Model Overlays in GM-SYS Profile Modelling

Models can be overlaid with backdrop images, symbols, wells, and LAS wells. Overlays are external data displayed with the model which do not affect the calculations at all.

Backdrops

Backdrop images, such as seismic sections, balanced cross-sections, GPR profiles, or even hand-sketches are used as a visual aid to model construction. GM-SYS Profile will import a wide variety of image formats with the Seismic Bitmap option.

Additional information on managing backdrops can be found in the *Backdrop How-To Guide*.

Symbols

Use Symbols to display dip measurements, depth-solutions from Geosoft's Depth-to-Basement GXs, shot point locations, tie-line crossings, interpreted seismic horizons, or any other point data as an overlay to the model cross-section. You may group symbols in a single file, or load multiple files and display them concurrently.

Wells

Wells are used as a type of annotation. By displaying a well marker, you can show depths of various stratigraphic horizons or other geological markers. This data can come from well logs, core samples, magnetotellurics, resistivity studies, geologic maps, or any other source you may have. It is useful to have these annotations on the screen to keep track of all of the geological and geophysical constraints on the model.

The locations of well horizons are stored as depth beneath the ground surface.

LAS Wells

Each LAS Well file may be independently configured to show up to two log curves. Specify the well location, symbol, and log curves for display. Configure scale, color, and line weight for each curve.

Loading a Backdrop

Both the Depth pane and the Time pane support loading backdrop images independently. Selecting the **Load Backdrop (Depth)** or **Load Backdrop (Time)** options on the *Overlay* menu will pop-up the *Backdrop Image Setup* dialog. If you choose a supported file type other than BMP, GM-SYS Profile calls the open source image conversion package ImageMagick to convert the image to BMP internally. If Advanced Profile Modelling is licensed, you will also have the option of loading a SEG-Y file using the SEG-Y Reader.

You may fine-tune the image location graphically once it is loaded.

To Load a Backdrop in the Depth Pane

1. On the *Overlay* menu, select **Backdrop**.
2. Select **Load Backdrop (Depth)**. The *Backdrop Image Setup* dialog appears.
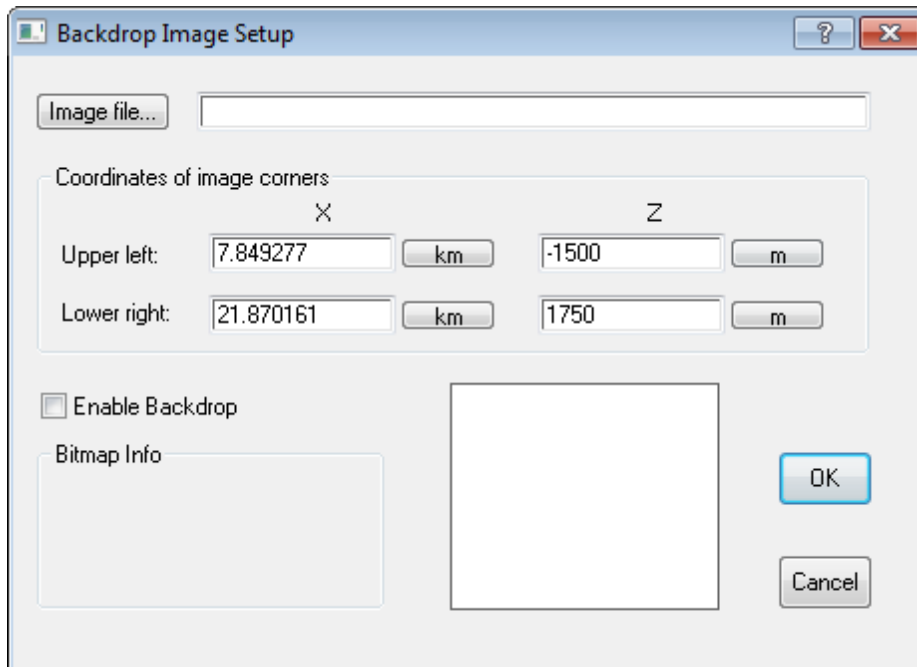
3. On *Image File*, browse to the location of the backdrop image. You will need to set the "File type" in order to see files using formats other than "BMP".

