

New Geoscience Data and Interpretation of the Region Around Bjarni/North Bjarni Field, Hopedale Basin

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The Labrador shelf and slope is divided by the Okak Arch into two large basins, the Saglek Basin and the Hopedale Basin. The Hopedale Basin is the most southern basin and extends from the Cartwright Transfer Fault Zone (CTFZ) in the south to the Okak Arch in the North; a distance of approximately 500 kilometers from 55° to 59° North. It is part of a large, oval, tectonic depression having an area of about 175 000 square kilometers with an uneven basement floor consisting of stretched continental crust, exhumed continental mantle (transitional crust) and subsided oceanic crust which serves as a connection between the Atlantic and Arctic Ocean basins.

A recent seismic grid collected by Geophysical Service Incorporated (GSI) during 2003, 2004 and 2005 has produced a regional 2D seismic coverage adequately covering this vast area that contains the giant Bjarni/North Bjarni gas field. These speculative seismic lines were graciously donated to Memorial University of Newfoundland to be used for regional tectonic, structural and seismic stratigraphic mapping which will result in added insight into the Hopedale Basin's petroleum systems.

During this research, several seismic sequences were defined, correlated to well information and mapped throughout the area surrounding the Bjarni/North Bjarni field. Our study indicates a widespread Bjarni Formation that was deposited in a large rifted area and contains the basin's main reservoir. This reservoir presently extends beyond the shelf and into the outer slope region. This new interpretation increases the probability that there are still many undrilled prospects on the shelf and even on the slope.

On the basis of seismic character observed on lines that extend into deepwater, it is apparent that there was significant amount of post-rift mantle exhumation in the Labrador Sea expressed as serpentinized peridotite ridges. Pre-drift and syn-drift lava flows are observed beyond the transitional crust. Seaward, true oceanic crust is identified on some long lines. Thick syn-drift and post-drift sediments overlie this oceanic crust.

Currently there is minor exploration interest in the Hopedale Basin due to its remote location and its vulnerability to natural hazards including high frequency of icebergs, long-lasting pack ice and

variable weather. These natural hazards have resulted in no exploration drilling or landsales in the basin for over 25 years even though it has already been proven to hold over 4.2 Tcf of gas. Hopefully, increasing demand for gas, high commodity prices, new drilling and production technologies and new seismic surveys supplemented by hydrocarbon detection methods (AVO, LMR, CEMS, etc.) will encourage companies to develop the existing discoveries and explore for new ones.