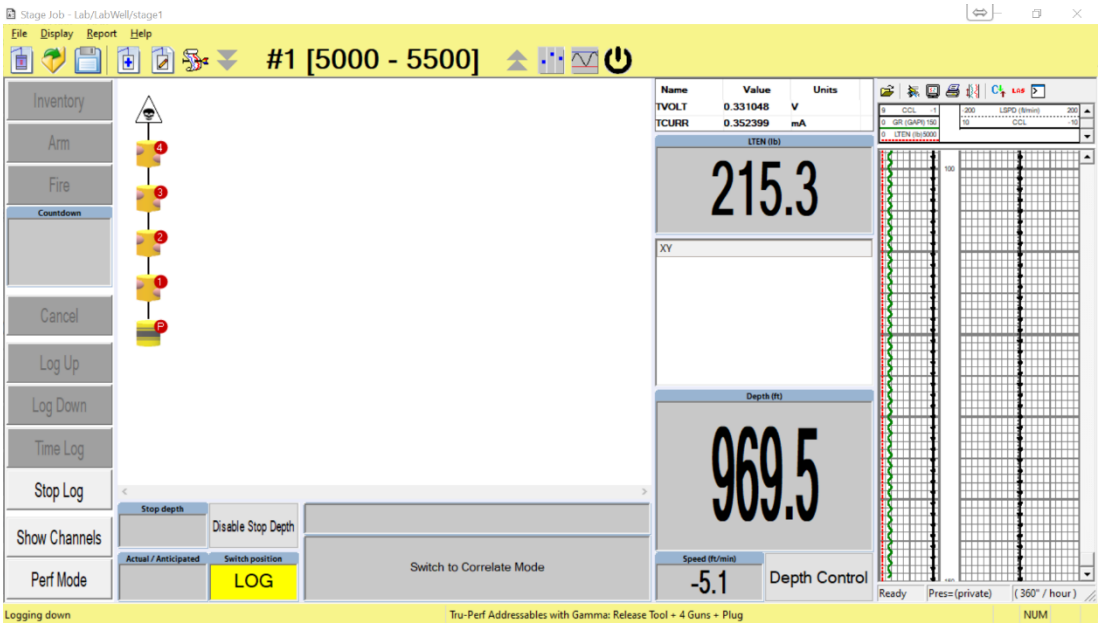


FIG: 21.31 Logging Corelation Pass

As you log the shooting depths will be highlighted on the log transitioning from yellow to green as you enter your perforation zone.

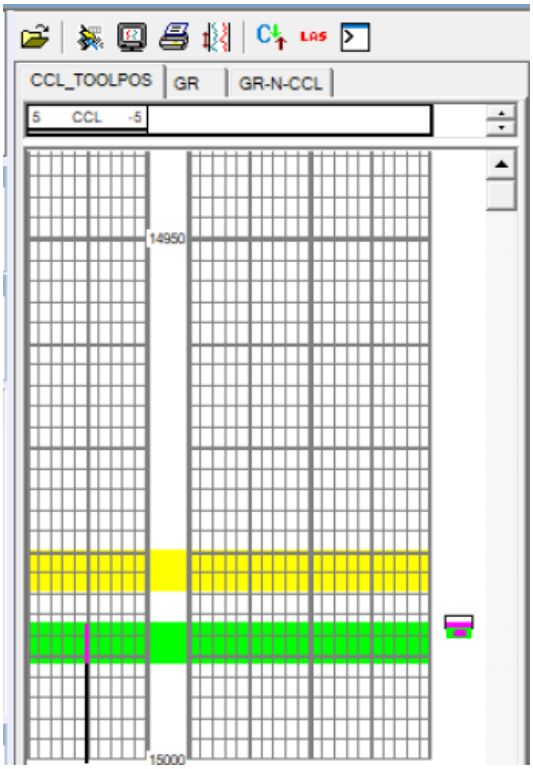


FIG: 21.32 Highlighted logging zones

21.2.6 Inventorying Switches

To inventory click on the Inventory button, make sure your Sync Gain and Download Gain sliders are set correctly. You can monitor the uplink using the PMON window.

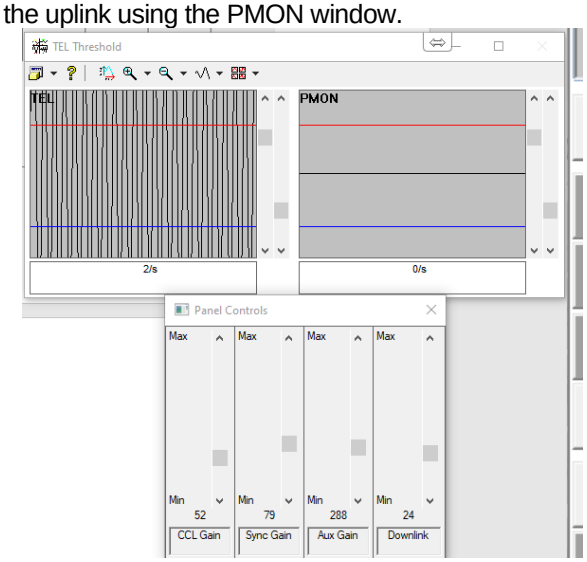


FIG: 21.33 Switch Telemetry

As the inventory is completed the individual switches will change color to green as they are found. There will be switch mismatch error if the switch count or type does not match the anticipated switches for the stage.

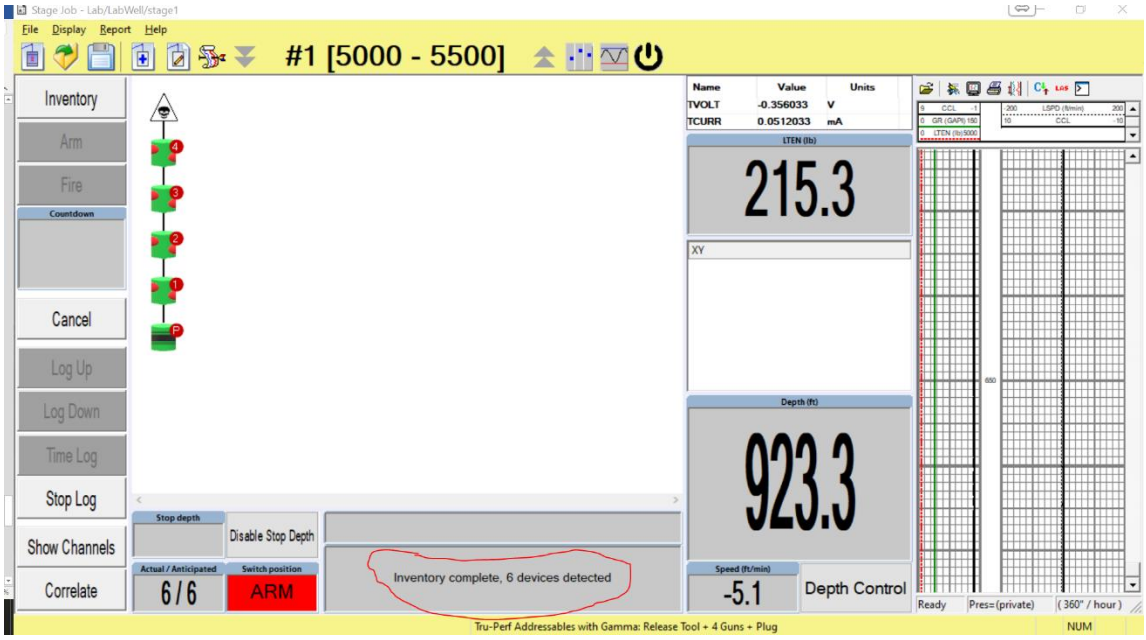


FIG: 21.34 Switch Inventory

21.2.7 Arming Switches

At this point if you are on depth you can begin to shoot your switches. Click on any switch and the Arm button will be activated, if you need to shoot out of sequence you be prompted to use the control key on your keyboard while clicking yes on the Warrning window.

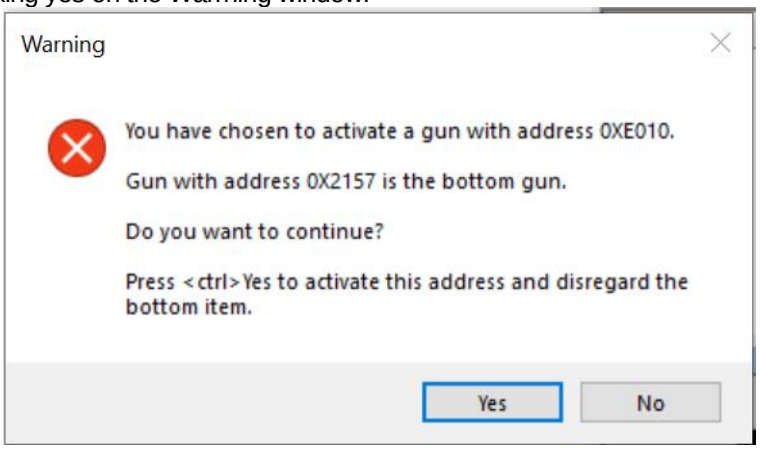


FIG: 21.35 Selecting out of Sequence Switch

Clicking Arm in sequence will highlight the selected switch and start the countdown timer, you will not be able to fire the switch unless you are at the correct depth. You have until the timer times out to position the gun and fire or you will need to reinventory and Arm. The depth shown will go from red to green when you are within the switches depth. There will be a message in the message box Arm Success when a switch is armed and ready to fire.

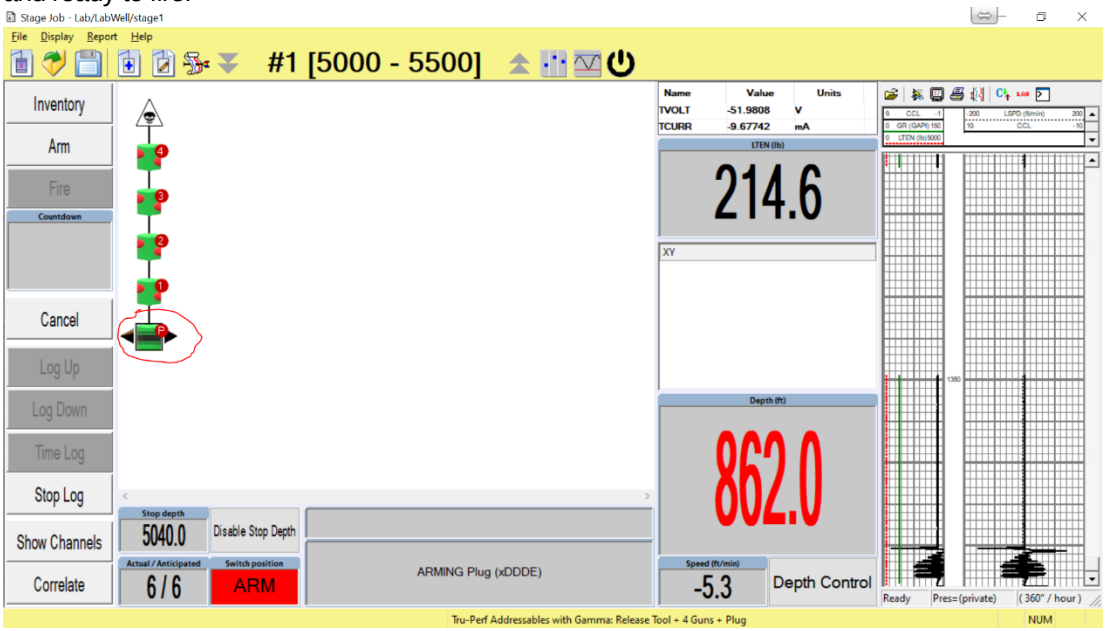


FIG: 21.36 Arming the switch

FIG: 21.37 Successfull Arming and on Depth

21.2.8 Firing Switch

When you click on the Fire button you should see aFire comand Sucsess in the message box. You should now be able to fire the switch using the Shooting Panel. As you ramp the Variac the shooting voltage and current will be shown on the window below the line tension.

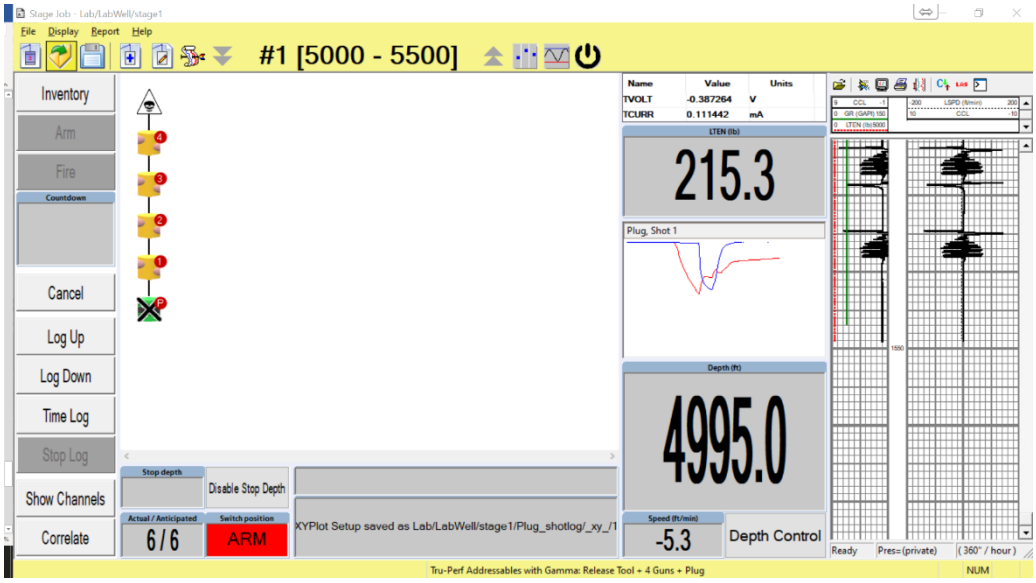


FIG: 21.38 Successfull Switch Firing

If you right click on a switch that was fired you can display its shot profile.You can now continue to shoot the rest of the guns in sequence.

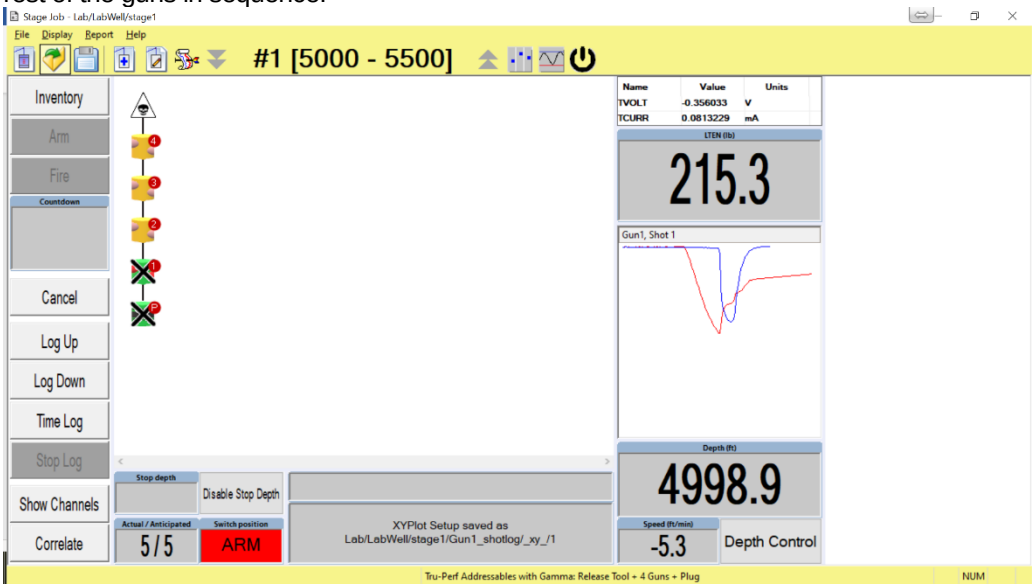


FIG: 21.39 Switch Firing inn Sequence

Section

22

22 USB Shooting Panel

The shooting panel has a new additional option Safety Software Key to run guns, if the panel has the USB port available (USB board inside), it should be connected to USBHUB back to the interface panel, add the DEVICE, SENSORS and Check the box to **Make this service available for perforating** must be include in the service
Setup in the software the new device, add the **Device** CYSHPNL, 4

22.1 Software set up

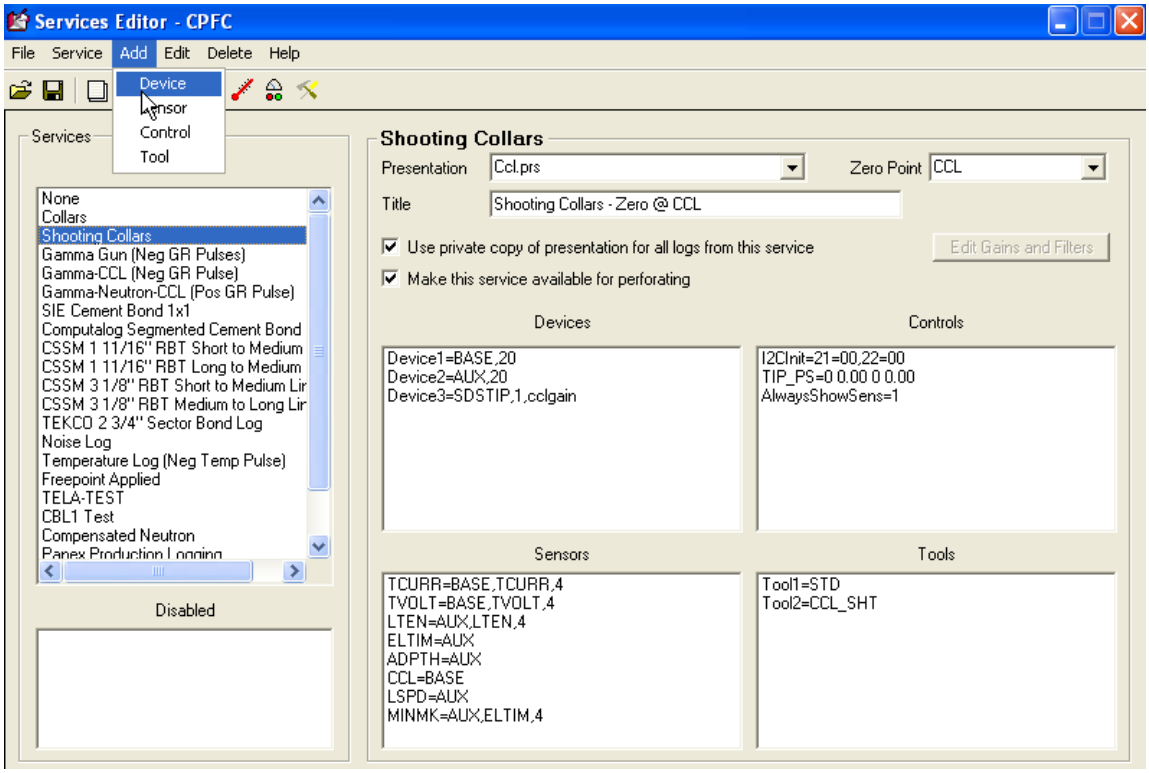


FIG: 22.1 Device

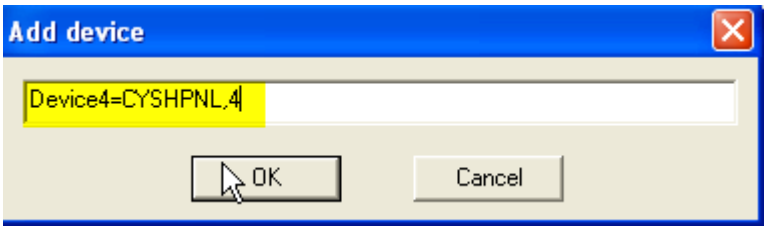


FIG: 22.2 Add Device

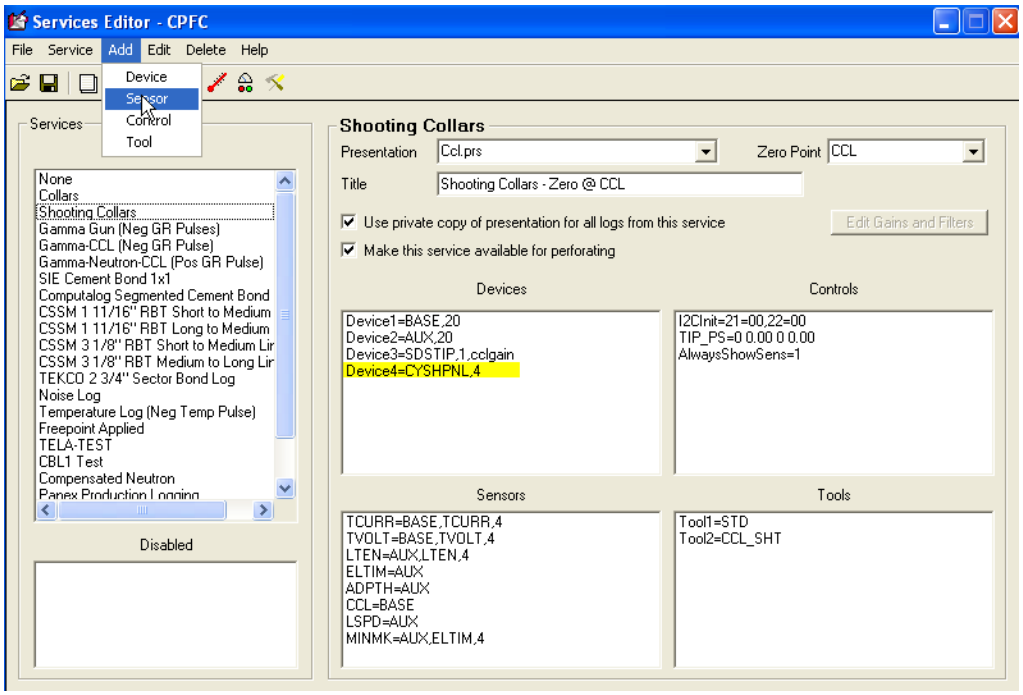


FIG: 22.3 Sensor

Add the new two **Sensors** SHVOLT=CYSHPNL, and SHCURR=CYSHPNL

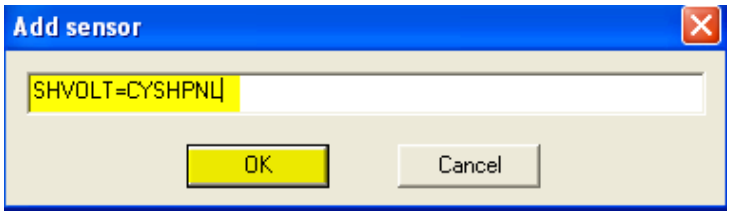
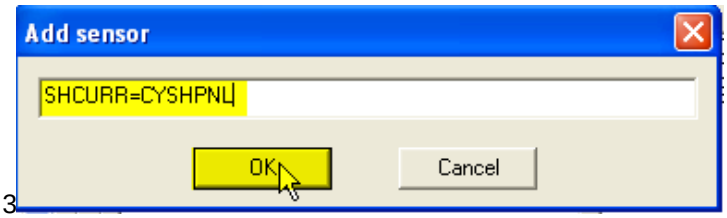


FIG: 22.4 Add Sensor

Shooting Voltage sensor



3

FIG: 22.5 Add second Sensor

Shooting Current sensor
Add sensor in order to acquire at the same time DEPTH and TIME versus Curves in the same Data Base.
Double check the ADPTH = AUX is under sensor.
Set the Data base for two outputs (Time and Depth)
TimeToDepthInputSec = (seconds per time sample), e.g. 0.10
TimeToDepthOutputFt = (feet per depth sample), e.g. 0.25

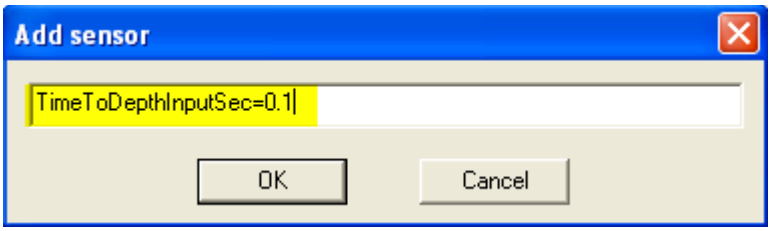


FIG: 22.6 Add Time to convert to Depth Input

Set the File Time with sample rate every 0.1 Sec, for high resolution for low resolution increase the sample rate Time.

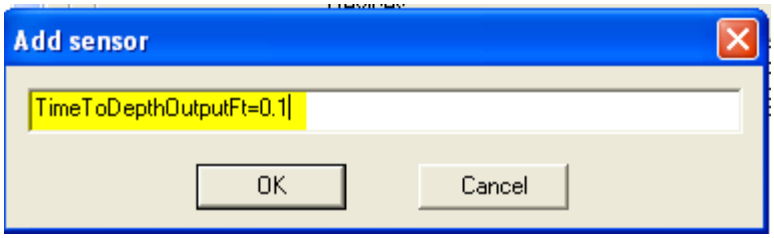


FIG: 22.7 Add Time to convert to Depth Output

Set the Depth File with sample rate every 0.1 Ft. for high resolution, for low resolution increase the sample rate to 0.25 FT.
Check the option Make this service available for perforating

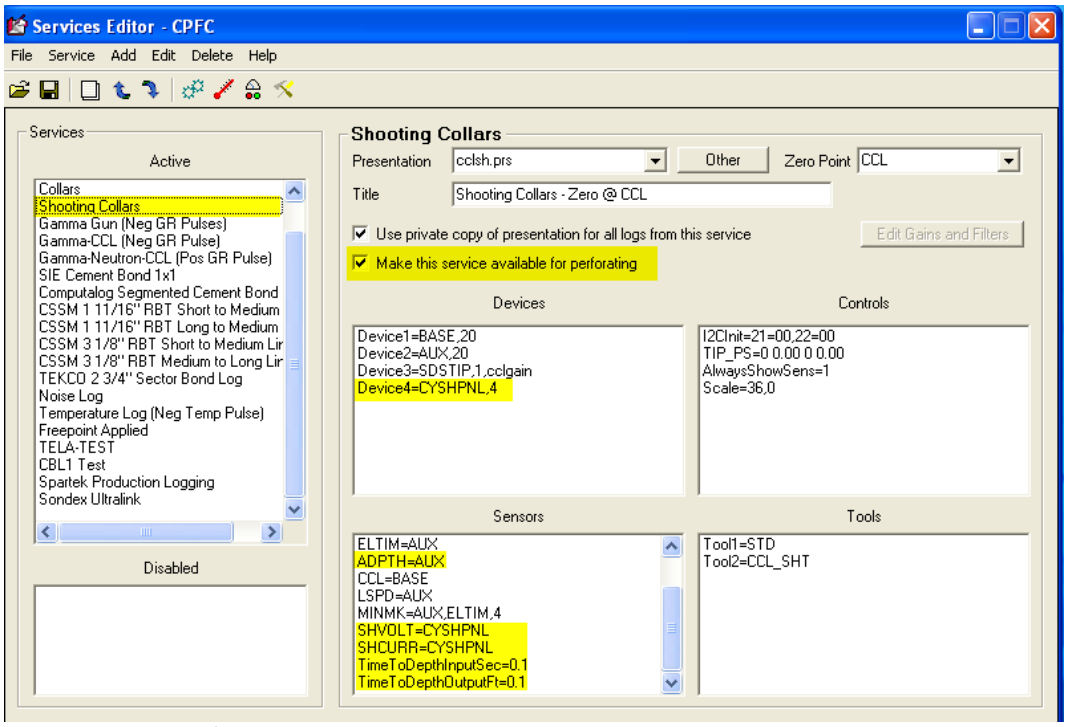


FIG: 22.8 Set Service

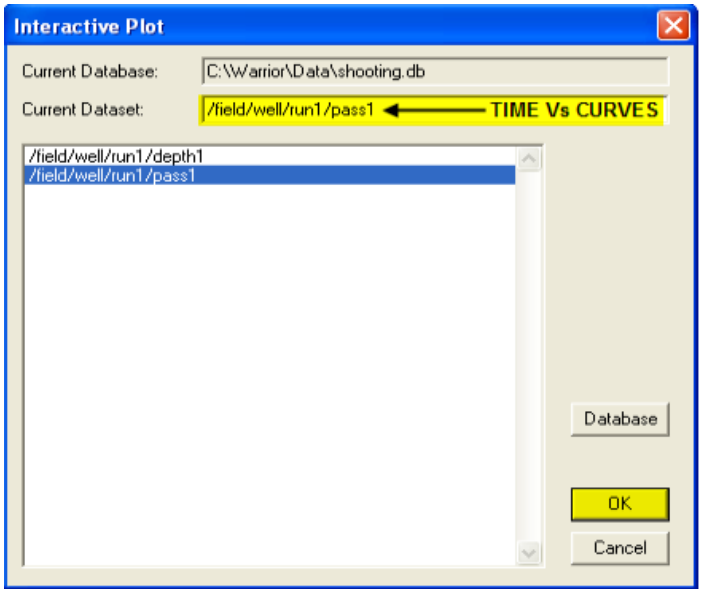


FIG: 22.9 Interactive Time Plot

Select the File Pass1 to plot Time Vs Curves

22.2 Time Plot

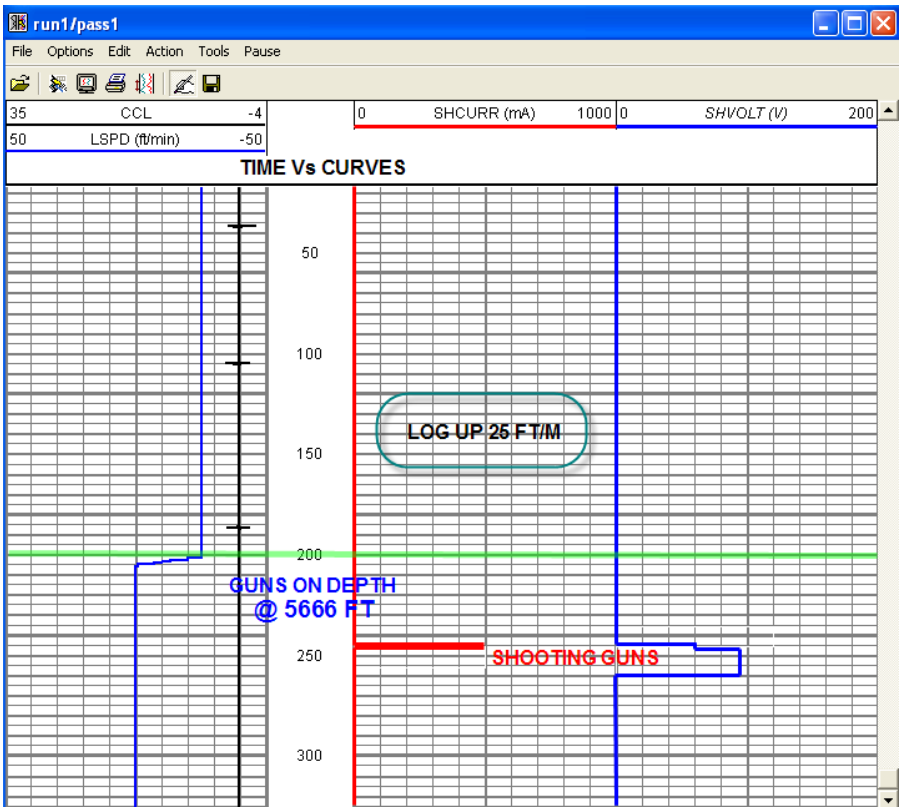


FIG: 22.10 Time Plot

The time plot is continues just depend of start acquisition (Record Up, Record Down, Record Time)

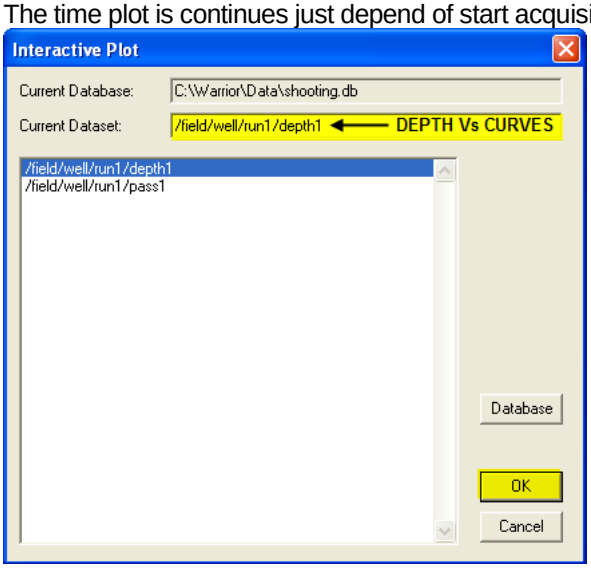


FIG: 22.11 Depth Plot

The Depth is the standard plot Depth Vs curves if the you stop the tool the plot stop to acquire data.

22.3 Depth Plot

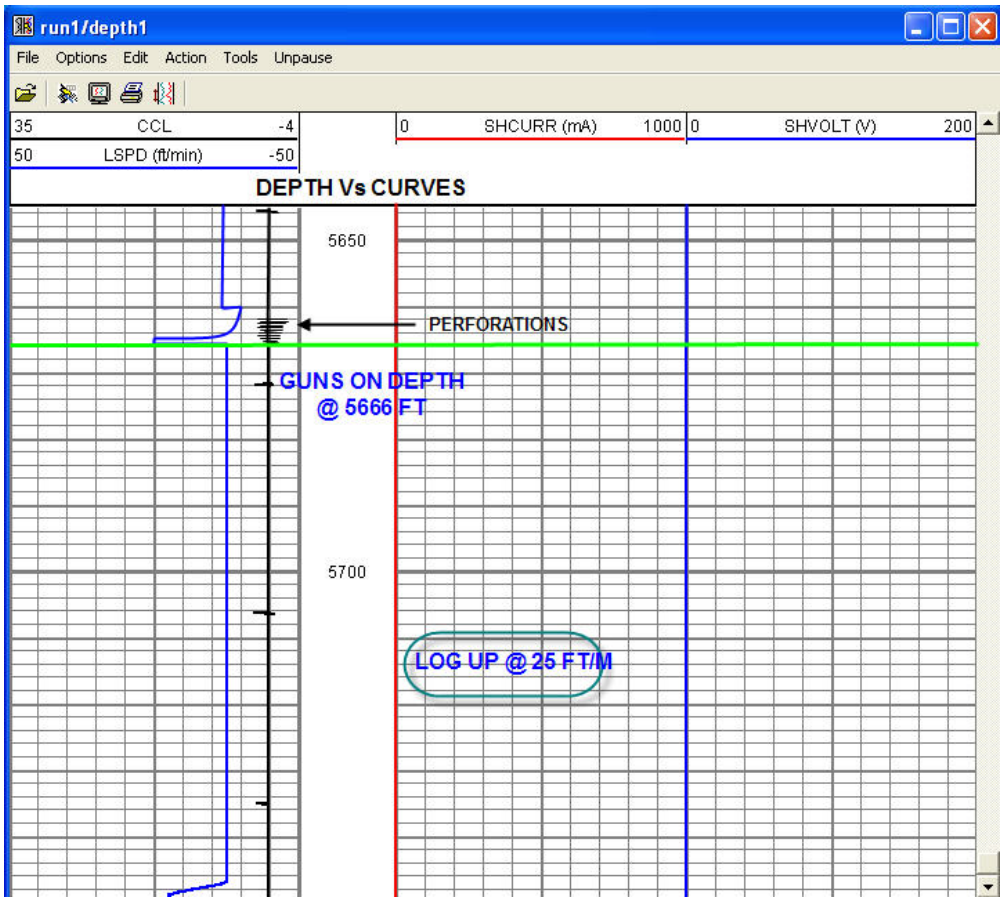


FIG: 22.12 Depth Plot

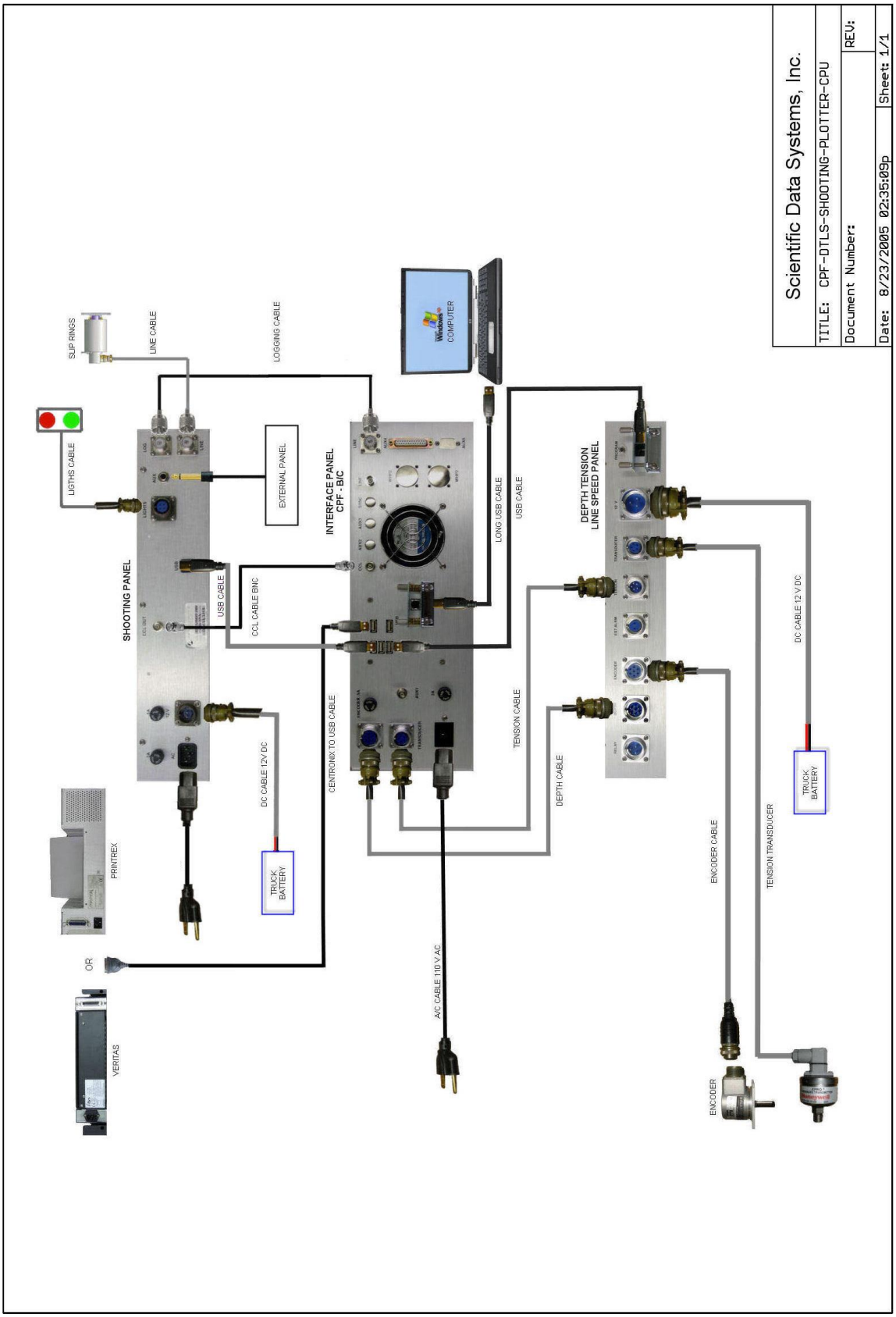


FIG: 22.13 Panels Connection

22.4 Shooting Panel Calibration

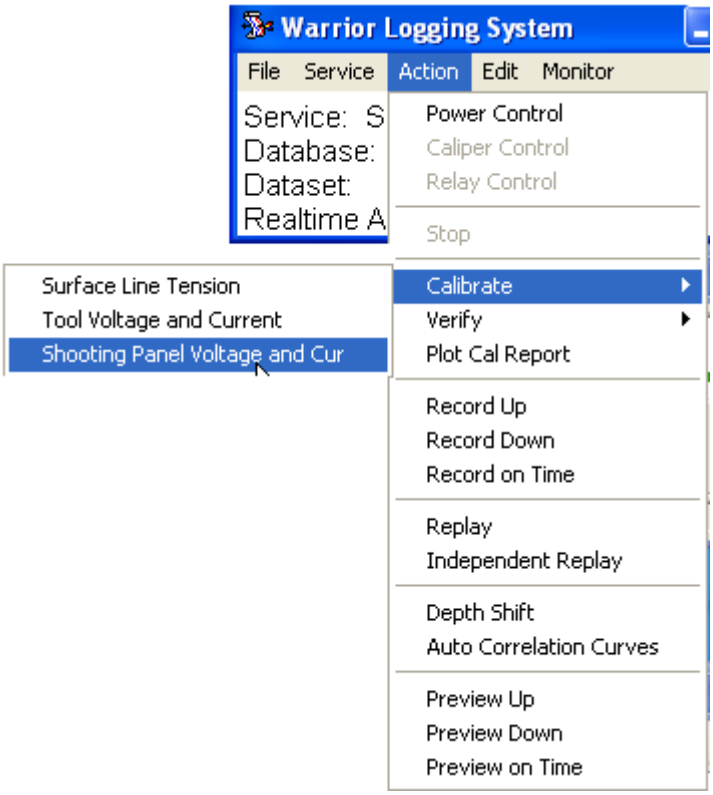


FIG: 221.14 Shooting Panel Calibration

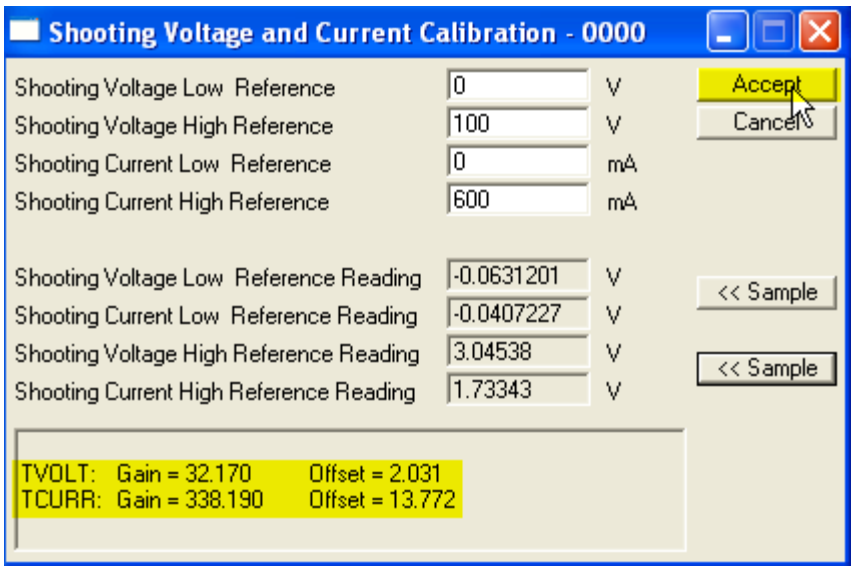


FIG: 22.15 Voltage and Current Calibration

FIG: 22.16 Voltage and Current Values

22.5 Operation of the Shooting Panel

The speaker will emit a continuous WARNING tone while the **AC / DC** switch is in the AC position.
The **'LOG'** and **'AUX'** positions on the **'MODE'** switch are active when the shooting panel is not powered. If the **'MODE'** switch is set to the **'LOG'** position, the **'LOG' and 'LINE'** connectors on the rear of the panel are connected.

22.5.1 AUX Position

Place Switch in Aux Position
The '**AUX'** key switch position simply connects the AUX connector to the line connector on the rear of the panel.

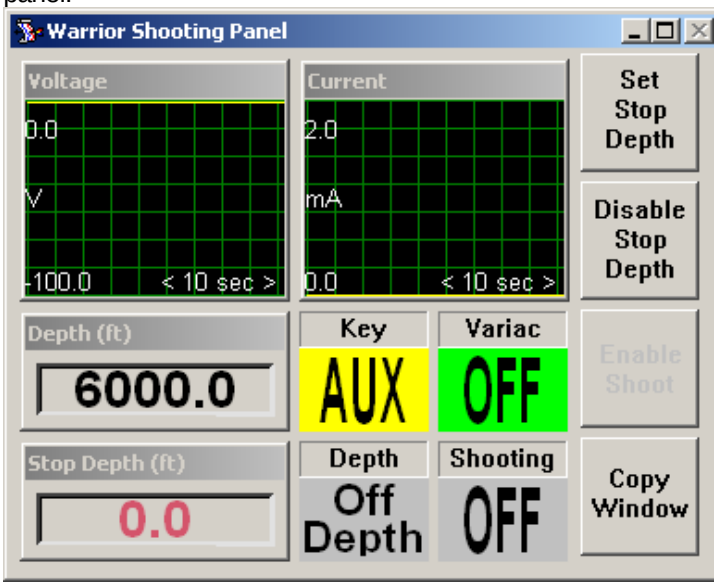


FIG: 22.17 Switch in AUX

22.5.2 LOG Position

Place Switch in LOG Position

To **log**, set the **'MODE'** key switch to **'LOG'**. The **'SAFE LIGHT'** connector on the back of the panel will have pins A & C shorted for a **UNSAFE** 'red light' to be illuminated on the rear of the logging truck.

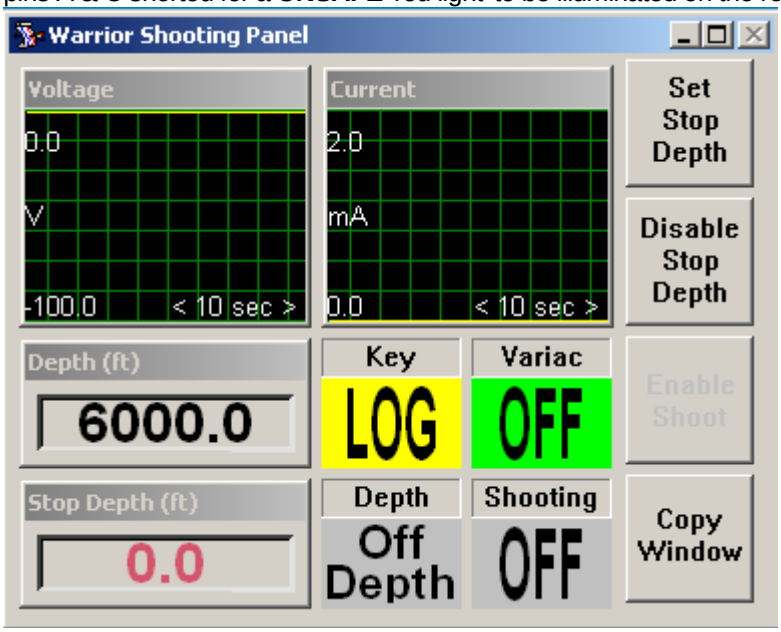


FIG: 22.18 Switch in LOG

22.5.3 SAFE Position

Place Switch in SAFE Position

The panel is in **'SAFE'** mode (line is shunted) any time the 'MODE' key switch is in the 'SAFE' position. The **'LIGHTS'** connector on the rear of the panel will have pins A & C shorted for a **SAFE** 'green light' to be illuminated on the rear of the logging truck. If the **'MODE'** switch is in any other position, pins A & B of the **'LIGHTS'** connector are shorted to indicate an unsafe **CONDITION**.

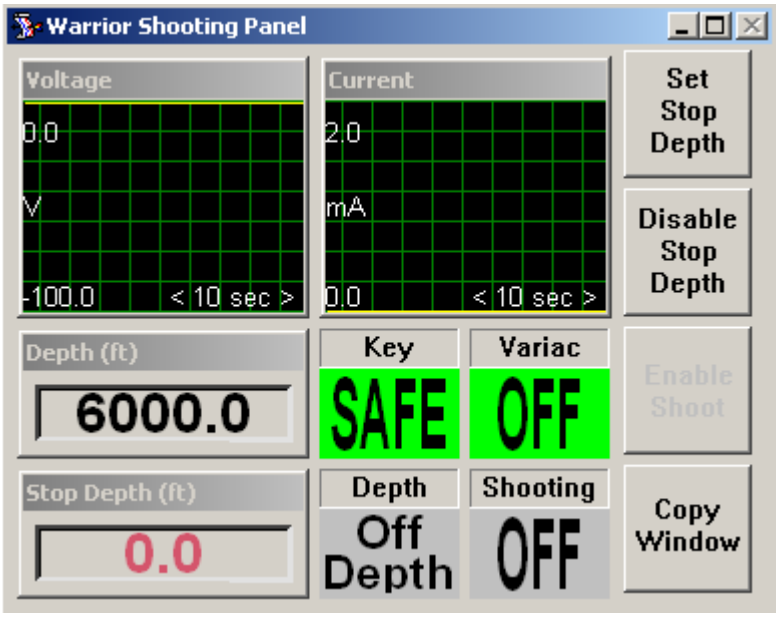


FIG: 22.19 Switch in SAFE

22.5.4 CCL Position

Place Switch in CCL Position

To log **CCL**, set the '**MODE'** key switch to '**CCL'.** The CCL amplifier is now connected to the line. The **'CCL GAIN'** control adjusts the relative reading of the **'CCL'** meter and the **'VOLUME'** control adjusts the volume of a speaker inside the panel that emits a chirp when a collar is detected. The CCL amplifier will function when the power plant is shut off as long as the **'MAIN'** switch is on.

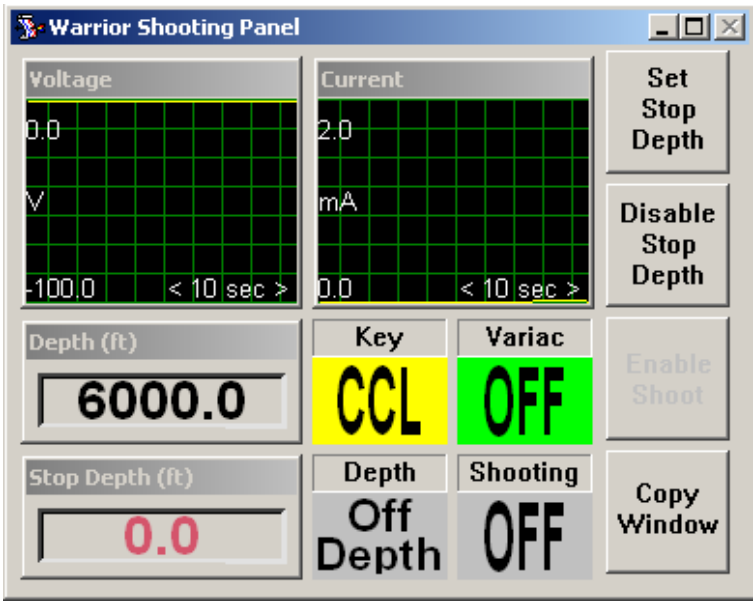


FIG: 22.20 Switch in CCL

22.5.5 ARM Position

Place Switch in CCL Position

To **arm** the panel, set the **'MODE'** key switch to **'ARM'**. The **'SAFE LIGHT'** connector on the back of the panel will have pins A & C shorted for a **UNSAFE** 'red light' to be illuminated on the rear of the logging truck.

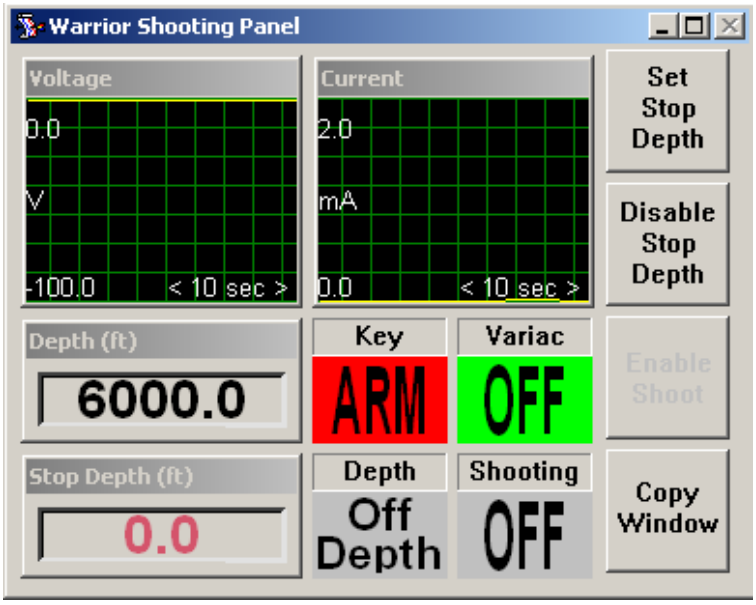


FIG: 22.21 Switch in ARM

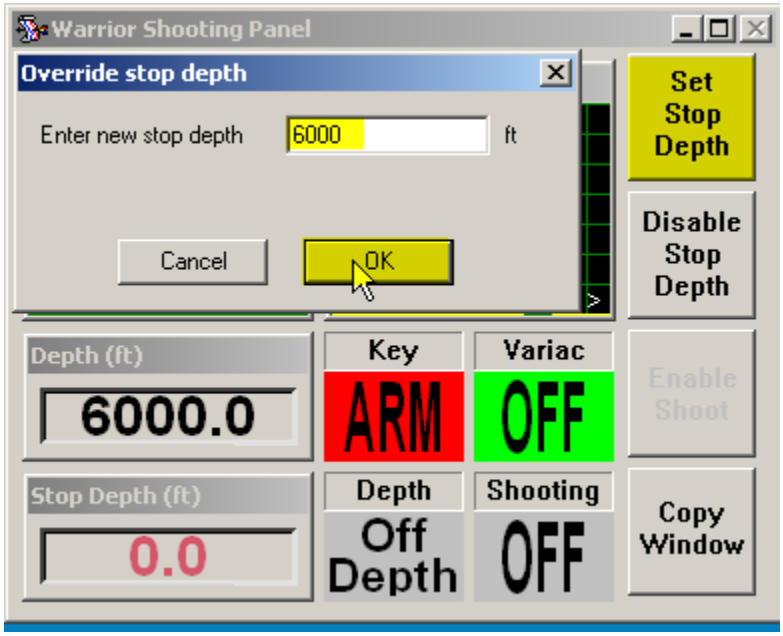


FIG: 22.22 Set Stop Depth

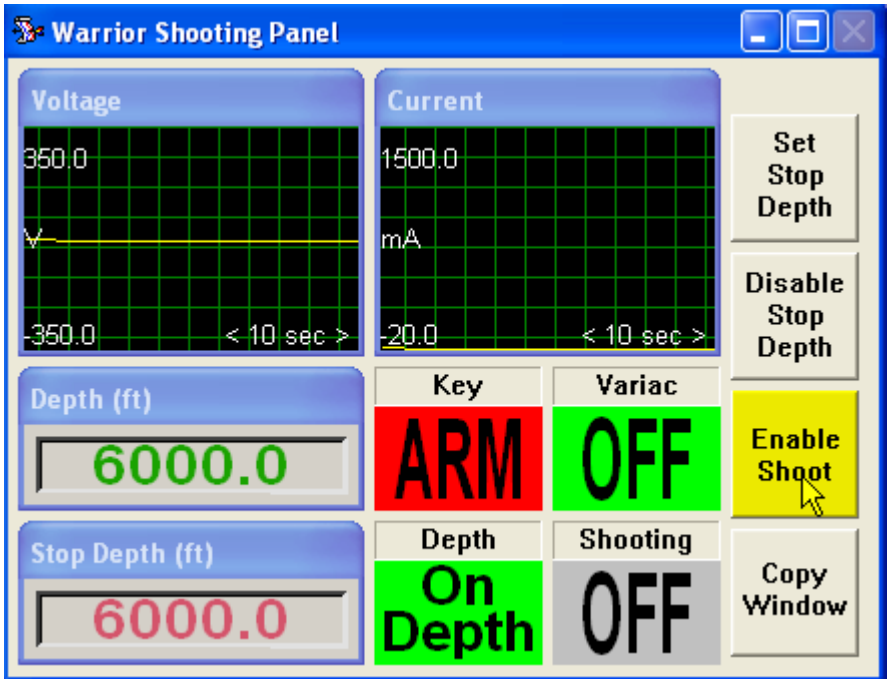


FIG: 22.23 Set Enable Shoot

Click over Enable Shoot

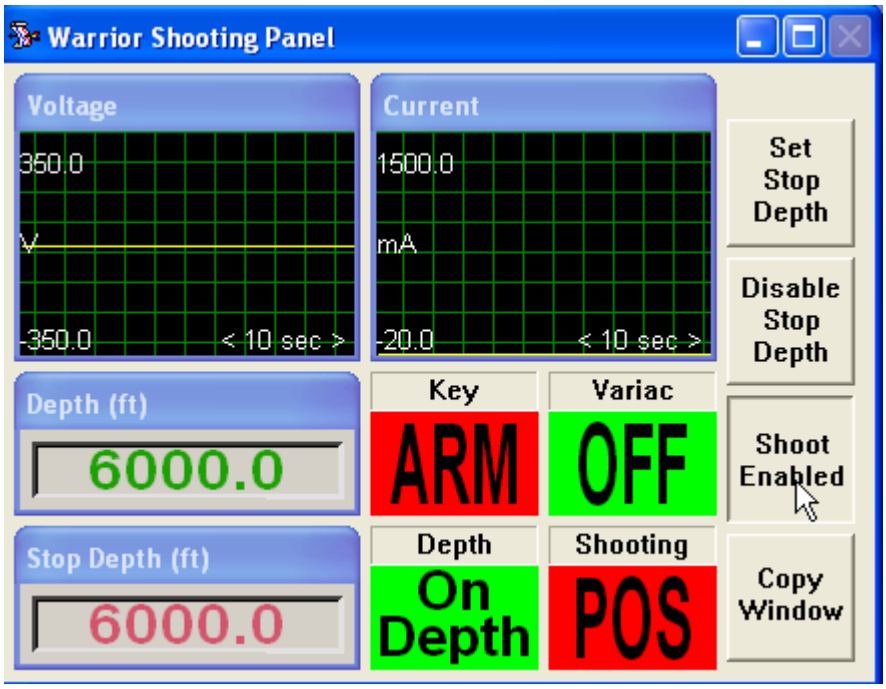


FIG: 22.24 Software Ready to Shoot

Ready to shoot

To **shoot**, verify that the **'MODE'** key switch is set to **'ARM'** and the **'ADJUST VOLTAGE'** control is rotated fully counter clock wise. Set the **'AC / DC'** switch the and the **'POS / NEG'** switch to the required settings (NOTE: the 'POS / NEG' switch has no effect when the 'AC / DC switch is in the AC position.) The panel is now ready to shoot. Lift and hold the **'SHOOT'** switch up and rotate the **'ADJUST VOLTAGE'** control clock wise while watching the **'VOLTAGE'** and **'CURRENT'** meters.

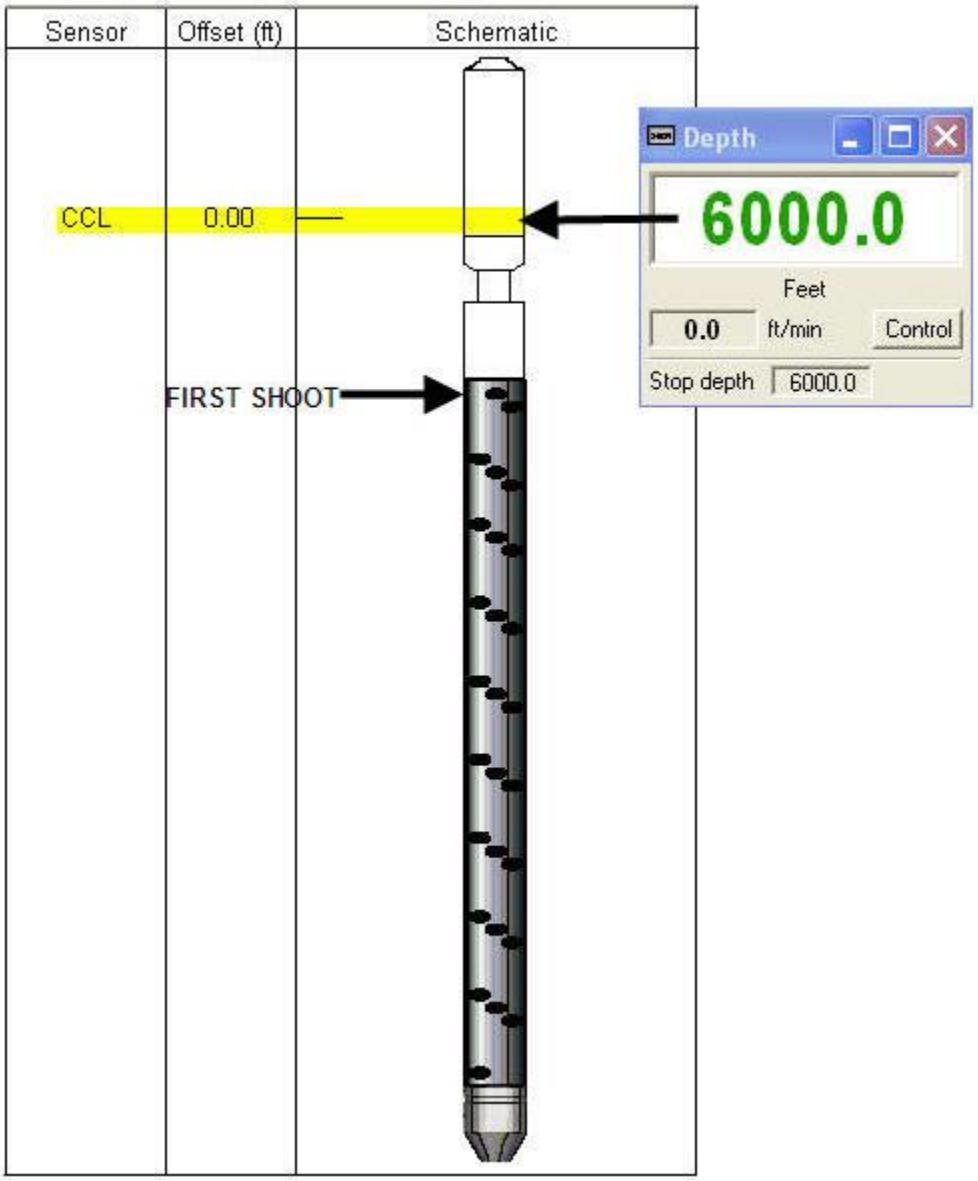


FIG: 22.25 CCL on Depth

Tool on Depth CCL Reference

FIG: 22.26 Positive Voltage and Current Shooting

Set Switch in Positive position

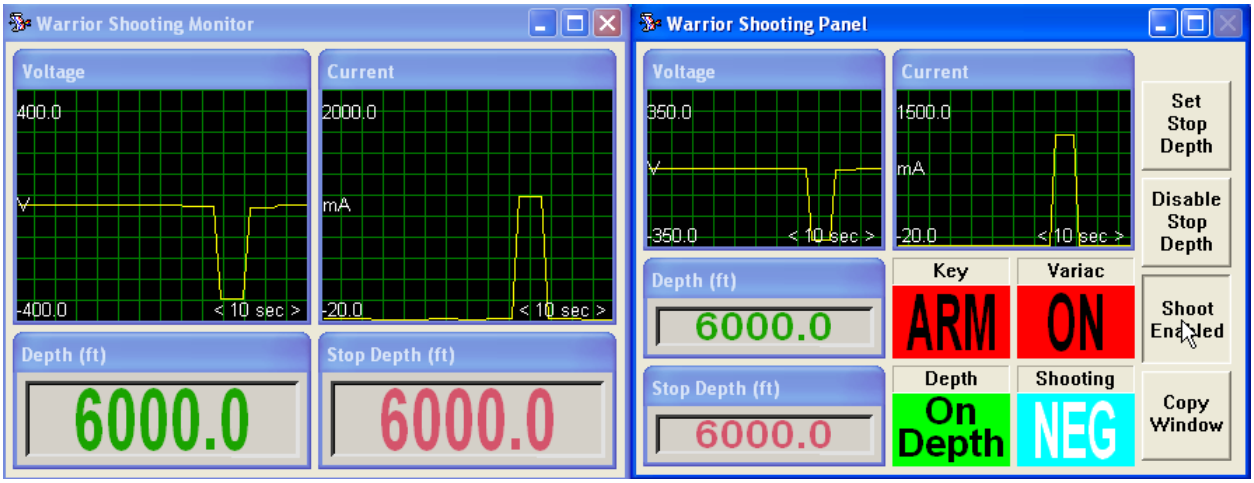


FIG: 22.27 Negative Voltage and Current Shooting

Set Switch in Negative position

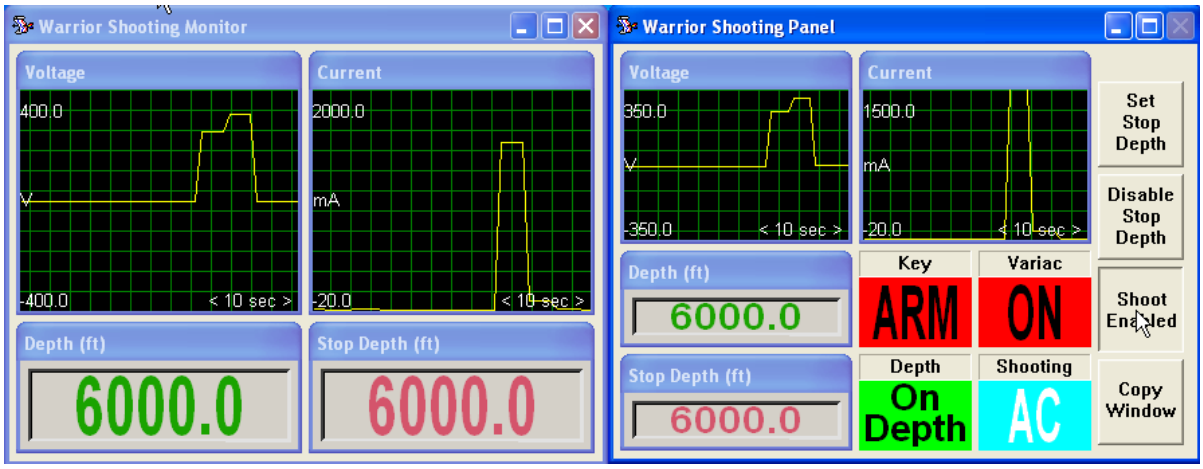


FIG: 22.28 Voltage and Current Shooting

Set Switch in AC position

Section

23

23 Distributable Digital Media

The Warrior software now includes the option of being able to generate a distributable digital media that would allow a User to supply their clients an interactive copy of log data to view without having to have Warrior software installed on their computer. Multiple files may be included for different log runs. It also includes the option to add a PDF file to the distributable files.

The media would allow the customer to view the log much as interactive plot is viewed by scrolling up and down the log. It does not provide capabilities to alter the log presentation such as changing scales or adding or removing curves. It does have the ability to change the vertical scaling. If the plot was created with a 3D presentation attached, as often happens in multi-finger caliper presentation, the 3D imaging will also be included in the distributed files.

Basic knowledge in the use of the Warrior Plot Job Editor is required in order to assemble a plot job from which the distributable media is created. Refer to the Warrior software manual for more information on the use of the Warrior Plot Job Editor.

23.1 Writing Distributable Digital Media

Once the option for distributable media has been invoked in the Warrior Software, the creating of the distributive digital media occurs through the Warrior Plot Job Editor much in the same manner as printing a log through a printer.

23.1.1 Use of Plot Job Editor to Create Files

After a plot job has been created in the normal manner and is ready to print and make copies, click on File -> Print, as if printing the plot job.