4. Select the image and click **Open**. A thumbnail of the image appears in the *Backdrop Image Setup* dialog.

5. By default, the image will be stretched to fit the current cross-section window. You may reposition the image manually by adjusting the coordinates of the outside edges of the image.

💡 The **Enable Backdrop** *option must be active for the backdrop to appear in the model.*

Importing Symbols

The *Manage Symbol Files* dialog enables you to load, reload, unload, hide, or configure symbol files. The symbol file should contain X, Y and Z coordinates for each symbol, and may optionally include fields for symbol flag, dip, and susceptibility. The symbol flag should be an integer that is unique within that file for each type of information (e.g. 1=dip measurements, 2=seismic picks). Dips should be in degrees. Susceptibility values may be in either cgs or SI units; the length of the dip-tails will be scaled logarithmically with values of 10^{-7} scaled to the effective radius of the symbol.
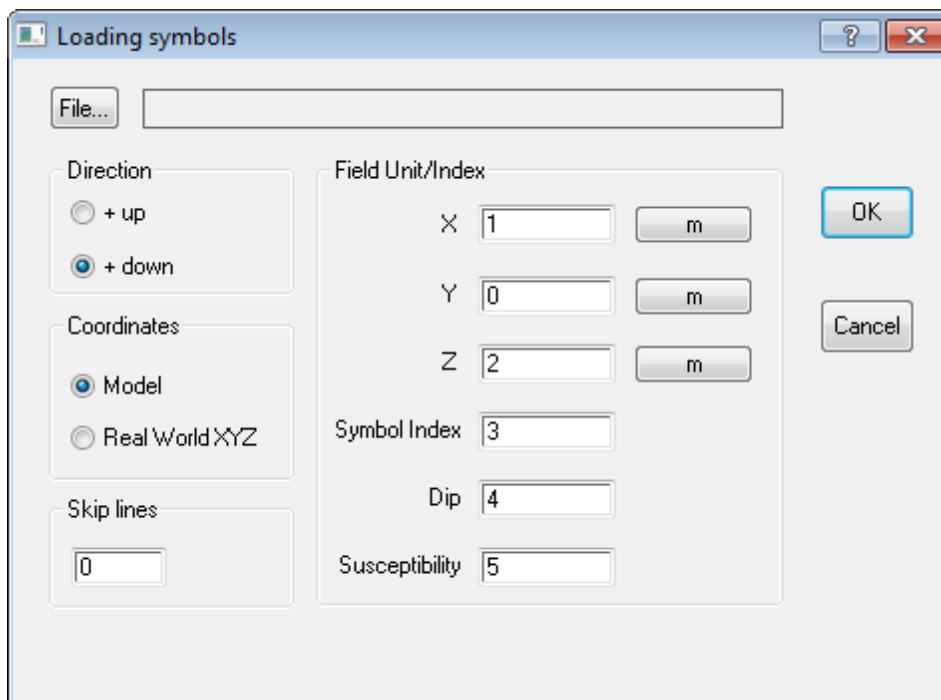
⚠️ *If* **Enable Symbols** *is not activated, symbols may be imported and configured, but no symbols will be displayed with the model.*

