

Mapping of Key Geological Markers In the Jeanne d'Arc Basin Based on 3-D Seismic

Judith McIntyre*, Neil DeSilva, Tim Thompson
Canada Newfoundland Offshore Petroleum Board
140 Water St., St. John's, NL A1 C 2W3
jmcintyre@cnopb.nf.ca

ABSTRACT

In the mid 1990s, advances in 3-D seismic data acquisition, that reduced the cost of acquiring large volumes of data, led to a dramatic increase in the number of kilometres of 3-D data recorded in the Newfoundland and Labrador offshore area. Authorization, granted by the Canada-Newfoundland Offshore Petroleum Board, is required to record any seismic data in the area. Data collected exclusively for one operator under an authorization is held confidential for five years following completion of the program while non-exclusive data, which is available for purchase by any interested party, is held confidential for ten years. Following these time periods the data, and any interpretative reports based on the data, are made publicly available. Exclusive 3-D programs, recorded in 1997 and 1998, which covered most of the Jeanne d'Arc basin, are now released.

Over 3,000 sq. km. of industry 3-D seismic data, have been interpreted and merged to show the superimposition of the tectonic expressions of the last two rift stages that affected the Grand Banks of Newfoundland. Evidence of changing palaeo-drainage patterns is also seen. A late Jurassic/early Cretaceous northerly trending system deposited the fluvial reservoir unit for the Terra Nova oil field, while in the Tertiary an easterly trending system deposited submarine fans, which now contain hydrocarbons in such fields as Mara and Springdale.

The northwards opening of the northern Atlantic Ocean separated the Grand Banks of Newfoundland from the Iberian Peninsula in late Jurassic - early Cretaceous. This was the second rift phase to affect the Banks and resulted in a strong north-south overprint on the original northeast-southwest fabric of the initial basins. The third and final rifting phase to affect the Banks, also related to the opening of the Atlantic, started in mid-Cretaceous when the British Isles separated from the Grand Banks and the Labrador rift opened.

Exploration in the Jeanne d'Arc basin and on the adjacent Ridge Complex has yielded approximately 20 significant hydrocarbon discoveries. The largest of these are the Hibernia and Terra Nova oilfields, with estimated reserves of 884 million barrels and 406 million barrels respectively.