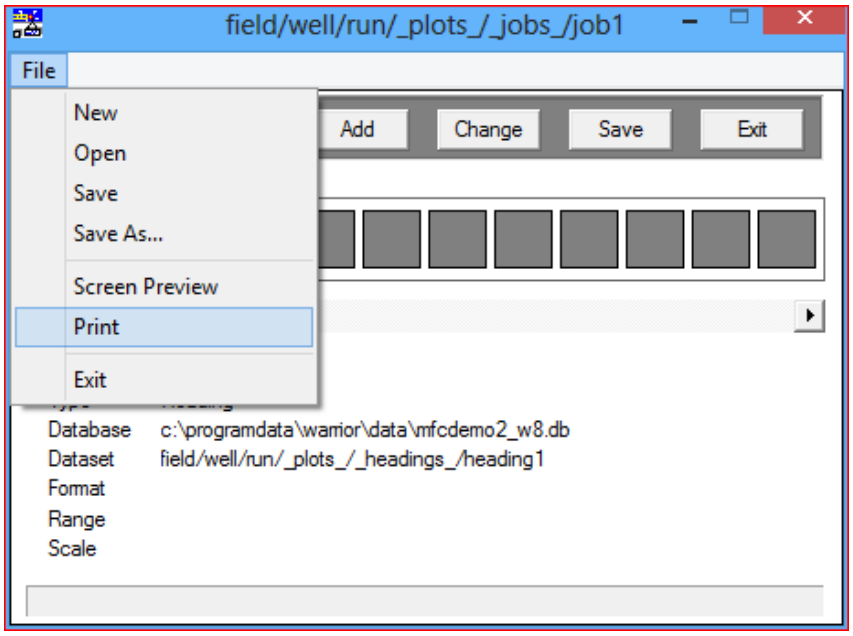


Fig. 23.1 Preparing to print a plot job

The normal printing dialog window will come up. Click on the Printer drop down list to see all the available printers. “Distributable Digital” will have been added to your existing list of printers. Select the “Distributable Digital” printer and then click the [Print] button. The Distributable Digital dialog window will then open.

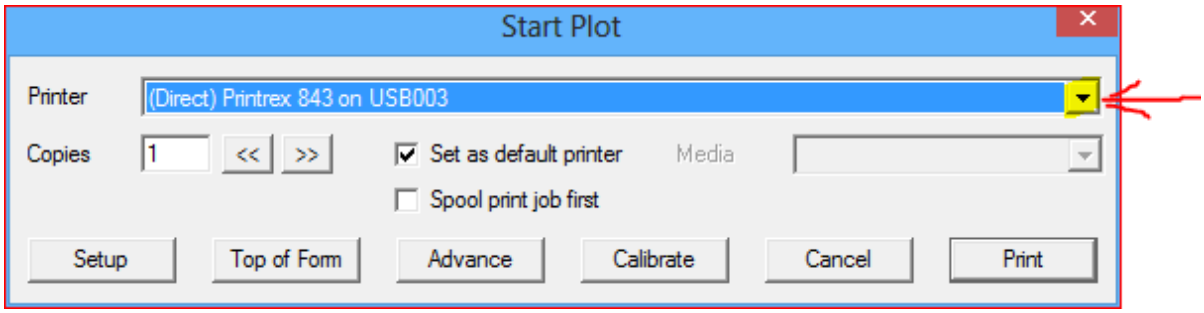


Fig.23.2 Click Drop Down List to view available printers

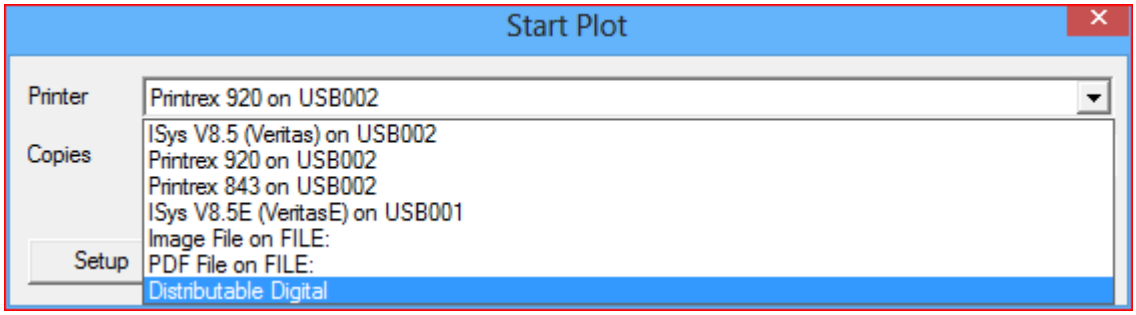


Fig. 23.3 Select Distributable Digital

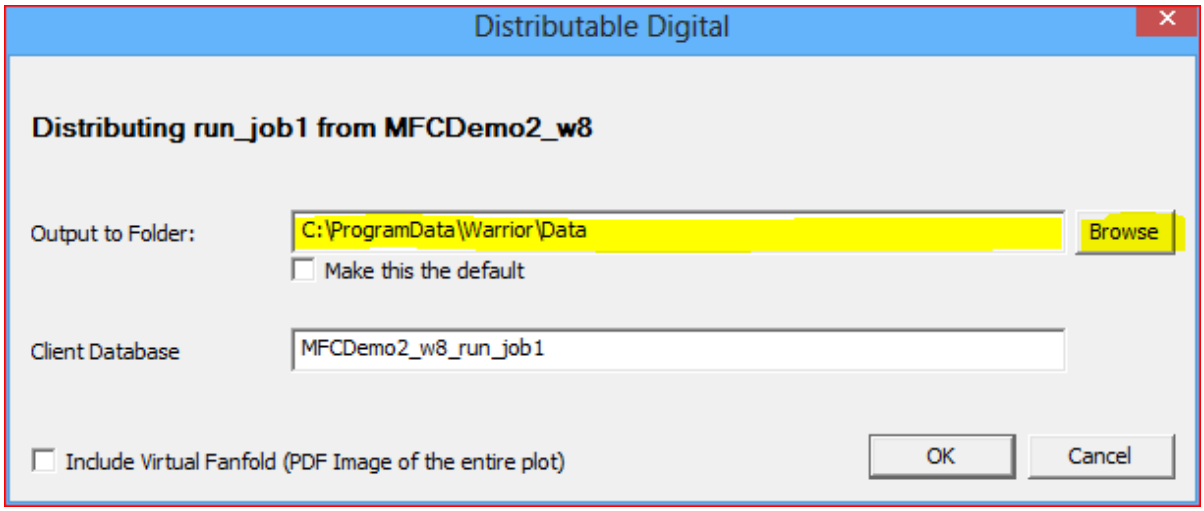


Fig. 23.4 Distributable Digital Dialog window

The first time the software is used the default Output Folder will be the Warrior\Data folder. The [Browse] button can be used to select a different Output Folder. **It is highly recommended that the Output Folder be a blank USB Drive, writeable CD, or empty folder.** The output will contain multiple files that could be misplaced otherwise. Once selected, this can be made to be the default Output folder by click the box beneath the folder path.

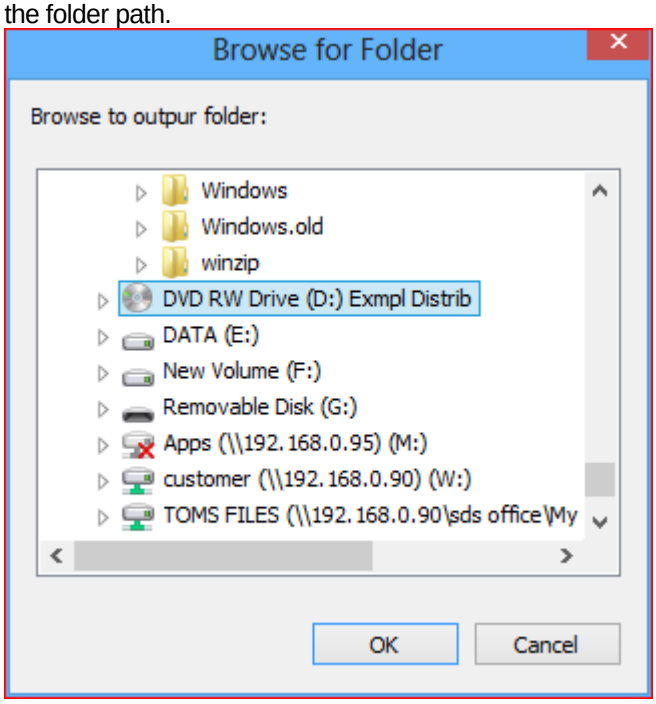


Fig. 23.5 Selecting Distributable Media Output folder

The Client Database name defaults to the Warrior Database name and plot job name. The User should change this so that it would be familiar to the Client and more descriptive of what the log is.

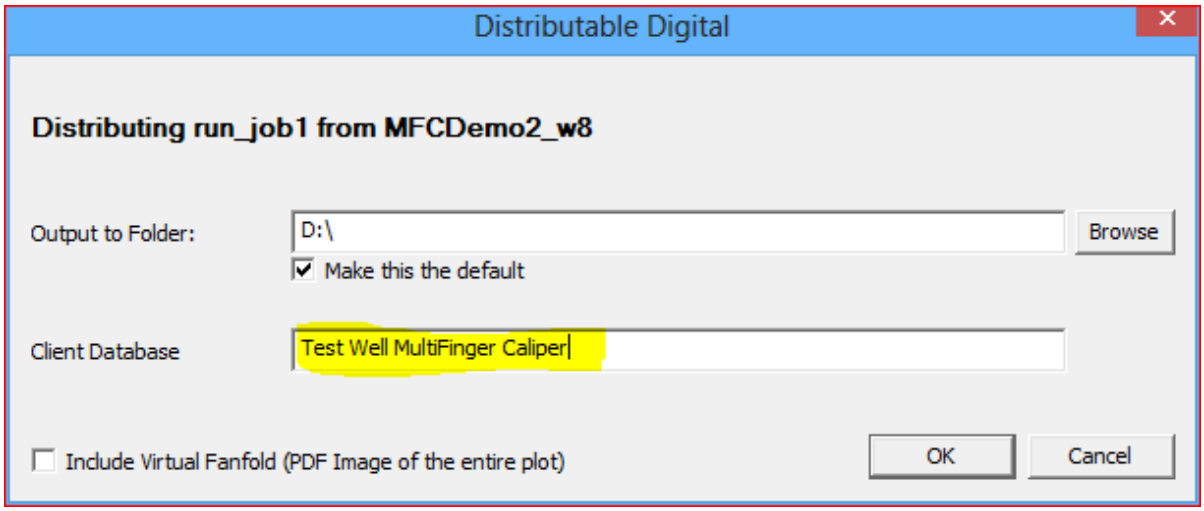


Fig. 23.6 Renaming Client Database

A PDF file will be generated as part of the distributable media package if the “Include Virtual Fanfold (PDF Image of the entire plot)” is checked. When the [OK] button is clicked, you might temporarily get a window that shows the progress of generating the files. When all the files have been written, you will get a message window that will say that the file is ready.

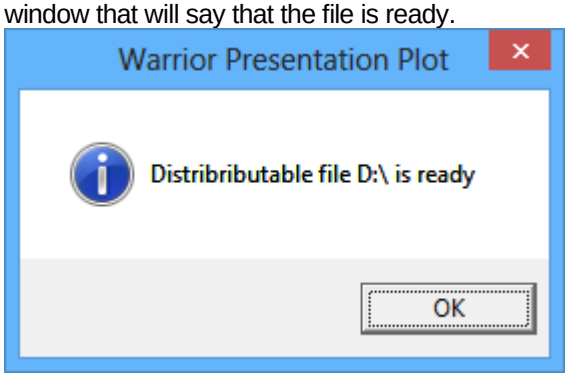


Fig. 23.7 Files have be written to folder

If you check the folder, you should see the files shown below.

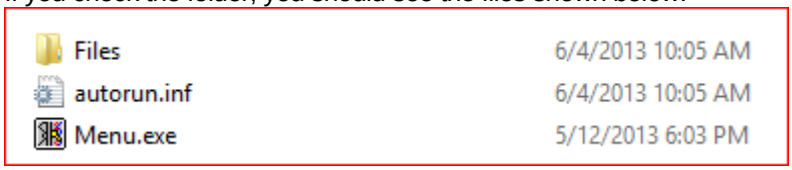


Fig. 23.8 Files created in folder

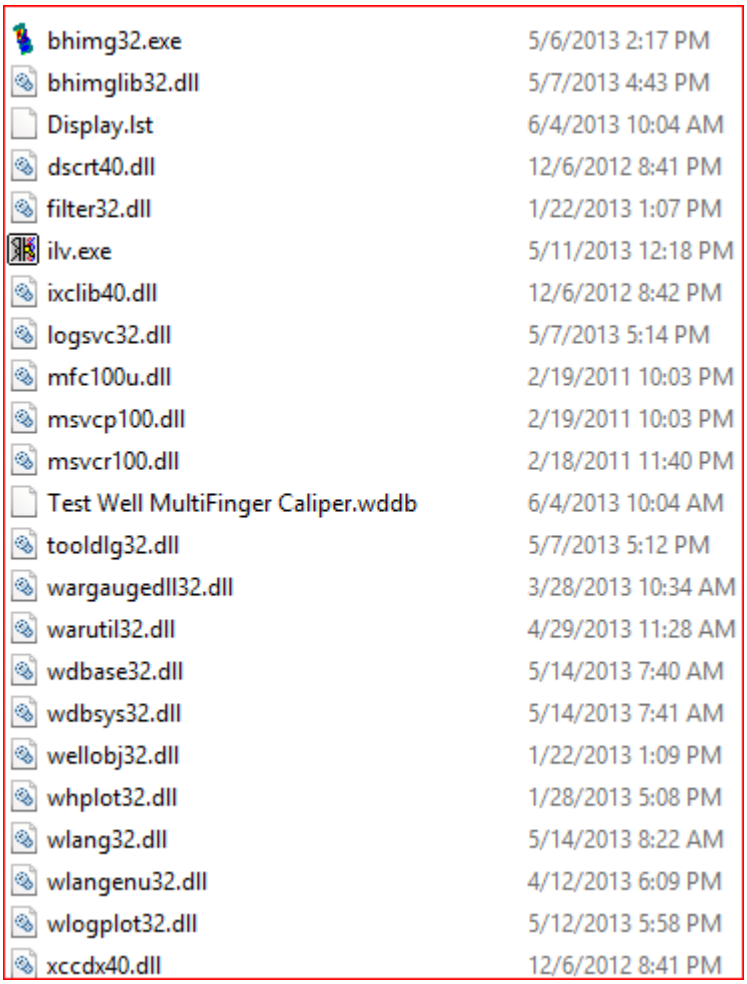


Fig. 23.9 Example files in Files Folder

IMPORTANT NOTICE
If you have written to a CD / DVD or USB Drive, make sure that you properly eject the drive to ensure that files are completely written. Failure to do so may result in the client receiving unreadable data.

23.2 Creating Multiple Files of Distribution

If the user wanted to add another Plot Job to the same distribution file, you would go about it in the same manner and write to the same output folder, but the Client Database name would need to be changed so that the original data is not overwritten

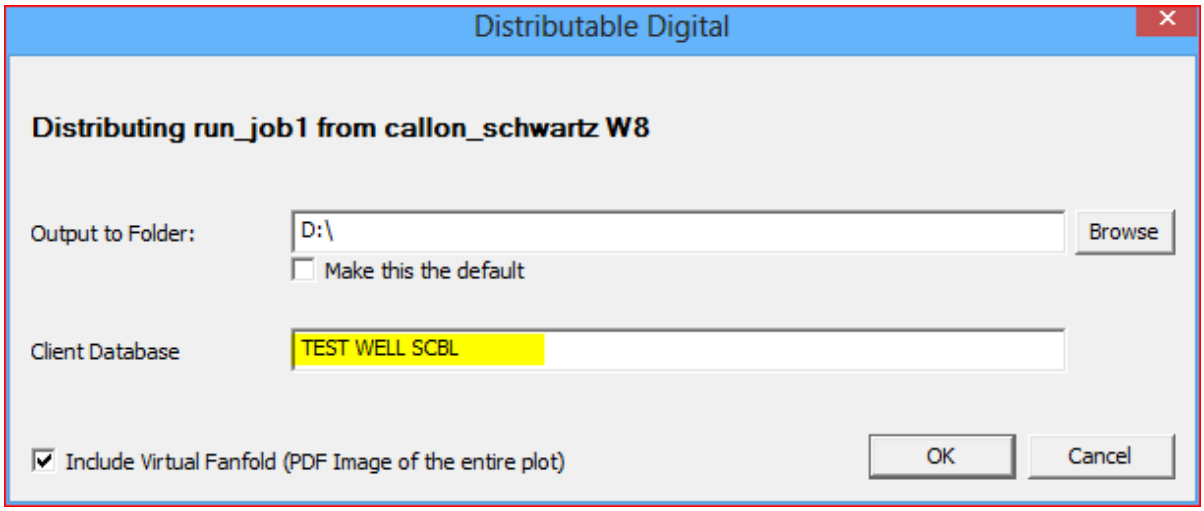


Fig. 23.10 Adding additional data to output folder

23.3 Viewing Distributable Digital Media

The Distributable Digital media has an Autorun.inf file included. If the Computer that is viewing the files is setup to use Autorun.inf files it will open the Menu viewing menu. The menu will include all log passes that were in the Plot Jobs that the media was created from. Any PDF files that were created of the plot job will also be shown as a Fanfold document.

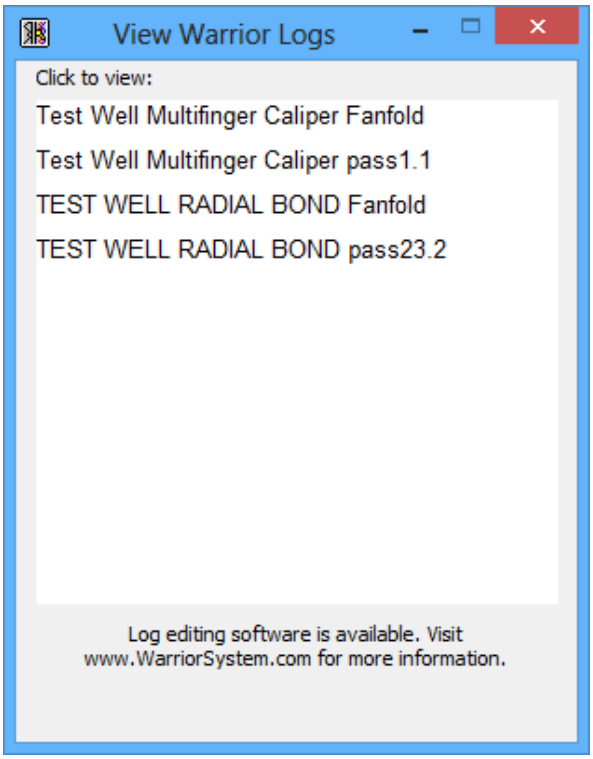


Fig. 23.11 Distributable Digital Viewing Menu

To view any of the log passes or PDF Fanfold files Simply click on the desire one. PDF Fanfold files will be opened in Adobe Acrobat for viewing and the Log passes will be opened with a simplified version of Warrior Interactive. Plot

Section

24

24 Convert from 7.0 to 8.0 Warrior

The conversion from Warrior 7 to Warrior 8 is a straight forward process with one exception, if your warrior 7 services use CBL instruments. If you are unsure if you are using CBL or SCBL instruments go to section 24.4.

24.1 Procedure

On the system with Warrior 7, Install Warrior 7 Backup for Warrior 8 "setup_w7bk_2013_11_19001.exe " you will find this on the CD provided with your system or it can be downloaded from the Scientific Data Systems web site
http://www.warriorsystem.com/private_download/Beta/setup_w7bk_2013_11_19001.exe

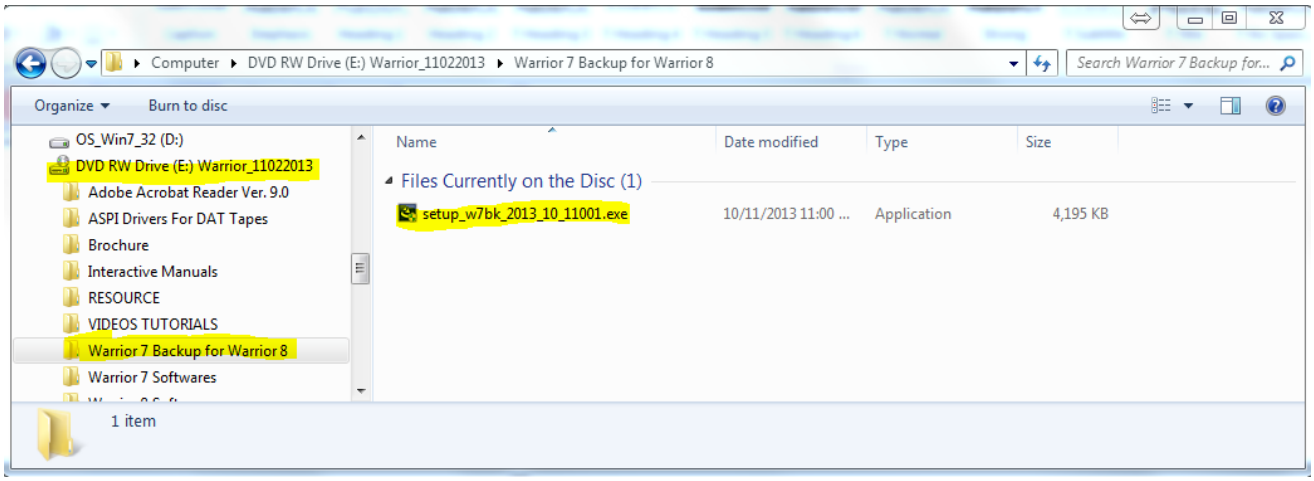


FIG: 24.1 Warrior 7 Backup for Warrior 8

Once installed execute the program. This will convert your Warrior 7 configuration into a warrior 8 compatible configuration. The first thing you may notice is that in warrior 7 configuration backups took the form of a zip file and warrior 8 backups use a wbu extension.

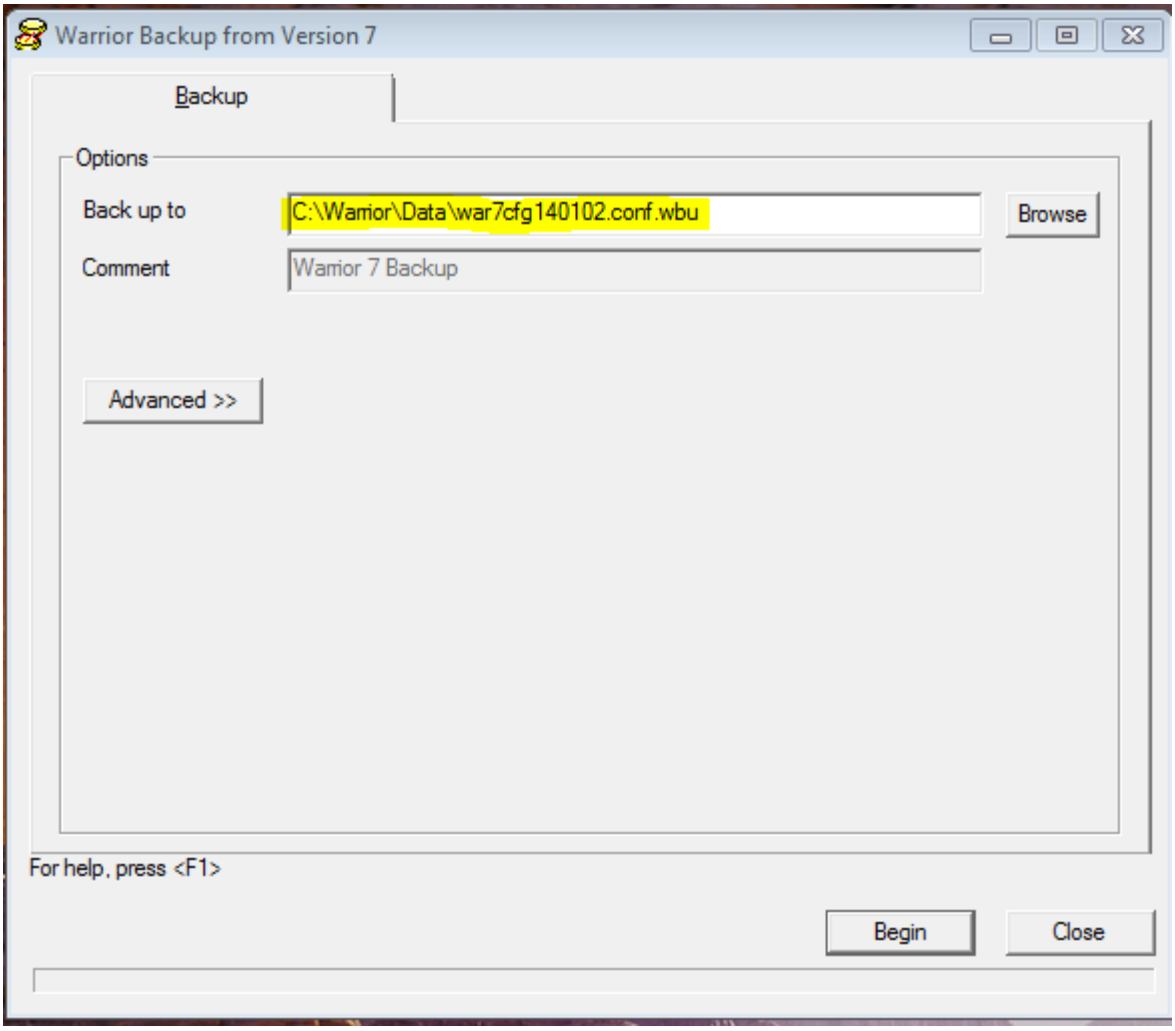


FIG: 24.2 Warrior 7 Backup for Warrior 8 Execution

Make a note of where the backup file will be saved so that you can browse to it later to install the generated backup or copy it to a USB drive to be installed on another computer.
The advanced button lets you modify which files to convert, this option is for the more experienced and is beyond the scope of this manual.
Once you click on begin the software will begin the backup process. You will receive a Backup completed status when finished.

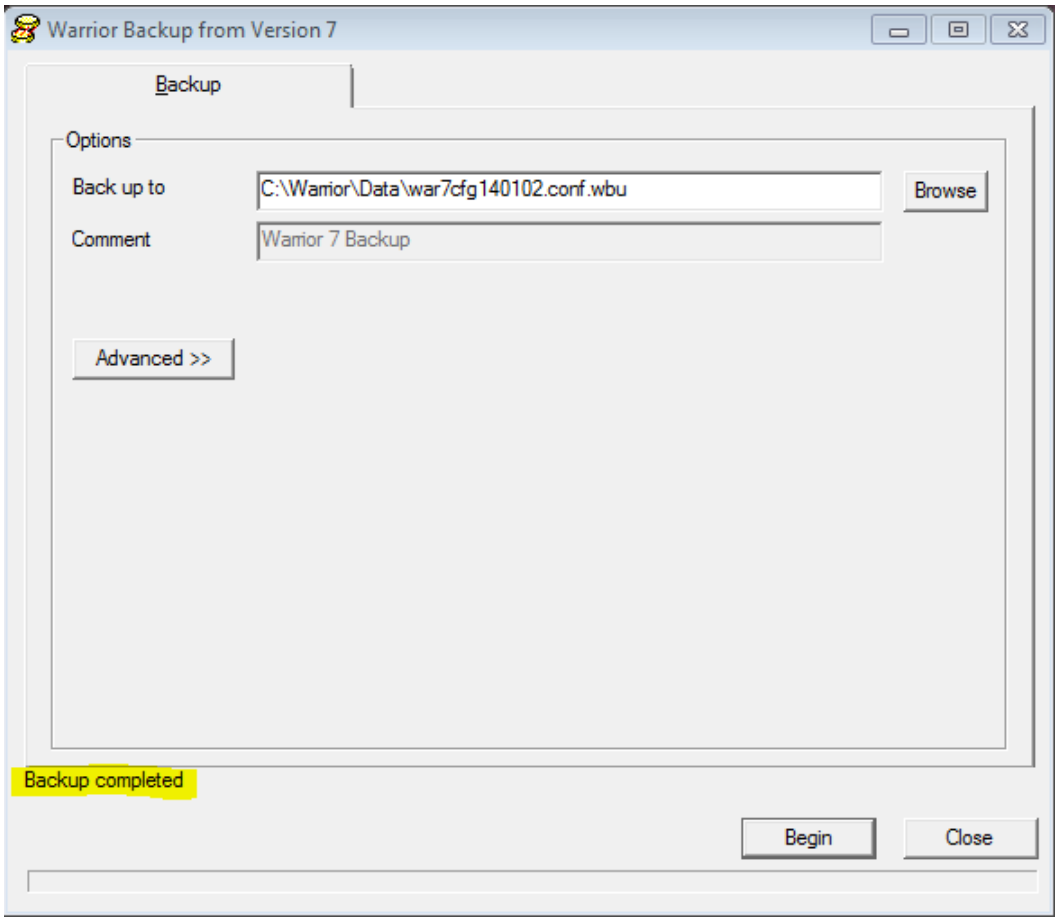


FIG: 24.3 Backup Completed

24.2 Importing WBU file

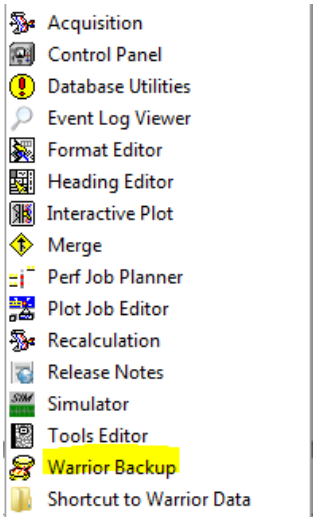


FIG: 24.4 Warrior Backup

Select Restore tab in Warrior Backup and the File created with the Warrior 7 Backup for Warrio8. Once selected " Examining" and a status bar will come up.

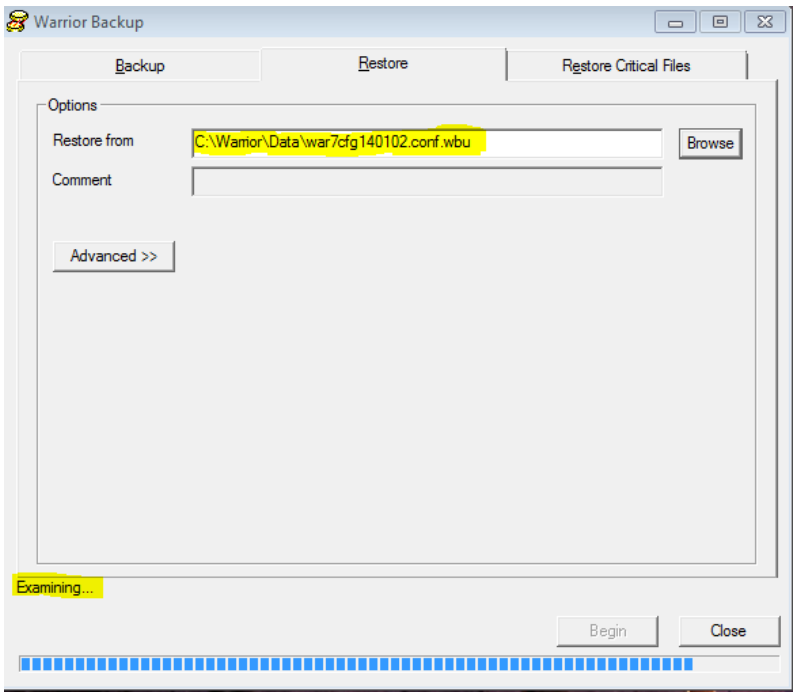


FIG: 24.5 Opening Backup

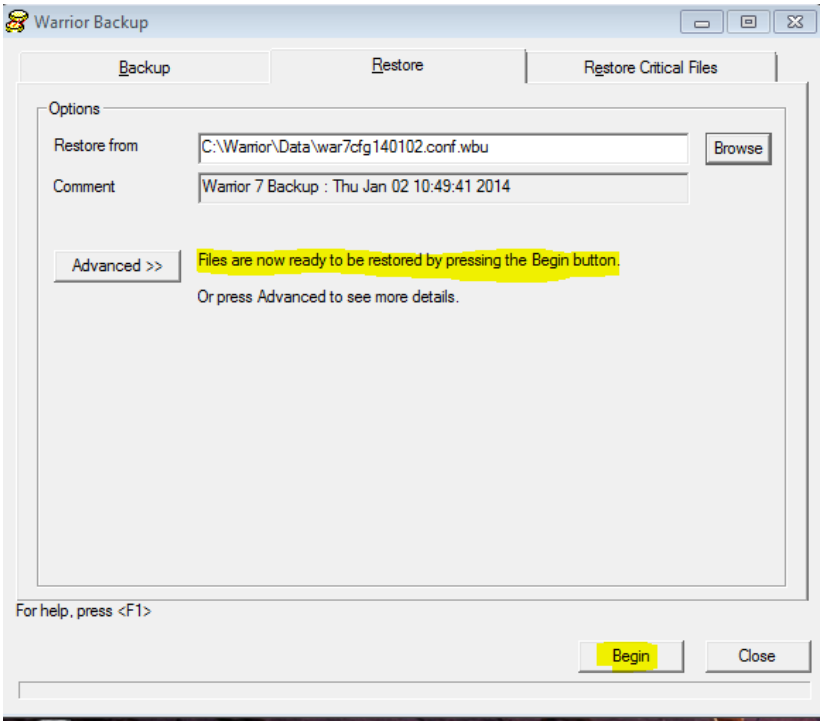


FIG: 24.6 Begin Restore

Once the Examining is complete click on the Begin button. This will cause a pop up asking you if you want to Restore configuration from Warrior 7 , click on yes

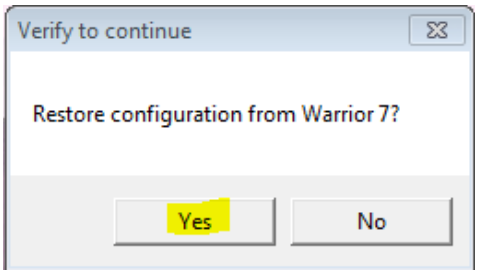


FIG: 24.7 Confirmation Pop Up

This will begin the restoration process that will end with a text status window.

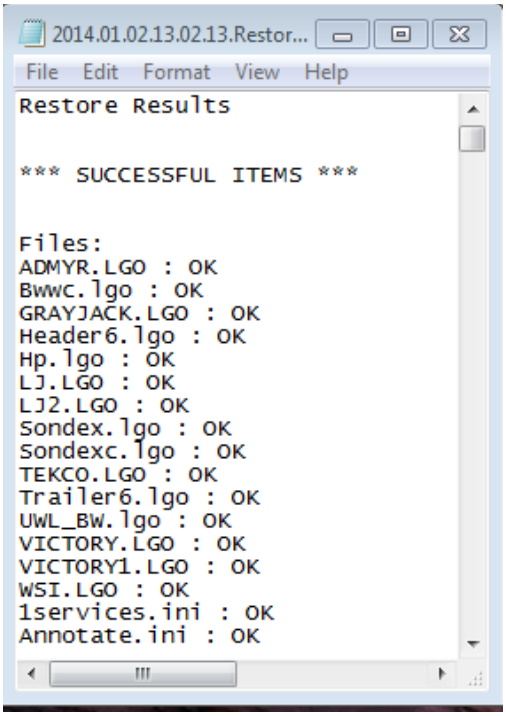


FIG: 24.8 Restore Results

This should complete your restoration; load acquisition and all your services and tools should be present.

24.3 Importing select Services from Warrior 7 Backup

You may wish to only import select services, this can be done from the same Warrior 7 backup for Warrior 8 “wbu” file. Go to Database Utilities and select “ Edit Logging Service Details “.

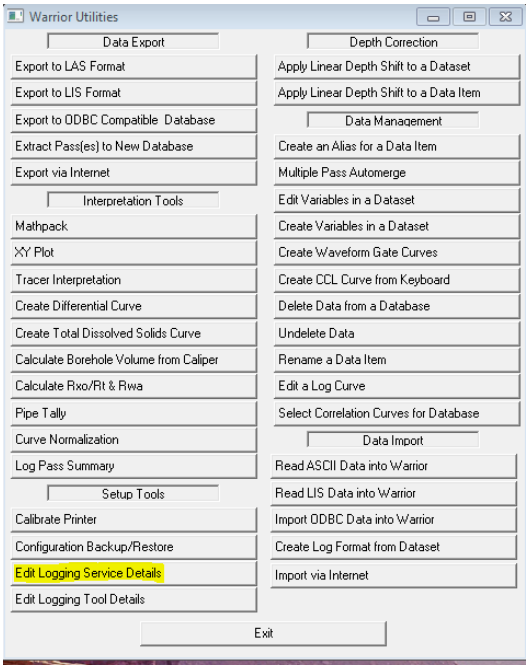


FIG: 24.9 Edit Logging Service Details

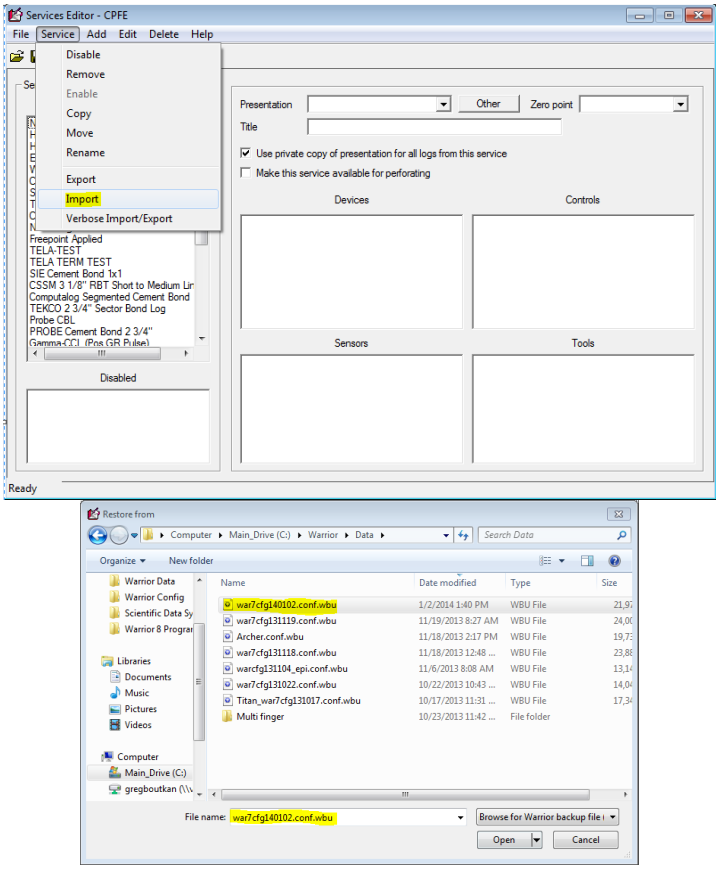


FIG: 24.10 Browse to WBU file

This will open a dialog that will allow you to select one or more services to import, by holding the control key and right clicking with your mouse.

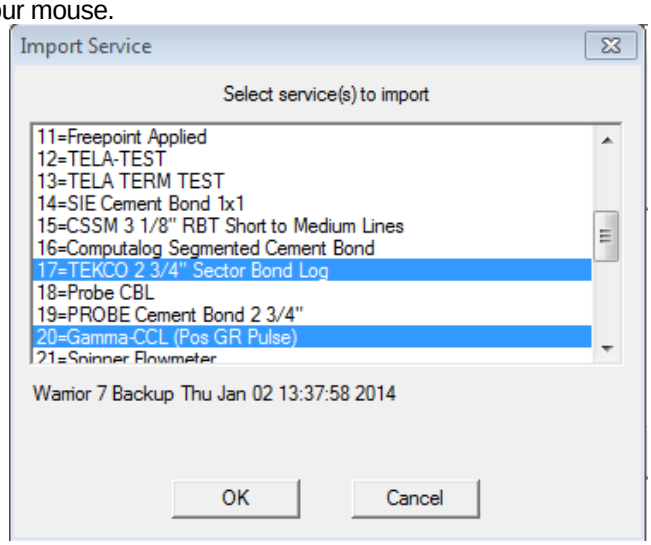


FIG: 24.11 Selecting services

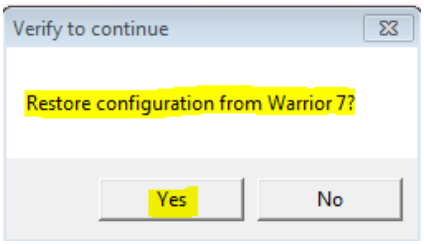


FIG: 24.12 Confirmation Dialog

You will then be prompted to select or de-select specific tool serial numbers.

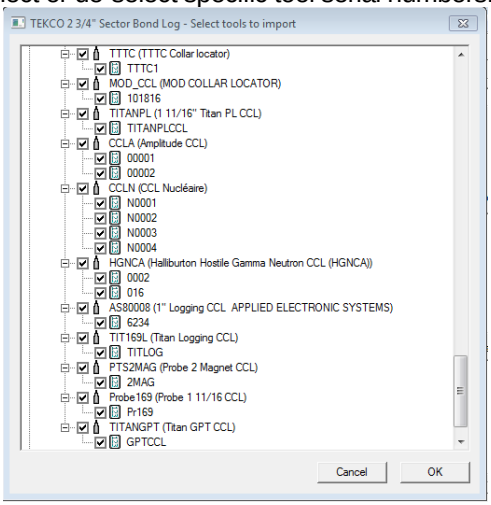


FIG: 24.13 Serial number Selection

At this point the service and selected serial numbers will be imported with a confirmation text window.

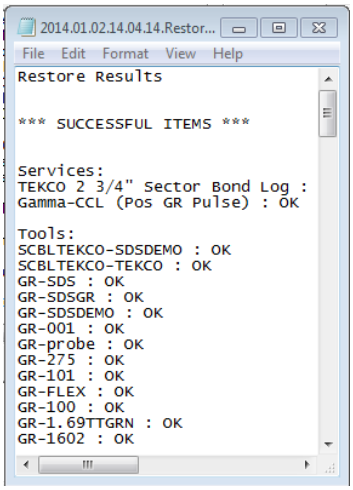


FIG: 24.14 Status Text Box

If the service or any of the serial numbers already exist, you will be given a confirmation window to confirm overwriting the existing file.

24.4 Importing select Serial numbers from Warrior 7 Backup

You also have the option of importing specific tool serial; numbers from the Warrior 7 backup for Warrior 8 “wbu” file. Go to Database Utilities and sellect Edit Logging Tool Details.

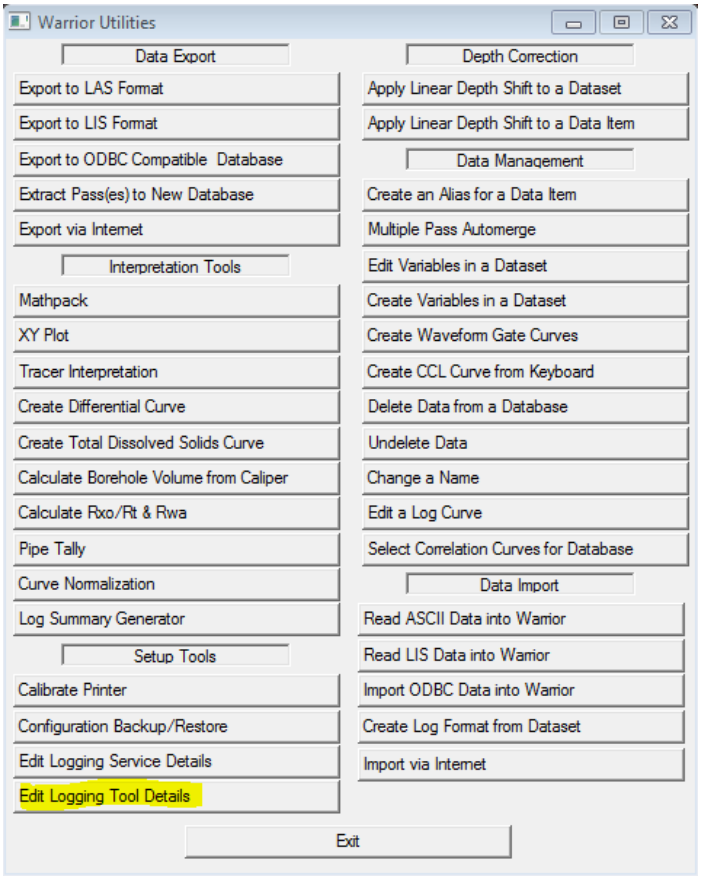


FIG: 24.15 Edit Logging Tools Details

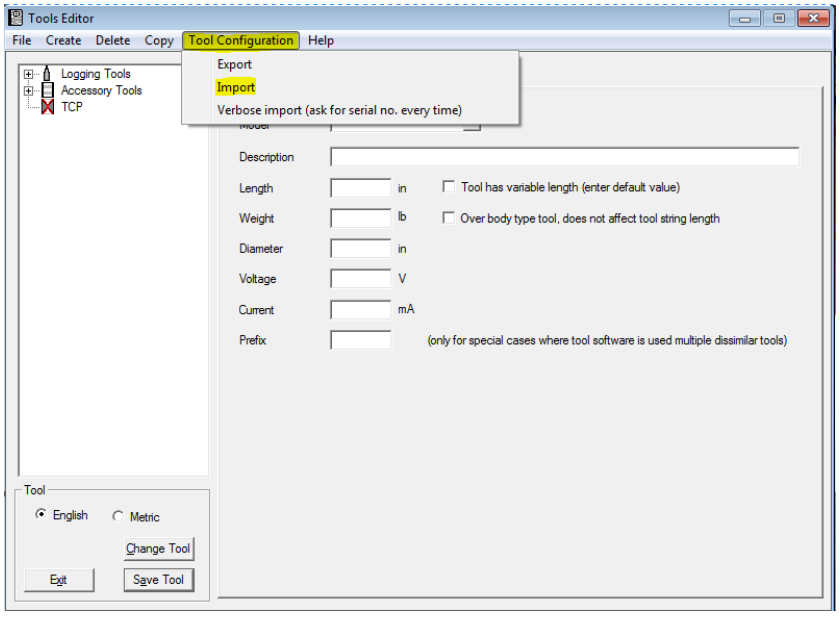


FIG: 24.16 Importing Tool

Select the “Tool Configuration” tab and from the pulldown select Import.

Browse to the Warrior 7 Backup for Warrior 8"wbu" file and select it. This will bring a a tool import window , here you can sellect a tool type and specific serial numbers.

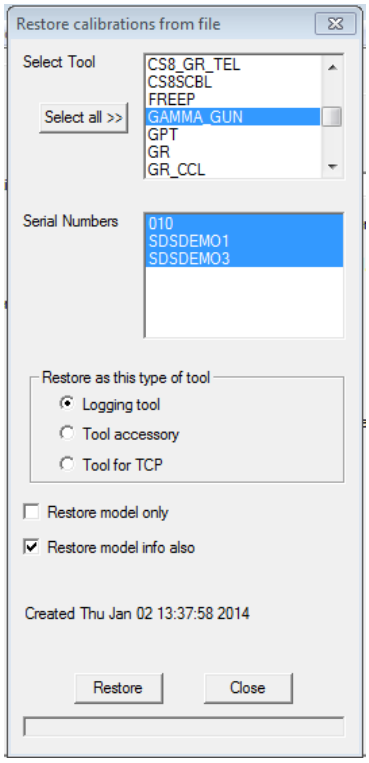


FIG: 24.17 Tool and Serial number selection

Once you have selected the desired Tool and serial numbers click on Restore. This will bring up a confirmation dialog click on OK. If the tool and serial numbers do not exist on the system you will be given a confirmation message in the status window.

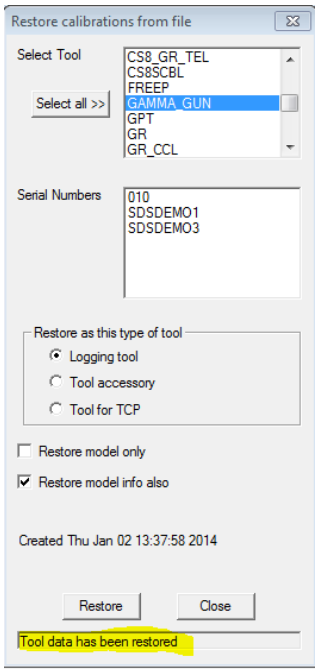


FIG: 24.18 Restore Confirmation

If either the tool or specific serial numbers were already present, you will be give an overwrite confirmation for each.

24.5 Identifying a CBL Service

Before using the Warrior 7 Backup for Warrior 8 you should confirm that your Bond services are configured to use SCBL as opposed to CBL instruments. Go to Database Utilities and select Edit Logging Tool Details.

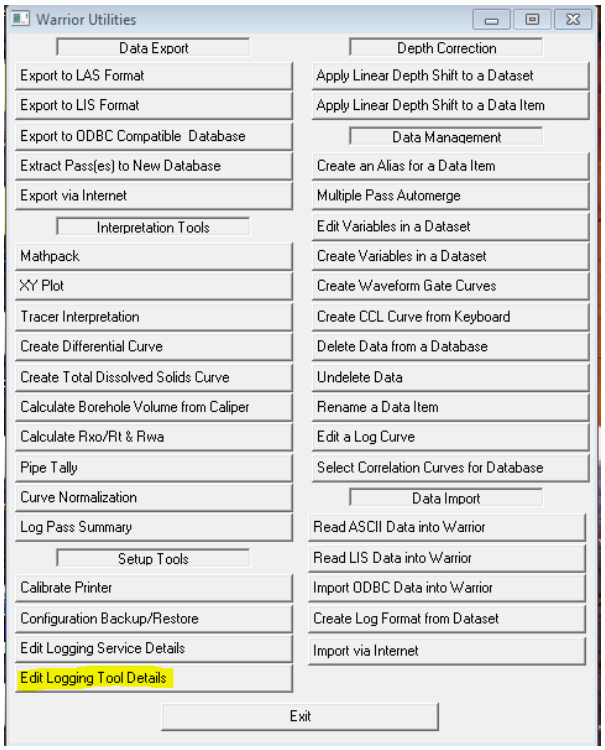


FIG: 24.19 Edit Logging Tool Details

Browse to your Bond tool Serial number, highlight it and click on the software tab. If under Software in this Tool string it has CBL contact Scientific Data System for instruction on the most effective way to convert you service prior to running Warrior 7 Backup for Warrior 8.

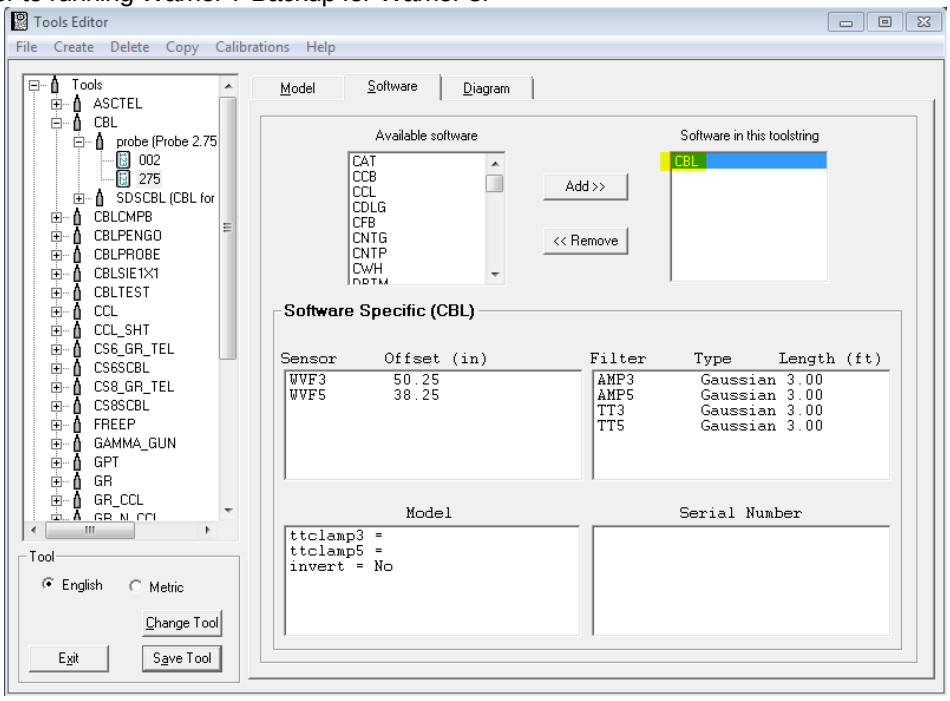


FIG: 24.20 CBL Service

Section

25

25 Spartek Tools

25.1 Tool Editor Setup

In the Warrior Utilities, Edit Logging Tool Details check to see if the default (sample) Spartek logging tools are present. SPTK-BULLPLUG, SPTK-CCL, SPTK-CENT, SPTK-FULLBORE, SPTK-GRCCL, SPTK-MAST, SPTK-PTC, SPTK-SPIN, SPTK-TEMPPRES, SPTK-TPCD.

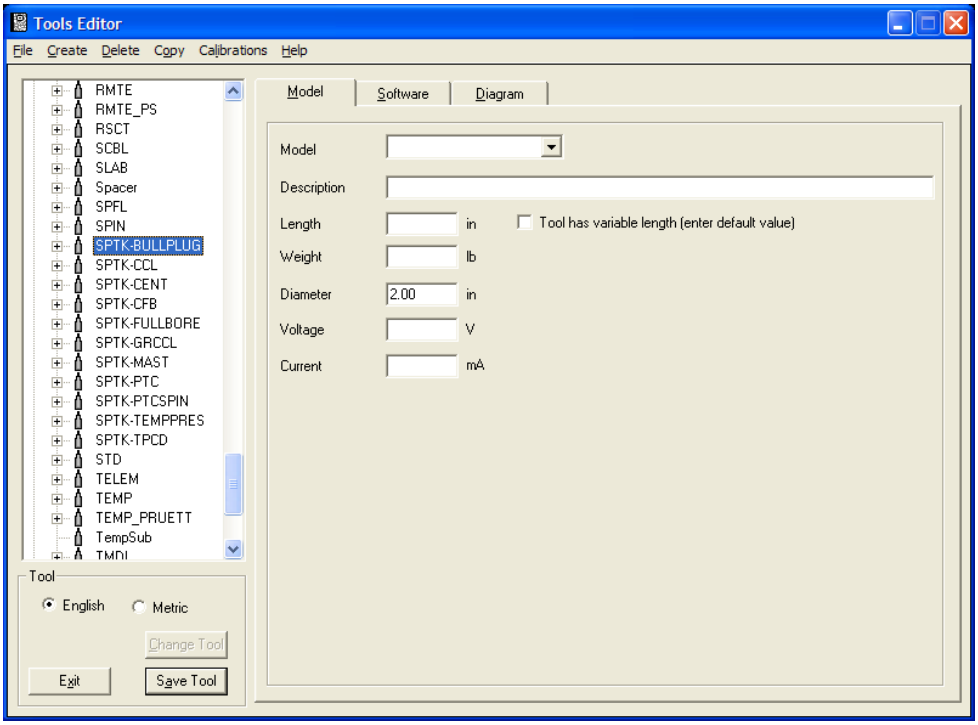


FIG: 25.1 Tools Editor

If these tools are not present use the Calibrations->Restore feature to either restore the sample tools from "**CH USB 70.wcf**" or "**SpartekPL.wcf**".
There are also some "external" calibration files needed to correctly configure some of the tools, these are the pressure and temperature quartzdine format .cff and .cft files. These will be provided by Spartek, but sample files are included in our release and in the file "**SpartekCals.zip**". These files need to be in the "**Warrior\Config**" directory.
Special care needs to be taken when creating a new Spartek tool in the Warrior system when basing it on an existing example tool. The Spartek tools communicate their types and serial numbers via telemetry to the system, and likewise the tools are set up in Warrior to convey their types and serial numbers to the telemetry handling device (the DSP inside the panel). Each tool will be examined in turn to demonstrate where the type and serial information is stored to be passed on to the telemetry

25.1.1 SPTK-BULLPLUG

Well, the first one on the list is an exception to the rule, no ID or type; this tool can be copied again as necessary without any special steps.

25.1.2 SPTK-CCL

In the example screenshot the field in the Software, Serial section termed "**TelID**" needs to be filled correctly, this tool, serial number **L00121**, has the **TelID** field set to "**ccl@121**", this is type@serial and the format follows through the tool family. Note that the "L00" has been stripped off, this is because the tools identify themselves in telemetry in the same manner, only the numerical part of the serial number is used. This field will need to check and filled when creating new tools.

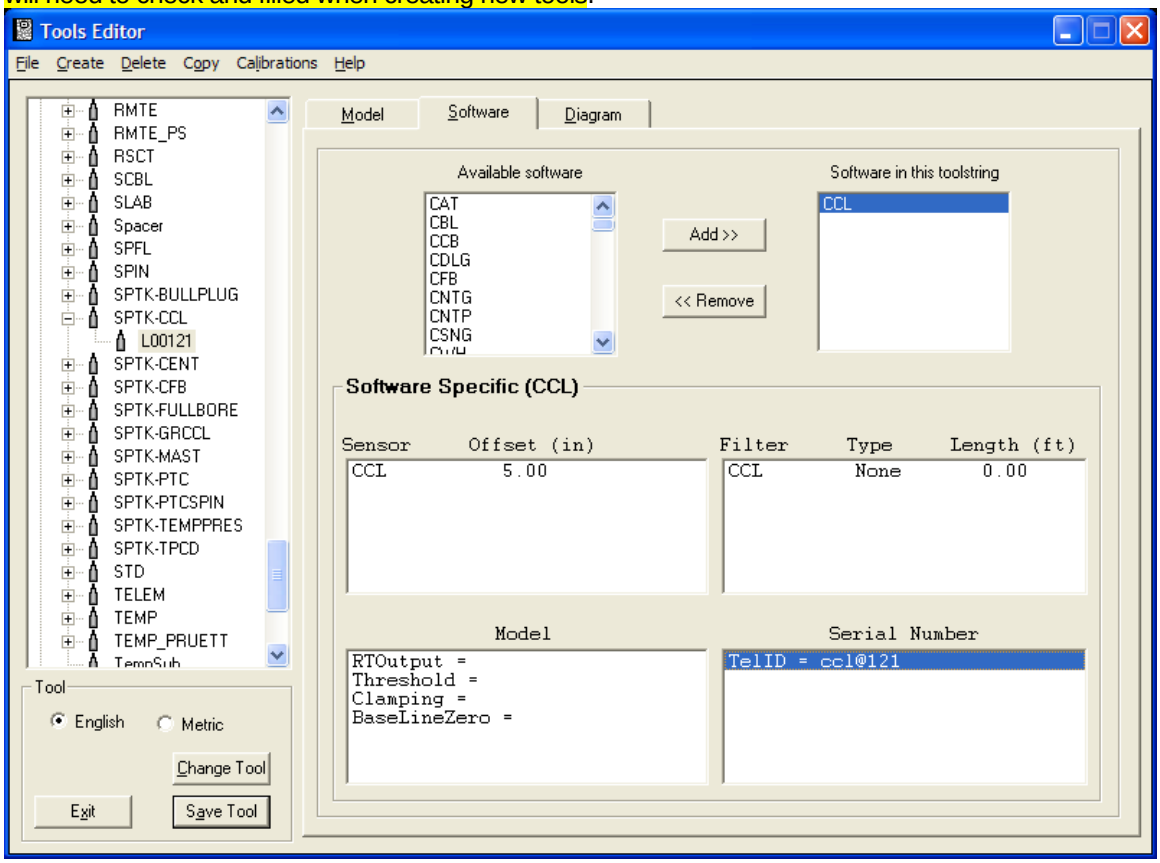


FIG: 25.2 CCL Tool

The centralizer does identify itself in the tool string so appropriately there is the need for it to have the correct TelID setup. In the first screen shot the software section of the tool serial L00318 is shown having a

25.1.3 SPTK-CENT

Sensor called “IDOnly”, double clicking on this brings up a second screen where the field “Telemetry ID” is filled in with “cent@318”. This field will need to be checked and filled in correctly for new tools created in the system.

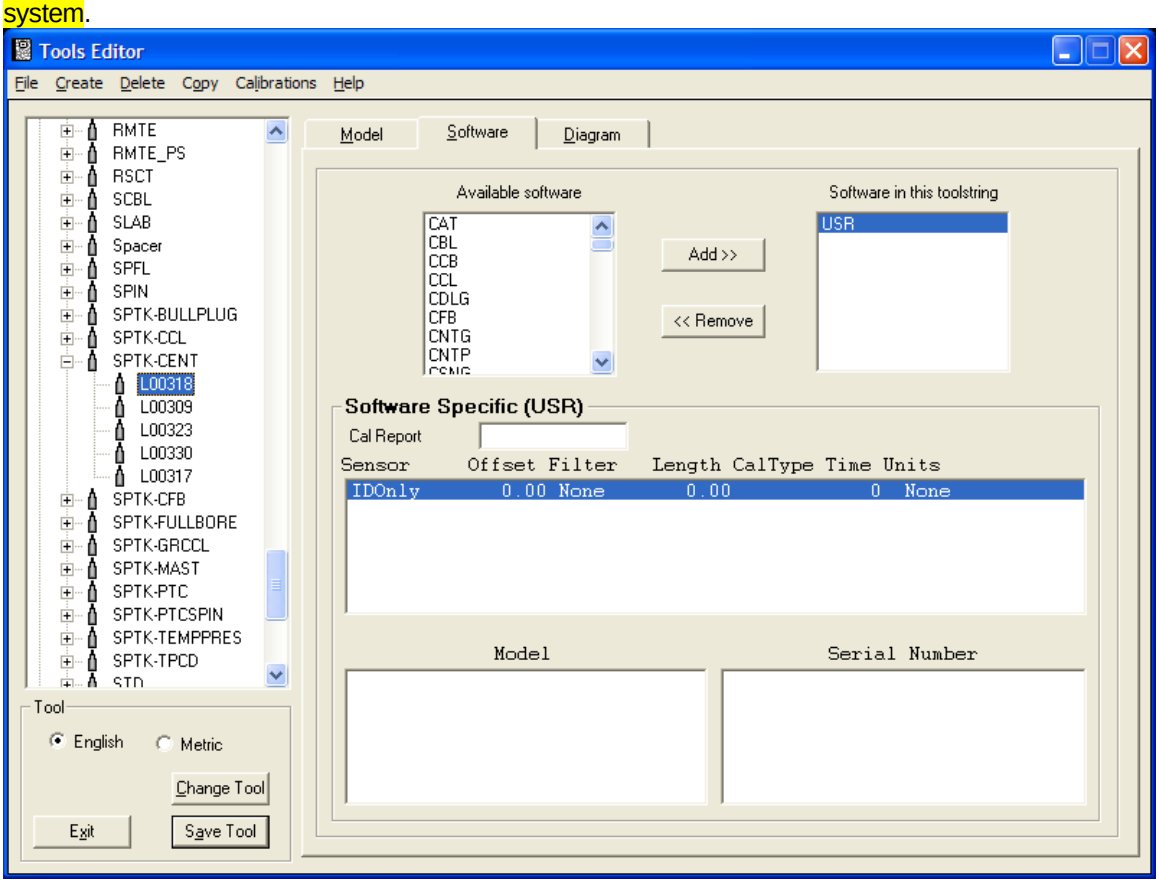


FIG: 25.3 CENT Tool

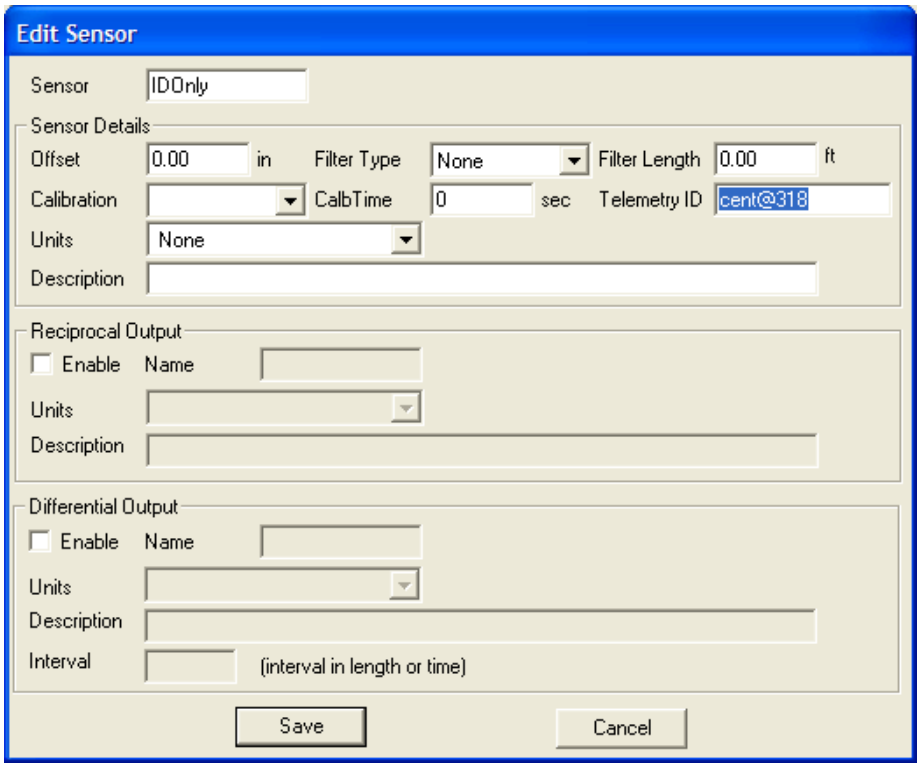


FIG: 25.4 CENT Sensor

25.1.4 SPTK-CFB

This tool type takes care of the 1-3/8" caged spinner tools. The example shown with tool serial "L00264" shows the TelID field in the Software screen, Serial Section, filled with "cfb@264" appropriately. This field will need to check and filled when creating new tools.

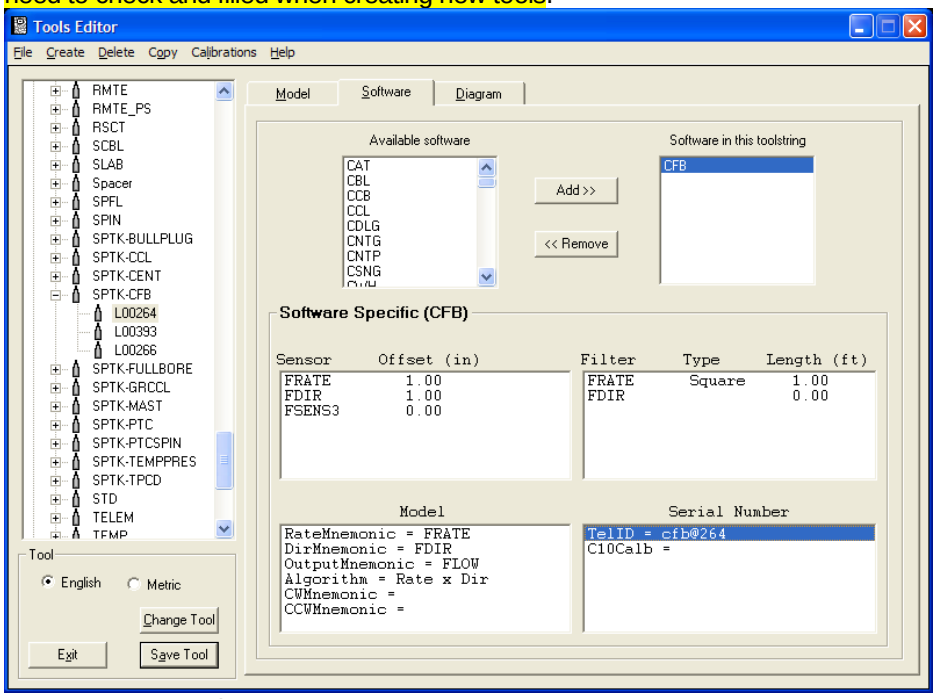


FIG: 25.5 CFB Tool

25.1.5 SPTK-FULLBORE

This tool takes care of the 1-3/8 folding flow meter. It is setup in the same manner as the **SPTK-CFB** as seen in the following screenshot, the "**TelID**" uses the same "**type**" being "**cfb**" as before. This field will need to be checked and filled when creating new tools.