To Import a Symbol File

1. On the *Overlay* menu, select **Symbols**.

2. Select **Manage Symbol Files**. The *Manage Symbol Files* dialog appears.
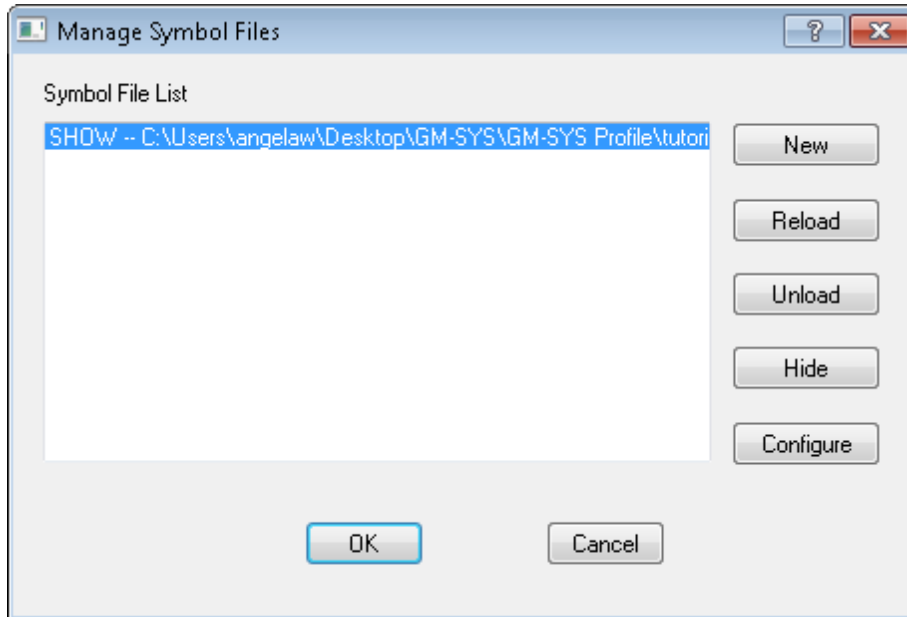
3. Click **New**. The *Loading symbols* dialog appears.

4. On *File*, browse to the location of the symbol file.
5. Select the file and click **Open**. A preview of the file appears.
6. Click **OK**. You are returned to the *Loading symbols* dialog.
7. Specify whether the Z values in the file are positive **Up** (elevation) or **Down** (depth).

8. Specify whether the X,Y coordinates in the file represent **Model** coordinates (distance along line, offset from line), or **Real World** coordinates. The Real World coordinates in the input file must share the same coordinate system as the model.

9. In the *Skip lines* field, specify the number of header lines. Header lines not skipped will be imported as zeroes in all fields.

10. Specify the column containing the *X* coordinates and the units of those values.

11. Specify the column containing the *Y* coordinates and the units of those values, if available. Otherwise, leave the field blank or set to "0"

12. Specify the column containing the *Z* coordinates of the stations and the units of those values.

13. Specify the column containing the integer *Index* for different symbol types, if available. Otherwise, leave the field blank or set to "0".

14. Specify the column containing the *Dip* data, if available, to determine the direction for plotting dip-tails on the symbols. Otherwise, leave the field blank or set to "0".

15. Specify the column containing *Susceptibility* values, if available, for scaling the dip-tails. Otherwise, leave the field blank or set to "0".

16. Click **OK**. You are returned to the *Manage Symbol Files* dialog.

17. Click **OK**. The symbols appear with the model if **Enable Symbols** is checked.
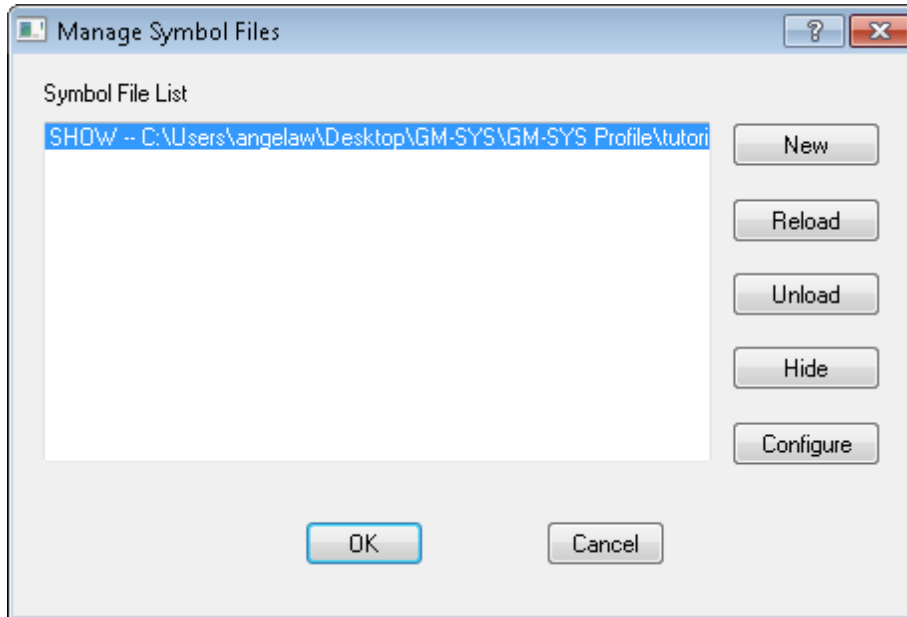
Configuring Symbols

