EEG 335: *Petroleum Geology and Geophysics* Fall Term 2025

NOTE: this document may be hard to read on paper, so open up the pdf on the class folder in order to zoom in. The populated fields in the dialog boxes may differ from what you see on your screen because I used a different well than you are using to create some of the examples.

Copy the files from the course folder to your (Q:) folder. Duplicate the "lastname_SESdatabase.mdb" file and rename it to have your last name.

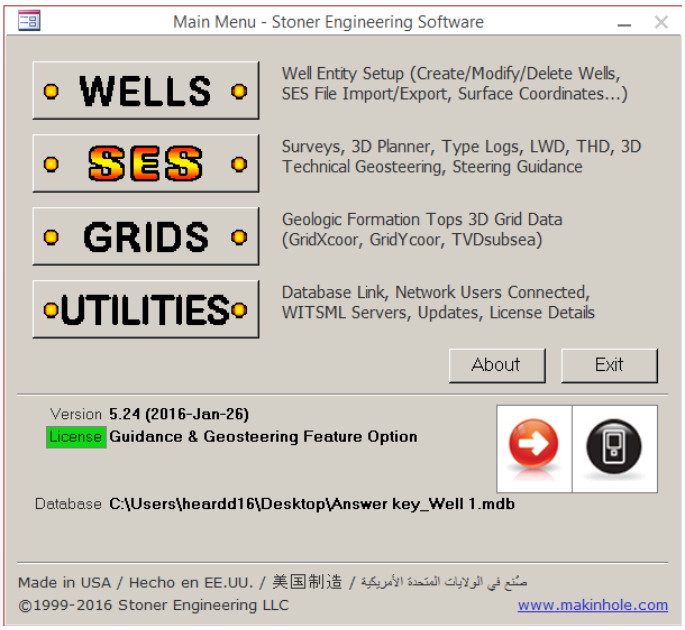
SES Workflow – ****When exiting the SES Program, always navigate back to Main Menu screen and press "Exit."***

Open SES Program

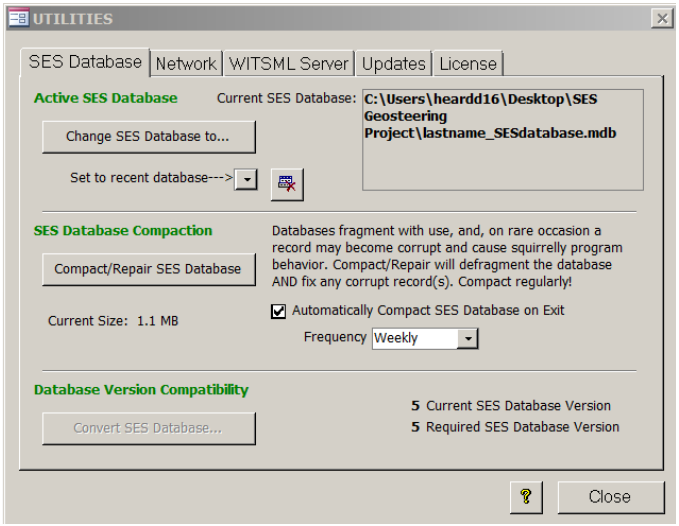
If you get a message about installing the latest version, click OK and type in the number they show.

The main buttons below are how to change screens

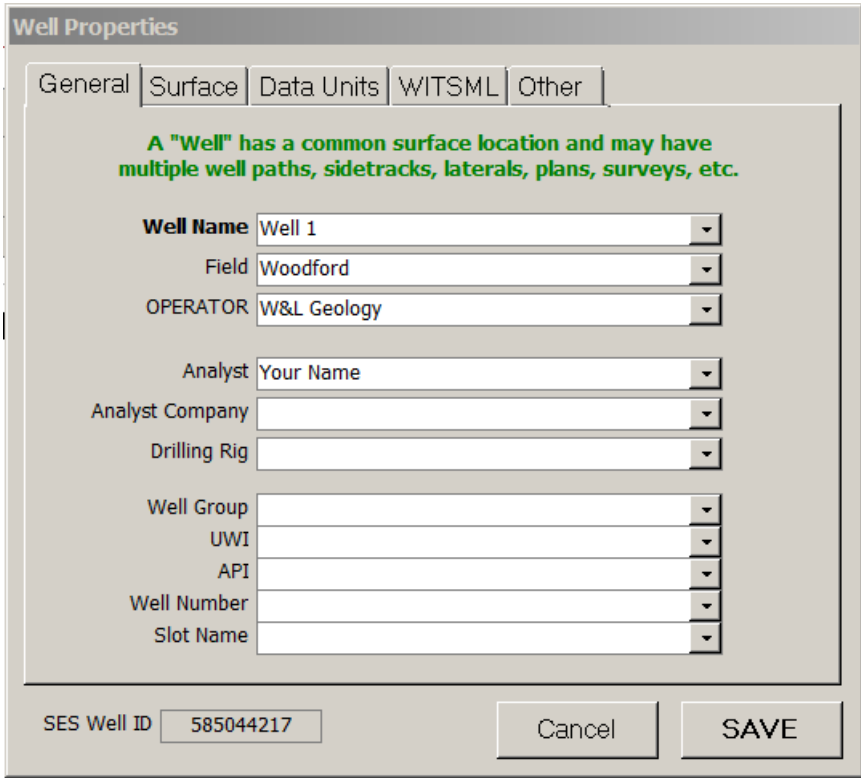
If you get a message about a potential security flaw from editing a database file click OK.



