

## **The Challenge of the Deep HPHT Exploration**

**J. Matthew (ConocoPhillips)**

Exploration growth in the North Sea, and elsewhere in the world, increasingly relies on targeting deeper prospects than have previously been drilled. In the North Sea there are a number of prospects that industry and ConocoPhillips have drilled, and are planning to drill in the future targeting both Jurassic and Triassic clastic reservoirs at approximately 6km depth.

These prospects are pushing the envelope of high pressure and high temperature drilling and logging technology. As drilling costs make up a very large part of the development cost of deep HPHT fields, HC recovery per well or drainage area, and reducing well cost, are paramount to improving the economics of this play.

Porosity and permeability preservation is a critical risk at deep burial depths. Porosity degradation with increasing depth due to compaction may reduce reservoir connectivity and can lead to reduced recovery factors compared to shallower fields.

At depths of 5km or more it is likely that cataclastic faults seal due to the effects of quartz cementation increasing capillary entry pressures. The implications problematical than shallower reservoirs when it comes to development.