

Seal Capacity and Trap Risking: A North Sea Case Study

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Seal breach and trap risking involves knowledge of reservoir fluids, their pressures and the fracture strength of the seal and reservoir rocks. Fluid pressure measurements and Leak Off Test data from 141 wells in the Central North Sea HPHT area were analysed to assess top reservoir seal capacity of the Upper Jurassic shoreface sandstones. Algorithms for both fracture gradient and lithostatic stress show a cross over at approximately 3.8 km, when LOT data consistently include values in excess of the lithostatic stress.

Analysis of the distribution of dry holes and hydrocarbon discoveries at top reservoir fails to show a clear relationship with estimated seal capacity. Analysis of seal capacity at shallower stratigraphic horizons above top reservoir, however, a more consistent relationship suggesting that top reservoir is not the controlling lithology in relation to seal integrity in this region.