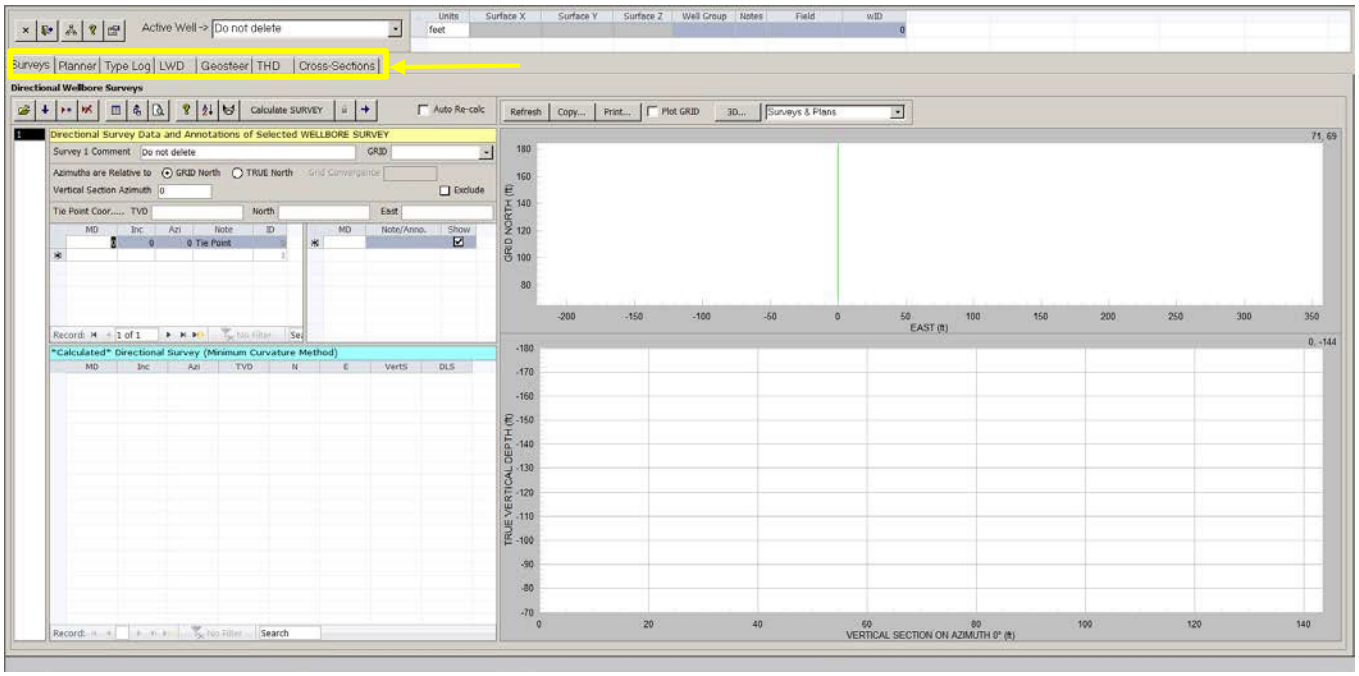
1. In the **Utilities** screen, change the SES Database to the database yourlastname_SESdatabase.mdb in your SES Geosteering Project folder



2. In the **Wells** screen from the Main Menu, select Well 1 and edit well properties as below. Save and Close, and then Close to get back to the main buttons.



