Resource Assessment of Oil and Gas Plays in Paleozoic Basins of Eastern Canada*

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Abstract

There are three major Paleozoic basins in eastern Canada:
- Cambrian-Ordovician St. Lawrence shallow marine platform and coeval deep water facies
- Silurian-Devonian shallow to deep marine Gaspé Belt
- Devonian-Permian terrestrial to shallow marine Maritimes Basin

The sedimentary successions are bounded by tectonically-generated unconformities - the Taconian unconformity separating Cambrian-Ordovician from Silurian-Devonian strata and the Acadian unconformity at the base of the late Devonian-Permian strata. Each basin contains unique source rock and reservoir units and specific trap types. All of the basins contain producing or discovered hydrocarbon fields but there has been no independent evaluation of their oil and gas resource potential.

Over the past five years the Geological Survey of Canada and its partners have acquired new hydrocarbon systems data, in preparation for a first regional hydrocarbon play assessment of Paleozoic strata in eastern Canada. A total of 16 conventional and 2 unconventional plays have been identified.

Seven conventional plays are recognized in Cambrian-Ordovician strata:
- Cambrian rift sandstones
- Lower Ordovician hydrothermal dolomite (HTD)
- carbonate thrust slices at the Appalachian structural front
Middle-Upper Ordovician HTD
passive margin slope clastics
foreland sandstones and carbonates
Quaternary sands

Six conventional plays are recognized in the Silurian-Devonian strata:

- Lower Silurian sandstones
- Lower Silurian HTD
- Upper Silurian HTD reefs
- lowermost Devonian HTD reefs
- Lower Devonian fractured carbonates
- Lower Devonian nearshore sandstones

Three conventional plays are recognized in Carboniferous strata:

- Lower Carboniferous sandstones
- Lower Carboniferous (Visean) carbonate reefs
- Upper Carboniferous sandstones and an unconventional coal bed methane play

Unconventional shale gas plays may occur in Cambro-Ordovician and/or Carboniferous strata.

Of the 16 conventional plays, 6 plays have enough production or exploration data to prepare quantitative estimates of resource potential:

- Lower Ordovician and Middle-Upper Ordovician HTD
- carbonate thrust slice
- Lower Devonian sandstone
- Lower and Upper Carboniferous sandstone

For each of the quantitative play assessments, we present play maps, parametric pool-size data, exploration risk factors, prospect numbers and estimates of in-place oil and gas resource potential.
References


