
**Hydrocarbon systems in the Paleozoic of northern
New Brunswick: are all the elements there?**

D. LAVOIE

*Geological Survey of Canada (Quebec), Quebec City,
QC, G1K 9A9 <delavoie@nrcan.gc.ca>*

Since 1999, fundamental and hydrocarbon-oriented research by the Geological Survey of Canada and the New Brunswick Geological Surveys Branch has generated data that serve as the cornerstone for new exploration activities in northern New Brunswick.

Source rock: maturation – generation – migration: Rock-Eval analysis identified potential hydrocarbon source rocks in the Paleozoic succession of northern New Brunswick and adjacent southern Gaspé: Middle Ordovician oceanic black shale (TOC: 10.7%; Mictaw Group and Popelogan Formation), Upper Ordovician successor basin shale (TOC: 1.4%; Garin Formation and Ritchie Brook Member of the Boland Brook Formation) and Lower Devonian coals (Val d'Amour and Campbellton formations). GC-MS and GC-IRMS analyses were done in order to link potential source rocks with recently produced oils in nearby Gaspé. Oil in Lower Devonian reservoirs in Gaspé can be tied with either Middle or Upper Ordovician black shales.

Recent maturation studies provided a regional framework that clearly supports the prospectivity of large segments of northern New Brunswick, in particular the northeastern sector, where field samples are within the oil window. This domain is surrounded by an even larger area within the condensate to gas zones. The regional variation of the maturation data documents three major tectonic blocks that were active in Silurian time. The detailed organic matter petrography has

documented the presence of migrabitumen in most of the sedimentary pile and that generation and migration occurred both vertically and laterally within individual tectonic blocks before the peak of the Salinic orogeny.

Reservoirs: clastics – carbonates: In the adjacent Gaspé Peninsula, small but economic accumulations of oil and gas are hosted in Devonian sandstones and hydrothermal dolomites. In eastern Gaspé Peninsula, oil occurs in sandstones of the Lower Devonian York River Formation. The sandstones of the Devonian Val d'Amour and Campbellton formations share some depositional characteristics with the producing Gaspé sandstones. The Devonian hydrothermal dolomite breccia in eastern Gaspé is host to natural gas (Galt field). Although these Devonian carbonates are absent in northern New Brunswick, recent research has documented the presence of bitumen-rich hydrothermal dolomites in the Lower Silurian La Vieille Formation. Moreover, work in progress on the Late Silurian reefal facies of the LaPlante Formation documents significant subaerial karst development as well as local hydrothermal imprint. The abundance of early faults in the hydrocarbon prospective area is strong evidence for the early formation of hydrothermal dolomite reservoirs.

Traps and seals: the missing data: The actual high level of exploration in adjacent Gaspé Peninsula is largely fuelled by the availability of modern seismic data (public and private) which were instrumental in documenting a number of shallow-to mid-level structural traps. Such seismic information is lacking in northern New Brunswick. However, field data clearly support the presence of Salinic and Acadian deformation in this area and both orogenic phases are involved in the development of sub-surface structural traps in adjacent southern Gaspé.