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GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

GSC Open File 4572 (sheet 2 of 2)

EAST COAST BASIN ATLAS SERIES
GRAND BANKS OF NEWFOUNDLAND
HYDROCARBONS II

HYDROCARBON PROSPECTS AND FIELDS 2

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Additional copies of this map sheet may be obtained from the Geological Survey of Canada (Atlantic), P.O. Box 1006, Dartmouth, Nova Scotia, B2Y 4A2, Canada.
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The Fortune structure (Fig. 13), also on the eastern basin margin, is a relatively simple, tilted fault block, bound to the east by a major N-S to NE-SW-trending fault. Seismic and well data indicate fault growth during both the Tithonian to early Valanginian and Aptian/Albian times.

The two discoveries on the Ridge are at Trave and South Tempest. The Central Ridge, which bounds the Jeanne d'Arc Basin to the east, is a high-standing feature with a multitude of fault blocks and salt cored anticlines. This ridge initiated as a low amplitude feature in the Late Jurassic to early Valanginian but was greatly uplifted and fractured in the Aptian to Albian (Sinclair, 1998). The Trave structure (Fig. 16), located along the western margin of the ridge is a southeast-tilted and truncated fault block capped by Tertiary shales. South Tempest (Fig. 12), located on the north plunge of the Central Ridge, is a series of tilted fault blocks, defined by a series of NE-SW trending faults which intersect with a NW-SE trending fault.

The North Dana (Fig. 15) structure at the eastern end of the Ragnar Trough is a structural low separating the Central Ridge from the North Central Ridge which is a tilted and truncated salt-cored anticline and fault block bound by normal faults on three sides. The history of the structure is similar to that of the Central Ridge.

Hydrocarbons are trapped in most of these discoveries by abutment of reservoirs against shales and limestones across bounding faults. The Terra Nova and Trave discoveries have an additional stratigraphic trapping component, with reservoir pinch-out against the southern margin in Terra Nova. In Trave the subcrop of the reservoir to impermeable Tertiary cap rocks provides the trapping mechanism. In the WhiteRose structure, Nautilus Formation shales overlying domed Ben Nevis Formation reservoirs trap hydrocarbons. The Mara discovery is strictly a stratigraphic trap of areally restricted sandstones encased in Tertiary shales. These examples underscore the importance of the stratigraphic component of trapping involved in the Jeanne d'Arc basin.

Note that Adolphus (Fig. 17) is classified as an oil show and is included to show its structural style.

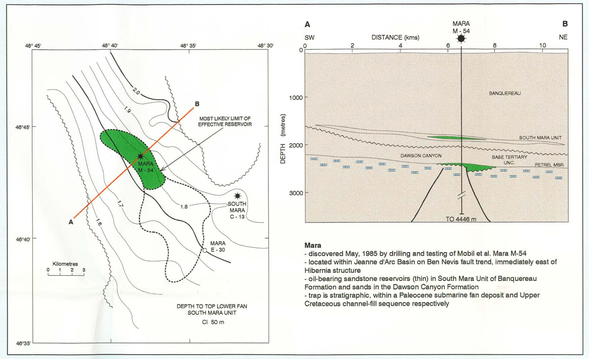


Figure 8

Mara
- discovered May, 1985 by drilling and testing of Mobil et al. Mara M-54
- located within Jeanne d'Arc Basin on Ben Nevis fault trend, immediately east of Hibernia structure
- oil-bearing sandstone reservoirs (thin) in South Mara Unit of Banquereau Formation and sands in the Dawson Canyon Formation
- trap is stratigraphic, within a Paleocene submarine fan deposit and Upper Cretaceous channel-fill sequence respectively

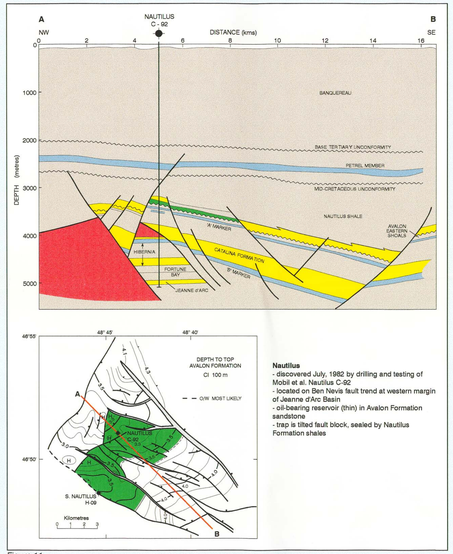


Figure 11

Nautilus
- discovered July, 1982 by drilling and testing of Mobil et al. Nautilus C-92
- located on Ben Nevis fault trend at western margin of Jeanne d'Arc Basin
- oil-bearing reservoir (thin) in Avalon Formation sandstone
- trap is tilted fault block, sealed by Nautilus Formation shales