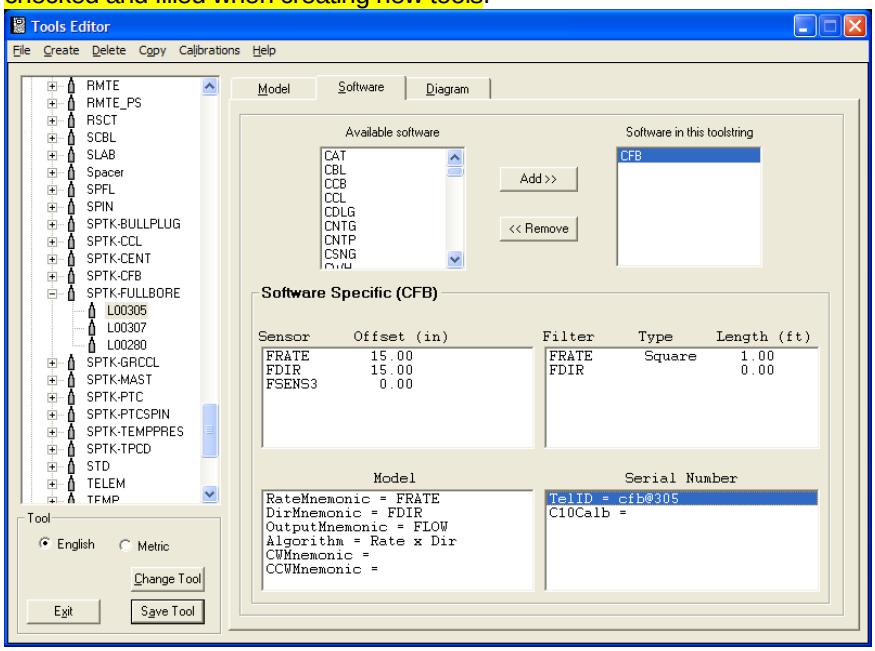


FIG: 25.6 CFB Tool

25.1.6 SPTK-GRCCL

The setup for this tool is slightly different as for the spinner tools as the tool incorporates two software modules combined to represent the tool in its single housing, being the CCL and GR. The "**TelID**" information only must be present in one part of the tool information, we have chosen to use the CCL screen as this is the default when looking at the tool information and creating the new copies of the tool. In the screen shot below for example tool "**L00043**" the "**TelID**" is "**grccl@43**". This field will need to be checked and filled when creating new tools. If you click on the "**GR**" in the "**Software in this tool string**" box you will see the GR setup and note that intentionally the "**TelID**" field is left blank, this does not have to be filled in as the CCL software is communicating to the telemetry that the tool is present.

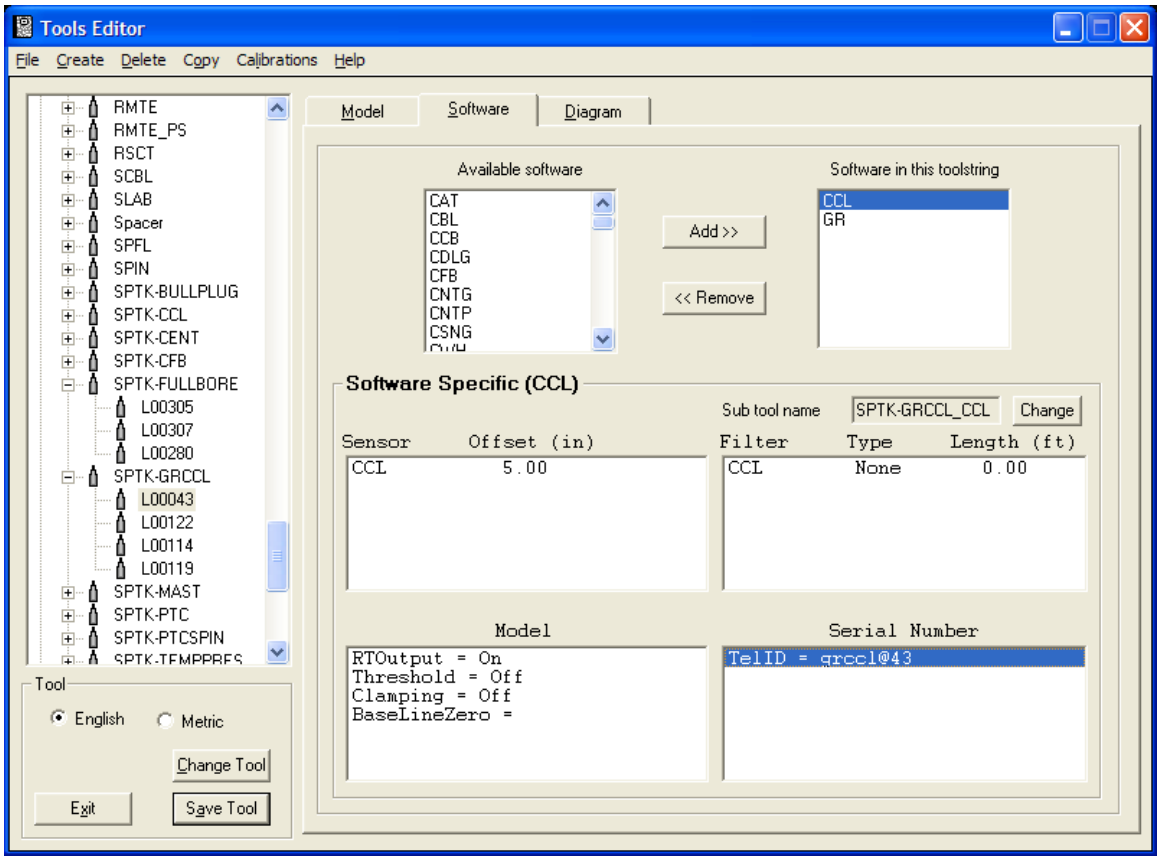


FIG: 25.7 GRCCL Tool

25.1.7 SPTK-MAST

This takes care of both the 1" and 1-3/8" telemetry master tools. There is one example of the 1" tool, serial "**L00020**" and several examples of the 1-3/8" tools, such as "**L00041**". Care must be taken when copying one of these tools to create a new one in the system that the correct model type is selected, this is in the "**Model**" tab-screen of the tool in the Tools Editor. The SPTK-MAST tools have three sensors, double clicking on any sensor will bring up its set-up screen. As each sensor can have a "**Telemetry ID**" but we only need one to convey the tool type and identity to the telemetry we have chosen to set this up with the "**CHV**" sensor. Care must be taken to check and fill in this field when copying these tools.

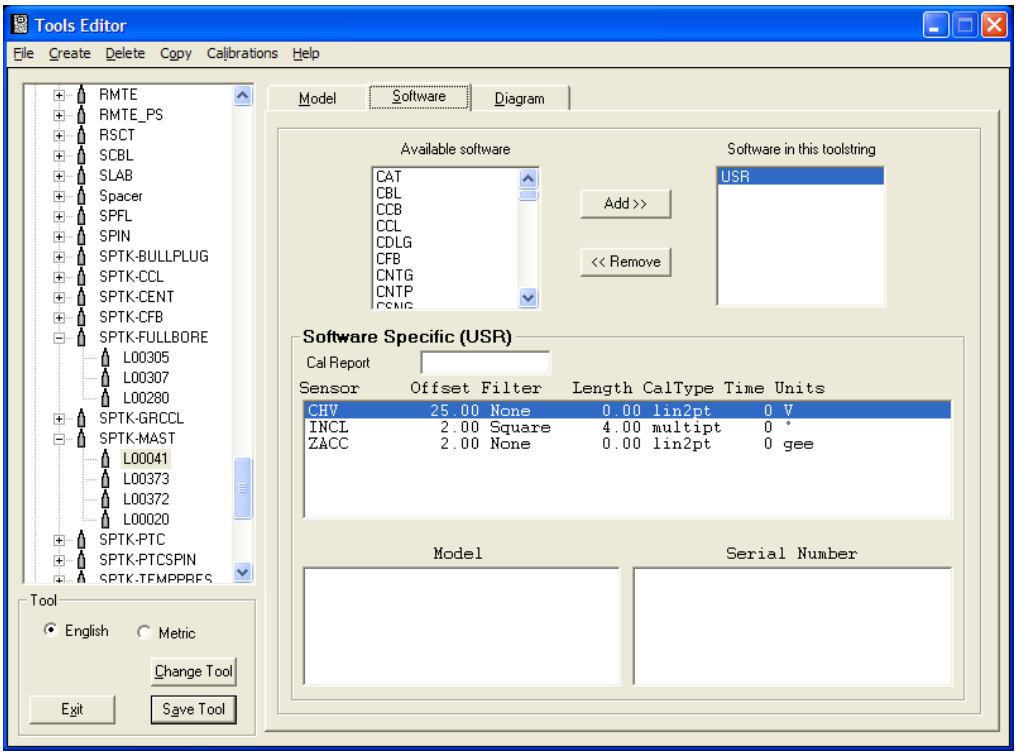


FIG: 25.8 MAST Tool

In this example the "**Telemetry ID**" is "**mast@41**", the same type "**mast**" is used for both 1" and 1-3/8" tools.

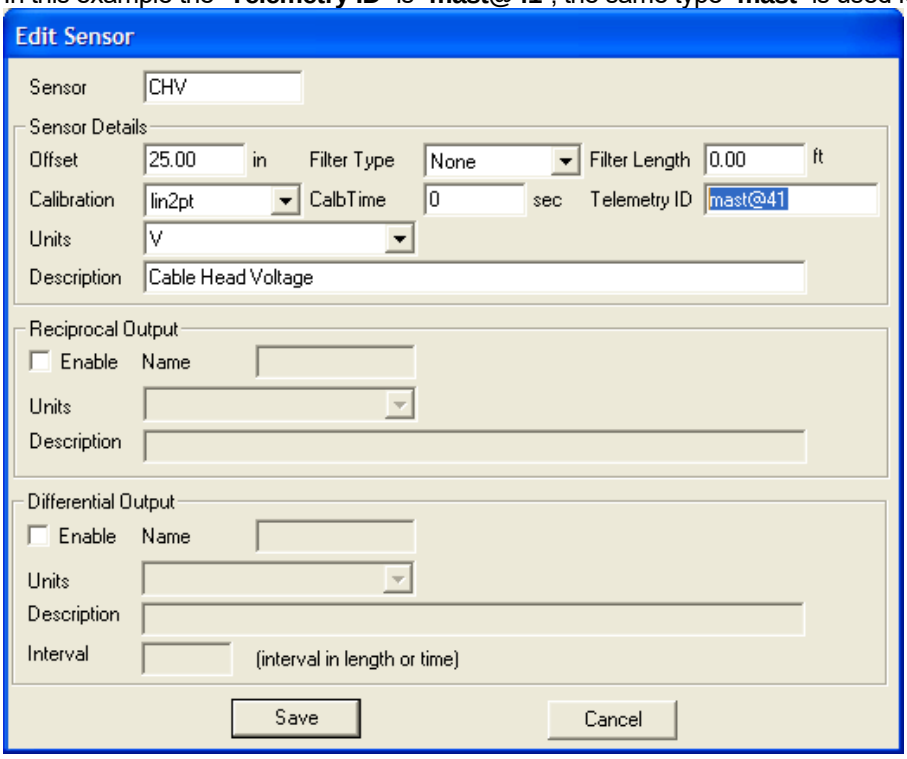


FIG: 25.9 Edit sensor

Calibration values for the INCL and ZACC must be provided by Spartek and are hand-entered in the software using Acquisition->Edit->Calibrations and selecting the appropriate output. For example, with the INCL (inclinometer):

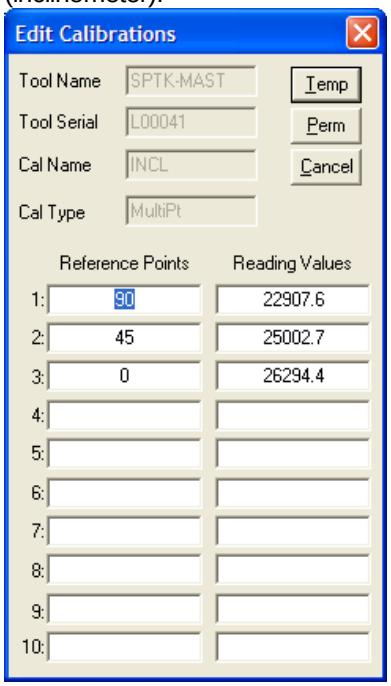


FIG: 25.10 Edit Calibration

25.1.8 SPTK-PTC

This tool is another composite of several tool software modules using **CWH** (Capacitance) and **PRESTEMP** (Pressure/temperature) software. The example tool "**L00026**" sets up the "**TelID**" in the **CWH** page as seen in the screen shot, "**ptc@26**". Care must be taken to check and fill in this field when copying these tools. The CWH calibration is hand entered similarly to the INCL mentioned above, via Acquisition->Edit->Calibrations and selecting the "**CWH**" from the list. Currently Warrior software is supporting this with 10 calibration multi-points (provided by Spartek), this may change in the future converting to a curve-fit type calibration that can handle more points. Clicking on the "**PRESTEMP**" line on the "**Software in tool string**" box will bring us to the pressure/temperature setup. There are three sensors here, **PTCP**, **PTCT** and **PTCTEMP**. All of them need correct configuration when setting up a new tool. Double clicking on a sensor will take you to the sensor setup screen and importantly the "**Gauge Serial No.**" of each sensor needs to be filled correctly. These fields relate directly to the external calibration files (provided by Spartek) for the tool. Each prestemp sensor has a calibration file. The file name is the composite of the serial number and the sensor channel, for example for tool "**L00026**" the pressure calibration name is "**L00026-01303**", software automatically assigns the file extension (**.cff** or **.cft**) by gauge type (pressure or temperature). These fields must be correctly configured for each sensor and each tool.

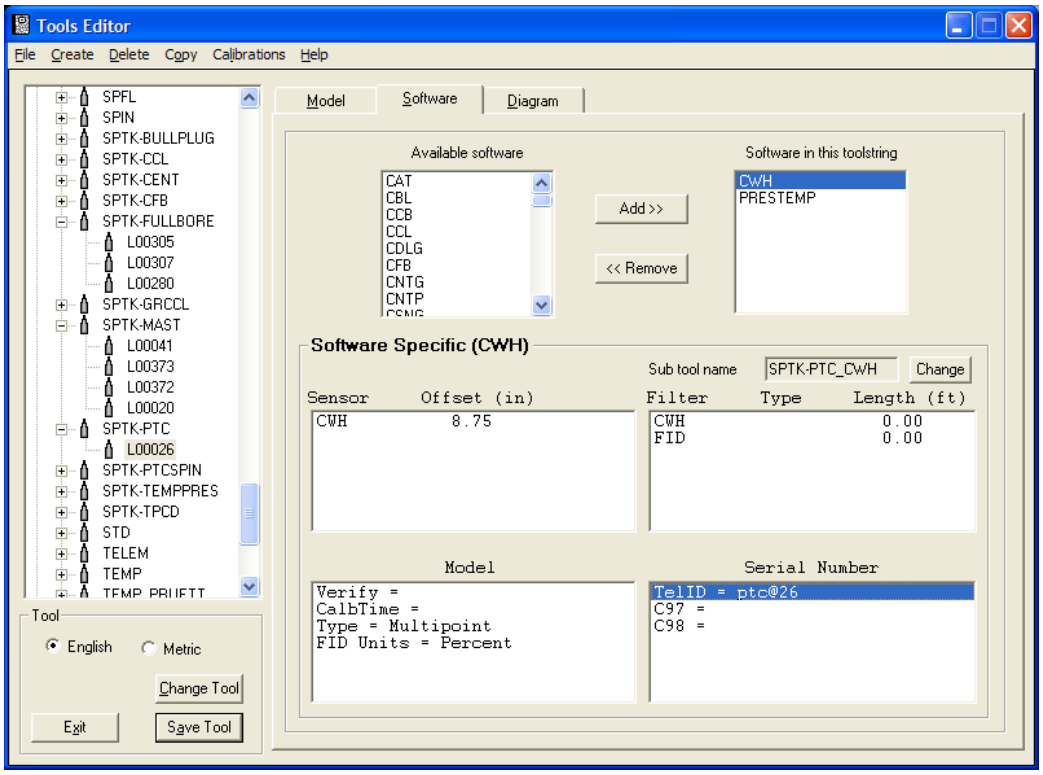


FIG: 25.11 Tools Editor

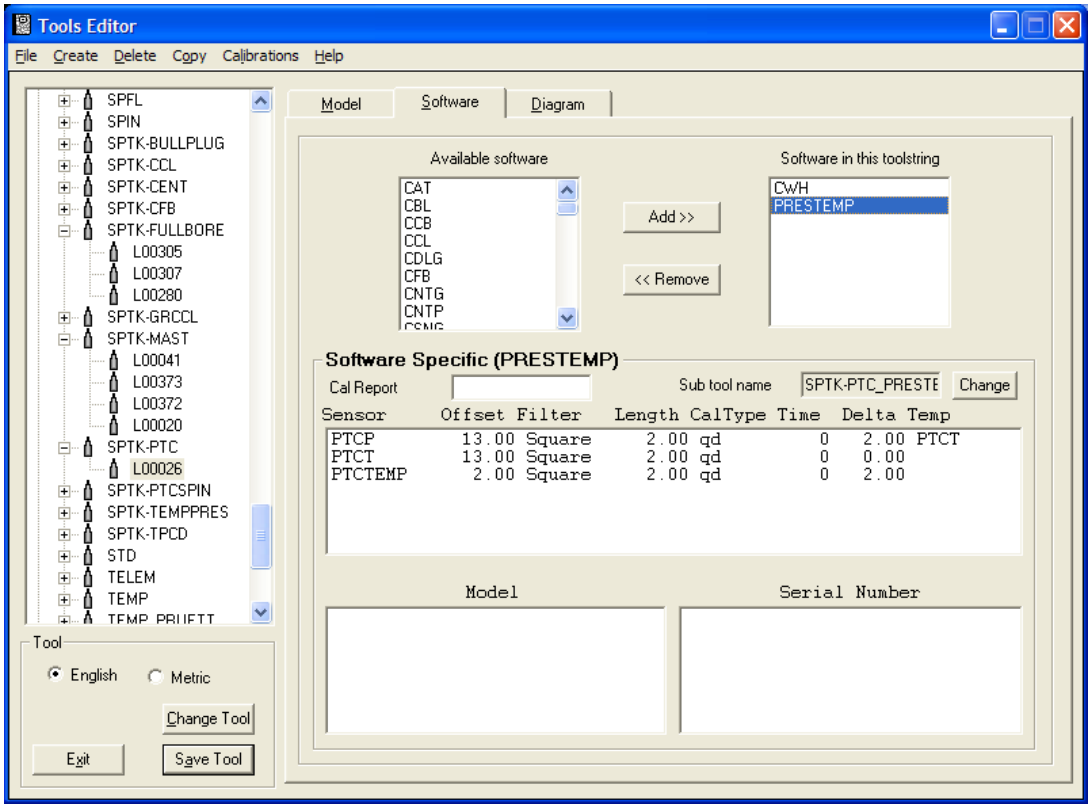


FIG: 25.12 Tools Editor

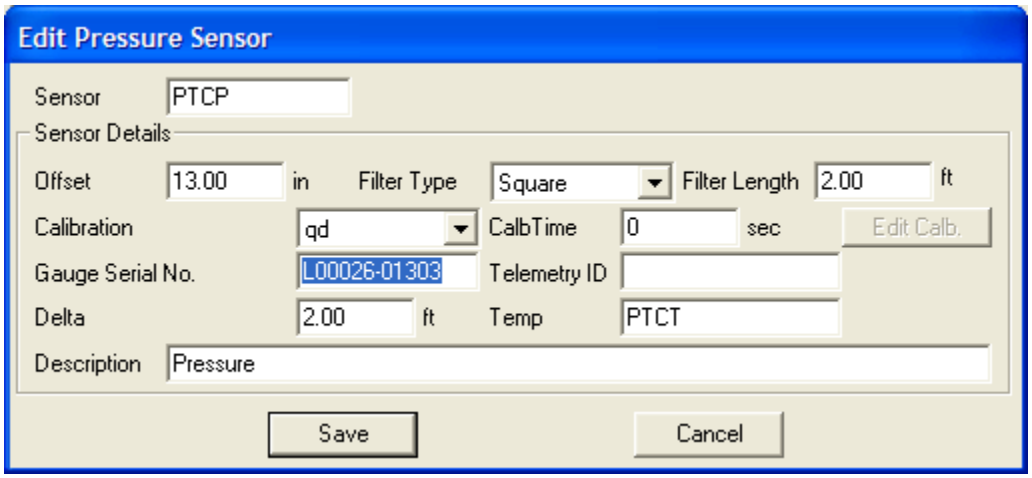


FIG: 25.13 Edit Pressure sensor

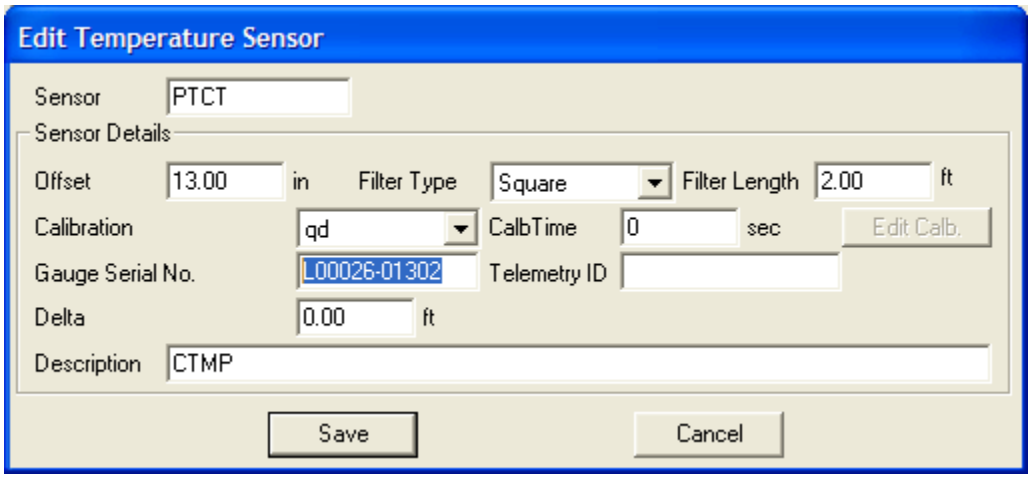


FIG: 25.14 Edit Temperature sensor

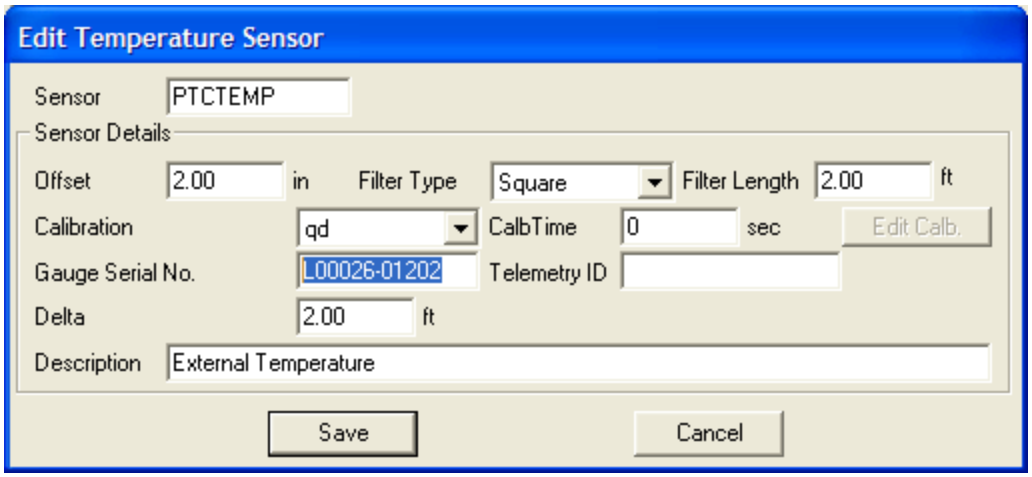


FIG: 25.15 Edit External Temperature Sensor

25.1.9 SPTK-SPIN

This is for the 1" spinner that is optionally run on the **PTC**. Setup is very similar to the **SPTK-CFB** except that the "**TelID**" has a different identifier, for the example tool "**L00026**" the "**TelID**" is "**spin@26**".

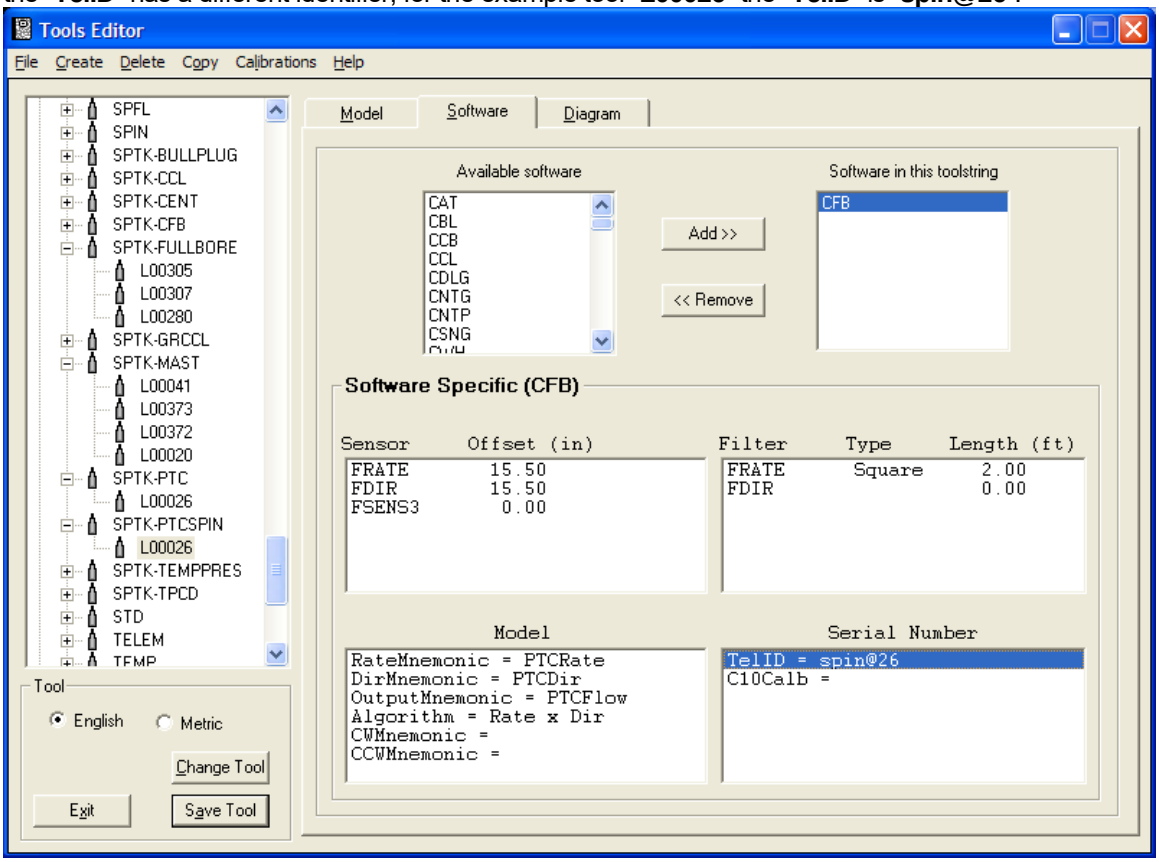


FIG: 25.16 Tools editor Spin

25.1.10 SPTK-TEMPPRES

This tool is the combined 1-3/8" Temperature/Pressure. Setup is like the **PTC** Prestemp software section. Each sensor must have the correct "**Gauge Serial No.**" entry to identify the calibration file. The "**Telemetry ID**" is entered only in the "**TPP**" sensor setup as shown in the screen shots below. The example tool is serial "**L00022**" and the "**Telemetry ID**" is "**tp@22**". Each sensor must have the calibration file info entered as before in the **PTC** example and as demonstrated below. These fields must be correctly configured for each sensor and each tool. The external calibration files will be provided by Spartek and copied to the Warrior\Config directory as before.

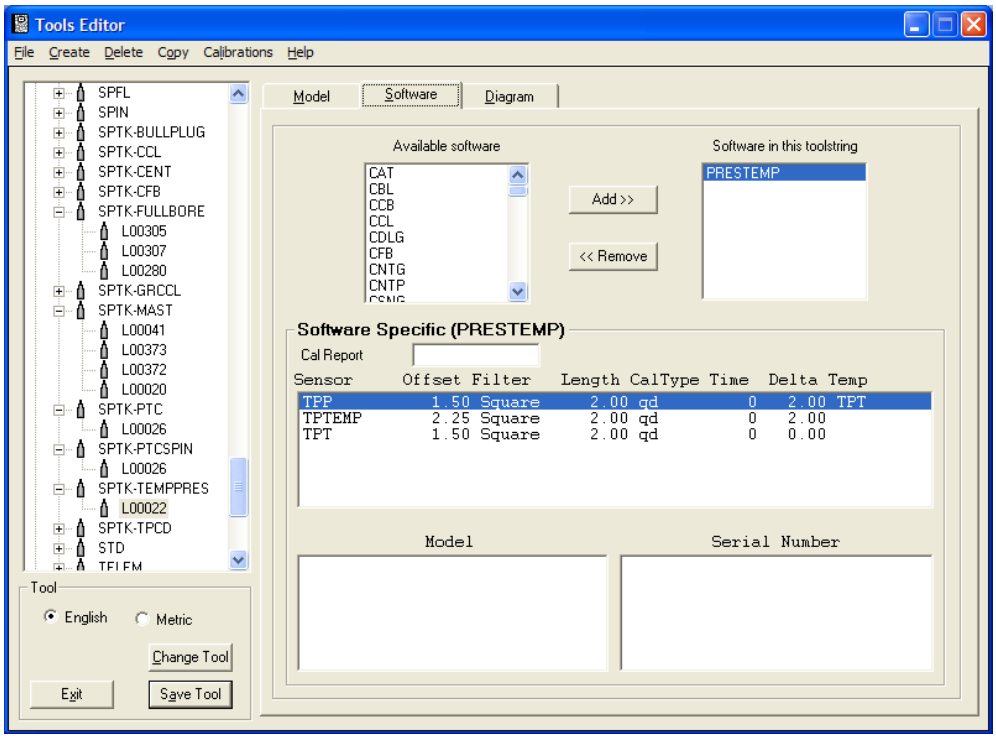


FIG: 25.17 Tools editor PresTemp

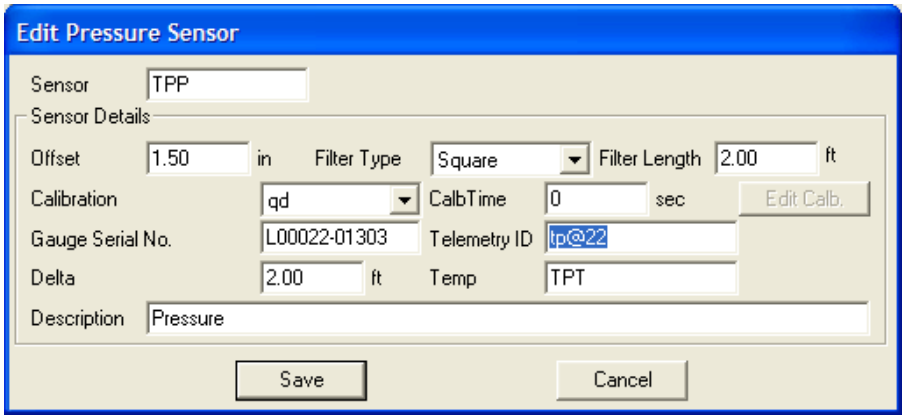


FIG: 25.18 Edit Pressure sensor

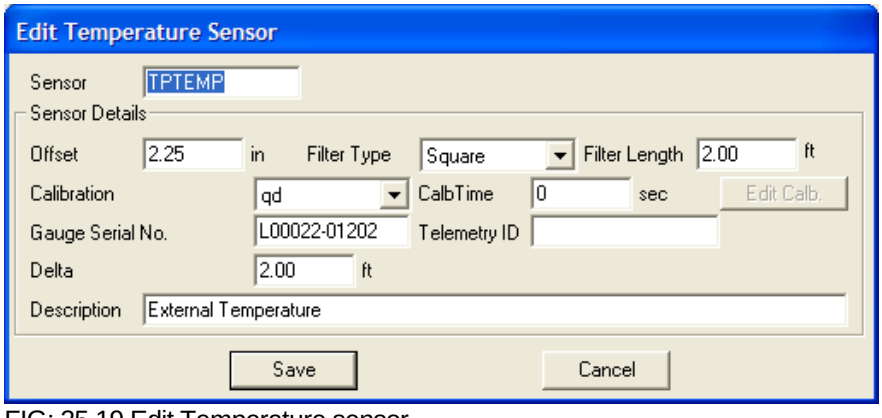


FIG: 25.19 Edit Temperature sensor

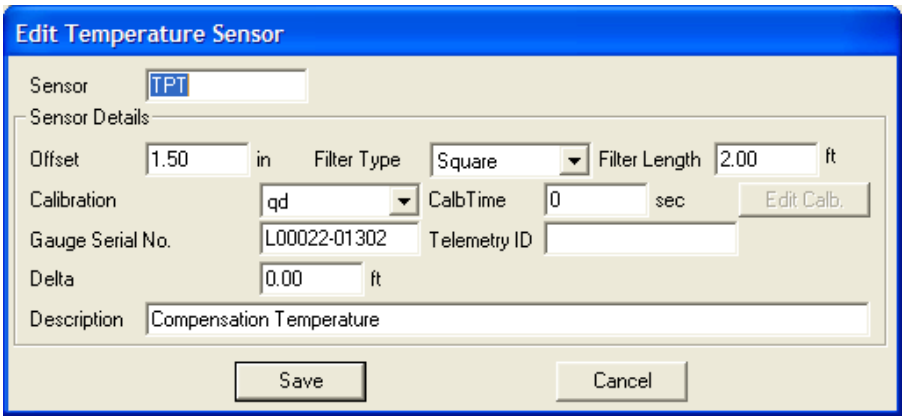


FIG: 25.20 Edit Compensation Temperature sensor

25.1.11 SPTK-TPCD

This is set up for the 1-3/8" TPCD tool with dual pressure, external temperature and capacitance. It comprises three software modules, CWH, PRESTEMP and GRADIO. GRADIO is purely a calculation module that uses pressure or delta pressure outputs together with the INCL output of the **SPTK-MAST** to calculate fluid density. Setup is the same as for the **SPTK-PTC** and this can be used as a reference with the exception shown in the "**TelID**" type being "**tpcd**", so for example tool "**L00051**" the "**TelID**" is set up as "**tpcd@51**" as seen in the CWH screen shot below. There are 5 Prestemp sensors to be configured correctly as seen in the example and this will need 5 corresponding external calibration files from Spartek copied to the \Warrior\Config directory. The sensors are **PRESU**, **PRESL**, **TEMP**, **TEMPU** and **TEMPL**.

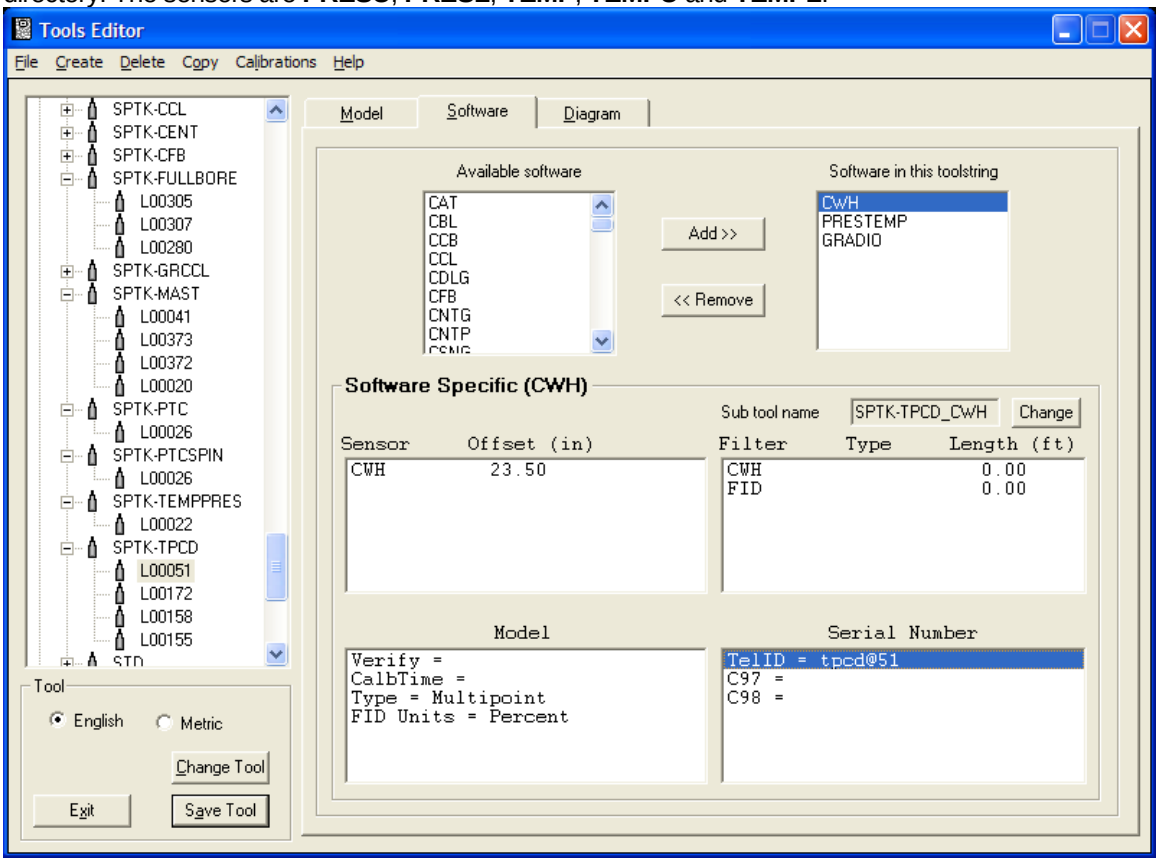


FIG: 25.21 Tools Editor TPCD

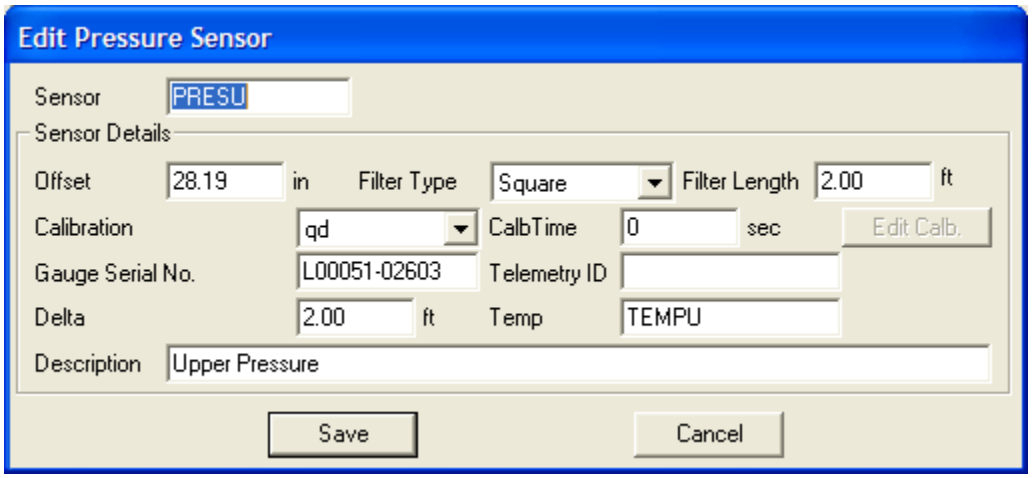


FIG: 25.22 Edit Pressure sensor

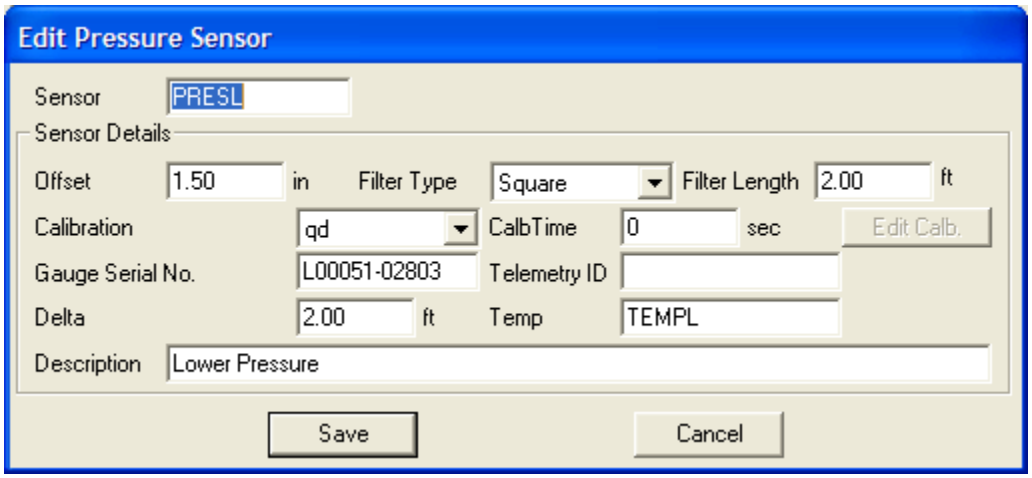


FIG: 25.23 Edit Pressure sensor

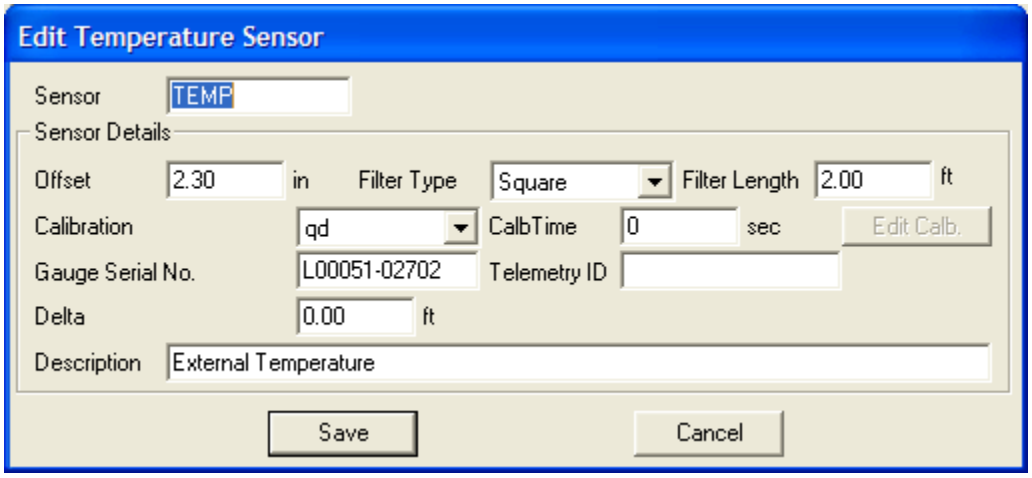


FIG: 25.248 Edit Temperature sensor

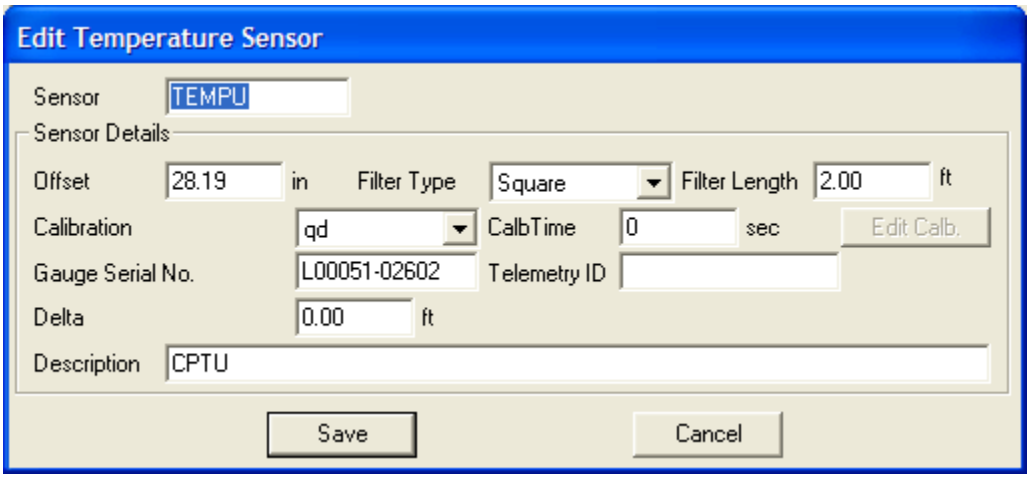


FIG: 25.25 Edit Temperature sensor

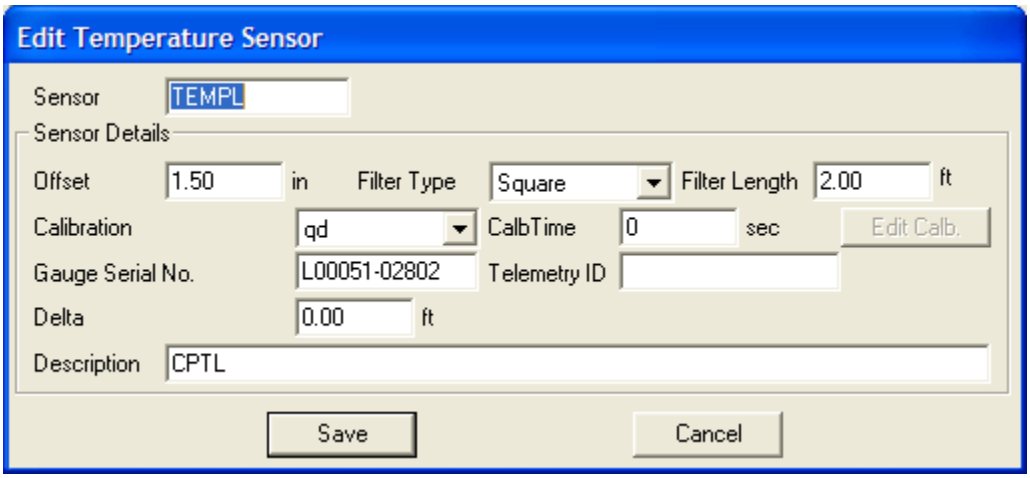


FIG: 25.26 Edit Temperature sensor

25.2 Acquisition

When selecting the Spartek service you will first need to configure the Tool String in the Tool String Editor:

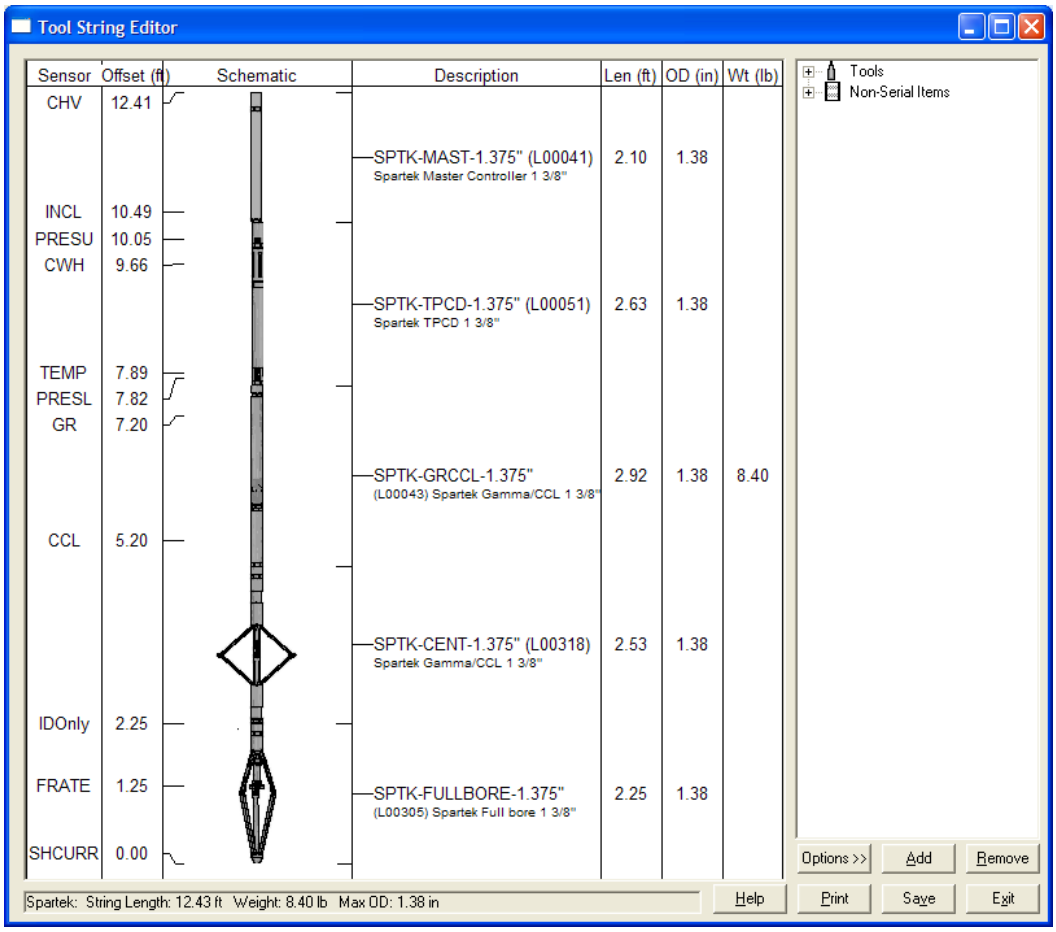


FIG: 25.27 Tool String

Once this is set up how you want to run the tools press Save.
The normal acquisition windows will now appear and will include the Spartek Telemetry monitor, and the TEL Threshold screen. This is how they will appear before tool power is applied:

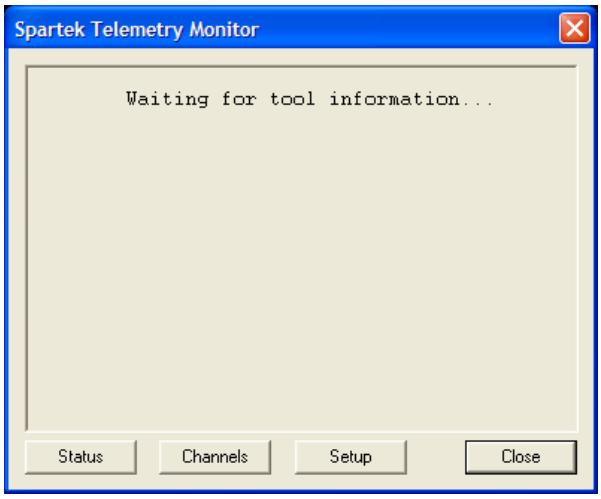


FIG: 25.28 Telemetry Monitor

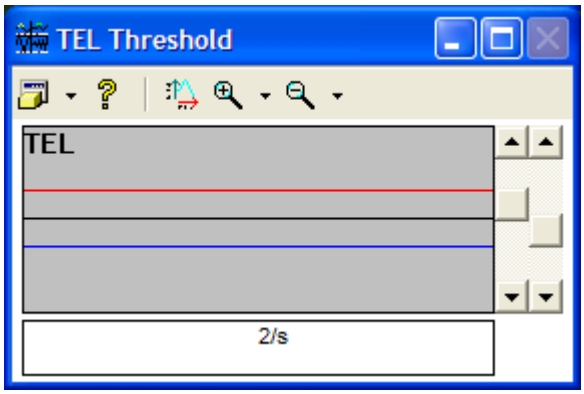


FIG: 25.29 Telemetry

Currently the system is set up to work with manual thresholds, but possibly future automatic thresholds will be made available. Initial threshold settings (that can be saved so as not to set them every time the service is loaded) as above work fine.
Other settings that influence the telemetry detection are the line conditioning and gain settings. In Edit->Devices->SDSTIP the following general settings work well where only changes in the gain using the AUX slider will be needed to “sync” the tool.

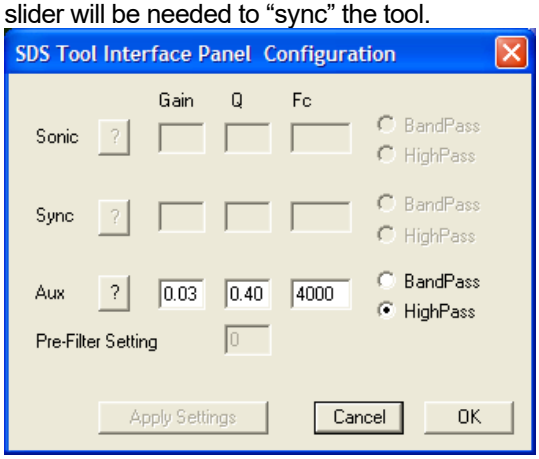


FIG: 25.30 SDSTIP

On powering the tool, if an uplink is detected the system goes through a sequence of enquiring the tools themselves as to what type and serial numbers they are and configuring the telemetry to be setup in the specified configuration that the user selected.
Any differences between the user set up and the tool responses to the enquiries will be shown in the monitor. One other possibility is that the tools are unable to respond to the system downlink (on extremely long cables), in this case the system makes no attempt to downlink a new configuration and will simply try to acquire data from the tools in the manner they are sending it. Since these tools memorize their prior configuration it is possible to use the system to configure the tools while on surface using a dummy-load cable and then running them in the whole where they will work without being configured again on power-up.
The following screen shots indicate a normal start up and ones with non-matching user selection and actual tools and a shot of the TEL Threshold monitor:

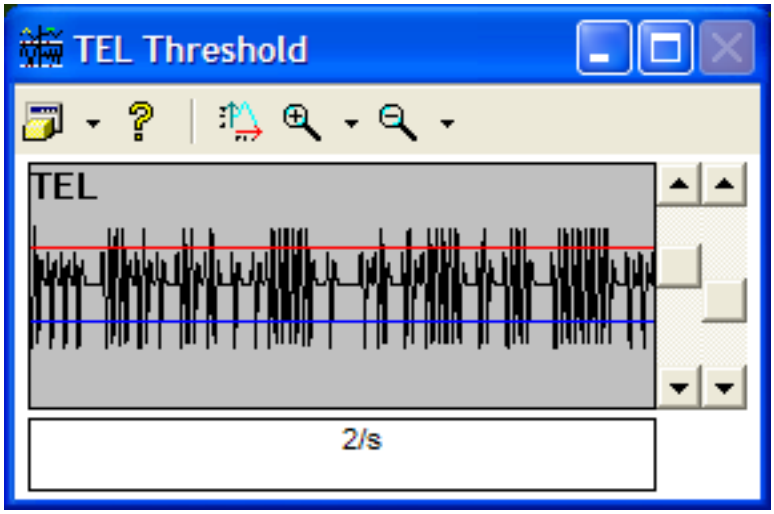


FIG: 25.31 Tel Threshold

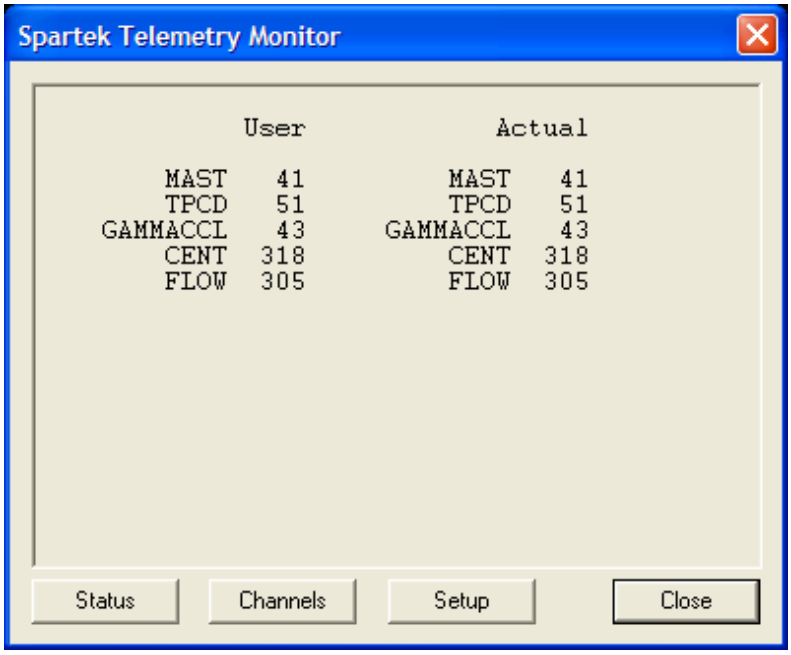


FIG: 25.32 Telemetry Monitor

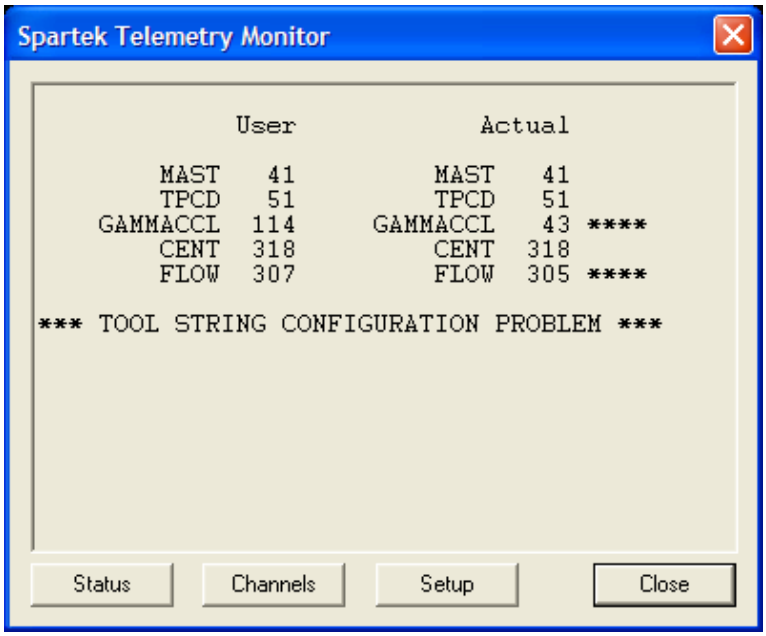


FIG: 25.33 Telemetry Monitor

It is advisable that once the status screen has been updated with the tool information that the user switch to the Channels display. This will show the Frame Count and as importantly the Errors. Normal operation will show an update of 10 frames per second, some initial errors are normal while the configuration is taking place, but this should not update once the tools are running. The sensor channels are unprocessed raw counts.

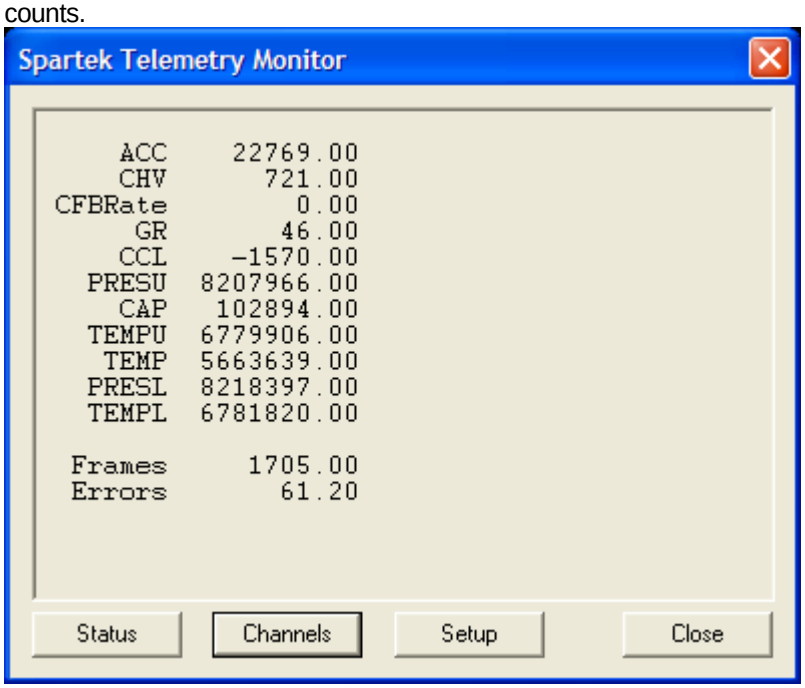


FIG: 25.34 Telemetry Monitor

The final view option is Setup. This tells us exactly what the downhole EEPROM was programmed with to configure the master controller. Each press of Setup will take us on to a new setup screen.

Section

26

26 MULTI-FINGER CALIPER AND PIPE TALLY

The Warrior Logging Software supports imaging tools that include a wide range of multi-arm or multi-finger caliper tools supplied by different manufacturers such as Sondex , Hotwell, Probe, Katwell, GoWell, and Spartek Systems. The various caliper tools may have from 12 to 60 fingers. The Warrior software presents the readings from the fingers as radii or diameters. In addition, many presentations will also present a 3-dimensional image of the caliper log.

One of the problems with multi-finger caliper tools is when the tool is not centered in the wellbore, the readings of the diameters measured may not be correct. With the tool not centered, the diameters perpendicular to the high / low axis will read smaller than actual size, showing an eccentric pipe. Warrior Software has a Caliper Processing package available as a supplement to the Warrior 8 Software that corrects the eccentric caliper readings in real time. The Caliper Processing software would replace the third-party software that is normally used after the well is logged as post processing in the office or processing center. Sondex calipers cannot use the Warrior eccentricity correction.

The example shown in Fig. 26.1 shows a log pass with uncorrected caliper image on the left and a corrected caliper image on the right. Fig. 26.2 shows a cross-section image of the caliper readings. Fig. 26.3 shows a 3-dimensional image of the uncorrected and corrected caliper readings.

If you have Caliper processing software you will have an option in variables to select none, eccentricity correction or eccentricity correction and elliptical correction.

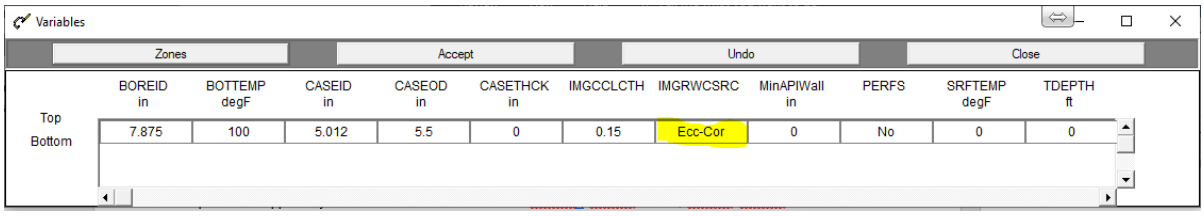


Fig. 26.1 Multi-finger Caliper Correction Selection

For more information about the Caliper Processing Software contact Scientific Data Systems.