The Configure Symbols dialog enables you to associate predefined symbols with the symbol flag field in your symbol files. The symbol flag field should contain a positive integer value that is the same for all points containing the same type of information (e.g. dip measurements).

If any symbols in a file contain only X,Z fields, all symbols in that file will be assigned the flag value #00. Each flag value may be associated with a specific symbol type, size, color, and line weight. Symbol files that include dip and susceptibility information will plot with "dip tails" scaled to the susceptibility.
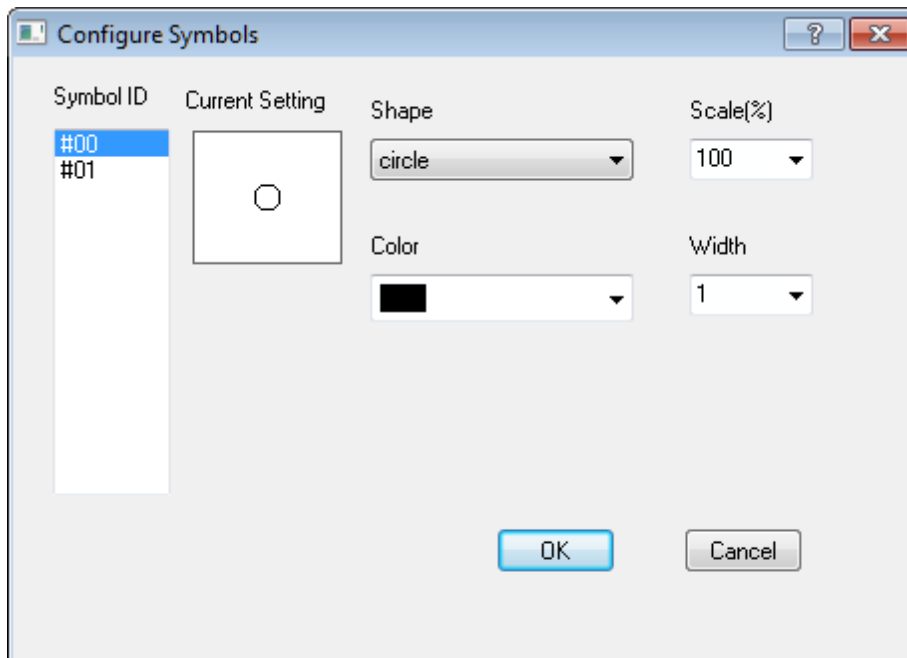
Each loaded symbol file can be configured independently.