3. Enter the **SES** screen from the Main Menu



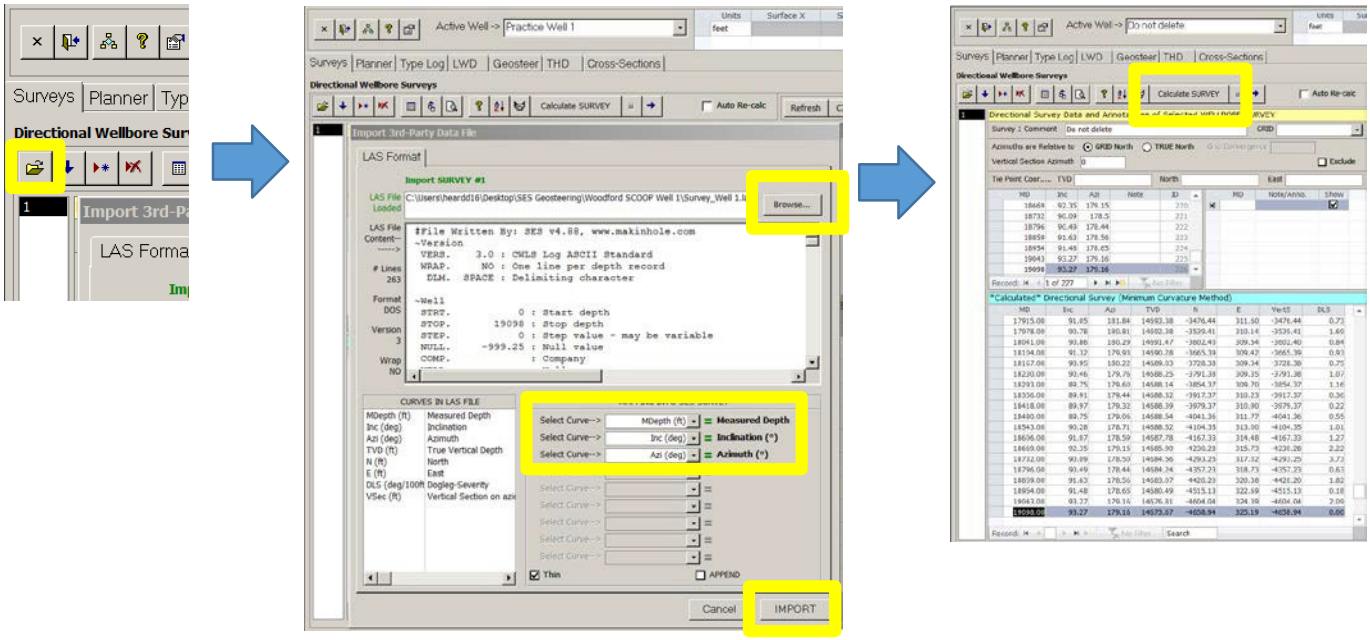
Notice the tabs listed across the top of the SES screen. From this screen you will enter survey, type log, and LWD data with which you will geosteer the well and produce the final cross section.

4. Under the **Surveys** tab is a list of icons. Click the import icon at the top left.

From the import window, click the Browse button. Navigate to your SES Geosteering Project\Woodford SCOOP Well 1\Survey_Well 1.las. This is the deviation survey (positioning information) for the well.

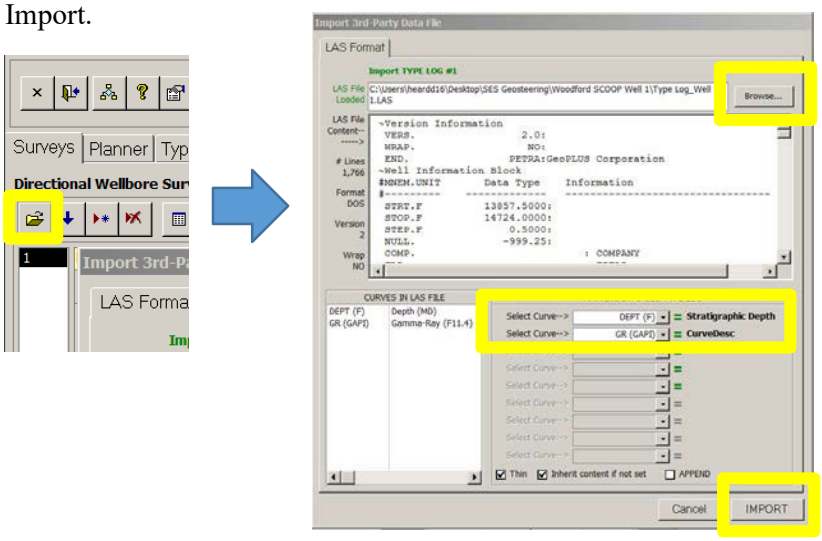
Select the correct curves (logs) to be imported from the LAS file as shown below, and Import.

Click the Calculate SURVEY button to interpolate TVD and wellbore location relative to surface location.

