AVO Modeling Scenarios
AVO What Ifs?

HRS-9

Houston, Texas

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What are AVO What Ifs?

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- **The "AVO What Ifs?" function is designed to allow you to quickly and easily generate AVO synthetics that represent different fluid compositions and layer thicknesses of the target zone.**

- **AVO What Ifs, eliminates the need to generate multiple variations of fluid replaced logs in order to generate different synthetic scenarios.**

- **What ifs, also eliminates the need to generate multiple logs with varying thickness for synthetic testing.**

- **You can generate both Zoeppritz and Aki-Richards synthetics, and you can make adjustments to the lithological and fluid in-situ conditions.**

Why are AVO What Ifs Useful?

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- **It greatly reduces the amount of time required to generate AVO synthetics of different fluid compositions and thicknesses.**

- **You can now easily test multiple conditional scenarios and compare their seismic response to the actual seismic.**

- **Understanding the in-situ and predicted synthetics response is critical to understanding the AVO event.**

AVO What Ifs?

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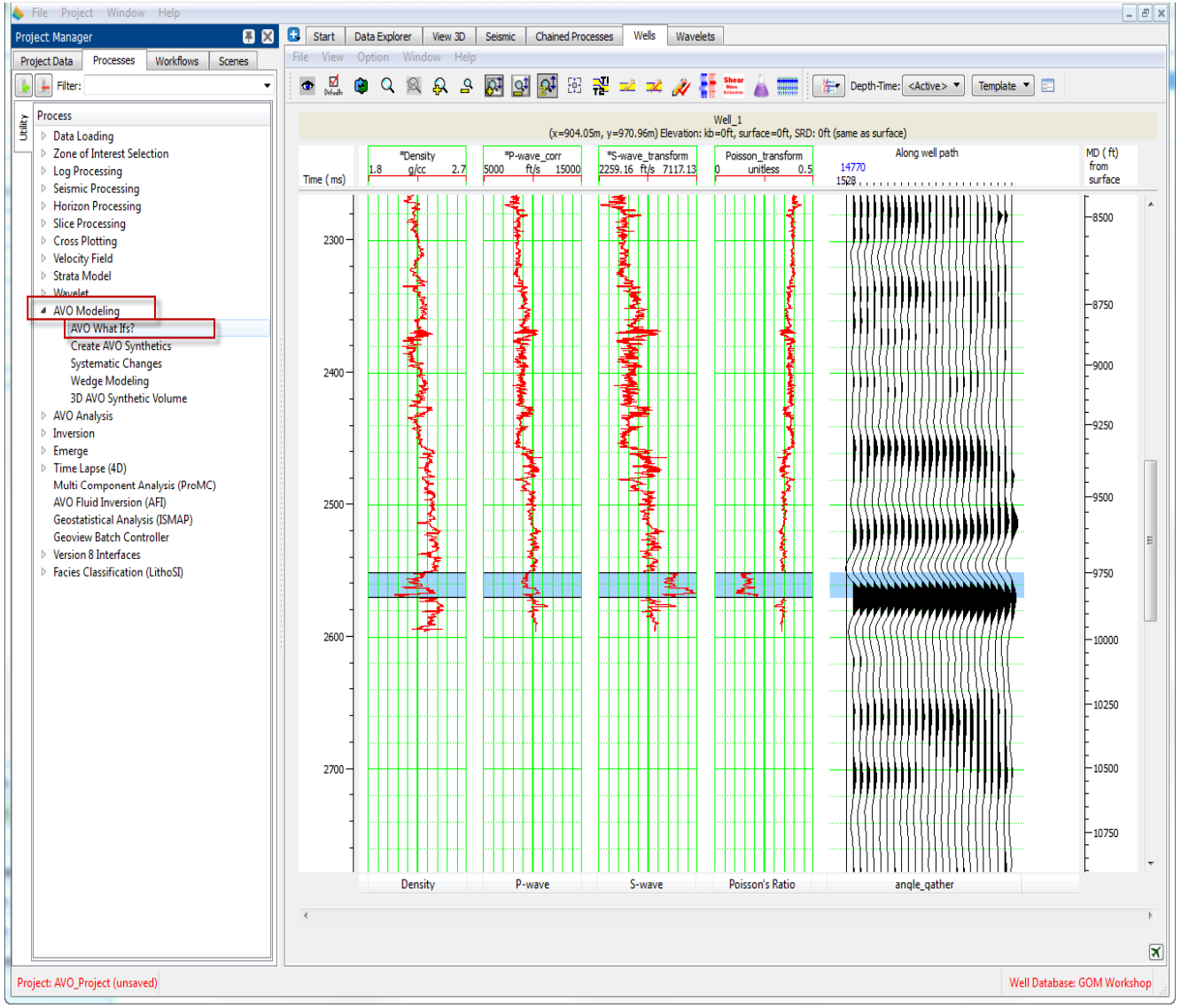
The AVO What If tool is located under the “Processes” tab, and in the “AVO Modeling” group.