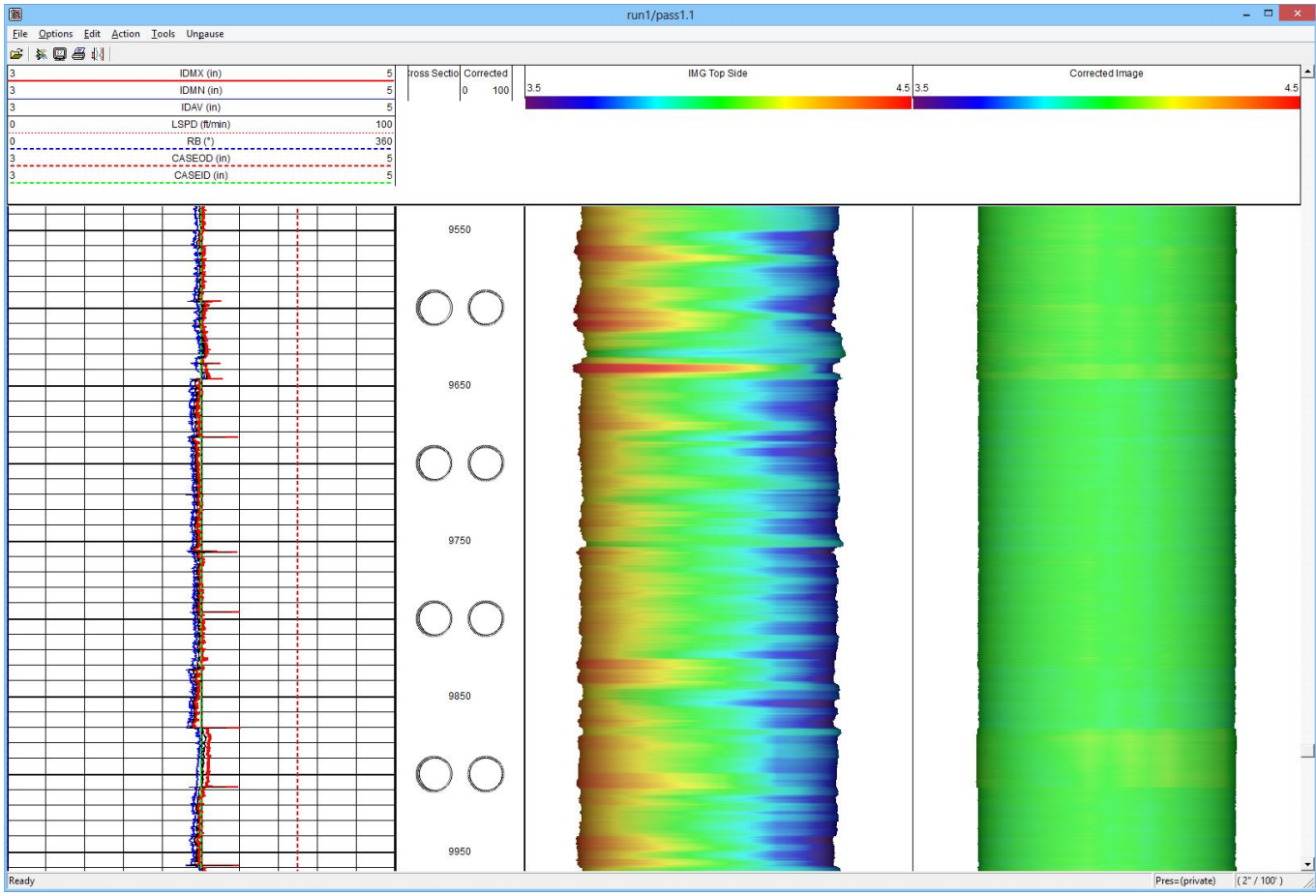


Fig. 26.2 Multi-finger Caliper Image Plot

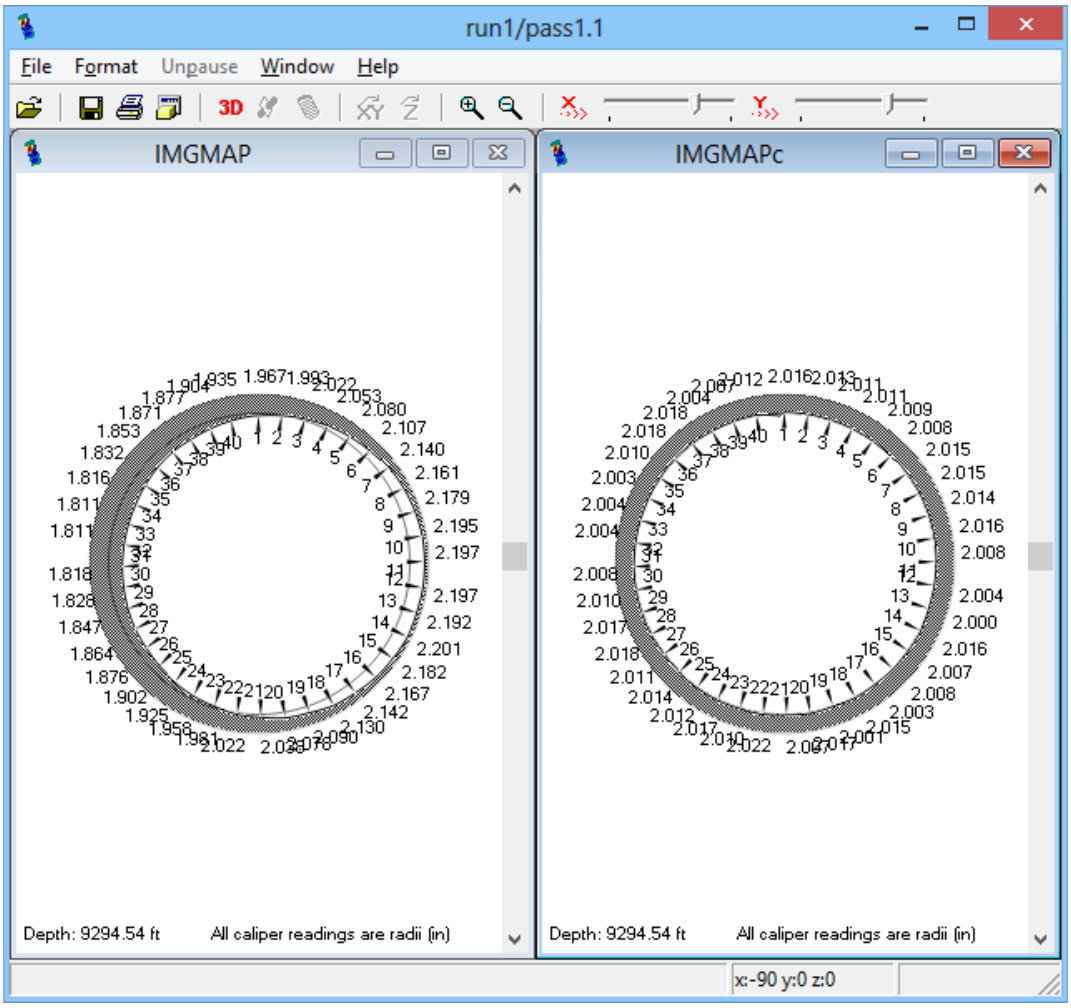


Fig. 26.3 Image map showing uncorrected and corrected caliper readings

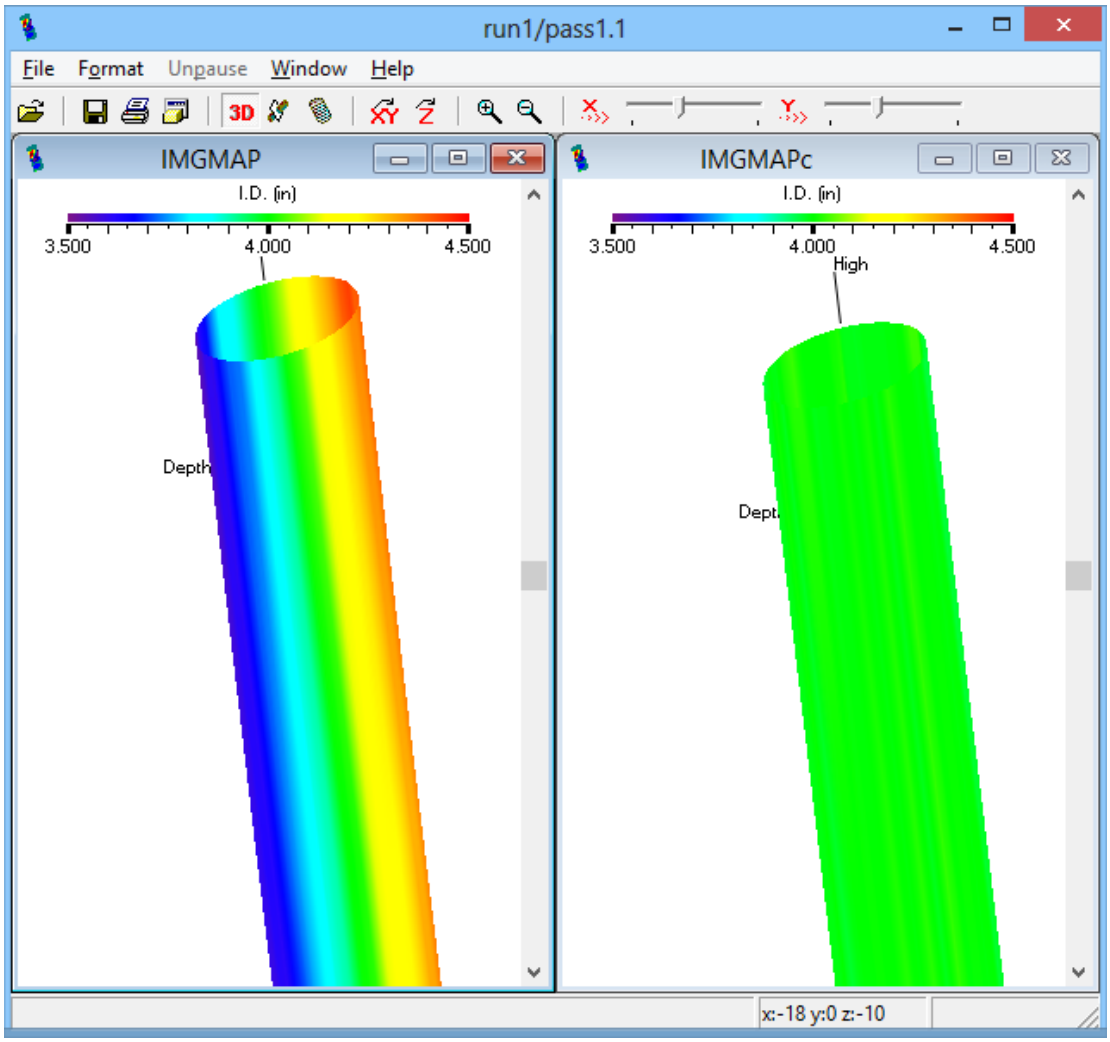


Fig. 26.4 3-D Image map showing uncorrected and corrected caliper readings

26.1 Pipe Tally Utility

The Warrior 8 software has an enhanced version of the Warrior Pipe Tally Utility. The utility provides a numerical table by joints of casing / tubing showing casing loss. In addition, it provides capabilities for enhancing the log presentations.
The Pipe Tally Utility is accessed through the Warrior Database Utilities by clicking on the Pipe Tally selection button.

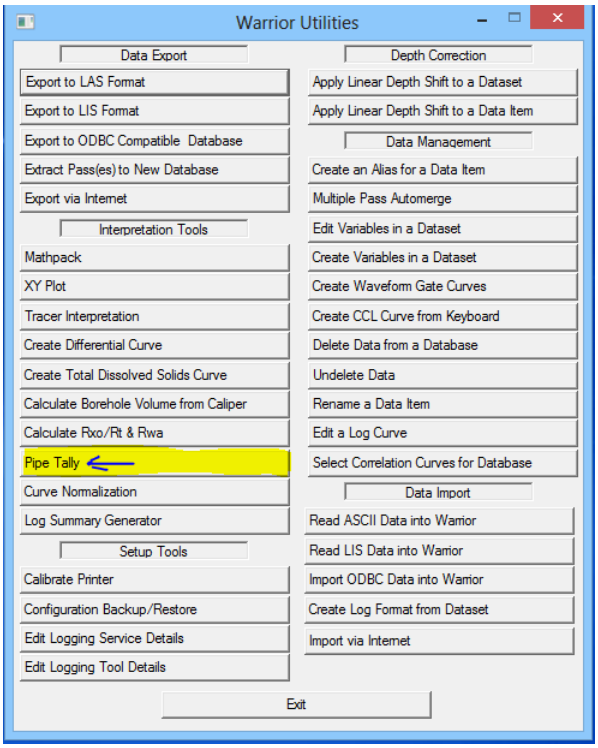
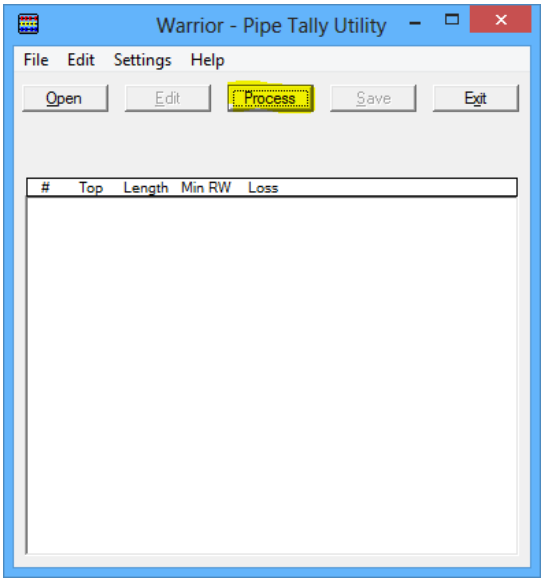


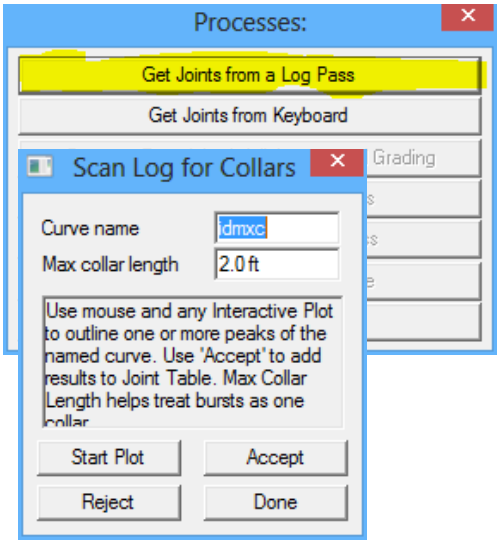
Fig. 26.5 Warrior Database Utilities – Pipe Tally

26.1.1 Get Pipe Tally Data – Scan for Collars

When the Pipe Tally Utility is opened, there is no information present. The first step is to get the casing joints. If you click on the [Process] button, you will get the choice of getting the joints from a log pass or entering them from the keyboard. By clicking on [Get Joints from a Log Pass], multiple collars can be selected at one time with the mouse and the software will enter them into the table. If [Get Joints from Keyboard] is selected, the user must type in each collar position that he wants to use

Fig. 26.5 Pipe Tally Utility – Process





When getting joints from a log pass, any curve that indicates collars may be used, not just CCL. In the following example, since there is no CCL in the string, I will use the IDMXC curve. The maximum collar length would be set to the minimum length of a casing joint or longer than any hardware that might be in the well, normally 2 to 4 feet. When the [Start Plot] button is clicked, Interactive Plot will start. You will need to select the pass that you wish to process and to do a screen plot to see the pass. It is often advantageous to compress the scale of the plot to enable the user to select more collars at one time. To do this, click the Options choice from the Interactive Plot menu.

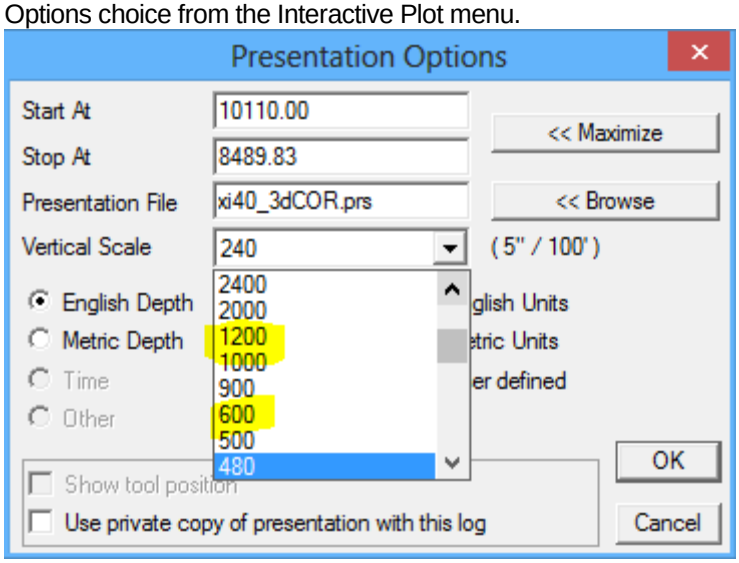
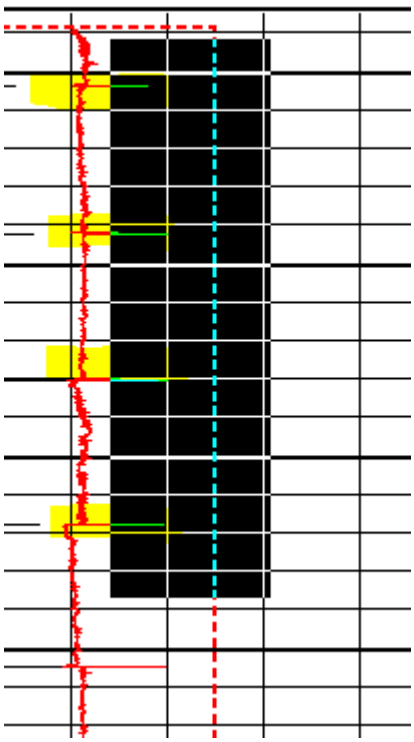
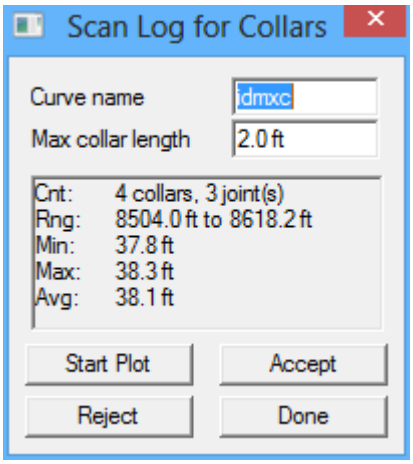


Fig. 26.6 Setting Vertical Scale to compress the viewed log pass

Click the Vertical Scale drop down and select a larger number to compress the scale. 600 or 1200 are good options. Using the mouse, draw a rectangle that catches the peaks of the curve that you are using as a CCL indicator.

Fig. 26.7 Capturing CCL indications in a log pass





The Scan Log for Collars window will show a summary of what you have just scanned. In this case, it shows 4 collars in the range of 8504.0 feet to 8618.2 feet and gives the minimum, maximum, and average lengths of the joints in that interval. If you click the [Reject] button, the summary is cleared, and you may reselect the collars from the log pass. If you click the [Accept] button, the collars that have been selected will be entered automatically into the pipe tally table. You should continue down the log pass, selecting collars until the whole pass has been collars picked. When you are finished, click the [Done] button to close the Scan Log for Collars window.

At this point, it is a good idea to take a close look at the Pipe Tally table and look for problems with the collars that have been selected. Things that should be looked for are extra-long and extra-short joints.

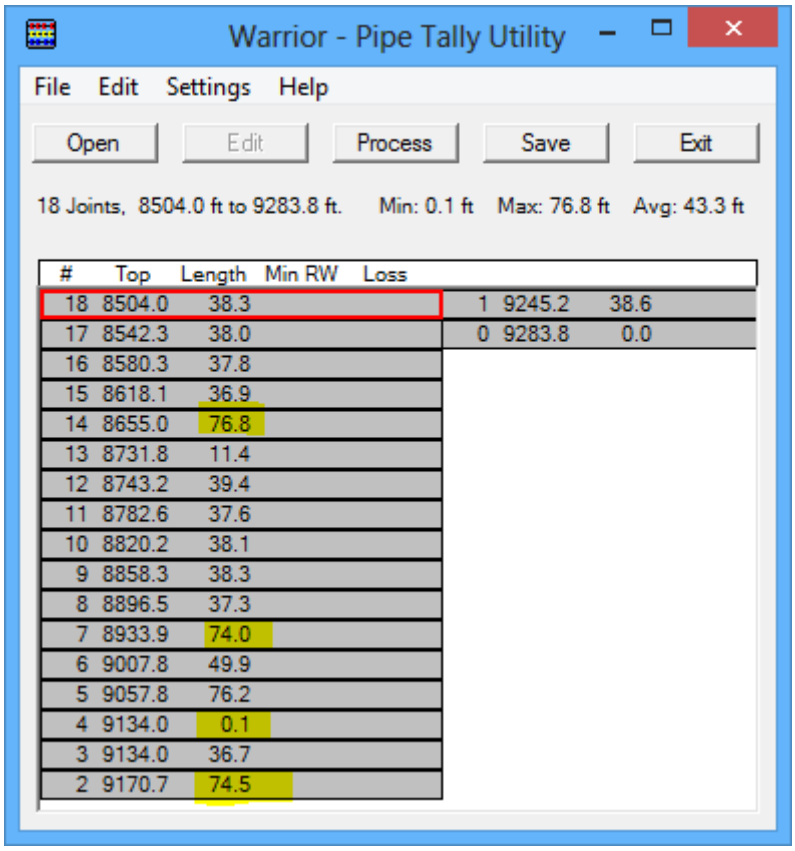


Fig. 26.8 Examine table for bad CCL selections

In the table shown in Fig. 2.5, there are long joints at joints 14, 7, and 2 and a .1-foot joint at joint 4. The long joints are probably caused by not having enough of an indication in the signal to pick the collar and the short joint is caused by selecting the same collar twice. The collars that have been selected twice can be eliminated by clicking on that collar in the table and then click on Edit -> Delete Selected Entries.

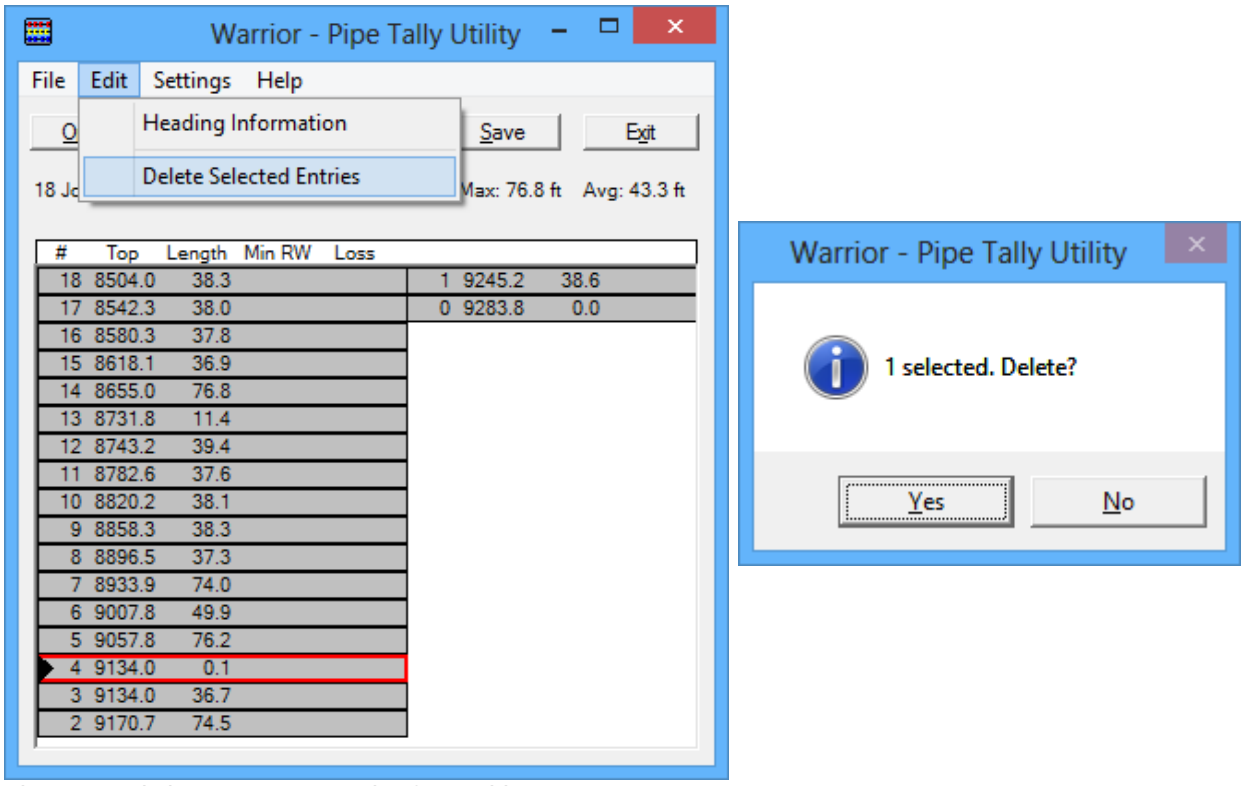
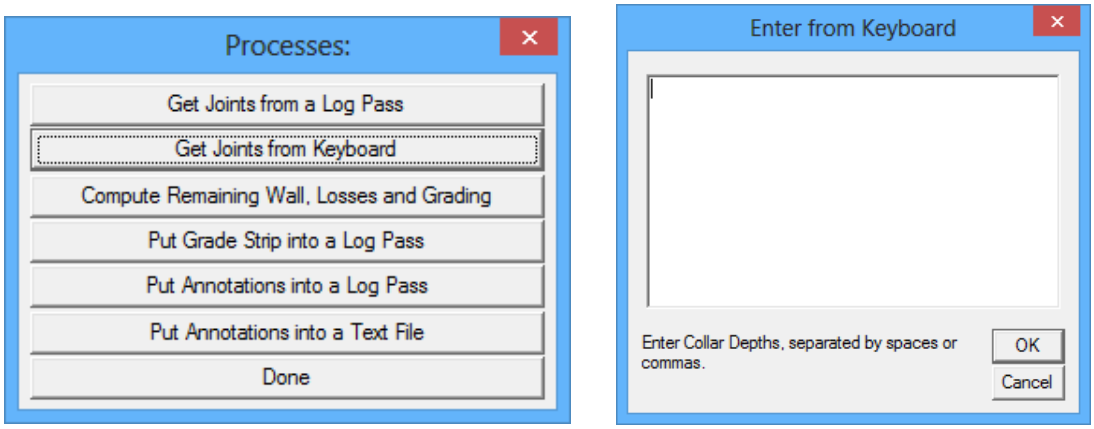


Fig. 26.9 Deleting erroneous entries from table

To correct the long joints, you would need to Process and Get Joints from a Log Pass again or in this case I will Get Joints from Keyboard.

Fig. 26.10 Get Joints from Keyboard



After closely examining the log, I missed collars at 8695.3, 8966.1, and 9209.4. These depths will be entered the window separated by spaces or commas as shown in Fig. 2.8.

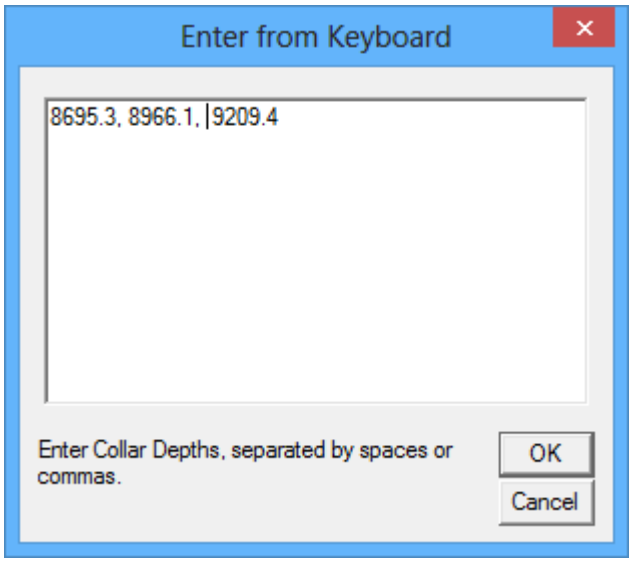
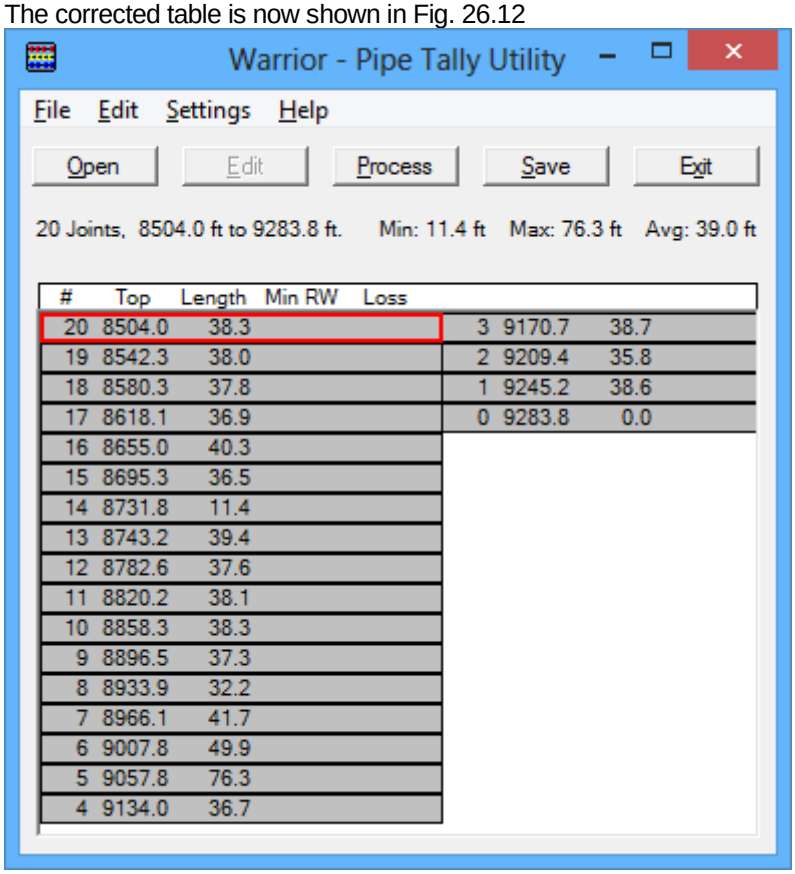


Fig. 26.11 Process – Get Joints from Keyboard

The corrected table is now shown in Fig. 26.12



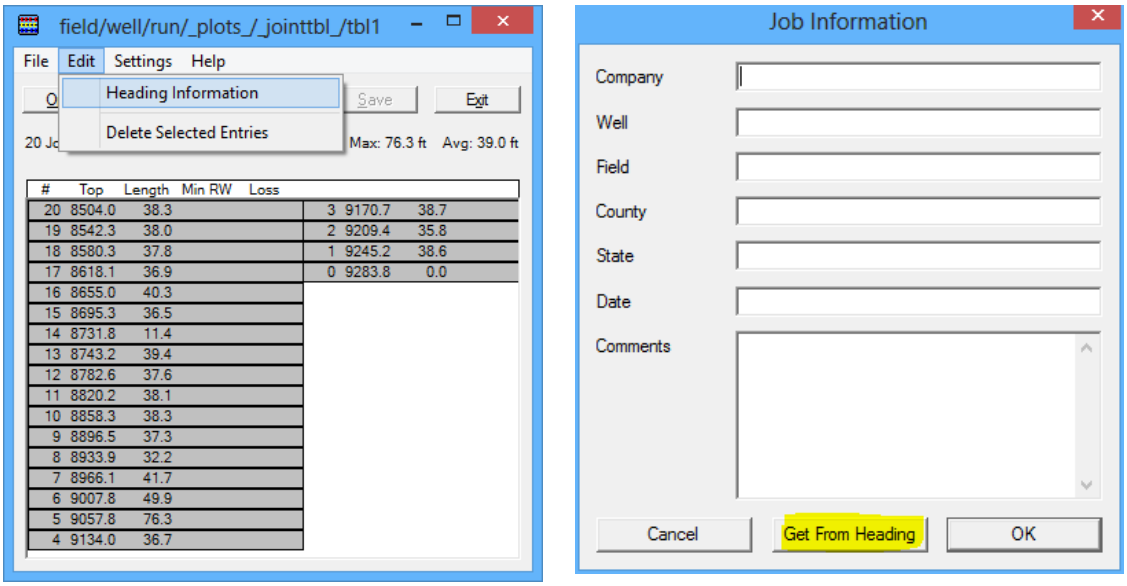
#	Top	Length	Min RW	Loss				
20	8504.0	38.3			3	9170.7	38.7	
19	8542.3	38.0			2	9209.4	35.8	
18	8580.3	37.8			1	9245.2	38.6	
17	8618.1	36.9			0	9283.8	0.0	
16	8655.0	40.3						
15	8695.3	36.5						
14	8731.8	11.4						
13	8743.2	39.4						
12	8782.6	37.6						
11	8820.2	38.1						
10	8858.3	38.3						
9	8896.5	37.3						
8	8933.9	32.2						
7	8966.1	41.7						
6	9007.8	49.9						
5	9057.8	76.3						
4	9134.0	36.7						

Fig 26.12 Corrected Pipe Tally Table

26.1.2 Edit Pipe Tally Settings

There are several things that should be done before continuing. The first is editing the table header information.

Fig. 26.13 Edit Heading Information



If the Warrior Heading has already been completed and saved, that information can be brought into the Pipe Tally Header by clicking the [Get from Heading] button at the bottom of the Job Information window. If that heading information is not available, then the User should enter the data in the fields provided. The heading information is saved into the table by clicking the [OK] button.

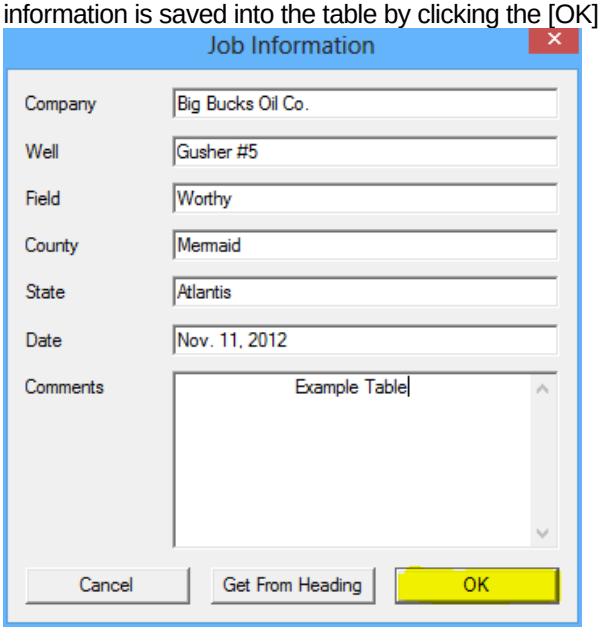
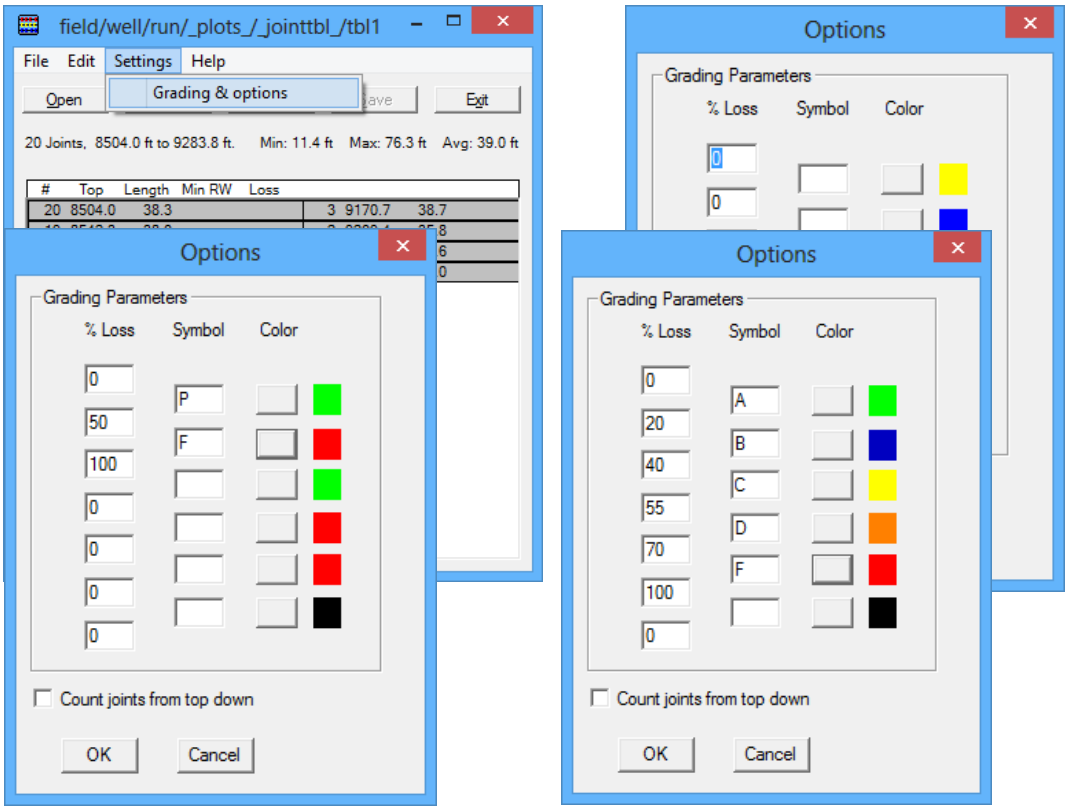


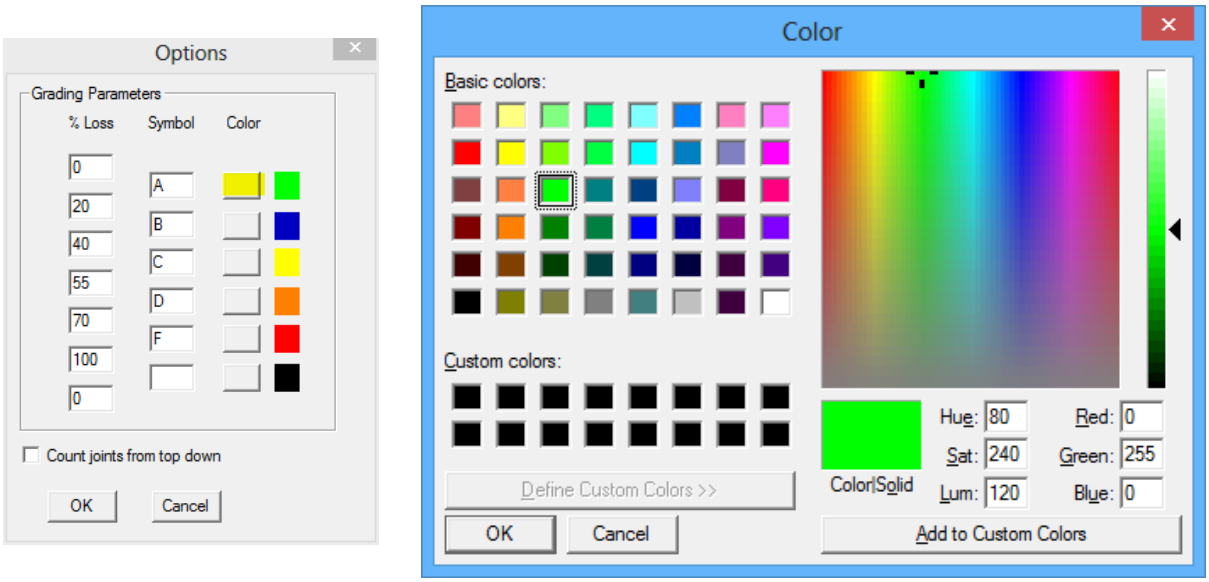
Fig. 26.14 Completed Job Heading Information

If grading to going to be applied to the log data, the grading options need to be set up before the casing thickness is scanned. Click on Settings -> Grading and options to bring up the options window.
Fig. 26.15 Options and Grading



The grading is based on a percentage of loss. The User would normally setup between 2 and 6 grade levels. This may be as simple as 0% - 50% Passing (Green) and 50% - 100% Failing (Red). It could be something more complex, such as a letter grading A=0% -20% (Green), B=20%-40% (Blue), C=40%-55% (Yellow), D=55%-70% (Orange), and F=70%-100% (Red)
Fig. 26.16 Example Grading Scales

The colors assigned to the grading are used as a quick indication of the grading and can be shown both in some of the pipe tally tables and as a pattern strip in the log. The color for a given grade may be edited by clicking on the box located between the grade symbol and the grade color, defining the color and then clicking the [OK] button.
Fig. 26.16 Selecting Grading Colors



26.1.3 Remaining Wall Loss and Grading
Now that grading options have been set up, the next step is to have the software scan the log, computing the wall loss percentage and grading the casing joints. Click on [Process] to open the Process window. Click on the [Compute Remaining Wall, Losses and Grading] option.

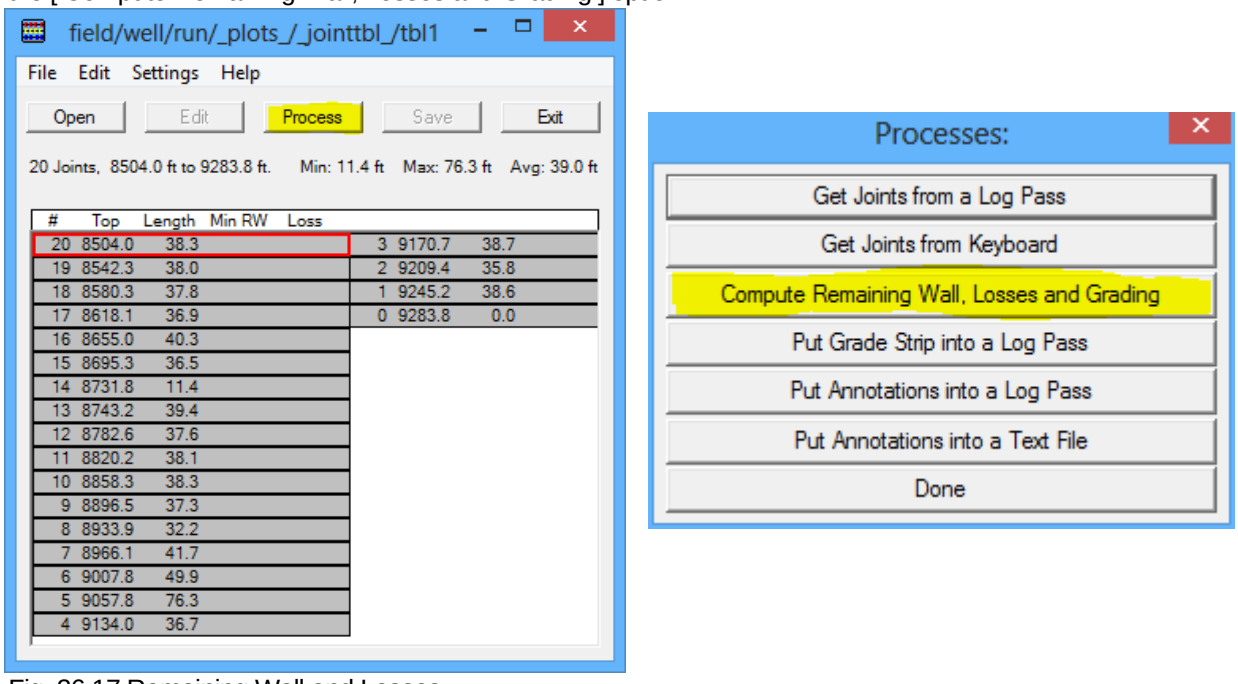


Fig. 26.17 Remaining Wall and Losses

There are two ways to process the remaining wall and losses. If the Warrior Caliper Processing software has been used, remaining wall has already been computed and that curve (MINRC – Minimum Remaining Corrected) can be used. The second method is to use the maximum diameter (which, depending upon the caliper eccentric could be appreciably off) and the casing OD and ID set up in Variables.
From the Compute Loss and Grading window, the User will first need to select which method that he wishes to use. And then, using the [<<Browse] button select the data item that he wished to use to process the log for losses.

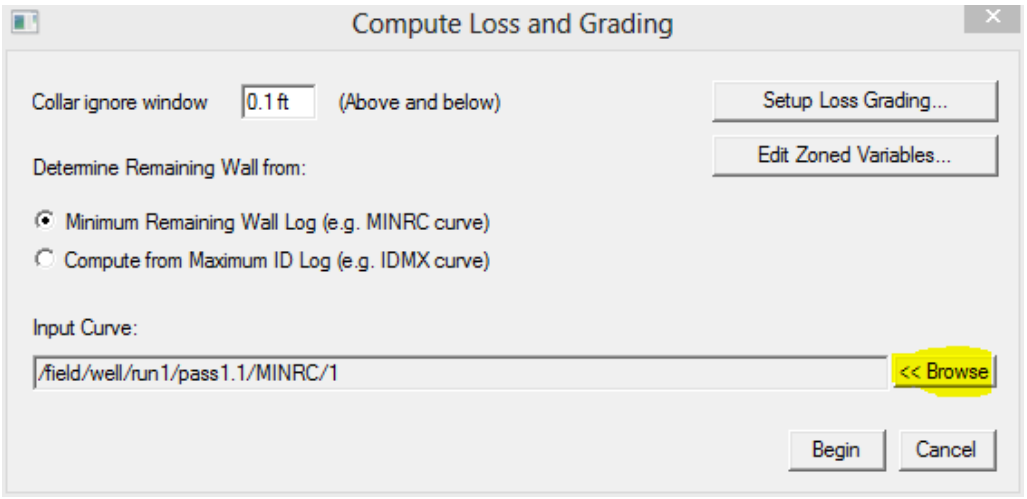


Fig. 26.18 Compute loss and Grading

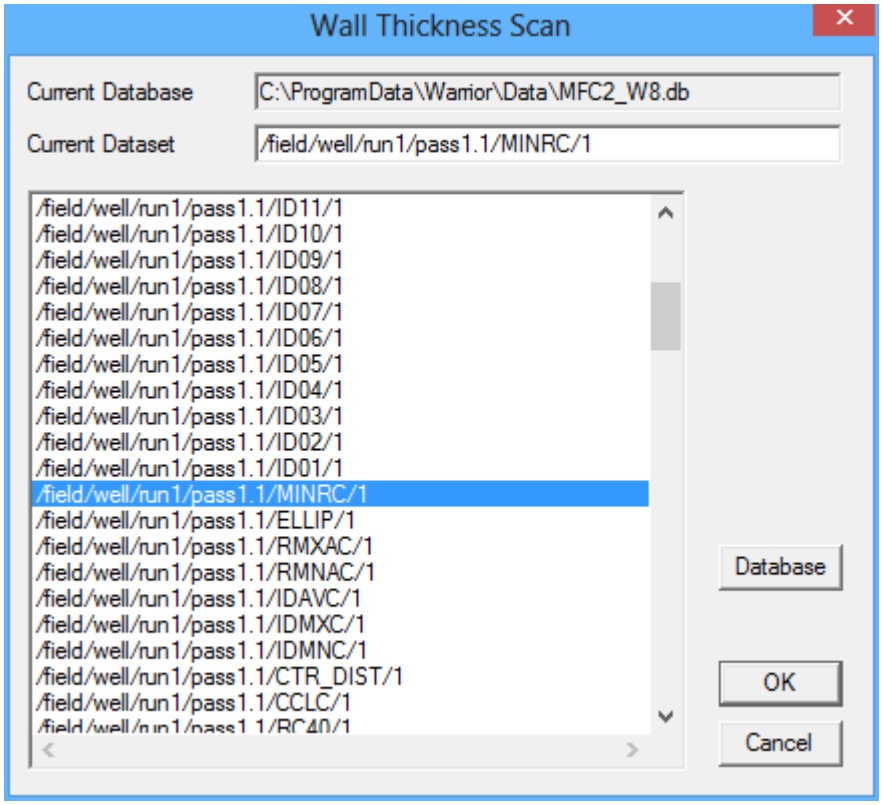
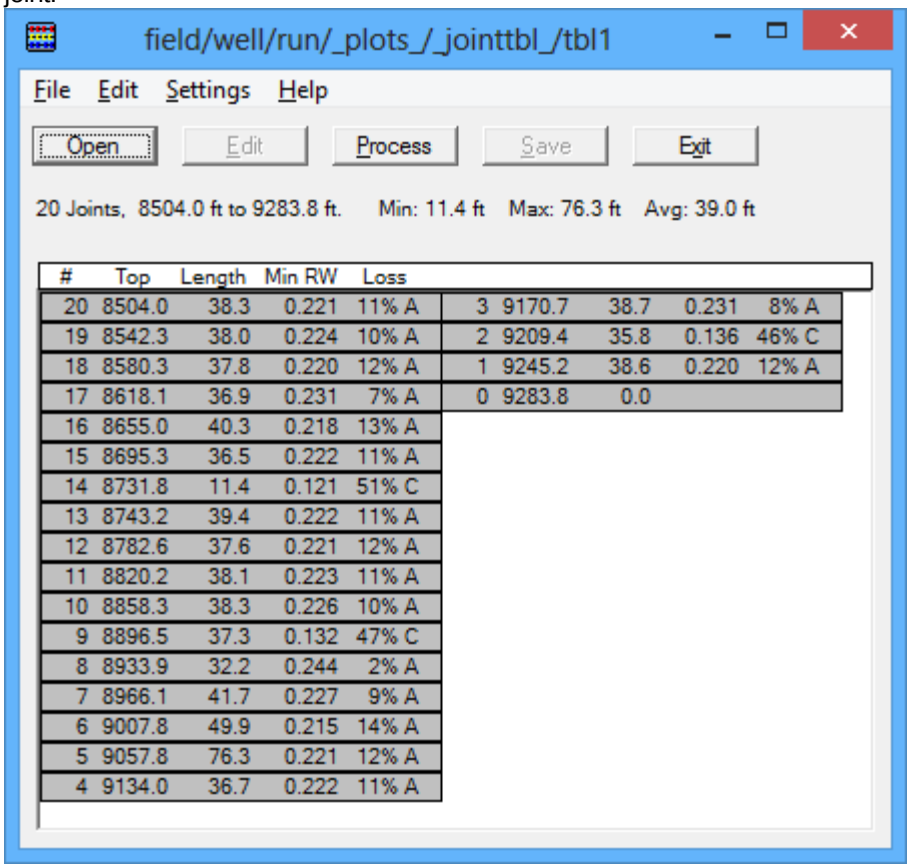


Fig. 26.19 Selecting Data to Process for Losses

The Pipe Tally table will now be completed, showing the number of joints, the collar depth of each collar, the length of each joint, the minimum remaining wall in each joint, and the grade that has been given to each joint.



#	Top	Length	Min RW	Loss	#	Top	Length	Min RW	Loss
20	8504.0	38.3	0.221	11% A	3	9170.7	38.7	0.231	8% A
19	8542.3	38.0	0.224	10% A	2	9209.4	35.8	0.136	46% C
18	8580.3	37.8	0.220	12% A	1	9245.2	38.6	0.220	12% A
17	8618.1	36.9	0.231	7% A	0	9283.8	0.0		
16	8655.0	40.3	0.218	13% A					
15	8695.3	36.5	0.222	11% A					
14	8731.8	11.4	0.121	51% C					
13	8743.2	39.4	0.222	11% A					
12	8782.6	37.6	0.221	12% A					
11	8820.2	38.1	0.223	11% A					
10	8858.3	38.3	0.226	10% A					
9	8896.5	37.3	0.132	47% C					
8	8933.9	32.2	0.244	2% A					
7	8966.1	41.7	0.227	9% A					
6	9007.8	49.9	0.215	14% A					
5	9057.8	76.3	0.221	12% A					
4	9134.0	36.7	0.222	11% A					

Fig. 26.20 Completed Pipe Tally Table

26.2 Multi-Finger Caliper Presentations

If the Warrior Caliper Processing software is being used, there are several additional curves or outputs that are created in addition to the standard logging outputs. These include but are not restricted to IMGMAPC (corrected image map), IDMXC (corrected maximum diameter), IDMNC (corrected minimum diameter), IDAVC (corrected average diameter), MINRC (minimum remaining wall), and CTR_DIST (distance from center of tool to center of hole). These outputs can be added to presentations in the normal manner.

26.2.1 Pipe Tally Annotations and Grading

During the processing of the Pipe Tally table, there are two processes that will add data to the database. These are “Put Grade Strip into a Log Pass” and “Put Annotations into a Log Pass”. While the information is added to the database, it is not plotted until it is added to a presentation format.

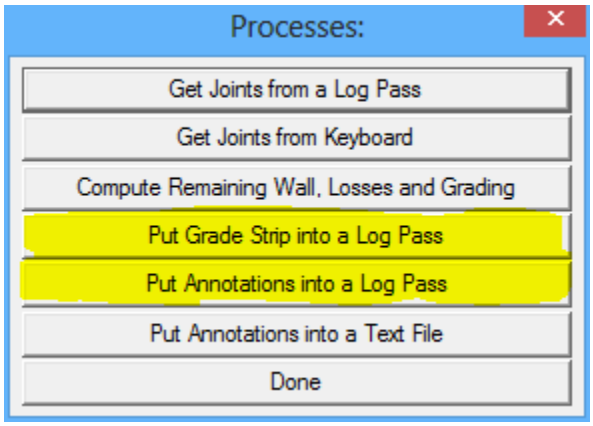


Fig. 26.21 Additional Pipe Tally Processes

From Interactive Plot, with a log pass pulled up, edit the log format. Click on the [Add] button to add a new database item to the presentation.

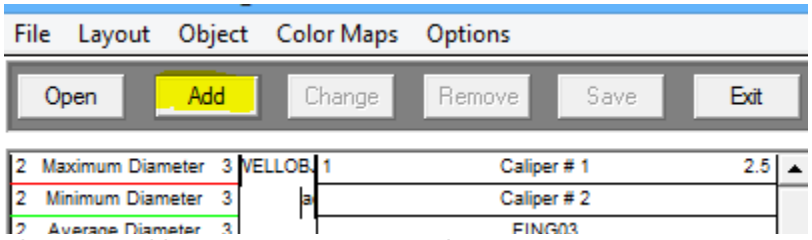


Fig. 26.22 Add a New Item to Presentation

To add the Pipe Tally Annotations to the presentation, the DB Item needs to be PTANN. This can be typed in or chosen from the [Current Pass] drop down list. The annotations can be placed in any track that is available, and the scales have no relevance in this case. The Presentation Type must be tabular, and the Style needs to be Tabular by delta.

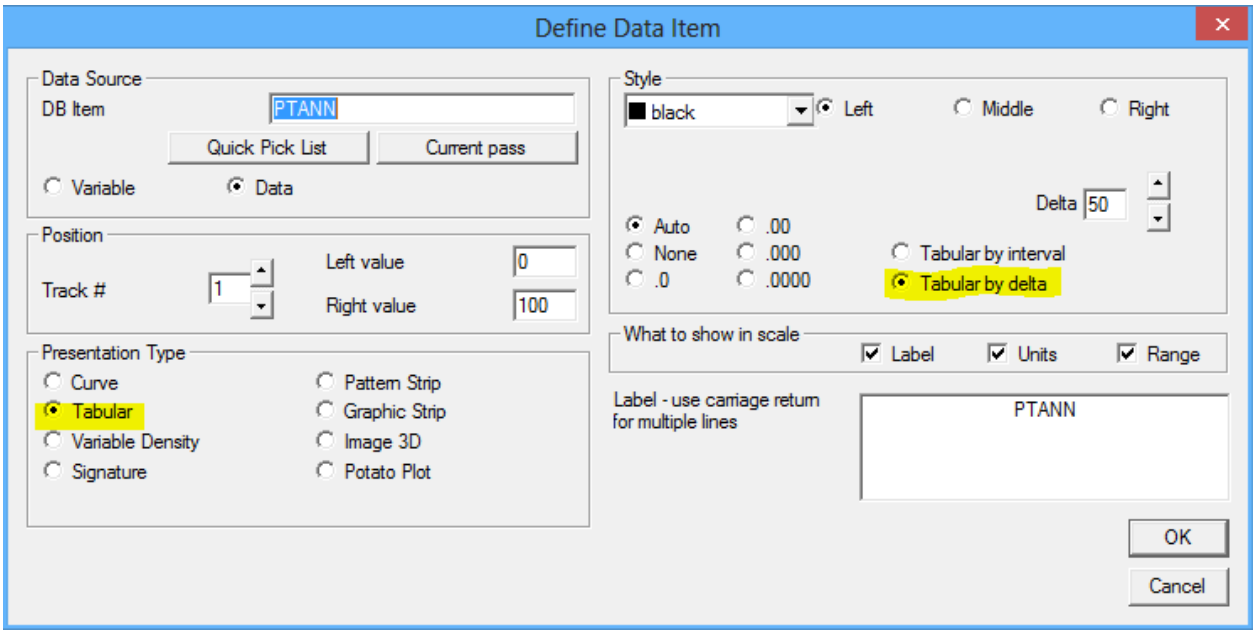


Fig. 26.23 Adding Pipe Tally Annotations

To add the grading strip, the DB item needs to be Grade. The presentation type needs to be a Pattern Strip. The color map needs to be Pipe Grade. This is a special color map that can only be edited from the pipe tally grading and options settings. It cannot be edited through the normal color map editing. The scales should be set from 1 to the number of grades that were set up in the Pipe Tally Options.

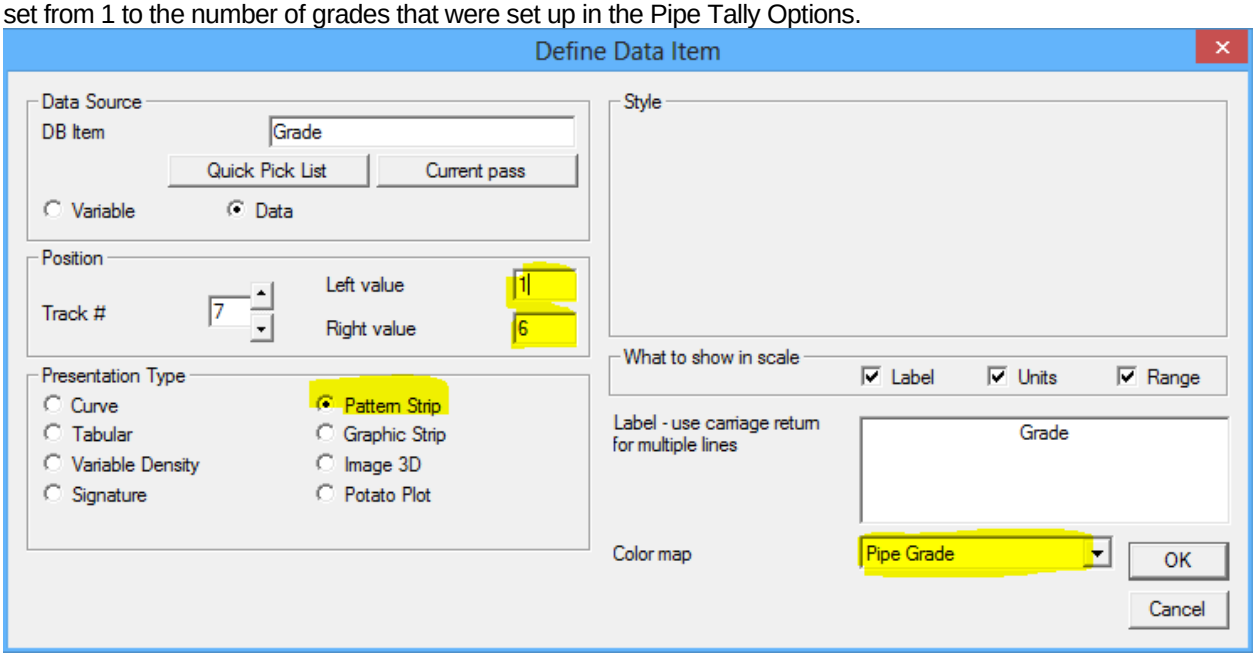
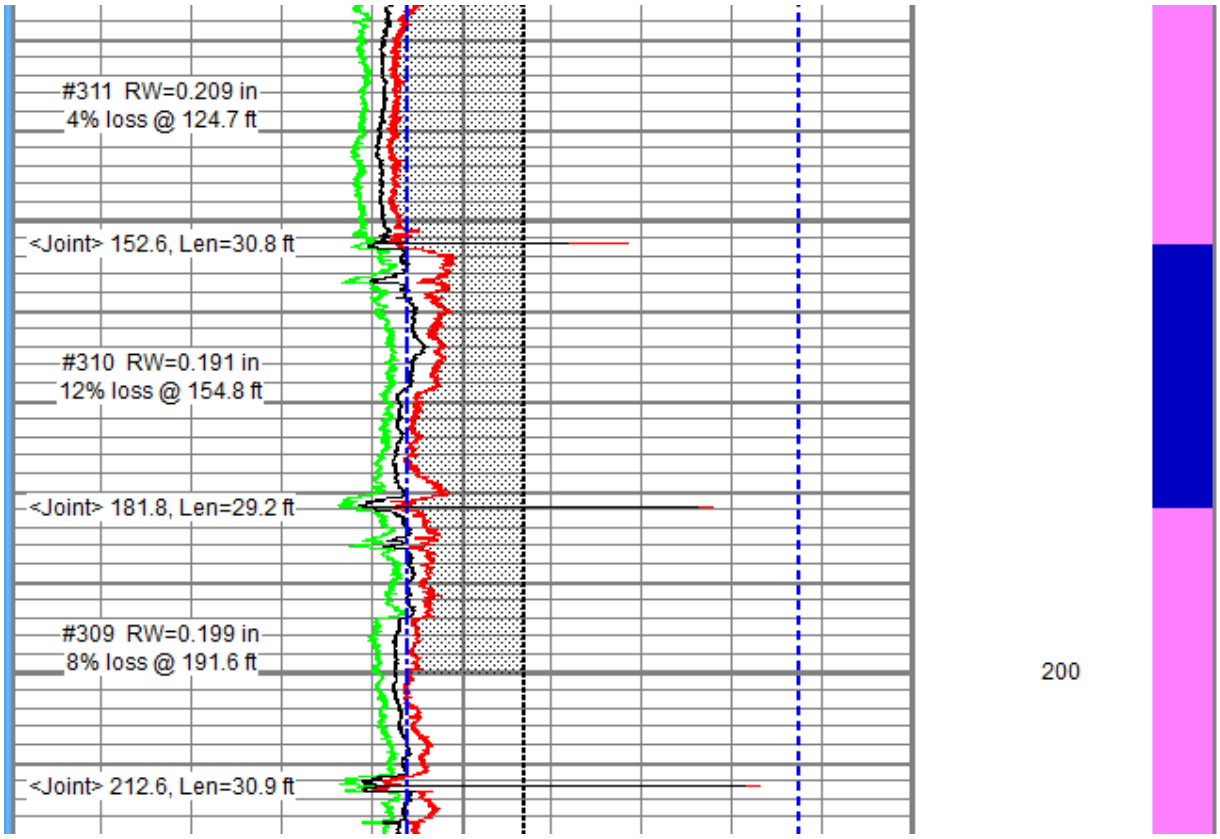


Fig. 26.24 Adding Pipe Grade Strip

Fig. 26.25 shows an example with annotations and grading strip in a presentation.



26.2.2 Pipe Tally Tables in Plot Job

- When adding a pipe tally table to a plot job, there are several formats that the table may be printed under. These are *.WRF in the Warrior\Format folder. When adding the table to a Plot Job, the format that is to be used for printing the pipe tally table can be selected. Examples are shown below.

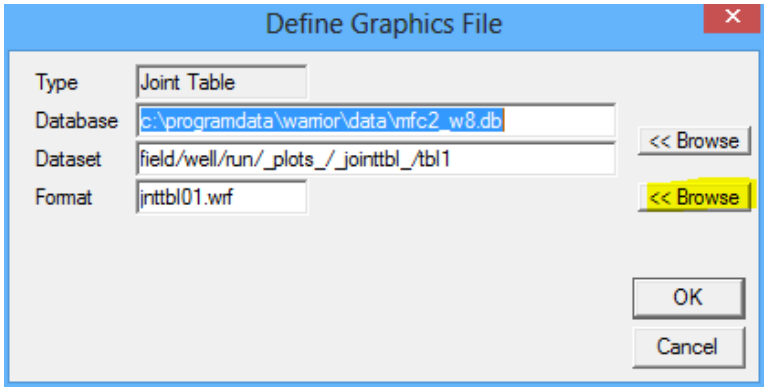
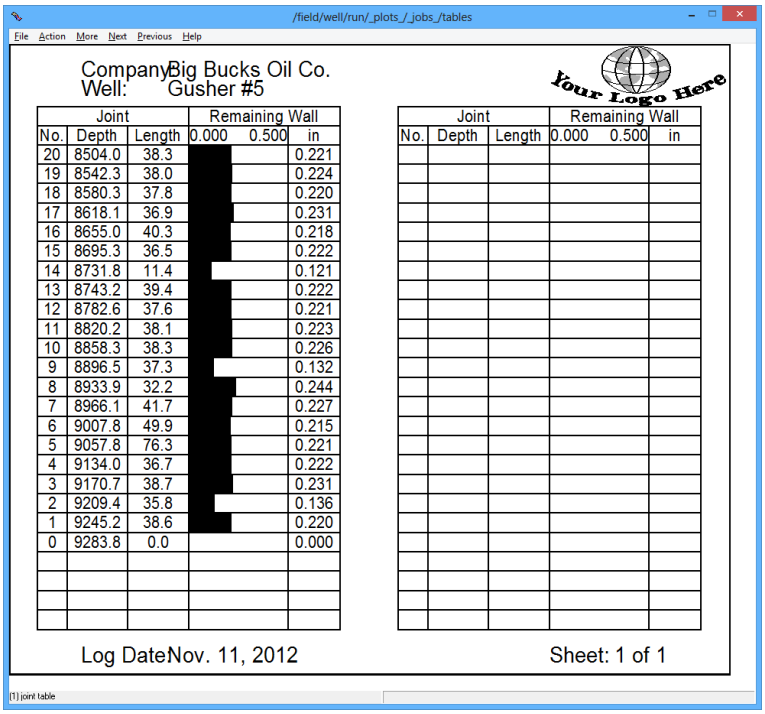
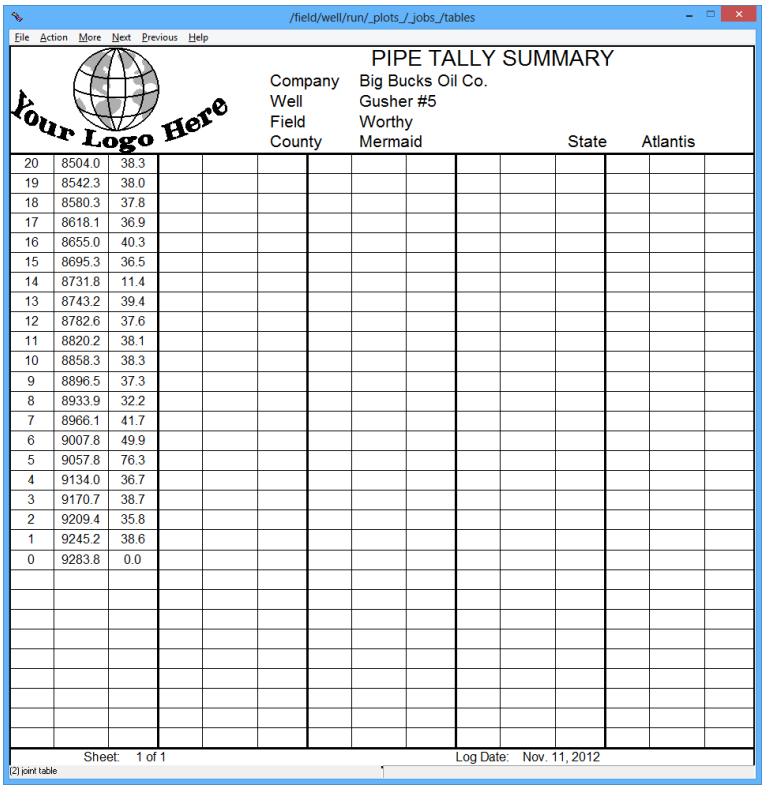


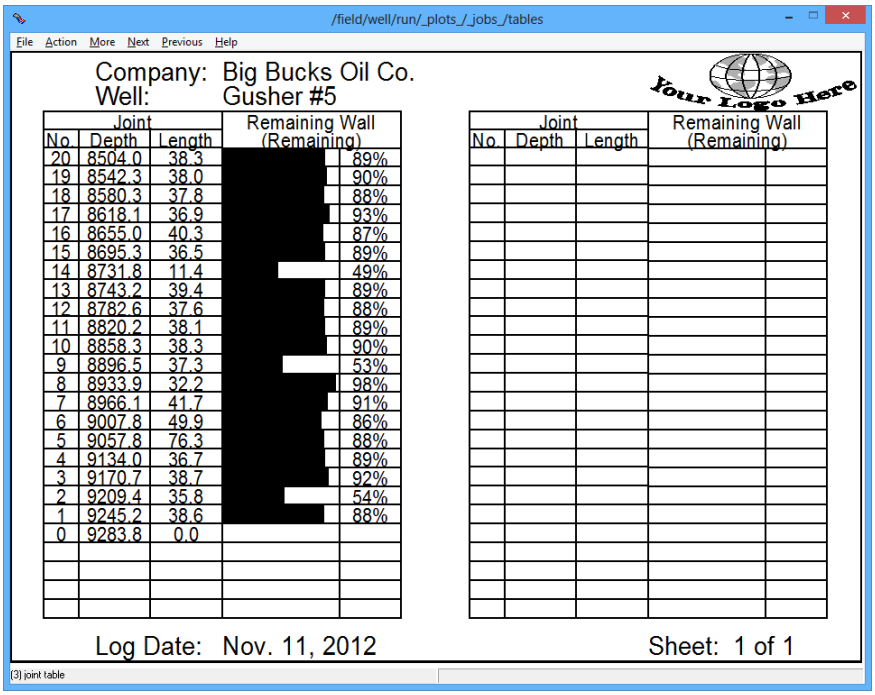
Fig. 26.26 Selecting Pipe Tally Report format



- JNTTBL01.wrf



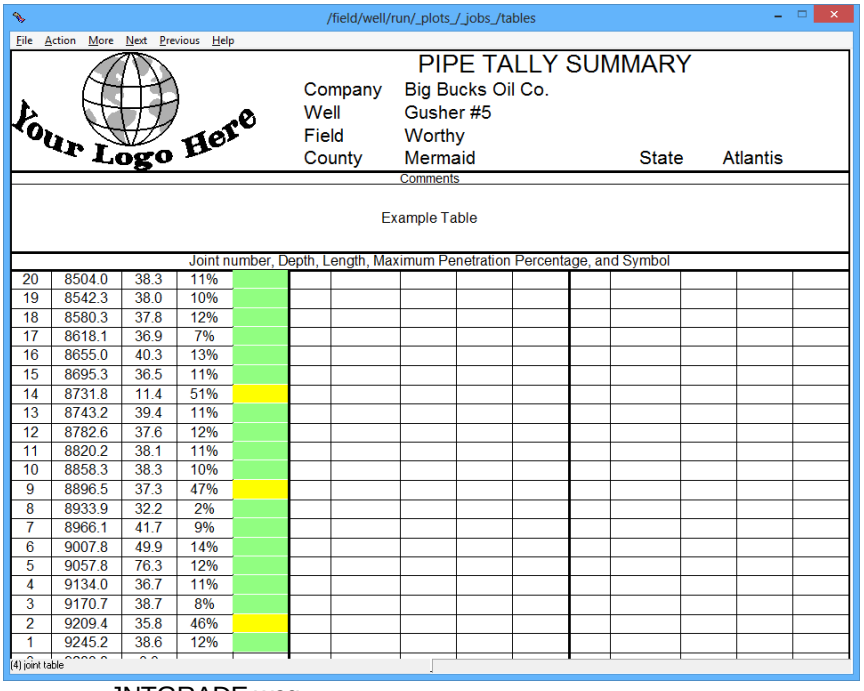
- CCL.wrf
-
-



- JNTBARPCT.wrf

-

-



- JNTGRADE.wcg

-

-

/field/well/run/_plots_/_jobs_/tables

File Action More Next Previous Help

Your Logo Here

PIPE TALLY SUMMARY

Company Big Bucks Oil Co.
Well Gusher #5
Field Worthy
County Mermaid State Atlantis

JOINT CLASSIFICATION		
Range	Symbol	# Joints
0% to 20%	A	17
20% to 40%	B	0
40% to 55%	C	3
55% to 70%	D	0
70% to 100%	F	0
100% to 0%		

Comments

Example Table

Joint number, maximum penetration percentage, and symbol

20	11%	A
19	10%	A
18	12%	A
17	7%	A
16	13%	A
15	11%	A
14	51%	C
13	11%	A
12	12%	A
11	11%	A
10	10%	A
9	47%	C
8	2%	A
7	9%	A
6	14%	A
5	12%	A
4	11%	A
3	8%	A
2	46%	C
1	12%	A

(5) joint table

-
- MAC.wrf

/field/well/run/_plots_/_jobs_/tables

File Action More Next Previous Help

Your Logo Here

PIPE TALLY SUMMARY

Company Big Bucks Oil Co.
Well Gusher #5
Field Worthy
County Mermaid State Atlantis

JOINT CLASSIFICATION	
Range	Symbol
0% to 20%	A
20% to 40%	B
40% to 55%	C
55% to 70%	D
70% to 100%	F
100% to 0%	

Comments

Example Table

Joint number, Depth, Length, Maximum Penetration Percentage, and Symbol

20	8504.0	38.3	11%	A
19	8542.3	38.0	10%	A
18	8580.3	37.8	12%	A
17	8618.1	36.9	7%	A
16	8655.0	40.3	13%	A
15	8695.3	36.5	11%	A
14	8731.8	11.4	51%	C
13	8743.2	39.4	11%	A
12	8782.6	37.6	12%	A
11	8820.2	38.1	11%	A
10	8858.3	38.3	10%	A
9	8896.5	37.3	47%	C
8	8933.9	32.2	2%	A
7	8966.1	41.7	9%	A
6	9007.8	49.9	14%	A
5	9057.8	76.3	12%	A
4	9134.0	36.7	11%	A
3	9170.7	38.7	8%	A
2	9209.4	35.8	46%	C
1	9245.2	38.6	12%	A

(6) joint table

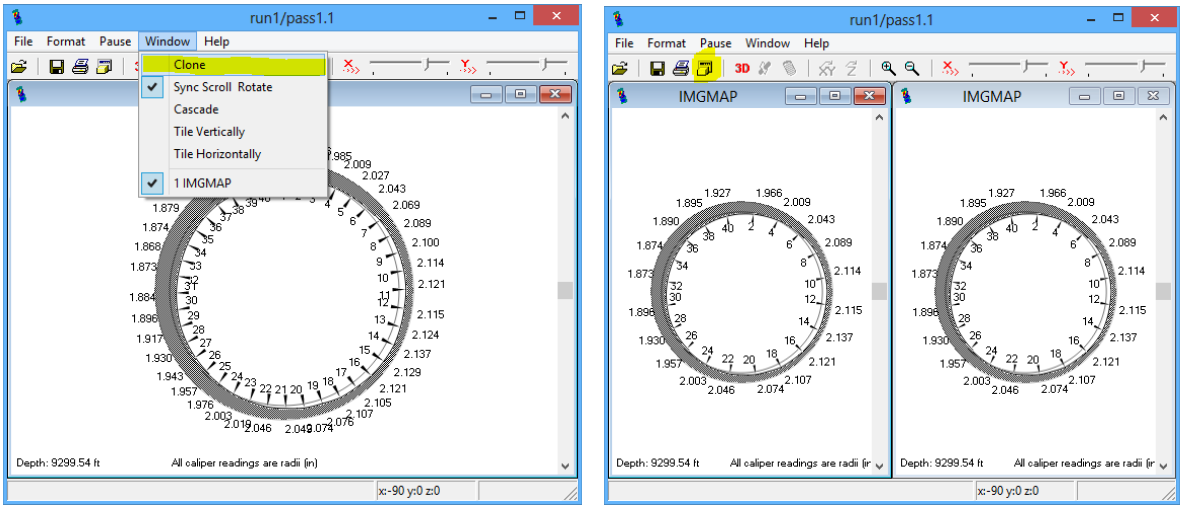
- MAC2.wrf

Fig. 26.27 grading examples

26.2.3 Borehole Presentations

The Borehole Presentation Window, available in some presentations, has been enhanced with the ability to show two image map presentations. To show the second image map, click on the “Window” menu option and then select “Clone”.

