Deepwater Deposits: the final frontier?

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2004 CSEG National Convention

Modern deep-water settings arguably constitute the final petroleum exploration frontier. Advancing drilling technology and enhanced seismic resolution of deeply buried exploration targets have resulted in lowered costs, the ability to drill in progressively deeper water, lowered risk, and shortened cycle time. Over the past decade, exploration activities in ultra-deep waters have increased dramatically and the economics of exploration have improved commensurately. A key to the improved economics is decreased cycle time and lowered risk. Much of this is attributable to the vastly improved quality and lowered cost of 3-D seismic data.

The deep-water depositional environment until recently has been an especially difficult exploration target as a result of the fact that deep-water deposits have been poorly understood. With the advent of widely available high-quality 3-D seismic data reservoir targets can now be imaged with greater precision and accuracy. New exploration models are emerging that can explain the presence of coarse-grained potential reservoir sandstones deposited many 100's of kilometers offshore. A quantum leap in risk reduction with regard to prediction of reservoir, reservoir compartmentalization, and stratigraphic trapping potential has resulted from the integration of seismic stratigraphy and seismic geomorphology. Numerous examples of imaged deep-water depositional elements will be presented within the context of overall deep-water depositional systems. These elements include primary sand habitats such as slope channels, basin floor channels, frontal splays and crevasse splays as well as elements that contain lesser amounts of sand such as levees, sediment waves, and distal overbank deposits. Debrite deposits comprise another type of deposit that are common in the deep-water environment, but have poor reservoir properties.