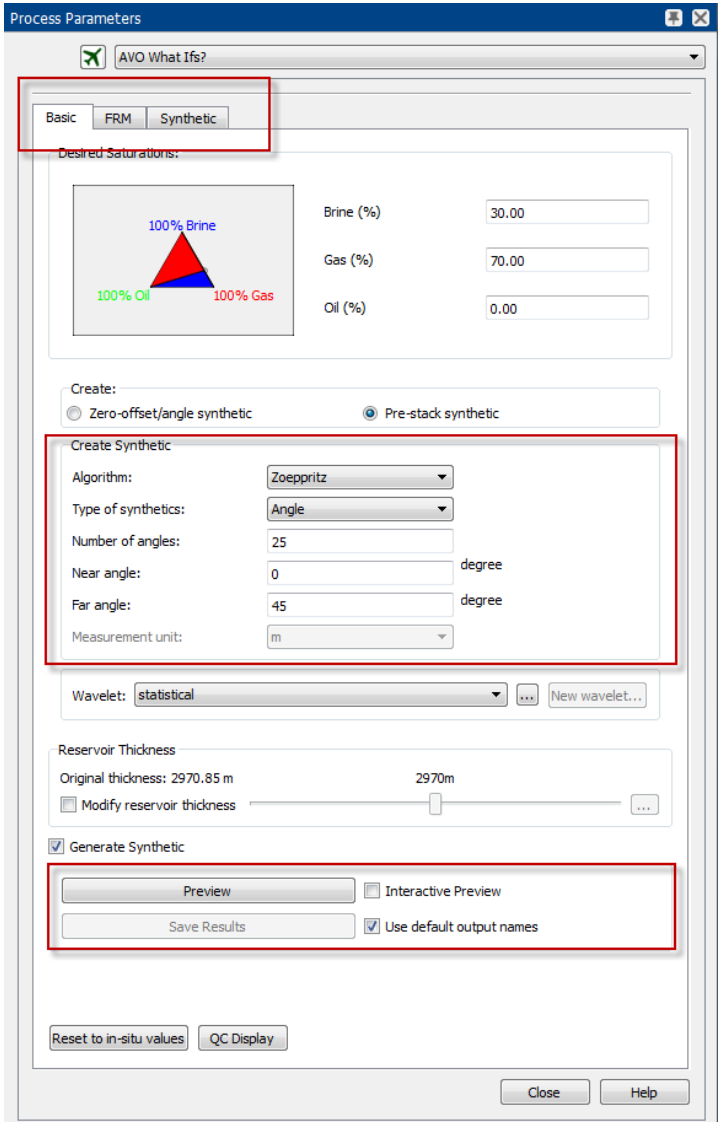


AVO What Ifs?

There are several important parameters that you need to set in order to perform the scenario analysis.

The first point is that there are three tabs along the top of the menu, Basic, FRM, and Synthetic.

1st) The "**Basic**" tab is where you specify the type of synthetic to produce (Zoeppritz or Aki-Richards), and where you will specify the fluid content and reservoir thickness of the models you produce.



