Exploration in an Upper Slope Setting, Columbus Basin, Trinidad and Tobago


This paper was prepared for presentation at the GSTT 2000 SPE Conference held in Port of Spain, Trinidad 10-13 July 2000. It was selected for presentation by a Technical Committee following review of the information contained in an abstract submitted by the author(s). Contents of the paper, as presented, have not been reviewed by this Technical Committee and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the Technical Committee, Geological Society of Trinidad and Tobago, Society of Petroleum Engineers, its officers, or members. Copies of papers should contain conspicuous acknowledgement of where and by whom the paper was presented.

Abstract
Recent exploration efforts in Block 5b targeted amplitude anomalies associated with upper slope channel complexes of the early Pleistocene. Synthesis of 3-D seismic, sparse deep-water well penetrations (wireline logs, biostrat, sidewall cores), and a regional stratigraphic/structural framework derived from an extensive shelf data set and 2-D seismic in deepwater, were used to establish the overall depositional setting and detailed stratigraphic framework. Drilling results re-emphasize the high reservoir risk inherent to exploration in an upper slope setting, as has been the experience in other successful deepwater basins.

The tested section in Block 5b was located some 10 to 30 km east of the proto-Orinoco shelf-edge delta in a proximal upper slope setting. The wells the targeted complex channel fill facies within two well defined, stacked sediment transport fairways. These northeast trending fairways are defined by broad, basal scour surfaces that separate complex cut-and-fill deposits from adjacent low amplitude conformable slope deposits. The gross architecture of both fairways is similar: a large basal mass transport complex (MTC), overlain by channel facies. The MTC’s comprise slumps and shaly debris flows represented by low amplitude chaotic and noisy reflection data. Turbidite channel facies are more continuous, moderate to high amplitude single cycle events which have straight to sinuous patterns in map view. Detailed mapping of the channel facies reveals a very complex architecture, with numerous levels of scour surfaces, smaller scale MTC’s and channel fill.

Rapid sedimentation resulted in over-steepening, instability and failure of the shelf edge delta. Although canyons did not develop, the initial evacuation and associated downdip basal MTC deposit set up topography that captured and funneled subsequent gravity flows and turbidites into deepwater. However, as drilling results show, this region is one of mainly sand bypass, and suggest that better reservoir development can be expected in more distal depositional settings.

Manuscript Not Submitted