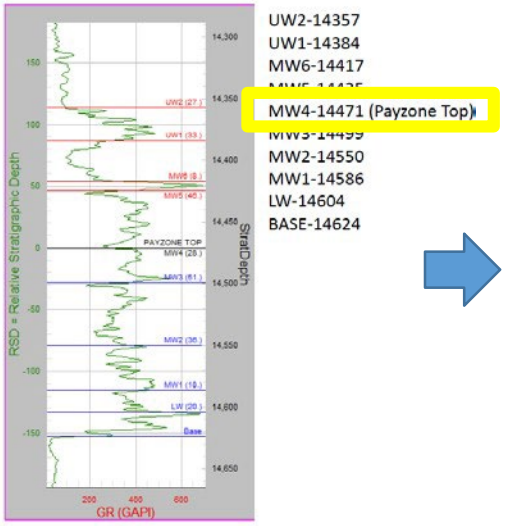


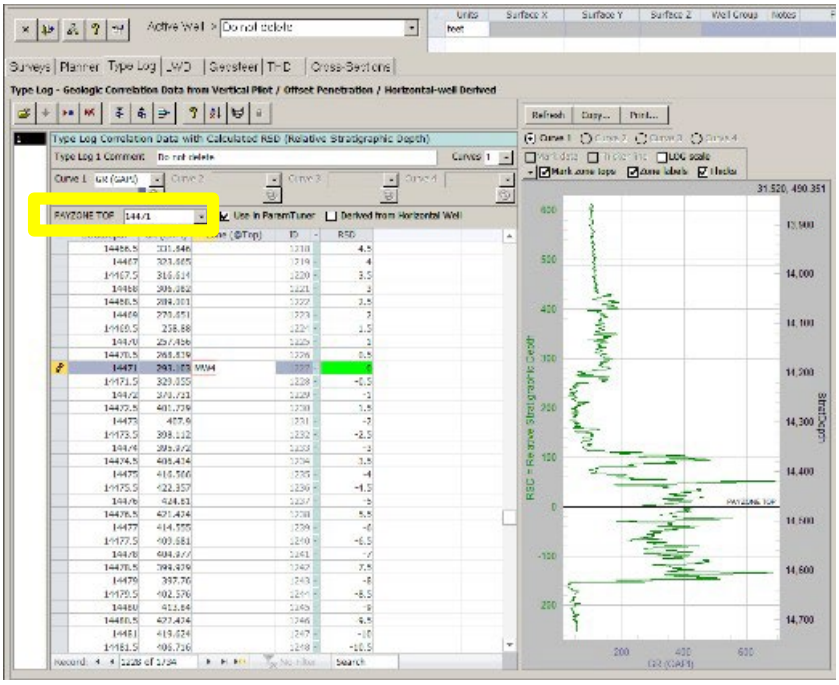
5. Under the **Type Log tab**, click the import button in the top left.

From the import window, click the browse button. Navigate to your SES Geosteering Project\Woodford SCOOP Well 1\Type Log_Well1.LAS, select the correct curves to be imported from the LAS file, and Import.



6. Still in the Type Log tab, you must specific the PAYZONE TOP. Open the PDF found in your SES Geosteering Project\Woodford SCOOP Well 1\Type Log_Well1_tops.pdf. This is a PDF of the Type Log that specifies the identified stratigraphic sections in the Woodford. Keep the Type Log PDF open, you will need it again soon. Enter the TVD value of the section denoted Payzone Top in the PAYZONE TOP box in the Type Log tab. It will select the correct row.



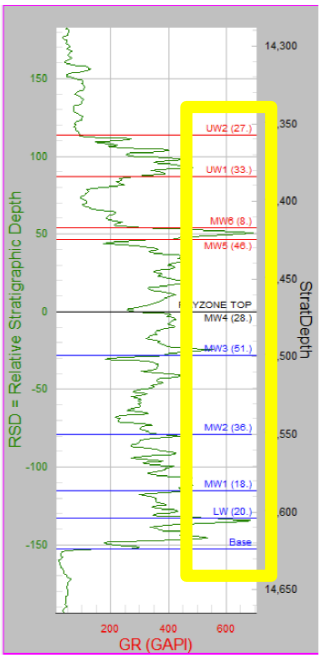


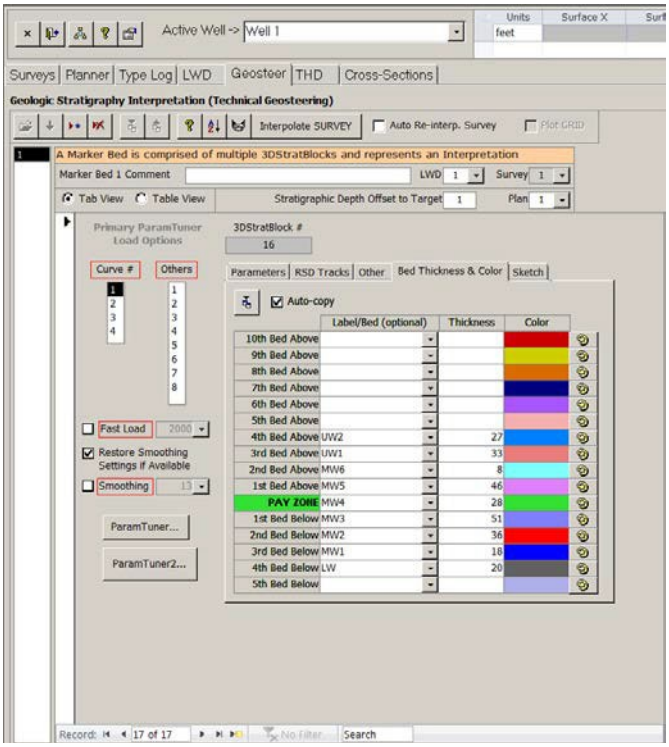
The legend next to the curve specifies the name of the section (e.g. MW4=Middle Woodford 4) and the TVD of the top of the section.