To Configure Symbols

1. On the *Overlay* menu, select **Symbols**.

2. Select **Manage Symbol Files**. The *Manage Symbol Files* dialog appears.

3. Select the symbol file to configure and click **Configure**. The *Configure Symbols* dialog appears.

4. Configure the desired Symbol ID(s). You can change the *Shape*, *Scale*, *Color*, and Width of the symbols.
5. Click **OK** when finished. You are returned to the *Manage Symbol Files* dialog.
6. Click **OK**. You are returned to the model. The changes appear.
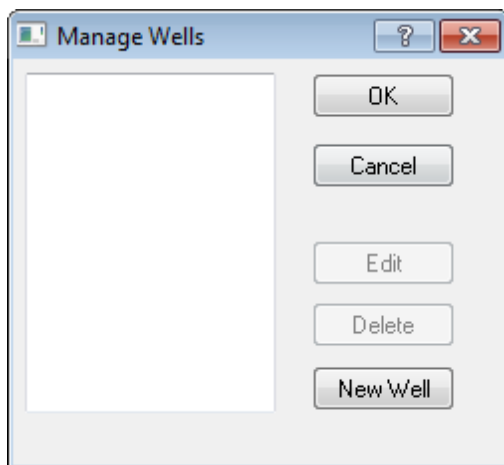
Adding a New Well

The *Edit Well* dialog enables you to add, modify, or delete well markers that appear on the model Cross-Section and Plan Views.

Well locations are input in model coordinates, i.e. X-Distance along the profile, Y-distance from the plane of the section, and Z-elevation of the ground surface (Z is positive down). Well horizons are input as depth below ground surface and should always be positive. Units for X, Y, Z, and depth to horizons may be independently selected using the pull-down menus in the Edit Well dialog box.

⚠️   *If **Enable Wells** is not activated, wells may be added and configured, but no wells will be displayed with the model.*

To Add a New Well

1. On the *Overlay* menu, select **Wells**

2. Select **Manage Wells**. The *Manage Wells* dialog appears.

3. Click **New Well**. The *Edit Well* dialog appears.

4. Specify the *Well Name*.

5. Specify the *Elevation* of the top of the well, commonly the Kelly Bushing, against which all depth measurements are based.

6. In the *X Coordinate* field, specify the distance along the profile, in model coordinates.

7. In the *Y Coordinate* field, specify the offset from the profile, in model coordinates.

8. Select a **Well Symbol** from the drop-down list.

9. For up to 10 *Well Horizons*, specify the *Relative Depth*, depth from the top of the well to the first horizon marker, and optional *Horizon label*.

10. Click **OK**. You are returned to the *Manage Wells* dialog.

11. Click **OK**. You are returned to the model. The new well appears.

Managing LAS Well Files

The *Manage LAS Files* dialog enables you to add, delete, unload, or reload one or many LAS files. You may elect to show/hide each loaded LAS well file independently and each loaded file may be configured independently.

⚠️   *If **Enable LAS Wells** is not activated, LAS wells may be added and configured, but none will appear with the model.*

To Manage LAS Wells

1. On the *Overlay* menu, select **LAS Wells**.
2. Select **Manage LAS Wells**. The *Manage LAS Well Files* dialog appears.
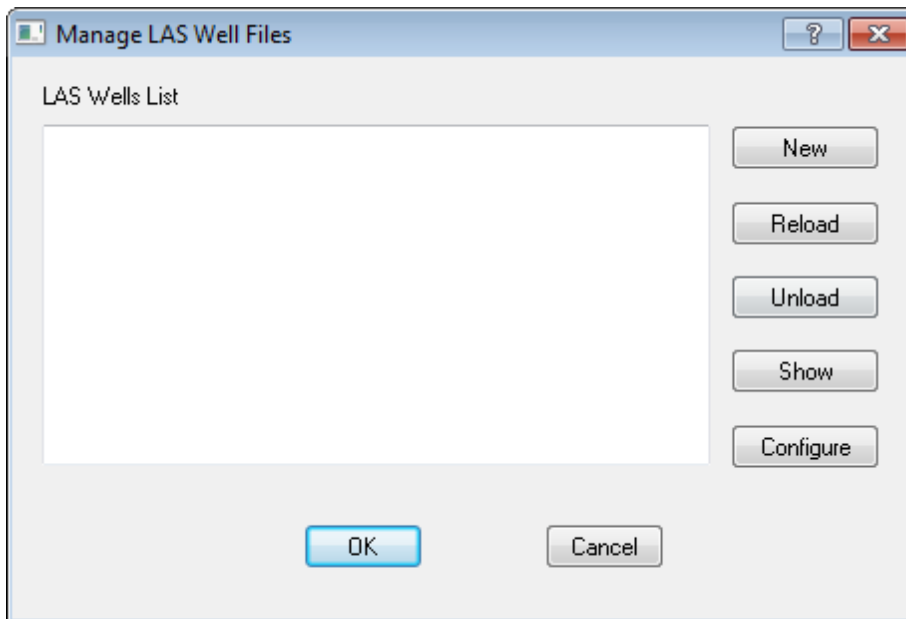
3. To add a new LAS Well file, click **New**. Browse to the LAS Well file location and click **Open**.
4. Select a file to **Configure** or **Unload**. You can also elect to **Reload** an existing LAS Well file.

