

Sandstone reservoir characteristics of the Upper Carboniferous in the central Maritimes Basin

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Reservations regarding the storage and productive capacity of reservoirs in the Carboniferous to Permian succession of the Maritimes Basin have discouraged exploration in this large, under-evaluated basin. Using a revised stratigraphic framework emerging from PERD-supported work in progress at the GSC-Atlantic, we have documented the characteristics of sandstone reservoirs, with an initial focus on those in the Westphalian to Permian succession of the Gulf of St. Lawrence, traditionally assigned to the Pictou Group. This forms the basis of ongoing diagenetic studies aimed to quantify reservoir risk.

Core measurements within the Central Maritimes Basin are sparse. However, compiled regional data suggest that the

Green Gables Formation has the highest overall reservoir quality (porosities of 1.5-10.5%, median of 8.7% and permeabilities of 0-1.45mD, median of 0.28mD). Within the Bradelle and Cable Head formations porosities range between 0.4 to 9.7% (median 5.8%), permeabilities range between 0.01 to 1.41mD (median 0.04mD). Effective porosities estimated using wireline data are generally less than 10%. Over some intervals, however, median porosities range up to 15%. Although porosity tends to decrease with depth, localized variations in this trend suggest development of secondary porosity at depth. Upper Carboniferous clay mineral assemblages in the Maritimes Basin are typically a mixture of illite, chlorite, koalinite and mixed layer clays. Variability of

clay mineral assemblages might have a controlling effect on both primary and secondary porosity.

Internationally, Upper Carboniferous petroleum systems exhibit similar reservoir qualities and have proven reserves. For example, the Red Fork sandstone of the Anadarko Basin, USA, has an average porosity of 8 %, an average permeability

of 0.1mD and reserves of 250 million m³ of gas. The Slochteren sandstone of the Groningen Gas Field, North Sea, has proven gas reserves of 2.4×10^{12} m³ and porosities ranging between 10-25% and permeabilities between 0.1-1000mD. Maritimes Basin reservoirs therefore compare well with proven Carboniferous reservoirs elsewhere.