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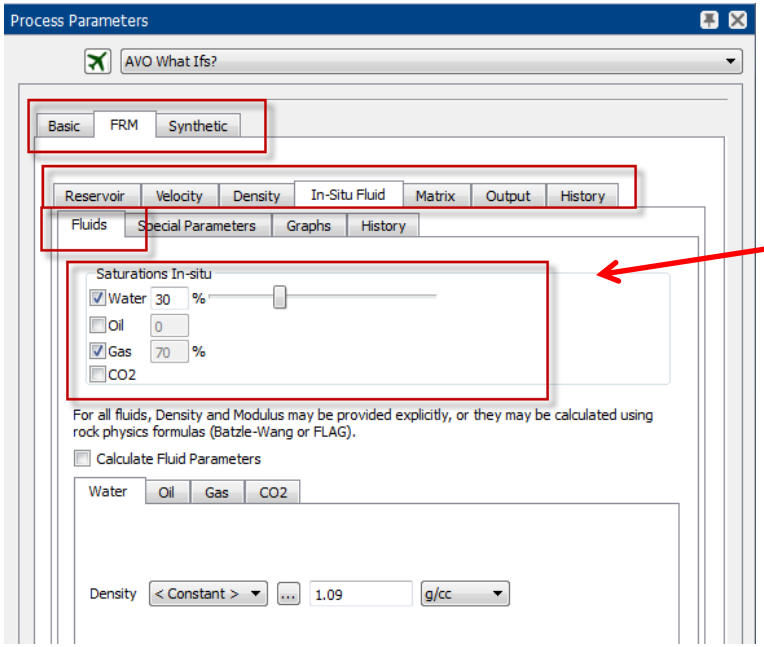
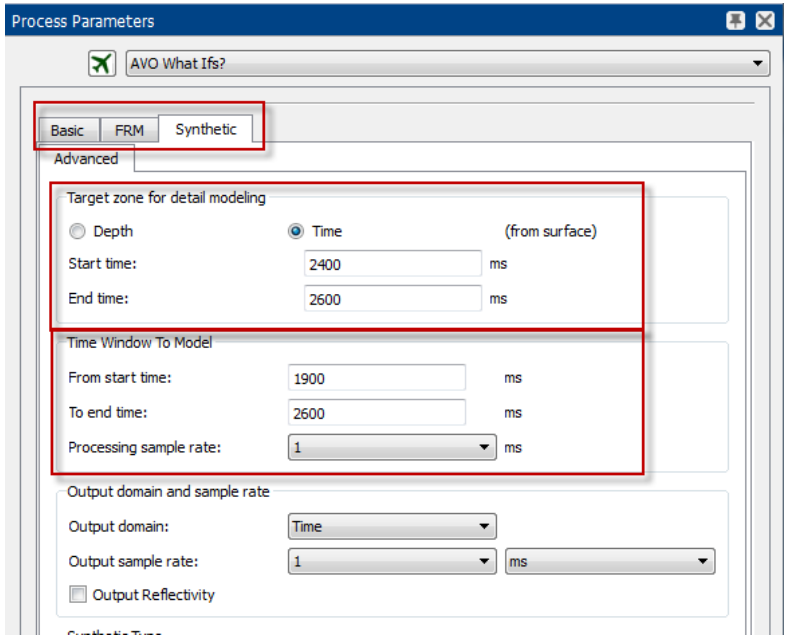


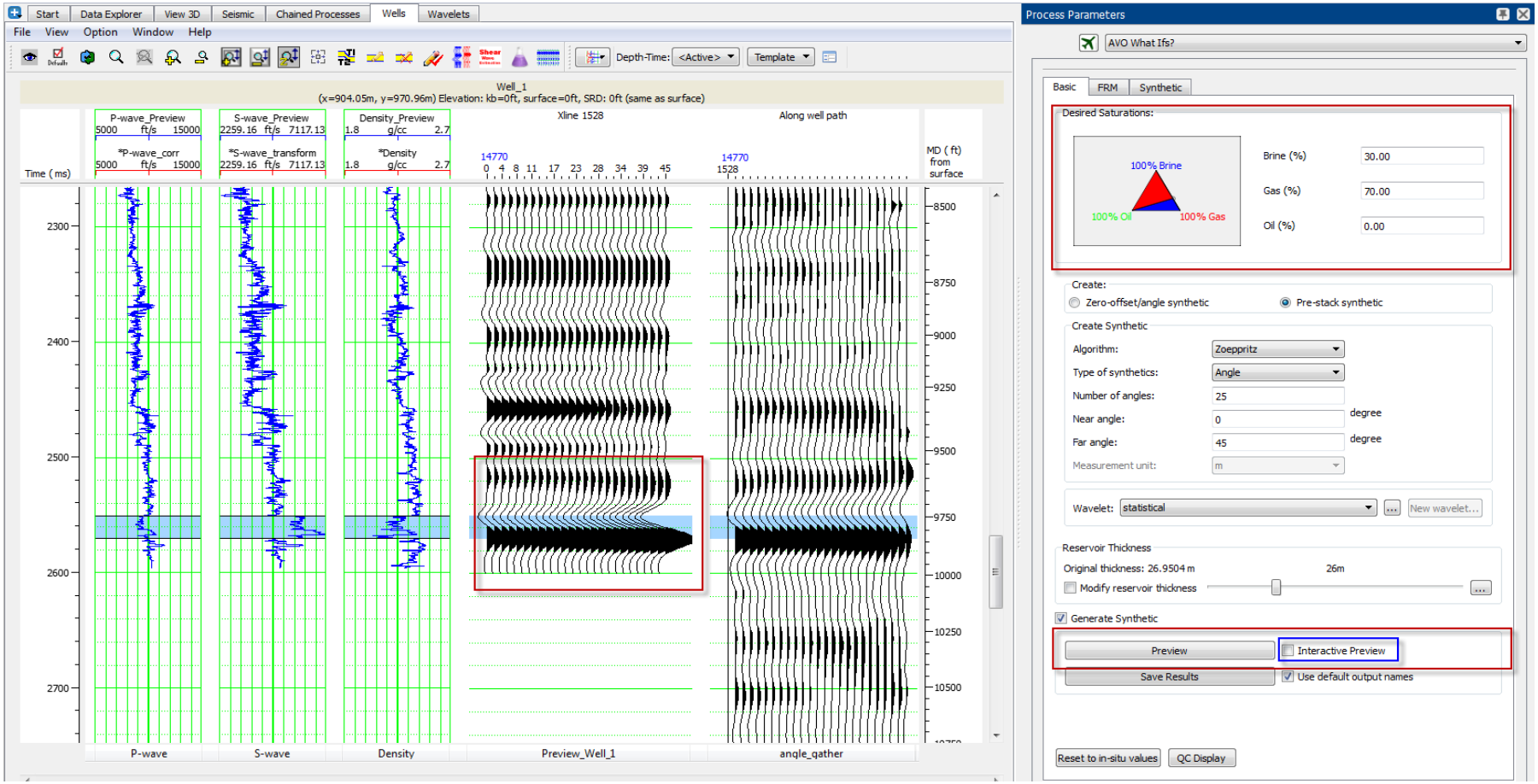
2nd) The **"FRM"** tab is where the in-situ conditions of the logs are specified. Move from left to right along the series of tabs and specify all necessary information. Under the **"Reservoir"** tab you will specify the zone for fluid replacement, and the "**In-Situ "** water saturation.