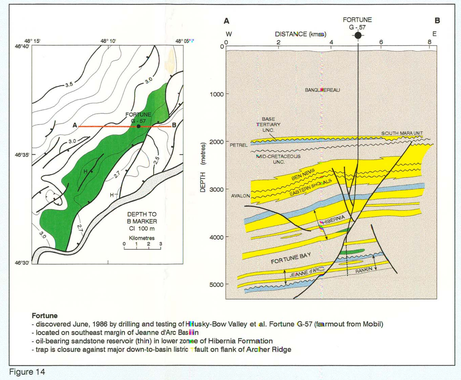


Figure 14

Fortune
- discovered June, 1986 by drilling and testing of Husky-Bow Valley et al. Fortune G-57 (tiarmout from Mobil)
- located on southeast margin of Jeanne d'Arc Basin
- oil-bearing sandstone reservoir (thin) in lower zone of Hibernia Formation
- trap is closure against major down-to-basin listric fault on flank of Archer Ridge

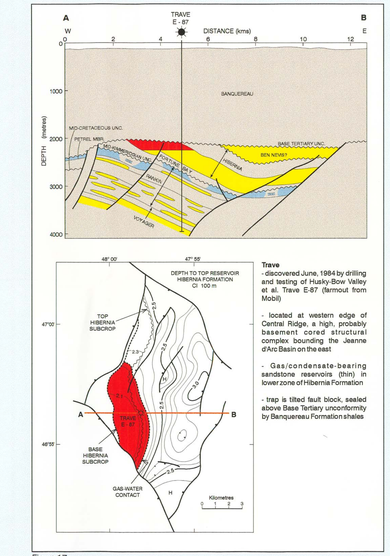


Figure 17

Trave
- discovered June, 1984 by drilling and testing of Husky-Bow Valley et al. Trave E-87 (farmout from Mobil)
- located at western edge of Central Ridge, a high, probably basement cored structural complex bounding the Jeanne d'Arc Basin on the east
- Gas/condensate-bearing sandstone reservoirs (thin) in lower zone of Hibernia Formation
- trap is tilted fault block, sealed above Base Tertiary unconformity by Banquereau Formation shales

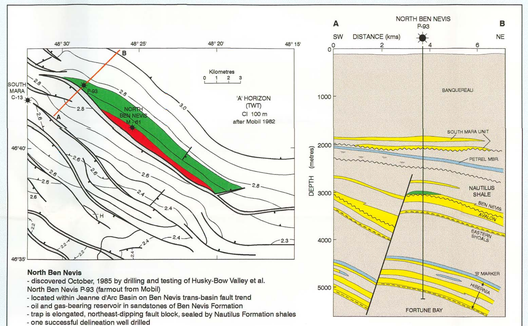


Figure 9

North Ben Nevis
- discovered October, 1985 by drilling and testing of Husky-Bow Valley et al. North Ben Nevis P-93 (farmout from Mobil)
- located within Jeanne d'Arc Basin on Ben Nevis trans-basin fault trend
- oil and gas-bearing reservoir in sandstones of Ben Nevis Formation
- trap is elongated, northeast-dipping fault block, sealed by Nautilus Formation shales
- one successful delineation well drilled