7. Under the **LWD tab**, click the import button in the top left.

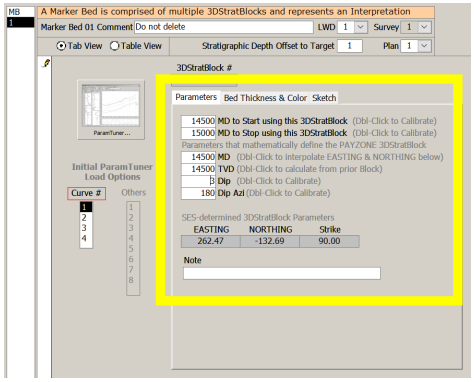
From the import window, click the browse button. Navigate to your SES Geosteering Project\Woodford SCOOP Well 1\LWD_Well1.las, select the correct curves to be imported from the LAS file, and Import (same process as with Survey and Type Log data). MD is sometimes just called DEPTH. Click the **Interpolate SURVEY** icon in the ribbon.

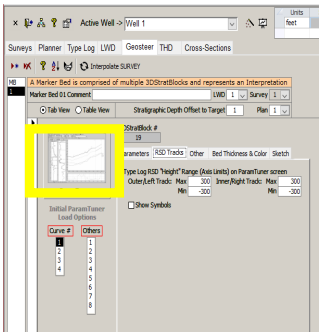
8. Under the **Geosteer** tab, select the Bed Thickness & Color tab. From your Type Log PDF, enter the name and relative thickness of each bed from the Base to Upper Woodford 2. The relative thickness of each bed is given in parentheses next to the name of the section on the type curve.

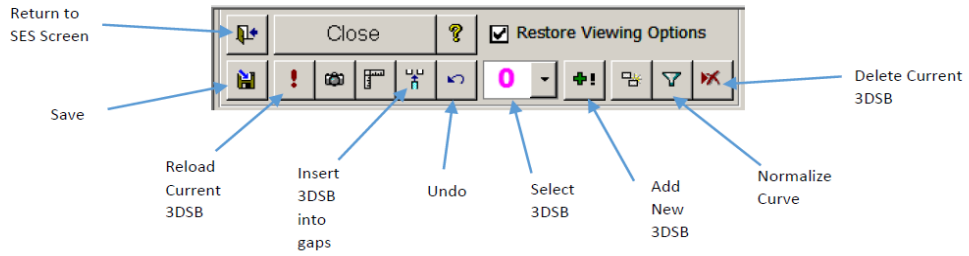




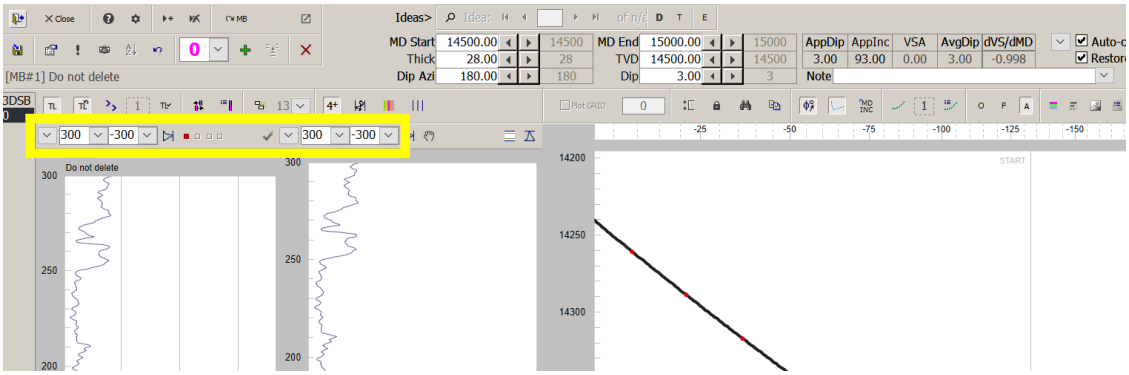
9. Under the Parameters tab, enter parameters for starting and stopping MD of the strat block, and beginning TVD and MD, and a starting Dip value. These values only need to be your best estimation of the average TVD of the wells lateral. For this case use 14500 and 15000. Basically, you want to have increasing intervals to compare. If you do not have that it will not work right. Double click the third field to get the Easting and Northing. Use a 3 deg Dip and 180 deg Dip Azi.