3rd) The **"Synthetic"** tab is where the modeling parameters are entered.

Both the FRM and Synthetic sub-menus in the "What If" menu are the same as if you were performing either function by itself.

AVO What Ifs?



The basic tab will default to the in-situ conditions. Press the “Preview” button to generate the in-situ synthetic. If you check on the “Interactive preview” option the model will automatically update with any change to the What If menu.

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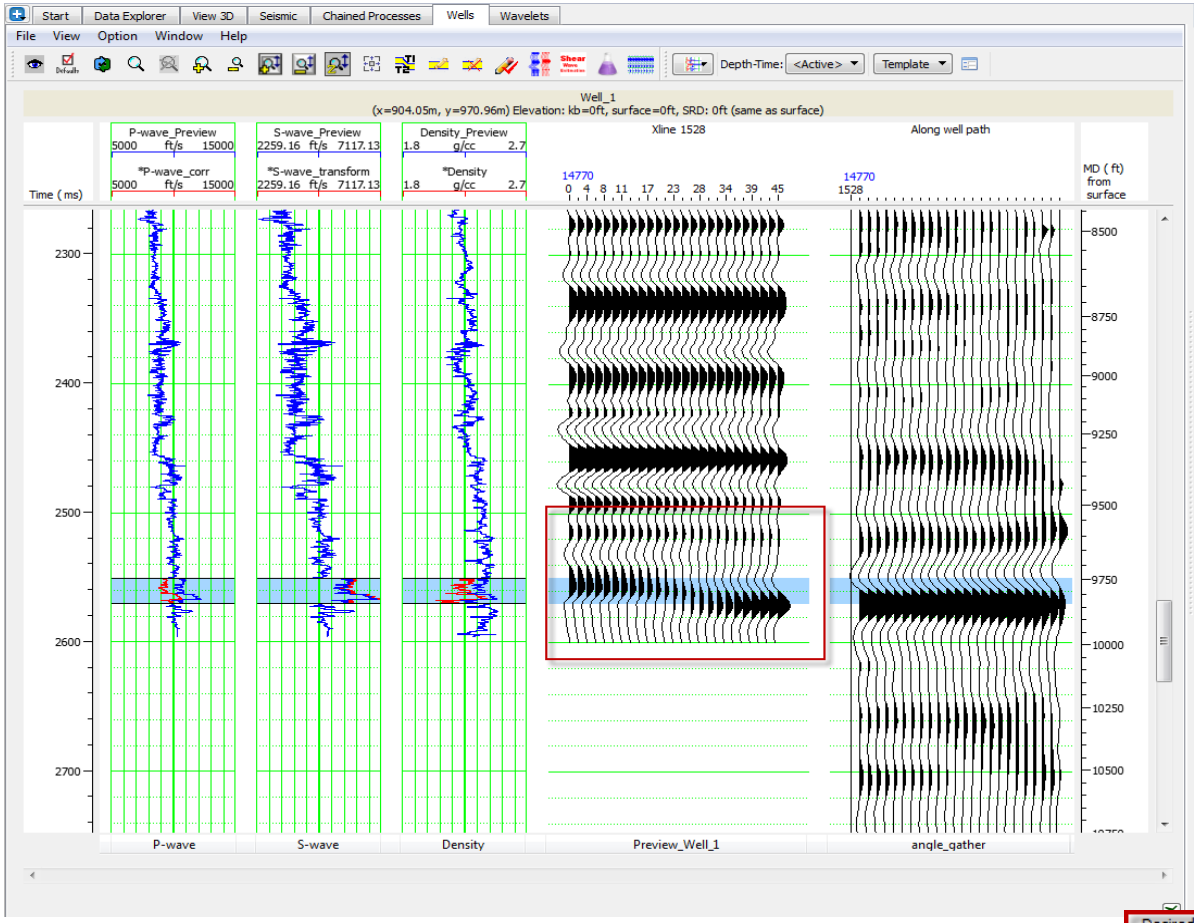
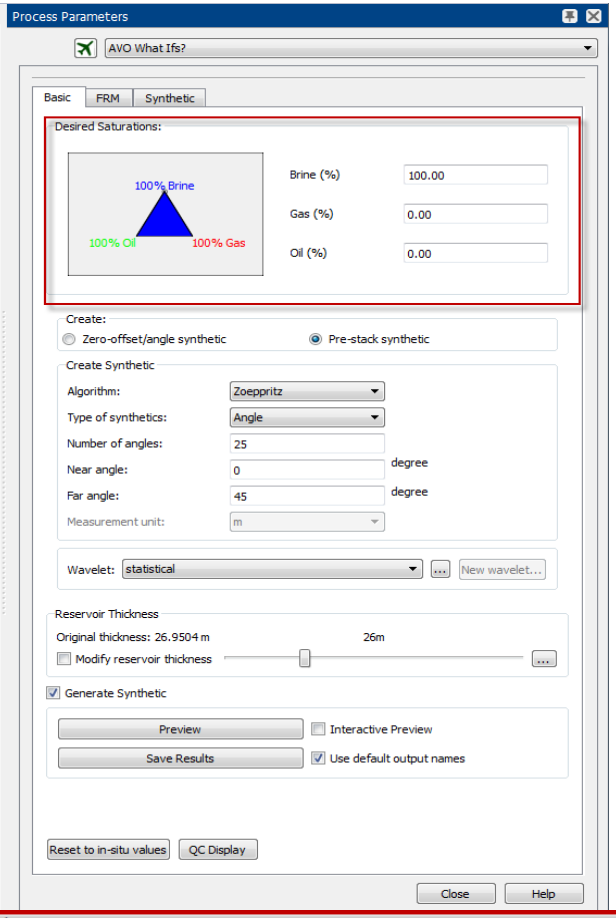
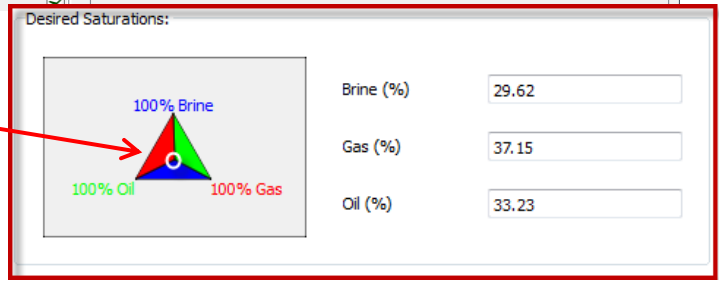




To adjust the fluid parameters simply click and hold the node in the tretiary fluid diagram, and drag it to the desired fluid ratios. Above is a wet synthetic with the original reservoir thickness.



