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NEW GEOSCIENCE POINTS TO THE POTENTIAL OF BENT HORN LANDS

Results from Canada's GeoMapping for Energy and Minerals (GEM) program provide a fresh look at the Bent Horn oil field and the southern margin of the Sverdrup Basin in the Canadian High Arctic. These studies, listed below, shed new light on the source rock for the Bent Horn oil and on the structure and matrix porosity of the reservoir.

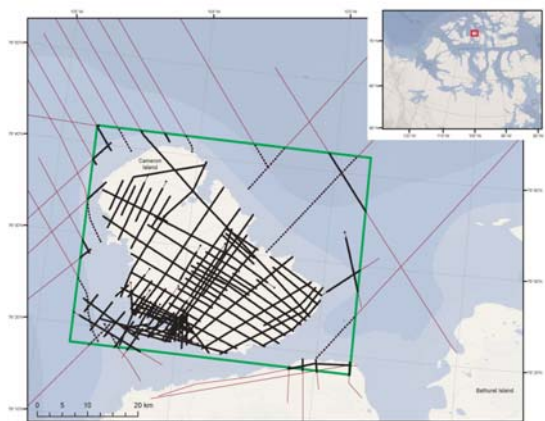
The Bent Horn oil field was discovered in 1974 and produced a total of 4.5×10^5 m³ or 2.8 million barrels between 1985 and 1996. The field was abandoned before being fully depleted. The reservoir is in the Devonian Blue Fiord Formation, a reefal limestone and is located in thrust fault slices in the upper part of an isolated, reef-rimmed carbonate bank. A detailed core study providing new insight into the rock matrix properties and paleo-environments of deposition is published in Wendte, 2012¹.

The Bent Horn oil was produced from partially opened fractures within the limestone, representing porosities between 1 and 3%. The oil produced from this field is a waxy light crude (43° API). Oil production was from late-formed open fractures related to thrust faults. Based on biomarker analyses, maturity and stratigraphic and geographic proximity to the Bent Horn oil field, the Silurian Cape Phillips Formation appears to be the most likely source rock for the hydrocarbons at Bent Horn (Dewing et al. 2009² and Obermajer et al., 2010³).

The fractured nature of the reservoir and the complex structure of the field challenged the original development of this resource and estimation of recoverable oil. Duchesne et al., 2012⁴ demonstrate that seismic reprocessing of data can improve imaging of the faulted structure. Improved understanding of the geology and new drilling reservoir stimulation techniques warrant the reexamination of this field.



◆ Wells on Cameron Island
Source: PEMT



— Seismic Lines on Cameron Island
Source: National Energy Board

Geoscience and related information on the Bent Horn lands are readily available on the web:

- Location of wells and summary information can be viewed using the Petroleum and Environment Management Tool (PEMT): www.aadnc-aandc.gc.ca/eng/1100100036632
- Well Formation tops are available from the National Energy Board: www.neb-one.gc.ca/clf-nsi/rthnb/nrthfshs/pblctnrprt/tblfrmtntp-eng.html
- Geological and Geophysical reports released by the National Energy Board: Frontier Lands: released information: www.neb-one.gc.ca/clf-nsi/rthnb/nrthfshs/pblctnrprt/fmtrlnsrlsdnf2005-eng.pdf
- GEM summary of results, Sverdrup Sedimentary Basin, Arctic Islands: www.nrcan.gc.ca/earth-sciences/about/current-program/geomapping/energy/7481
- Listing of Geological Survey publications; Geoscan: geoscan.ess.nrcan.gc.ca/geoscan-index.html
- Seismic covering the Bent Horn field and surrounds may be accessed through the Frontier Information Office at the NEB in Calgary. Some 129 lines were acquired over the period 1973 to 1979, under nine industry seismic programs listed as released frontier information. www.neb-one.gc.ca/clf-nsi/rthnb/nrthfshs/fmtrlnfimtntf-eng.html

Visit our website for more information on the resource management regime:
www.aadnc-aandc.gc.ca/nth/oq/index-eng.asp

1 Wendte, J. C., 2012. Core, petrographic, and rock petrophysical evaluation of the Blue Fiord Formation from wells in the Canadian Arctic Islands, Geological Survey of Canada, Open File 6984.

2 Dewing, K. and M. Obermajer., 2009. Lower Paleozoic Thermal Maturity and Hydrocarbon Potential of the Canadian Arctic Archipelago, Bulletin of Canadian Petroleum Geology, Vol. 57, no. 2.

3 Obermajer, M., Dewing, K. and M.G. Fowler, 2010. Geochemistry of crude oil from Bent Horn field (Canadian Arctic Archipelago) and its possible Paleozoic origin, Organic Geochemistry, Vol. 41, issue 9.

4 Duchesne, M. J., Claprod, M. and E. Gloaguen, 2012. Improving seismic velocity estimation for 2D poststack time migration of regional seismic data using kriging with an external drift, The Leading Edge, Vol. 31, no. 2.