   💡   *Configuring LAS Wells is covered in the next section.*

5. Click **OK** when finished managing LAS wells. You are returned to the model and your changes appear.


Configuring LAS Well Files

The LAS well *Configuration* dialog enables you to assign profile coordinates to the well head, assign a name to the well, and associate a well symbol to show the LAS well location on the Plan View and Cross Section. The well name and elevation (EKB) will be shown if they are available in the LAS file -- you may override these entries if you wish.

To Configure a LAS Well

1. On the *Overlay* menu, select **LAS Wells**.
2. Select **Manage LAS Wells**. The *Manage LAS Well Files* dialog appears.
3. Select the LAS Well file and click **Configure**. The *Config* dialog opens.
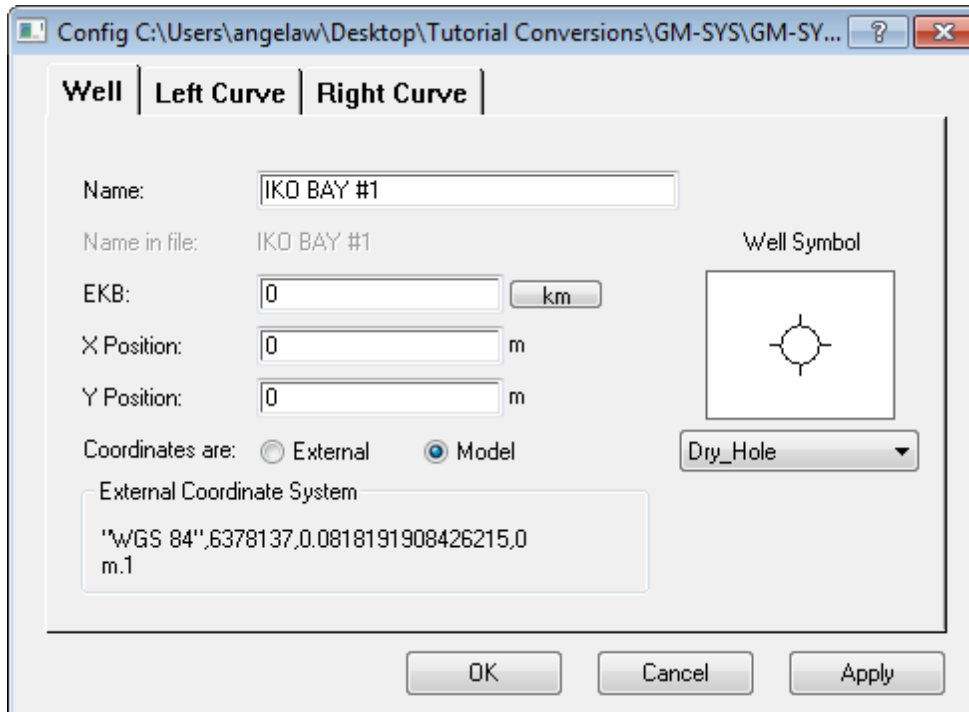
4. Specify the *Well Name*, if the name in the LAS file is not acceptable.
5. Specify the *Elevation* of the top of the well, commonly the Kelly Bushing, against which all depth measurements are based.
6. In the *X Position* field, specify the distance along the profile in model coordinates.
7. In the *Y Position* field, specify the offset from the profile in model coordinates.
8. Specify if the *Coordinates* are **External** or from the **Model**.
9. Select a **Well Symbol** from the drop-down list.
10. On the *Left Curve* tab, specify the log curve to be displayed to the left of the well symbol on the Depth Cross-Section Pane.
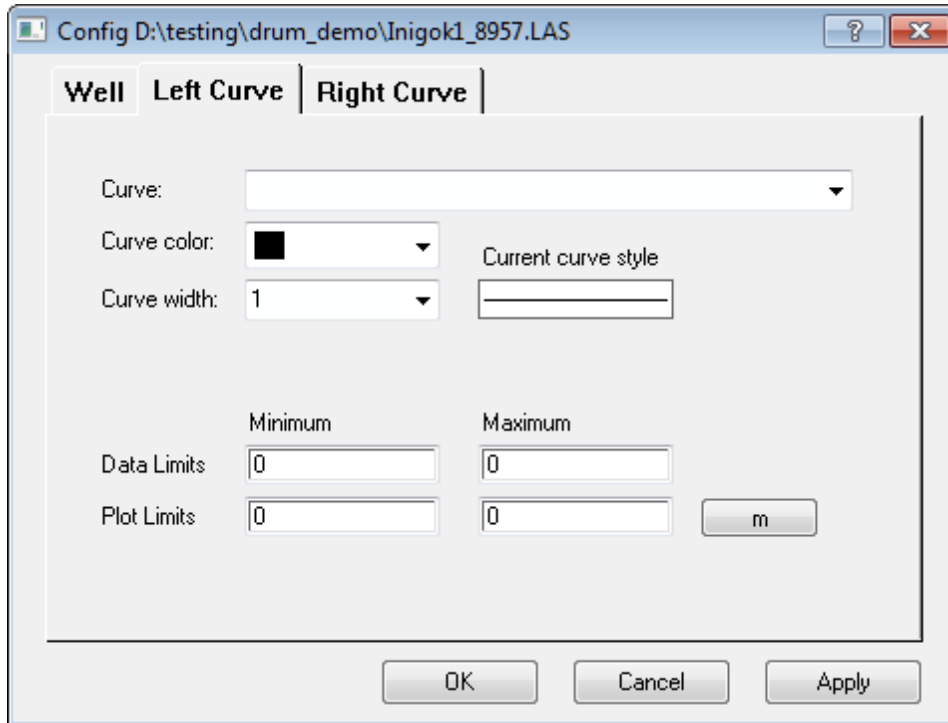