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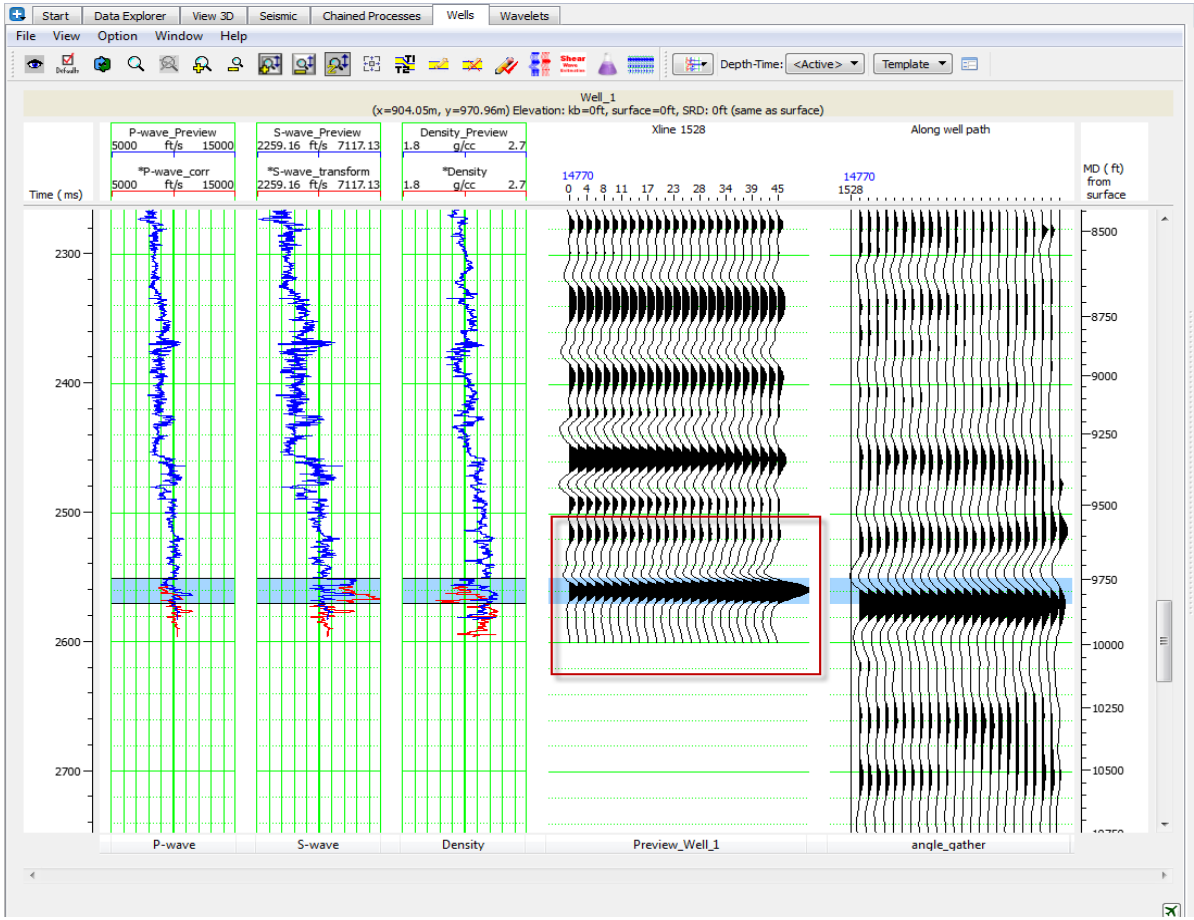

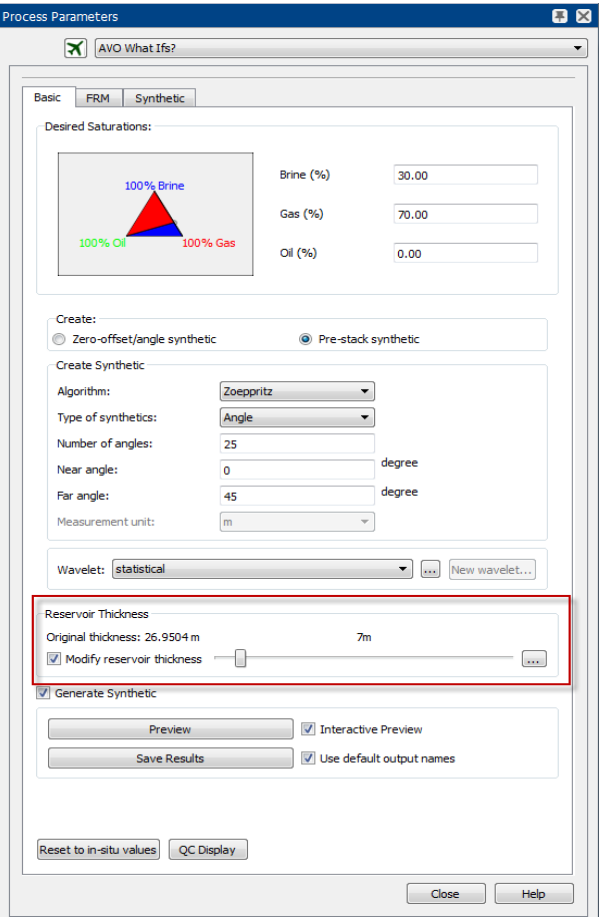

To change the reservoir thickness check the box next to “Modify reservoir thickness” and use the slider to select the desired thickness, then you can change both thickness and fluid content in the model.