Fig. 26.28 Setting Borehole Image Presentation for two Images



Once the two images are cloned, they will be the same image. By clicking one of the images and then clicking on the “Options” icon, as shown in fig. 3.1, the second image can be set to be a corrected caliper array image IMGMAPC. Either image can be set to either a 2-dimensional or 3-dimensional presentation.

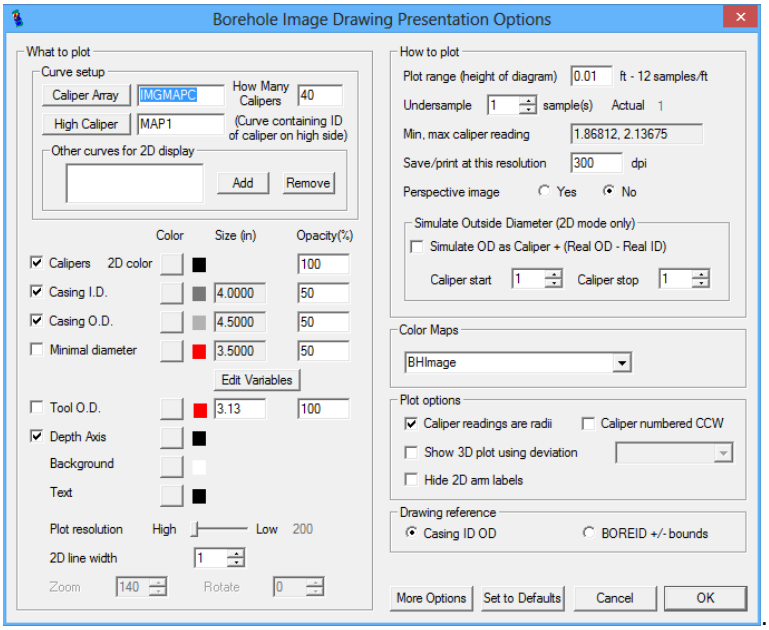
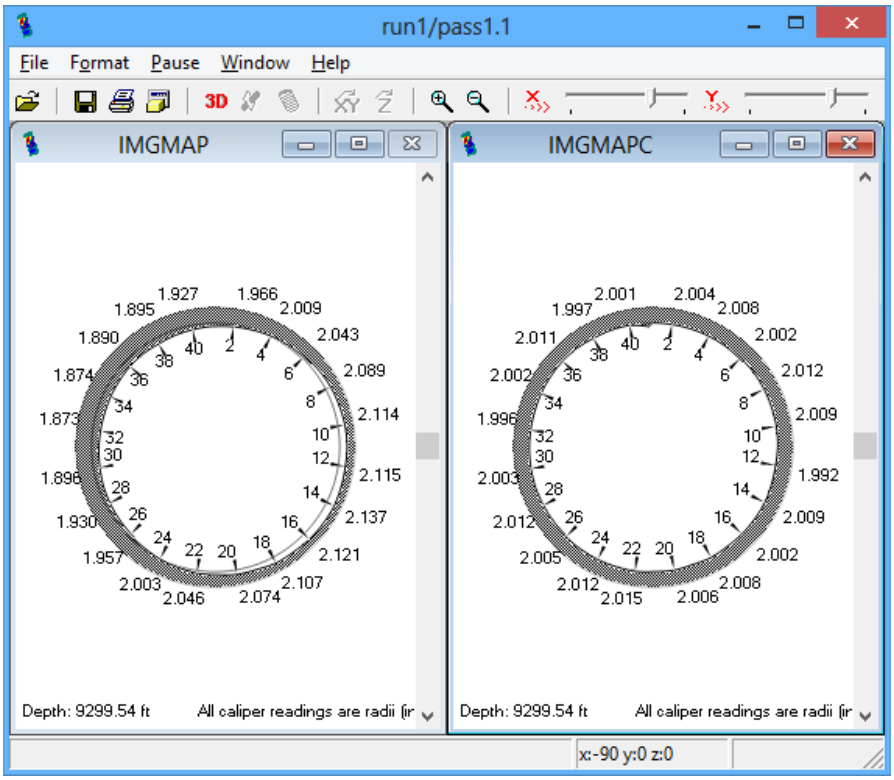


Fig. 26.29 Setting Corrected Image for Second Borehole Presentation



clicking on the “Options” icon, as shown in fig. 3.1, the second image can be set to be a corrected caliper array image IMGMAPC. Either image can be set to either a 2-dimensional or 3-dimensional presentation.

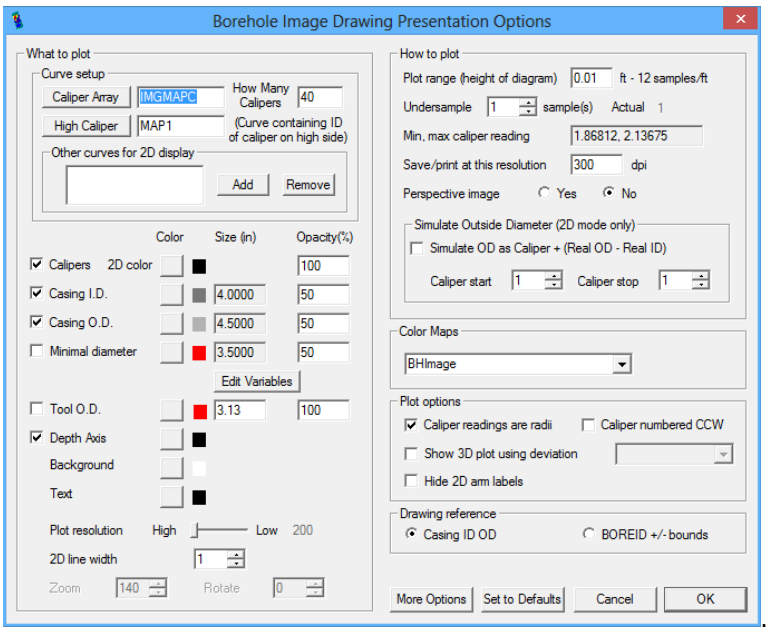


Fig. 26.30 Setting Corrected Image for Second Borehole Presentation

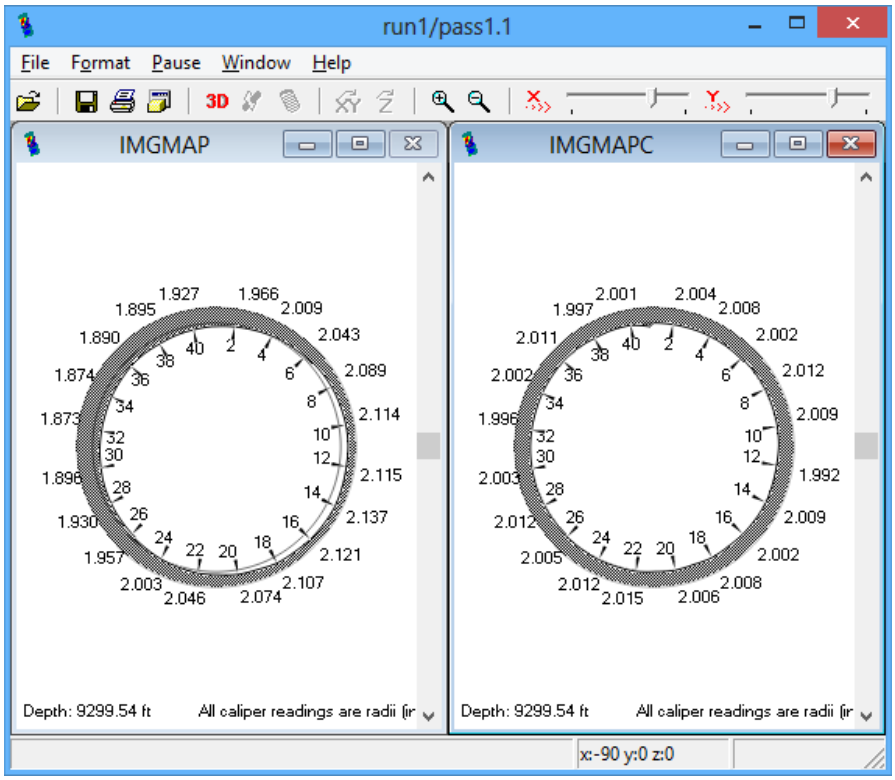


Fig. 26.31 Showing Caliper Array Image and Corrected Image

26.2.4 Multi-Finger Presentations

In previous versions of Warrior software, an array of curves, such as arm radii, each had to be plotted individually. This meant that if a scale change was required each individual arm had to be rescaled. Warrior 8 allows the User to plot a list of curves as a single DB item. The presentation shown if fig.3.4.1 shows a 40-arm caliper presentation with arm R01 plotted from 2.4375 to 4.9375. Each additional arm is plotted with the scales set to .0625 less so that arm R40 is plotted from 0 to 2.5.

In this example, I will remove every caliper arm curve as shown in Fig. 3.4.2. Next, I will click the [ADD] button and select the List type of Data Source for the DB item. Click the [Curve List Properties] button to bring up the Curve List Editor Window as shown in Fig. 3.4.4.

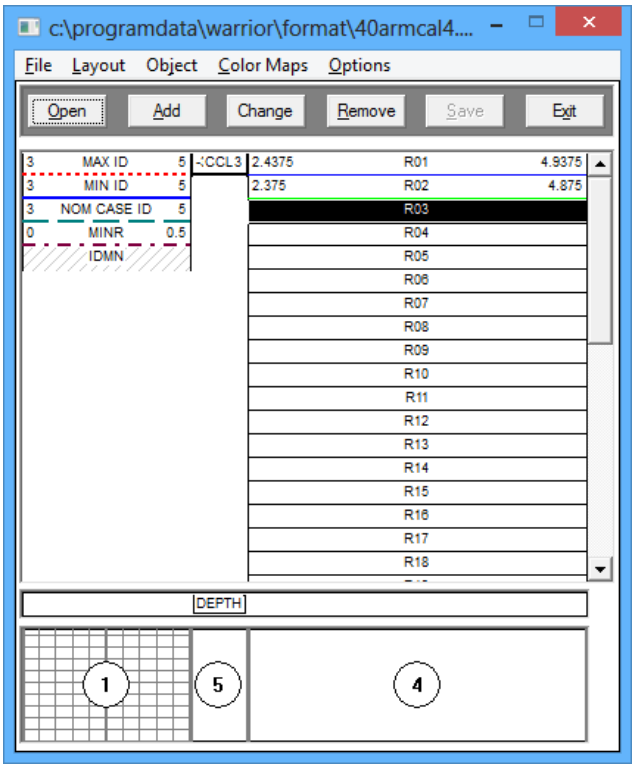


Fig. 26.32 Typical 40 arm caliper presentation

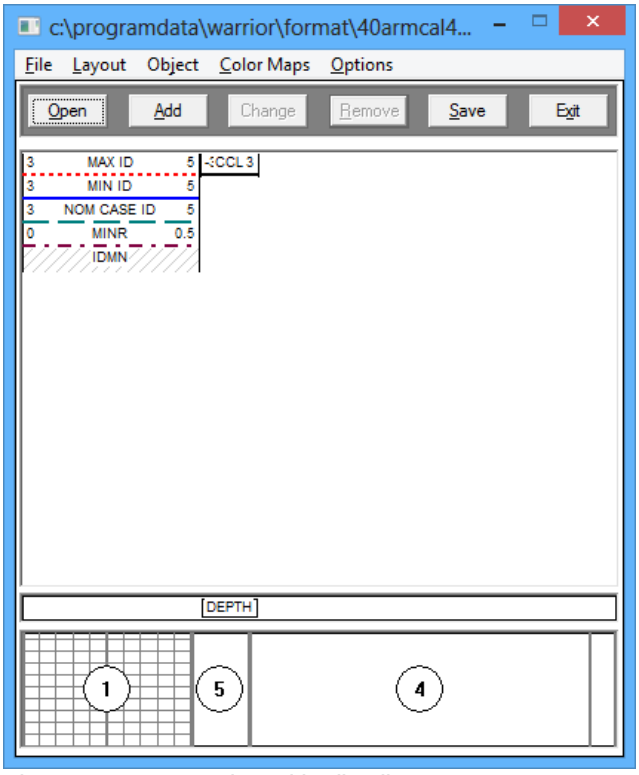


Fig. 26.33 Presentation with all caliper arm curves removed

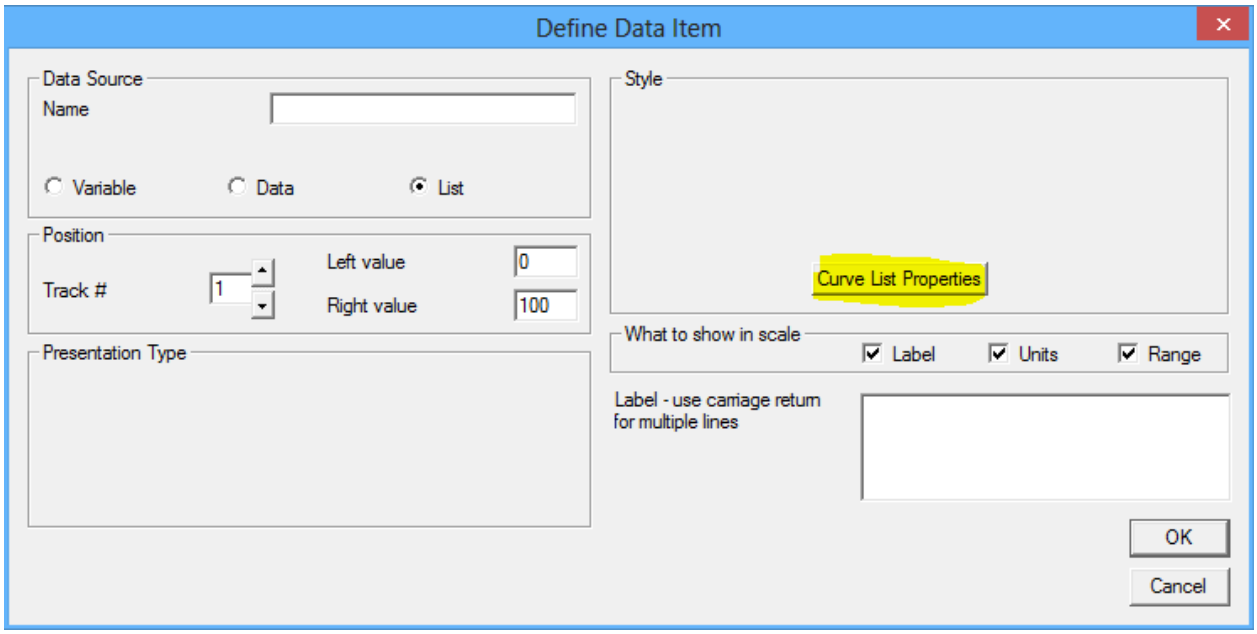


Fig. 26.34 Selected List type Data Source DB Item

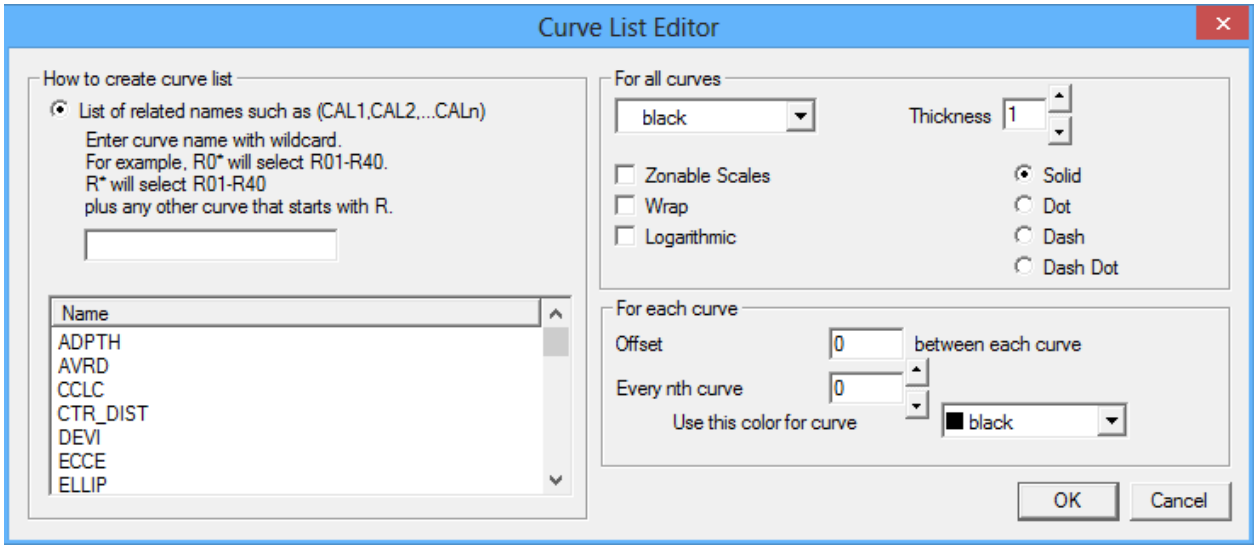


Fig. 26.35 Curve List Editor Window

On the left side of the Curve List Editor Window is a drop-down list of all the available outputs. Select the first curve in the list of curves that you would like to plot. There is a brief example that describes how to pick the curve shown in the “How to create curve list” box. When the curve is selected, the “list identifier” will be filled out. The “For all curves” box of the Curve List Editor Window is used the same as the style box of a normal curve.

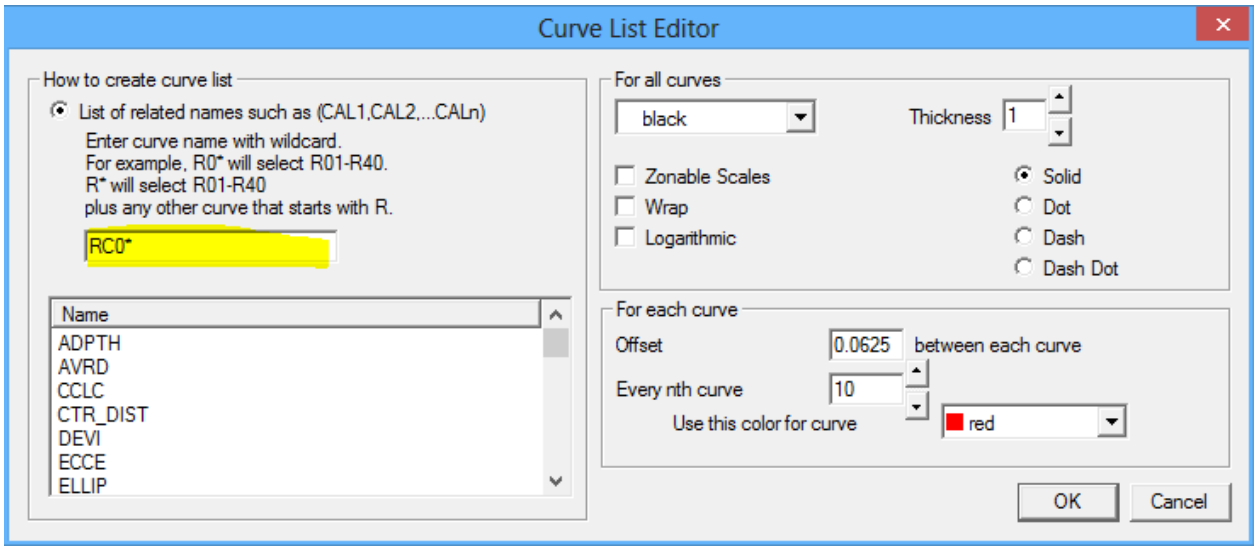


Fig. 26.36 Select List of Curves

The “For each curve” box provides some additional settings. When plotting multiple curves, it is normal to offset each curve by a small amount so that the curves are not stacked on top of each other and are distinguishable. Another method of distinguishing multiple curves is to make one of the curves a different color every so often. This box provides the User those capabilities with the multiple curve lists. When the settings have been selected, click [OK] to close the Curve List Editor window. Note that the scales for the first curve and every nth curve will automatically be shown.

The final settings for defining the list of curves are giving the list a name. This can be anything to identify the list, such as Calipers, R0 thru R40, or whatever the User decides is appropriate. The track and the scales also need to be set. The scales will be the scale for all the curves, but only the first curve and every nth curve will the scales be shown on the log insert. When complete, click [OK] to save the curve definition. Then click [Save] to save the edited plot.

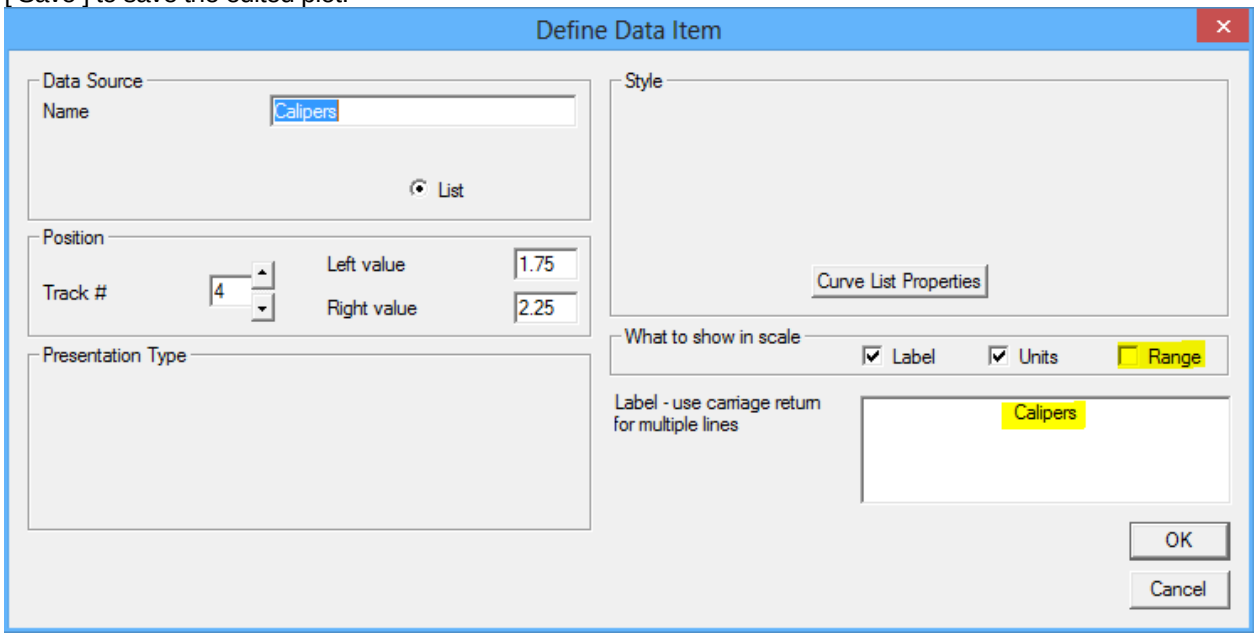


Fig. 26.37 Setting Track and Scales and giving list of curves a name

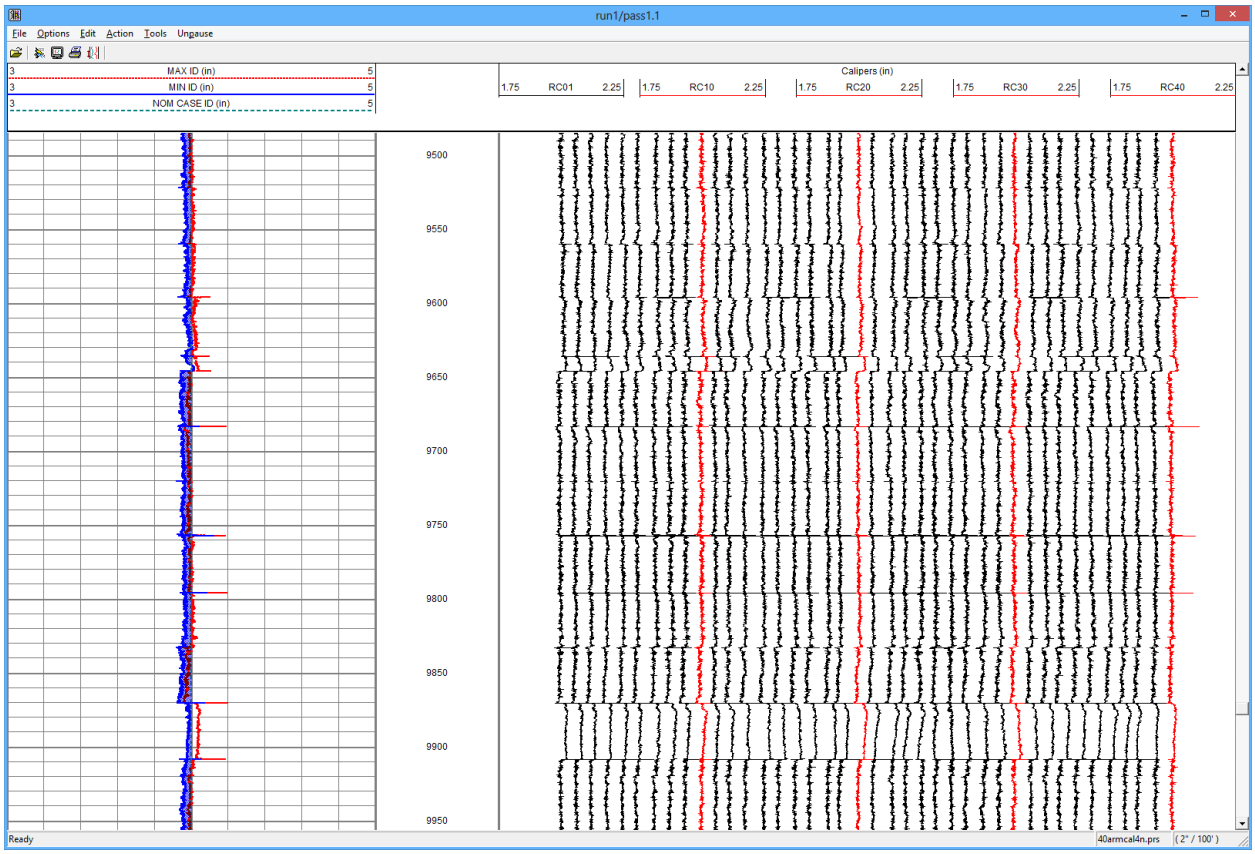


Fig. 26.38 Final presentation for a list of caliper curves

26.3 Multiarm64(32).exe

This program will read in LAS data from a Multi-Arm service and create a single pass in a Warrior database. This pass will not only contain the curves found in the LAS data, but will also create a 180-point VDL curve by interpolating between each of the Multi-Arm caliper readings. This program also contains a viewer that can display a 3-dimensional view of a section of the Multi-Arm data. The program is located at "C:\Program Files\Scientific Data Systems\Bin"

26.3.1 Importing Multi-Arm Data

The first step is to import the Multi-Arm data in to a Warrior database. Use the build button “Import from LAS” to select the LAS file to import.

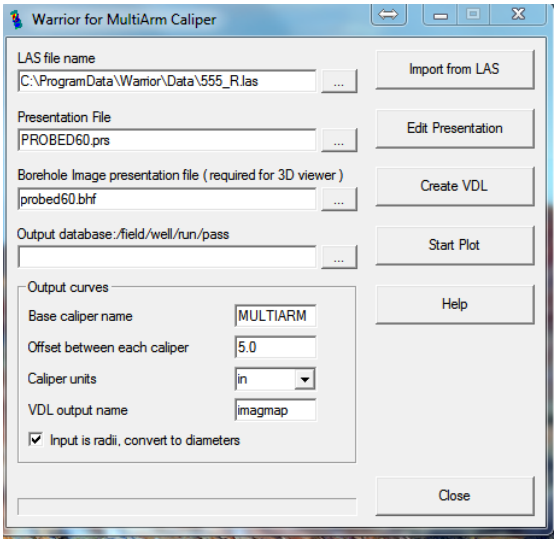


FIG:26.39 LAS Multiarm Caliper

26.3.2 Caliper Presentation

The presentation file will be embedded in the database as the presentation to be used when the data is plotted. This can be edited later.
Select the Las File
Select the Presentation file (Probed60.prs)
Select the output database Select an existing database or type in a new database name. Fill in the field/well/run portion of the dataset. The name of the pass will always be the same as the LAS file name.
Set the offset between calipers to show all the calipers in one track
Type the “Base Caliper Name” (MULTIARM)
Type the VDL output name (imagmap)
If you just have LAS, then select **import from LAS**. If you have the database select create **VDL**

26.3.3 Output curves
The program will search through the Multi-Arm LAS data for caliper curves that start with this name – i.e. ARM1, ARM2, etc. It uses these names to create the 180-point interpolation for the 3-D view. The offset between each caliper is automatically applied to the presentation file to display the individual arm data. An offset of 0 would put all the arm curves on top of each other which may make it difficult to see responses of individual curves. The VDL output name is the name of the curve that will contain the interpolation of the caliper data. This curve will contain 180 data points for each depth sample.

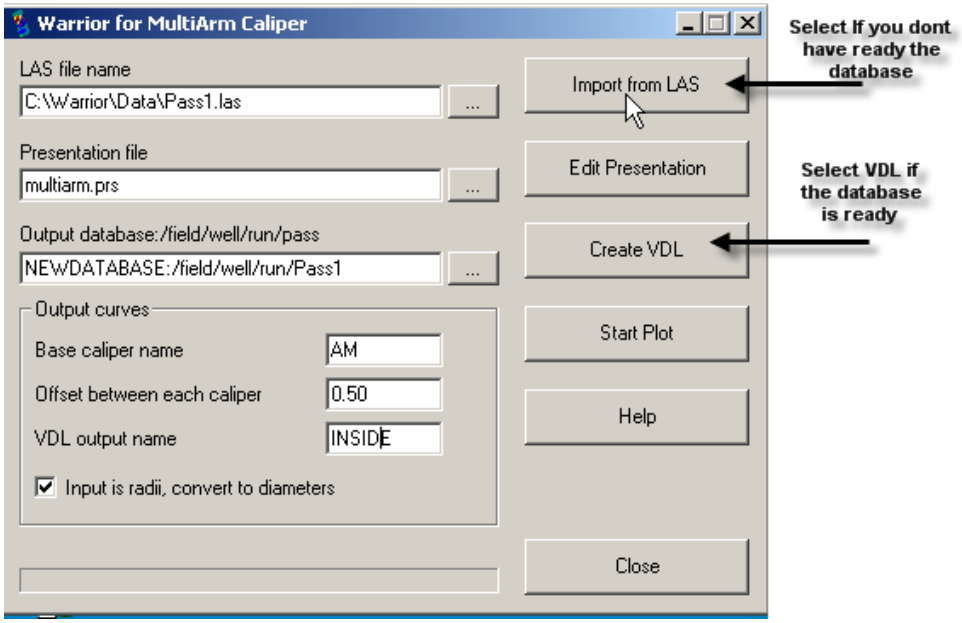


FIG: 26.40 Set up Multi-Arm Caliper

Start the process to convert the LAS to BD It takes long time for example to produce 1Gb .

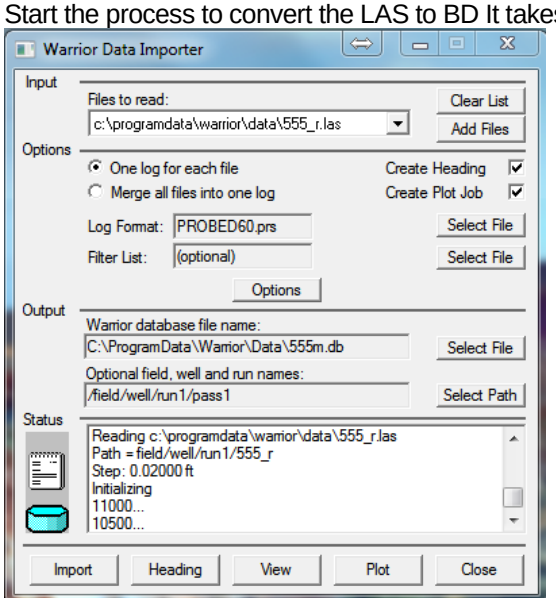


FIG: 26.41 Warrior Data Import

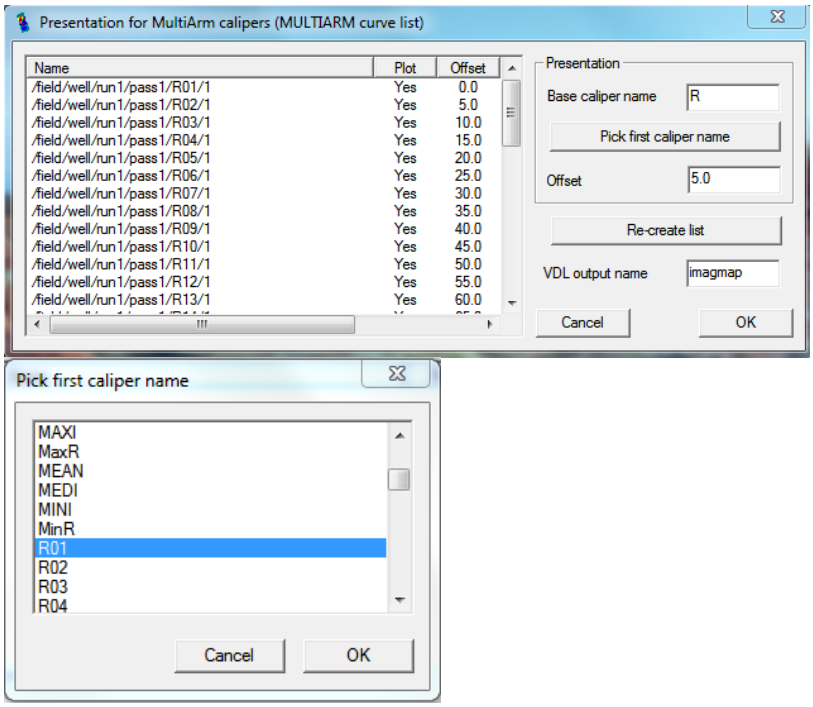
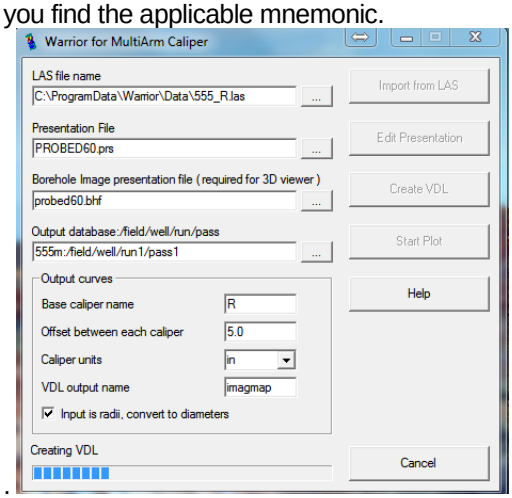


FIG: 26.42 Selecting Caliper Name

Once the system reads through the LAS file it will prompt you to select a caliper name, browse the list until you find the applicable mnemonic.



.

FIG 26.43 Creating VDL

Once it has completed the process the system will open the resulting file with interactive plot using the presentation selected earlier.

26.3.4 Edit Presentation

See section 6

Calibration Reports for IMG tool software (multi-finger calipers)

Background

First a little background about Warrior calibration reports.
Calibration report formats are essentially templates that describe a mixture of hard coded text and place-holders for calibration “terms” that the logging system produces.
The formats have the extension “wcp” and are edited using a text editor.
Within the file there are three sections:
[columns], starting at 1, this is a list that lets us demark column positions for placement of text in the report (the report itself is described row based).
For example:
1=10
2=45
3=20
4=27
5=34
Etc.
[layout], also starting at 1 for row 1, typically uses column references, alignment characters and text or “terms” to place information on the report dynamically when being generated.
@n places whatever follows at column **n**, **~** implies centering, **-** as the first character of a line implies a thin dividing line, **=** as the first character of a line implies a thick dividing line, **.** as the first character of a line implies a blank line. Terms are bookended between **%** symbols.
For example:
1= ~ Multi Finger Caliper Tool Calibration Report
2=-
3=@1 Serial Number: @2 %serial%
4=@1 Tool Model: @2 %model%
5=@ 1 Performed: @2 %date%
6=.
[WarriorFileInfo] is the final section, this is used during restoring of configuration backups or tool calibration exports or service exports. When a restore is made on a new system from the exported file if the target computer already has a file with the same name this section is looked at and compared to

resolve the conflict, when the date of the new file being restored is newer than the current then the new file will write over the current. The only content of this section is a line like the example below representing August 3rd, 2017, version 1 of the day (001):
WarriorFileVersion=2017.08.03001
Some tool modules have hard coded calibration report format file names but, in many cases, there is an option to specify the name (or base name when multiple pages are required) in the Tool Editor. Terms are generally tool module specific but there are a few general "terms" that will appear such as tool name, mnemonic, date of the calibration, model and serial number. This document will focus mostly on the "terms" produced by the IMG tool module but first here is how the format files should be named,

IMG calibration format file naming

Because by nature we are interested in information not just about the tool itself but also the individual caliper arms the calibration report can easily span more than the typical one page of say a simple logging tool like a Gamma Ray. Also, the IMG module must cater with various dynamic options where the number of individual arms can vary from one tool to another, the number of calibration references can vary, calibration options can vary, the engineering units can vary as well as some proprietary or tool type terms may or may not be produced also.
In the initial stages of this tool module development we required two or three pages for the reports depending on the number of arms. Any tool up to and including 40 arms would have two pages, the first for "master" or "shop" ring calibration, the second for the verifications. These would be files "basename_1.wcp" and "basename_2.wcp". Tools with more than 40 arms would have three pages, "basename_1.wcp" and "basename_2.wcp" for the "master" calibration, splitting the report of the arms in to half on the first page, half on the second. Then "basename_3.wcp" would be for the verifications.
The latest version of software has added two more pages, "basepage_n+1.wcp" and "basepage_n+2.wcp" for charts where "n" was the number of the page used for the verification report earlier. Page "n+1" has charts produced from the "master" calibration stage, "n+2" from the verification stages. So that these reports follow in a logical sequence, "master" tabular data followed by "master" charts and "verification" tabular data followed by "verification" charts, the actual "print" sequence is perhaps best shown in an example. The first column is for a 24-arm tool (would be like this for 36 and 40 arm tools), the second column for a 56-arm tool (would also be like this for a 60-arm tool). I am demonstrating this with a base cal report name of "BRANDX_MFC" which is named in the tool configuration, the number of arms and page are added dynamically:
BRANDX_MFC24_1.wcp (master cal) BRANDX_MFC56_1.wcp (master cal page 1)
BRANDX_MFC24_3.wcp (master cal charts) BRANDX_MFC56_2.wcp (master cal page 2)
BRANDX_MFC24_2.wcp (verifications) BRANDX_MFC56_4.wcp (master cal charts)
BRANDX_MFC24_4.wcp (verifications charts) BRANDX_MFC56_3.wcp (verifications)
BRANDX_MFC56_5.wcp (verifications charts)

IMG calibration report “terms”

There is a handy power-user “trick” to see what terms are being produced for which calibration report. After making all the calibrations, master, verifications etc., record a short database pass. In the Bin folder where Warrior is installed there is a program called EFEditxx.exe (xx is 32 or 64 depending on the installation). If you launch this software you can select File->Open, choose your database then from the list of sections on display select the pass you just recorded /_calrep_/1, for example /field/well/run1/pass1/_calrep_1/1, this will now display information that is used to generate the calibration report. Sections start at [1] and increment. The information is term=val, for example:

mnem=MFC
serial=12345
format=BRANDX_MFC56_1.wcp
model=56 Arm
date=Thu Aug 03 12:19:37 2017
Etc.

Below is a description of the latest terms, this may change in the future as the software is updated.

utArmRaw – this will be blank or have the raw caliper units, for example “mV”

utAmCal – this will be the user selected caliper units, for example “mm” or “in”

Dia**N**Ref – for each master calibration ring reference (N) there will be a term for the size in the units used, for example:

Dia1Ref=4.00
Dia2Ref=5.00

Ref**N**EccPct - for each master calibration ring reference there will be a term for the apparent eccentricity (%)

Arm**N**Off – for each arm (N) this is the offset applied to the calibration (typically 0 but the user can edit)

Arm**N**Rdg**Y** – for each arm (N) and each master calibration reference (Y) there will be a raw reading (some tools this has temperature correction applied and is in engineering units like “mm”, others types may be telemetry values, for example:

Arm56Rdg1=1.98
Or
Arm56Rdg1=2311

Arm**ND**Rdg**Y** –as above but doubled, useful for tools with temperature correction applied before the master calibration to give a “diameter” comparison:

Arm56DRdg1=3.96

Arm**N**Raw**Y** – for each arm (N) and each master calibration reference (Y) when the tool has raw readings in caliper engineering units we also store and make available the telemetry readings

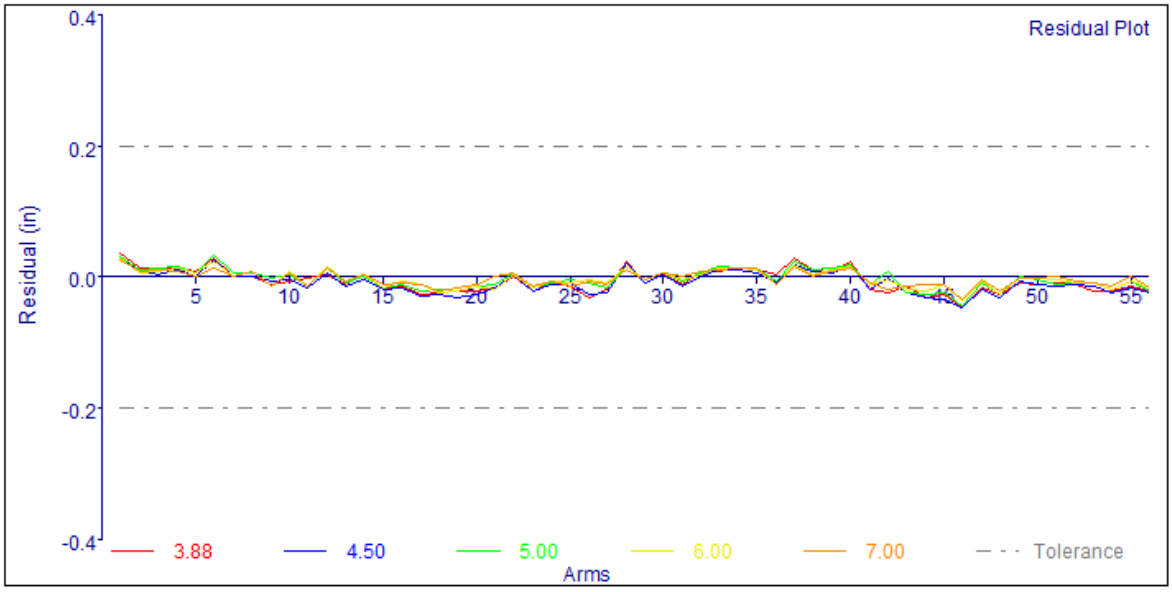
Arm**N**Corr**Y** – for each arm (N) and each master calibration reference (Y) if eccentralization calibration is being utilized this is the amount of correction needed
DRefTol - the reference tolerance used for diameter (double radii) comparison in the master calibration
RefTol – as above but tolerance for radii comparison
Arm**N**RefTolBad**Y -** for each arm (N) and each master calibration reference (Y) this is the symbol ! when the reading is outside the reference tolerance specified
Arm**N**RefTolDDiff**Y -** for each arm (N) and each master calibration reference (Y) this is the difference of double radii to reference
Arm**N**RefTolDiff**Y -** for each arm (N) and each master calibration reference (Y) this is the difference of radii to half reference
Arm**N**Bad – for each arm (N) this is the symbol * when an issue is found with the arm during calibration (for example all readings 0
Arm**N**CorCoef – for each arm (N) this is the homoscedastic (linearity) coefficient during the master calibration
Arm**N**BFGain – for each arm (N) this is the best fit gain during the master calibration
Arm**N**BFOffset – for each arm (N) this is the best fit offset during the master calibration
LinTol – tolerance used to identify arms out of linear tolerance
Arm**N**LinTolBad – for each arm (N) this is the symbol ~ when an arm is out of linear tolerance
ManuSerial – when a manufacturer calibration file is used this is the serial number from the file (can differ from Warrior serial number)
ManuCalBy – when available this is the user described as performing the manufacturer calibration from the supplied file
ExtCalFileDate – when available this is the date from the manufacturer supplied calibration file
ResPlotD – this is the Residual Plot chart (when applicable) from the master calibration
NormFitPlot – this is the Normalized Plot chart from the master calibration
ECC – Either blank or “Eccent. Corr. On”, this indicates if the master calibration used eccentricity correction
The following terms are from the Verifications, there are Pre, Post and Adhoc terms, below when describing a term starting with the prefix “Pre” there will be similar terms with prefixes of “Post” and “Adhoc”
PreArmVerTime – time verification was performed
PreArmVerRef – diameter reference of verification
PreArmVerMin – minimum diameter observed during verification
PreArmVerMax – maximum diameter observed during verification
PreArmVerAvg – average diameter observed during verification
DVerTol – double radii verification tolerance (reading vs reference)
VerTol – as above but radii

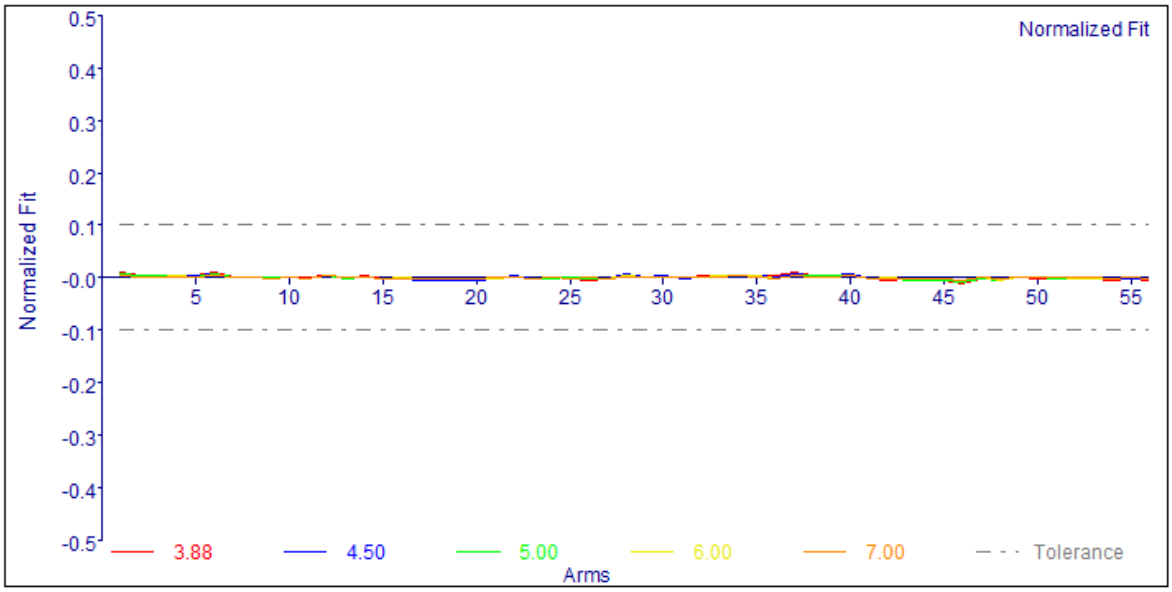
PreArmVerDia**N** - for each opposing pair of arms (N) this is diameter read during verification
Dia**N**TolBad - for each arm (N) this is the symbol * when the above diameter is out of reference tolerance
PreArmVerRad**N** - for each arm (N) this is the radii reading of the verification
PreArmVerDRad**N** - for each arm (N) this is the double radii reading of the verification
PreRad**N**TolBad - for each arm (N) this is the symbol * used when the radii is out of reference tolerance
PreArmEccPct – this is the term for the verification apparent eccentricity (%)
WearTol – Wear verification tolerance (pre radii vs post radii)
WearRad**N -** for each arm (N) this wear (pre verification – post verification)
WearRad**N**TolBad - for each arm (N) this is the symbol ! used when the wear observed is out of tolerance
WearPlot – this is the Wear chart (Pre vs Post) radii comparison
PrePlotD – this is the Pre Verification chart (vs Reference) double radii comparison
PostPlotD – this is the Post Verification chart (vs Reference) double radii comparison
AdhocPlotD – this is the Casing Check Verification chart (vs Reference) double radii comparison

Please note that using EFEdit can potentially (if you change and save back anything) corrupt a database, this is a power user tool and not recommended for general purpose use. Please contact Scientific Data Systems if help is needed in generating calibration report formats.

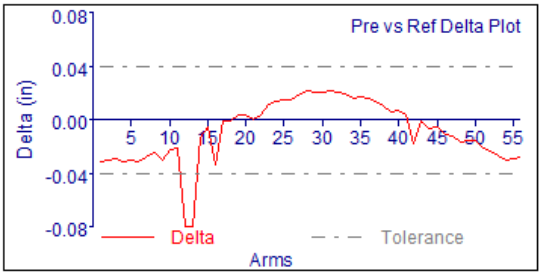
References

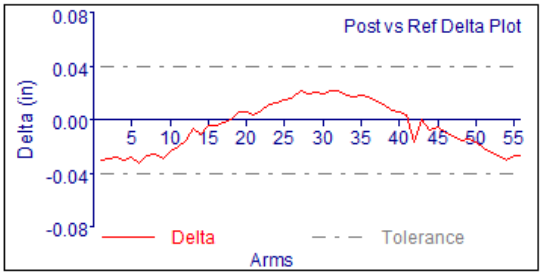
Example Master Calibration Charts (Residual and Normalized):

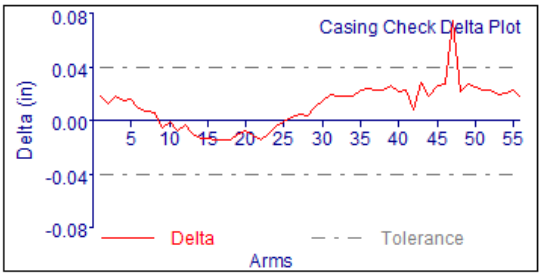


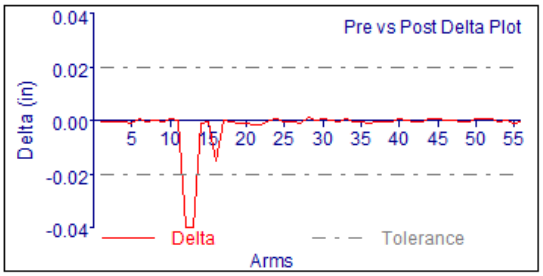


Example Verification Charts:









Section

27

27 Radioactive Tracer Survey

27.1 Setup Procedure

Bring up Radioactive Tracer service.
Click Acquisition Box - Edit - Tool String
Edit the tool string as necessary to reflect the tool string being run. This is important to insure proper offsets, filters, and tool diameters.
Click Acquisition Box - Edit - Variables

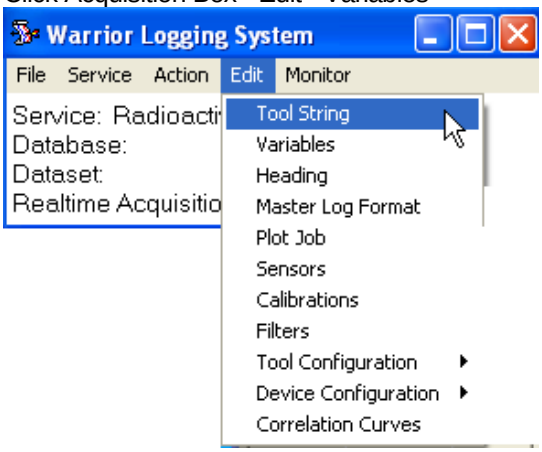


FIG: 27.1 Tool String

Edit the variables to reflect the correct casing ID and tubing ID sizes for proper flow rate calculation (Tubing OD is also important if running in annulus). Add multiple zones if needed. (Note: a size of 0 indicates no casing, tubing, etc.).

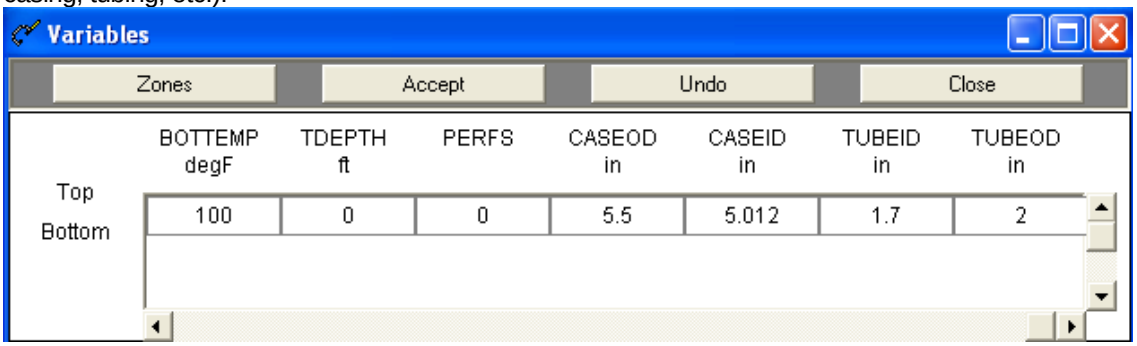


FIG: 24.2 Edit Variables

Click **Acquisition Edit Tool Configuration TREJCT** to bring up tracer configuration dialog box.

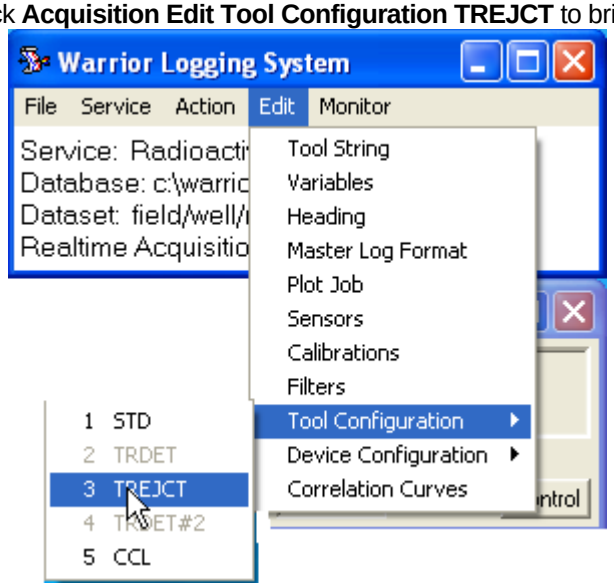


FIG: 27.3 Tool Configuration

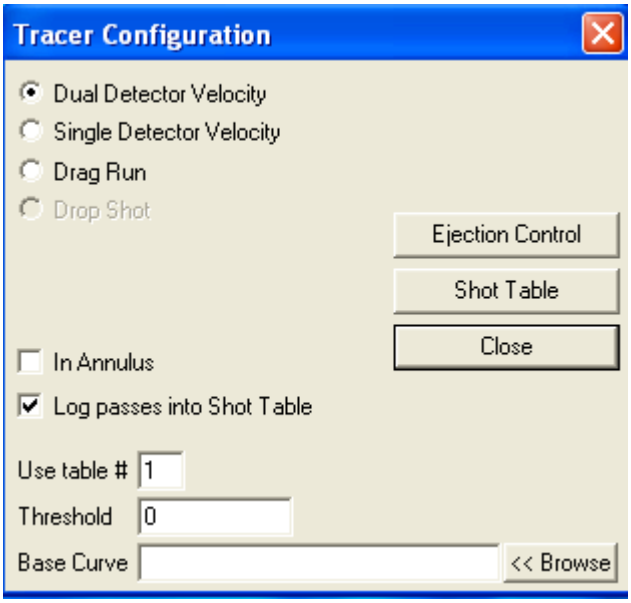


FIG: 27.4 Tracer Configuration

Pick the method of tracer log you wish to run Dual Detector, Single Detector, or Drop Run.
For Single Detector Velocity logs, the detection level can be determined from a base log pass if one has been run, (use browse to select it, it must be in your current database). Or enter a threshold value for the level of when a shot should be detected. More on this later.
If the log is being run in the annulus between the tubing and casing, check this box for proper flow rate determinations.
Other than base runs, make sure the Log Passes into Shot Table Box is checked.
While normally all shot passes are logged into a single table, more than one table can be used and would need to be selected.

27.1.1 Tracer Ejection Control

Click **Ejection Control** box to set up ejector control. The ejection duration that you choose is dependent upon your tool type and strength of the tracer material being used. (This should be tested with water prior to the job to determine the approximate number of shots that will be available during the job.)

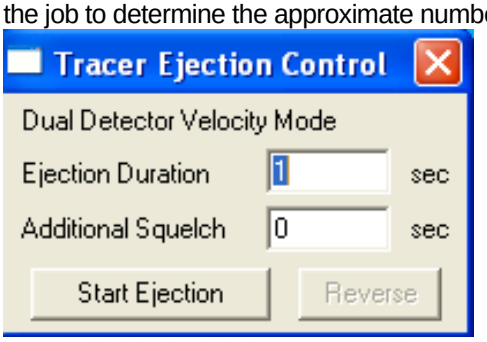


FIG: 27.5 Tracer Ejection Control

The Additional Squelch time is set to allow settling of the gamma detectors after the ejection to avoid noise being detected on the log.

27.2 Logging Procedures

The depths where a tool is positioned in the well can be critical to the final log interpretation. Normally the Warrior system uses the bottom of the tool string as its zero point; this may put the detectors several feet above the depth shown. (It is possible to change the zero point to a sensor if desired.)
If drag runs or velocity shots with a single detector are going to be done, it is recommended that a base run be logged first to record a background gamma. Use this to determine the threshold detection level or as a base curve that the threshold level is added to before detection occurs. Be aware detection occurs when the detector value crosses this threshold or base curve value plus threshold level, statistical deviations may cause premature detection. (Pick a high threshold level high enough to not cause premature detection.)

27.2.1 Velocity Shots

Position the tool in the well at the depth that you wish to make a shot. Shot passes are Recorded on Time. The true depth of the encoder is used as the shot depth. When starting a log pass. Allow enough time for the detectors to obtain a “background reading”. Then click the **Start Ejection** control. Continue recording until the detectors have drop back to the previous background reading. Stop the log pass.
Log as many passes in this manner as desired.
The Shot Table will now reflect the information just recorded. If a single detector method was used, the times and the flow rates will be complete. If a dual detector method was used the pass will have to be correlated to calculate the proper time, and thus the flow rates, as described below.

27.2.2 Drag Runs

Normal procedure is to eject a tracer slug, then to drop down and Record Up until the slug passes, then stop the pass. Then drop back down and start another pass. Each pass is recorded as a separate entry into the shot table.
The normal calculations integrate the area between the detection level and the curve, so it is important to record the complete passing of the tracer material.

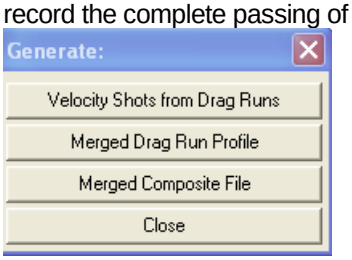


FIG: 27.6 Generate

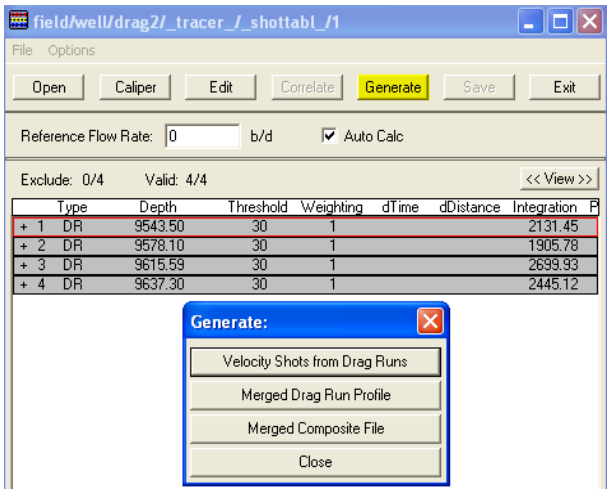


FIG: 27.7 Generate Drag Run Profile

By clicking on the Generate button of the Shot table, all drag runs with a plus sign will automatically be merged into a single presentation. Selected annotations can be added for each pass. By using auto merge, curves from other passes, such as collars, temperature, or gamma, can automatically be added to the presentation. By clicking on Velocity Shots from Drag Runs, records in the shot table will be generated with distances between runs. To get the times, each record will then have to be correlated.

27.2.3 Shot Table Editing, Correlation, and Flow Rate Log Generation

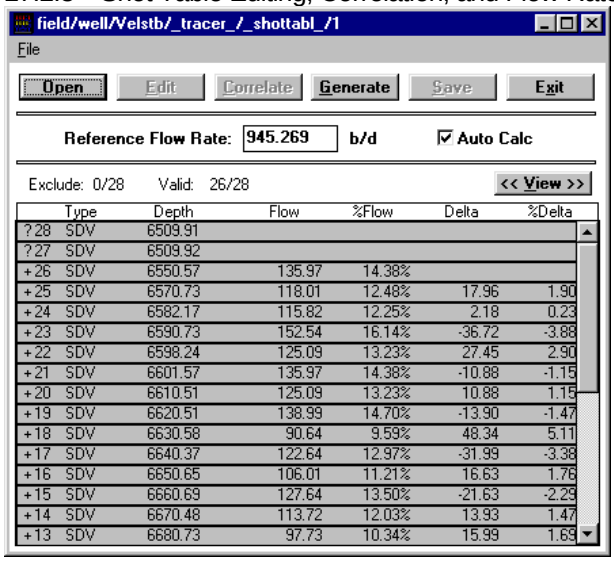


FIG: 27.8 Table flow rate

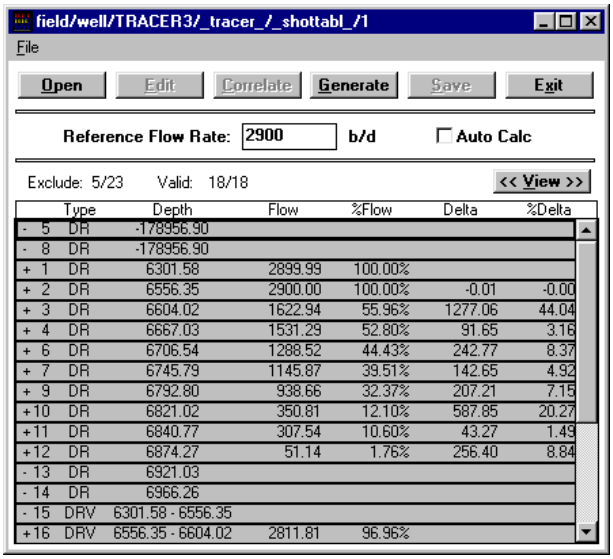


FIG: 27.9 Table Flow rate

Access to the shot table can be obtained through the Acquisition box and Editing Tool Configuration and choosing TREJCT and then clicking the Shot Table Button. It can also be accessed from the Utilities menu through the Tracer Interpretation selection.
The Shot Table shows the information taken each time a log pass was started. The first column contains a +, -, or ?. A + indicates a valid calculation. A – indicates that the record has been excluded from calculations. A ? indicates that correlation has not been done to determine time. The second column indicates the type of record. DR is drag run. DRV is velocity determined from drag runs. SDV is single detector velocity. DDV is dual detector velocity.
Other columns indicate depth of pass, flow rate, percentage of flow rate, change of flow rate, percent change of flow rate. By clicking on the view button, casing and tool dimensions can be viewed. Also available are detection times, integration, and dataset information.
Certain information for a given record can be edited by selecting the record and clicking the edit button or by double clicking on a record. Casing and tool dimensions can be changed. Weighting other than 1.0, adjusts the calculated output. . An unsatisfactory station can be removed from the flow rate calculations by removing the check mark beside **Include in calcs.** A record marked as reference will be maximum or 100% flow rate.