11. Specify the *Curve color* and *Curve width* (line weight) to be used. A preview of the curve is displayed.

12. Locate and scale the log curves. The minimum and maximum values in the selected curve will be displayed as the *Data Limits*. You may even change these limits to be rounded, even values, or to be consistent with other well curves.

13. Set the *Plot Minimum* and *Maximum* distance limits. These distances scale the data by determining how far from the well trace the Data Minimum and Maximum will be plotted. Set the minimum to the relative distance from the well trace that the Data Minimum will be plotted. Set the maximum to the relative distance from the well bore at which the Maximum Data Limit will be plotted.

   ⚠ *For example, if the Data Limits are 0 to 250, and the Plot Limits are -15km and -5km, when the log curve value is zero, it will plot 15km to the left of the well trace. A log curve value of 250 will plot 5km to the left of the well trace, and the rest of the curve will be scaled linearly.*

14. On the *Right Curve* tab, specify the log curve to be displayed to the right of the well symbol on the Depth Cross-Section Pane.

15. Click **Apply** to save changes.

16. Click **OK** to close the *Config* dialog. You are returned to the *Manage LAS Well Files* dialog.

17. Click **OK**. The dialog closes and you are returned to the model. Your changes appear.

How-To Guide Publication Date: 07/08/2013

Copyright 2013 *Geosoft Inc. All rights reserved.*