10. Select the **ParamTuner…**left button under the Geosteer tab. 
ParamTuner is the core function of the SES geosteering program.



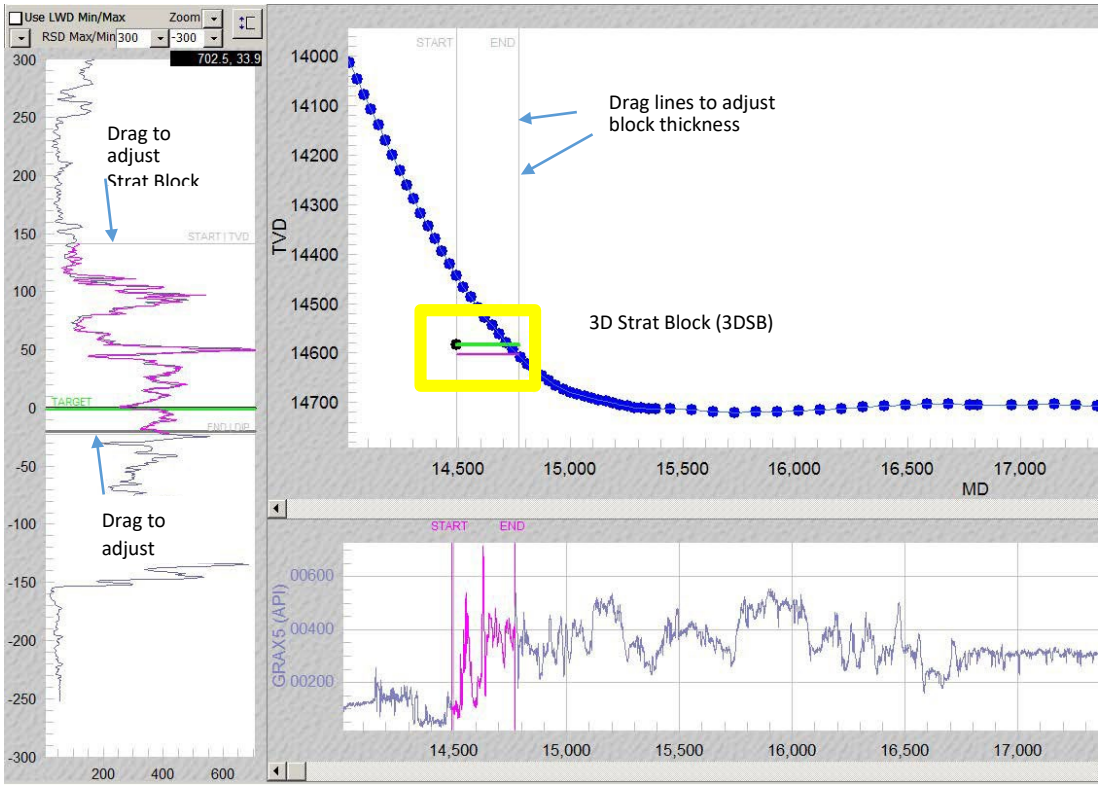
Enter 300 and -300 for the maximum and minimum, respectively, of both tracks at the top of the tracks.



