SG07
Geology and Prospectivity in the Deep Water Columbus Basin

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Abstract

In 1998, 3D seismic was acquired over Block 25 (a) in the deepwater acreage of Trinidad and Tobago. The Block is located 80 km east of Trinidad, in water depths ranging from 750m to 1350m. 3D seismic interpretation has revealed features that are important to the geological understanding of the deepwater Columbus Basin.

Pleistocene sediments in Block 25a are largely unfaulted but have been deformed by shale diapirism, probably in response to rapid deposition on older deepwater shales. Pre-existing deep-seated faults appear to have facilitated diapir intrusion. Two (2) mini basins are interpreted in the Block, the older 'Vivaldi' mini-basin to the east, and the more recent 'Mozart' mini-basin in the west. The flanks of the mini-basins are intruded by shale ridges and piercing shale diapirs, which form large potential truncation traps. A small 4-way dip closure and stratigraphic trap potential also exist.

Reservoirs are predominantly Pleistocene turbidites deposited under bathyal conditions. Turbidite channel - levee complexes clearly expressed on 3D and digital seismic are oriented predominantly from southwest to northeast, implying an Orinoco Delta source. Sands are predicted to occur in turbidite channels, levees, unconfined overbank fans, and as ponded deposits confined by the flanks of the mini-basins.

Thick intra-formational deepwater shale or mud forms good seals. Seismic hydrocarbon indicators include flat spots and amplitude anomalies, several of which conform to structure. Hydrocarbon charge is assumed to be derived from the Cretaceous Naparima Hill shale. Migration is assumed to have occurred along deep-seated faults and along the flanks of the shale diapirs.
Excellent potential exists for significant hydrocarbon accumulations in Block 25a. The main challenge is to find hydrocarbons of sufficient volume and value to justify the operation cost and contract terms in the deepwater Columbus Basin.

Manuscript Not Submitted