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Understanding the Key Challenges of 3-D Reservoir Geological Modeling

The challenge of building a robust 3-D geological model goes far beyond the know-how of using a specific modeling software. In one view, it starts with what the model is built for and ends with how to measure the goodness of the model constructed. Yet, there are many other significant challenges existing through the entire model-building procedure.

These challenges include but are not limited to: 1) understanding the business objectives of the modeling study; 2) understanding the key characteristics of the reservoir which have significant influences in achieving the objectives of the modeling study; 3) understanding the potential differences between an engineer's and a geologist's perception of what is a good model; 4) establishing appropriate modeling approaches and work flows to generate a model which captures the reservoir geology and also serves well for engineering purposes; 5) integrating different types of information in a coherent and practical method; 6) preparing and formatting the conditioning data which capture the key heterogeneities and support the modeling approaches suggested; 7) effectively and accurately implementing the modeling tasks; 8) evaluating the goodness of a model and the uncertainties associated with it.

The magnitudes of these challenges and the ways to overcome them vary from case to case. This talk reviews these challenges and the approaches to deal with them by presenting real-life modeling examples of different types of reservoirs. Emphasis is placed on reservoir property modeling and how to establish a robust work flow by utilizing different types of data and technologies available nowadays.