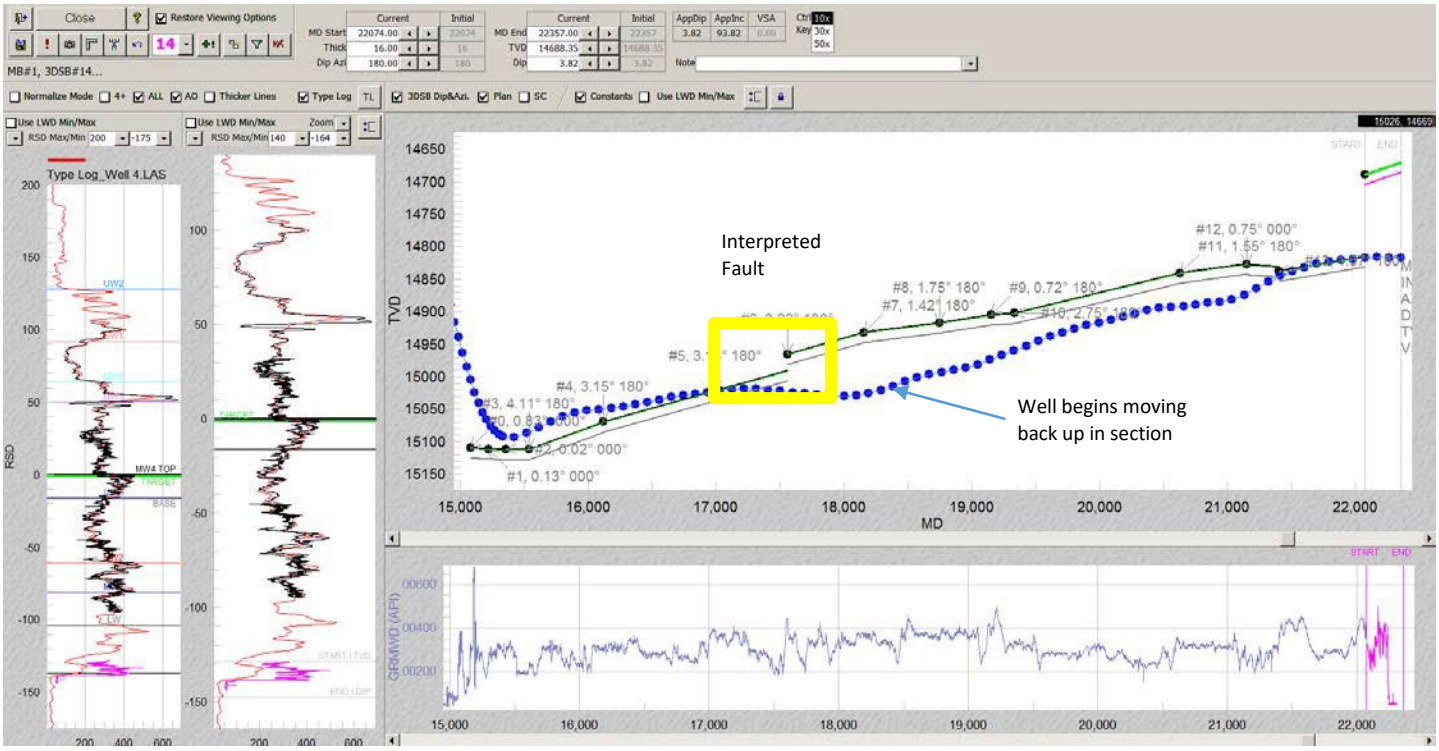
Using the inner left Relative Stratigraphic Depth (RSD) track, the operations geologist matches the log curve from the well (from the LWD LAS file) to the type log curve. This is done by dragging the Start | TVD and END | DIP gray lines until the LWD gramma ray and the type curve gamma ray align. If you alter the Start | TVD you are changing its starting depth relative to the block before. That is, you are making a fault between this block and one before. For the very first block, adjust the Start | TVD first, then the END | DIP. This is to get you closer than the starting estimated depth. For all additional blocks, you should always try and adjust the END | DIP first, using a few deg as the max. If the fit is pretty good, then don't change the Start | TVD. The reason is that most unconventional plays are in generally in gently dipping, modestly faulted rocks. You can also adjust the thickness of a layer in the right window if it is hard to match one dip for an entire thickness.

Once you feel good about the fit, add another 3DStratBlock (3DSB). See the Start Block Management Ribbon4for the main commands with the plus symbol. **Make sure to save often.**

If interpreted correctly, the geologist is left with an accurate idea of the apparent dip and relative location of beds relative to the well bore.



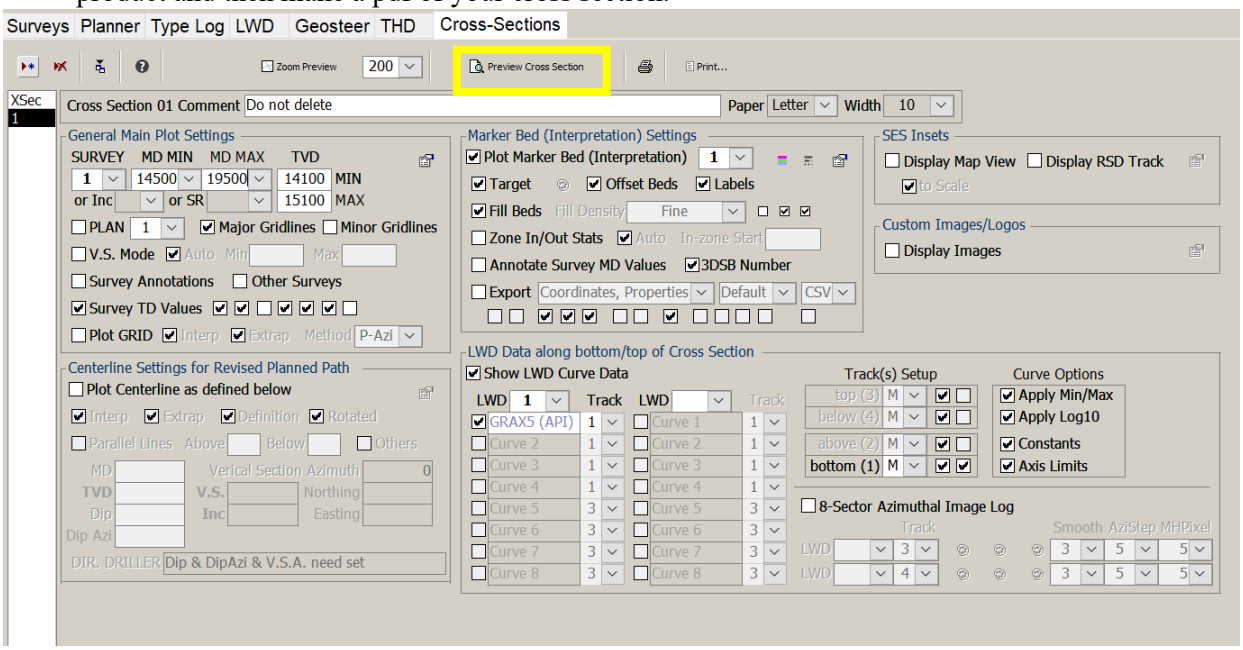
A fully interpreted well will look something like the product below. Note, the image below is NOT for Well 1, but another well.