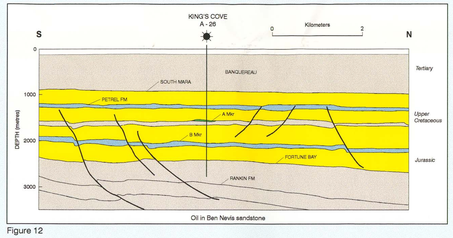


Figure 12

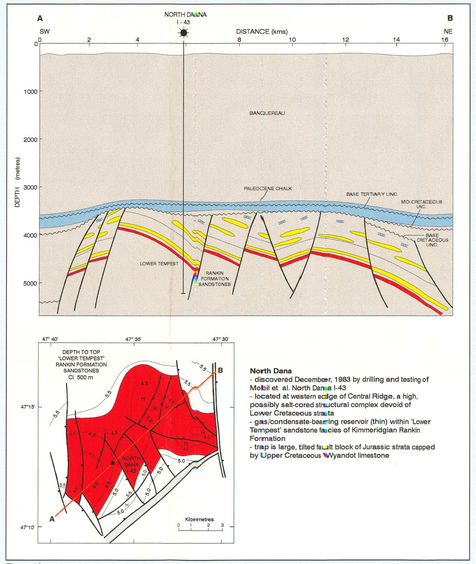


Figure 15

South Mara
- discover October, 1984 by drilling and testing of Mobil et al. South Mara C-13
- located within Jeanne d'Arc Basin on Ben Nevis trans-basin fault trend
- oil and gas-bearing reservoir in Ben Nevis Formation sandstones
- trap is elongated, northeast-dipping fault block, sealed by Nautilus

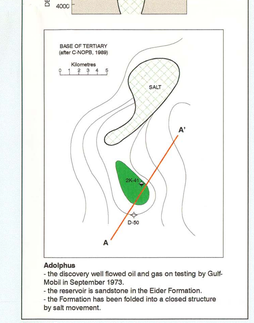


Figure 18

Adolphus
- the discovery well flowed oil and gas on testing by Gulf-Mobil in September 1973.
- the reservoir is sandstone in the Elder Formation.
- the Formation has been folded into a closed structure by salt movement.

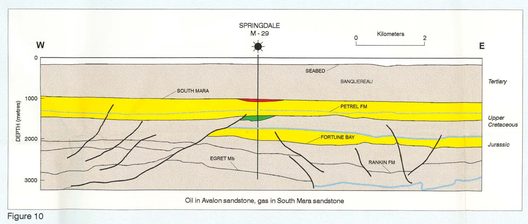


Figure 10

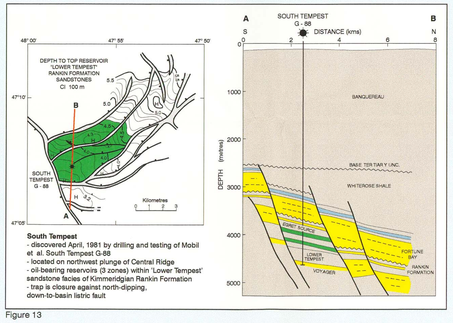
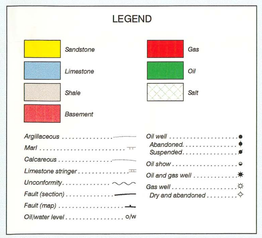


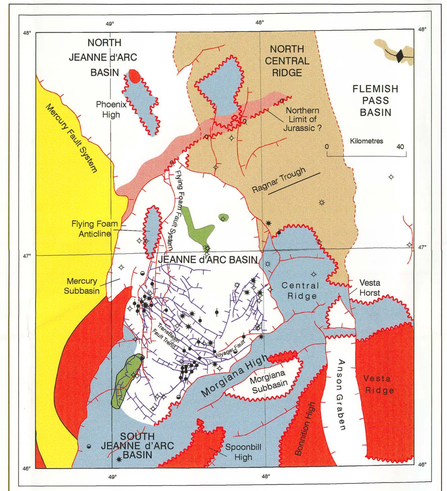
Figure 13

South Tempest
- discovered April, 1981 by drilling and testing of Mobil et al. South Tempest G-88
- located on northwest plunge of Central Ridge
- oil-bearing reservoirs (3 zones) within 'Lower Tempest' sandstone facies of Kimmeridgian Rankin Formation
- trap is closure against north-dipping, down-to-basin listric fault

Figure 16

North Dana
- discovered December, 1983 by drilling and testing of Mobil et al. North Dana I-43
- located at western edge of Central Ridge, a high, possibly salt-cored structural complex devoid of Lower Cretaceous strata
- gas/condensate-bearing reservoir (thin) within 'Lower Tempest' sandstone facies of Kimmeridgian Rankin Formation
- trap is large, tilted fault block of Jurassic strata capped by Upper Cretaceous Wyandot limestone





LEGEND

- Area of truncated Jurassic
- Jurassic sediments absent or thin
- Carboniferous basins on the Bonavista Platform
- Major salt structures
- Paleozoic ridges
- Shallow Paleozoic basement highs and ridges

Basement involved faults (defined, approximate)
Intra-basin faults (defined, approximate)
Synclinal axes
Basin edge, unconformable
Basin outline (defined, approximate)
Magnetic Anomaly

WELL SYMBOLS

- Oil
- Gas
- Gas and oil
- Dry and abandoned
- Potential oil and gas
- Suspended oil well

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