

Down the Pipeline Route: Play Fairways in the Central Mackenzie Valley and Eagle Plain

Alula Damte, P. Putnam, B.Davies* A. J. Madi and A. Kolisnik
Petrel Robertson Consulting Ltd., Calgary, AB
adamte@petrelrob.com

and

Grant Ward,
Ward Hydrodynamics Ltd.

ABSTRACT

A regional multi-disciplinary analysis of the Central Mackenzie Valley and Eagle Plain was undertaken to assess the hydrocarbon potential and map regional play fairways following the proposed northern pipeline route.

The lowermost Cambrian section unconformably overlies strongly deformed Proterozoic units and is represented by coarse-grained fluvial deposits which are directly succeeded by the development of sandy, tidally-influenced deposits. Although well control intersecting Cambrian beds is limited mainly to the eastern portions, one can anticipate Cambrian strata to extend throughout much of the study area.

The Ordovician-Middle-Upper Devonian targets are hosted within leached reefal deposits, karsted dolostones, and vuggy to sucrosic shelfal grainstones. A hydrothermal-related dolomitization (HTD) and karst is identified within the Ordovician Franklin Mountain and Lower Devonian Arnica Formations.

Permo-Carboniferous reservoirs in the Eagle Plain and Peel Plateau are characterized by locally developed conglomeratic deposits flanking paleotopographic highs. These coarse, fan delta deposits commonly form a 'halo' in close proximity to, and around, the source of sediment.

Analysis of the original DST charts and the pressure distributions resulted in the identification of 50 potentially by-passed zones as well as the positions of hydraulic lows. The Norman Wells Keescarp oil pool, by far the largest hydrocarbon discovery within the study area, is a hydraulically assisted, stratigraphic oil trap.

The study area is characterized by an abundance of mature potential source-rocks ranging in age from Precambrian to Cretaceous. With the exception of the Eagle Basin, where the onset of hydrocarbon generation for Canol and Road River formations may be in the Mississippian, 1D basin models indicate that generally, maturation occurred in mid-to -late Cretaceous time.