

A STRUCTURAL INTERPRETATION OF THE PENAL / BARRACKPORE / MANDINGO FOLD FORM - IMPLICATIONS FOR HYDROCARBON EXPLOITATION

Inniss, F.

Petroleum Company of Trinidad & Tobago Limited, Pointe-a-Pierre, Trinidad

ABSTRACT

Along the Penal/Barrackpore/Mandingo structure the primary risk in hydrocarbon exploitation lies in identifying the structural traps above the Eocene detachment level. Complexity of structuring, especially at the deeper horizons, coupled with the fact that available seismic data quality is generally poor, has led to model-driven seismic interpretations for the identification of prospects at the deeper and older horizons. This paper attempts to deal with some of these structural elements by the integration of all the available data such as well logs, surface geology, stratigraphy and to a large extent, paleontology. From this data set structural maps and cross-sections have been constructed using "thin-skinned" deformation models.

The results show that the Penal/Barrackpore/Mandingo structure resulted from stacking of imbricates detached within the Eocene to form a duplex. This structure was subsequently deformed by the emplacement below of a Cretaceous-involved fault-bend fold which resulted in highly folded thrust faults and overturning of the southward verging imbricate stack duplex. The roughly northeast to southwest trending thrust faults are now thought to be primarily responsible for fluid relationships observed in wells along the trend, and not the northwest to southeast trending normal faults as previously believed. The recognition of this type of fault and fold geometry has helped to alleviate the uncertainty of predicting sub-surface structural form, stratigraphy and timing and has led to the identification of prospective areas which were once overlooked and which in turn may lead to renewed exploration efforts.