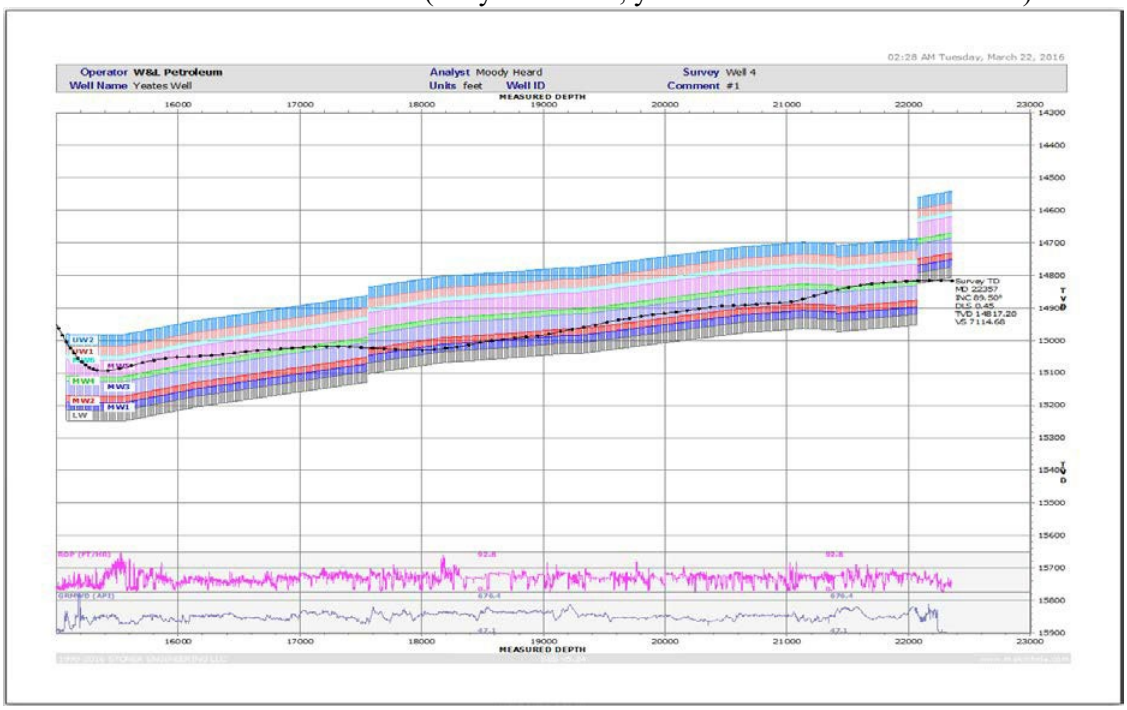
Notice that the well passes through the "payzone" bed multiple times. You can expect to frequently encounter the same LWD signatures as the well moves laterally, which requires stretching, shrinking, and reversing the direction of the log curve on the interpretation track. The well may also encounter faults, in which case you will have to adjust the depth of a strat block by detaching it from the previous strat block.

After interpreting, close the ParamTuner window.

11. Under the **Cross-Sections** tab, set the desired parameters for the stratigraphic cross section of the drilled region. After setting the parameters, select the print preview button to view the final product and then make a pdf of your cross section.



Below is a finished cross section (not your Well 1; yours will look different in detail).



Directions for Well 2

I have updated the files for Well 2. So copy over from the class folder the "Woodford SCOOP Well 2 NEW" folder to your (Q:) folder. As with Well 1, inspect all of the data in the folder, including the maps and type log, tops.

All of the data has been loaded for you in this second well in the database "lastname_Well_2_SESdata.mdb" that is in the class folder. So, copy this as well to your (Q:) folder.

Make sure to rename the database, and then in the program change the database (Step 1).

Then all you have to do is steer the well (Steps 10 and 11).

I started a couple of blocks for you. The printer settings for this well are correct and do not need to be changed.

Note this one is slightly more complicated, and may have small faults, and/or move up and down through the target interval. Furthermore, the section is likely steeper than implied by the structure map.