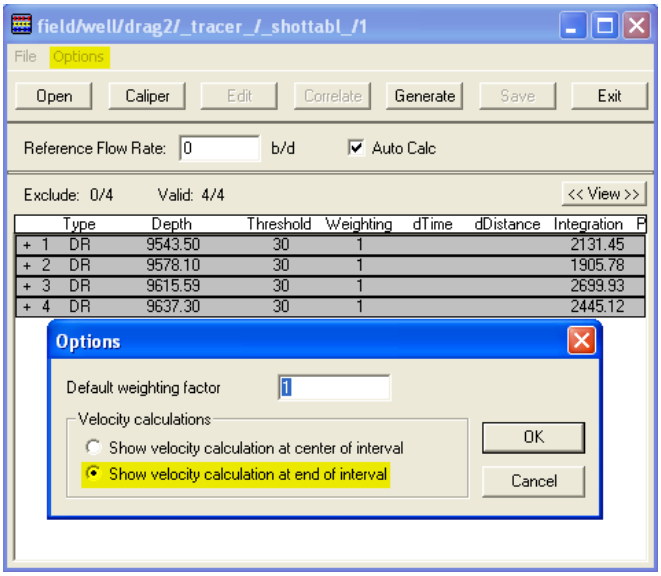


FIG: 27.10 Options

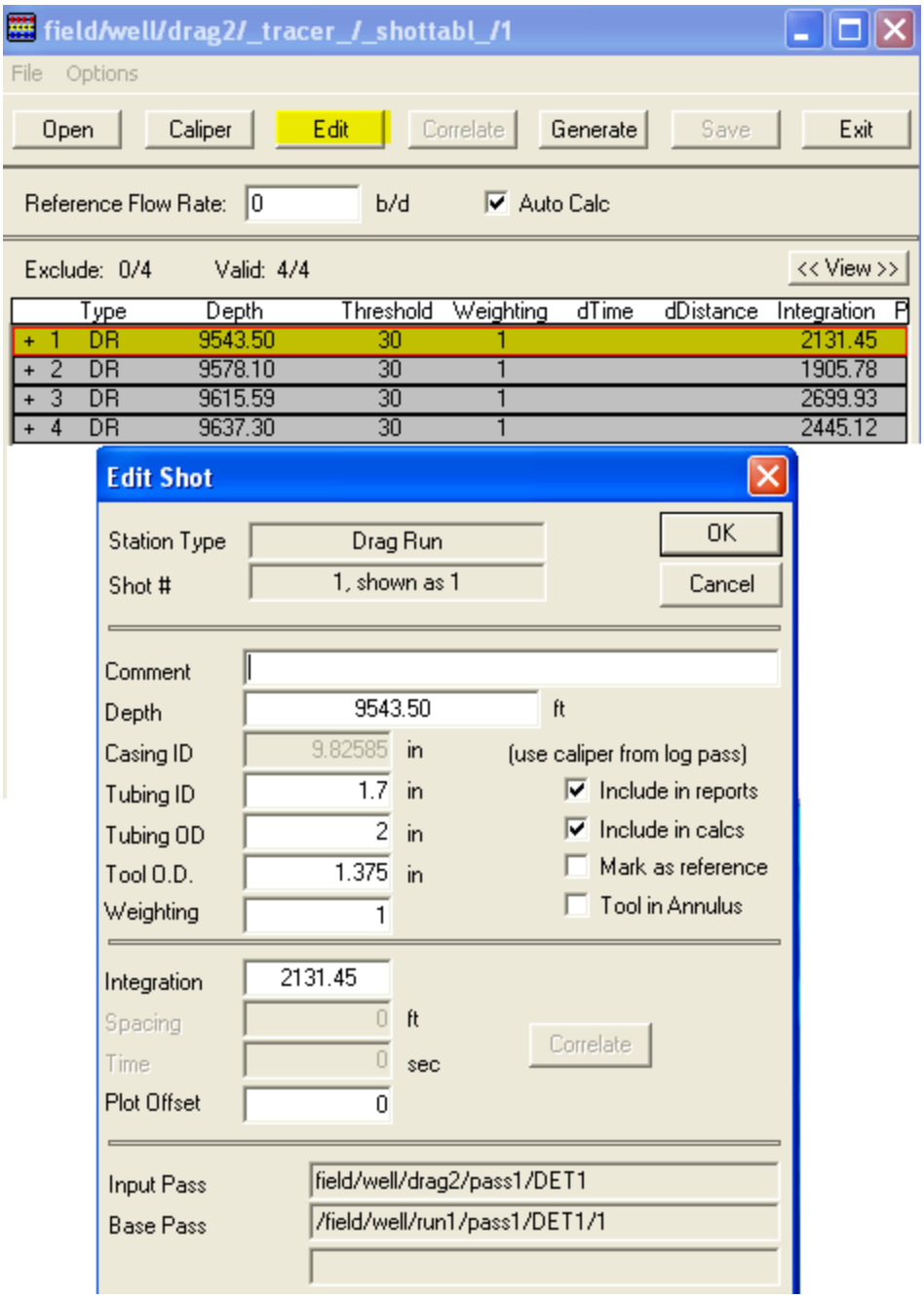


FIG: 27.11 edit shot

If a Dual Detector method or velocity shots from drag runs was used, the data recorded will have to be correlated before times will be computed. Shots that have not been computed will be tagged with a question mark (?). Click on a shot pass to select it, then click on correlate to open the correlation process box.

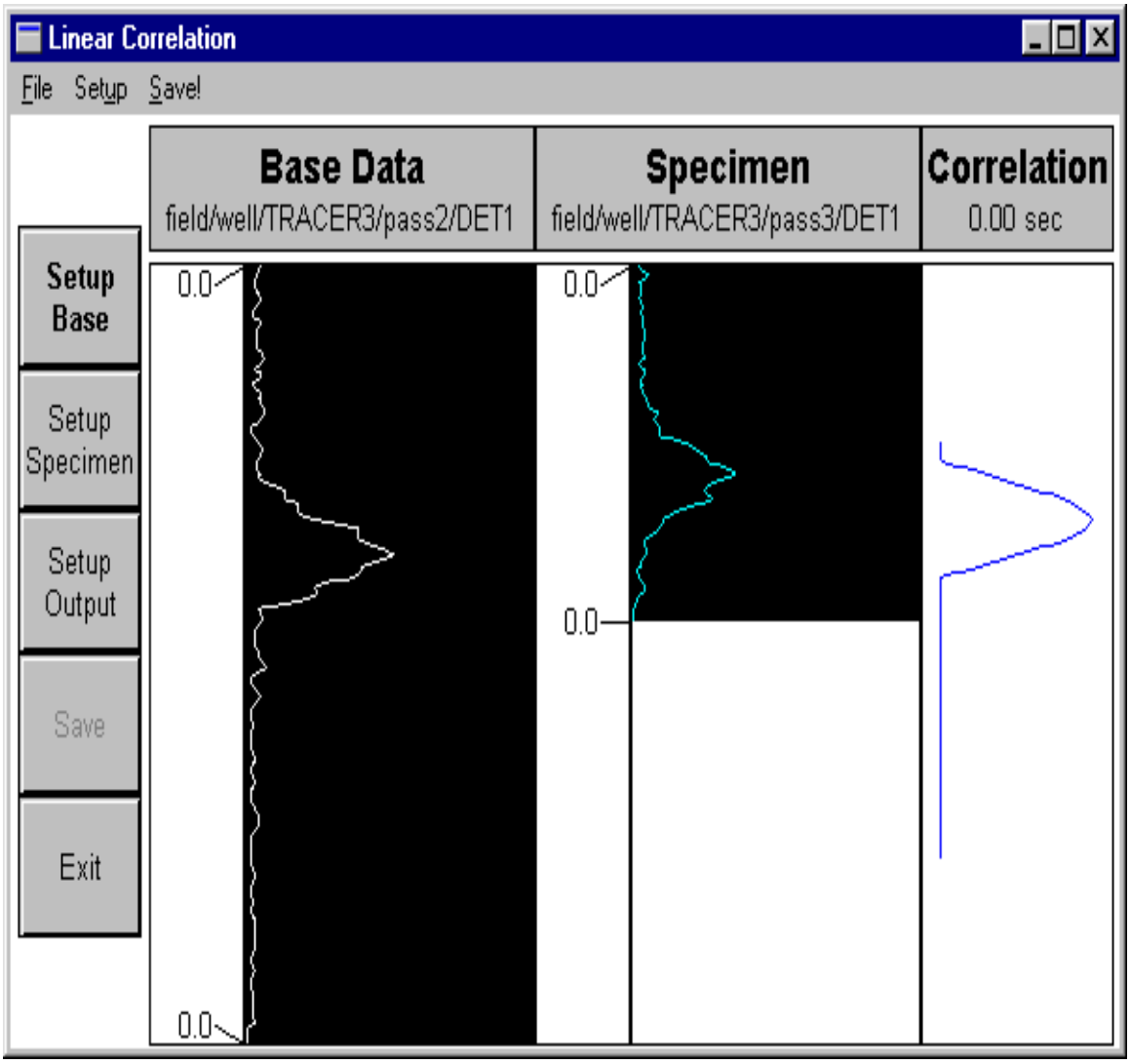


FIG: 27.12 Liner Correlation

Normally the selected base curve, specimen curve, and output curve will be setup. There are options to select different curves to be used if desired. On the base data, click and drag on the portion of the data that you think is valid, if the whole pass looks good, this step may be skipped. On the specimen data, click and drag on the portion of the data that is valid. The length of this data MUST be less than the length of the base data.
It is important that the whole response to the shot be selected since the calculations are done on the area under the curve and not on a given level.
Click Begin to compute the time. Click Save to retain the present calculations. Click Exit to return to the Shot table.
When all stations have been edited as desired, click on **Generate**. Choose Merged Composite File. Curves from a collar locator pass, a gamma ray pass, etc. may be added to the final presentation if desired. Finally, when OK is clicked the flow rate presentation will be plotted out.

27.3 Service Specific - Tracer Survey

The Tracer service incorporates several special features that may require further explanation. The Warrior software attempts to calculate results from each pass of data as it is recorded or immediately afterwards.

27.3.1 Dual Detector Velocity

In **Dual Detector Velocity** mode, the time displacement between the two curves is determined by a correlation technique. Any part or all the data may be used to match the curves together. It is essential that complete event of the slug passing the detectors be recorded for this technique to be effective.

27.3.2 Single Detector Velocity

In Single Detector Velocity mode, the time from the ejector shot to a threshold crossing by the GR (or detector) curve is measured. If two detectors are in the tool string, the time measurement is made from the ejector shot to the first GR curve to cross the threshold.

27.3.3 Tracer

In **Tracer** the area between the designated GR (or detector) curve and either a baseline GR or a fixed level, is the primary measurement.
The results and other information are placed in a **Shot Table**. The contents of the shot table are used as a basis for the calculation of total and differential flow rates for display in tabular or log format.
When a Tracer survey is selected, **Edit/Tool Configuration/Tracer** brings up the **Tracer Configuration** window as shown below.

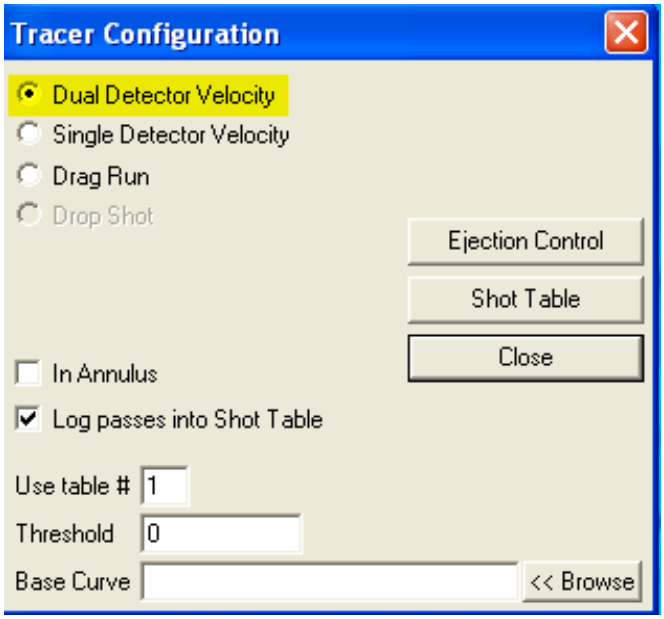


FIG: 27.13 Tracer Configuration

The user defines the type of survey to be run from a choice of Single or Dual Detector Velocity, or Tracer (Drop Run). This selection defines the type of on-line calculation that the software will attempt. If the survey is being run in the annulus the **In Annulus** box should be selected on order that the correct calculations be made.
If it is required that the passes be inserted into the current shot table, the **Log passes into Shot Table** should be selected. This would be the normal case to record the results and is the default.
More than one Shot Table may be defined for each survey.

27.3.4 Drag Run

Drag Run option is selected the user is asked to define which detector is to be used.

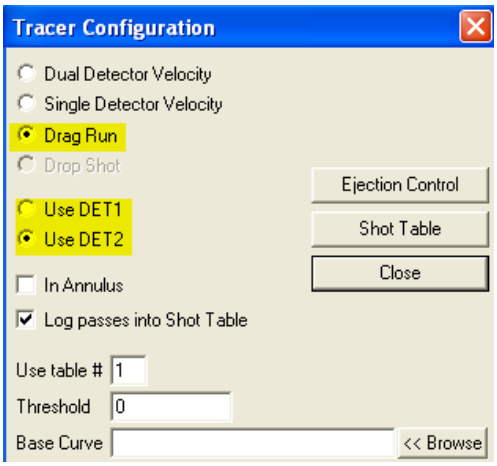


FIG: 27.14 Tracer Configuration

When two detectors are in the tool string and single detector velocity is selected the system will make calculations based on the first curve to cross the threshold.
When making calculations from the tracer passes (i.e. the area under the DET curve) it is necessary to define either a fixed threshold value or a baseline DET pass. The area under the DET curve and above the Threshold or
Base Curve is used to calculate the percentage of the original radioactive material passing the detector and the flow profile.
This information is defined in the **Threshold** or **Base Curve** fields.
To display the current **Shot Table** and/or **Tracer Ejection Control** window click on the appropriate button.

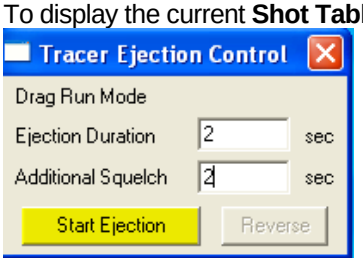


FIG: 27.15 Tracer Ejection Control

When running the service with the SDS interface panel the operator has the option to control the run time of the ejector motor from the Tracer Ejection Control window.
The length of time for each motor run is entered in the **Duration** dialog box. Clicking on the **Start Ejection** button changes the polarity of the line power for the time set in the Duration box.

27.3.5 Additional Squelch

The **Additional Squelch** field allows the user to set an additional dead time period in the DET curves after the ejector motor has run in order to avoid line noise appearing on the log. The time needed depends on various factors and is best set by trial and error.
The Tracer tool software module generates a curve called **EJECT** which shifts one unit to the right for the period of the ejection, thus indicating the occurrence and duration of the ejector motor run.
The survey is currently run by logging with the internal encoder simulator, however the actual depth is recorded as a curve named **ADEPTH**. This curve may be presented on the log in curve or tabular form, in order to indicate movement of the tool during the survey.
The elapsed time from the start of the survey is available via a curve named **ELTIM**.

Section

28

28 Freepoint Service

Warning!

The warrior panel supports motorized and non-motorized free point tools depending on a combination of panel type and installed boards. Before importing a free point, service check the panel type in the warrior control panel.

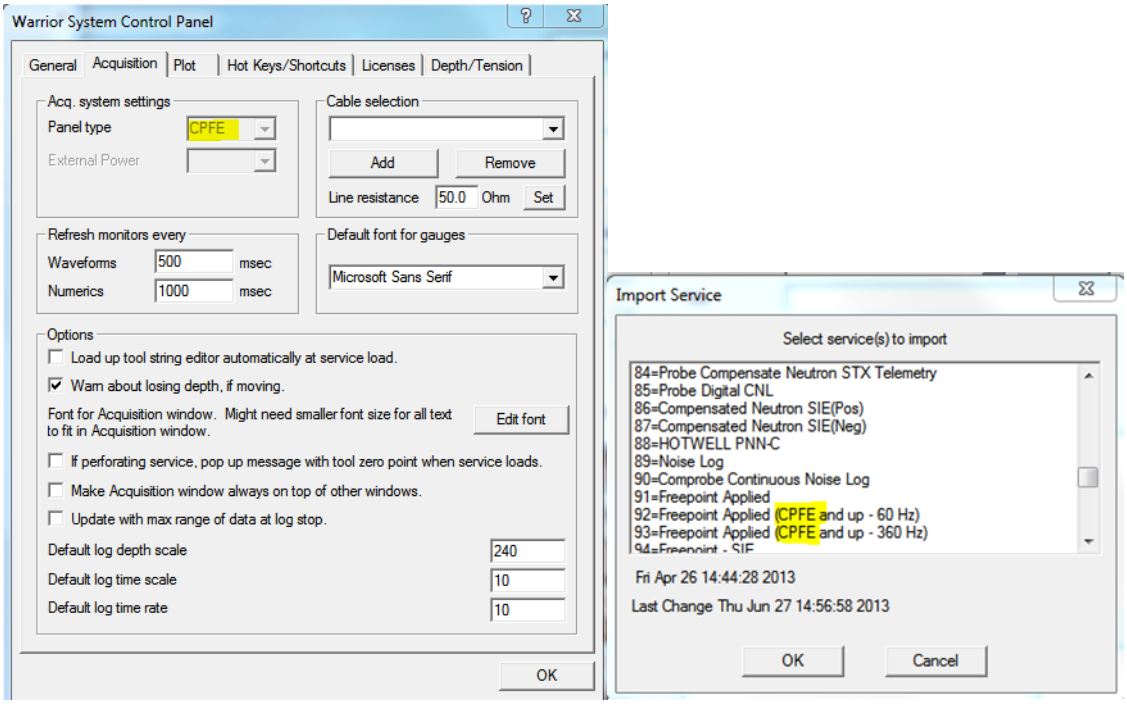


FIG:28.1 Free point Service must match Panel Type

28.1 FREEPOINT Service CPFE and newer panels.

The current warrior system uses a combination of TELA board and the DSP for the free point service. Currently there is a 500ma limit for setting the tool, if your free point tool requires more current to set it, you will require an external panel. Supported tools include Applied Electronics Bowspring and Magnetic tools and

Homco tools. Other models of Freepoint tools could also be setup in the Warrior system if the frequency of the transponder is known.
When the Freepoint service is first started, the window show below will appear. This is the Freepoint service control panel. It shows a graphical representation of the Freepoint output and a text output. It has selection buttons that allow one to select whether the next station is to be run is to be torque or stretch. There are three large buttons that control the Freepoint tool setup, starting and stopping time log passes, and station manager access.

28.1.1 FREEPOINT CONTROL PANEL

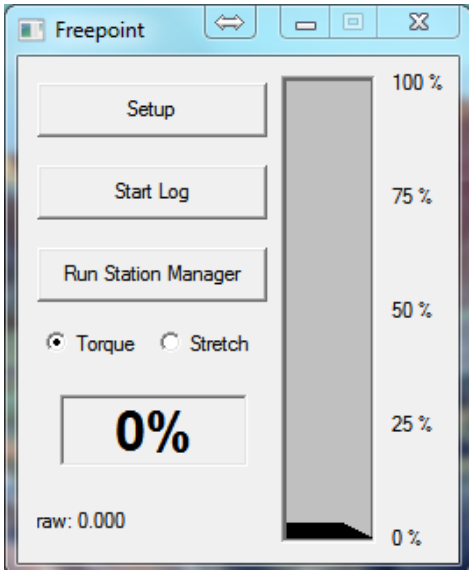


FIG: 28.2 Freepoint Control panel

28.1.2 FREEPOINT TOOL SETUP

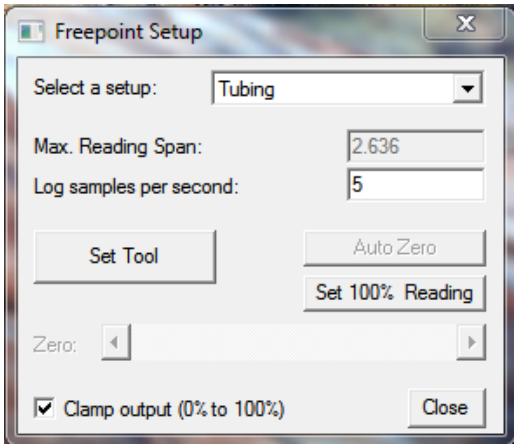


FIG: 28.3 Freepoint Setup

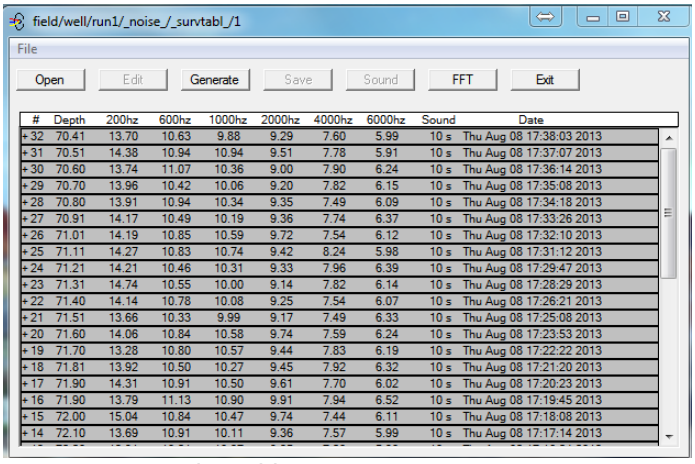
When the **Setup** button on the Freepoint control panel is pressed, the window shown below will appear. This is the Freepoint setup control panel. Up to five different setups may be saved. Which setup is used may be selected by clicking on the dropdown box and choosing from Heavy Drill Pipe, Drill Pipe, Large Casing, Small

Casing, or Tubing? Any changes made to the log sample rate or reading for 100% movement will be saved to the setup that has been selected.
A normal sample rate for the log should be set to 5 to 10 samples per second.
The 100% movement box is used to control the sensitivity of the response like the gain knob on an analog panel. Note that the lower the number the more sensitive the response will become. This does not have to be a whole number and may contain a decimal point (2.75 would be valid).
The Set Tool button engages power supply in the interface panel and temporarily applies a DC voltage to the line to set the Freepoint tool. Note that the tool power switch on the interface panel must be on and the 'Neg, Auto, Pos" switch must be in Auto position.
The Zero slide bar is used to set the zero position of the output before the log pass is started and torque or stretch is applied to the casing.
There is an optional check box to clamp the Freepoint output to 0% to 100% so that it does not go off the page on the log.

28.1.3 Running the Service

Once the Freepoint service has been selected and the tool lowered into the well to a depth where the casing is known to be free, the tool should be set, and the output zeroed. Stretch or torque should be put on the casing and the 100% movement number adjusted to get near a 100% output reading.
This should be repeated until you are satisfied that the equipment is responding correctly in free pipe. Once satisfied, the 100% Movement number should not be changed while recording stations.
You are now ready to record the first station. Click the Start Log button on the Freepoint Control panel. The system will start recording on time. Have the rig apply torque or stretch and the output will be recorded. When you have seen the tool response, click the Stop Log button to stop the pass. The minimum and maximum Freepoint readings will be entered the Station Manager table at the encoder depth (note that since the encoder depth is used. You can only simulate a log by using the encoder and resetting the depth before each pass).
Drop down the well to the depth that you wish to make the next pass and repeat the process. Make as many passes as desired to determine the Freepoint location in the well. Each pass will have the maximum output entered the station manager table.
The depths at which you run the stations do not have to be in descending order. You would normally start at the top of the well and start doing stations going down. Once stuck pipe is found, you can come back up to a depth between there and your last free pipe station to refine the stuck depth. Whatever order the stations are run, they will be entered the Station Manager table in descending order.

28.1.4 Station Manager



#	Depth	200hz	600hz	1000hz	2000hz	4000hz	6000hz	Sound	Date
+32	70.41	13.70	10.63	9.88	9.29	7.60	5.99	10 s	Thu Aug 08 17:38:03 2013
+31	70.51	14.38	10.94	10.94	9.51	7.78	5.91	10 s	Thu Aug 08 17:37:07 2013
+30	70.60	13.74	11.07	10.36	9.00	7.90	6.24	10 s	Thu Aug 08 17:36:14 2013
+29	70.70	13.96	10.42	10.06	9.20	7.82	6.15	10 s	Thu Aug 08 17:35:08 2013
+28	70.80	13.91	10.94	10.34	9.35	7.49	6.09	10 s	Thu Aug 08 17:34:18 2013
+27	70.91	14.17	10.49	10.19	9.36	7.74	6.37	10 s	Thu Aug 08 17:33:26 2013
+26	71.01	14.19	10.85	10.59	9.72	7.54	6.12	10 s	Thu Aug 08 17:32:10 2013
+25	71.11	14.27	10.83	10.74	9.42	8.24	5.98	10 s	Thu Aug 08 17:31:12 2013
+24	71.21	14.21	10.46	10.31	9.33	7.96	6.39	10 s	Thu Aug 08 17:29:47 2013
+23	71.31	14.74	10.55	10.00	9.14	7.82	6.14	10 s	Thu Aug 08 17:28:29 2013
+22	71.40	14.14	10.78	10.08	9.25	7.54	6.07	10 s	Thu Aug 08 17:26:21 2013
+21	71.51	13.66	10.33	9.99	9.17	7.49	6.33	10 s	Thu Aug 08 17:25:08 2013
+20	71.60	14.06	10.84	10.58	9.74	7.59	6.24	10 s	Thu Aug 08 17:23:53 2013
+19	71.70	13.28	10.80	10.57	9.44	7.83	6.19	10 s	Thu Aug 08 17:22:22 2013
+18	71.81	13.92	10.50	10.27	9.45	7.92	6.32	10 s	Thu Aug 08 17:21:20 2013
+17	71.90	14.31	10.91	10.50	9.61	7.70	6.02	10 s	Thu Aug 08 17:20:23 2013
+16	71.90	13.79	11.13	10.90	9.91	7.94	6.52	10 s	Thu Aug 08 17:19:45 2013
+15	72.00	15.04	10.84	10.47	9.74	7.44	6.11	10 s	Thu Aug 08 17:18:08 2013
+14	72.10	13.69	10.91	10.11	9.36	7.57	5.99	10 s	Thu Aug 08 17:17:14 2013

FIG: 28.4 Freepoint Table

As each station is run, the minimum and maximum values are placed into the station manager table. Notice that the stations can be done in any order but are placed into the table in descending order.
Once a station has been entered the table. It can be viewed and edited. Any field except the station # can be edited. This can be useful to make your final presentation more acceptable. There is a check box to disable the station so that it will not be included in the final log presentation if the tool slipped or something else occurred to make the station invalid.
When all the stations have been edited as desired, the final log presentation can be made by clicking the **Generate** button, and then click the **Depth Log** button.

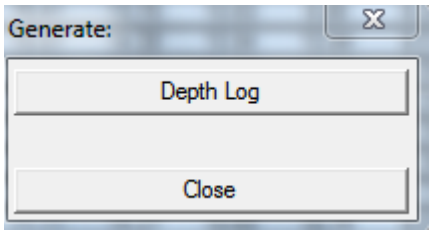


FIG: 28.5 Generate

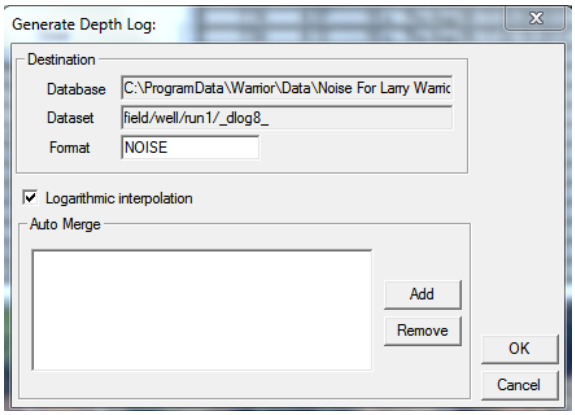


FIG: 28.6 Generate Depth

There is a check box for Logarithmic Interpolation that will produce a slight smoothing effect to the output curves. Additional curves from the same database, such as a CCL or gamma ray, can be auto merged into the output. When the **OK** button is clicked, the interactive plot will be presented on a ½" /100' scale.
Using the Plot Job Editor, a presentation can now be made for the customer. This will normally include a heading, the Freepoint survey table, the generated depth log. The individual station passes could also be included and a tool string diagram if desired.

28.2 FREEPOINT With CPFD and older panels.

The main difference between the CPFD and CPFE panels with regards to the free point service is the CPFD has an auxiliary transformer and a Freepoint board. The auxiliary transformer can supply up to 1000ma to set the tool. The operation is the same except that the tool power supply does not need to be turned on to set the tool since the auxiliary transformer produced the set current and is enabled by a software controlled relay.

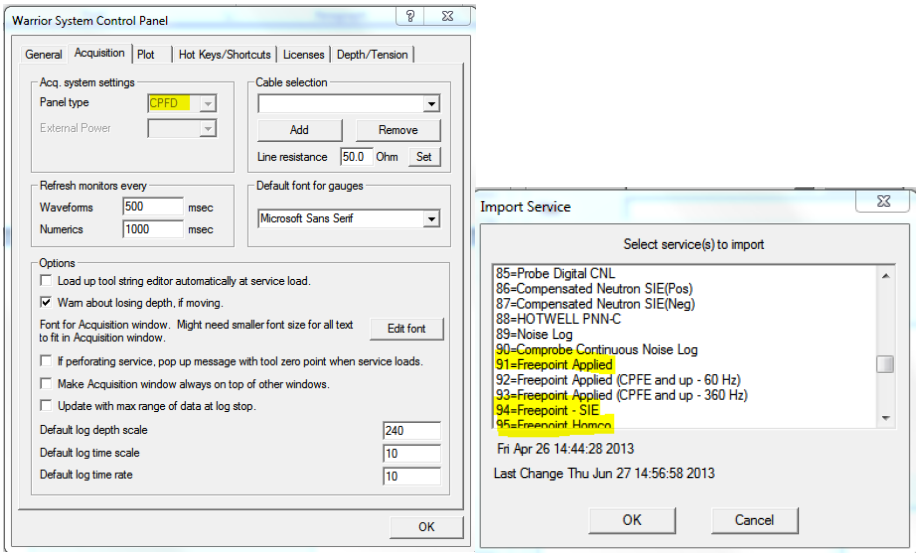


FIG:28.7 Free point Service must match Panel Type

28.2.1 Running the Service

The logging operation of the service is the same as earlier Freepoint services.
See section 28.1.3

28.3 Freepoint Service Homco-GO

The Warrior system supports Freepoint tools that require minimum DC voltage for motorized deployment. This includes Applied Electronics Bowspring and Magnetic tools, and Homco tools. Other models of Freepoint tools could also be setup in the Warrior system if the frequency of the transponder is known.

28.3.1 FREEPOINT CONTROL PANEL

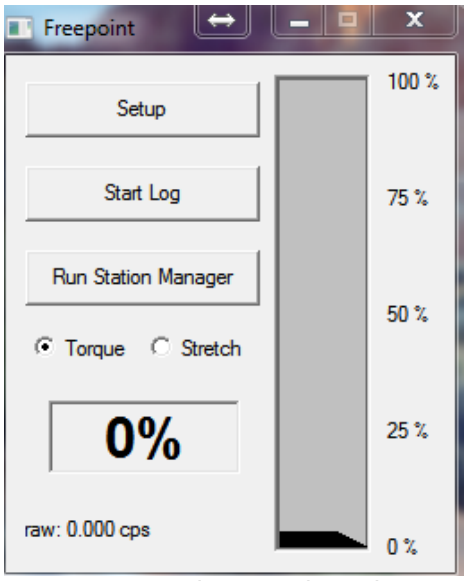


FIG: 28.8 Freepoint Control panel

The Freepoint control panel appears the same as the control panel used for other free point tools. The difference is when you select the setup button you have an added slider for the 100% reading.

28.3.2 FREEPOINT TOOL SETUP

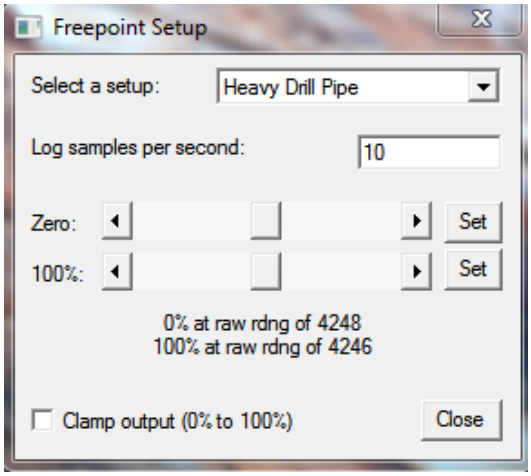


FIG: 28.9 Freepoint Setup

When the **Setup** button on the Freepoint control panel is pressed, the window shown below will appear. This is the Freepoint setup control panel. Up to six different setups may be saved. Which setup is used may be selected by clicking on the dropdown box and choosing from Heavy Drill Pipe, Drill Pipe, Large Casing, Small Casing, collars, and Tubing? Any changes made to the log sample rate or reading for 100% movement will be saved to the setup that has been selected.

A normal sample rate for the log should be set to 5 to 10 samples per second.

The Zero slider bar is used to set the frequency for when no torque or stretch is applied. The 100% slider bar is used to set the frequency for the maximum Torque or Stretch to be used.

There is an optional check box to clamp the Freepoint output to 0% to 100% so that it does not go off the page on the log.

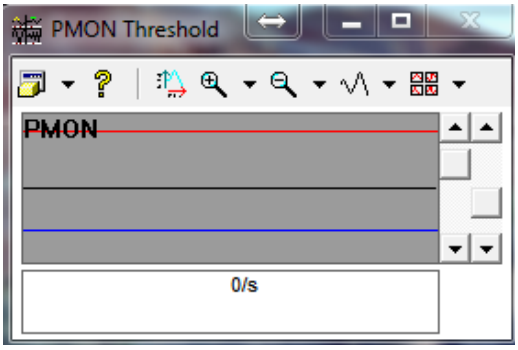


FIG: 28.10 Freepoint PMON Threshold

Remember that the signals in the PMON (pulse monitor) window need to be discriminated properly, like a gamma/ neutron service.

28.3.4 Running the Service

The logging operation of the service is the same as earlier Freepoint services.
See section 28.1.3

Section

29

29 Bond Index and Borehole Volume

29.1 BL Attenuation and Bond Index arithmetic

Bond index is the ratio of measured attenuation to maximum attenuation.

29.2 Calculation parameters

29.2.1 fMxAmp
Maximum expected amplitude; should be the same as the free pipe
Reference value used in calibration.
Obtained from zoned variable MAXAMPL. If the zero is entered, then a value is calculated from the casing O.D.

29.2.2 fMnAmp
Minimum expected amplitude; should be the same as the zero signal
used in calibration except for one caveat: Zero is not a valid
value, even though it is commonly used for calibration. Suggest
using a value of one millivolt for both.
Obtained from zoned variable MINAMPL.

29.2.3 fMnAtt:
Minimum attenuation. Attenuation value expected to be measured in free pipe.
Obtained from zoned variable MINATTN. SPE papers suggest a value of 0.8 as an overall average for common casing sizes and weights.

29.2.4 fLogValue:
Calibrated log amplitude. (each sample). Transmitter/receiver spacing is assumed to be 3 feet.

29.3 Outputs:

29.3.1 fAtt:
Calculated output attenuation.
29.3.2 fBI:
Calculated output Bond Index.

29.4 Processing for each log sample: (math protection not shown)

ffRatio = fLogValue / fMxAmp;
fAtt = 20.0 / 3.0 * log(fRatio) - fMnAtt;
fRatio = fMnAmp / fMxAmp;
fBI = fAtt / (20.0 / 3.0 * log(fRatio) - fMnAtt);

29.5 BOREHOLE VOLUME

Tool. From the Serial Number drop From Warrior Utilities select 'Edit Logging Tool Details'. From the Edit Tool drop down box select 'STD' down box select the serial number of the STD tool.

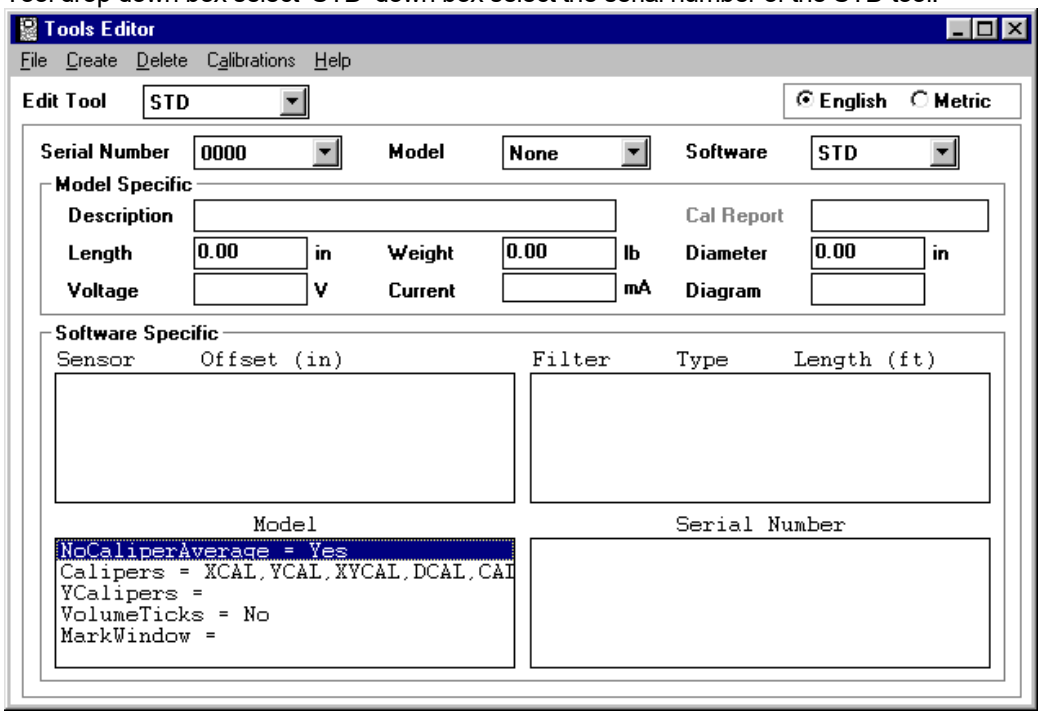


FIG: 29.1 Tools editor

Double click on the 'Calipers=' line. Enter a list of any output names, from all your different services that should be used as main ('X') caliper inputs into the borehole volume calculation. Separate multiple names by commas.

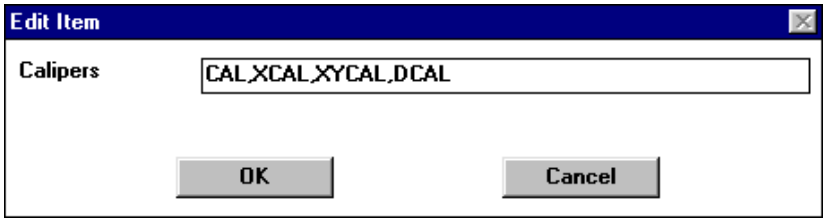


FIG: 29.2 Edit item

Repeat for the YCalipers line. Y calipers measure perpendicularly to X calipers and allow a better calculation with an elliptical hole.

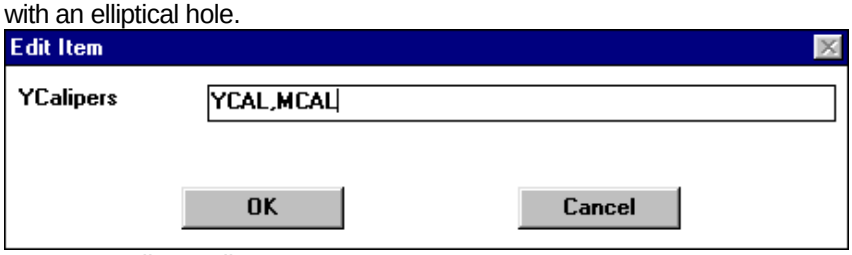


FIG: 29.3 Edit Y Caliper

If any service has more than one X or more than one Y caliper, then those readings will be averaged unless the NoCaliperAverage flag is set to Yes.
Double click on the 'Volume Ticks =' Line.
Select **'YES'** if you want volume ticks displayed instead of a tabular output.
Each small tick equals 10 cubic feet or 1 cubic meter. Each large tick equals 10 small ticks.
Select '**NO'** if you want a tabular output for volume.
You can get either ticks or tabular volume, not both.

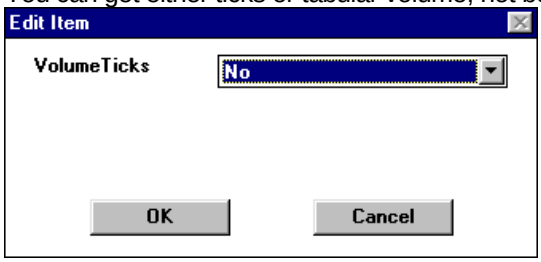


FIG: 29.4 Edit Volume Ticks

From Acquisition 'Edit Variables' the 'BOREID' size and 'CASEOD' size must be entered correctly for a valid calculation of borehole volume.
A total borehole volume curve 'TBHV' must be added to the Log format as follows:

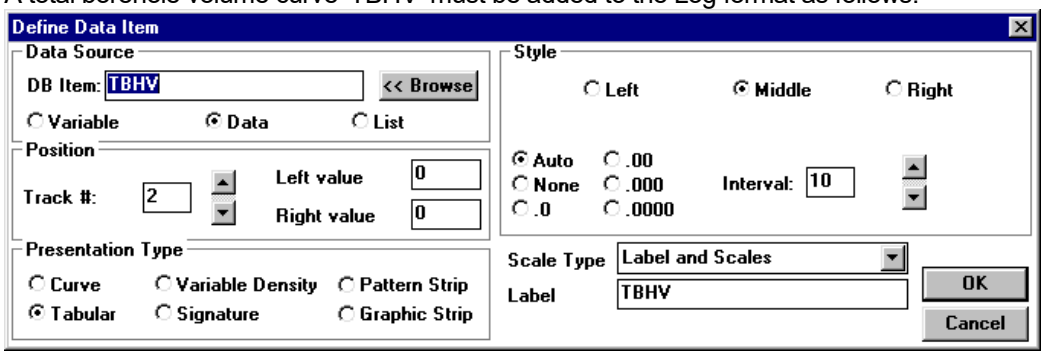


FIG: 29.5 Define Data Item

An annular bore hole volume curve 'ABHV' needs to be added to the log format as follows:

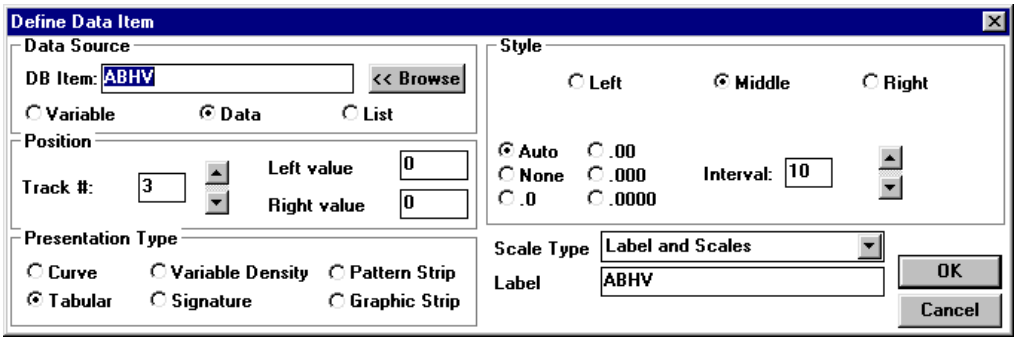


FIG: 29.6 Set Scales Data Item

Section

30

30 CSS Radial Bond Services

Computer Sonics produces two types of radial bond tool. One (the earlier model, though still produced) is known as the sequential tool. This tool has four modes of operation:
3 ft.- 5 ft. mode for generating the conventional dual spaced CBL radial mode for generating the eight-receiver radial bond log (RBL)
calibration mode for generating the internal calibration signal open hole mode
The tool is switched from mode to mode and to acquire data for a complete log two passes must be made over the log interval, one in CBL mode and one in RBL.
The later tool model generates all the required signals simultaneously and is known as the multiplexed tool.
Both tools transmit nuclear, collar, and temperature log data in a digital form interleaved with analog sonic data. The telemetry scheme employed is not the same for the two tools, however in both cases it is detected and decoded in the Warrior system by DSP software through selection of the appropriate script command.
The sequential tool transmits acoustic signals on the wireline at their natural frequency (approximately 20 – 25 kHz). The multiplexed tool divides the downhole frequency by a factor of four before transmission to the surface, therefore the frequency of the tool signals on the line is approximately 6 kHz. Special provision must be made for this feature in the logging system in the form of a special filter / amplifier card that can be switched to accommodate conventional as well the CSS multiplexed tool.
In both tools CSS has provided an internal calibration signal which can be used for a well site calibration which does not rely on finding (assuming) free pipe in the well. For both tools the philosophy is the same, namely the tool is calibrated in a known environment (zero signal and a calibration pipe) and the internal calibrate signal evaluated. The calibrations for all the receivers and the value of the internal calibration signal are recorded by tool serial number. This procedure is termed the shop or master calibration. At the well site the receiver zero signals and internal calibration signal are re-evaluated, and corrections made to reproduce the readings obtained during the shop calibration. In this way any changes in signal amplitudes due to electronic drift, differences in wireline and other factors may be minimized.
The 3 ft receiver signal curve is calibrated to industry standard values. The sector signals are normalized to a given log amplitude during the shop calibration for calibration pipe diameter. When logging casing of other diameters the sector amplitudes are adjusted to produce the same log deflection and cement map appearance.

30.1 SDSTIP

The gains and filters for the CSS tools should be setup as follows:
From Acquisition Window Select ‘Edit/Device Configuration/SDSTIP’
For the CSSM 1 11/16” tool, with Short to medium lines the following values should be entered in the SDSTIP Panel.

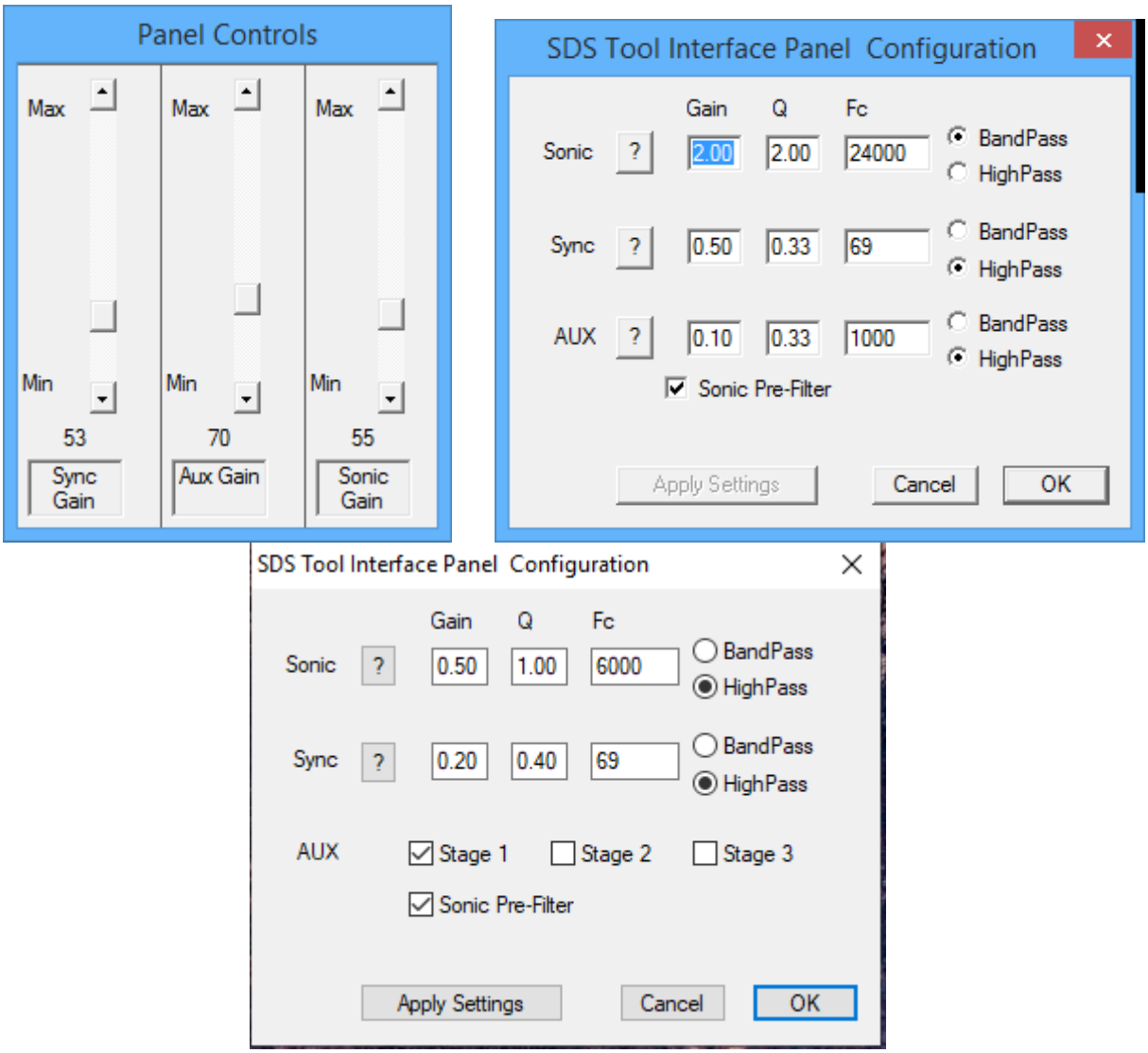


FIG: 30.1SDS Tool Interface Panel Configurations 1 11/16 Short to Medium Lines

The Gains set the maximum gain for the Panel Control Slider bars and should be set to give a usable range for the slider bars depending on line length and tool signal.
The Sonic line is for the Sonic signal.
The Sync line is for the Sync signal.
The Aux line is for the Telemetry signal.
The FC is the frequency of the signal being detected. The Q is the sharpness of the filter, the higher the Q the sharper the cutoff frequency. Band Pass or High Pass is the type filter used. Newer panels have enhanced telemetry filtering of the AUX channel that allow up to 8 filter options checkboxes selectable.

The FC for the Sonic Line should be set for the frequency of the sonic receiver crystals, with a Band Pass Filter.
The FC for the Sync Line usually works best with a low Q and Low FC, with a High Pass Filter.
The FC for the Aux Line has been tested for short to medium lines and medium to long lines and should be entered as shown.
For the CSSM 1 11/16" tool, with medium to long lines the following values should be entered in the SDSTIP Panel.

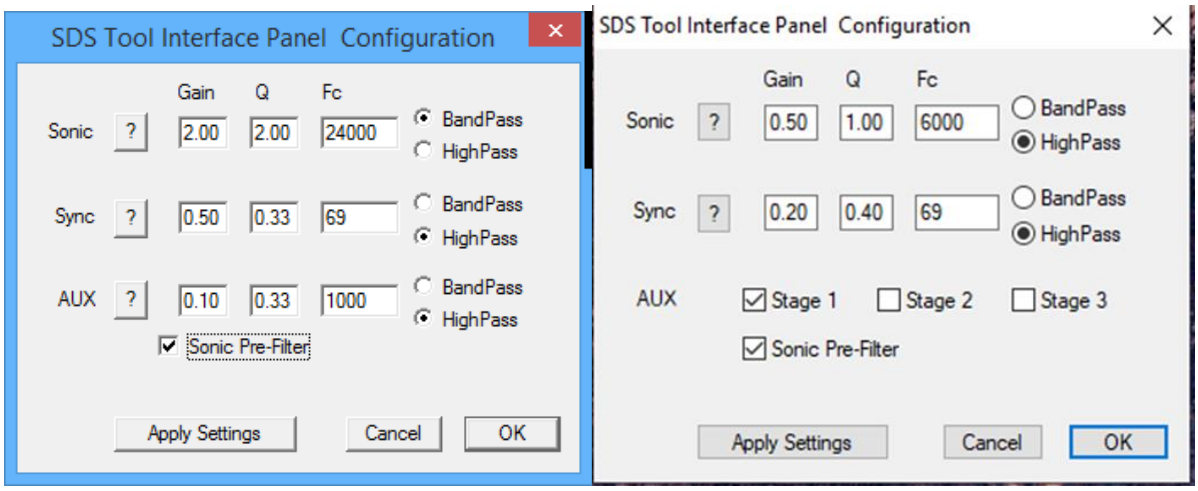


FIG: 30.2 SDS Tool Interface Panel Configurations 1 11/16 Medium to Long Lines

For the CSSM 3 1/8" tool, with short to medium lines the following values should be entered in the SDSTIP Panel.

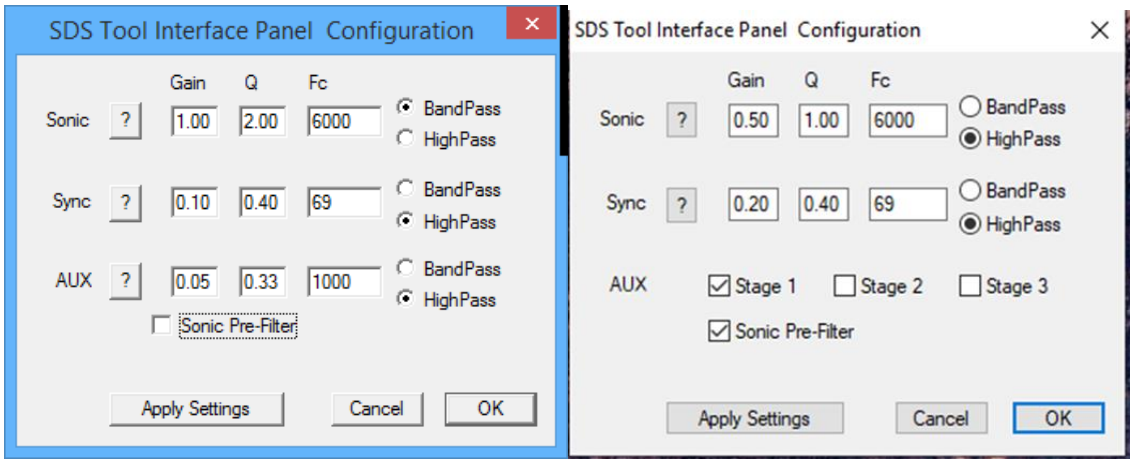


FIG: 30.3 SDS Tool Interface Panel Configurations 3 1/8 Short to Medium Lines

For the CSSM 3 1/8" tool, with medium to long lines the following values should be entered in the SDSTIP Panel.

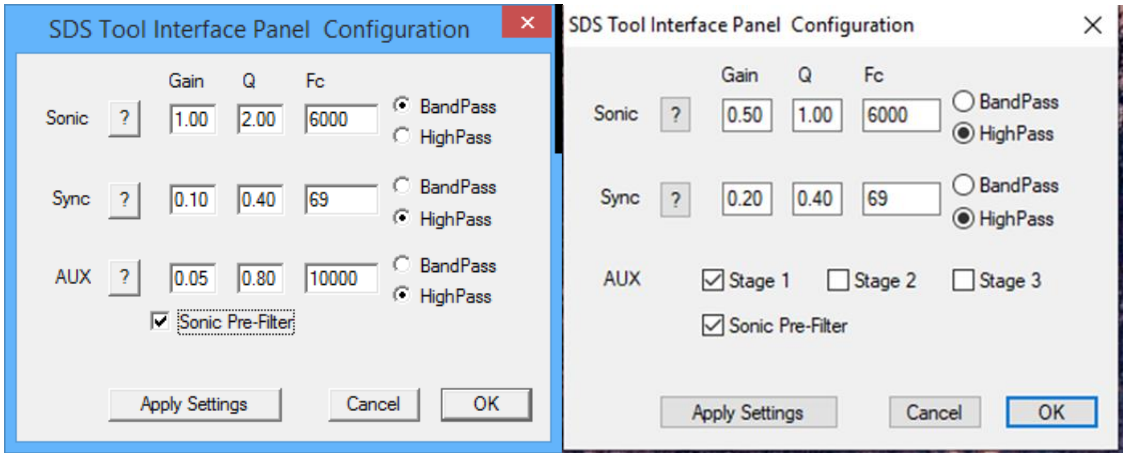


FIG: 30.4 SDS Tool Interface Panel Configurations 3 1/8 Medium to Long Lines

These values are not set and stone and may have to be tweaked for individual situations.

30.2 Acquisition

After starting Acquisition, the first step when running a Bond Tool of any type on Warrior will be to set the proper casing size. This will ensure that the gates will default to the correct saved settings.

30.2.1 Edit

Click on the Edit menu box of the Warrior Logging System menu box and scroll down to and select Variables.

30.2.2 Variables

Displays the Variable (parameter) editor window, enabling depth dependent parameters associated with the selected service to be zoned and values to be set.

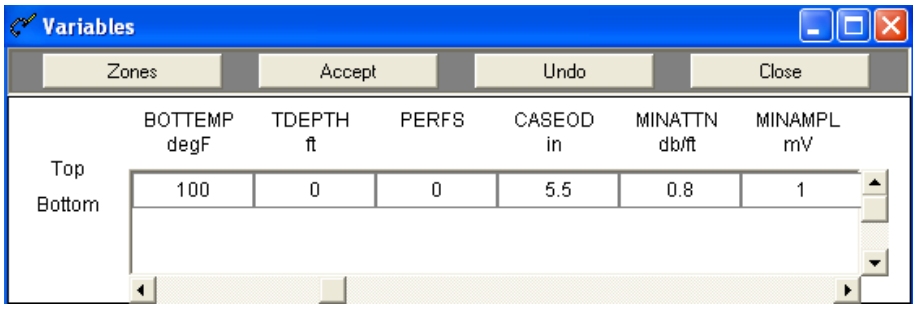


FIG: 30.5 SDS Variables

Check the proper Casing OD under CASEOD. If you are outputting a Bond Index curve, enter the Minimum and Maximum Amplitudes. Enter any other variables that may be required. Then push the Accept button.

The Minimum and Maximum Amplitude values are used for calculating the Bond Index Curve. Of these values the MINAMPL will have the greatest impact upon the calculations. The proper values are listed in Appendix A. Also, the MINATTN value is typical for most standard casings.

30.2.3 Edit Logging Services Details

From the Warrior Logging System menu box, click on Services and select the proper service for the tool type. Tools have different telemetry schemes and the services must be set up to match the telemetry.

30.2.4 Edit logging Tools details

When the Service is selected the Edit Tool string Window will come up automatically. Or, select Edit and Tool String, to display the following window:

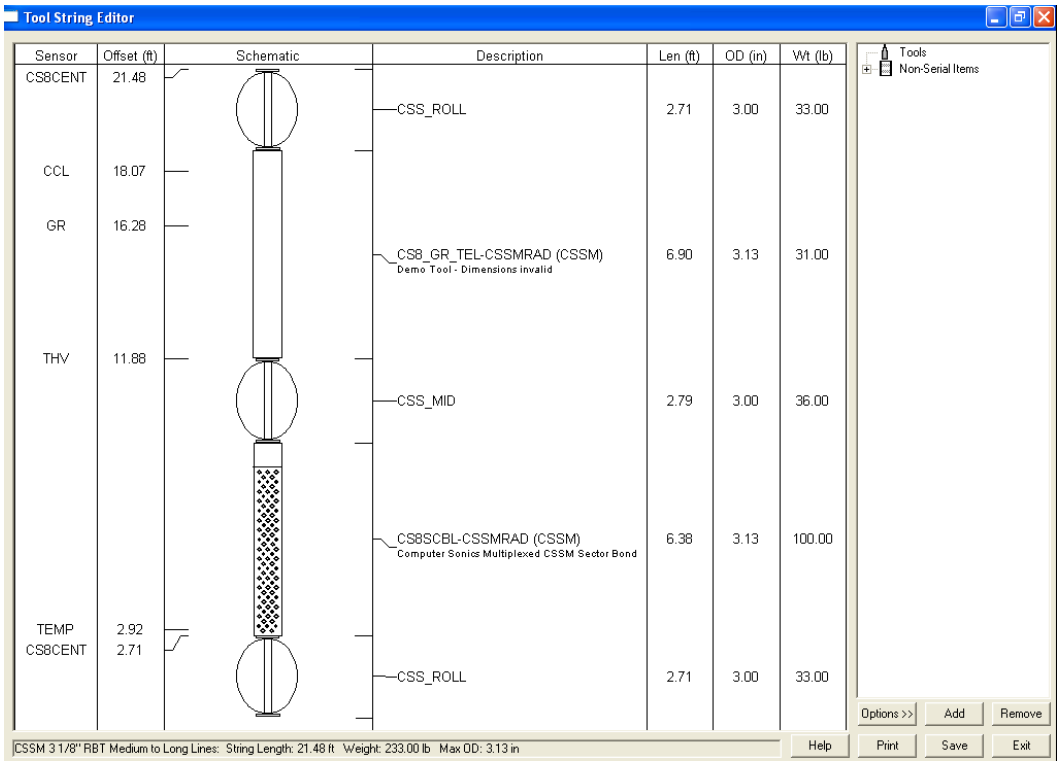
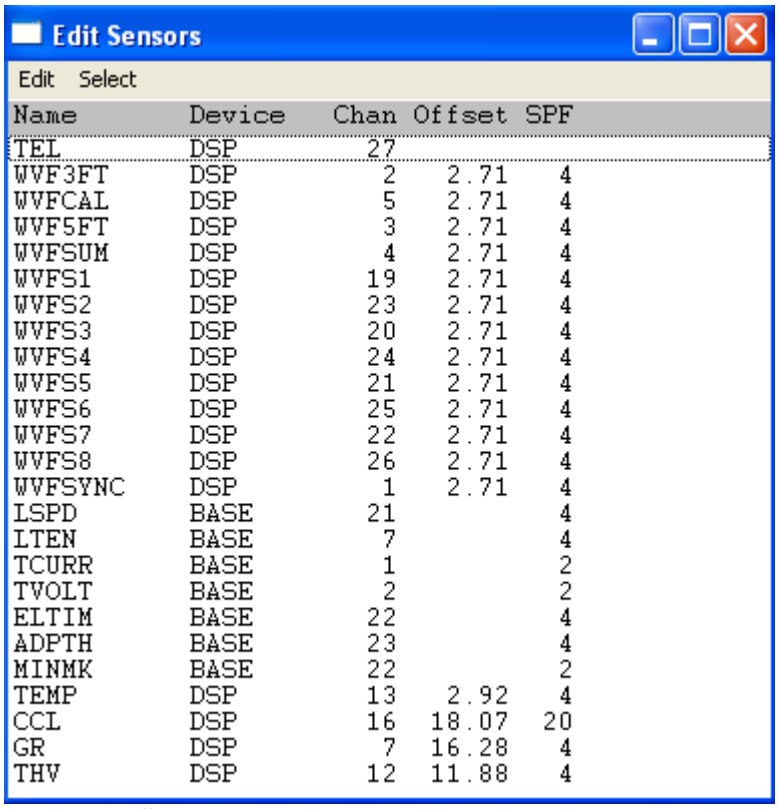


FIG: 30.6 Tool string

From this window it is possible to change the tool being run, the order of the tools in the string, and add or delete centralizers, weight bars, knuckle joints or other tool string components. It is from the information set in this window that the calibrations, default offsets and filters settings for the log to be run are derived.

30.2.5 Tool String

Depth offsets that were derived from the Edit - Tool String step may be viewed by choosing Edit - Sensors, to display the following window:



Name	Device	Chan	Offset	SPF
TEL	DSP	27		
WVF3FT	DSP	2	2.71	4
WVFCAL	DSP	5	2.71	4
WVF5FT	DSP	3	2.71	4
WVFSUM	DSP	4	2.71	4
WVFS1	DSP	19	2.71	4
WVFS2	DSP	23	2.71	4
WVFS3	DSP	20	2.71	4
WVFS4	DSP	24	2.71	4
WVFS5	DSP	21	2.71	4
WVFS6	DSP	25	2.71	4
WVFS7	DSP	22	2.71	4
WVFS8	DSP	26	2.71	4
WVFSYNC	DSP	1	2.71	4
LSPD	BASE	21		4
LTEN	BASE	7		4
TCURR	BASE	1		2
TVOLT	BASE	2		2
ELTIM	BASE	22		4
ADPTH	BASE	23		4
MINMK	BASE	22		2
TEMP	DSP	13	2.92	4
CCL	DSP	16	18.07	20
GR	DSP	7	16.28	4
THV	DSP	12	11.88	4

FIG: 30.7 Edit Sensors

These offsets may be edited from this window, by double clicking on a sensor. The information in this window normally consists of the hardware source of the sensor (Device and Channel number), the depth offset of the sensor from tool zero reference, and the sampling rate.
The information contained in Edit Sensors is defaulted to the current service and current tool string information. For example, sensor depth offsets are derived from the selected tool string and the information contained in the tools database. The default sample rates and device channel assignments are derived from the services file. The default device and channel settings, and the default sample rates are contained in the services.ini file. The default depth offsets are derived from tool information contained in the tools.ini file.
Sensors cannot be modified while in a record mode.

It is important to know that no permanent changes are saved from this window. If you change anything in the Edit Tool String window and save them, any changes under Edit Sensors will be deleted when the service is closed. If you must edit offsets in the Edit Sensor window the Tool.ini file should be modified.

30.2.6 Power Up

Power up the tool string. (Nominally 125V at the STIP)
Adjusting the sync. Start by turning the Panel Control 'Sync' slider bar all the way down. Monitor the Waveform Window and slowly raise the Slider Bar. In the Waveform Window you will see the 0/s changes to typically 3/s or 4/s on the 1 11/16" tool and 7/s or 8/s for the 3 1/8" tool. At this point the waveforms are synced. The PMON Window is used to adjust the telemetry thresholds. (This window will be hidden behind the Waveform window and must be brought to the front.) On the PMON Window the left arrow adjusts the positive threshold and the right arrow the negative threshold.
Adjusting CSS Telemetry sync. While looking at the PMON window, adjust the positive (+) and negative (-) thresholds to about 50%. Adjust the Panel Control 'AUX' Slider to adjust the height of the digital signal, until the pulses are just below saturation

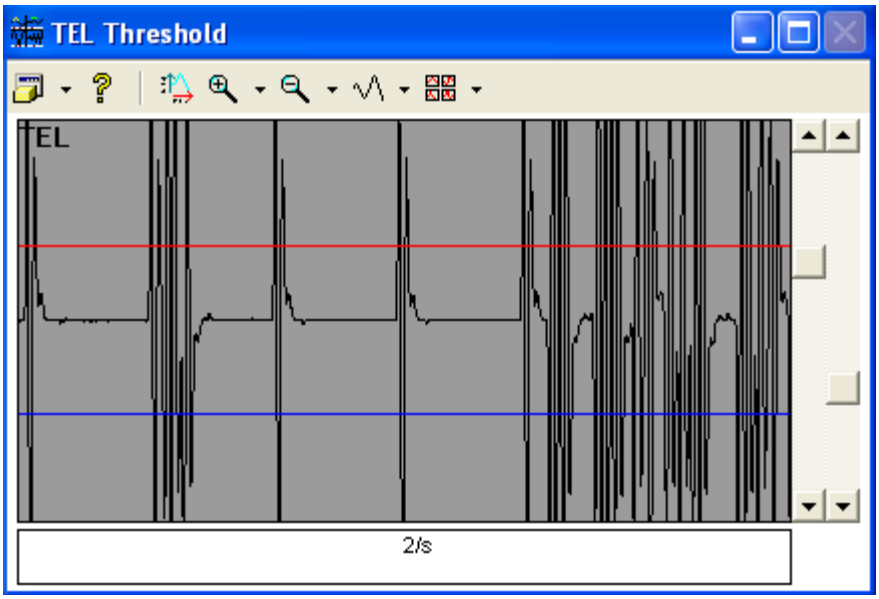


FIG: 30.8 Tel threshold

Warning!

The PMON discriminator values will be what is saved in the 'Source/Save Setup' for this service. *Options - View Axis Scaling* may be used to more accurately set these values. This window is digital. The screen will not update until waveform sync is established. Select *Source/Save Setup* to retain these values for your next log.

