
South Whale Basin: renewed hopes for a hybrid basin

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The South Whale Basin, an Atlantic rifted area situated mostly in shallow water in the southern part of Grand Banks and close to the Newfoundland Transfer Zone, is one of the recently revived exploration areas situated offshore Newfoundland and Labrador. On trend and close to petroliferous proven Sable Sub-basin and Jeanne d'Arc Basin, the South Whale Basin was drilled without success during the sixty, seventies and eighties. The 5 to 8 km deep basin is incised on the Grand Bank's Avalon and probably Meguma terranes and contains synrift sediments of Scotian Shelf affiliation. The basin was drastically affected by erosion during the Late Cretaceous and Early Tertiary and has a shallow Tertiary sedimentary cover. Its structure is dominated by spectacular salt diapirs and ridges and intervening sink-synclines.

The South Whale Basin is a hybrid basin that evolved initially as an early rifted area on the North American Margin and underwent significant tectonic subsidence within the Thethys rift system, including the accumulation of considerable amount of salt. At the end of the Thethys phase the basin failed as a rift and was later modified along a major transform zone. During the Late Triassic-Early Jurassic and Late Jurassic-Early Cretaceous the basin was interconnected to the other rift basins of the system including the adjacent Scotian Shelf and Slope areas. The favorite oil play off the early exploration efforts in the basin was the salt anticline, drilled generally crestal and at shallow depths but with no success. Repeated dry wells brought an early condemnation of the basin for lack of oil source rock and breaching of the traps at the Avalon (Base Aptian) Unconformity level. Basin re-mapping projects using newly acquired seismic data and re-evaluation of potential plays with focus in the inter-salt

domains or on the slope has brought back several operators into the area.

The petroleum system of the South Whale Basin should include: a) ponded Kimmeridgian (Verrill Canyon and/or Egret shales) source rock in the sink-synclines and probably Albian source rocks on the slope; b) Late Jurassic (Mic Mac sandstones and Abenaki carbonates) and Early Cretaceous (Logan Canyon) reservoirs; c) large fault bounded roll-over anticlines and rotated fault blocks within deeper synclines and possibly sand-rich fans on the slope and d) source maturation, generation and short distance migration of oil and gas from a few existing ponds with mapped Kimmeridgian rocks into existing antiforms or sand-rich fans. The future of the exploration in the basin is to be decided this year (2004) by an exploration well scheduled to be drilled by Husky Energy over the Lewis Hill prospect.