

Devonian Petroleum Systems in the Western Canada Sedimentary Basin (WCSB)

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The vast hydrocarbon reserves that occur within Devonian strata of the WCSB can be largely attributed to the occurrence of abundant mature, excellent to good quality Devonian source rocks. The Middle Devonian Elk Point Group contains several units with proven hydrocarbon potential in N.E. British Columbia, northern and east-central Alberta and in southern Saskatchewan. No hydrocarbons have been definitively linked to a Beaverhill Lake Group source rock but it is possible that such a unit is the source of some oils in northwest Alberta. The Late Devonian Woodbend Group contains the Duvernay Formation, the most prolific Devonian source rock in the Alberta Basin. Oils have been correlated to Winterburn Group source rocks within the Nisku Formation of east-central Alberta, Camrose Member/Nisku Formation of southern Alberta and the time-equivalent Birdbear Formation of southern Saskatchewan. The Bigoray Member of the Nisku Formation in west-central Alberta may be a minor contributor to hydrocarbons in the West Pembina area. The Wabamun Group contains no regionally extensive potential source rocks. Almost all the oil generated from Devonian source rocks appears to have remained within Devonian-aged reservoirs and very little is biodegraded. In contrast, where latest Devonian-earliest Mississippian-age Exshaw Formation sourced oil is found in Devonian reservoirs, such as within the Grosmont and Nisku formations in the vicinity of the Athabasca Mannville Group deposit, it tends to be biodegraded. This presentation will highlight areas where we believe there is still potential for economic reserves of oil and gas to be discovered within Devonian strata.