
Application of New Seismic Interpretation Techniques in the Exploration of Louisiana Coastal and Shelf Areas

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ABSTRACT

Regional studies indicate that the Louisiana coastal and shelf areas have significant remaining economic potential. The productive sand zones are typically stacked and distributed vertically from 2,000 feet to 22,000 feet depth. This productive section is divided vertically into two distinct domains. The shallower section is characterized by little structural deformation and highstand coastal-shelf sediments whereas the deeper section is characterized by strong structural deformation and lowstand slope sands. These deep plays are analogous in many respects to the stratigraphically younger deep-water plays in the present-day Gulf of Mexico, which have been the recent exploration focus of the industry.

The deep section below 15,000 feet contains the major remaining potential and should be the focus of future exploration, but due to complex fault systems, subtle salt bodies, highly variable lowstand sand distribution, and over-pressured formations, exploitation of the high potential deep zones is associated with high risk. Exploration success can be greatly improved by taking advantage of the available 3-D seismic and new seismic interpretation technologies. Multiple-attribute seismic classification, calibrated to well data, helps to identify low-risk hydrocarbon-bearing targets. Artificial intelligence fault surface extraction techniques result in a greater level of fault detail interpretation. Variance and spectral decomposition techniques can reveal many previously unrecognized subtle structural and depositional features. Integration of the application of advanced seismic interpretation techniques with regional geological and production studies can optimize target identification and delineation in the process of regional screening, asset evaluation, and prospect generation.