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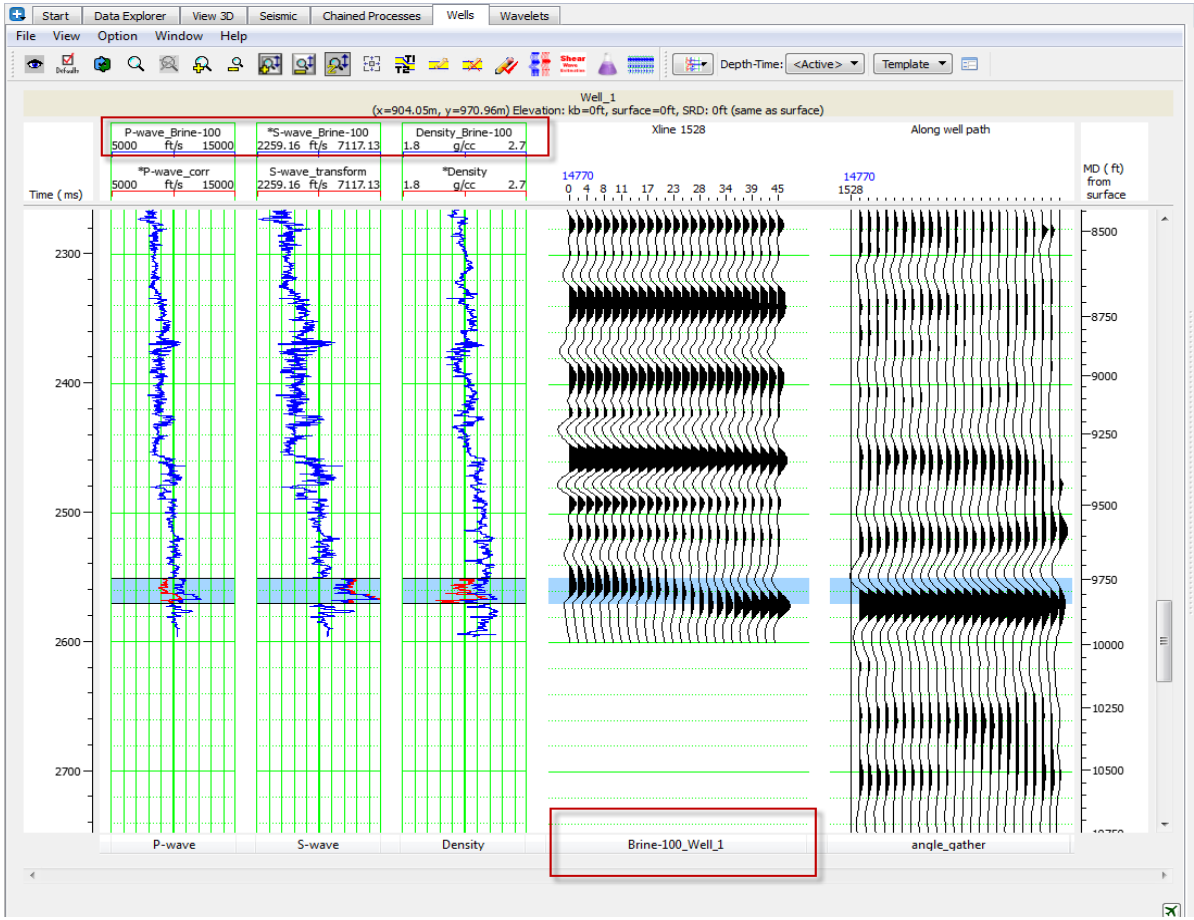

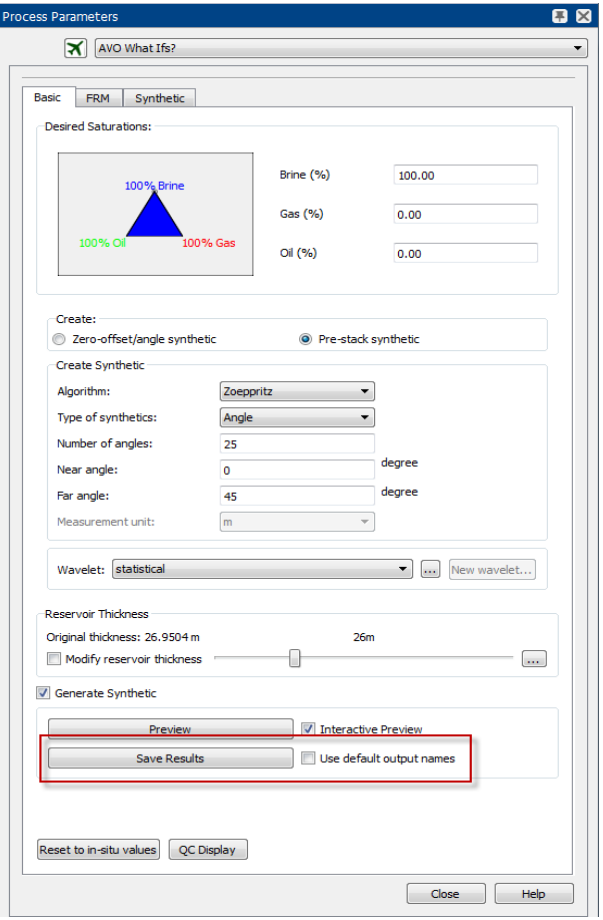

Any scenario you generate can be saved as a SEG-Y file and the corresponding fluid replaced and thickness changed logs will be saved as well.