30.2.7 Telemetry

Verifying Telemetry Data:

From Warrior Acquisition Window -Select Monitor/ Devices/ DSP:

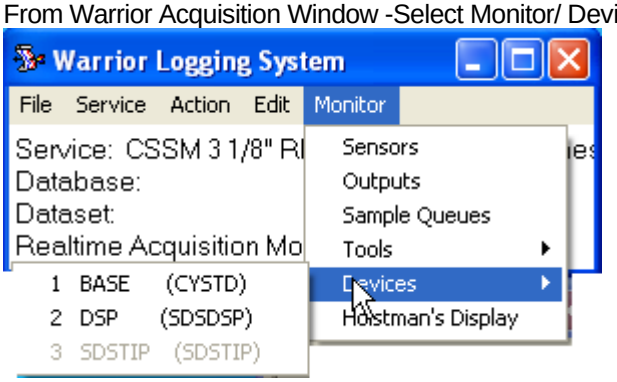


FIG: 30.9 Devices

Values for CSSM 3 1/8" Radial Bond Tool

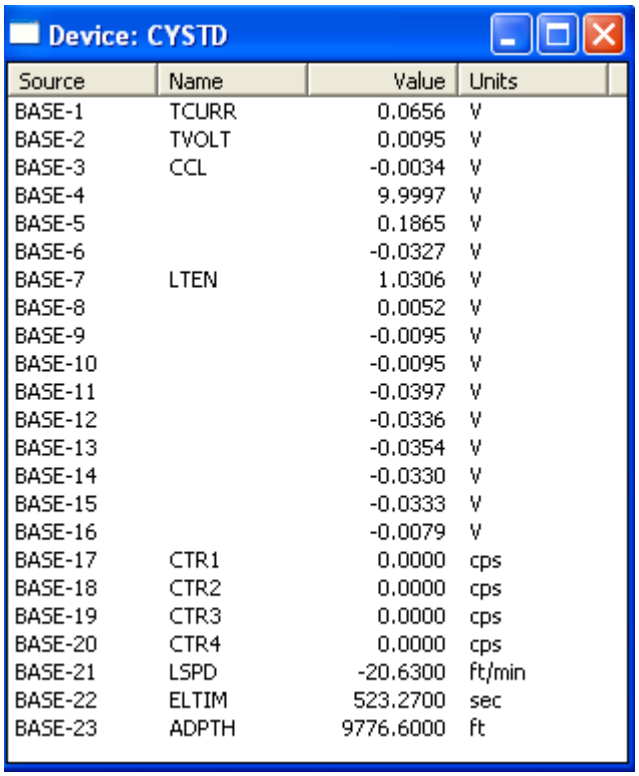
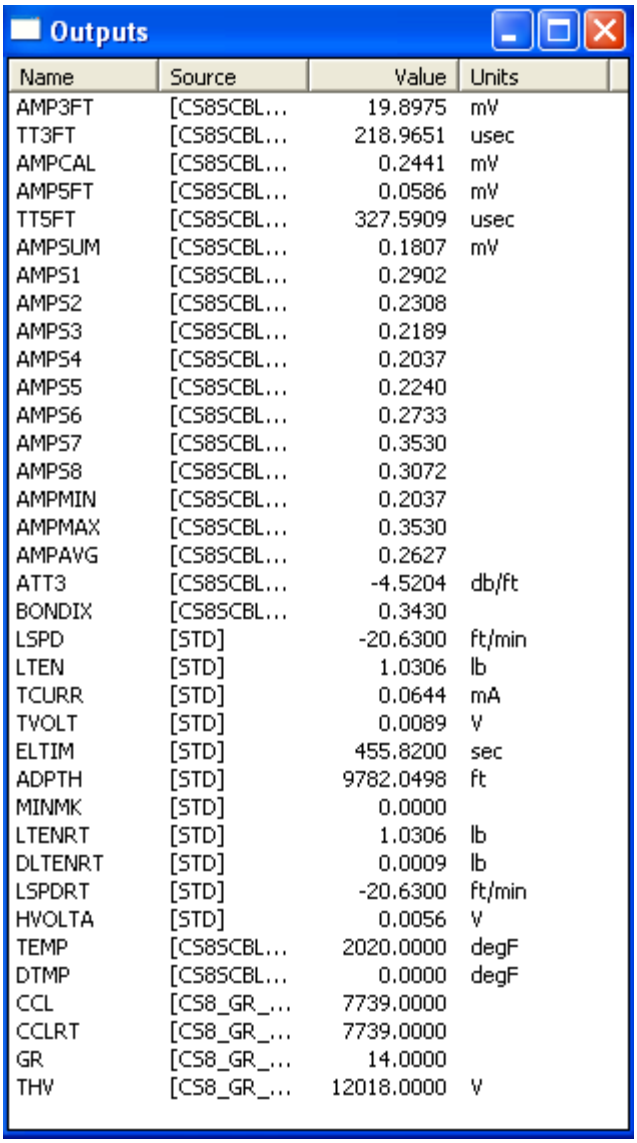


FIG: 30.10 Devices List

The above values are very close to what the tool normally reads. Monitor TEL5-CCL, TEL7-Cable head voltage and TEL8-Temperature for stable readings. If necessary, adjust the positive threshold in the PMON window up or down to stabilize the readings.

30.2.8 Monitoring Outputs.

From Warrior Acquisition Window select Monitor /Outputs. *An* Outputs window will appear that allows you to monitor signals such as CCL, GR, and other sensors.



Name	Source	Value	Units
AMP3FT	[CS85CBL...	19.8975	mV
TT3FT	[CS85CBL...	218.9651	usec
AMPCAL	[CS85CBL...	0.2441	mV
AMP5FT	[CS85CBL...	0.0586	mV
TT5FT	[CS85CBL...	327.5909	usec
AMPSUM	[CS85CBL...	0.1807	mV
AMPS1	[CS85CBL...	0.2902	
AMPS2	[CS85CBL...	0.2308	
AMPS3	[CS85CBL...	0.2189	
AMPS4	[CS85CBL...	0.2037	
AMPS5	[CS85CBL...	0.2240	
AMPS6	[CS85CBL...	0.2733	
AMPS7	[CS85CBL...	0.3530	
AMPS8	[CS85CBL...	0.3072	
AMPMIN	[CS85CBL...	0.2037	
AMPMAX	[CS85CBL...	0.3530	
AMPAVG	[CS85CBL...	0.2627	
ATT3	[CS85CBL...	-4.5204	db/ft
BONDIX	[CS85CBL...	0.3430	
LSPD	[STD]	-20.6300	ft/min
LTEN	[STD]	1.0306	lb
TCURR	[STD]	0.0644	mA
TVOLT	[STD]	0.0089	V
ELTIM	[STD]	455.8200	sec
ADPTH	[STD]	9782.0498	ft
MINMK	[STD]	0.0000	
LTENRT	[STD]	1.0306	lb
DLTENRT	[STD]	0.0009	lb
LSPDRT	[STD]	-20.6300	ft/min
HVOLTA	[STD]	0.0056	V
TEMP	[CS85CBL...	2020.0000	degF
DTMP	[CS85CBL...	0.0000	degF
CCL	[CS8_GR_...	7739.0000	
CCLRT	[CS8_GR_...	7739.0000	
GR	[CS8_GR_...	14.0000	
THV	[CS8_GR_...	12018.0000	V

FIG: 30.11 Outputs List

Continue to Shop Calibration Section.

30.3 Shop / Tank Calibration:

Make up the tool with the centralizers and slide it into the tank. The tool should show signals on all the signals in the Waveform Window.

Bring the Waveform Window to the front. The gates appear on the waveforms as a white line on the section of the waveform where they are set.

The gates can be changed on this window by clicking on the waveform that needs to be adjusted (note the dark border around the selected waveform) and then using the buttons in the top right corner of the Waveform Window. To move the gate right or left on the x-axis use the buttons labeled <<< to move it to the left or the button labeled >>> to move the gate to the right. The width of the gate can be increased by selecting the < = > button and decreased by using the > - < button.

Note: It is recommended that you keep all of your gate widths the same. Approximatly 30 micro-seconds works well with most tool types.

Also, specific waveforms can be viewed by selecting Options – Enable, and selecting the waveforms that you want displayed. Reducing the number of waveforms gives you a screen that is easier to work with. Remember to click on the waveform before adjusting the gates.
Before gating on the first arrival use the ('BHC/CBL' pot on the panel for CBL01-09 sytems) (Panel Control 'Sonic' Slider Bar on CBLDR systems) to increase/decrease the signal. Make sure that none of the signals are saturated. (If you are going to be running logs in casing that is smaller than your calibration tank, be aware that the signals will be larger in smaller casings and decrease your signal to accomodate this.)
Note: The signal height on the screen is not valid if you are in threshold mode.
After all of the gates are set select *Source – Save As*. Give this setup a name, such as 'CSSM 1 11/16" Cal Tank Amplitudes.' If there is a problem later the setting can be restored by selecting Source – Load and selcting that setup name.
Note: The same can be done for settings on the PMON Window.

Warning!

AT THIS POINT YOU SHOULD HAVE YOUR GATE (WHITE LINE) ON ALL THE FIRST POSITVE ARRIVALS OF ALL THE SIGNALS BEING DISPLAYED. (The CAL pulse first arrival should be positive. If the first arrival is not positive, the polarity can be changed through Warrior/Utilities/Edit Logging Tool Details.)

On the Waveform Window, select Source – Threshold Mode and use the UP/DOWN Arrows (Only on the 3 ft and 5 ft display). To move the red threshold line to a suitable position where the threshold cuts the first arrival. Make sure it is far enough to avoid baseline noise (This may be above or below the baseline). Threshold Mode is only used to set the travel time thresholds.
On the Waveform Window, select Source – Normal Mode.
On the Acquisition Window select Action – Calibrate – Shop / Free Pipe Zero Cal. A window will appear to sample the base line noise.

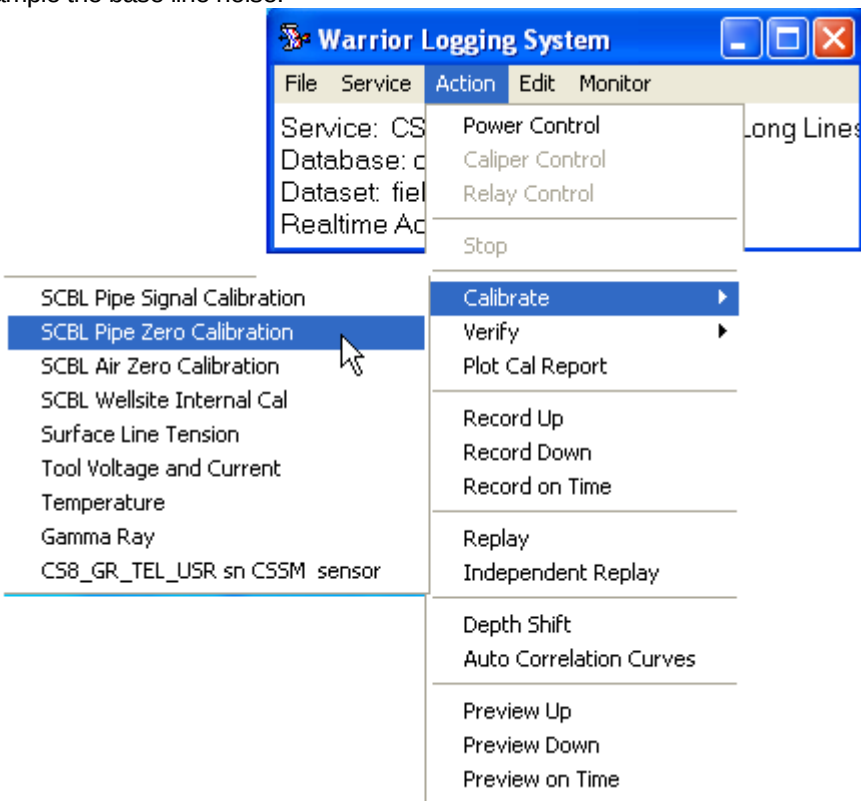


FIG: 30.12 Calibrate

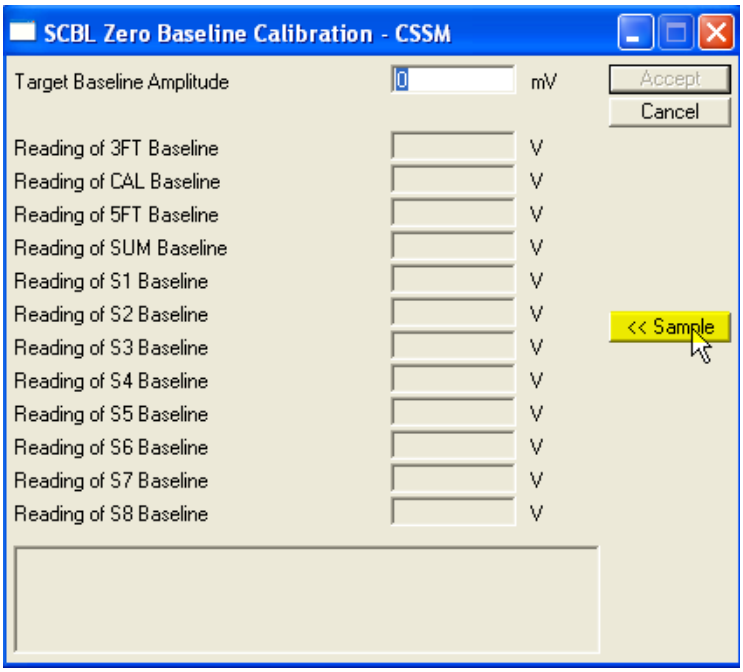


FIG: 30.13 Zero Baseline Calibration

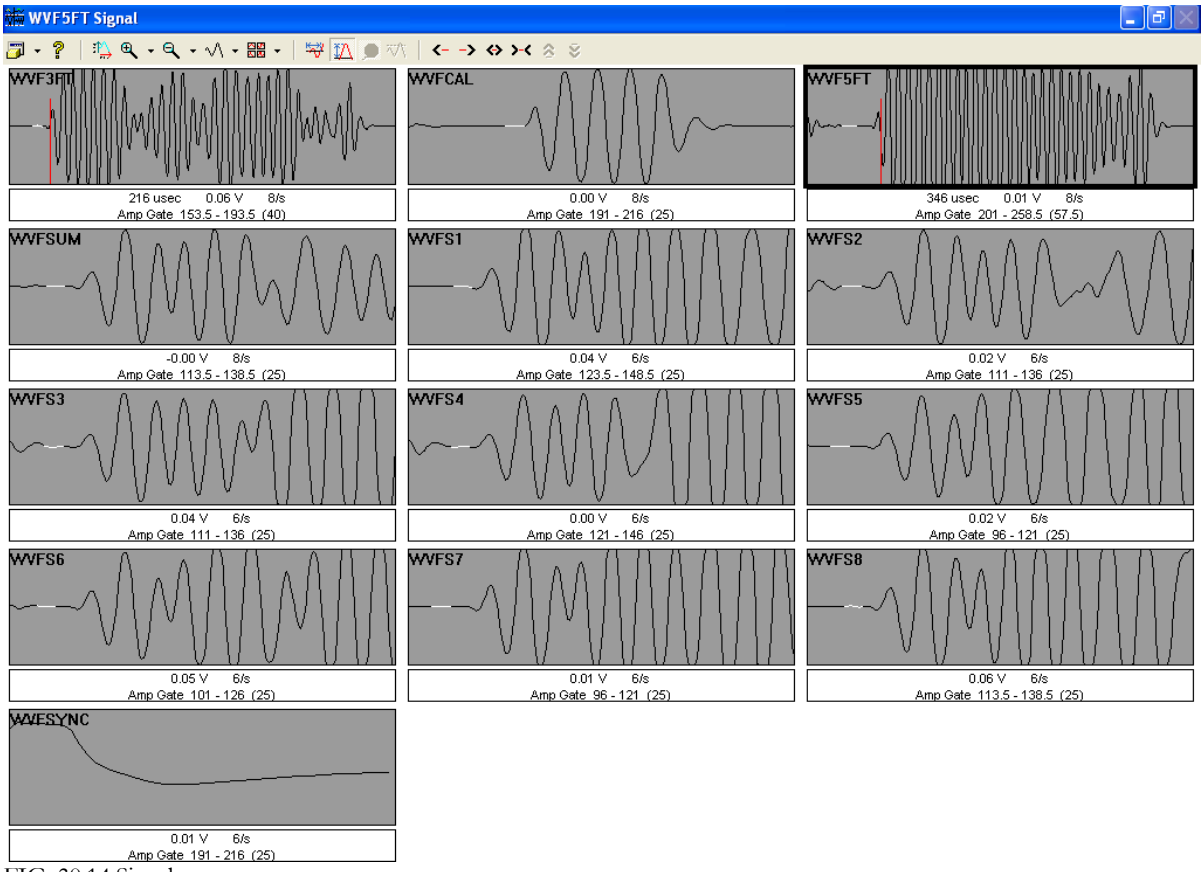


FIG: 30.14 Signals

Make sure the gates for all signals are on the flat part of baseline before the first arrival. These values will be updated when doing the well site air zero cal.
Click on the <<sample button. The Sample & Average Sensor(s) box will appear. Click on the begin button. When the sample is complete, monitor the values they should be very close to zero. If they are click the Accept button. If the values are not close to zero, click the Reject button and correct the problem.

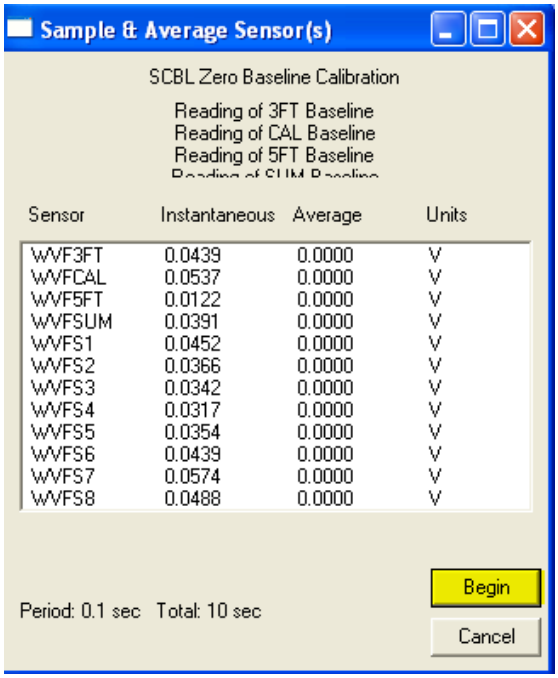


FIG: 30.15 Sensors signals

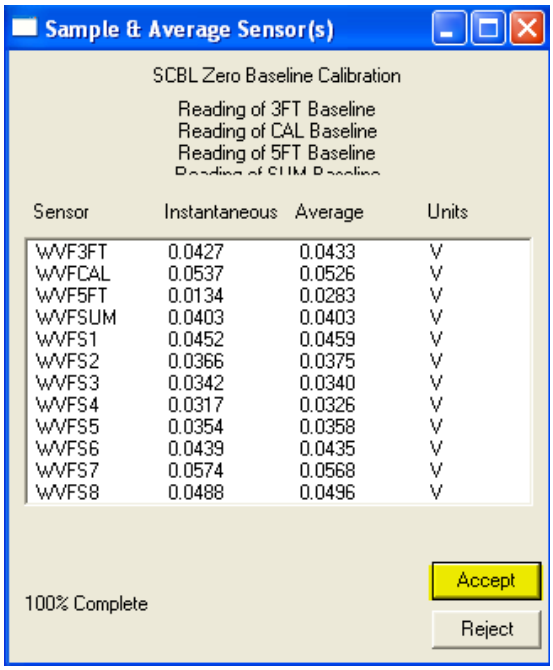


FIG: 30.16 Sensors Value signals

The SCBL Zero Baseline Calibration box will appear check that the values are all close to zero and click Accept.

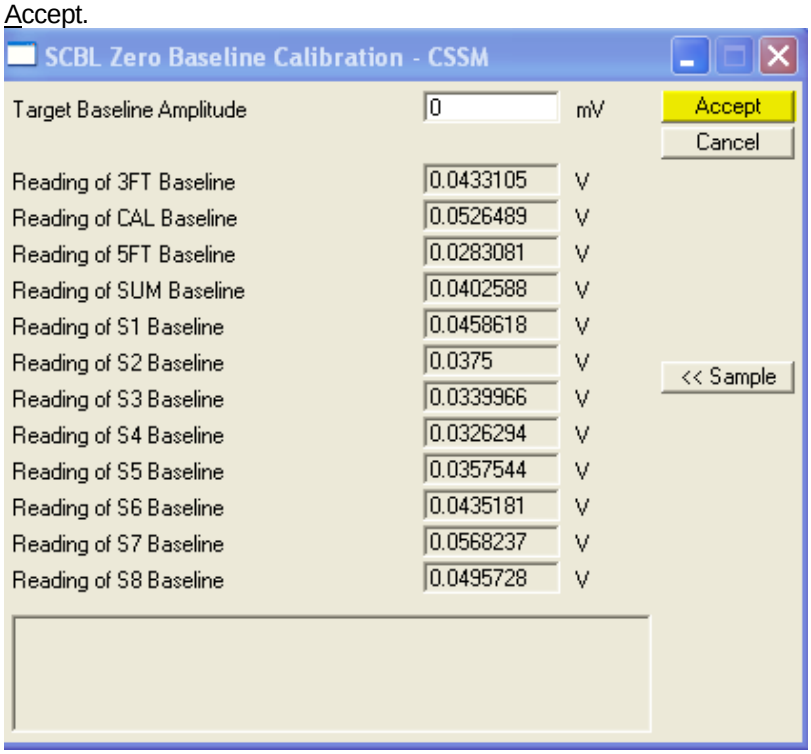


FIG: 30.17 Zero Base line

On the Acquisition Window select Action – Calibrate – Shop/Free Pipe Reference. The SCBL E1 Amplitude Calibration window will appear to sample the first arrival pipe amplitude. The Free Pipe Millivolt of the casing you are sampling is in the cells at the top of the window. The Sector E1 amplitude is normally set to 100 or made to match the 3ft E1 amplitude.

Note: If the value is not there or not correct check to see if the Casing OD and Maximum Amplitude were input in the Variables Window.

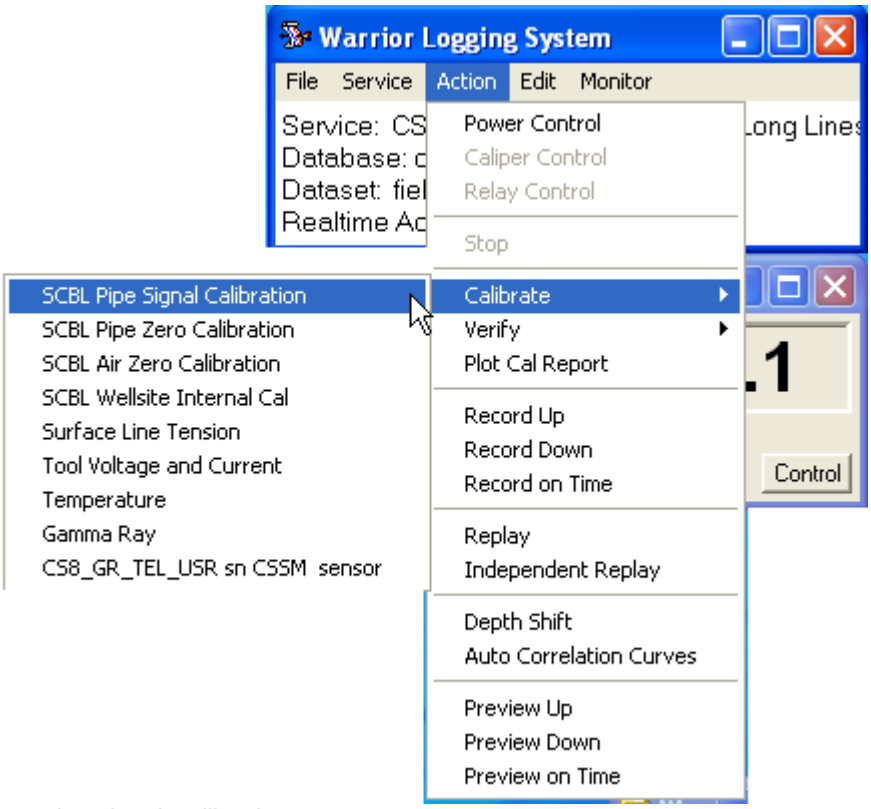


FIG: 30.18 Pipe signal Calibration

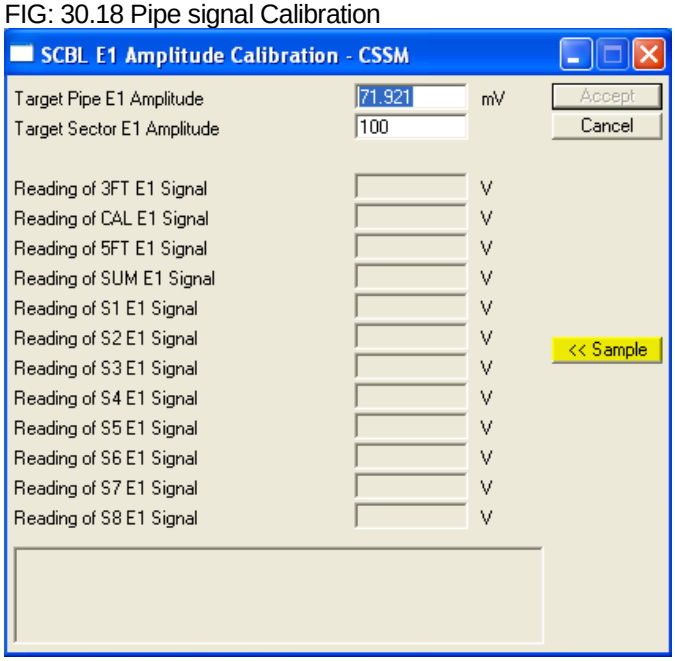


FIG: 30.19 Amplitude Calibration

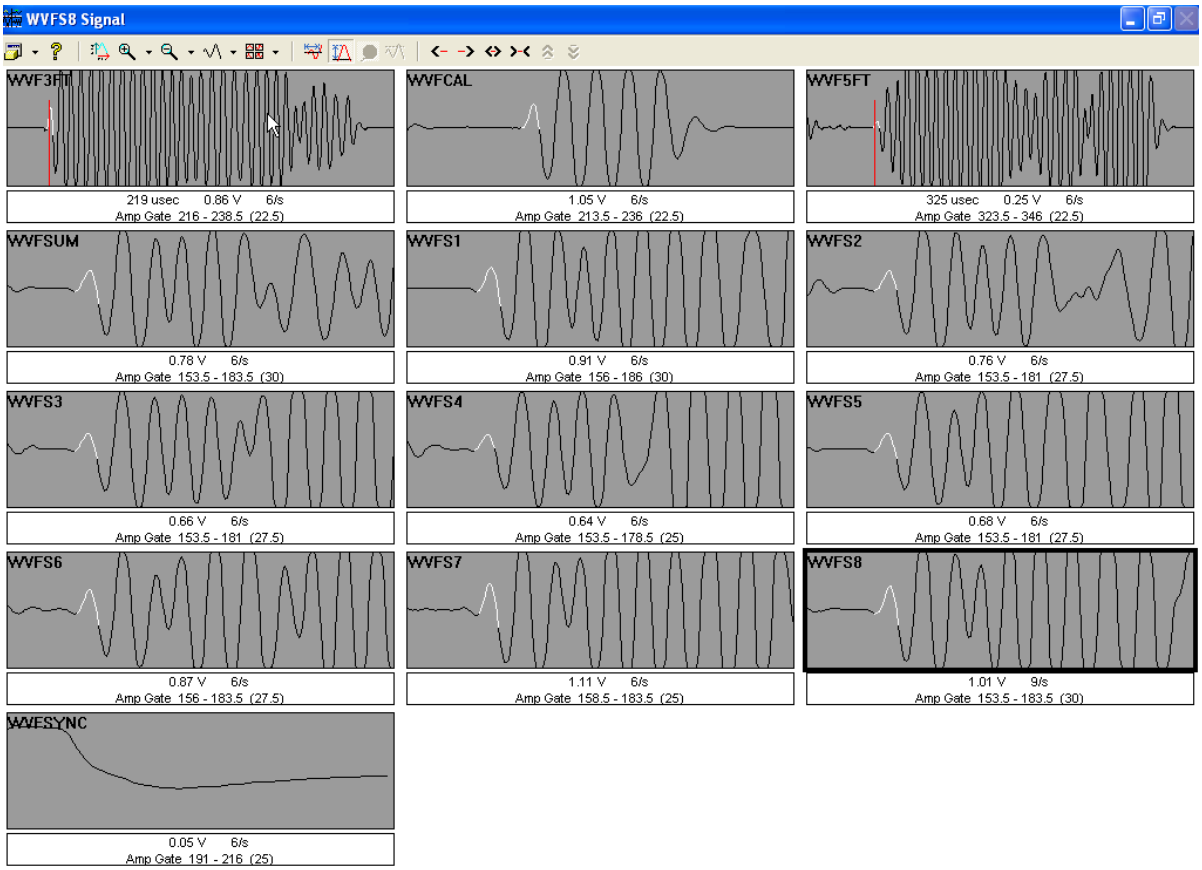


FIG: 30.20 Signals

Make sure the gates for all signals are on the positive part of the first arrival. Click on the <<sample button. The Sample & Average Sensor(s) box will appear.

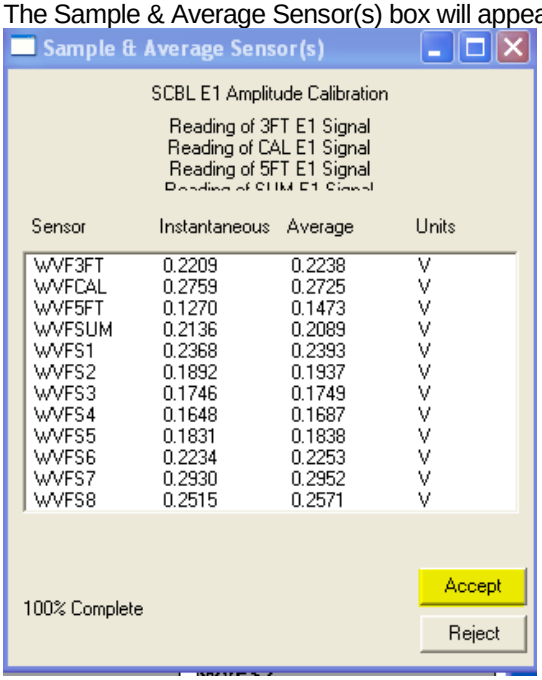


FIG: 30.21 Sample Signals

Select <<Sample. After the sampling has finished select Accept. The calibration gains and offsets for each waveform are displayed. The offsets on all waveforms should be near zero. The gains should range from 20 to150. Select OK.

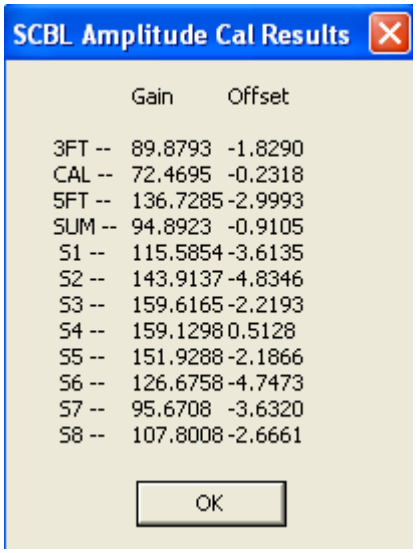


FIG: 30.22 Amplitude Calibration Results

The SCBL E1 Amplitude Calibration window will appear with the raw voltage readings displayed. Select Accept.

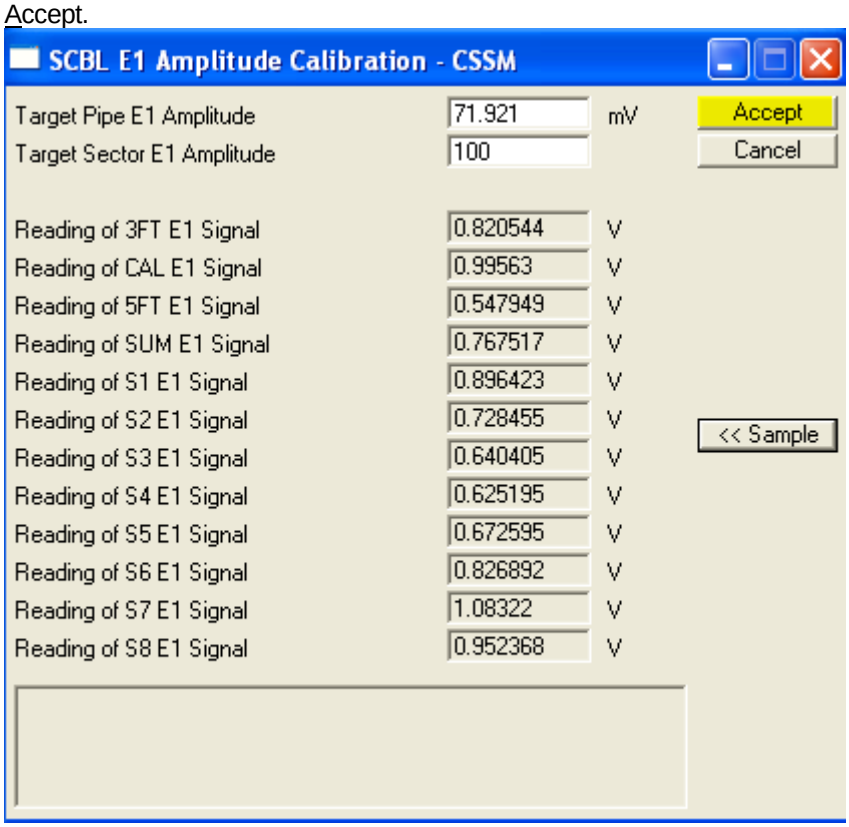


FIG: 30.23 E1 Amplitude Calibration

Note: If you need to make more than one calibration for each tool you must enter a different Serial Number.

Do not do a downhole cal with the same Serial Number because if you accept the cal and it is no good you will have over written the good shop cal, which can be utilized, if there is no Free Pipe found in the well.

Note: To create In the Warrior Screen select Utilities – Edit Logging Tool details then click Edit Tool. A list will come up, select SCBL and enter the "alias" Serial Number which you will use to do other cals on the same tool without over writing the original. Then Click Create – Tool. Enter a new serial number.

30.4 Wellsite Calibration Procedures:

The GR can be calibrated like any other GR tool. Select Action – Calibrate – Gamma Ray. Follow the onscreen menu.

30.4.1 SCBL Air Zero Cal.

SCBL Air Zero Cal: The following step is performed with the tool hanging in the air. On the Acquisition Window select Action/ Calibrate/SCBL Well Site Air Zero Cal. The SCBL Air Zero Cal window will appear.

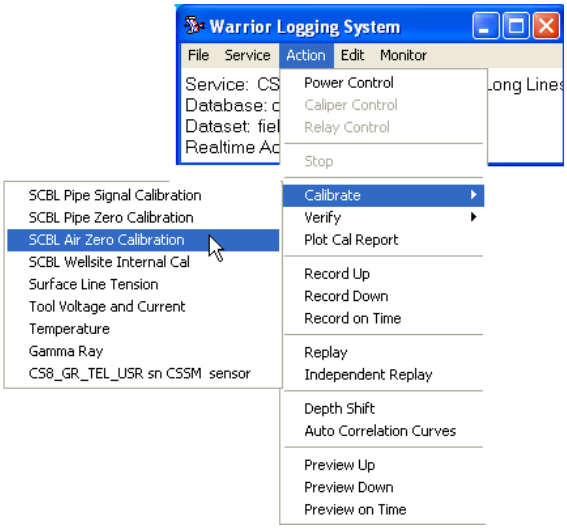


FIG: 30.24 Air Zero calibration

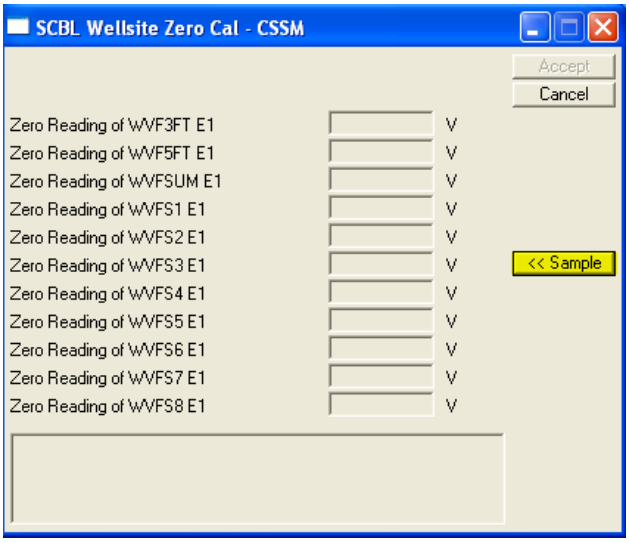


FIG: 30.25 Air Zero calibration

Ensure the gates are set in the proper position for the size pipe to be logged select <<Sample. The Sample & Average Sensor(s) box will appear. Select Begin.

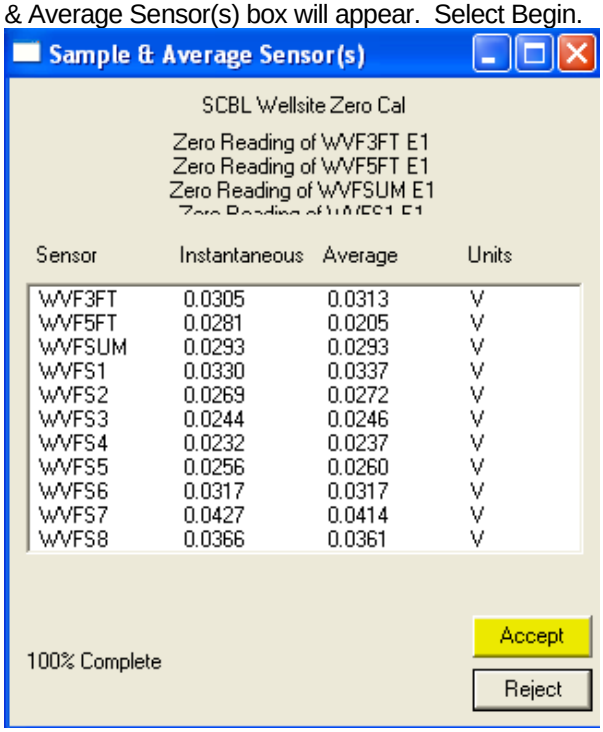


FIG: 30.26 Air Zero Values

All the values should be close to zero, and are used to establish the offset to be applied to the primary gain and offset established in the Shop Calibration. Select Accept.
Select Accept in the SCBL Air Zero Cal Window.

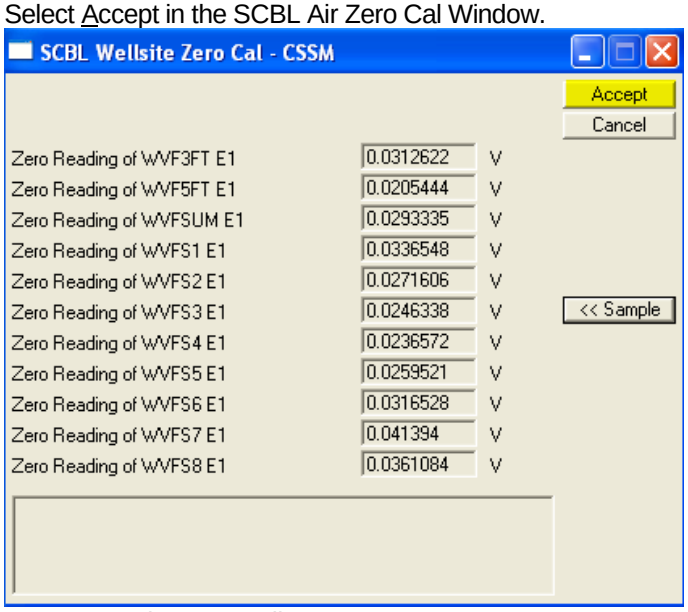


FIG: 30.27 Air Zero reading

30.4.2 SCBL Wellsite Internal Ref Cal

SCBL Wellsite Internal Ref Cal: The following step should be performed down hole. The CAL pulse is recalibrated to compensate for line resistance and temperature. The new values are used to normalize all waveform amplitude values back to the shop calibration.

On the Acquisition Window select Action/ Calibrate/ Well Site Internal Ref Cal. The SCBL Internal Reference Cal window will appear

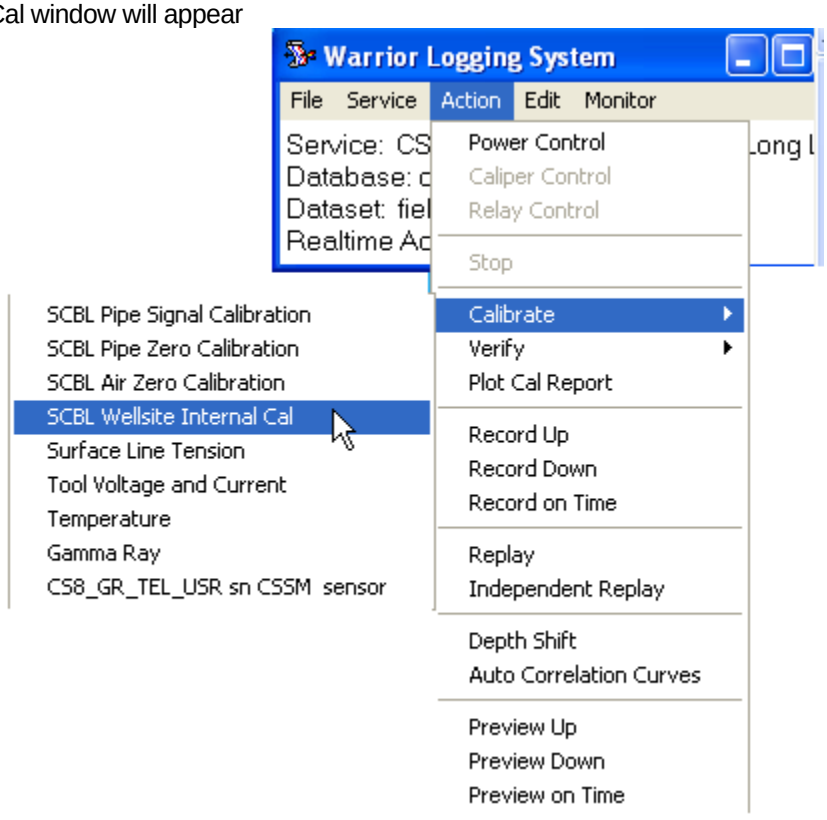


FIG: 30.28 Wellsite Internal Calibration

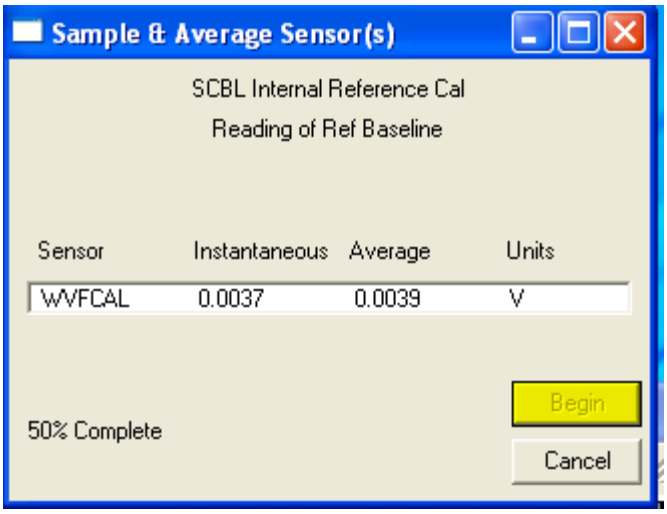


FIG: 30.29 Internal Reference Calibration

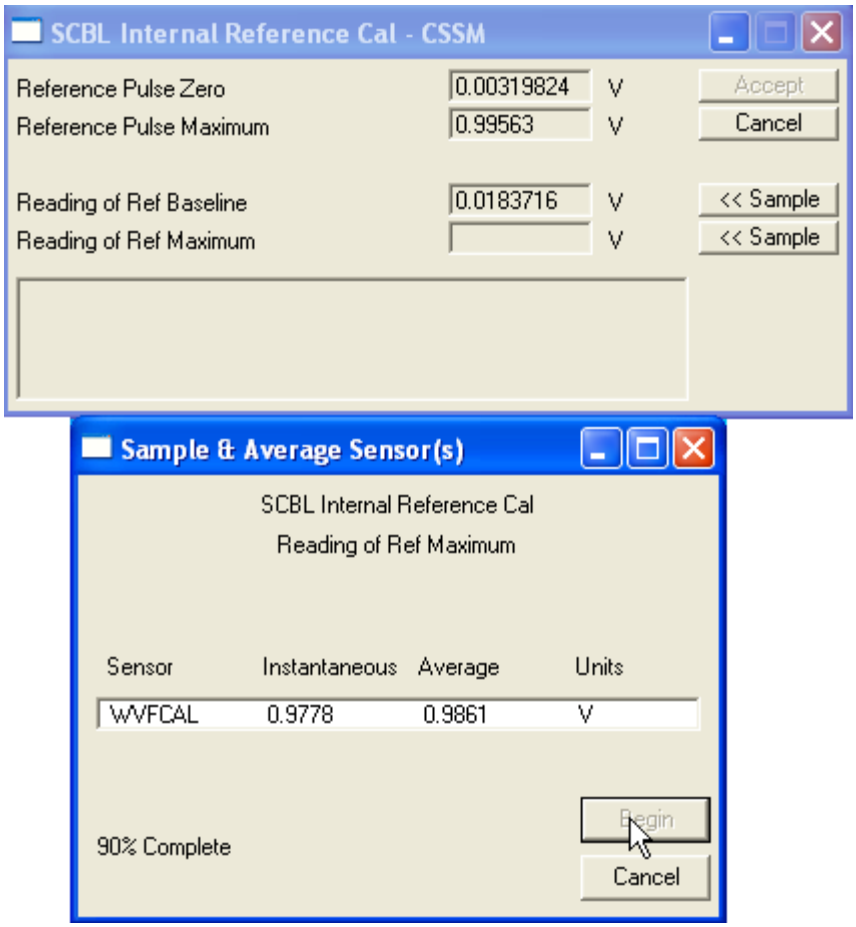


FIG: 30.30 Zero Reference

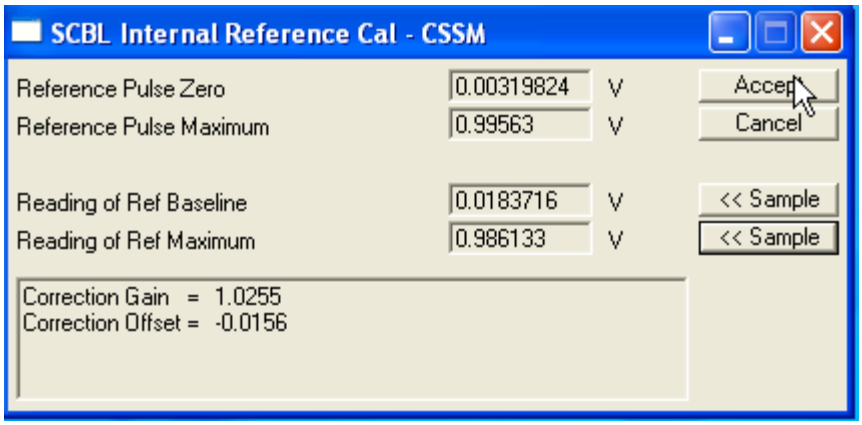


FIG: 30.31 Gain and Offset

Move the gate in the WVFCAL Signal window to the flat part of the baseline in front of the first positive arrival. Select <<Sample on the Reading of Ref Baseline. The Sample & Average Sensor(s) window will appear.

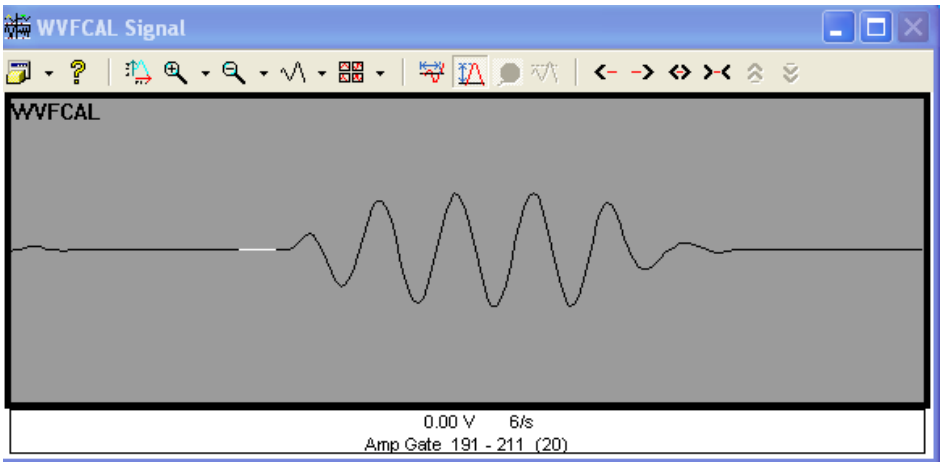


FIG: 30.32 Signal calibration reference

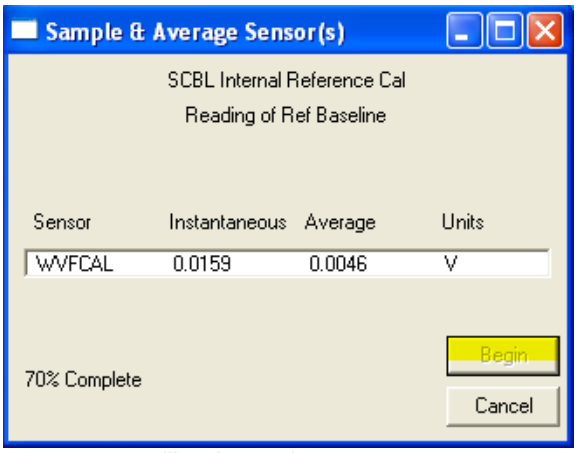


FIG: 30.33 Calibration value

Select Begin the values should be very close to zero. Select Accept.
Move the gate in the WVFCAL Signal window to gate the first positive arrival. Select <<Sample on the Reading of Ref Maximum. The Sample & Average Sensor(s) window will appear.

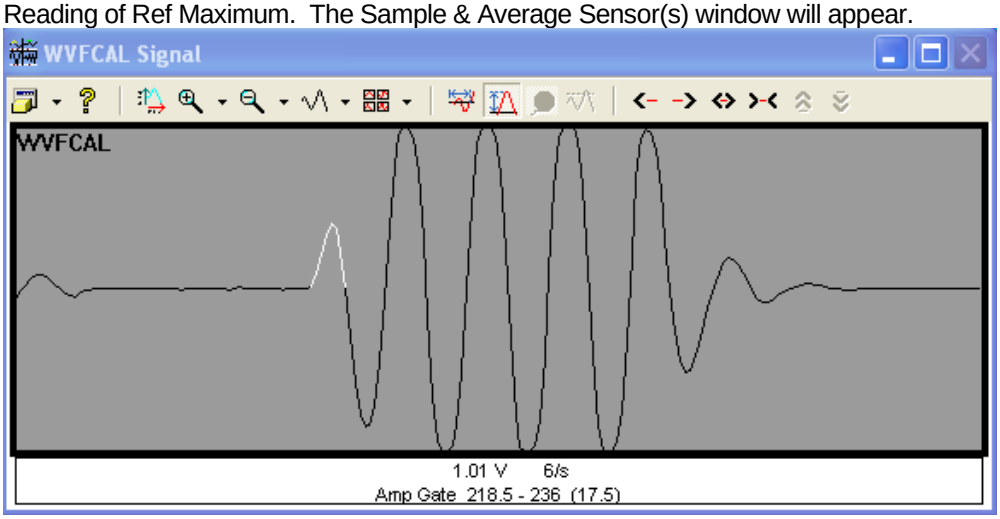


FIG: 30.34 Signal Reference Maximum value

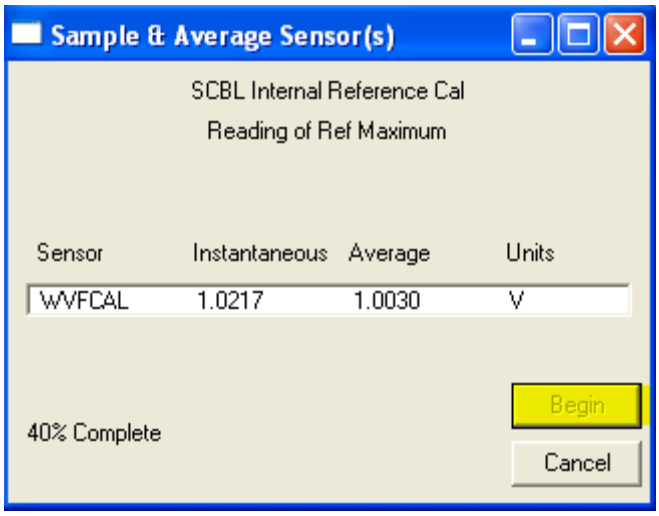


FIG: 30.35 Reference Maximum value

Select <<Begin on the Sample & Average Sensor(s). Select Accept. A gain and offset value will be shown in the SCBL Internal Reference Cal window. The gain should be very close to 1.0 and the offset value will be very close to 0. If they are not, redo your calibrations to ensure that the correct voltage is set for the WVFCAL and the gate was set in the proper position for each reading. Select Accept in the SCBL internal Reference Cal window.

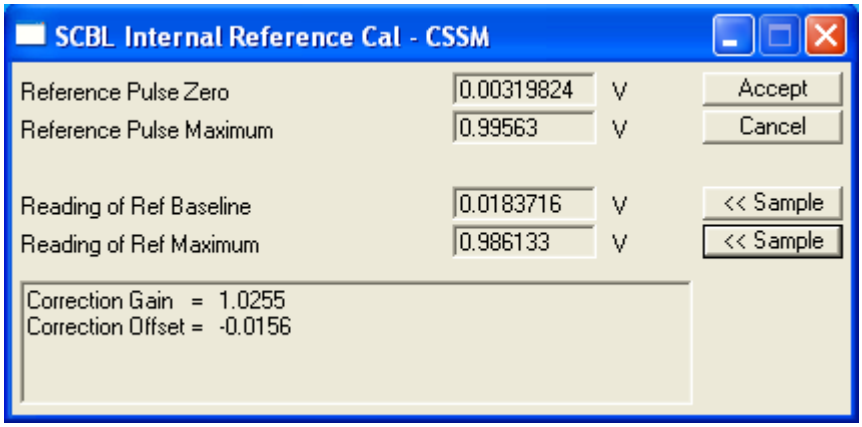


FIG: 30.36 Reference Maximum value

Go in the hole monitoring the various waveforms as shown below. Ensure that the gates are over the first positive signal and that the relative positions of the gates are correct. The gate for the 5ft receiver should be approximately 114 microseconds later in time than the 3ft. The various sector gates should be approximately 57 microseconds earlier in time than the 3ft (for a 2 foot sector spacing).

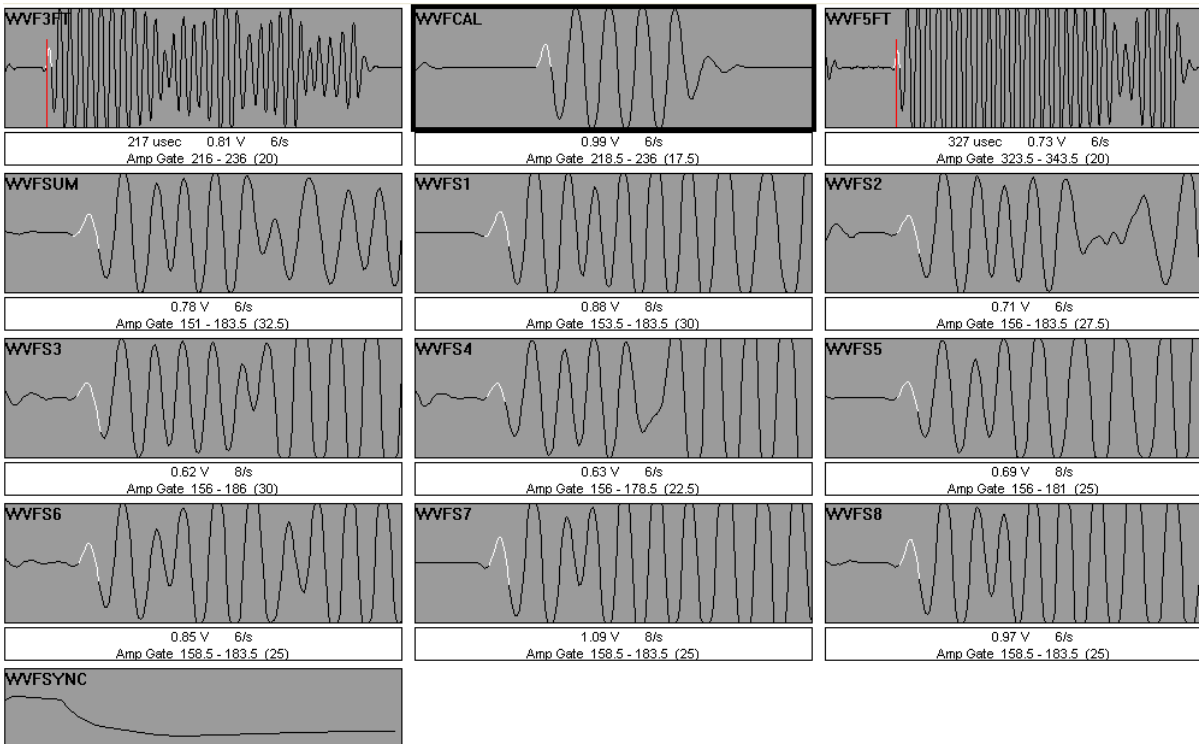


FIG: 30.37 Signals

All waveforms may be shown by selecting Options - Enable from the waveform window.
After the gates are adjusted, open the Monitor -Outputs Window and monitor the various outputs.
All the sector gates can be adjusted simultaneously if they are tethered. To tether the sectors, click on a sector window and then click on the tethering button.

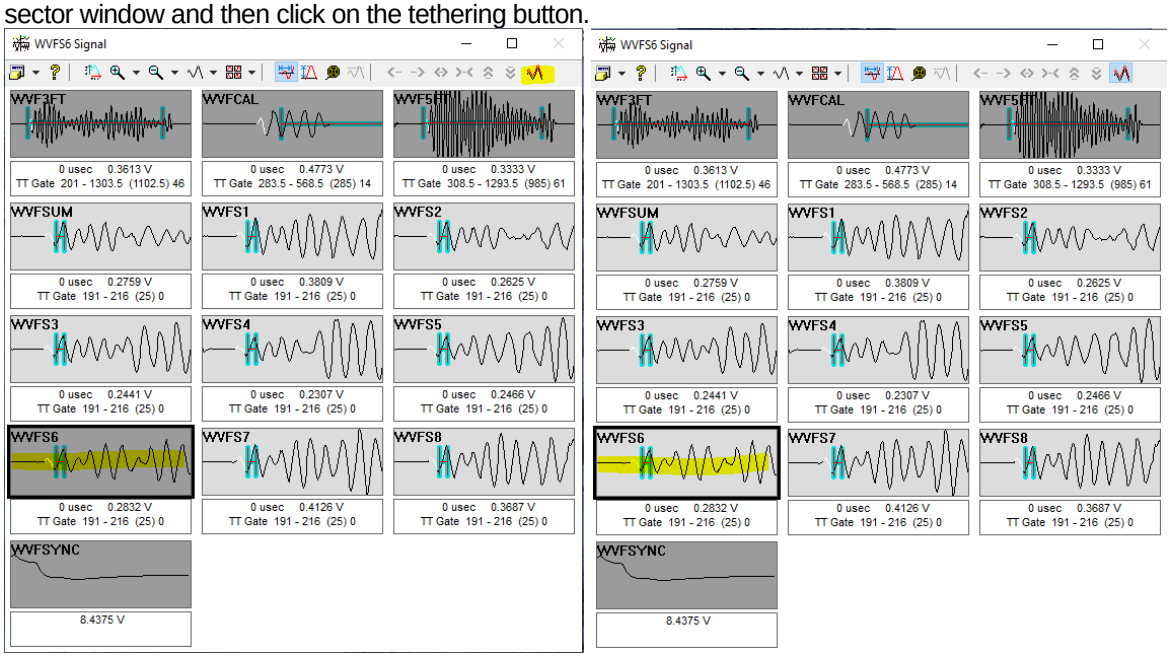
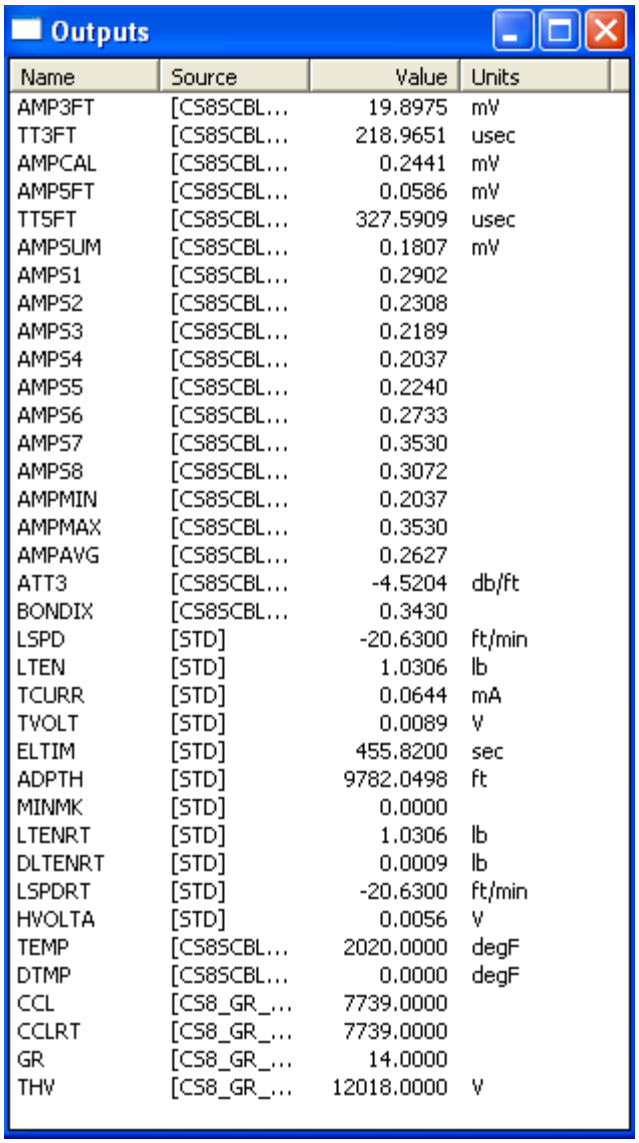


FIG: 30.38 Tethering Sector Signals



Name	Source	Value	Units
AMP3FT	[CS85CBL...	19.8975	mV
TT3FT	[CS85CBL...	218.9651	usec
AMPCAL	[CS85CBL...	0.2441	mV
AMP5FT	[CS85CBL...	0.0586	mV
TT5FT	[CS85CBL...	327.5909	usec
AMPSUM	[CS85CBL...	0.1807	mV
AMPS1	[CS85CBL...	0.2902	
AMPS2	[CS85CBL...	0.2308	
AMPS3	[CS85CBL...	0.2189	
AMPS4	[CS85CBL...	0.2037	
AMPS5	[CS85CBL...	0.2240	
AMPS6	[CS85CBL...	0.2733	
AMPS7	[CS85CBL...	0.3530	
AMPS8	[CS85CBL...	0.3072	
AMPMIN	[CS85CBL...	0.2037	
AMPMAX	[CS85CBL...	0.3530	
AMPAVG	[CS85CBL...	0.2627	
ATT3	[CS85CBL...	-4.5204	db/ft
BONDIX	[CS85CBL...	0.3430	
LSPD	[STD]	-20.6300	ft/min
LTEN	[STD]	1.0306	lb
TCURR	[STD]	0.0644	mA
TVOLT	[STD]	0.0089	V
ELTIM	[STD]	455.8200	sec
ADPTH	[STD]	9782.0498	ft
MINMK	[STD]	0.0000	
LTENRT	[STD]	1.0306	lb
DLTENRT	[STD]	0.0009	lb
LSPDRT	[STD]	-20.6300	ft/min
HVOLTA	[STD]	0.0056	V
TEMP	[CS85CBL...	2020.0000	degF
DTMP	[CS85CBL...	0.0000	degF
CCL	[CS8_GR_...	7739.0000	
CCLRT	[CS8_GR_...	7739.0000	
GR	[CS8_GR_...	14.0000	
THV	[CS8_GR_...	12018.0000	V

FIG: 30.39 Outputs

The maximum of the 3ft and sector outputs should be approximately those shown in appendix I for a given size casing. The minimum values in bonded casing should also match the indicated values. Sector values will tend to be slightly above indicated values in bonded pipe.

30.4.3 Setting Travel Time:

While monitoring the 3ft Waveform, choose Source - Threshold Setup Mode. Using the right hand scroll bar to set the Threshold Setting. The Travel Time should read within 10 microseconds of the value listed in Appendix I. This threshold should be kept as close to the baseline as possible without the threshold picking up baseline noise and triggering early.

30.5 Running the Log:

1 11/16” CSSM Radial Bond Tool
CCL Calibrations – Gain = 0.1 Offset = -12.8
Temp Calibrations - Gain =1.8 Offset = 32
3 1/8” CSSM Radial Bond Tool
CCL Calibrations – Gain = 0.0005 Offset = -3.7
Temp Calibrations - Gain =0.02 Offset = 0
An example Radial Bond presentation is shown below.

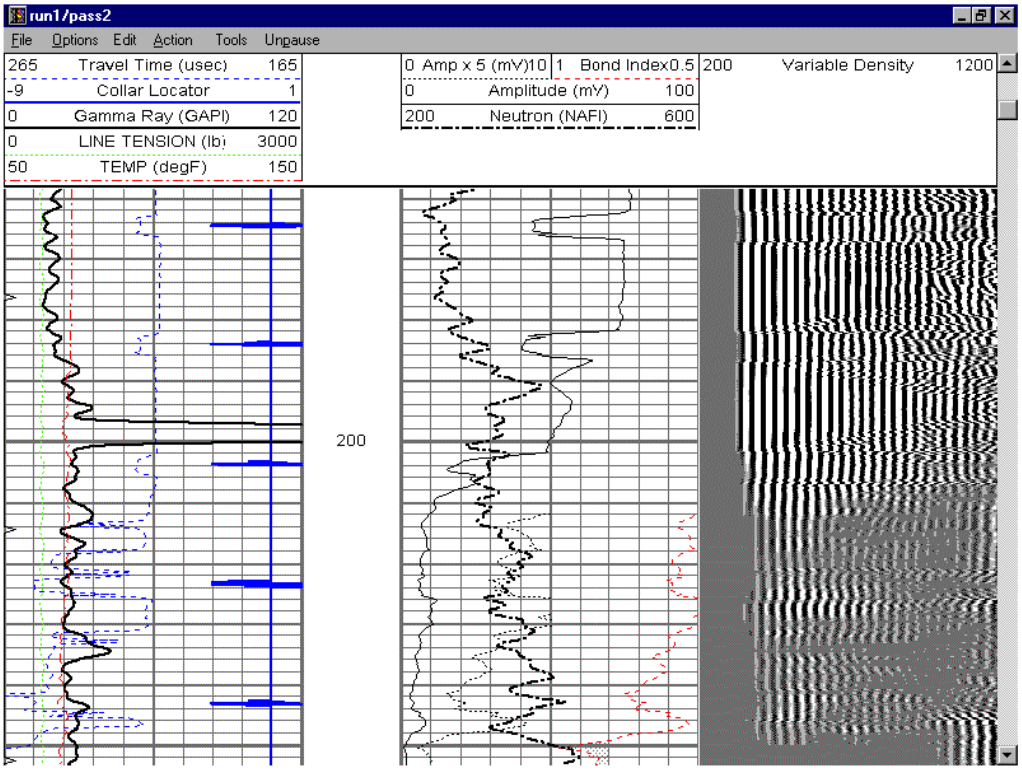


FIG: 30.40 Log

The additional Radial Bond presentation is shown below. This presentation shows the eight sector readings and the waveforms of each as a signature presentation.

