Incorporating Stratigraphic, Petrophysical and Fault Seal Uncertainties Through the Reservoir Characterization and Simulation Process

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During production it would be desirable to define the likely range in reservoir responses and fully integrate all aspects of the geological properties of the reservoir. This includes uncertainties in both the host reservoir and fault properties. Historically this has been difficult to achieve.

In this contribution we present new tools to better characterize and integrate geologically based fault seal predictions into reservoir simulation models. Robust fault seal prediction is intimately linked to the petrophysical and stratigraphic properties. Multiple different stratigraphic and petrophysical models are routinely developed for a reservoir, but these are rarely tightly linked to the range of possible fault properties. By developing core-calibrated fault seal prediction techniques within Petrel™ we can seamlessly integrate the fault seal prediction process into existing stratigraphic and petrophysical property population workflows.

This extended workflow is quick to design and run. Through the use of this approach many potentially valid scenarios are produced, however simulator limitations often mean that running all of these scenarios is impractical. To address this problem we have developed additional tools that help predict the likely flow response from static data, without the need for simulation and also aid comparison of the numerous different geological scenarios. This enables rapid identification of the influential geological parameters which will control the flow response and therefore the key models which should be sent forward for simulation. The likely range in flow models can be more effectively and efficiently defined then simulated, which should lead to better management of resources.