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## **Integrated Stratigraphic-Geopressure Fairway Trends: A Fast Track to Boost Success in Semi-Mature Basins — A Case History from the Gulf of Mexico**

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### **ABSTRACT**

The new concept of integrating stratigraphy and geopressure compartmentalization is a comprehensive risk assessment method and a fast track to success when used in semi-mature basins, where infrastructure is abundant.

Stratigraphy, including depositional environment, impacts the spatial distribution of sand (reservoirs) and shale (seals). The optimum depositional environment for hydrocarbon trapping, especially in faulted structural closures, lies in the transition zone between the middle and outer shelf. In this zone, the sand to shale ratio is conducive to sealing of juxtaposed fault surfaces.

Geopressure differential plays a principle role in determining migration of hydrocarbons from deeper source rocks and carrier beds to the shallower ones. The subsurface pressure profile is usually divided into two main zones, namely the lower geopressed and the upper hydrostatic. The transition zone between the two zones is the major recipient of upward migrating hydrocarbons.

In semi-mature basins such as the Gulf of Mexico, well logs and paleontological, production, drilling and test data can be integrated in a data base. The High Island – Galveston areas were used for a pilot study to test this concept. Stratigraphy and geopressure trends were mapped for the different lower-middle Miocene units. Producing, potential pay and reservoirs trends were found to be clearly following the most favorable trends, where depositional environment and geopressure gradient result in favorable reservoir characteristics and effective seals. This new method confirms the belief that 70% of hydrocarbons accessible without trouble are perched around the geopressure transition zone. Therefore, risk of future prospective endeavors can be substantially reduced by tracking the optimum strat-geopressure fairways.