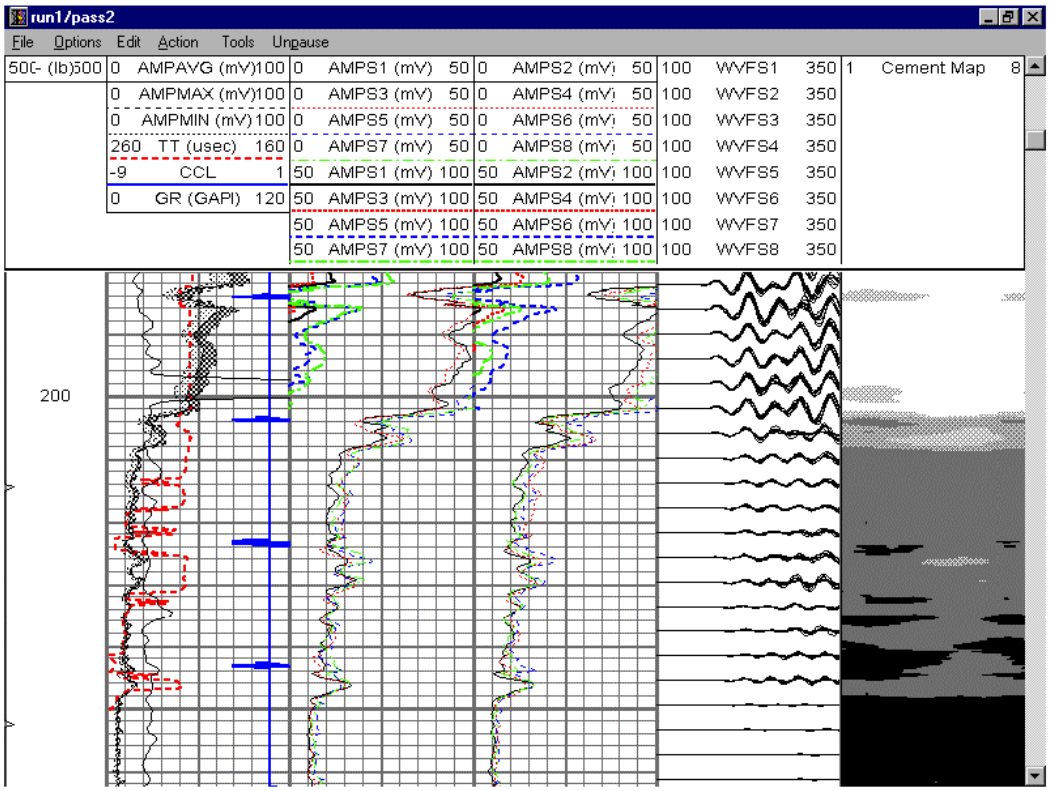


FIG: 30.41 Log Additional Radial Bond Presentation with Cement Map

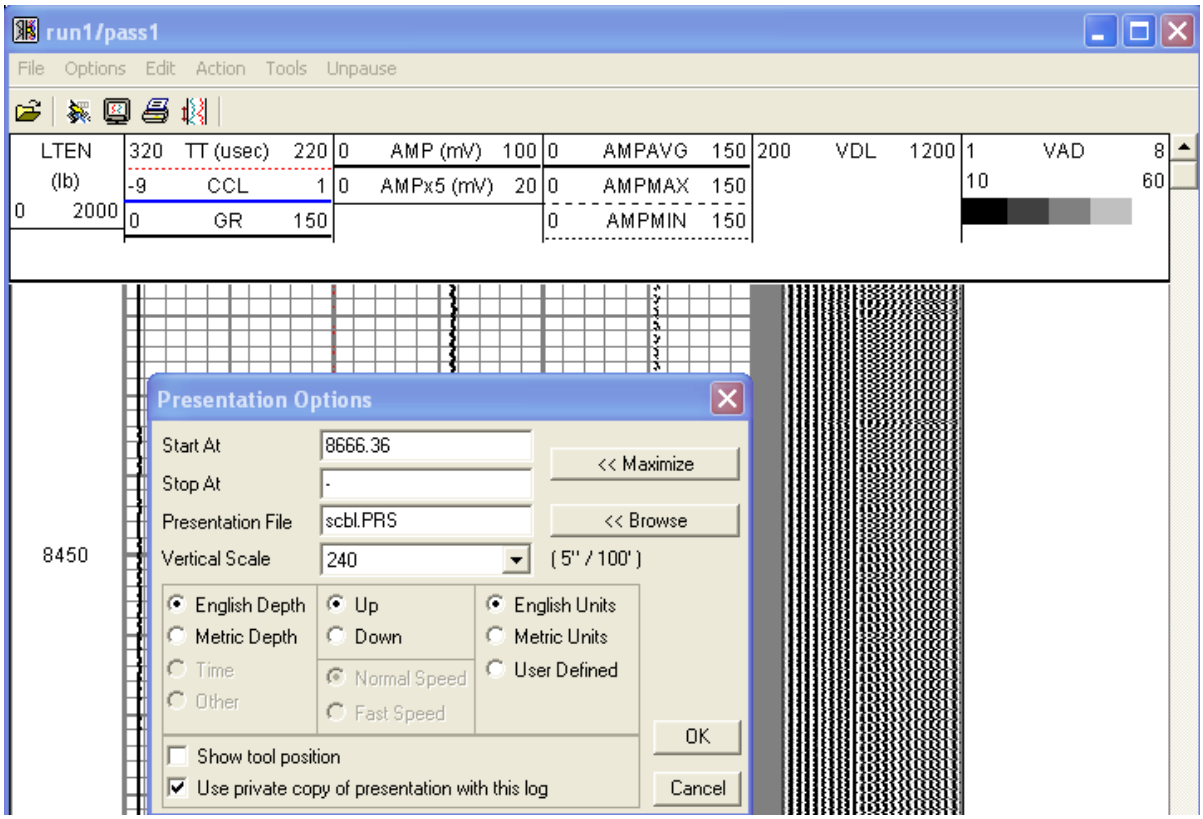


FIG: 30.42 Presentation Options

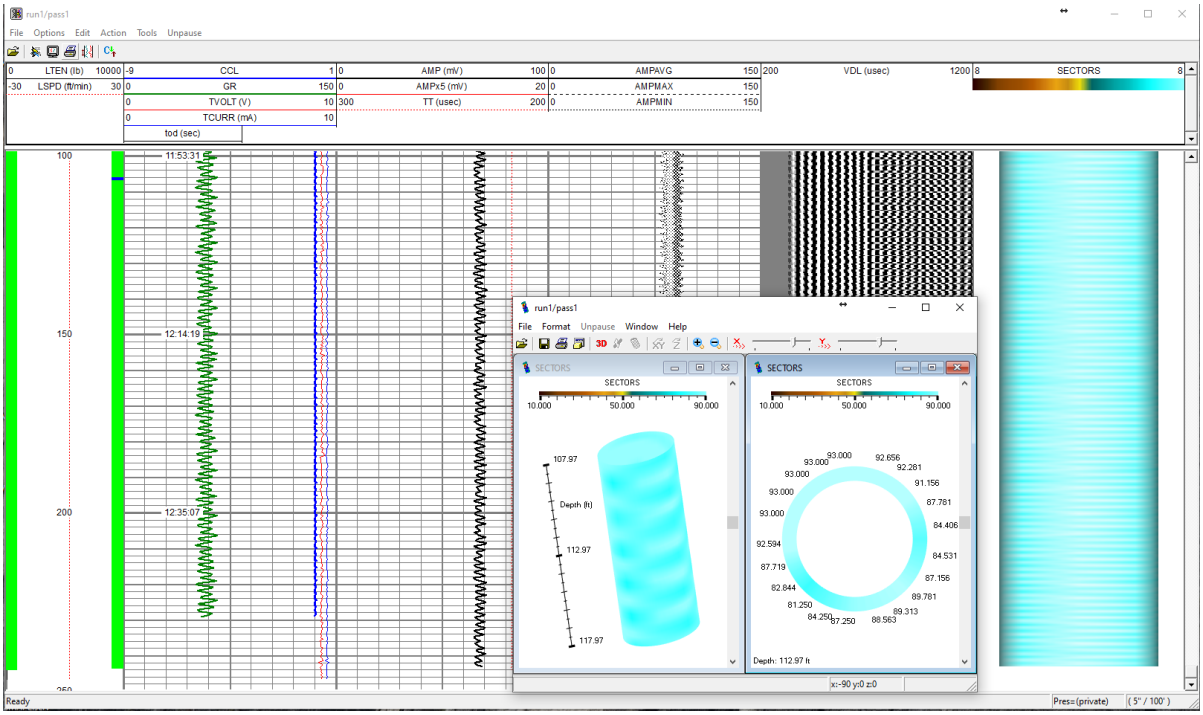


FIG: 30.43 Bond Log with 3D presentation and BH Image

The Presentation may be changed by clicking on *Options* in the Interactive Plot Window. This brings up the window shown below. Either browse to select the presentation required or edit the presentation name to the desired presentation.
Under Plot Job Editor, calling up Single Log pass will bring up a similar window. Editing the Format field will allow you to show the same pass, using different presentations.
Note: This same window allows you to show the same pass with different logging scales.
Note: Annotations must be made from the Interactive Replay Window for each presentation, as the annotations will not be transferred from one presentation to another.

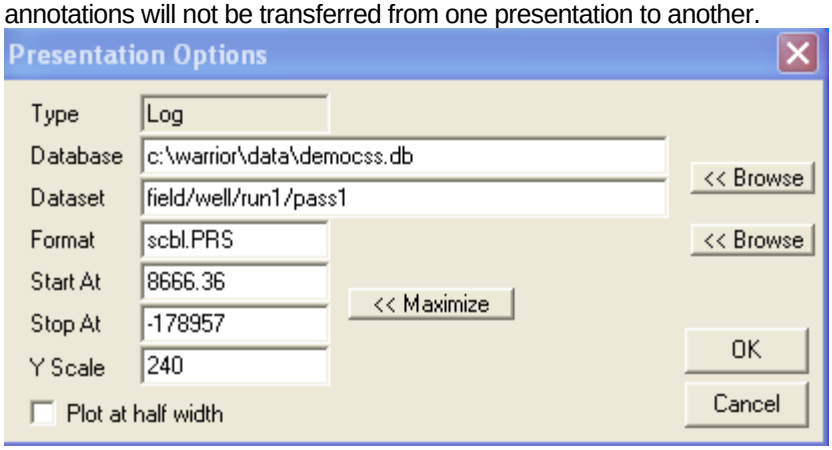


FIG: 30.44 Presentation Options Type

APPENDIX A Pipe Weight and Id

PIPE			1 11/16" RCBS			3 1/8" RCBL		
OD	WEIGHT	ID	RADIAL	3 FT	5 FT	RADIAL	3 FT	5 FT
2.875	6.500	2.441	128	204	318			
	7.900	2.323	126	202	316			
	8.700	2.259	125	201	315			
	9.500	2.195	123	199	313			
	10.700	2.091	121	197	311			
	11.000	2.065	121	197	311			
3.500	9.300	2.992	139	215	329			
	10.300	2.922	138	214	328			
	12.800	2.764	135	211	325			
	12.950	2.750	134	210	324			
	15.800	2.548	130	206	320			
	16.700	2.480	129	205	319			
4.000	11.850	3.476	149	225	339			
	14.000	3.340	146	222	336			
4.500	9.500	4.090	161	237	351	151	208	322
	10.500	4.052	160	236	350	150	207	321
	11.600	4.000	159	235	349	149	206	320
	13.500	3.920	157	233	347	148	205	319
	15.100	3.826	155	231	345	146	203	317
5.000	11.500	4.560	170	246	360	160	217	331
	13.000	4.494	169	245	359	159	216	330
	15.000	4.408	167	243	357	157	214	328
	18.000	4.276	164	240	354	155	212	326
	20.300	4.184	162	238	352	153	210	324
	23.200	4.044	160	236	350	150	207	321
	24.200	4.000	159	235	349	149	206	320
5.500	13.000	5.044	179	255	369	170	227	341
	14.000	5.012	179	255	369	169	226	340
	15.500	4.950	177	253	367	168	225	339
	17.000	4.892	176	252	366	167	224	338

6.000	15.000	5.524		189	265	379		179	236	350
	18.000	5.424		187	263	377		177	234	348
	20.000	5.352		185	261	375		176	233	347
	23.000	5.240		183	259	373		174	231	345
	26.000	5.132		181	257	371		172	229	343
	20.000	4.778	174	250	364		165	222	336	
	23.000	4.670	172	248	362		163	220	334	
	26.000	4.548	170	246	360		160	217	331	
6.625	17.000	6.135		201	277	391		191	248	362
	20.000	6.047		199	275	389		190	247	361
	24.000	5.921		197	273	387		187	244	358
	28.000	5.791		194	270	384		185	242	356
	32.000	5.675		192	268	382		182	239	353
7.000	17.000	6.538		209	285	399		199	256	370
	20.000	6.456		207	283	397		198	255	369
	23.000	6.366		205	281	395		196	253	367
	26.000	6.276		203	279	393		194	251	365
	29.000	6.184		202	278	392		192	249	363
	32.000	6.094		200	276	390		190	247	361
	35.000	6.004		198	274	388		189	246	360
	38.000	5.920		196	272	386		187	244	358
7.625	20.000	7.125						211	268	382
	24.000	7.025						209	266	380
	26.400	6.969						208	265	379
	29.700	6.875						206	263	377
	33.700	6.765						204	261	375
	39.000	6.625						201	258	372
	45.300	6.435						197	254	368
8.625	24.000	8.097						230	287	401
	28.000	8.017						228	285	399
	32.000	7.921						226	283	397
	36.000	7.825						224	281	395
	40.000	7.725						222	279	393
	44.000	7.625						220	277	391
	49.000	7.511						218	275	389
9.625	29.300	9.063						249	306	420
	32.300	9.001						247	304	418
	36.000	8.921						246	303	417
	40.000	8.835						244	301	415
	43.500	8.755						243	300	414
	47.000	8.681						241	298	412
	53.500	8.535						238	295	409
	58.400	8.435						236	293	407
	61.100	8.375						235	292	406
	71.800	8.125						230	287	401

APPENDIX B-Sector Map

30.6 Map

30.6.1 Introduction

The heart of the Radial Bond Tool is the segmented crystal found below the transmitter. This crystal is cylindrical in shape. It is divided into 6 or 8 segments, each of which covers a section of the well bore.

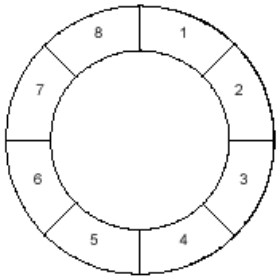


FIG: 30.39 Sector Map

30.6.2 The Calibration Procedure

When the Radial Bond Tool is calibrated, the sonde section is rigidly centralized in a 5-1/2" calibration chamber and the chamber is pressured up to 500 lbs. of water pressure. The tool is powered up and the calibration signal is set to a reference voltage, using pots within the electronics section of the tool. Gates are then set over E1 of the 3ft, 5ft, and each of the segmented crystals. Each of these signals is then set to 1 Volt, again using pots within the electronics section.

Using the SCBL Shop/Free Pipe Calibration routine, the tool is then calibrated so that each of the signals reads 100 millivolts within the test chamber. Then, the test chamber is depressurized, and the tool is rotated 180 degrees. The test chamber is again pressurized, and the calibrations are checked again to assure that the tool was properly centralized during the calibration procedure.

NOTE: While it is true that the expected amplitude reading for the 3ft receiver in 5-1/2" casing is 72 millivolts, that is the expected reading with pressurized water on the backside of the casing. The presence of air on the backside allows the test chamber to vibrate more freely than 5-1/2" casing. The expected readings of the 3ft in various sizes of pipe, are based upon a tool calibrated to 100 millivolts in a 5-1/2" test chamber with air on the backside.

30.6.3 The Radial Readings

Edit Calibrations

Edit Select

Name	Type	Gain	Hi Read	Hi Ref	Lo Read	Lo Ref	Offset
AMP3FT	Lin2Pt	97.649	1.009	100.000	-0.015	0.000	3.004
WS_3FT	Lin2Pt	1.008	0.000	0.000	0.005	0.000	-0.021
AMPCAL	Lin2Pt	66.102	1.503	100.000	-0.009	0.000	0.625
WS_CAL	Lin2Pt	1.008	1.493	1.503	-0.008	-0.009	-0.001
AMP5FT	Lin2Pt	98.521	1.000	100.000	-0.015	0.000	1.491
WS_5FT	Lin2Pt	1.008	0.000	0.000	-0.006	0.000	-0.009
AMPSUM	Lin2Pt	99.273	0.993	100.000	-0.014	0.000	1.403
WS_SUM	Lin2Pt	1.008	0.000	0.000	-0.008	0.000	-0.006
AMPS1	Lin2Pt	97.452	1.011	100.000	-0.015	0.000	1.482
WS_S1	Lin2Pt	1.008	0.000	0.000	-0.008	0.000	-0.007
AMPS2	Lin2Pt	98.770	0.997	100.000	-0.015	0.000	1.505
WS_S2	Lin2Pt	1.008	0.000	0.000	-0.006	0.000	-0.009
AMPS3	Lin2Pt	98.485	1.002	100.000	-0.014	0.000	1.366
WS_S3	Lin2Pt	1.008	0.000	0.000	-0.008	0.000	-0.006
AMPS4	Lin2Pt	97.953	1.008	100.000	-0.013	0.000	1.296
WS_S4	Lin2Pt	1.008	0.000	0.000	-0.007	0.000	-0.006
AMPS5	Lin2Pt	97.091	1.016	100.000	-0.014	0.000	1.337
WS_S5	Lin2Pt	1.008	0.000	0.000	-0.003	0.000	-0.011
AMPS6	Lin2Pt	98.266	1.004	100.000	-0.014	0.000	1.346
WS_S6	Lin2Pt	1.008	0.000	0.000	-0.008	0.000	-0.006
AMPS7	Lin2Pt	99.237	0.994	100.000	-0.013	0.000	1.325
WS_S7	Lin2Pt	1.008	0.000	0.000	-0.008	0.000	-0.006
AMPS8	Lin2Pt	99.230	0.995	100.000	-0.013	0.000	1.308
WS_S8	Lin2Pt	1.008	0.000	0.000	-0.007	0.000	-0.006

FIG: 30.43 Radial Readings

With the Shop Calibration recorded in the Tools.ini file, all that is left for the Engineer to do at the well site, is to perform the SCBL Wellsite Internal Reference Cal and the SCBL Air Zero Cal. These calibrations generate a secondary Gain and Offset that are applied to readings from the SCBL outputs before they are plotted and recorded. These secondary calibrations are identified by WS_ and are listed directly under the curve to which they are applied.
When the SCBL Internal Reference Calibration is performed, the High and Lo Read of the AMPCAL from the Shop Calibration are used as the Hi and Lo Ref for the WS_CAL and the Calibration Signal is calibrated back to the readings taken during the Shop Calibration. The Gain derived from this calibration is then applied to ALL the Bond curves. This calibration adjusts the Warrior Logging System for differences in line length and variations in CBL/BHC Signal gains.
When the SCBL Air Zero Cal is performed, the gates of all the bond signals are set to their approximate values for the casing size anticipated by choosing the appropriate Setup (under *Load Setu*p), while to tool is in air. This calibration generates the secondary calibration offset, which is applied to each of the Bond curves individually.
When using Shop Calibrations for logging, both calibrations must be done before going in the hole. If, for some reason a Wellsite Calibration is performed, there is no need to perform these two additional calibrations. Wellsite calibrations are not recommended except under unusual situations.

30.6.4 The Cement Map

The Cement Map is a graphical representation of the response of the sector measurements. The shading of the cement map is purely representative of the recorded amplitude readings from the various sectors. Look back to the representation of the segmented crystal shown at the beginning of this bulletin, and visualize the sectors laid out horizontally.

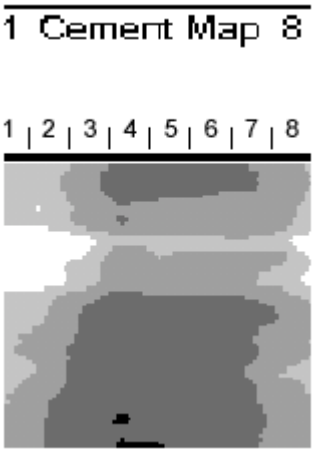


FIG: 30.44 Cement Map

Each of the individual sectors is represented by a section of the cement map, as shown below. The shade applied to each section of the map is a function of the amplitude of that sector as recorded.
The Warrior Logging System uses an algorithm to determine the shading associated with the amplitude recorded, based on several factors. These factors include:
The number of grayscales and the density of the grayscales in the Cement Map, as applied in the screen and printer setup within the Warrior.ini file.
The Filter level associated with each of the Sector Curves.
The amplitude reading of adjacent sectors.
The High Reference recorded in the Shop Calibration associated with each Sector Curve.
The Black and White values set in the presentation file.

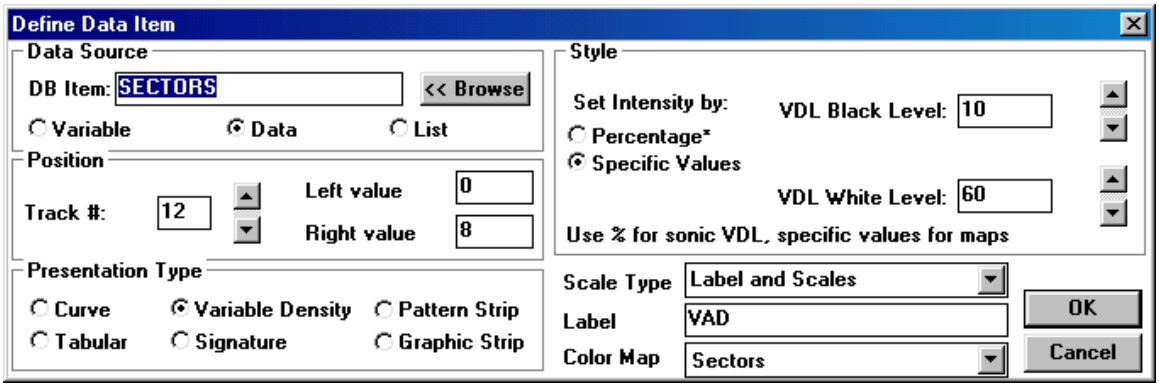


FIG: 30.45 Sectors

The only factor under control of the engineer is the Black and White values within the presentation file. The purpose of the Cement Map is to graphically illustrate small channels that may pose a problem. With that end in mind, the following is the proscribed setup for the Cement Map.
With the Black and White Levels set as above, the grays scales of the Cement Map will change as follows:

1. Amplitudes less than 10mv Black
2. Amplitudes greater than 10.0mv and less than 26.7mv Dark Gray
3. Amplitudes greater than 26.7mv and less than 43.3mv Medium Gray
4. Amplitudes greater than 43.3mv and less than 60.0mv Light Gray
5. Amplitudes greater than 60.0mv White

If different gray scales are needed for an application, contact Technical Support.

30.6.5 Logging Conditions

The Cement Map is a visual representation of the cement conditions behind the pipe. The Sector Crystal is not free to rotate within the tool, and the cement and casing are not free to rotate. However, the tool itself is free to rotate with the well, and it is expected that it will. For this reason, apparent “channels” may rotate within the cement map while running repeats, and that the Cement Map may not repeat exactly.
The Cement Map also becomes an important aid to quickly identify problems in tool setup or logging procedures.

Section

31

31 Ultrawire Memlog Chart

31.1 Updating Warrior V7.00

Run the self-extracting Warrior Updates executable.
Add the following entry to Warrior.ini (found in the Warrior Config directory or use the shortcut in Sondex Utilities).
In the Device Alias section add UWD=UWMEMORY
[Device Alias]
UWD=UWMEMORY
Next import the new UW memory tools using the Warrior tool editor (found in Utilities).
In the Calibration select Restore and select MBH025.wcf, UMT003.wcf, MITUW.wcf, PRC034.wcf, PRC057.wcf in turn. This imports the Memory Battery Holder, Ultrawire memory tool, Ultrawire MIT and 2 new centralizers.
Now add the new Ultrawire memory services. In the Service Editor (Utilities) import UMT Services.wsv which contains all 4 memory services.

31.2 Update MCU driver

Uninstall the current MCU device driver (using the Device Manager) and reinstall the latest MCU driver (SXMCULDR.SYS). The version required is V1,0,0,6 or greater.

31.3 Update UMT firmware

Open Ultrawire Memlog, select the Diagnostic menu and click on Upload new firmware. Select the latest firmware file (XXXX.bin) and if the UMT is connected to the MCU the new firmware is uploaded.

31.4 Using Ultrawire Memlog

Setting up the Service (tool string).

All service information is set up in Warrior. In Warrior Acquisition select the required Memory Service (i.e. Ultrawire Memory MIT). Make up the tool string, and at this point it is possible to perform all the calibrations using an XTU.
Next, if required set up the zoned variables in Warrior.
Once the service information is complete then UW Memlog can be used.

LEAVE WARRIOR RUNNING, DO NOT CLOSE UNTIL YOU HAVE FINISHED USING UW MEMLOG!

31.4.1 Open UW Memlog

The first thing that must be done is to set up the DPT Settings. In the Edit menu select Edit DPT Settings, the options in this window must match those on the DTR or UW Memlog will not output the correct depth units!
Create a new project (File menu, or toolbar), the user is then prompted to create the project files. Only do this if the service has been completely set up in Warrior.
UW Memlog takes all the service information from Warrior (tool string, telemetry information etc.) and creates the Project.ini and the Service.ini in the project directory. It also copies any calibration files in Warrior to the Project directory. They are not used by UW Memlog but are a useful archive.
Next import the zoned variables from Warrior. In the UW Memlog File menu select Create Variables database. This takes the zoned variable information and places it in the Project directory (vars.db).

31.4.2 Create the Profile

The profile editor is slightly modified from the previous version of Memlog. It is now possible to sample any tool, at any rate (within reason). For each profile line a tool can be sampled at a different rate.
The first difference is that a start time for the profile line is NOT entered; this has been changed to the length of the profile in seconds.
The second major change is the profile type. There are 4 options, LOG, OPEN, CLOSE and SLEEP.
LOG is the default and will record all the tools at the selected sample rates.
OPEN and CLOSE can only be used on tools with motorized arms. (i.e. MIT). It is recommended that each OPEN and CLOSE profile be 3 minutes in length to allow the tool to fully open and close.
Note when an OPEN or CLOSE profile type is selected the tool to be opened\closed must also be selected in the rate window. The drop down list will now contain OPEN or CLOSE rather than sample rates.
NOTE: Only one tool can be opened or closed in a single profile!
NOTE: During an open or close no other tools can be sampled.
I recommend that a LOG profile precedes each open or close profile type.
The amount of memory being used can be seen at the bottom of the window. Make sure this does NOT exceed your memory limit.
If an MIT is in the service, there will be two memory usage values. Click on the Details… button and select the MIT compression rate to view the true memory used.
Save the profile.

31.4.3 Programming the tool

Assemble the tool string and attach to the MCU etc.
If an MIT is in the tool string, then before programming the tool, the COMPRESSION MODE must be set.
Enter Command mode in UW Memlog (toolbar option), once the Command window is loaded, using Warrior select the MIT Tool Configuration window and select the Sample Options button.
The following options should selected and sent to the MIT.
Compression Mode = Absolute (12 bit), although this is a user choice.
Sample Type= On Demand
Sample Rate = 20 or 50 ms (again a user choice).
Send the command to the MIT, if the command is sent successfully the Command window will increment the command and response counters.
NOTE: If testing in the shop it might be worth changing the Memory size to 2MB prior to programming the tool (Edit menu). This will save time but REMEMBER TO CORRECT IT BEFORE GOING ON A JOB.
Program the tool using the toolbar option.
Monitoring the tool, or run the job

To monitor the tool, select the Monitor toolbar option (Warrior MUST be open with the correct service). The Monitor window outputs the MCU voltage, but the tool readings are sent directly to Warrior and can be view in Warrior in the View Outputs window.
As UW Memlog is transmitting the data directly to Warrior, the calibrations can be performed if required. Use the standard Warrior calibration routines.
Remember if you perform a new calibration it is recommended that you recreate the UW Memlog project files.

31.4.4 Download the tool

Download the tool using the toolbar option. It is recommended that all the errors are viewed, and the user look at the UWstats text file. It will report any errors on each of the UW addresses and is a useful diagnostic tool.

31.4.5 Visual Merge the depth and tool data

Note: I have not gone into the DTR download and setup as this is identical to the old Memlog.
Visual Merge is also pretty much the same as the previous version, although UW Memlog only uses raw memory data, so the plotted data is all raw values.
The depth and tool data should be tied-in as usual and all passes picked and saved to file.

31.4.6 Output passes

UW Memlog now only outputs directly to Warrior. Select the passes to output to Warrior and select the options for time based outputs (i.e. fast or slow sampling).
Output the passes, you are prompted for a Warrior database name. Make sure you do not attempt to over write a previously created database. You can append to an existing database, but the pass names must be different.

31.4.7 Recalculating the raw UW Memlog data and creating the curves

UW Memlog outputs a raw data dump into the Warrior database. To extract the curves and apply the calibrations Warrior Recalculation must be used.
Open Warrior Recalculation and select the database you have just output from UW Memlog. Enter a name for the recalculated pass and select OK.
At this point, if an MIT or CAT is in the tool string the user is prompted to use either current or embedded calibration files. I recommend using the current files (taken from the Warrior database).
Next it is possible to configure the tools, i.e. for the MIT the user can select whether to centralize or temperature-compensate the data. The zoned variables can also be altered at this point.
Now select the maximum speed option and the calibrated curve data is plotted and is ready to use.
It is possible to recalculate the raw data as often as necessary should any changes need to be made.

31.4.8 Extras

There is a Calibration Pass option in UW Memlog; this can be found on the tool bar. This looks like the Visual Merge window and you select a calibration pass in the same way you would pick a log pass. Once a calibration pass is selected it can be sent to Warrior using the option in the File menu.
If calibration data has been recorded to memory this is the way to pass it to Warrior.
When the data is being passed to Warrior a cursor scrolls across the screen to show which data is being sent. In the Warrior Output Monitors the user can view the data, and the calibrations can be performed in the standard way.
Remember after performing calibrations it is recommended the service information in the UW Memlog project be updated.

Section

32

32 Noise Log

32.1 Services - Noise Survey

The signals from the noise tool are conditioned by filters and amplifiers on the ANASW board and routed to the AUDIO board. The AUDIO board produces 4 separate signals that are then sent to the DSPAUX and DSP for digitizing. The signal is amplified by the 4 stages of the Audio board so that each output is gained up by a factor of ten from the previous stage. The Warrior software examines the 4 signals and chooses the signal that is not saturated and with enough signal strength to analyze. This signal is digitally filtered in the computer and divided into the conventional frequency components. The frequency spectrum and raw and filtered signals may be monitored on the computer screen. Several samples may be averaged to produce a station reading for a given depth. The averaged frequency spectrum may be monitored on the computer screen.

Start the service from Services in the normal manner and power the downhole tool. A raw data monitor window is presented which has four signal displays corresponding to the conventional four peak to peak voltage ranges.

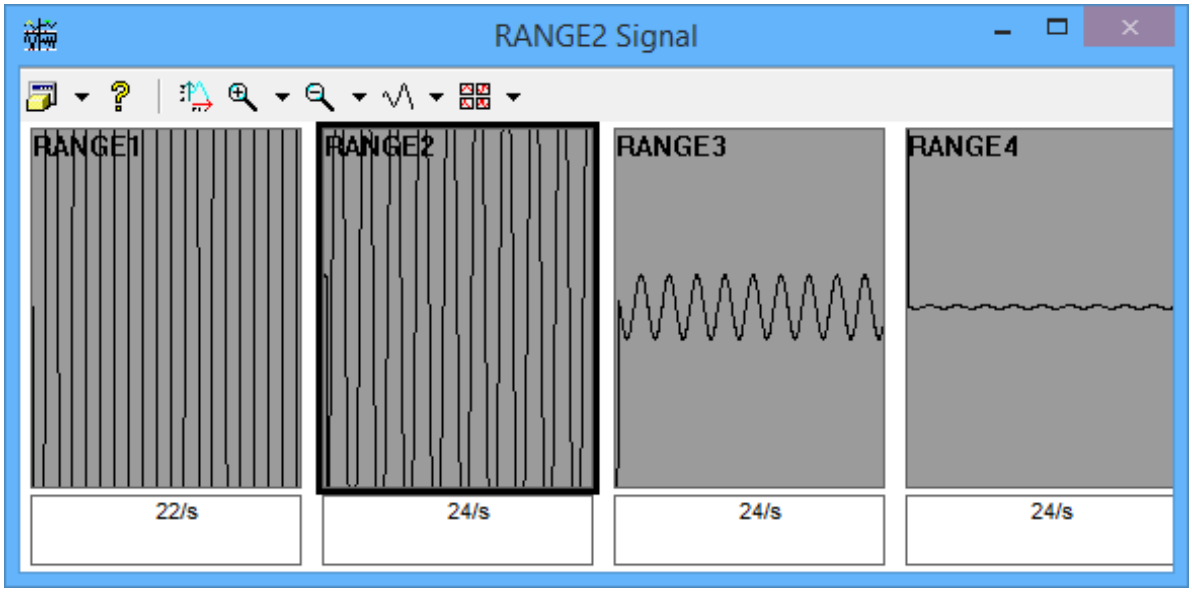


FIG: 32.1 Range Signals

The usual range of options associated with waveform monitors is available for this display. During operation the system automatically selects the most appropriate range for data collection.

The system also displays a window displaying the processed waveforms and frequency spectra. The survey is also controlled from this window. The settings that are used for sampling stations are controlled by clicking the [Settings] button. There is also a “Record Soundfile” checkbox that when checked will make a WAV recording after the data has been sampled.

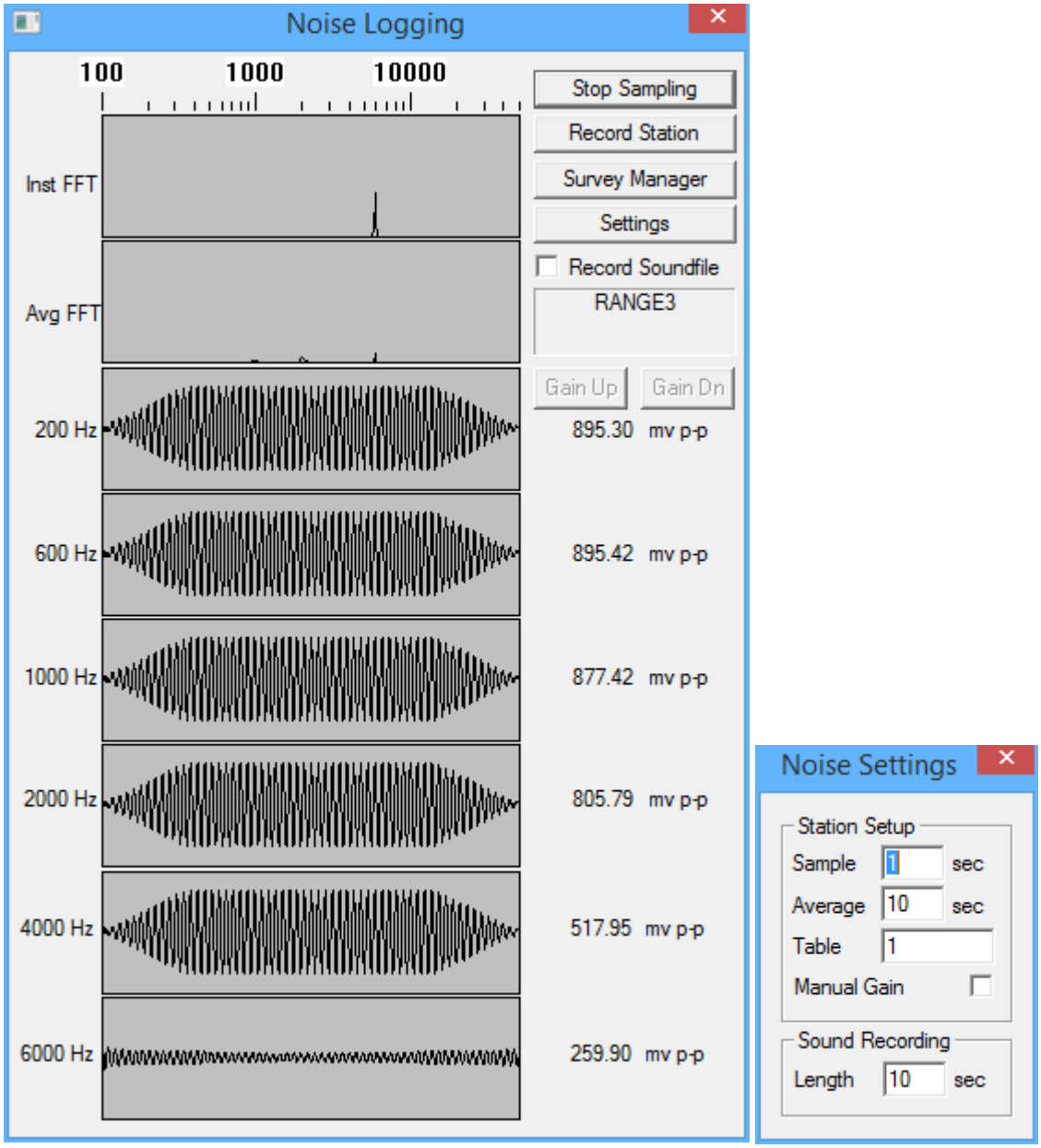


FIG: 32.2 Noise Logging Control

32.2 To run the survey

Click on the [Start Sampling] button and signals should appear in the various windows. To record a station, click on the [Record Station] button. With the parameters shown the system will take ten one second samples, average the results and record them as a depth station in a survey table.

To view the survey table, click on the [Survey Manager] button. As each depth station is recorded the results are entered the survey table as shown.

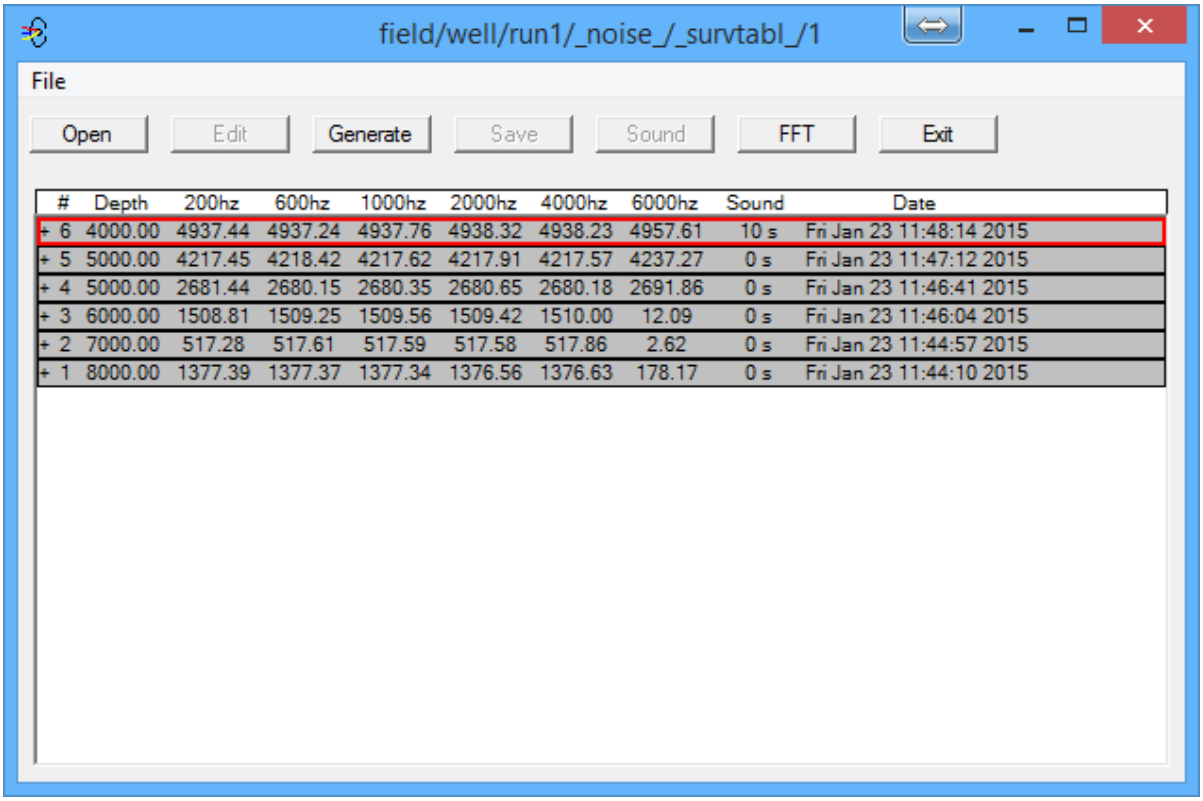


FIG: 32.3 Survey Manager

After all stations have been recorded the survey may be output as log curves and/or tabular results. If there are stations which need to be excluded from the results this may be achieved by selecting the station in the survey table (by clicking anywhere in its line) and then clicking the Disabled box as shown below.

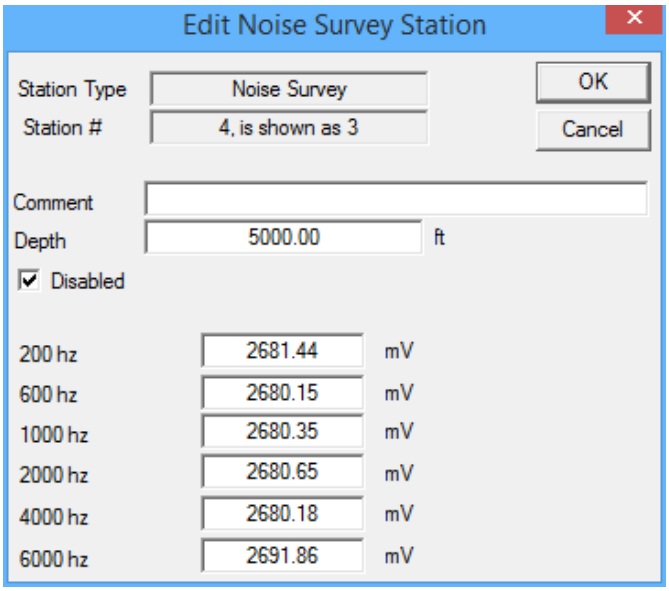


FIG: 32.4 Edit Survey Station

Clicking on the Generate button and Depth Log displays the window shown below.

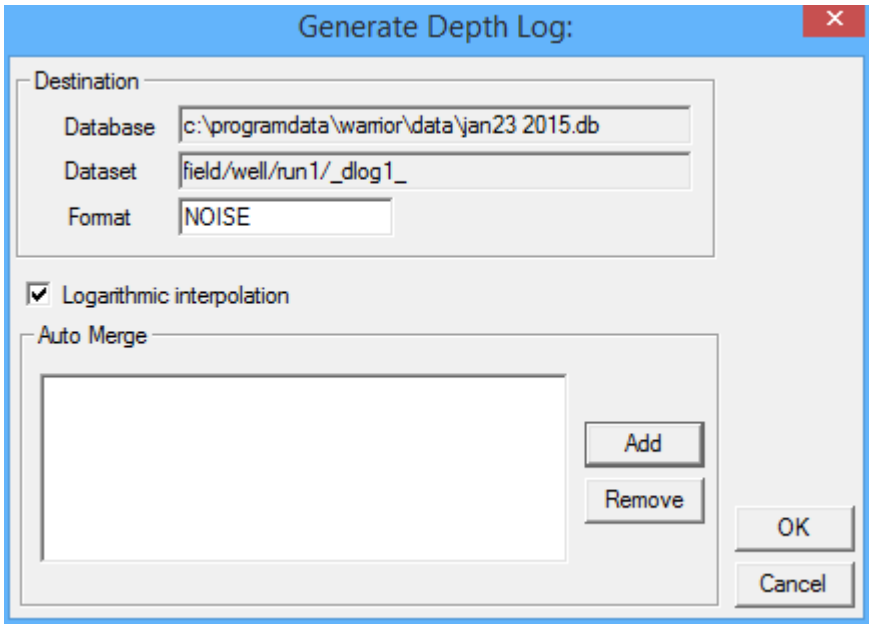


FIG: 32.5 Depth Log Format

The cryptic Dataset entry simply indicates what the resulting merged and interpolated log will be called. If a logarithmic display of the data is required, then the Logarithmic Interpolation box must be checked. In this case the log presentation used must specify a logarithmic grid and a logarithmic curve.
Note that other curves e.g. CCL, may be easily merged with the noise curves using the Auto Merge feature. Clicking the Add button displays a list of the other curves present in the current database. At present it is not possible to merge curves from other databases by this method. Aliasing may be used to achieve this if required.

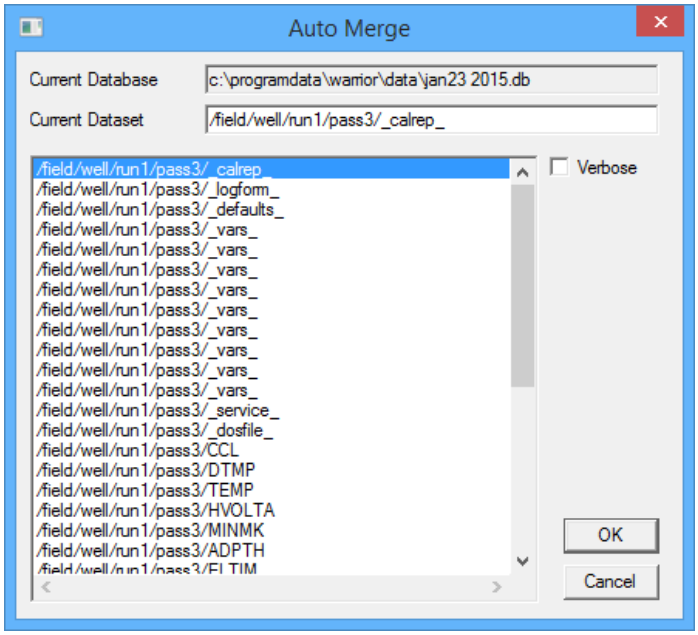


FIG: 32.6 Select Data set Auto merge

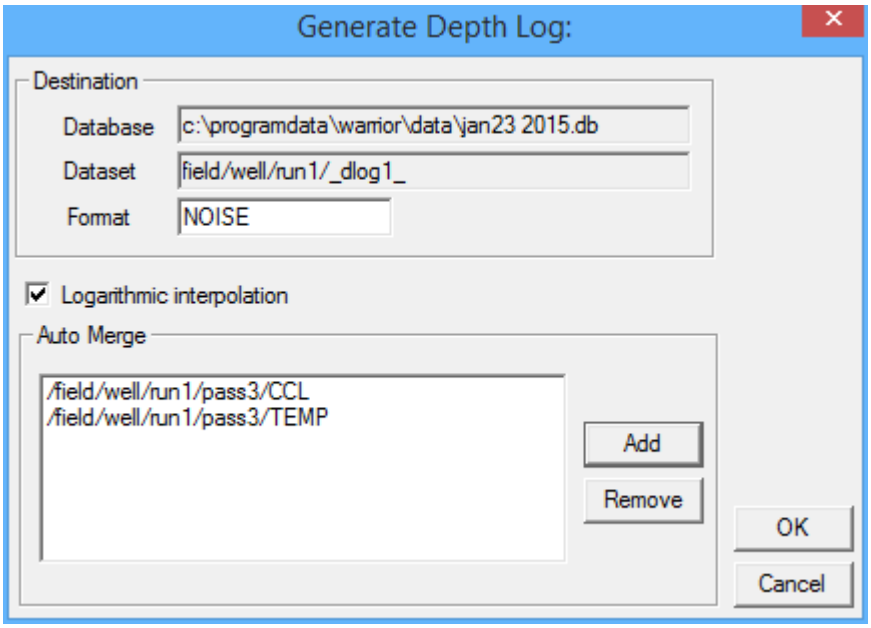


Fig. 32.7 Curves added to Depth pass to be generated

Double click on the curve(s) to be merged with the noise data. To generate the merged presentation, click on the **OK** button and the merged log will be displayed on the screen. With long log intervals this may take several seconds.
Note that a merged presentation may be generated at any time in order to monitor the progress of the survey, e.g. after each depth station if required.
For final presentation a tabular output of the survey table may be added to log grid presentation when assembling the final plot using the Plot Job Editor.

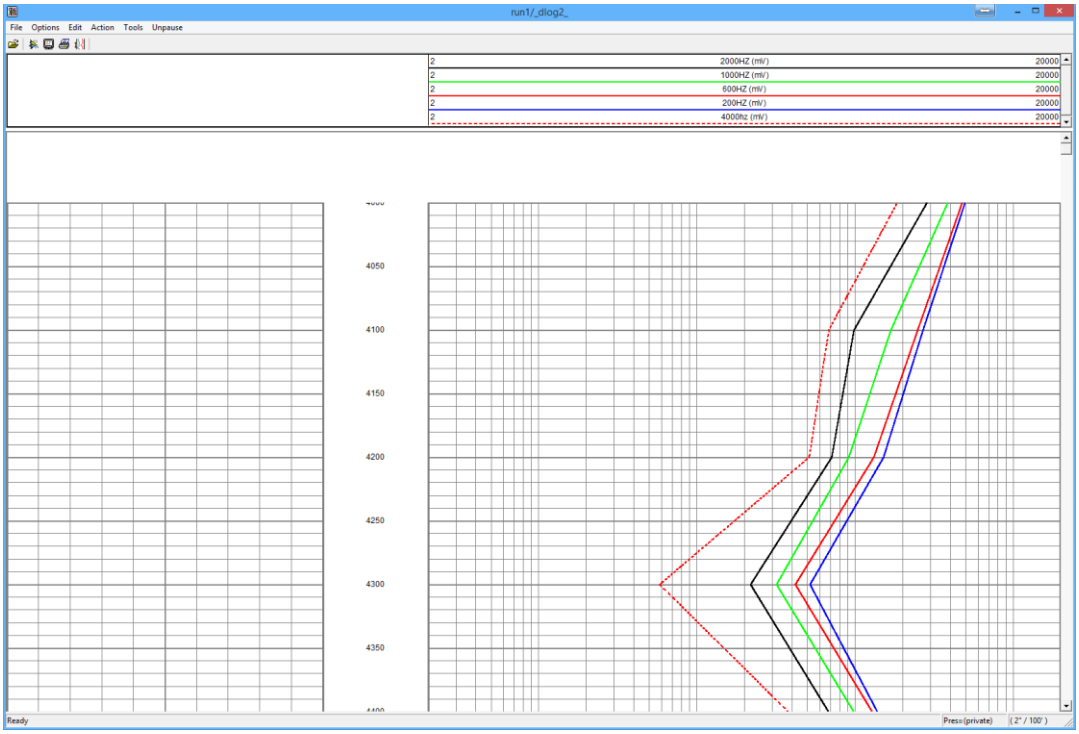


Fig. 32.8 Example Noise Log output

Section

33

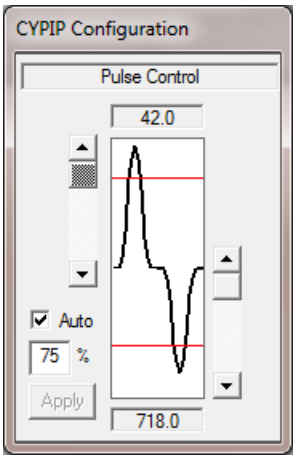
33 Pulse Interface Panel

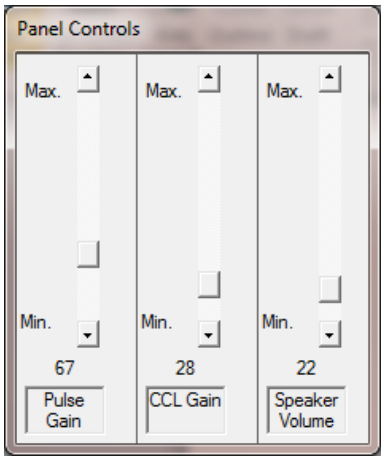
Pulse Interface Panel
(PIP System) Operating Procedures

The Pulse Interface panel has much of the same functionality of a standard panel but is limited to being able to process one positive pulse, one negative pulse, and an analog CCL. While the standard interface panel has a digital signal processor capable of digitizing and displaying line signals for visually adjusting pulse discriminators, the PIP does not have these capabilities.

The Pulse Interface Panel has peak detection circuitry. What is shown in the CYPIP Configuration Pulse Control window is a representation of the positive and negative peaks that are being detected, not the actual pulses. The Pulse Gain in the Panel Controls window should be adjusted so that the peaks of the pulses are in the window, but large enough to allow easy discrimination. The peak detection circuitry has a very long time constant. Thus, when adjusting the panel controls Pulse Gain to set the pulse height in the "pulse" window, allow enough time for the detected pulse peaks to respond.

Fig 33.1 Panel Controls





Discrimination of pulse is accomplished through hardware comparators and counters. Since the peak signal levels have been detected by the hardware, the software can set the discrimination levels for the pulses to be a percentage of the peak level. This is accomplished by checking the “Auto” box in the Pulse Control window and setting the percentage in the “%” box.
The alternative method of setting the discriminator levels is by manual control. If the “Auto” box is not checked, then the slider bars to each side of the “pulse” window control the discrimination levels that are sent to the comparators.
Another difference in the Pulse Interface Panel and a standard panel is the way that periodic pulses are handled. Periodic pulses are pulse that have essentially the same time between pulses though the time between pulses may vary. If only pulses are counted there is always a variance of ± 1 count per second. These are tools such as temperatures and calipers.
In the standard panel with the appropriate DSP script, essentially the time between pulses is measured. This time is then converted to counts per second with fractional accuracy. The pulse interface panel has phase locked loop voltage controled oscillator circuits to multiple the number of counts by a scalar set in the hardware and confirmed in the software. After the pulses are counted, the software divides the scalar back out to give fractional counts per second to increase accuracy.
To implement whether the raw counts or the counts from the PLL are used, the services.ini file needs to be modified through the Service Editor. Go to the Service Editor and click on the service that will have periodic pulses. In the Devices section, after the Base device, you can add either multiply+, multiply-, or both as shown below to choose which pulse or pulses you wish to process as a periodic measurement. DO NOT use this method with random or non-periodic pulses as this will cause drastically incorrects counts for that sensor.

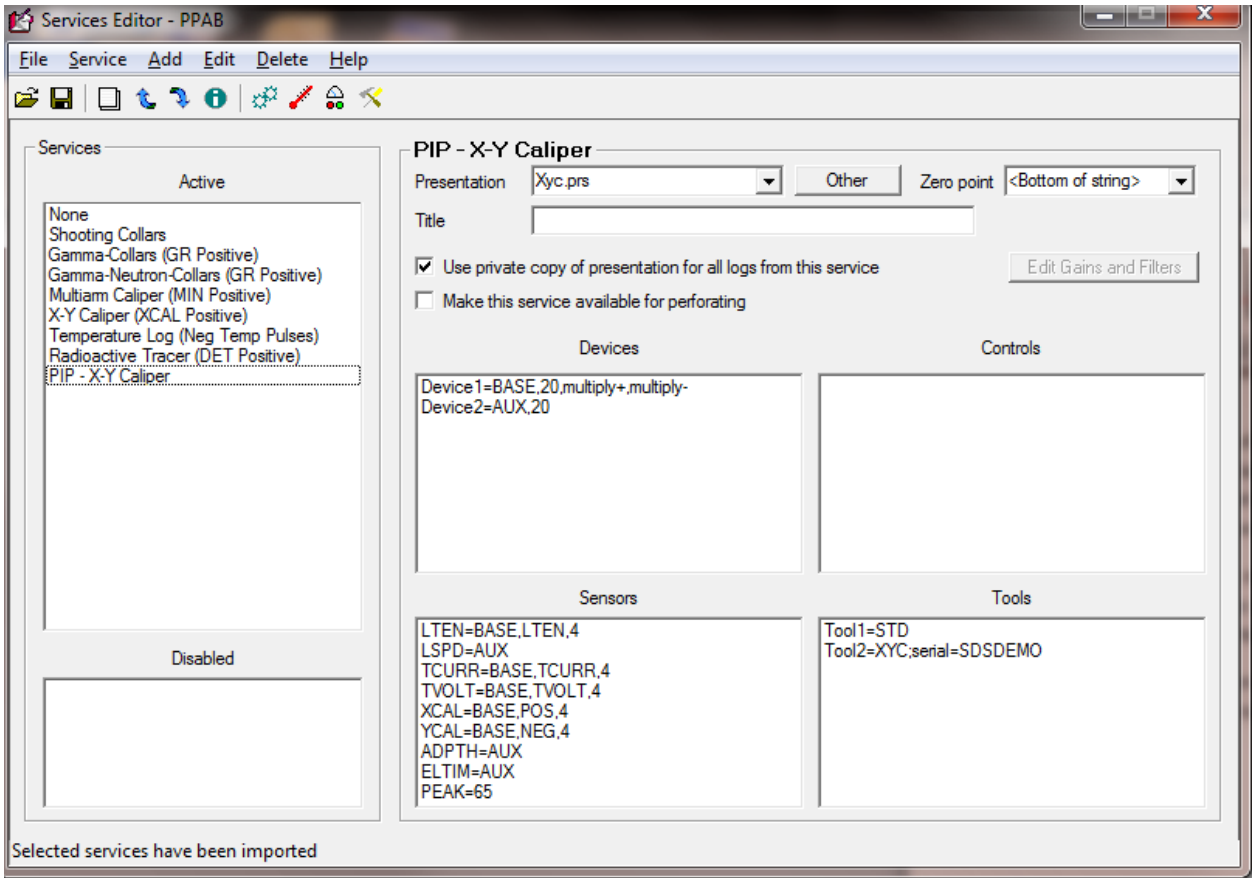


Fig 33.2 Service Editor for Periodic Pulse

34 SERMON and ASCTEL

The Warrior software can send any data output through a COM Port as serial ASCII data so that the information that can then be made available to external computers or displays by use of the SERMON device module. ASCII data may also be imported through the ASCTEL device module to use as any sensor data input.

34.1 Sermon Device

To export serial data through Sermon, in the Database Utilities, click on [Edit Logging Service Details] to bring up the Service Editor. The current software supports two Sermon outputs, Sermon and Sermon2. In any service that the User desires, a new device can be added.
The example shown in Fig. 34.1 shows a typical Sermon device setup. Note that the 10 that would usually be the maximum rate of the device, is only a place holder. The output rate is set up in the Device configuration.

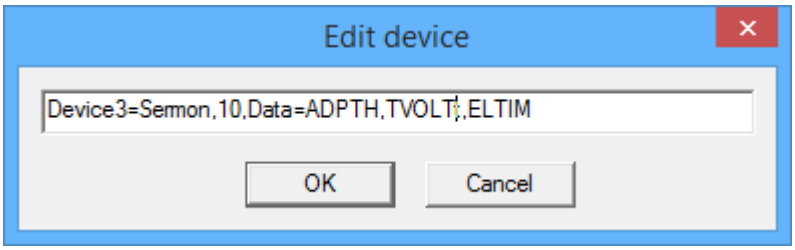


Fig 34.1 Sermon Device outputting Depth, Tool Voltage, and Elapsed Time

Often when the service with the Sermon outputs is first loaded, an error message will appear that indicates that Sermon failed to open a COM port. The COM port first must be configured by clicking on Edit -> Device Configuration -> Sermon from the Acquisition window. There are drop down lists to choose from the available Com Ports that the software has found on the computer and to select the transmission baud rate. There are several different types of serial outputs that can be chosen with standard being the most commonly used. Normally the continuous box is checked to have data continuously sent out. The rate is determined by the Repeat setting with 100 being 10 times per second and 10000 being once every 10 seconds.

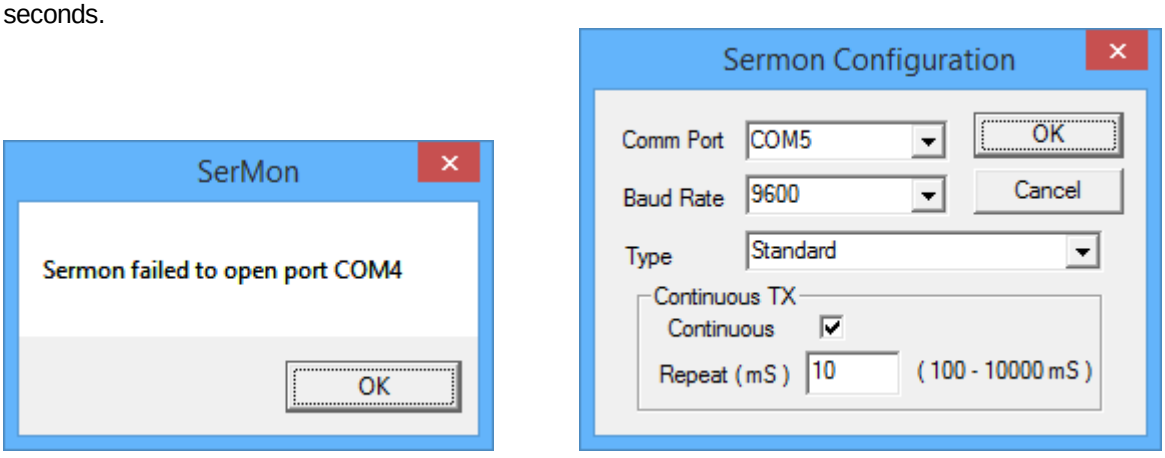


Fig 34.2 Sermon port failed to initialize and Sermon COM port settings.

34.2 ASCTEL Device

The ASCTEL device allows the User to bring in serial ASCII data and assign it as a sensor data source. Up to 10 sensors may be brought in through the ASCTEL device. The current software supports two ASTEL inputs, ASCTEL and ASCTEL2. The ASCTEL device has several additional parameters in the declaration. The third parameter in the declaration is the format of the data coming from the COM port (ifs is shown in fig. 43.3). The fourth parameter allows the User to specify the number of data inputs received by the ASCTEL device (shown as “n=8” for 8 inputs). You can send receive depth via ASCTEL by adding depth to the command line.

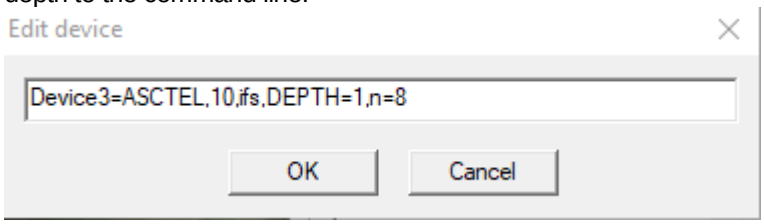


Fig. 34.3 ASCTEL entered as a device in the Service Editor

Like Sermon, the ASCTEL device can be configured by entering the service and Edit -> Device Configuration -> ASCTEL. The User can select from a dropdown list of available import types, select the COM Port, and a timeout period

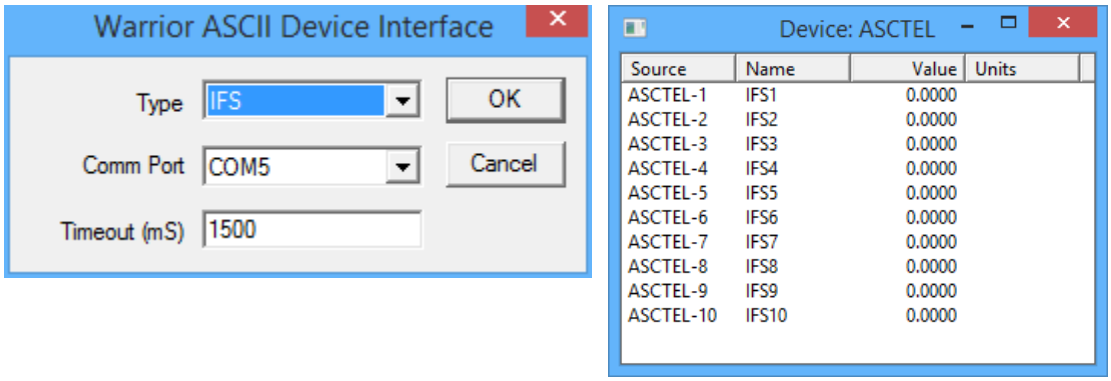


Fig. 34.4 ASCTEL COM Port settings and Monitor -> Device -> ASCTEL

Any tool sensor may now use the ASCTEL inputs as sensor data. The sensor references the device and the device channel in the normal manner. The sensor must be a valid sensor from a tool in the tool string to be available.

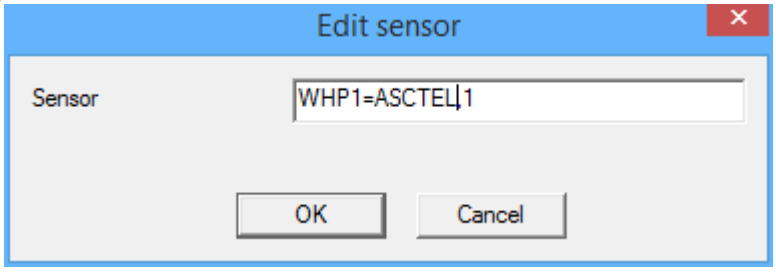


Fig. 34.5 WHP1 sensor from ASCTEL Device channel 1

For CPFF panels there are two 9 pin RS232 ports on the rear plate and two RS485 ports " both of these are on the same 9 pin connector.

The ports appear as:

WWSA_STIP_A	Bottom RS232
WWSA_STIP_B	1st RS485 pins 1&2
WWSA_STIP_C	Top RS232
WWSA_STIP_D	2nd RS485 pins 6&7

Appendix

Appendix 1 Requirements for Addressable Switches

Required wiring for TELA HR5

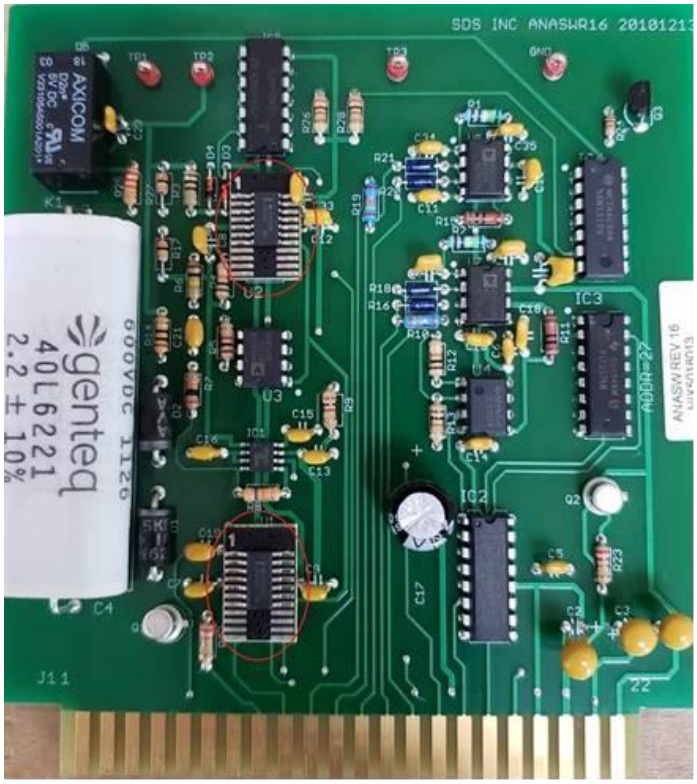
CC1-11 to CC14-35

If wire present from CC13-36 to CC14-35 it may be removed.

CC1-16 to CC6-16

CC1-17 to CC6-17

Recommended ANASW R15 or R16 Mod



Apendix 1.0.1 ANASW R15 or R16

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