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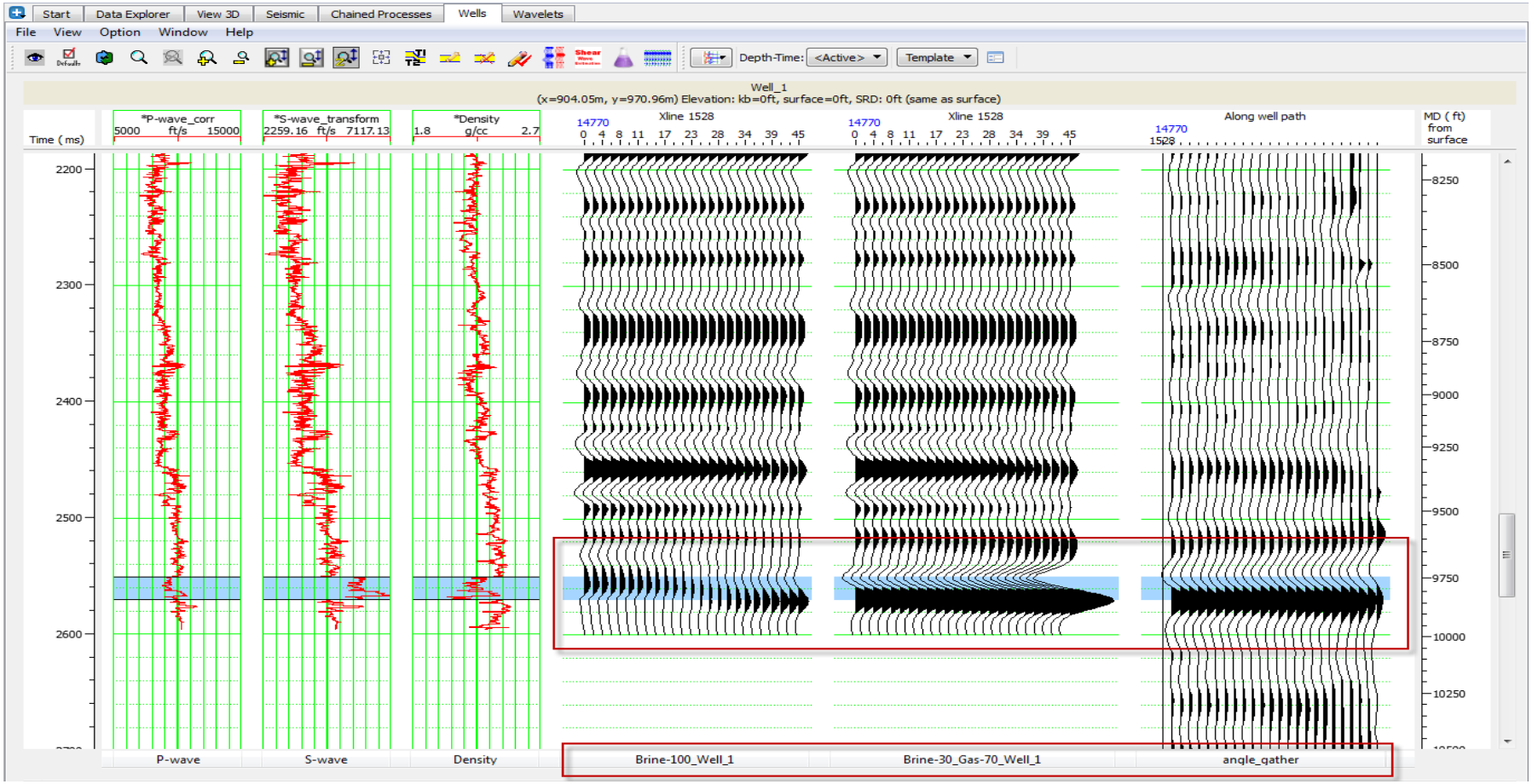

Once you have saved the desired models they are available to any of the AVO analysis tools.

Reasons to use AVO What Ifs?

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- AVO What Ifs, are a fast and easy way to perform Fluid replacement, and generate AVO synthetics.
- AVO modeling is a critical step in determining the expected seismic response for each target interval.
- The AVO what if tool gives you one utility to generate multiple logs with fluid substitutions and reservoir thickness changes, and their corresponding AVO synthetics.

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