Integrated Reservoir Characterization - Circular not Linear.

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ABSTRACT
This presentation describes 'an integrated workflow' which revolves around a 'shared earth model' as the essential component.

Traditionally, the reservoir characterization workflow follows a sequential or linear pattern. The seismic interpreter picks tops and faults to generate a structural framework, which is then passed on to the reservoir geologist who produces geologically correct reservoir layering. The petrophysicist then populates these layers with petrophysical properties for the geologist to produce a hydrocarbon pore volume map. The hydrocarbon pore volume is then passed on to the reservoir engineer who then scales-up the geological layers to produce a reservoir simulation.

With the advent of increased computing power and powerful new software, companies are applying a completely different workflow to the process of reservoir characterization. The 'new' approach follows a more circular or iterative process, which by its nature, is far more integrated. The geophysicists - who need more accurate time-depth conversions and algorithms to predict petrophysical properties directly from seismic volumes - to the geologists - who need accurate prediction of 'petrofacies' from logs and core to populate uncored wells in a field and facilitate better correlation of the interwell space in the earth model. Then, the role of the petrophysical practitioner to integrate all data – not just logs, with the goal of reducing risk or uncertainty in the in-place hydrocarbon calculation. The next link in the circle requires the characterization team to work with the reservoir engineers for reserves and reservoir simulation.

Once established, near real-time updates of the shared earth model are possible using new well data, new geoscience hypotheses and new petrophysical parameters - which can then be readily simulated to corroborate their validity. Further, the shared earth model can be used as a reservoir planning tool, where drilling engineers can interact with the reservoir characterization team to add value by optimizing well trajectories and drilling costs.